MASS COMMUNICATION SPECIALIST (MC)

Module 2

VISUAL INFORMATION BASIC TRAINING MANUAL

NAVEDTRA 15011
0504LP1107087

February 2011

Although the words "he," "him," and "his" are used sparingly in this course to enhance communication, they are not intended to be gender driven or to affront or discriminate against anyone.

Sailor's Creed

"I am a United States Sailor.

I will support and defend the Constitution of the United States of America and I will obey the orders of those appointed over me.

I represent the fighting spirit of the Navy and those who have gone before me to defend freedom and democracy around the world.

I proudly serve my country's Navy combat team with honor, courage and commitment.

I am committed to excellence and the fair treatment of all."

THE UNITED STATES NAVY

GUARDIAN OF OUR COUNTRY
The United States Navy is responsible for maintaining control of the sea and is a ready force on watch at home and overseas, capable of strong action to preserve the peace or of instant offensive action to win in war.
It is upon the maintenance of this control that our country's glorious future depends; the United States Navy exists to make it so.

WE SERVE WITH HONOR, COURAGE, AND COMMITMENT
Tradition, valor, and victory are the Navy's heritage from the past. To these may be added dedication, discipline, and vigilance as the watchwords of the present and the future.
At home or on distant stations, we serve with pride, confident in the respect of our country, our shipmates, and our families.
Our responsibilities sober us; our adversities strengthen us.
Service to God and Country is our special privilege. We serve with honor.

THE FUTURE OF THE NAVY
The Navy will always employ new weapons, new techniques, and greater power to protect and defend the United States on the sea, under the sea, and in the air.
Now and in the future, control of the sea gives the United States her greatest advantage for the maintenance of peace and for victory in war.
Mobility, surprise, dispersal, and offensive power are the keynotes of the new Navy. The roots of the Navy lie in a strong belief in the future, in continued dedication to our tasks, and in reflection on our heritage from the past.
Never have our opportunities and our responsibilities been greater.

Center for Service Support

ACKNOWLEDGEMENTS

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PREFACE

About this course:

This is a self-study course. By studying this course, you can improve your professional/military knowledge, as well as prepare for the Navy-wide advancement-in-rate examination. It contains subject matter about day-to-day occupational knowledge and skill requirements and includes text, tables, and illustrations to help you understand the information. An additional important feature of this course is its reference to useful information in other publications. The well-prepared Sailor will take the time to look up the additional information.

By enrolling in this self-study course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program.

COURSE OVERVIEW: In completing this non-resident training course, you will demonstrate knowledge of the subject matter by correctly answering questions on the following subjects: The military postal service, designations and terminations, mail packaging and acceptance, domestic mail, international mail, registered mail, finance, handling and transportation, claims and inquiries, directory service, equipment and supplies, official mail, audits, reports and inspections.

THE COURSE: This self-study course is organized into subject matter areas, each containing learning objectives to help you determine what you should learn along with text and illustrations to help you understand the information. The subject matter reflects day-to-day requirements and experiences of personnel in the rating or skill area. Also, it reflects guidance provided by Enlisted Community Managers (ECMs) and other senior personnel, technical references, instruction, etc., and either the occupational or Naval standards, which are listed in *Manual of Navy Enlisted Manpower and Personnel Classifications and Occupations Standards*, NAVPERS 18068.

THE ASSIGNMENTS: The assignments that appear in this course are designed to help you understand the material in the text.

COURSE OBJECTIVE

The objective of this course is to provide Mass Communication Specialist (MC) with Visual Information (VI).

INSTRUCTIONS FOR TAKING THE COURSE ASSIGNMENTS

The links and material that you are to study are included in each chapter. Study the material and links carefully before attempting to answer the questions. Pay close attention to tables and illustrations, and read the information in the links.

SELECTING YOUR ANSWERS

Read each question carefully, and then select the BEST answer. You may refer freely to the text. The answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the course.

SUBMITTING YOUR ASSIGNMENTS

To have your assignments graded, you must be enrolled in the course with the Non-Resident Training Course Administration Branch. Following enrollment, there are two ways of having your assignments graded:

- Use the Internet to submit your assignments as you complete them.

- Send all the assignments at one time by mail to CPPD, NRTC.

Grading on the Internet: Advantages to Internet grading are as follows:

- You may submit your answers as soon as you complete an assignment.

- You get your results faster.

- In addition to receiving grade results for each assignment, you will receive course completion confirmation once you have completed all the assignments.

To submit your assignment answers via the Internet, go to the following site:

https://www.courses.netc.navy.mil

Grading by Mail: When you submit answer sheets by mail, send all of your assignments at one time. Do NOT submit individual answer sheets for grading. Mail all of your assignments in an envelope, which you either provide yourself or obtain from your nearest Educational Services Officer (ESO). Submit answer sheets to the following:

> *Commanding Officer*
> *Center for Personal and Professional Development*
> *ATTN: VOLED Det. (NRTC)*
> *6490 Saufley Field Road*
> *Pensacola, FL 32509*

Answer Sheets: Each course includes an answer sheet for your assignments. If you are going to mail in your answer sheets, please make copies of the included answer sheet. Explanations for completing the answer sheets are on the answer sheet.

Follow the instructions for marking your answer on the answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information is necessary for your course to be properly processed and for you to receive credit for your work.

COMPLETION TIME

Courses must be completed within 12 months from the date of enrollment. This includes time required to resubmit failed assignments.

PASS/FAIL ASSIGNMENT PROCEDURES

You will be given the opportunity to resubmit failed assignments. You may resubmit failed assignments only once. Internet students will receive notification when they have failed an assignment; they may then resubmit failed assignments on the Web site. Internet students may view and print results for failed assignments from the Web site. Students who submit by mail will receive a failing result letter and a new answer sheet for resubmission of each failed assignment.

COMPLETION CONFIRMATION

After successfully completing this course, you can download a copy of your letter of completion on the NRTC Web site:

https://www.courses.netc.navy.mil

STUDENT FEEDBACK QUESTIONS

We value your suggestions, questions, and criticisms on our courses. If you would like to communicate with us regarding this course, we encourage you, if possible, to use e-mail. If you write or fax, please use a copy of the Student Comment form that follows this page.

For subject matter questions:

Contact the Center for Service Support, Newport, RI

Email: NWPT_CSS_RTM@navy.mil

Phone: 401-841-1057 or DSN 841-1057

For enrollment, shipping, grading, or completion letter questions:

Email: NRTC@navy.mil

Phone: Toll Free 1-877-264-8583

Comm: 850-452-1511

DSN: 922-1511

FAX: 850-452-1370

(Do NOT fax answer sheets.)

ADDRESS:

     Commanding Officer
Center for Personal and Professional Development
ATTN: VOLED Det. (NRTC)
6490 Saufley Field Road
Pensacola, FL 32509

Privacy Act Statement: Under authority of Title 5, USC 301, information regarding your military status is requested in processing your comments and in preparing a reply. This information will not be divulged without written authorization to anyone other than those within DOD for official use in determining performance.

Students' Comments

Course Title: ____Mass Communication Specialist (MC) Basic Module 2_____

NAVEDTRA: ____15011_____Date: _____

We need some information about you:

Rate/Rank and Name: _____

Command/Unit: _____

Street Address: _____

City: _____

State/FPO: _____

Zip: _____

Email Address: _____ DSN: _____

Your comments, suggestions, etc: _____

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CHAPTER 1

INTRODUCTION TO VISUAL INFORMATION

Learning Objectives: *Upon completing this chapter, you should be able to do the following:*

— Define visual information.

— Identify policies outlined in and DoDINST 5040.02 and OPNAVINST 3104.1

— Explain the missions of Navy Visual News Service, combat camera, and the Defense Imagery Management Operations Center.

— Discuss the ethics associated with visual information.

WHAT IS VISUAL INFORMATION

Welcome to the visual information section of the Basic MC rate training manual. In this module, we will build upon the information discussed in module one, public affairs. As an MC, you will be expected to be well rounded in your public affairs and visual information knowledge, skill and technique.

Visual Information (VI), as described by [Department of Defense Instruction 5040.02 (Visual Information),](#) is "information in the form of visual or pictorial representation of person(s), place(s), or thing(s), either with or without sound." Generally, VI includes still imagery, motion picture imagery, video or audio recording, graphic arts, visual aids, models, displays, visual presentation services and the support processes.

VI is an essential communication tool. Imagery is a powerful weapon in the Navy's communication strategy and can help counter propaganda and misinformation that have significant effects in the operational environment. The capability to provide information and visual media content that contributes to accurate perceptions and favorable attitudes is critical to achieving national and military objectives.

Navy VI is also a professional visual communication capability closely associated with public affairs. VI products help tell the story of America's Navy to all of our audiences. The instruction regulating Department of Defense (DoD) VI production procedures is [DoDINST 5040.07.](#)

PRIMARY ACTIVITIES and FUNCTIONS

Navy VI translates into the following primary activity missions and functions:

- VI documentation (VIDOC), which includes combat camera documentation, operational documentation (OPDOC), technical documentation (TECDOC) and subfunctions using graphic arts, motion media, still photographic, audio and other VI systems

- VI production in support of Navy operations, training and other functions

- Support of DoD VI records centers

- Ship/shore VI activities which include: motion media production, still photographic production, graphic arts production, and other VI services needed at ship/base level.

VI ORGANIZATION

CHINFO – All aspects of Navy VI fall under the auspices of CHINFO. CHINFO as the CNO's special assistant for public affairs support is responsible for the implementation and administration of the Navy's VI Program. High-quality, timely, truthful and accurate visual communication products aid operational planning and decision making, and can achieve operational effects through its use with external audiences such as the adversary and the local populace. CHINFO also issues policies, doctrine, guidance, direction, planning, assessment, and procedures to implement the VI program:

OPNAVINST 3104.1 (series) (Navy Visual Information Program Policy and Responsibilities) outlines policy for the use, management and assignment of responsibilities for VI within the Navy.

Combat camera, or COMCAM, is the operational and directed imagery component of VI and is covered in detail in the independent guidance, OPNAVINST 3104.3 (series) speaks specifically of Navy COMCAM Program Policy Responsibilities and Procedures.

It is Navy policy to maintain VI and combat camera (COMCAM) resources to provide:

- Rapid deployable of COMCAM assets for the planning and execution of operational imagery documentation of force deployments and activities before, during and after military engagements, operations and emergency actions

- General purpose VI support that satisfies DON and DoD requirements for audiovisual documentation, production, distribution, records centers and installation-level support other than COMCAM

- Dedicated VI support of such activities as medical and intelligence functions and for research, development, test and evaluation (RDT&E)

- Life cycle management of VI, COMCAM and other audiovisual records.

The assistant chief of information for VI (CHINFO OI-7) reports to CHINFO on all VI matters.

Navy Visual News Service (NVNS) is a component under OI-7. Its mission is to provide imagery to national and international media outlets, DoD agencies and other federal agencies as required tell the U.S. Navy story. NVNS is the Navy's primary point of contact for requests by major media outlets for U.S. Navy visual information products both still and video.

As an organization, Navy Visual News Service provides this material directly upon request, while proactively pushing content to our external media customers as important stories and issues develop. For more information on NVNS, check out their website.

Navy VI works in conjunction with Defense Visual Information, who operates the *Defense Imagery Management Operations Center* (DIMOC). DIMOC supports worldwide DoD and other U.S. government agency communication and operational missions with the right imagery in the right place at the right time by providing an enabling architecture to synchronize and integrate the various DoD imagery capabilities and centrally manage current and historical visual information. The DIMOC is an evolving, transformational agency that will move into full capability by February 2011.

To accomplish its mission, the DIMOC manages four distinct, but interrelated programs. They are the Visual Information Operations and Coordination Program, Imagery Management and Distribution, Order Fulfillment, Customer Service Programs. These functions are currently active but will have increased capabilities as the DIMOC moves toward full operating capability.

More information about DIMOC can be found at their <u>website</u>.

Note: Registration is required for this site.

ETHICS OF VISUAL INFORMATION

The VI mission of disseminating "high-quality, timely, truthful and accurate" products looks similar to the ABCs of journalism. As with public affairs, MCs are held to a high standard and must adhere to ethics when creating VI products.

The main issues surrounding ethics in VI are still image and video post-production enhancement and alteration. <u>DODINST 5040.05 (Alteration of Official DoD Imagery)</u> is the governing regulation for VI ethics. As written in the instruction, DoD "imagery is used to make decisions and inform the public. Mission success depends on official DoD imagery being complete, timely and accurate. Anything that casts doubt on DoD imagery will not be tolerated.

Note: DODINST 5040.05, dated June, 6, 2006, officially canceled DoD Directive 5040.5.

Image Enhancement/Alteration

Electronic image manipulation is a powerful tool made available with desktop computers and image-editing software programs. These systems provide a means to effectively and ethically edit and enhance captured media. The photographer either shoots with an electronic camera or digitizes analog imagery into digital media to enter the image into the system. The image is converted into a set of picture elements (pixels) and assigned values for a position, brightness and color. These pixels are entered into the computer, which can rearrange them, change their values, duplicate them or eliminate them.

This operation can alter the image in just about any way imaginable — retouching, adding or deleting visual elements; changing positions of objects; modifying colors; and creating montages of entirely imaginary scenes. When complete, the manipulated image can be delivered as a hard-copy print.

The adoption of electronic imaging raises important ethical questions. With the ability to create images comes the ability to manipulate images easily, completely and transparently. Electronic information, unlike traditional photography, can be radically modified with no loss of resolution or evidence the information has been altered.

According to DoDINST 5040.05, alteration of official imagery is prohibited except as follows:

- Photographic techniques common to traditional darkrooms and digital imaging stations (dodging, burning, color balancing, spotting and contrast adjustment) used to achieve the accurate recording of an event or object are not considered alterations

- Photographic and video enhancement, exploitation and simulation techniques used in support of unique cartography, topography, engineering, geodesy, intelligence, criminal investigation, medical research, development, test and evaluation, scientific and training requirements are authorized if they do not misrepresent the subject of the original image

- The obvious masking of portions of a photographic image in support of specific security, criminal investigation, privacy or legal requirements is authorized by DoD instruction 5040.05

- Use of cropping, editing or enlargement to selectively isolate, link or display a portion of a photographic or video image is not considered alteration. Cropping, editing or image enlargement that has the effect of misrepresenting the facts or circumstances of the event or object as originally recorded is prohibited

- Digital conversion and compression of official DoD imagery is authorized

- Photographic and video post-production enhancement, including animation, digital simulation, graphics and special effects, used for dramatic or narrative effect in education, recruiting, safety and training illustrations, publications or productions is authorized under either of the conditions below:

— The enhancement does not misrepresent the subject of the original image.

— It is clearly and readily apparent from the context or from the content of the image or accompanying text that the enhanced image is not intended to be an accurate representation of any actual event.

Examples of the above-mentioned techniques as they relate to the ethics of VI can be found on the NVNS training Web page.

Maintaining your credibility as well as the credibility of the DoD and the Navy is the bottom line. If we are perceived as trying to deceive the public, whatever we have done electronically to the image will be wrong. If we are perceived as attempting to bring the most accurate representation of reality as we can create, we will have acted ethically in behalf of our profession.

Summary

In this chapter, we introduced you to the visual information side of being an MC. Through the information received here, you now should be able to define VI and should be familiar with the instructions and policies that regulate MCs in their everyday duties in VI. Now, it's time to move on to the fundamentals of visual information. In this manual, we will discuss photography, videography, multimedia and print production. However, in the following chapter, we are going to discuss the theories of light and color.

CHAPTER 2

LIGHTING AND COLOR

Learning Objectives: *Upon completing this chapter, you should be able to do the following:*

— *Explain the theory of light.*

— *Describe the different types of photographic and video lighting.*

— *Explain the differences between CMYK and RGB, as they pertain to the color theory.*

Before you can master the VI side of being an MC, it is important to understand light and color and how each plays a part in the art of visual communication. Light is the magic ingredient that makes visual information possible. In performing your duties as an MC, you must be aware of how light is reflected, absorbed and refracted.

Color is all around us. Color is a sensation that adds excitement and emotion to our lives. Everything – from the clothes we wear, to the images and graphics we create – revolves around color. Without color, the world would be duller place. In order to understand color, however, we need to understand light. Without light, there is no color. Without light, there can be no vision or visual information.

THEORY OF LIGHT

Light is reflected from the world around us, making things visible to both our eyes and the eye of a camera. The nature of light has a critical effect on the images you create. Few photographers and videographers actually understand much about light, but they are not alone. Scientists have never been able to agree fully about the nature of light. However, certain useful things are clear.

Science does tell us light is produced in waves. In many respects, the waves of light can be compared to sound waves. Sound waves vary in length and register as different pitches, while light waves register as different colors. Light is made up of energy waves, which are grouped together in what is called a spectrum. Light that appears white to us, such as light from the sun, is actually composed of many colors. The wavelengths of light are not colored but produce the sensation of color.

To the photographer, there are two important characteristics in the way light travels. In a given medium, light travels at a constant speed (conflict) and ALWAYS in a straight line.

Visible light – The wavelengths our eyes detect are only a small portion of the electromagnetic energy spectrum. We call this the visible light spectrum (See Figure 2-1). At one end of the visible spectrum are the short wavelengths of light we perceive as blue. At the other end of the visible spectrum are the longer wavelengths of light we perceive as red. All the other colors we can see in nature are found somewhere along the spectrum between blue and red. Beyond the limits at each end of the visible spectrum are the short wavelengths of ultraviolet light and X-rays and the long wavelengths of infrared radiation and radio waves not visible to the human eye.

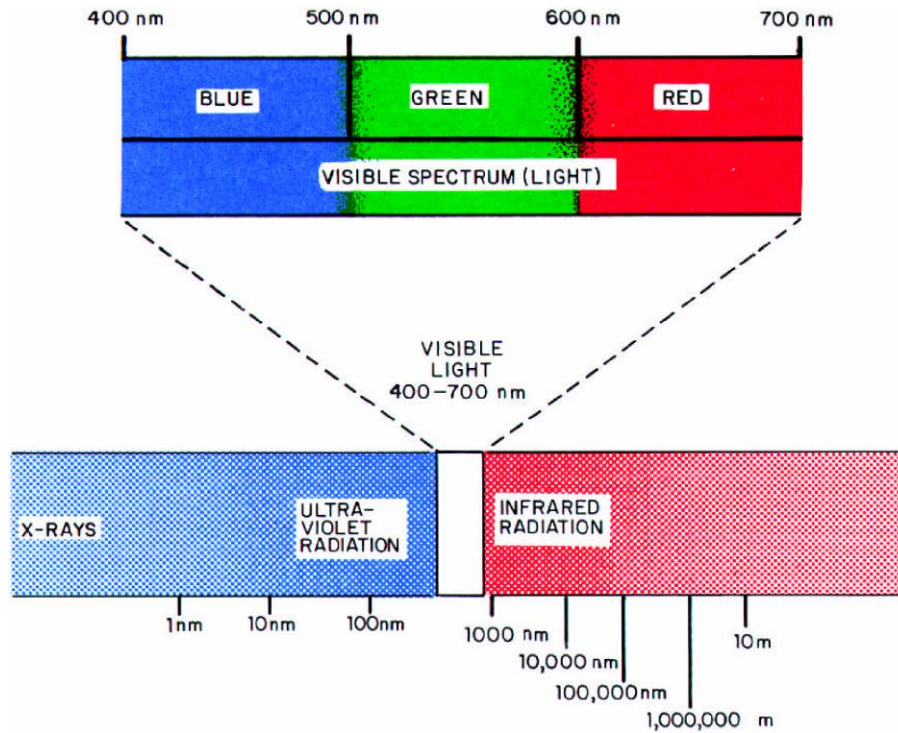*Incident Light* – Light that falls upon a subject form another source.

Figure 2-1, The electromagnetic energy spectrum.

EFFECTS of DIFFERENT MEDIUMS

Once light is produced, or emitted, it is no longer dependent on its source. Only its speed is affected by the many mediums (conflict) through which it can travel. When light travels from air into a denser, but transparent medium, such as a glass, it slows down. But when it leaves the glass, it returns to its original speed.

Transmission – Light is "transmitted" when it passes through a medium. Transparent mediums transmit all light striking them; you see objects behind them quite clearly. Translucent mediums, such as frosted glass, transmit only a portion of the light; an object behind them is not seen clearly.

Reflection – Light is "reflected" when it strikes an object and bounces back. There are two types of reflection – specular and diffused. Specular reflection occurs when light strikes a smooth, polished surface and reflects back at the same angle that it struck the surface. Light that strikes a rough surface is reflected back in many directions. This is diffused reflection. Diffused reflections form the middle tone areas in a photograph; specular reflections form the highlighted areas. Three factors affect reflected light:

- Intensity

- Direction

- Color

Absorption – Absorbed light is neither transmitted, nor reflected. An object that absorbs the light falling upon it is "opaque." Absorption (the absence of light) forms the shadow areas in a photograph. Most objects are opaque. Both opaque and translucent objects have color because they

reflect certain wavelengths of light. Black objects appear black because they absorb nearly all of the wavelengths of the visible spectrum (see figure 2-2).
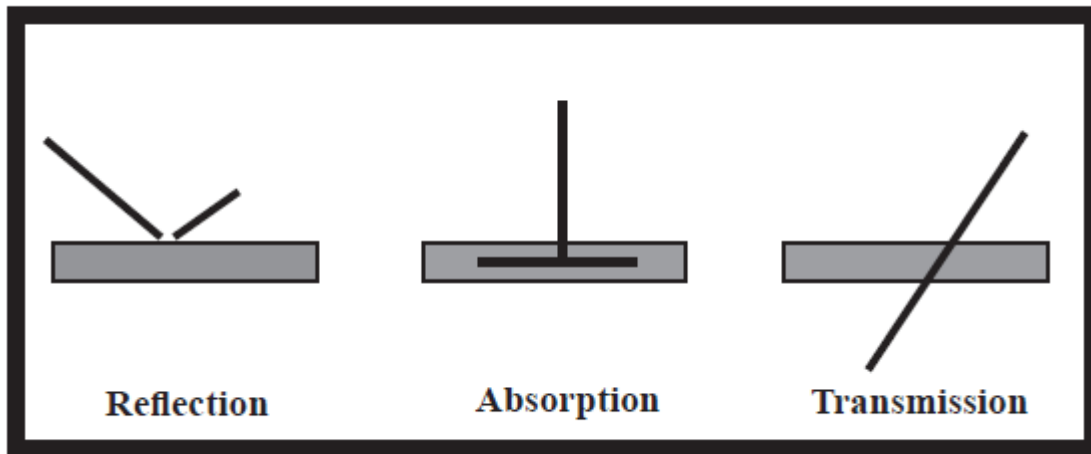

Figure 2-2, Effects of Different Mediums.

When speaking of light, black is the absence of ALL light, and white is the presence of all three colors of light (red, green and blue) in equal amounts. White items, such as snow, appear white because they reflect nearly all of the visible spectrum. No object completely absorbs or transmits all light. There is a certain amount of absorption or reflection in every object. If this were not true, we could not see the object. For example, the windows in a car appear to be transparent even though they are slightly tinted. The tint absorbs some of the energy (light) to make the interior of the car cooler. Also, since the surface of the window is highly polished, some of the light is reflected. Transmission, absorption and reflection properties of objects allow us to see objects as well as photograph them.

Bending of Light

Dispersion – Dispersion is the separation of white light into its individual colors, due to the bending of each wavelength to a different degree of angle. A prism can be used to separate white light in this manner. In nature, water droplets that produce a rainbow also cause dispersion of light. A camera lens also disperses light if not corrected. Dispersion is usually undesirable for most photographic purposes. Through the years, lens manufacturers have practically eliminated the occurrence of dispersion. As a result, you do not have to be overly concerned with dispersion.

Refraction – Refraction is the change of direction of light rays (conflict) as they enter a medium of a different density. Refraction occurs when light leaves a medium, such as air, and enters a medium such as water, glass or even a vacuum. You probably have witnessed refraction of light in water. A canoe paddle that halfway in the water appears bent at the union between the water and the air. A lens bends light rays in a controlled manner allowing you to capture the scene in front of the camera, recreating it behind the lens and recording the image.

Diffraction – Light is slightly bent and scattered when light passes over the edge of an opaque object. This change of direction of light rays is called diffraction. When an opaque object is placed so that it partially blocks the path of the rays from a point source of light, you can see diffraction as a

fuzzy-edged shadow. An example of this can be seen during a solar eclipse. The outside edge of the shadow is light and indistinct; it gradually fades into the deep black of the shadow. Thus, you can see that some of the light is scattered into the shadow area. In photography, diffraction takes place as light passes over the opaque edge of a camera's diaphragm in the lens-and-shutter system. Camera operations and equipment will be discussed in a later chapter.

POLARIZATION

Energy in the form of wave motion radiates from its source and travels through a medium. For example, when a section of line is secured at one end and the free end is held in your hand and given a shake, a wave travels down the length of the line from the end that was shaken to the secured end just like an oscillator. A light source acts as an oscillator; the wave motion, the line. It does not, however, represent the true wave motion of light, because light waves move at right angles, in all possible directions.

A much clearer picture of light wave motion is demonstrated by having a number of parallel lines with each one being shaken in a different direction – one up, one down, one sideways, others at various angles in between. Ordinarily, light waves vibrate in all directions at right angles to their direction of travel. However, when light waves strike a series of parallel microscopic slots, all the light that passes through vibrates in one direction. This is polarized light. In photography, polarized filters polarize light.

Specular reflected light, from a nonmetallic surface at any angle between 32 and 37 degrees, is polarized in such a manner that the light rays vibrate in a direction parallel to the reflecting surface. Light reflected in this manner is said to be plane polarized and is seen as glare. Reflections from metallic surfaces do not create polarization. However, if you are using the panning technique while you are shooting, you will see the variable darkening of an image.

PHOTOGRAPHIC LIGHTING

By now, you surely realize that light is the most important ingredient in photography. Light makes photography possible by reflecting off the subject, entering the camera and exposing the film or charged coupled device (CCD).

The intensity of light determines the brightness of the subject in relationship to the inverse-square law, see figure 2-3. It demonstrates that light decreases as the square of the distance increases. Becoming familiar with this law will help you use light more effectively during photographic assignments.
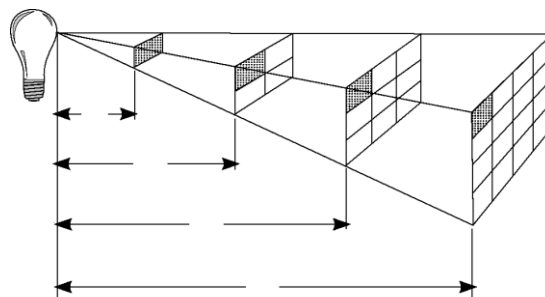

Figure 2-3, Inverse-square law.

OUTDOOR LIGHTING

Daylight and sunlight are not constant sources; they change hourly with the weather, seasons and latitude. The changes in daylight can radically alter the apparent shapes, colors, tones and forms of a scene. The color of sunlight changes most rapidly at the extreme end of the day. Strong color changes also occur during storms, haze or mist and on blue wintery days. The direction of the light changes as the sun moves across the sky. The shape and direction of shadows are altered, and the different directions of sunlight greatly affect the appearance of each scene.

The quality of sunlight depends on its strength and direction. Strong, direct sunlight is "hard," and it produces dark, well-defined shadows and brilliant highlights. Sunlight is hardest on clear summer days at noon. Strong sunlight makes strong colors more brilliant, but weak colors pale. Sunlight is diffused by haze, mist and pollution in the air. This diffused or reflected light is softer, and it produces weak, soft shadows and dull highlights. Directionless, diffused sunlight is often called flat lighting. It produces fine detail but subdues or flattens form. In weak, directionless sunlight, colors are muted, but strong, directionless, flat sunlight provides vibrant, well-saturated colors.

Take a look at the two pictures below, paying close attention to the differences in how the bricks look. The differences are created by using different lighting techniques.

Photos by JOCS (AW) Jon Gagné (retired)
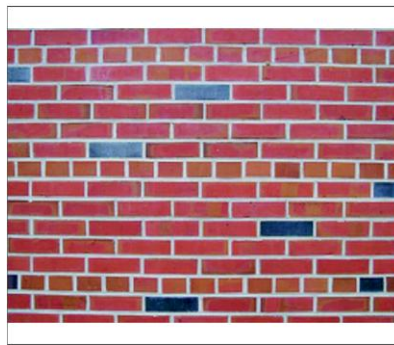
Figure 2-4, Frontlighting.   *Figure 2-5, Sidelighting.*

Frontlighting

The old adage about keeping the sun at your back is a good place to continue our discussion of outdoor lighting. The type of lighting created when the sun is behind the photographer is called *frontlighting* (see figure 2-4). This over-the-shoulder lighting is typically the first photographic advice amateur photographs receive. However, it may not be the best type of lighting. Over-the-shoulder lighting produces a flattened effect, doing nothing to bring out the detail or to provide an impression of depth. The eyes see in three dimensions and will compensate for unhelpful lighting. However, a photograph is two-dimensional. To give an impression of form, depth and texture to the subject light your object from the side or at an angle.

Sidelighting

As you gain experience with various types of outdoor lighting, you can achieve different effects by changing the angle of the light falling on your subject. As you turn your subject, change camera viewpoint or wait for the sun to move. Look at the brick wall photo once again. The sidelighting creates shadows in every crevice (see figure 2-5). The effect increases as the light is more parallel with the wall until long shadows fall from the smallest irregularity in the brickwork. This can give an almost three-dimensional effect to a photograph.

Sidelighting is particularly important with black-and-white photography, which relies on gray tones, rather than color, to record the subject. Shadows caused by sidelighting reveal details that can create striking pictures from ordinary objects that otherwise would not be worth photographing in black and white. Anything that has a noticeable texture — like the ripples of sand on a beach — gains impact when lighted from the side. Landscapes, buildings and people look better when lighted from the side.

In color photography, color gives the viewer extra information about the subject, making up for a lack of texture in frontlighting, but often the result is much better when lighted from the side.

U.S. Navy photo by MC3 Spencer W. Mickler

Figure 2-6, Backlighting.

Backlighting

When the sun is in front of the photographer, coming directly at the camera, you have what is referred to as *backlighting* (see figure 2-6) – that is, the subject is backlighted. This type of lighting is effective for images of people outdoors in bright sunlight. In bright sunlight, subjects that frontlighted or even sidelighted may be uncomfortable and squint. Backlighting helps eliminate this problem. Backlighting may require the use of a reflector or fill-in flash to brighten the dark shadows and improve subject detail. Backlighting also is used to produce a silhouette effect. When you use backlighting, avoid allowing sunrays to fall directly on the lens (except for artistic special effects). Use a lens hood or some other means of shading the lens to prevent lens flare.

EXISTING LIGHT

Existing light, sometimes called available or natural light, is light that is already on the scene. This includes light from table, floor and ceiling lights; neon signs; windows and skylights; candles and fireplaces; automobile headlights and any other type of light that provides the natural lighting of a scene — except daylight outdoors. Moonlight is considered existing light. Existing light is found in homes, offices, hangar bays, chapels, clubs, sports arenas and so on. Outdoor scenes at twilight or after dark are also existing light situations.

Photography by existing light produces pictures that look natural (see figure 2-7). Even the most skillfully lighted flash image may look artificial when compared to a good existing light photograph. With existing light photography, the photographer has an opportunity to make dramatic, creative pictures. Existing light allows the photographer greater freedom of movement because he is not burdened with extra lighting equipment. Subject distance, when not using flash, has no effect on exposure, so you can easily photograph distant subjects that could not otherwise be photographed using flash or some other means of auxiliary lighting. With existing light you can make pictures that you could not make with other types of lighting.

For example, flash may not be appropriate during a change-of-command ceremony or chapel service. Not only might the flash disturb the proceedings, but it also may not carry far enough to adequately light the subject.

U.S. Navy photo by MC3 Marie Brindo-Vas

Figure 2-7, Existing Light.

Fluorescent Lighting

Indoor scenes illuminated by fluorescent lights usually appear pleasing and natural in real life. However, color pictures of these same scenes will often have an overall colorcast that makes them look unnatural. Fluorescent light is deficient in red light and emits primarily blue and green light. Most color photographs made without a filter under fluorescent light are deficient in red and have an overall greenish appearance. When used correctly, fluorescent light does have some advantages over other types of available light. A room illuminated by fluorescent lamps is usually brighter and more evenly lighted than a room illuminated by tungsten lamps. This higher level of light makes it easier to get enough exposure for your existing light photography and helps record detail that might have been lost in the shadow areas with other types of existing light.

When you are photographing people, fluorescent lighting often causes dark shadows under the eyes of the subject. This effect causes the eyes to appear dark, sunken in and unflattering.

ELECTRONIC FLASH LIGHTING

INTRODUCTION to FLASH PHOTOGRAPHY

A photo is created when light emits from an external source and reflects off different objects. But, sometimes, you may find yourself in a situation where you don't have enough light, such as in a dark place or at night. In this situation, you could set your camera for a longer exposure, but that is not always practical. Instead, you may opt to use a flash unit. A flash provides the necessary light for the scene you wish to capture.

Photography as we know it dates back to the 19th century. From the start, early photographers began looking for solutions to their lighting issues as discussed above. The first flashes they created were made of magnesium powders and other materials that when ignited created a short burst of light. Naturally, blowing up noisy smoky compounds for a photo was quite unpleasant. In using this "flash" mechanism, the photographer opened the lid of the lens (shutter), held the magnesium ribbon in his hand, lit it and immediately covered the lens and walked away before the people in the photo begin to complain about the smoke. Today, flashes work much more efficiently and comfortably than 150 years ago.

Flash Operation

- Batteries – Flash units require an energy source, most often 1.5-volt batteries better known as "AA batteries"

- Capacitor – Most flash units have two capacitors, a main and a secondary, to store large amounts of electricity from the batteries. The power from the batteries is augmented from 1.5 volts to about 300 volts in the capacitors. While the capacitors charge, you can hear a high-pitched sound that anticipates the flash's fire

- Transformer – This device augments the power (from 300 volts to thousands of volts) and delivers the power to the flash's lightbulb

- Lightbulb – The lightbulb is a glass cylinder filled with xenon gas, which usually doesn't conduct electricity. In the flash process, electricity is conducted from the secondary capacitor with voltage of thousands of volts in order to ionize the xenon and turn it into a conductor for free electrons. After that, the main current is delivered from the main capacitor to the bulb and is converted to photons – meaning light. Naturally, this whole process happens in a "flash." After the flash is drained of power, the process repeats itself.

When the camera measures light, it accounts for the light being reflected off the subject. When using a flash unit, however, the camera shoots a tiny pre-flash before the actual flash to measure the light reflecting off the subject. The flash intensity for the flash is determined according to this measurement. This is known as through-the-flash metering, or TTL. For a detailed explanation, read about TTL in the manual that came with your flash unit.

Every flash also has a guide number (GN), which measures the intensity of the flash. The number is listed in meters according to ISO 100 (ISO = International Standards Organization's standardized industry scale for measuring sensitivity to light). To double the GN, you increase the energy fourfold.

When using a flash unit, the GN comes in handy when you need to determine the relevant working distance, or the distance your subject should be from the camera. The formula GN ÷ aperture = relevant working distance. For example, if your flash as a GN of 42 and your aperture setting is f/4, the relevant working distance is 42 ÷ 4, or 10.5 meters. In other words, your camera should be no more than 10.5 meters from your subject.

NOTE: The aperture is the opening through which light passes through the lens. The aperture is controlled by an adjustable diaphragm or iris. Each setting of diaphragm is known as an f/stop (f-stop) and is always read as a number.

The relevant factors that affect exposure when using a flash:

- *Shutter Speed* – The shutter on a digital camera is a mechanical device that opens for a specific amount of time, allowing a set level of light to enter the camera through the lens. The speed of the shutter doesn't influence a subject's exposure when flash is used, because the flash is faster than the fastest shutter speed. This is why the shutter speed only affects the backgrounds exposure and any ambient light falling on the subject

- *Aperture* – The aperture is the main factor affecting the exposure with flash photography, because it determines the amount of light entering the lens. As a rule, use the widest aperture you can (the lowest F number) in order to use the flash most efficiently. If we close the aperture down too small, then the flash might not be strong enough, or it may become too strong in compensation and blind the subjects

- *Sensitivity* – ISO is the number indicating a digital camera sensor's sensitivity to light. The higher the sensitivity, the less light is needed to make an exposure. Shooting at a lower ISO number requires more light than shooting at a higher number

- *Working distance* – The distance between the camera and the subject is one of the most influential factors on exposure in flash photography. You need to keep your subject within the flash's range. In a case where several subjects are being lit, it's recommended to keep them as close to the same plane as possible from the flash in order to guarantee even lighting

- *Flash compensation* – Most advanced cameras have an option of positive or negative flash compensation. This function gives you more control on the scene's exposure by overexposing or underexposing the subject.

Synchronizing speed

When the flash unit coincides with the camera's shutter, light hits the camera's electronic image sensor. This is measured in synchronization (sync) speed. In single lens reflex (SLR) cameras, when using high sync speeds, the shutter exposes the film in several stages and not just once. This is why the synchronizing speed of the flash is limited to the maximal single exposure speed of the film/sensor. In most cameras, the synchronizing speed stands at 1/250. In some digital cameras, this problem is solved by using an electronic shutter instead of a mechanical shutter. Before using a flash, you should review its manual for information on sync speeds.

Flash photography modes

Flash units can be set to different modes, depending on how much light you want on your subject.

- Automatic flash – Automatic flash is the simplest mode for novice photographers. In this mode the camera decides when to activate the flash. It's recommend you use your judgment instead of automatic flash

- Red eye – The "red-eye" effect is the appearance of red eyes on images captured while using a flash. The light of the flash occurs too fast for the iris of the eye to close the pupil. The flash then illuminates the blood-rich retina at the back of the eye, resulting in a red appearance of the eye on the photo. The "red-eye" effect can be prevented in a number of ways

  — Moving the flash away from the camera lens (off camera flash) is the most preferable method. Using this method, the flash does not enter the eye directly. The light reflected by the retina is not be captured by the camera's lens, thus the eyes appear natural.

  — Another method is to take pictures with no flash.

  — Many modern cameras precede the flash with a period of bright light – the "anti-red-eye system" – allowing the iris to close. Professional photographers prefer the former approaches, as this system does not always prevent red eyes.

- Slow synchronization – Slow synchronization is used in night photography when you want to activate the flash and maintain a low shutter speed in order to expose the background. The regular synchronizing speed is usually at a minimum of 1/60, and longer exposures permit enough light from the background to enter the lens. When using this method, a tripod should be used

- Rear curtain – Rear curtain offers the ability to fire the flash at the end of the exposure to freeze motion. When making long exposures while firing a flash, rear curtain creates the effect of motion blur trailing the main subject

- Fill flash – Fill flash is a technique used to brighten deep shadow areas, typically outdoors on a sunny day. Fill flash is useful any time the background is significantly brighter than the subject of the photograph, particularly in backlit subjects. To use fill flash, the aperture and shutter speed are adjusted to correctly expose the background, and the flash is fired to lighten the foreground.

External Flash

Most cameras used today come equipped with a built-in flash, but you may find an external flash produces higher-quality images.

- *Power* – An internal flash is weaker compared to an external flash. This is because there is less room for the flash apparatus we learned about earlier, such as the capacitors, bulb, transformers and the batteries. A built-in flash uses battery power from the camera, while an external flash relies on its own energy source, resulting in a significantly stronger flash

- *Red eye* – An external flash solves the problem of red eye, because the distance between the external flash and the lens is great enough so the angle won't allow light to be reflected off the retina back into the lens

- *Attachment* – There are varieties of ways to attach a flash to a camera:

  — "Hot shoe" – The hot shoe is a metal groove with several contacts on its bottom to slide on the flash.

— Synchronizing cable and special flash adaptor.

- *Through the Lens (TTL)* – TTL spares us the need to manually adjust the flash before every photo. There are several variations on the method such as A-TTL, I-TTL, E-TTL etc. The differences between the methods involve light-measuring techniques. A flash working on TTL fires without a preliminary flash and measures the correct exposure, while the flash is shooting. It stops the flash when the result has been achieved

- *Zoom Flash* – Advanced flashes are equipped with zoom heads that adjust according to the lens' focal length. In a wide lens the light is dispersed in the space. In a narrow lens it is focused on a narrow area in a more efficient way to enable it to reach a longer distance

- *Fast Synchronization* – The sync speed of the camera is limited. But sometimes the need arises for faster shutter speeds, such as in strong daylight. This is why "fast synchronization" was developed. The flash emits a series of ultra rapid fires one right after the other throughout the exposure and by doing that exposes the film (or the sensor) to light in each stage of the exposure. The disadvantage of this mode is that the intensity of the flash becomes much weaker because instead of one strong flash there are a lot of short weak ones. This is also the reason why the shorter the exposure speed is in fast sync so will the flash intensity be lower (it flashes less times) until even from a distance of a meter at speeds of 1/4000 it will be difficult to achieve good exposure. In electronic shutter speeds you can use higher shutter speeds than in mechanic shutter cameras

- *Strobe* – In this mode the flash fires several short flashes for about half a second. It is a good mode if you want to see how shadows fall in the scene or if you want to achieve special effects such as motion or freezing action. In today's digital world this is a less meaningful function, because you can shoot a picture and see on the screen exactly how the shadows fall

- *Slave flash* – A slave flash is not located on the camera; it is activated as a reaction to another flash. The firing mechanism is a reaction to the light emitted from another flash or through a wire/wireless connection in more advanced flashes. The first flashes fire in a predetermined intensity while the second fires according to the light measured by the camera as the data are transferred through the wires (or air in the wireless mode)

- *Repeat* – Ultra-fast flashes are determined by the flash frequency per second and the length of the flash. For example, a frequency of 20 flashes per second for half a second will cause 10 flashes. This is used mainly for creative effects in photography, such as freeze framing.

When purchasing a flash for your camera, you should look for one from the same manufacturer as the camera since the communication between them is best. Remember, reading the manual before use is strongly encouraged.

Flash Techniques

There are two main techniques with flash photography – direct flash and bounce flash.

Direct Flash – The flash is directed straight forward toward the subject. It is characterized with harsh shadows and a little lighting from above.

Bounce Flash – To bounce your flash means to reflect if off of another surface before it flashes upon your subject. When using this technique, it is important to use surfaces light in color, preferably white, so the flash reflected will be in the color of the surface from which it was bounced. This technique is one of the better methods to illuminate a subject or scene with a single-flash unit is to

use *bounce flash*. There are times when you want a very soft light in order to lessen the tonal range between highlights and shadows and to soften harsh background shadows:

- Using a ceiling - The flash is aimed at the ceiling. An advanced flash knows that it is pointing to the ceiling and will compensate for the long way it has to go with TTL. The result if lighting from above is also called butterfly lighting, and it is soft due to the diffusing qualities of the ceiling.

- Using a wall - The flash is pointed to a bulkhead or wall. Flash measurement is done the same as bouncing off the ceiling, and the result is quality lighting from one side also known as window lighting or Rembrandt lighting.

Diffuser – A flash typically creates strong contrasts in the lighting with sharp shadows because of the small size of the light source. A good way to overcome this disadvantage is by using a diffuser. The diffuser is made of plastic and is placed on the external flash. Its job is to soften the light and create gentler shadows and soft uniform lighting. A diffuser is highly recommended in direct flash photography. Take into consideration you have to increase your flash's intensity to get the same illumination with a diffuser. In a photo studio, you can use more effective diffusing methods – umbrellas, soft boxes, etc. – to diffuse the light further and to create very soft and pleasant shadows.

OPEN FLASH – Flash photographs can be produced without the camera shutter and flash being synchronized, using a technique called open flash. In the open-flash method, the camera shutter is set at T or B, the shutter is opened, the flash unit fired, and the shutter closed. The open-flash technique is sometimes used when the level of light over a large scene is very low or at night. This method of flash photography allows the photographing of large scenes that ordinarily are quite difficult to illuminate with artificial light. The photographer can walk into a scene with the flash unit and illuminate sections of the scene or the entire scene. Any number of flashes can be used during the exposure while the shutter remains open. A silhouette of your body can be recorded if your body gets between the flash and the camera. To arrive at the exposure for an open-flash image using a manual flash, determine your flash-to-subject distance and f/stop. Keep the distance equal to the objects being illuminated when using manual flash. For example, when the f/stop for the scene is f/5.6 based on a flash-to-subject distance of 10 feet, every flash within the scene should be 10 feet from that section of the scene being illuminated. When an automatic flash is used, the flash automatically shuts off when the proper amount of light is reflected from the subject, providing the object is within its distance range. When you are using a manual flash, the exposure for open flash is determined as previously discussed. This is true unless two or more flash units with equal intensities are used at equal distances or two or more flashes from the same unit at the same distance are used to illuminate the subject.

In the paragraphs above, you learned about the importance of lighting to the photographer. The flash is a unique and advanced device that enables us to shoot in situations where the available light is working against us. We've learned how it all began, how the flash is built and how it works, what an external flash is and its advanced functions, and how to make the most out of your flash. The possibilities are endless. As always, the best way to learn is to put the theory into practice.

Before we move on to video lighting, however, it is important to take a step aside and talk about color.

COLOR THEORY

Think about a bright, red apple on a dark, green tree. Color is not an inherent property of these objects. In fact, color is not even inherent to light. What you see is a visual perception stimulated by

light. The apple and the tree are only visible because they reflect light from the sun. The apple appears red and the tree appears green, because they reflect certain wavelengths of light more than others. In this case, the human eye sees these particular wavelengths as red and green.

When we see a color, we are simply seeing light of a particular wavelength. When a beam of light has a relatively even mixture of light of all visible wavelengths, it appears as white light. When this beam of white light is passed through a prism, its different wavelengths are spread apart and form a visible spectrum. This visible spectrum is seen as a band of colors, such as violet, blue, blue-green, green, yellow, and red.
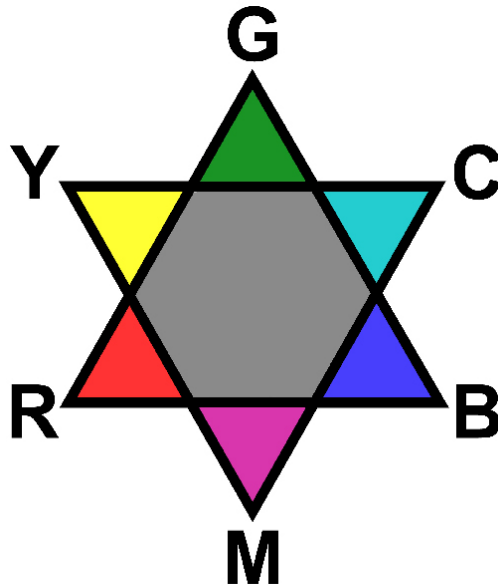
Figure 2-8, Color Star.

The color star shown here (see figure 2-8) is the foundation of color theory. The design of the star is very simple. The primary colors are R (red), G (green), and B (blue). The secondary colors are cyan (C), yellow (Y), and magenta (M). Combining the two colors on either side of the color that is to be produced can produce any color on the color star. Example: Y + C = G or G + B = C. If a green filter and a cyan filter are placed in front of a white light the resulting light will be blue. The colors that are opposite of each other on the star are called complements (opposites). Y and B are complements, C and R are complements, and G and M are complements. When magenta is added to a print, at the same time and same amount, green is being subtracted. Complementary colors are directly related to each other.

COLOR TEMPERATURE SCALE

The color temperature of light is measured according to a scale of degrees in Kelvin (°K), which indicates the proportion of red light to blue light radiated by the light source (the sun, electronic journalism lights, fluorescent lights, etc.). Daylight is a combination of all the light rays in the visible spectrum, but daylight contains a higher proportion of blue than some other sources. Tungsten halogen lights commonly used in video lighting also contain all the light rays of the visible spectrum, but with a higher proportion of red hues.

Remember …

- Daylight ☞ Blue

- Television light ☞ Red

Color temperature is a way of measuring (in units derived from the Kelvin temperature scale) and describing the color quality of white light by comparing it to a theoretical black body heated to a specified temperature on the Kelvin scale (see figure 2-9). It's important in the design and use of computer monitors, solid-state displays and digital cameras.

9500° K	Clear Blue Sky
7000° K	Overcast Sky
5500° K	Sun at Noon
3750° K	Cool Fluorescent
3000° K	Halogen
2700° K	100W Incandescent
2250° K	40W Incandescent / Warm Fluorescent
1800° K	High Pressure Sodium
1500° K	Candle Light
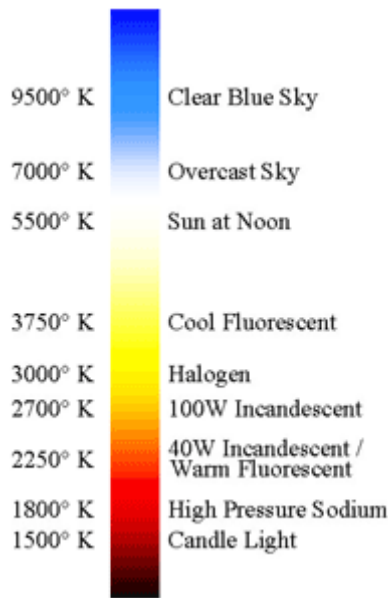
Figure 2-9, Color Temperature Scale.

As MCs, we need to understand color temperature, because we use equipment that doesn't see true colors like we do with our eyes. Knowing that outside light, inside lights and camera lights have different color temperature, you should gather that it's bad to mix these light sources. Instead, you should eliminate all but one light source when you are shooting. For example, shooting indoors near windows is challenging. The outside light creates blue light (around 5600˚K), and the inside fluorescent lights are about 3200˚K. To avoid having color issues with your product, you could:

- Get away from the windows (best choice)

- Match outdoor light coming in by putting blue gels on your lights, and make them match the incoming blue light

- Place an amber gel sheet over all the windows to match the 3200˚K lights you're using.

Video lights normally run at about 3200˚K. However, you may find that some studios lights are 5600˚K, similar to lighting outdoors. The 5600˚K lights often are found at indoor sports arenas, such as the Louisiana Superdome. If shooting in one of these arenas you need to use an outdoor filter on your camera for 5600°K.

Most professional grade video cameras have a filter wheel such as the found in figure 2-10. The filter wheel is used to achieve a proper white balance.

Figure 2-10, Filter wheel found on the Ikegami 201W ENG Camera.

For the camera shown in the image above, the filters are used as such:

1. Shooting indoors 3000°K (clear filter)

2. Outdoor bright sunny 5600°K (darker filter like sunglasses)

3. Outdoor cloudy/overcast 5600°K (not so dark but still like sunglasses)

4. Outdoor very bright and sunny with snow or water (rarely used).

WHITE BALANCE

The term *white balance* refers to the process of balancing color when shooting images. When white balancing, you are defining for the camera what the color white looks like in specific lighting conditions, which also affects the hue of all other colors. Usually the automatic white-balance function of a video camera operates sufficiently in the automatic position for you; however, some situations will require manual white balancing:

- When the light reflecting from the subject is different from the light that is illuminating the video camera

- When shooting a monochromatic subject or the subject is against a monochromatic background

- When recording under a sodium lamp, mercury lamp or a white fluorescent lamp

- When recording outdoors under neon lights or fireworks

- When shooting scenes just before sunrise or right after sunset.

To white balance a motion-video camera manually, you can follow a simple procedure. Normally a white lens cap, made of a diffuse plastic material, is supplied with the camera. You also can use any white object to white balance the camera, providing the white object is illuminated under

the same conditions that you will be shooting. To white balance, you simply place the white lens cap over the lens, point the camera at the light source, and press the white balance button. Remember, when in the manual white-balance mode, if the color temperature of the light changes, you must reset the white balance.

To create special effects, you may want to "lie" to the white balance sensor; for example, you may want to produce motion video that has a warm color balance, such as that which occurs at sunrise or sunset. To produce video coverage with warm characteristics, you can "white balance" the video camera on a blue object or any of the complementary colors. When you record the scene, an overall yellow cast is produced. You can also use filters to create various effects.

<div align="center">

VIDEO LIGHTING

</div>

Now that we have discussed light and color, it's time to move on to video lighting. Knowledge of light and color is essential to every MC. When shooting video, we use lighting for visibility and quality. The images you shoot for photography and video must add to the communicative qualities of the story or spot. The light from a scene being captured with a video camera are changed to electrical impulses when exposed to a cameras CCD. Even though most modern cameras are capable of shooting in extremely low lighting conditions, you still may not produce a quality image. If the images are dark and grainy for no apparent reason, you distract from the message and lose your audience.

We cannot always create light where and when we want it, but we have tools that allow us to create lighting that does more than just provide enough light for the camera to pick up an image. Lighting schemes also enhance the communicative qualities of video. Lighting is an art form. The three main goals of video lighting are:

- Fulfill the technical requirements of the camera

- Add a three-dimensional look

- Draw attention to an object

THREE-POINT LIGHTING

The three-point lighting technique (see figure 2-11) is a proven method within the broadcast industry and is used with film, still photography and multimedia products. This method is also good for conducting on-camera interviews with one subject-matter expert (SME).

With this technique you use three lights – a key light, a fill light and a back light.

- *Key Light (Modeling light)* – The key light is the main light and is usually the strongest (about 500 watts). This rectangle-shaped light has the most influence on the look of your scene and is used to light your subject's face. The key light is placed to one side of the camera/subject, so that the side is well lit and the other side has some shadow. It's also use to control the direction of the shadows

- *Fill Light* – The fill light "fills" in shadows and provides detail to you subject's face. The fill light will not fill in all shadows, however, so you will need a slight shadow from the key light

- *Backlight* – Opposite the key light, the backlight illuminates the subject's back to separate him or her from the background, creating a three-dimensional look.

Important facts to know about three-point lighting:

- Opt for a key-to-fill-light ratio of 2:1. In other words, the key light needs to be two times more intense than the fill light. For example, your key light could be 500 watts and your fill light 250 watts

- Key light placement:

  — 35-50 degrees to the left or right of the camera

  — 35-50 degrees above the subject

- Fill Light placement – 35 to 50 degrees to the side of the camera opposite the key light side again, above the subject 35-50 degrees. Remember, you will have a shadow from the key light. A shadow is fine but make sure you lessen it with the fill light

- Back Light – 35 to 50 degrees behind and to the side of the subject. You want it the same height as your key and fill (35-50 degrees above). The back light is best used opposite the key light (see figure 2-11)

Although three-point lighting is typically the standard, there are instances when you will need to adapt your lighting technique.
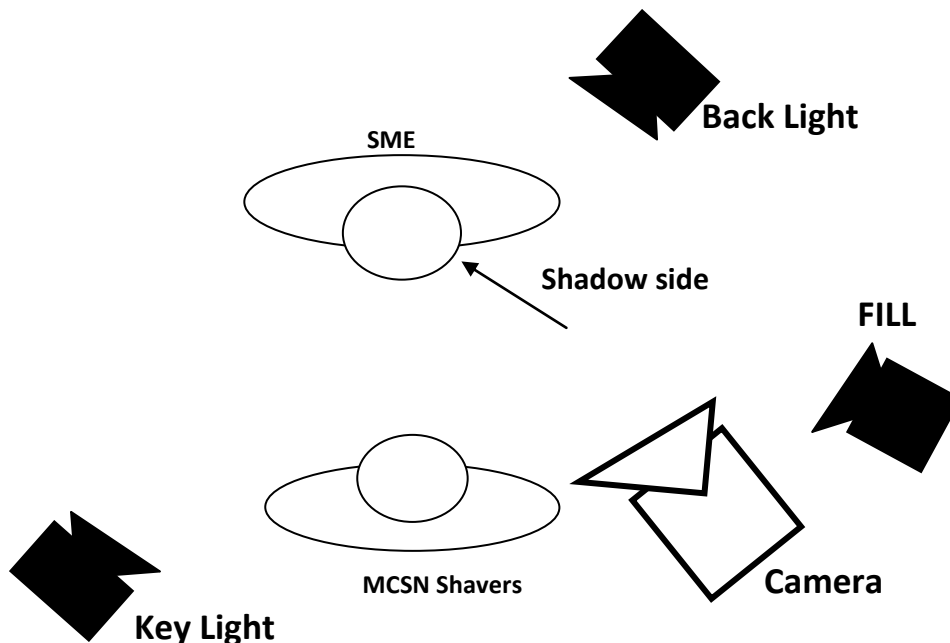
Figure 2-11, Three-point lighting.

BACKGROUND LIGHT

The third light in studio portrait lighting is the background light. A background light is usually placed on a low stand midway between the background and the subject. When adjusted correctly, the background light provides good tonal separation between subject and background. The intensity of the light falling on the background should not normally be greater than the intensity of the light from the main light falling on the subject's face. By increasing or decreasing the intensity of the light on the background, you can control the tone or color reproduction of the background in the finished print.

SUN GUN

A sun gun is the name for a light mounted on top of a camera. You also may hear it referred to as a tota light, top light or camera light. These lights sometimes come with a filter attached to it called a dichroic filter. Its purpose is to match the sunlight when used during the day. If you turn it on inside, you will see it has a bluish color as if shooting outdoors. For the best lighting at an outdoor ENG (electronic newsgathering) shoot, the talent should be placed with the sun to his or her right.

LIGHT DIFFUSION

To give your image a softer, more natural light, with undefined shadows you can use diffusion material over the lights – material such as spun glass (tough spun), heat-resistant plastic, metal window screen, and a metallic mesh (scrim). Diffusion materials reduce glare and harshness in your scene. Diffused light makes people more comfortable as well.

BOUNCE LIGHTING

The bouncing of light spoken of in the photography lighting section also comes in handy when shooting video. Bouncing light produces soft, natural lighting and reduces glare and harshness. You can bounce your lights off of walls and ceilings or use lighting umbrellas. Be careful when bouncing light; however, because if the surface is not white, your light will be mixed with another color.

No other tool at your disposal will do what light can do for the look, feel, and mood of your productions. When you apply these lessons and use your camera and light kit, you'll increase the effectiveness of your productions and the command information messages you craft.

FUNDAMENTAL PORTRAIT LIGHTING

The success of a portrait is equally dependent on lighting as on the pose of the subject. The manner in how the subject is lighted can actually set the mood of a portrait. The best portrait lighting will simulate natural sunlight. This is because we are accustomed to seeing faces illuminated from above and to one side with shadows cast downward and on one side or the other. Light coming from below eye level casts shadows upward and produces an unnatural, ghastly effect.

Good portrait lighting shows off the subject to the best advantage, emphasizing the form and expressiveness of the facial features. When lighting appears pleasing and natural in a portrait, it produces prominent highlights on the forehead, nose, cheeks, and chin with enough shadows to round out the facial features.

Lighting for a studio portrait normally requires at least two lights. One of these is the *main*, *modeling,* or *key* light; the other is the *fill* or *fill-in* light. Portrait lighting is divided into various types called lightings. Some of these lightings are as follows: broad, short, butterfly, Rembrandt, split, and rim. These names have been assigned because of the visual effects the lighting creates when it falls on the subject from a given direction.

This visual effect is derived from the modeling light. Other light sources that may be added to the *modeling light* to enhance the subject are as follows:

- *Broad lighting* – The main light completely illuminates the side of the face turned toward the camera.

- *Short lighting* – The main light completely illuminates the side of the face turned away from the camera

- *Butterfly lighting* – The main light is placed directly in front of the face and casts a shadow directly under the nose.

- *Rembrandt lighting* – This is a combination of short and butterfly lighting. The main light is placed high and to the side of the face turned away from the camera and produces a triangle of light on the side of the face in shadow.

- *Split lighting* – The modeling light is placed to light completely one side of the face while placing the other side of the face in shadow.

- *Rim lighting* – The modeling light is placed behind the subject and places the entire face in shadow.

MAIN LIGHT

The main light as mentioned above is also known as the modeling light, because it is used to model the face (or subject). The main light creates a three-dimensional effect by either emphasizing or de-emphasizing the curvature and characteristic features of the face with highlights and shadows. The modeling light should always be the one dominant light source in a portrait because it controls the direction of the shadows.

The direction of the main light establishes four basic portrait lightings – *three-quarter lighting*, *sidelighting*, *frontlighting* and *backlighting.* When reading other books on portrait lighting, you will often encounter other names depending on what the author wanted to call the lightings. You, as an MC, will mostly be concerned with three-quarter (broad and short) and front (butterfly) lighting. We also designate each of our lightings as high, medium, and low for vertical position. To go further, we designate the lighting as right or left of the subject. These lighting positions change with each subject. When setting portrait lights, you should always study the effect and view the subject from the camera position, preferably through the viewfinder.

THREE-QUARTER LIGHTING

Broad and short lighting are two types of three-quarter lighting, and they are the types that you most often use for official portraits. The only difference between the two is the position of the main light and the way it illuminates the subject.

Short lighting is used for people with a normal-shaped face or people who have a wide face. When short lighting is used, the side of the subject's face that is away from the camera is illuminated. This puts the side of the face toward the camera in shadow. By putting the side of the face toward the camera in shadow, you can provide a slimming effect.

Broad lighting is useful for subjects with a narrow face. When broad lighting is used, the side of the face toward the camera is illuminated, and the side of the face away from the camera is in shadow. This provides a widening or broadening effect of the face (see figure 2-12).
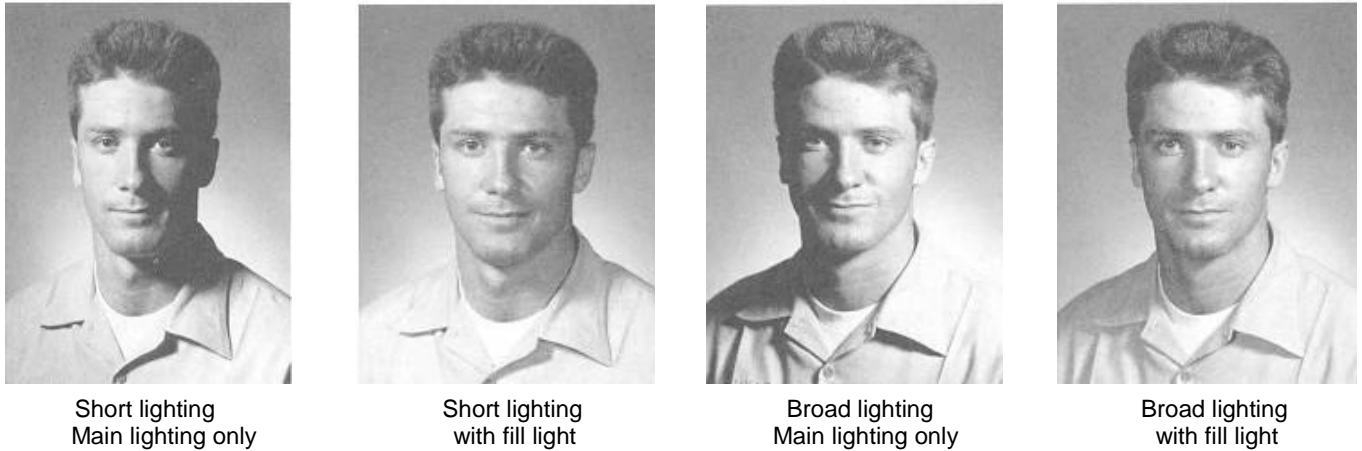
| Short lighting Main lighting only | Short lighting with fill light | Broad lighting Main lighting only | Broad lighting with fill light |

Figure 2-12, Short and broad lighting.

Flexibility of Three-Quarter Lighting

Three-quarter lighting can be used with almost any type of face. It is flexible because once it is set, the subject can move his head from full face to profile and the lighting remains good at any point you choose to pose the sitter. The degree of flexibility is determined by the type of light used (spot or flood) and the size and type of reflector used.

MAIN LIGHT DISTANCE

The power or intensity of the main light is not the determining factor for the distance the main light is placed from the subject. It is the visual effect the light has on the subject that determines this distance. When the main light is too high and close to the subject, there may be too much light falling on the forehead and not enough light falling on the lower part of the face. This effect can be improved by moving the main light farther away from the subject and placing it correctly. Highlights on the forehead, the upper cheeks, the chin, and along the bridge of the nose are created by the main light. These highlights give life, brilliance, and form to a portrait, and the quality of these highlights is controlled by the main light distance.

To determine the main light distance, start with the light about four feet from the subject and about two feet above the subject's eye level. The light should be about a 45-degree angle to the lens axis. Observe the forehead highlight and move the light closer to the subject. As the light gets closer to the forehead, highlights spread out to a large, flat area and begin to wash out.

Now, start moving the main light away from the subject. As you slowly move it back, you will find there is a point where the forehead highlight becomes relatively small and bright. When the light is moved back much further from this point, the highlight spreads and disappears. Between the point where the highlight is brightest and where it starts to disappear lies the range where the highlight still has character. This point is where you get the most pleasing effect. Once you have found the distance where the main light gives your desired effect, the *distance* should remain the same regardless of the *direction* you need to move the light. This main light distance should always be considered as the *starting* point of portrait lighting.

MAIN LIGHT HEIGHT

To determine the correct height for the main light, move the light directly in front of the subject while maintaining the distance determined for the forehead highlight. Raise or lower the light until the shadow cast by the nose is just long enough to touch the top edge of the upper lip. This is the height the main light should normally be no matter at what position you place it in an arc around the subject. When your subject is wearing a hat with a visor, the visor shadow should fall naturally across the face. Many photographers think the shadow cast by the visor should not shade the eyes. The shadow from the visor should shade the eyes. However, in a portrait, this shadow should not be so dark that shadow detail is lost and the eyes are hard to see. To prevent this shadow from being too dark, raise the main light to the desired height, and instead of aiming it down at an angle, aim it straight. This way the light is cast under the visor and prevents the shadow from becoming too dark.

MAIN LIGHT DIRECTION

By the time you have determined the main light distance and the height for a given subject, you should have a pretty fair idea of the direction of light from the main light. To establish the direction from which this light should come, move the main light in an arc, to the right or left, around the subject.

Remember, while moving the main light, its established distance and height should be maintained. The shadow cast by the subject's nose is your key to main light direction. The light should be moved around until the shadow cast by the nose merges with the cheek shadow and leaves a small, triangular highlight on the cheek. When this is done, the main light is in position. Remember, the main light must always be the dominant, directional, shadow pattern forming light.

FILL-IN LIGHT

Once the main light has been established, the fill or fill-in light is added. This fill light is a secondary light and must not overpower the main light. Its purpose is to fill in and soften the shadow areas, making them lighter, and to provide shadow detail. The fill light is placed slightly above the subject's eye level, on the opposite side of the camera from the main light and near the camera lens axis. The fill-in light should be less intense than the main light and of softer quality. This light is often diffused even when the main light is not. By placing the fill light slightly above the subject's eye level, you can cast a shadow under the chin. This shadow separates the head from the neck. The chin shadow should be soft and unpronounced.

The intensity of the fill-in light can be controlled by either adjusting the power setting of an electronic studio light set or adjusting the light-to-subject distance. The fill light can be moved in an arc to the side of the subject and away from the camera. The fill light must not produce conflicting shadows (shadows that point toward the main light).

CATCH LIGHT

A catch light provides a small, bright reflection of the main light in the eyes of the subject. It adds life and brilliance to a portrait and gives the eyes sparkle. There should be only one catch light in each eye, and it should be high in the iris of the eye. For broad lighting, the catch light should be approximately in the 11 o'clock position. The main light for short lighting should create a catch light at approximately the one o'clock position.

The lighting ratio for portraits should usually be about 3:1; 4:1 is maximum for good color portraits.

BACKGROUND LIGHT

The third light in studio portrait lighting is the background light, see figure 2-13. A background light is usually placed on a low stand midway between the background and the subject. When adjusted correctly, the background light provides good tonal separation between subject and background. The intensity of the light falling on the background should not normally be greater than the intensity of the light from the main light falling on the subject's face. By increasing or decreasing the intensity of the light on the background, you can control the tone or color reproduction of the background in the finished print. To reproduce the background color to its "true" color in a color print, it must receive the same amount of light as the subject's face.

When taking portraits for use on a roster board, you want the tone and color of the background to be consistent. When the backgrounds vary in color, the roster board does not appear uniform, and the attention of the viewer is distracted. When a background light is used, it is wise to position it before setting up any other light. It is easier to determine its effect without the interference of the main and fill light.

The background light should be positioned so the brightest area of the light illuminates the background directly behind the head and gradually falls off into the corners of the frame. When the background light is set in this manner, it separates the head from the body and draws the viewer's attention to the subject's face.

Figure 2-13, Effect of backlighting.

HAIR LIGHT

Once the main, fill and background lights are in their established locations, additional lights may be added to the setup to further in enhance the portrait. One such light is a hair light. A hair light is usually a small lighting unit placed on a boom so it shines down from above and behind the subject. It is used to lighten the hair (or hat) and shoulders, add detail to the hair, and separate the subject from the background, presenting the illusion of a third dimension, see figure 2-14.

The intensity of the hair light varies with the subject since it is dictated not only by the color of the person's hair (or hat) but also by the amount of sheen the hair has. The hair light is usually placed on the side of the subject opposite the main light and behind the subject. It should be used from an angle about six to eight feet high and from a position close to the center of the subject area without

the light stand or boom showing in the picture. Light from this unit should not be allowed to spill over onto the forehead or tip of the nose. The hair light normally has a snoot attached so light from it does not strike the camera lens. Be sure the hair light is turned off when making any exposure readings. This light does not affect your basic film exposure, but it could influence your meter.
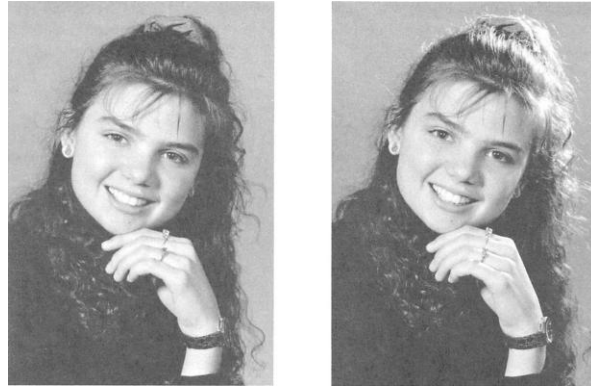
Figure 2-14, Effects of hair light.

SIDELIGHTING

With sidelighting, the face is lit more intensely on one side than the other (see figure 2-15). This type of lighting is well suited for young women WHO have smooth skin and regular facial features, or for men whose rugged character lines should be emphasized. Normally, you will not use sidelighting for official portraits.

Figure 2-15, Sidelighting.

BUTTERFLY LIGHTING

Butterfly lighting is often used when making portraits of women. To start, you can place the main light very close to the camera lens axis at about the subject's eye level. This creates a flat lighting, and facial feature characteristics can be lost. By moving the main light higher, you can create a certain amount of modeling. The light now creates a little modeling and is still very flattering and almost foolproof. This lighting is flattering because it does not emphasize lines or crow's feet around the eyes, wrinkles on the forehead, or shadows around the mouth. It does, however, emphasize eyes and eyelashes, especially in females. The main light should be just high enough to cast a shadow of the nose about a third of the distance from the nose to the top edge of the upper lip (see figure 2-16).
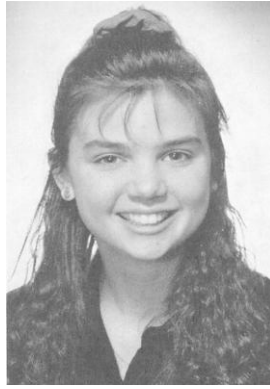
Figure 2-16, Butterfly lighting.

RIM LIGHTING

Rim lighting is often used when making profile portraits. Rim lighting is the same as backlighting, where the subject is lighted from behind causing the facial features of the profile to be highlighted (see figure 2-17).

In a profile portrait, when a person looks straight ahead, only the whites of the eyes are seen by the camera. This causes an undesirable effect. Instead have the eyes cheat. Turn the eyes slightly toward the camera, without turning the head, to show enough of the iris so the eye can be seen as an eye, not a white ball. Have the subject's head tipped back slightly. This separates the chin from the far shoulder, gives a better neckline, and reduces the appearance of a double chin. Allow more space on the side of the picture toward which the eyes are looking. This allows the subject to "look" beyond the frame.

Figure 2-17, Rim lighting.

PORTRAIT STUDIO EQUIPMENT

Barn Doors – Barn doors are made from opaque material. They are usually made of metal, painted black, and attached and hinged to the front of a light unit. They can be positioned to block or feather a portion of the light produced by the unit. Barn doors are made for both spotlights and floodlights. They are good accessories for controlling spill light.

Snoots – Snoots are cylinders, open at both ends, usually made of metal and painted black. They are used at the front of a spotlight to limit the size of the circular area projected by the unit. Short, wide snoots give a large circle of light. Long, narrow snoots give a narrow circle of light. A cardboard tube or black-rolled paper can be used for a snoot when you need to improvise.

Umbrellas – Umbrellas work much like the reflectors used on floodlights and provide an excellent means of converting specular light into soft, diffused light. Umbrellas can be used with any light source. The light unit points away from the subject; the umbrella is attached in front of the light and reflects or bounces the light back and onto the subject. The reflected light falling on the subject is softer and more diffused than the light originally emitted by the source. The reflecting surface of the umbrella determines the quality of the light. Umbrellas are usually made with a matte, white surface that provides a very soft, completely diffused light. Some umbrellas are constructed with a shiny, metalized surface. Metalized umbrellas throw a somewhat specular light, but the light is softer and spread over a larger area than the light emitted by the original light source.

Screens – Screens can be used to help eliminate strong shadows on a subject.

CORRECTIVE TECHNIQUES

Because the photogenic qualities of each person's face vary, certain corrective techniques in posing, lighting, and camera heights can be used to help depict the subject favorably and improve the quality of the portrait. Changing the camera viewpoint, combined with proper lighting and pose, can create amazing alterations in the pictured appearance of any face. Keep in mind that the most commonly made mistake is placing the subject too low in the frame.

For example, when the subject has a long nose, the light should be low to shorten the shadow. When the subject has a short nose, raise the main light to lengthen the shadow. This has a secondary effect as well. It adds form below the eyebrow and accentuates any slight hollowness in the cheeks, giving a more provocative look.

When shooting a portrait of a person smiling, you must shorten the nose shadow because the upper lip draws up and the shadow goes over the lip. The nose shadow should not extend over or touch the edge of the lip. When it does, the lip form is destroyed and it appears unnaturally small. The main light-to-subject distance is again determined using the forehead highlight test. The fill-in light is positioned directly below the main light-close to the camera lens axis and slightly above the subject's eye level. The intensity of this light should be about one f/stop less than the main light. The lighting ratio is established by moving the fill light closer to or farther away from the subject to increase or decrease its effect. Balance also can be controlled by using diffusion screens over the fill-in light. Although not as flexible as three-quarter lighting, front lighting does have some flexibility. The subject's head can be posed from full face to profile. However, the nose shadow must always remain under the nose. Therefore, the main light must be moved with the head; and as the head moves to the three-quarter or profile position, the hair light also must be moved. The fill light is not moved.

In the chart below, you will find additional techniques.

Issue	Corrective Technique
Chubby, round face	- Shoot three-quarter view, light side of face away from camera - Use three-quarter or sidelighting
Thin face	- Shoot front, full face - Use low three-quarter or sidelighting
Wide forehead	- Use low-camera viewpoint - Tilt chin upward
Narrow forehead	Use high-camera viewpoint
Baldness	- Use low-camera viewpoint - Little or no hair light - Blend head with background
Eyes close together	Shoot three-quarter pose
Eyes far apart	Shoot three-quarter pose
Small eyes	- Shoot three-quarter pose - Use three-quarter lighting so the eyes are in shadow
Large or protruding eyes	- Use high three-quarter lighting - Lower eyes slightly
Deep set eyes	- Use Low-camera viewpoint - Use frontlighting to keep eyes out of shadow
Uneven eyes	Turn head toward one side so natural perspective eliminates uneven appearance
Bags under eyes	- Use makeup - Use frontlighting
Cross eyed or defective eye	- Turn head so bad eye is away from camera - Light side of face toward camera to place other eye in shadow
Short nose	- Use front lighting - Use high-camera viewpoint
Dark skin	- Look for backgrounds slightly darker than the subject - Keep as much light as possible off the background - Move the subject away from the bright background - Keep subject away from a wall, desk, etc., to avoid shadows.

PORTRAIT COMPOSITION and SUBJECT PLACEMENT

As in every type of photography, in portraiture there must be one, and only one, principal point of interest. Naturally, in a portrait, this is the subject's face. You can emphasize the point of interest in a portrait by doing the following:

- Contrasting the point of interest with the background

- Giving it the strongest lighting

- Posing the subject and arranging the props, so all elements point to the point of interest

- Identifying it at a strong point within the picture area.

Where are the strong points within a portrait picture space? The principle of thirds, to be discussed in a subsequent chapter, applies to portraiture as well. These are the areas within a portrait

that attract eye attention and are the preferred locations for the center of interest. In a portrait, when the main point of interest is located at Point A, the secondary point of interest should be at Point D. If B is the point of interest, C becomes the secondary interest point. Such an arrangement obviously balances the composition. Usually in portrait composition, the eyes fall close to Points A or B.

These positions are approximations only. The final adjustment of the head depends upon:

- the eye direction

- the shape of the body

- the leading lines

No rule can be given for best portrait composition. Rules only give guidance to a rough approximation of good placement. You can only arrive at the best composition for each portrait through the feeling for balance and subject position. When the head and shoulders are placed high in the picture frame, a sense of dignity and stability is gained. Such placement is particularly appropriate when the subject is a person of importance, such as your commanding officer. However, when the head is too high, viewing the picture is uncomfortable. This creates a scenario in your mind that if the subject stood up he would bump his head. Also, when the head is too high, the proportion between head and body areas becomes awkward.

FULL-LENGTH PHOTOGRAPHS

Another type of portrait photography you will encounter as a Navy MC is full-length photographs used for promotion and other selection boards. Per the <u>Military Personnel Manual</u> article 1070-180 (officer photographs), "photographs are required for all officers of the Navy and the Navy Reserve, regardless of status, within three months after acceptance of each promotion." This article also provides information for you as the MC when you are shooting this type of portrait. For example, the article states that the photograph must be in color with the subject at a three-quarter view, left shoulder forward. It also spells out the required photo size and specifications for the embedded title board.

When shooting full-length photos for boards other than officer promotions, ensure you review the current instruction for such additional guidance.

Background – Since the studio setup is unique for full-length photographs, they should be scheduled at a time other than that of normal head-and-shoulders portraits. The background for full-length photographs must be a contrasting color from the uniform of the subject. Normally, white seamless paper is used because it provides the best results. When white seamless paper is used for full-length portraits, it must drape down and provide enough coverage for the subject's head and extend to the deck so the subject is standing on it. You should protect the background from footprints and tears by laying down a protective material, such as paper or acetate.

Lighting – When lighting a full-length portrait, you must light the entire body of the subject evenly and not allow objectionable shadows to show on the final product. This is best achieved when the subject is lighted with light diffused from two umbrellas. The background can be lighted evenly with two background lights you should always conduct tests to determine the best lighting setup for your studio equipment and facilities.

PASSPORT PHOTOGRAPHS

Passport photographs are special portraits required for travel outside the United States. If you are tasked with shooting passport photographs, you should familiarize yourself with the current U.S. government passport photo requirements.

Passports should only be provided to U.S. military personnel, their authorized family members, and employees of the federal government when required for executing official orders. Providing such photography for purposes and to individuals other than this is an infringement of the rights and commercial enterprise and may violate U.S. Navy Regulations.

Passport photos must portray a good likeness of the applicant as well as satisfactorily identify the applicant. Passport photographs must meet the following requirements:

- Photographs must be 2x2 inches in overall size. The image size, measured from the bottom of the chin to the top of the head (including hair), shall be not less than 1 inch or more than 1 3/8 inches

- Passport photographs must be in color (see figure 2-18)

- Photographs that depict the applicant as relaxed and smiling are encouraged. Photographs should be portrait-type prints, meeting the size and image specifications listed above. Photographs must be clear, front view, full face, eyes open with a light, plain background

- A passport photograph serves to identify the passport applicant. When glasses, a hearing aid, a wig, or similar articles are normally worn, these articles should be worn when the photograph is made. Dark glasses with tinted lenses are not acceptable, unless required for medical reasons

- Photographs should be made in normal street attire without a hat or other headgear that obscures the hair or hairline.

Up-to-date guidelines for taking passport photos can be found on the U.S. State Department page for [professional photographers](#).

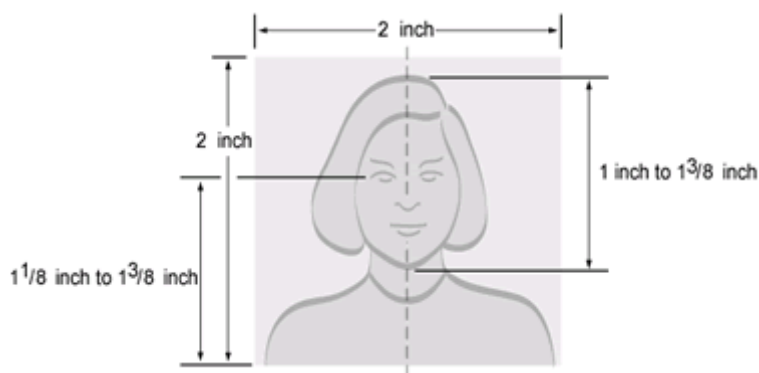
Figure 2-18, Passport dimensions.

TENTING

Photographing small products can be quite difficult if they include bright reflective surfaces. You can easily see other nearby objects reflected in them and sometimes even the whole studio. Also,

light from the lighting units may reflect off the surface very strongly at a particular point. This can create an unwanted bright highlight. There are two ways to get around these problems. You could use many lights and add reflectors to make sure the lighting is even. This may solve the problem of light from the lighting units reflecting off the subject surface, but unfortunately there are two great disadvantages: it requires more lights than most photo labs have, and you still have reflections. The other way to solve the problem is to use the tenting technique. The tent consists of a frame covered by a translucent white material that casts a diffused illumination on the subject. The lights are placed outside the tent and directed onto the translucent material. The color of the background, which is placed inside the tent with the subject, depends on the subject and the effect desired (see figure 2-19). Strips of black or colored paper taped to the inside of the tent add the necessary dark accents or "bring to life" a colorless object.

Figure 2-19, Tenting.

MULTIMEDIA

Just as MCs who shoot still and video images need to understand about lighting and color, so do those of us working with multimedia products. More specifically, you must understand the difference between RGB color and CMYK color in order to ensure the products you create look as good in print as they do projected on a screen.

COLOR MANAGEMENT

Few issues in multimedia cause as much confusion as color management and the differences between the RGB (red, green, blue) and CMYK [cyan, magenta, yellow, and key (black)] color models. These color models are opposites.

RGB, sometimes referred to as an additive color process, is what your monitor uses to send color to your eye. It combines red, green, and blue to create a whole range of different colors. CMYK is the color space used in the world of ink and paper. It is also known as a subtractive color process. Cyan, magenta and yellow inks are combined to create thousands of other colors. Black ink is added into the process, because while in theory, black can be created by combining cyan, magenta and yellow. In reality, the combination has somewhat of a tint and is not pure black. The result of this combination, in reality, is black with a tint, not pure black.

NOTE: White establishes overall color balance of your monitor.

So what does all this mean to you as an MC? For starters, RGB offers a wider range of colors than CMYK, and RGB colors tend to be more vivid than CMYK. Additionally, many RGB colors cannot be duplicated using the CMYK process.

As long as your product remains on a computer screen (website, command presentation, etc.) the differences between the two-color processes are purely theoretical. However, the moment your desktop published document makes the leap from monitor to printing press, the differences between the two color spaces become crucial. A green that looked vivid on screen can turn into a dull, khaki color when your document is printed. That charming piece of clip art of Santa's elves in bright green outfits suddenly looks like a picture of elves in Army uniforms when converted from RGB to CMYK.

Thus, if you are using a particular color, convert it to CMYK to make sure it will print the way you want it to. Note that some software does not allow users to work in CMYK.

In the early days of desktop publishing, the prevailing wisdom was that all documents should be converted to CMYK before sending them to a printer or service bureau. This allowed the desktop publisher a measure of control over color appearance. More than one desktop publisher has forgotten to convert a color, thus having a print job come back with graphic elements like lines and shaded boxes missing as a result.

Nowadays, however, some printers prefer to receive files in RGB, so they can convert to CMYK themselves using their expertise. This helps them convert the colors to their closest CMYK equivalents, while taking into account the calibration of their printing equipment. The key is to consult with your printer or service bureau ahead of time to see what format they prefer for your document.

If using your shop's inkjet printer or desktop color lasers, keep in mind that these devices sometimes convert files from RGB automatically. However, the limitations of CMYK still apply to these output devices, so design with color mode differences in mind. As with any equipment you use in your shop, always check the user's manuals and get to know your equipment.

SUMMARY

In this chapter, you learned about light, lighting techniques and color and how these processes and theories affect photography, videography and multimedia products. Lighting is critical to all visible mediums, and, as an MC, light is one of the most important tools you'll have in your toolbox. Today's MCs produce, edit and view products on light-sensitive devices that require a basic understanding of what this chapter has covered. Therefore, the discussion of color, theory of light, and multimedia in this chapter is meant to be a quick and efficient reference to the visible light portion of the electromagnetic spectrum. Remember having an understanding of how light and color affect your images and multimedia products is critical to your role as an MC.

CHAPTER 3

PHOTOGRAPHY

Learning Objectives: Upon completing this chapter, you should be able to do the following:

— Identify the basic parts of a camera.

— Identify the basic process of photography.

— Identify camera accessories.

— Identify the methods used for controlled and uncontrolled shooting.

INTRODUCTION

Photography is one of the pillars of the MC rating, and every MC must possess the skills necessary to capture images in support of our mission. As you have heard hundreds, if not thousands of times in your lifetime, "a picture paints a thousand words." Statistics show most people glance through newspapers and magazines, and rely on imagery to tell the story. Visual imagery readily tells and sells the Navy story to the media, elected officials and the public. Without imagery, we have no story.

In this chapter we will take what you learned about lighting and color and turn our focus to cameras, camera operations and basic shooting techniques.

CAMERA OPERATIONS

The basic elements of photography include:

- The Camera
- Aperture
- Shutter
- Exposure
- Depth
- Angle
- Lens
- Accessories
- Composition Techniques
- Controlled/Uncontrolled Subjects.

The CAMERA

Derived from the Latin phrase *camera obscura*, meaning dark chamber, a camera is a light-tight box used to capture images. A camera generally consists of an enclosed hollow chamber with an opening (aperture) at one end for light to enter and a recording or viewing surface for capturing the light at the other end. Though still based upon this principle, additions to the basic camera have improved focusing the image, viewing, controlling the amount and duration of light entering the box, as well as range and exposure calculations.

Today's MCs use digital single-lens reflex cameras, (DSLRs), that use a mechanical mirror system and a pentaprism that directs light from the camera's lens to its optical viewfinder found on the back of the camera. DSLRs resemble traditional 35mm format cameras.

<p align="center">CONTROLS AND INDICATORS</p>

The basic DSLR camera (see figure 3-1) contains main controls and indicators, which will be discussed briefly below. However, when you begin working with a camera, you should take the time to read through the camera's manual and to familiarize yourself with your equipment. Imagery you produce will be a result of your skills and experience in using your camera. The camera is simply the tool with which you gather this imagery.
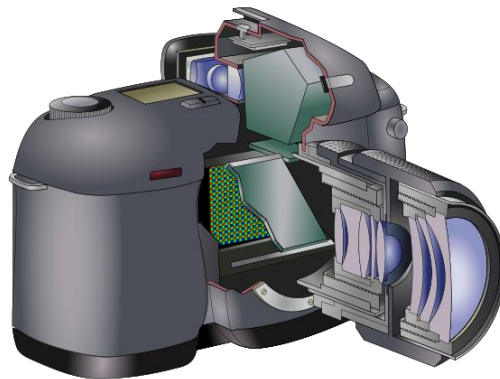
Figure 3-1, Digital Reflex Camera.

APERTURE

Aperture is the variable opening, produced by the iris-diaphragm, through which light passes into the camera. The aperture control is a ring around the lens with a scale that lists aperture numbers (2.8, 3.5, 4, 5.6, etc.), also known as "f/stops." The ring sets the f/stop on the lens to control the amount of light entering the lens.

Aperture also controls the depth of field of an image, or the range of acceptably sharp focus in front of and behind the subject of your image. The lower the f/stop, the shallower the depth of field.

On modern cameras, the aperture settings are controlled on the camera. Full stops are 1.0, 1.4, 2.0, 2.8, 4.0, 5.6, 8, 11, 16, 22, 32, 45, 64, 90 and so on. Notice that the number doubles for each two-stop decrease in size. Slight optical corrections are made for f/11 and f/45. This may seem confusing at first, but knowledge of the f/stop system is necessary to compute optical formulas used by advanced photographers. It is necessary to know that each marked f/stop on a lens, except its widest aperture, is usually a full stop — that is, it admits one-half or twice the amount of light as the adjacent stop, and the larger the number, the smaller the aperture. At first, it is perhaps easier to think of the f/stops in terms of fractions; 1/8 is larger than 1/11 which is, in turn, larger than 1/16.

Setting the Aperture Control

Adjust the f/stop on the aperture control ring on the lens, or the main control dial on the camera, depending on the specific type of camera and lens, to attain the correct exposure. Both controls can increase or decrease the depth of field.

SHUTTER

A shutter controls both the exact instant of exposure to light and the duration of that exposure. The shutter works in conjunction with the diaphragm to control the exposure. The shutter is a thin sheet that covers the charge-coupled device, or CCD (think of the CCD as film). When this shutter opens, it exposes light from the exterior onto the CCD, allowing a photo to be taken. The length of time that the shutter remains open is termed the shutter speed.

Shutter Release Button

The shutter release button opens the shutter and initiates the exposure.

Shutter Speed Dial

The shutter speed dial indicates optional shutter speeds and sets the length of time the shutter remains open during an exposure. Shutter speeds are indicated in fractions of a second; for example, 60 = 1/60 of a second (also expressed as 1/60). The higher the number on the dial, the faster the shutter speed and the shorter the exposure. Like aperture settings, shutter settings are controlled on the camera on modern cameras. Shutter speeds control the duration of time that light is allowed to pass through the lens aperture to the film. Shutter speeds are usually marked on the camera as the reciprocal of the fraction of a second that the shutter remains "open" (one is 1/1 or one second, two is 1/2 or one-half second, four is 1/4 or one-quarter second and so on).

Standard shutter speeds are B, 1", 1/2", 1/4", 1/8", 1/15", 1/30", 1/60", 1/125", 1/250", 1/500", 1/1000" and 1/2000". B is the bulb setting. Bulb setting allows the shutter actuation button to keep the shutter open for so long as the shutter release button is held.

SETTING THE SHUTTER SPEED

You may encounter situations where you need to freeze action or blur motion. In these situations you must manipulate both the shutter speed and the aperture control ring. For instance, you may set your camera at 1/60" to illustrate the speed of a runner — his legs and arms are a blur of motion on the finished photograph.

Consequently, if you want to freeze the action, you set your camera at 1/250" or higher. Then the runner's legs, arms and victory expression are "frozen." For hand-held shots, choose a shutter

speed no slower than the speed closest to the focal length of the lens. For example, you would select 1/60" for a 50mm lens and 1/250" for a 250mm lens.

To stop the movement or action in a picture, you must consider the following three factors:

- *Relative movement of the subject* — the faster the movement, the faster the shutter speed required. The term relative movement is used because if the motion of the subject is followed, that is, the action is "panned" with the camera, a slower shutter speed can be used than if the camera were held stationary

- *Subject's direction of movement* — a subject traveling at a right angle to the camera/lens axis requires a faster shutter speed than one traveling at a diagonal. Conversely, a subject moving toward or away from the camera, parallel to the lens axis, can be "stopped" with a slower shutter speed than movement in other directions

- *Camera-to-subject distance* — the closer the action is to the camera, the faster the shutter speed must be. A car traveling 60 miles per hour across the lens axis at a distance of 100 feet would be "stopped" by a shutter speed of 1/1000" (or perhaps 1/500"). However, if the camera-to-subject distance were increased to 500 feet, the action could be "stopped" with a shutter speed of "1/250" or "1/125." If the car was a half-mile away, 1/60" should be sufficient to stop the movement.

ISO Indicator

The ISO (International Standards Organization) is another method of controlling the amount of light that enters a DSLR. The lower the ISO setting, the less light available in the camera. Modern cameras can be set as low as 100 and as high as 6400.

EXPOSURE

Exposure is the amount of light falling on a unit area of the digital sensor. The intensity is the amount of light falling on this unit area during the exposure time. Thus the equation for exposure is as follows:

Exposure = Intensity x Time (E = I x T)

Exposure is controlled through the aperture setting, shutter speed and ISO speed. The same exposure can be given to a certain subject by using various combinations of lens openings and exposure times — a wide opening and short time of exposure may allow the same total amount of light to reach the sensor as a small opening and a long exposure time. A common rule for exposure calculation is the "sunny f/16" rule.

To use the f/16 rule, set your camera shutter speed to 1/125 and your aperture to f/16. In photography, the **sunny f/16 rule** (also known as the **f/16 rule**) is a method of estimating correct daylight exposures without a light meter and can aid in achieving correct exposure of difficult subjects. As the rule is based on incident light, rather than reflected light as with most camera light meters, the photographer compensates for very bright or very dark subjects. The rule serves as a mnemonic (or a reminder) for the camera settings obtained on a sunny day using the exposure value (EV) system.

Equivalent Exposures

Aperture and shutter speeds each have a doubling and halving effect on exposure. This doubling and halving relationship of aperture and shutter allows you to combine different f/stops and shutter speeds to alter the image, while, at the same time, admitting the same amount of exposure to the light-sensitive material.

For example, you have determined that the correct camera settings for your subject is 1/125 second, at f/16. Instead of using this combination of shutter speed and f/stop, you could double the shutter speed (to stop action) and halve the f/stop. In this example your new camera setting could be 1/250 second at f/11, 1/500 second at f/8, or 1/1000 second at f/5.6, and so on. Or when you need more depth of field, 1/60 second at f/22 or 1/30 second at f/32, and so on, can be used.

These shutter-speed and f/stop combinations are called equivalent exposures. Equivalent exposures control depth of field and stop motion. The combination of shutter speed and f/stop is used to capture the subject and effect you want to create.

Because many cameras are fully automatic, you may wonder why you need to know basic exposure. There are three good reasons for knowing an understanding the basic principles of exposure. First, you want to control the depth of field and stop action instead of the camera controlling it. Second, a light meter cannot think for itself. A light meter only responds to the light it receives. You must know when to override the camera, such as when the subject is sidelighted or backlighted. Lastly, meters are mechanical. They can be inconsistent, consistently wrong, or fail altogether. When you can workout in your head, roughly what the camera exposures should be, you will know when the camera or light meter is wrong. Knowing when a light meter is giving incorrect readings could make the difference between success and failure of an important photographic assignment.

DEPTH OF FIELD

You do not always want everything in your photographs to be in sharp focus. By using selective focus, you can emphasize the main subject and draw attention to it. "Selective focus" means the use of a shallow depth of field to isolate or emphasize the subject. Selective focus is the control of the zone of sharpness, or depth of field, in your photographs. "Depth of field" is the distance between the nearest and farthest points of acceptable sharp focus of the scene photographed.

Simply stated, depth of field increases as the focal length of the lens decreases (a shorter focal-length lens is used). As the lens aperture decreases (gets smaller in size) and as the distance focused on (focal point) increases, or both. Inversely, depth of field is less for long-focal-length lenses than for short-focal-length lenses, is less for wider apertures and is less for shorter lens-to-subject distances.

A peculiarity of the term depth of field is that it is typically used to define a condition of maximum depth of field. When the depth of field is shallow or purposely restrictive, the term selective focus is used. Selective focus is merely "selecting" a depth of field that will satisfy a requirement to have the foreground, background, or both, not in sharp focus. The use of selective focus to make the main subject stand out in the picture by being "sharp" while the rest of the image area is blurred is a good technique for gaining subject emphasis.

Camera Modes

Aperture Priority – User controls the aperture, and the camera chooses the appropriate shutter speed in order to capture correct exposure.

Shutter Priority – User controls the shutter, and the camera chooses the appropriate aperture setting in order to capture correct exposure.

Program Mode – The camera controls both shutter and aperture settings in order to capture correct exposure.

ANGLE OF FIELD

The focal length of a lens is a determining factor in the coverage of that lens. The maximum coverage at the focal plane of a lens is expressed in degrees as the angle of field. Angle of field is the widest angle at which light entering a lens produces a usable portion of the circle of illumination at the focal plane. Light around the edges of the entire circle falls off in intensity before disappearing completely. The usable portion of this circle is called the *circle of good definition*.

LENSES

As noted previously, most digital single-lens reflex cameras (digital SLR or DSLR) have interchangeable lenses. The "focal length" of a lens is the distance from the optical center of the lens to the focal plane (film plane) when the camera is focused upon an object at infinity. A 50mm focal-length lens is considered the "normal" lens, because when you look through the viewfinder, objects appear at their approximate normal size. A smaller than normal focal length (such as 28mm) means a wider angle of view. A longer than normal focal length (such as 135mm) is a telephoto lens.

The f/stop (aperture) ring controls the amount of light passing through the iris diaphragm of the lens and striking the CCD. The higher the f/stop number, the smaller the amount of light allowed to enter the camera lens. This principle works in the same manner as the iris of the human eye (see figure 3-2).
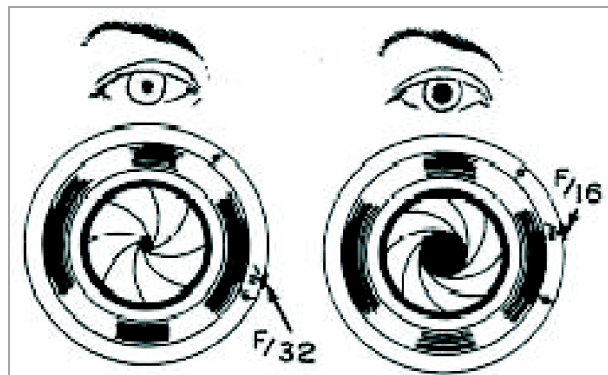
Figure 3-2, Comparison of the iris diaphragm of a camera lens to the iris of the human eye.

The types of lenses you may use in the fleet are as wide angle, ultra-wide angle, macro, normal focal length, telephoto, and variable focal-length, or zoom, lenses.

Wide-Angle Lenses – Anything less than 40mm in focal length is considered a wide-angle lens. A wide-angle (short focal length) lens is designed to take in a large view and is indispensable when working in confined spaces or when you want to cover a large area. Wide-angle lenses have their own qualities, causing apparent (REPEAT … apparent) distortion and foreshortening of perspective, so objects close to the lens appear large, while background objects diminish in size dramatically.

Ultra-Wide-Angle Lenses – Many ultra-wide-angle, or short-focal-length, lenses are known as fisheye lenses. The ultra-wide-angle view of these lenses results in image distortion. Straight lines appear curved and curved Lines may appear straight. Fisheye lenses makes objects appear to diminish in size rapidly as the distance from the camera increases and objects close to the camera appear far apart.

Macro Lenses – A macro lens is used for close-up photography and is a valuable lens for any imaging facility to have. These lenses come in various focal lengths and are capable of producing up to one-half or even life-size 1:1 images.

Normal Focal-Length Lenses – The standard or normal focal-length lens for a DSLR camera is from about 40mm to 58mm (the most common being 50mm). This focal length gives you the same impression as you would get if you look at the subject with one eye. A normal lens helps you shoot photos of people when you don't want to get too close.

Telephoto Lenses – A lens with a focal length greater than 58mm is a long focal-length lens. Most modern, long focal-length lenses are called telephoto lenses because of their compact design. A telephoto lens is used from farther away to obtain the same size image that would be produced by a shorter lens at a closer distance. Any telephoto lens seems to compress the perspective of your image. A telephoto lens does not compress perspective; it only appears that way! Remember, perspective does not depend on the lens being used, but on the position of the camera.

Variable Focal-Length Lenses – A variable focal length, or zoom, lens changes the focal length by mechanically moving the elements within the lens. The movement of lens elements, in unison and in precise order, gives a smooth change of image size while maintaining acceptably sharp focus throughout the entire adjustment. The biggest advantage of a zoom lens is that you have many focal lengths in one single lens. You do not have to change lenses to use a different focal length.

NOTE: *A lens used for portraits should have a longer than normal focal length. A long focal-length lens produces a large image on the film while keeping the camera at a far enough distance from the subject to prevent image distortion. Normal focal-length lenses are too short for anything but full-length portrait photography. They require the camera to be too close to the subject, image distortion becomes apparent, and working too close to the subject may intimidate him or her. Working too far from the subject with a normal lens to prevent distortion makes the image size too small. The ideal lens for portraiture should have a focal length equal to 1 1/2 or 2 times the diagonal of the film.*

Optical Center

The optical center of a lens is a point usually (although not always) within the lens, at which rays of light from different sources are assumed to cross.

Astigmatism

Astigmatism is a lens aberration that causes an off–axis point to be imaged as a pair of lines at right angles to each other and in different focal planes. A lens having astigmatism is unable to image horizontal and vertical lines in the same plane with equal sharpness.

Focusing Systems

Accurate focusing and framing are essential to good images, and modern cameras have many devices to help you get good focusing and framing results. Because of the principles of depth of field,

simple cameras are manufactured without any way of adjusting focus. The lenses of these simple cameras are prefocused at the hyperfocal distance.

The hyperfocal distance for a lens is determined by the focal length and the aperture. That allows "point and shoot," ID, and passport cameras to produce photographs where everything from about one half of the hyperfocal distance through infinity are acceptably sharp. Focusing is accomplished by adjusting the distance from the lens to the film. It does not matter which of the two is actually moved, the lens or the film. With handheld cameras the lens is moved in and out. No matter what system you use to focus the camera, there must be a means for you to determine when the image is in focus. Most cameras have automatic focusing systems. Your camera's user manual is always your best point of reference. Refer to your camera's user's manual for further information.

ACCESSORIES

There are many accessories photographers use in their day-to-day work some are required or optional, but we will only mention a few to give you an idea of what they are:

- Filters
- Light Meter
- Tripod
- Monopod
- Shutter Release
- Flash
- Lens and body caps
- Lens hoods
- Memory card.

Filters

Filters are optical elements, such as glass, gelatin or plastic, dyed in a specific manner to absorb light of certain colors selectively, to emphasize or subdue certain objects and to improve the monochrome or natural reproduction of objects. The purpose of photographic filters is to alter the characteristics of light that reaches the light-sensitive emulsion. As light is transmitted through a filter, at least one of the following alterations occurs:

- The color of light is modified
- The amount of light is reduced
- The vibration direction of the light rays is limited.

With the advent of digital photography and sophisticated computer photo-editing software, the physical application of filters is almost non-existent. However, neutral-density (ND) and polarizing filters continue to be of importance when creating digital images.

Neutral Density Filters Haze Filters

Neutral density (ND) filters reduce the amount of light passing through a camera lens without changing the reproduction of colors in the scene. These filters are nonselective in their absorption of colors of light and therefore uniformly reduce the various colors of light in the spectrum. White light and colored light are transmitted through an ND filter with only the intensity of the light being affected.

This type of filter is useful in any setting where you want to use larger apertures and/or slow shutter speeds in bright conditions. When you desire to reduce the depth of field but maintain a given shutter speed, ND filters permit the use of a larger f/stop which in turn, reduces the depth of field. Neutral density filters are used extensively in motion-picture photography where depth of field is usually quite deep. ND filters are also used with mirror-type lenses where there is no aperture control.

Polarizing Filters

Polarizing filters change the way your camera sees and treats light. Their effect becomes apparent when you look at the blue sky through a polarizing filter while rotating it. As you rotate the filter, the sky appears to get darker, then lighter. Reasons for using polarizing filters:

- Reduction or elimination of unwanted reflections (glare) from nonmetallic surfaces, such as glass and water

- Exposure control, similar to ND filters

- Reducing the effects of haze

- Darkening the blue-sky image in both black and-white and color photography

- Increasing color saturation in a color photograph without altering the hues of image colors.

As discussed in Chapter 2, the term *polarize* refers to a property of light that cannot be seen – the direction in which light rays vibrate. Unpolarized light rays vibrate in all directions at right angles to the ray itself. A light ray is polarized when vibrations are in one direction only.

Any synthetic material that polarizes light may be called a polarizer, or polarizing device. A polarizing screen is a polarizer in sheet form.

Although there are many different polarizing filters, there are only two main types – one that fits over the camera lens and one for use over a light source. Since they do not affect color, polarizing filters and screens may be used for both black-and-white and color photography. A polarizing device used over the camera lens may have small posts (known as indicator handles) projecting from the rim for aligning the axis of the polarizing grid.

LIGHT METERS

A light meter measures light. As you read in the previous chapter, light is crucial to producing a quality image. The correct use of a light meter greatly increases the accuracy in determining your camera exposure. You should also understand that the incorrect use of a light meter can result in consistently unacceptable results. To assure consistently acceptable exposures, you must become thoroughly proficient with the correct operation of a light meter.

A light meter can be either built into the camera or a separate handheld unit. Both types are sensitive instruments and should be handled with care. There is little maintenance, but they do

require batteries. When you think a light meter is not working properly, have it checked by a qualified technician. Always be sure to check your equipment before leaving on an assignment. Like all camera equipment, careless handling and excessive heat and moisture limit the life of a light meter. A light meter must not be subjected to high temperatures for prolonged periods of time. Unless the light meter is designed for underwater photography, it should be protected in inclement weather.

Light Meter Readings – There are two methods of measuring light with handheld light meters. These two methods are the incident-light method and the reflected-light method.

- Incident-Light Method – This method requires the use of an incident-light meter. An incident-light meter has a diffusing dome that covers the photoelectric cell. When an incident-light meter reading is taken, the meter is held at the position of the subject with the photoelectric cell pointed toward the camera. The meter measures the light falling upon the scene. The incident-light method of measuring light is used extensively in motion-media photography and gives fast accurate results in all photography. Most light meters are designed for use as either incident-light or reflected-light meters. By removing the diffusion dome from the photoelectric cell, you can use the meter to measure reflected light

- Reflected-Light Method – When you are taking this type of light-meter reading, the diffusing dome should be removed from the photoelectric cell and the meter pointed toward the subject. A reflected-light meter receives and measures the light reflected from a scene within the angle of acceptance of the meter. The term angle of acceptance compares to the term angle of view of a lens. Both are predetermined during manufacturing

- The angle of acceptance and the distance between the meter and the scene are the controlling factors as to how much of the reflected light from the scene is measured by the meter

- When the angle of acceptance is greater than the angle of view of a lens (when using a telephoto lens for example), the meter should be moved closer to the scene. Light meters that are built into the camera are reflected-light meters

- When these meters are used, the angle of acceptance is not greater than the angle of view of the lens being used. The meter measures the light from the scene as seen by the lens. Some reflected-light meters have angles of acceptance between 1 and 4 degrees

- These meters can be used from a distance to measure the reflected light from specific objects within a scene. Exposure meters with angles of reflectance this small are called spot meters.

Light Meter Operation – You must understand the way light meters operate to determine whether the information they provide is accurate. No matter what type of light meter you use, it is an electrical-mechanical device that can only provide information for which it is designed. You are responsible for translating this information into useful exposure data.

Light meters are calibrated to see one shade only – middle gray. This means the information that the meter provides, no matter how much light is falling on the subject or what the reflection characteristics are, reads the subject the same as though it were middle or neutral gray (18-percent gray). Theoretically, if you take a reflected-exposure meter reading from an 18-percent gray card and expose your film according to the reading, the result should be a picture that matches the tone of the gray card exactly. However, when you take a light meter reading of a white or black object, the light meter still reads the objects as though they were 18-percent gray.

When you take a photograph that includes gray, white and black cards, you will see how, depending on where you take the light meter readings, they affect your photograph. For example, when you take the light meter reading from the black card, the final picture reproduces the black as middle gray, and the gray and white cards as white. When you take the reflected-light meter reading from the white card, just the opposite occurs. In your final photograph, the white card reproduces as middle gray, and the gray and black cards reproduce as black. This example demonstrates overexposure and underexposure. When the reading was taken from the black card, the meter raised the black tone to middle gray, and the gray card tone was also raised so it reproduced as white. Thus both the black and gray cards were overexposed. The opposite occurred when the exposure was based on the reading from the white card. The white tone was lowered to middle gray and the gray card tone to black, resulting from underexposure. Only a light meter reading taken from the gray card allows all three cards to be imaged at their true tone.

A more practical example on the way a light meter reads 18-percent gray is illustrated in the following example. Suppose you are going to photograph a ship alongside a pier. Bright sunlight is striking the ship from the side, causing part of the ship to be in shadow. This creates a brightness difference between the highlight area and the shadow area. Both highlight and shadow areas are equal in size and importance. When you get close to the ship and take a reflected meter reading of the highlight area alone, you expect the finished photograph, like the white card in the above example, to be middle gray. When you stop down the aperture to the recommended exposure of the meter, you are also reducing the amount of exposure from the shadow area. This results in a loss of detail in the shadow area of the ship, because it is underexposed. The opposite effect occurs when you take a meter reading from the shadow area. In this case, the shadow tones are raised to middle gray and have detail, but the highlights are overexposed and completely "washed out." If, however, there was an area in this scene whose tone was midway between the highlight and shadow areas, you could use it to take your light meter reading (like the gray card was used in the previous example).

In this example, assume there is no tone midway between the two extremes. You can still get an accurate light meter reading of the entire ship. Since the highlight and shadow areas are of equal size, the average light meter reading you get will represent a tone that is midway between the two extremes.

Reflected-Light Meter Reading

- Variations – There are variations of light meter readings used to provide accurate light meter readings of different types of scenes. These methods are as follows: the integrated, or average, method, the brightness range method, the darkest object method, the brightest object method, the substitution method, and the bracketing method

- Integrated, or average, method – The technique of making reflected-light meter readings from the camera position is called the integrated, or average, method. This method was used and explained in the examples above. This method is accurate for the majority of photographs taken

- The integrated, or average, method of measuring reflected light is acceptable for scenes that consist of approximately equal portions of light and dark areas; however, when a scene is composed of either predominately light or dark areas, the meter reading may not be accurate. The reason for these inaccurate meter readings can be more easily understood by using an example of photographing a checkerboard with alternating black-and-white squares

- When the meter is held at a distance to include the entire board, the reflected light from both the black and the white squares influence the meter, so an average reading results. The light measured from this position is the integrated sum of both the white and the black squares, as though the checkerboard were one gray tone. The light meter reading from this point should produce an acceptable image. If you hold the meter so close to one of the white squares that the black squares have no effect on the meter reading, the reading is higher than the integrated reading and the meter indicates that the scene requires less exposure. The same principle applies when a reading is taken close to a black square. The reading indicates that the scene requires more exposure. Each of the meter readings is a measurement of 18-percent gray. You can apply this checkerboard example when you photograph scenes that are predominately light or dark

- Compensation is required to expose such scenes correctly. As a general guide, you should double the indicated exposure when the light measurement is taken from a predominately light scene and detail is desired in the shadows. When you take a light meter reading from a predominately dark scene and detail is desired in the highlight areas, you should reduce the exposure by one half.

Brightness Range Method – This method requires you to take two readings from the scene – one from the highlight area and another from the shadow area. You then base your exposure on a point midway between the two readings. The brightness range method of determining exposures for most scenes usually provides detail in both the highlight and the shadow areas.

An exception to this is when the exposure latitude is not capable of recording the brightness range of the scene. This can occur with scenes that have extremely great brightness ranges. A scene brightness range is the difference between the brightest and the darkest areas of a scene and is usually expressed as a ratio. The average brightness range of a normal scene is 160:1.

When the scene exceeds a brightness range of 160:1, you must compromise the exposure. This compromise can be as follows:

- Underexpose and sacrifice shadow detail to retain highlight detail

- Overexpose and sacrifice highlight detail to retain shadow detail

- Do not compensate and expose for the midtones and sacrifice both highlight detail and shadow detail.

Darkest Object Method – The darkest object method of determining exposures is actually a variation of the brightness range method. When you desire detail in the shadow area or darkest object within the scene, you take the light meter reading from this area. This method actually overexposes the image overall, causing the highlight areas of the scene to be greatly overexposed. This overexposure occurs because the light meter averages the light reflected from the shadow area and indicates an exposure to produce middle gray. When a great amount of detail is not needed in the shadow area and you want to expose the overall scene normally, you can take your light meter reading from the darkest object or shadow area and stop down two f/stops. This method provides a good overall exposure of the shadows, midtones, and highlights.

Brightest Object Method – Another variation of the brightness range method is the brightest object method. The brightest object method of calculating exposures is used when a highlight area within a scene is the only area within the scene from which you can take a light meter reading. This method works when you want to record detail in the highlight area. In both situations, you take only one light meter reading of an important highlight area. When you do not want the highlight to record

as a middle-gray tone and desire a good overall exposure of the scene, you simply open up two or three f/stops from the indicated exposure. When you need maximum detail in the highlight area, you can use the reading that the light meter provides. This records the highlight area as medium gray. This method underexposes the film in other areas of the scene that reflect less light.

Substitution Method – With the substitution method, you replace an object within the scene with an object, such as a gray card. You then take a reflected-light meter reading from this object. You use this method when the other methods of determining exposure are not possible. Such situations may be caused by excessive distance between the light meter and the scene, barriers in front of the scene, or the size of the scene makes it impossible to get an accurate light meter reading.

The substitution method is often used in studio situations where objects may be too small to obtain an accurate light meter reading. You should select substitution objects that match the light reflectance quality of the object in the scene. For example, a white card can be used to substitute highlight areas of a distant scene. A dark or a black card can be used to substitute a shadow area, an 18-percent gray card can be used to represent middle gray or the back or palm of your hand can be used to substitute a gray tone.

When the substitution method is used, take the light meter reading from the substituted item under similar lighting conditions that exist in the scene. When the scene is in bright sunlight, the substituted object must also be in bright sunlight. Likewise, a scene in shade requires a substitute light meter reading in shade. You can use each of the methods discussed previously with the substitution method. An 18-percent gray card can be used for the integrated or averaging methods, a dark and a light card can be used for the scene brightness range method, a dark card for the darkest object method, and a light card for the brightest object method.

Bracketing Method – There are times when unusual lighting or subject brightness prevents you from getting an accurate light meter reading. In these cases, a good insurance policy is to bracket your exposure. To bracket, you should take one picture at the exposure indicated by the light meter, and then take two more exposures: one at one f/stop under the indicated exposure and another at one f/stop over the indicated exposure. When you are in doubt about the correct exposure, it is always better to overexpose than underexpose. Even though overexposure produces excess densities in the negative, it still provides a useable image that can normally be corrected in the printing stage. When underexposed, if the image does not exist on the film, no corrective printing techniques can provide image detail.

Causes of False Readings

Light meters give erroneous or bad readings that produce underexposed images for a number of reasons. You can prevent these bad readings by being aware of the conditions that cause them.

Light Entering the Viewfinder – When taking light meter readings, you must be sure the reflected light that influences your light meter is actually from the object you want to photograph. Stray light, backlighting, large dark areas and shadows can all cause erroneous light meter readings. When using a light meter, be sure that shadows are not cast from the light meter, camera or yourself.

When a handheld light meter is used, the distance of the light meter to the subject should not exceed the shortest dimension of the object. For example, when taking a light meter reading of a person's face that is approximately 9x6 inches, you should hold your light meter about six inches from the face of your subject when taking the meter reading. When using a light meter that is built into a camera, be sure to focus on the image before taking a light meter reading.

Light entering the viewfinder and falling on the viewing screen can cause underexposure. Most TTL meters read the light falling on the viewing screen from the lens. When strong lighting is coming from behind the camera, it can influence the light meter. When an occasional underexposed frame in an otherwise successful series occurs, the cause may be light entering the SLR viewfinder. Make a point of shielding the viewfinder if you do not have a rubber eyecup. When you use a tripod, have the camera set on automatic and cap the viewfinder to prevent exposure errors.

Incorrect Film-Speed Setting – When the majority of frames are consistently underexposed or overexposed, the most likely cause is you have the wrong ISO set on the film speed dial.

Bright Subject – A bright object or highlighted area can affect the sensing area of a spot or center-weighted TTL meter. This results in an underexposed image. To prevent this from occurring, you should ensure the sensor is pointed directly at a midtone within the scene, and use this as the camera exposure. When you frame and compose your image, the light meter may indicate a different setting. Be sure to leave your camera set at the indicated midtone setting. Normally, light meters that take integrated or averaged readings of the field of view cannot be fooled in this instance. But remember, even integrated systems cannot cope with extremely bright areas that take up a significant portion of the frame.

Bright Background, Dark Subject – When you are taking photographs that are backlighted or against a light background, there is always the danger of underexposing the main subject (unless you use special techniques to fill in shadows, such as using a reflector or a flash unit). Be careful to take a reading from only the shadow side of the subject in these situations.

Too Little Light – The most frequent cause of underexposure is trying to take pictures when there is not enough light. Light meter readings are not very accurate at these low-light levels. When you want to make photographs under these conditions, be sure to use a tripod and bracket to provide more exposure than indicated by the light meter. You also can switch to a higher IS0.

There are several other causes that may cause your images to be exposed incorrectly. Some of the most common causes:

- Wrong camera settings are set when transferring information from a handheld light meter to the camera. This can also occur when you attempt to override an automatic camera

- Using a camera with TTL metering and placing a color filter with a high-filter factor over the lens

- Wrong aperture setting when flash is used

- Shutter speed is not synchronized with camera flash

- Aperture or shutter speed setting is knocked while carrying the camera. Always check the camera setting before taking a photograph

- Weak or incorrect battery in the light meter.

TRIPODS

The best way to support your camera is with a sturdy, rigid tripod (see figure 3-3).Tripods are three-legged camera supports with flat platforms or heads in which cameras are secured. Most tripods are equipped with a head that has an elevator center post. The camera is attached to this center post and is raised or lowered easily by cranking the post up or down. These elevators eliminate

the need for readjusting all three tripod legs for making small, last-minute adjustments to the camera height.

Tripods come in a variety of designs, sizes and weights. The heavier models are the sturdiest and provide the best support; however, if too heavy, they are not very portable. As a rule, the heavier your camera, the heavier and stronger your tripod must be. For some of the light, full-size tripods, hanging a bag of sand or another weight from the tripod head improves rigidity. This is especially useful in high winds. Another method is to hang a strap from the tripod head, and use the strap as a foothold on which to apply downward pressure.

Tabletop tripods are also available and can be used almost anywhere a flat surface is available. These small tabletop tripods can be braced against the photographer's chest. Because of their small size, they fit in a camera bag. To set up a tripod, extend one leg straight ahead toward the subject. This way the camera may be aimed by pivoting the tripod on this one leg. Extend the other two legs and adjust them to level the tripod platform horizontally.

When setting up a tripod on level ground, you can waste a lot of time trying to get the tripod level if the leg sections are not extended fully. An easy solution to the problem is to mark the tripod legs in specific increments with a marking pen, pencil, or scribe. One method is to mark short lines at one-inch intervals and long lines at six-inch intervals. Doing this reduces your frustration, saves time, and allows you to level your camera on the tripod with less effort. When a tripod is set up on an uneven surface, several adjustments of the side legs are normally necessary. Readjustment of the front leg levels the camera vertically so the platform or head is level. Most newer tripods have platforms that can be adjusted by eliminating the need for minor leg adjustments.

To mount the camera on the tripod head, you secure it in place by tightening the tripod screw into the camera tripod socket. Secure the camera by tightening the camera clamp screw locknut. After the camera is mounted on a tripod, test the camera to ensure all camera controls are accessible and function properly. The camera should be stable and not shake when the camera controls are operated.

Using a foot strap to make a tripod more rigid

Using a monopod

Figure 3-3, Tripod and Monopod use.

Monopods

A monopod is a single pole on which a camera is mounted (see figure 3-3). Monopods are useful for keeping the camera steady for location work when a tripod is too bulky or difficult to use; however, the use of a monopod is not advisable when using large, heavy cameras or when shutter speeds below about 1/15 second are used. Standing or kneeling with a monopod braced against your body or leg provides a camera the extra support and steadiness required for it to be an effective tool.

Shutter Release

A shutter release is a device consisting of stiff wire encased in an outer flexible covering, or a wireless device used to trip a camera shutter without touching the camera itself.

Flash

The electronic flash is a high-voltage light source for illuminating the scene to be photographed. It produces a momentary flash of high-intensity light. See chapter 2 for more information on flash use.

Lens and Body Caps

Lens and body caps are protective covers that keep dust and moisture away from lenses and camera openings.

Lens Hoods

Lens hoods, or shades, are used to keep strong sunlight from striking the front of the lens obliquely.

Memory Card

Memory cards, also known as flash cards, are electronic data storage device that stores digital contents. They capacities depend on the gigabytes or megabytes. Always make sure you have extras!

PHOTOGRAPHIC COMPOSITION

Photographic composition is *the pleasing arrangement of subject-matter elements within the picture area*. The camera sees and records only a small isolated part of the larger scene, reduces it to only two dimensions, frames it and freezes it. It does not discriminate as we do. When we look at a scene we selectively see only the important elements and more or less ignore the rest. A camera, on the other hand, sees all the details within the field of view. This is the reason some of our pictures are often disappointing. Backgrounds may be cluttered with objects we do not remember, our subjects are smaller in the frame or less striking than we recall or the entire scene may lack significance and life. Good photographs are seldom created by chance.

To make the most of any subject, you must understand the basic principles of composition. How are photographic composition skills developed? You look, you study, and you practice. There are no hard-and-fast rules to follow that ensure good composition in every photograph. However, principles and elements provide a means of achieving pleasing composition when applied properly.

NOTE: After reading through the various photographic compositions, check out the Navy.mil photo galleries *and see if you can identify the many techniques used.*

Center of Interest

Each picture should have only one principal idea, topic or *center of interest* to which the viewer's eyes are attracted. Subordinate elements within the picture must support and focus attention on the principal feature so it alone is emphasized. The center of interest may be a single object or numerous ones arranged so attention is directed to one definite area. A photographer usually has at his or her disposal many factors or elements that can be used and arranged within the picture area to draw or direct attention to the primary idea of the picture. Some of these elements are lines, shapes, human figures, tone, and texture. Human figures attract attention more strongly than almost any other subject matter and unless they are the main object of the photograph should probably be kept out of the picture.

Subject Placement

In photographic composition, two general rules are used to determine the best location for the center of interest – *the rule of thirds (see figure 3-4) and dynamic symmetry*. In the rule of thirds, the intersection of lines that divide the picture area into thirds are good locations for the center of interest in most photographs. Notice we said THE center of interest. Remember, have only one center of interest to a image. The principle of dynamic symmetry is a similar idea. A good location for the center of interest is found by drawing or imagining a diagonal line from one corner to an opposite corner. Then, draw a second line perpendicular to the first from a third corner. The intersections of the lines are the location for the center of interest.
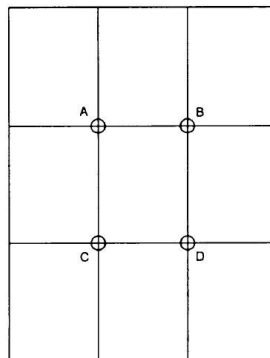
Figure 3-4, Rule of Thirds.

Simplicity

Simplicity is the key. The simpler and more direct a photo is, the clearer and stronger the resulting statement. When work toward simplicity, select a subject that lends itself to a simple arrangement or select different viewpoints or camera angles. Only after considering all possibilities should you take the photograph. Bottom line is to tell the story, while ensuring you have just the right amount of information to convey one single idea.

VIEWPOINT and CAMERA ANGLE

The proper viewpoint or camera angle is an important factor in good composition. Repositioning your subject within the viewfinder frame and changing the camera viewpoint or camera angle are two simple ways of controlling composition. The terms *viewpoint and camera angle* are often used in conjunction with one another and sometimes used interchangeably. They can also have

different meanings depending on how they are applied. Viewpoint is the camera position in relationship to the subject.

Low Viewpoint/ Low Camera Angle

A low camera angle is achieved when the camera angle is located below the point of primary interest and pointed upward. Low angles tend to lend strength and dominance to a subject and dramatize the subject. Low-angle shots are used when dramatic impact is desired. This type of shot is very useful for separating the subject from the background, for eliminating unwanted foreground and background, and for creating the illusion of greater size and speed.

High Viewpoint/High Camera Angle

High viewpoints and high camera angles help orient the viewer, because they show relationships among all elements within the picture area and produce a psychological effect by minimizing the apparent strength or size of the subject.

BALANCE

Balance in photographic composition is a process of making pictures appear harmonious. The subject placement within the picture area is the factor that must be carefully considered. Composition is kept in balance by two different methods:

Symmetrical (Formal) Balance

Symmetrical (formal) balance in a photograph is achieved when elements on both sides of the picture are of equal weight. The idea of formal balance can be related to a seesaw. When there are two equally weighted objects on the seesaw and they are equidistant from the pivot point, or fulcrum, the board will be in balance.

Asymmetrical (Informal) Balance

Asymmetrical (informal) balance is usually much more interesting than symmetrical balance. In asymmetrical balance the imaginary central pivot point is still presumed to be present. However, instead of mirror images on each side of the picture area, the subject elements are notably different in size, shape, weight, tone and placement. Asymmetrical balance is introduced when the presumed weight of two or more lighter objects is equalized by a single heavier object placed on the other side of the imaginary pivot.

Other Aspects of Balance

- An object far from the center of the picture seems to have more weight than one near the center

- Objects in the upperpart of a picture seem heavier than objects of the same size in the lower part of a picture

- Isolation seems to increase the weight of an object

- Intensely interesting objects seem to have more compositional weight

- Regular shapes seem to have more weight than irregular shapes

- Elements on the right side of an asymmetrical picture appear to have more weight than elements of the same size on the left side of the picture

- The directions in which figures, lines, and shapes appear to be moving within the picture area are important to balance. For example, a person may be walking in a direction, or his eyes may be looking in a direction, or the shape of some element creates a feeling of movement. When the feeling of direction is present within a scene, it tends to upset the balance if judged on the size of the subject alone.

SHAPES and LINES

Shapes and lines are important elements in photographic composition. When properly used, shapes and lines can create a desired effect.

Shape

Shape is a two-dimensional element basic to photo composition and is usually the first means by which a viewer identifies an object within the picture. *Form* is the three-dimensional equivalent of shape. The greatest emphasis of shape is achieved when the shape is silhouetted, thus eliminating other qualities of the shape, such as texture and roundness, or the illusion of the third dimension.

Lines

Lines unify composition by directing the viewer's eyes and attention to the main point of the picture or lead the eyes from one part of the picture to another. Lines that lead the eye or direct attention are referred to as *leading lines*. Vertical, diagonal, horizontal, and curved lines create different moods. Vertical lines communicate a sense of strength, rigidity, power, and solidarity to the viewer. Horizontal lines represent peace, tranquility and quietness. Diagonal lines represent movement, action and speed. Curved lines present a sense of grace, smoothness and dignity to a photograph. The most common curved line is the "S" curve.

Pattern

Creating images around repeating elements or patterns provides picture unity and structure. Pattern repetition creates rhythm that the eyes enjoy following repeated lines, tone, and color can also provide unity to your composition and combinations of these create interesting pictures. Triangles, squares, and circles are the basic shapes to look for in a pattern. Triangles and squares are usually static but can be placed to create a tension-filled, dynamic effect. Circles and curves are pleasing pattern shapes.

Volume

When photographing most subjects, you face the problem of how to symbolize three-dimensional objects in a two-dimensional picture. The solution becomes simple when a distinction is made between the two different ways three-dimensional objects appear: as positive or occupied space (volume) or as negative or unoccupied space. Positive space is where shapes and forms exist; negative space is the empty space around shapes and forms. An area of a photo absent of shapes and forms is negative space. It serves to balance the area. Areas of a picture that contain "nothing" are important visual elements that provide balance in an image.

Lighting

By controlling light and directing it where you want it, you can subdue objects or distracting elements in the scene to give more emphasis to the main point of interest. Light and shadows can be used in composition to create mood, to draw attention to an area, to modify or distort shape, or to bring out form and texture in the subject.

Texture

Texture helps to emphasize the features and details in a photograph. By capturing the texture of objects in the photograph, you create form. For example, when people observe a soft, furry object or a smooth, shining surface, they have a strong urge to touch it. Texture gives realism and character to a picture and may, in itself, be the subject of a photo. When texture is used as a subordinate element within the picture, it lends strength to the main idea. Just a little different lighting or a slight change in camera position may improve the rendering of texture in a picture.

Tone

Tone is probably the most intangible element of composition. Tone may consist of shadings from white-to-gray-to-black, or it may consist of darks against lights with little or no grays. The interaction of light against dark shades in varying degrees helps to set the mood of a composition. A picture consisting of dark or somber shades conveys mystery, intrigue, or sadness. When the tones are mostly light and airy, the picture portrays lightness, joy, or airiness.

Contrast

When we speak of contrast as it relates to composition, we are referring to both tonal contrast and color contrast. Tonal contrast is simply the difference between the light and dark areas of a photograph. Color contrast is the perceived difference in a color when surrounded by another color.

Framing

Framing is another technique photographers use to direct the viewer's attention to the primary subject of a picture. An element used as a frame should not draw attention to itself. Ideally, the frame should relate to the theme of the picture. For example, a line of aircraft parked on the flight line framed by the wing and prop of another aircraft.

Foreground

A distracting or unnecessary foreground ruins a large percentage of otherwise good images. An undesirable foreground can be eliminated by moving in closer to the subject, by making pictures with a longer than standard focal-length lens, or by changing viewpoint or camera angle. No object in the foreground should ever be so prominent that it distracts from the subject.

Background

The background is almost as important an element in good composition as the camera angle. Be particularly observant of the background to see that it contains nothing distracting.

PERSPECTIVE

Perspective refers to the relationship of imaged objects in a photograph. This includes their relative positions and sizes and the space between them. In other words, perspective in the composition of a photograph is the way real three-dimensional objects are pictured in a photograph that has a two-dimensional plane. In photography, perspective is another illusion you use to produce photographs of quality composition. When you are creating photos, the camera always creates perspective. When you know the principles of perspective and skillfully apply them, the photographs you produce show a good rendition of the subject's form and shape. The viewer is given the sensation of volume, space, depth and distance.

Linear Perspective

The human eye judges distance by the way elements within a scene diminish in size, and the angle at which lines and planes converge. This is called *linear perspective*. The use of different focal-length lenses in combination with different lens-to-subject distances helps you alter linear perspective in your pictures. When the focal length of the lens is changed but the lens-to-subject distance remains unchanged, there is a change in the image size of the objects, but no change in perspective. On the other hand, when the lens-to-subject distance and lens focal length are both changed, the relationship between objects is altered and perspective is changed.

By using the right combination of camera-to-subject distance and lens focal length, a photographer can create a picture that looks deep or shallow. This feeling of depth or shallowness is only an illusion, but it is an important compositional factor. Using a short-focal-length lens from a close camera-to-subject distance, or viewpoint, produces a picture with greater depth (not to be confused with depth of field) than would be produced with a standard lens. Conversely, using a long-focal-length lens from a more distant viewpoint produces a picture with less apparent depth.

Rectilinear Perspective

Most lenses produce rectilinear perspective typical of what the human eye sees. This is to say that lines that are straight in the subject are reproduced straight in the picture. Fisheye lenses and the lenses used on panoramic cameras produce a false perspective. With a fisheye lens, straight lines in the subject are imaged as curved lines toward the edges of the picture. A panoramic lens produces panoramic or cylindrical perspective.

Vanishing Point Perspective

In vision, lines that are parallel to each other give the sensation of meeting at vanishing points. When parallel lines, either horizontal or vertical, are *perpendicular* to the lens axis, the vanishing points are assumed to be at infinity.

Height Perspective

The higher up in the ground area of the picture (up to the horizon) that the base of an object is located, the further away it seems from the viewpoint and the greater its height perspective.

Overlap Perspective

When subjects within a photo are on about the same line of sight, those objects closer to the camera viewpoint overlap more distant objects and partially hide them.

Dwindling-Size Perspective

The farther away an object is from the viewpoint, the smaller it appears; therefore, when subjects of familiar size are included in a photograph, they help to establish the scale of the picture. Scale helps the viewer determine or visualize the actual size or relative size of the objects in the picture.

CONTROLLED/UNCONTROLLED SUBJECTS

Shooting photos typically falls into one of two categories – controlled or uncontrolled action. As the name implies, in controlled action you control all aspects of the shoot, and most aspects, if not all, are predictable. When you aren't the manager of the action or if the shot isn't predictable, you are shooting uncontrolled action.

CONTROLLED ACTION

One of the most difficult tasks of photographing controlled subjects, such as people, is directing them. Since you are the only person who can see what the picture will look like before it is taken, you must take responsibility for composition.

In Chapter 2, we discussed portrait photography, which is one form of controlled-action shooting. The paragraphs below feature further examples and techniques when shooting controlled action.

Individual Shots

As an MC you will shoot photos of individuals for a multitude of projects, such as news releases, familygrams and cruise books. Therefore, you should be familiar with the methods used to direct photographic subjects.

One way to make directing and posing easier is to give your subject an object to handle. Do not tell him to "just stand there," as though in a vacuum, with nothing to do. Men and women can hold a book, binoculars or a tool used in their work. Children will do fine with a doll or model airplane.

Another strategy is to give your subject something to lean against or sit upon. Use a chair, stool, post or tree.

If you use props in your individual photographs, make sure you do your homework. For instance, do not photograph a gunner's mate holding a three-inch shell in front of a 5-inch gun mount.

Also, pay attention to the eyes. Eyes are very important when photographing people. When the subject's eyes look straight into the camera, a strong and immediate impact is created that attracts the viewer's interest. When the eyes are directed away from the camera, the effect is less explicit and has more of an ambiguous quality. Decide on the best approach for your photograph and direct your subject appropriately.

Finally, you must be in charge of the situation. This cannot be emphasized enough. It is your responsibility as the photographer to direct the scene – tell the subject what to do, how to do it and when to do it. This applies to an admiral as well as a seaman. Just remember your military bearing and professionalism.

Many people are nervous and self-conscious in front of a camera. They try to look their best and, in doing so, often present a stilted expression or pose. It is your job to give directions regarding the pose. It is also your responsibility to make sure that coat sleeves are pulled down and wrinkles are smoothed. Make sure the subject's hat is set at the proper angle. If you ignore these potential problem areas, your photograph will ultimately suffer. Time will be wasted for yourself and for your subject.

Group Shots

Occasionally you will receive an assignment to photograph a group, which adds a degree of organizational difficulty. When shooting group shots, you should consider each person individually, but consider each individual as he relates to the entire group. Every precaution should be taken to ensure each person is shown clearly and interest is not drawn to one person by some awkward pose or expression.

Formal Group Shot

A formal group shot is one in which several people, uniformly dressed for the occasion, are seated or standing in as nearly the same pose as possible. Each member is placed in approximately the same relative position so that attention is not drawn to one person.

Customarily, in a formal group, the highest-ranking person is located in the center of the first row and other members of the group arranged alternately to the right and left, according to grade. When all members of the group are the same grade, arrange them according to height, with tall individuals either in the center or at the ends, or occupying the rear rank.

A formal group of about five people can be composed to fill the picture area very nicely. When six to 10 people are being photographed in a group, arrange them in two rows. For larger formal groups, arrange the people in as many rows as necessary to fill the frame. Avoid stringing out one long, narrow line of people across the frame.

When a large group is formed into three or more rows, you must devise some method to prevent the rear rows from being blocked from view. Furthermore, to compose the picture properly and fill it from top to bottom, you should have each row higher than the preceding one. One method is to arrange the group on the steps of a building, bleachers or terrace, so each row is higher than the preceding one. On level ground the first row can be seated, the second standing, and the third standing on benches. Another method which you can use in combination with the first is to elevate the camera so that it is pointing down at an angle on the group. This method is useful as an aid in composing and filling the picture area. A higher camera angle can be useful in eliminating an undesirable background. Remember, to get maximum depth of field, you should focus the camera one third of the way into the group. For example, if there are nine rows, focus the camera on the third row.

Informal Group Shot

The informal group is intended to depict some action or tell a story about the individuals. Although the position and pose of each member is carefully planned, the results must appear casual and realistic. Members may be seated, kneeling or standing in a variety of positions and do not have to look in the same direction.

One of the most important factors in group photography is arranging people to obtain the best possible composition. Regardless of the number of people in a group, they should be situated to fill the picture and provide the largest possible image size of each person. One exception to this general

rule is when the importance of the background is equal to or greater than the group itself. This often occurs with an informal group when the picture is actually intended to emphasize some object or piece of equipment, rather than the individuals. In this case, locate the camera for the best composition of the object; then arrange the people in the picture to enhance the story being told.

As with individual pictures, you must stay in charge. If you relinquish control, you will have a hard time getting everyone to look at the camera at the same time. Talk to the group and give them your instructions. Make sure your equipment is ready so you do not waste time and lose the group's attention.

ENVIRONMENTAL PORTRAITS

An environmental portrait is a portrait shot in someone's usual environment, such as in the home or workplace, highlighting the person's life and surroundings. When on such an assignment, place your subject in a setting that tells part her story. The background should be simple and non-distracting to the subject but compliment the essence of who you are photographing. For example, if you are aboard an aircraft carrier and want to shoot an environmental portrait of the air boss, shoot the photo in the tower, by the tower or by his aircraft. The environment adds story depth to the photo.

Candid Photography

Common perception within photography is that a candid photo is one that is not set up or the subject does not know is being taken. Photographers have learned, however, that candid techniques can be used just as effectively to make pictures of people they know, even when the people know they are being photographed. The key to a successful candid photograph is for the photographer to keep a low profile (not sneaky).

A candid shot is a candid shot, whether it is of the admiral at a news conference or a "genuine candid" of a Sailor you just happen to see out and about doing his job. The technique is the same in both cases. All that is important is for the pictures not to appear posed. The subjects of candid photographs are not posing or acting; they are simply being themselves and behaving as though the photographer is not there.

The compactness of today's digital cameras make them ideal for candid photography. SLRs with their fast, interchangeable lenses, TTL metering, and large film capacities make candid photography one of the most rewarding areas of our profession. A long focal-length lens is also a good choice for this type of photography. The long lens lets you maintain distance between yourself and the subject, and, if people are aware of your presence, they will not be as self-conscious. If you are taking "real" candid shots, a long lens is a necessity.

When people know you are shooting them, get them to occupy themselves, so they will "forget" a camera watching them. Only then, can you get a truly candid picture. When the person notices what you are doing, ask their permission before you shoot. People usually will not object, particularly if you are polite and work quickly. Stay casual and relaxed. People soon get used to seeing you with the camera, and you will be on your way to some good candid pictures.

Preset your focus and exposure whenever possible so you can respond quickly and avoid attracting attention to the camera. Estimate the likely subject distance, set it on the lens focus scale, and stop down for greater depth of field. Camera handling must be fast and smooth. Time does not allow for fumbling with camera controls, flash equipment, exposure meters, and film loading.

Keep alert, keep looking and keep shooting

Do not try to control the people you are shooting. Let them assume a natural "pose" in an appropriate setting. You may tell them, "Please do not look at the camera." Try to capture the details of their environment in your pictures. This adds interest to what they are doing. And finally, make your candid pictures reflect the people and events around you.

There are situations when you do not have the time for a candid approach, or it just is not feasible. You can still produce interesting people pictures by using the "frame approach." The "frame approach" simply means posing your subject in a situation or environment that is most meaningful to the subject or assignment. (See environmental shots above.)

UNCONTROLLED ACTION

When you photograph people in action, such as in sports or at work, the name of the game is anticipation, staying alert, and expecting the unexpected. Covering action events becomes an exercise in "guesstimating" where the action will take place and firing the shutter at the right moment. A good action photographer relies on his knowledge of the event taking place. Even if you cannot learn the game, a photographer that understands the principles of shooting people in action can do a good job by following a few simple rules: Anticipate the action. Watch for the unexpected moment. Know the mechanical functions of your camera equipment. Practice aiming, focusing, and shooting until they become reflex actions. This leaves your mind free to concentrate on the event. Learn something about the action you plan to photograph.

The best images of people usually have action, implied or apparent. The action should be appropriate to the subject of the picture. By understanding the importance of action in a photograph and the abundance of action available everywhere, you will soon become proficient at recognizing and picturing it. The blur technique has become popular for advertising and illustration use. Panning the camera with the action of a moving subject keeps the subject fairly sharp while blurring the background in a horizontal sweep, and this gives the feeling of action. A similar technique is to focus on the background instead of panning. This will keep the background sharp but show movement in the subject. A slow shutter speed is needed for both techniques.

Accident Scenes

Shooting photographs in the above-mentioned controlled- and uncontrolled-action settings focus on telling the Navy story and promoting the everyday lives of Navy personnel. However, as an MC, you may find yourself in a billet where your job is to shoot accident scenes.

If you are called to an accident scene, remember that current Navy policy specifies that if an accident or incident occurs, the surviving crew members (if physically able to do so) or the first military personnel arriving at the scene of accident must take charge until relieved by proper authority. Therefore, at the scene of the accident, you will be working for the officer in charge (OIC). You report to and receive your orders from the OIC. In many cases, it may be possible for you to accompany the crash rescue party to the accident. The sooner an experienced and qualified photographer can get to the scene of an accident, the better the possibilities of acquiring more valuable photographic evidence. You should commence taking pictures immediately upon arrival. Photographs made before extensive fire damage can reveal information that might otherwise be lost.

Safety of personnel involved is of primary concern in every accident. Rescue operations and removal of occupants from the aircraft, per se, should be among your first photographs. When medical treatment is being given to survivors of the accident, photograph it not only for documenting

the treatment but for the purpose of isolating factual information on human failure. Casualties should also be photographed in the positions they occupy when you arrive on the scene. Photographs of the dead should be made to show the location of the wreckage and the position of each body in relation to it.

You should be advised of any classified material involved, and it should be either covered or removed before photographs are made unless it is important to the accident investigation. This is a situation where close liaison with the OIC is necessary. News reporters may gather at the scene and because you, as a photographer, have something in common with them, they will naturally seek you out. Do not attempt to tell a reporter what to write. Do not make a statement, express an opinion, or provide information about the accident. You are there to document the situation only. Other MCs and PAOs will be dispatched to the scene if necessary to liaison with the media.

Equipment

After learning the nature of your photographic assignment — controlled or uncontrolled — and making a complete analysis of the assignment, you must ensure you have the proper equipment to complete the job. The variety of photographic equipment available and suited for location assignments is extremely broad; for example, the assignment may require the use of a 35mm, digital SLR, or video camera (videography will be discussed in a subsequent chapter). The lighting equipment you choose may range from a small, compact electronic flash unit to a complex array of lighting equipment and reflectors. Exposure meters, color temperature meters, tripods, and interchangeable lenses are just a few of the other accessories you may need on a location assignment.

Be prepared! At one time or another we have all heard this familiar quotation. But have you ever thought what this could mean to your assignment? For want of a gizmo, a photograph was lost; for want of a photograph, an assignment was ruined; and for want of an assignment, your reputation as a photographer was destroyed. No, we are not really concerned with gizmos here. What we are concerned with is your equipment. Do you have everything you need when you get to your assignment and does it work? Nearly all photographic equipment has one or more critical components. The failure or loss of which may put a vital piece of gear out of operation. With cameras, one of these items is the battery, because it may power both the meter and the shutter. Check the battery before you leave the shop, and **ALWAYS** carry a spare. You have a super deluxe all-powerful electronic flash unit that can light up the entire hangar deck in the wink of an eye. Or can it? Did you check it out and was it working before you left the work center? Did you remember the power cord and an extra sync cord? Speaking of synchronization did your make sure the flash was in sync with the camera shutter? Or was the shutter even working? What about the camera lens-is it clean, does it focus correctly? The diaphragm … is it working?

In the studio, a minor failure usually only causes embarrassment and gives the impression of unprofessionalism. You can usually get a spare camera, lights and tripod into service. But when you are out on location, you are limited in what you can take with you; therefore, it is important that **ALL** your equipment be thoroughly tested and operating correctly **BEFORE** you leave the work center.

SUMMARY

In this chapter, you built upon the theories of light and color found in Chapter 2 and the theories and practices you learned in the public affairs module. You have now added photography to your MC toolbox. From here, we move into videography and discuss your role in electronic

newsgathering. Putting together all the pieces to the MC puzzle will go a long way in ensuring you have a successful career in the field.

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CHAPTER 4

VIDEOGRAPHY

Learning Objectives: Upon completing this chapter, you should be able to do the following:

— Demonstrate center of interest.

— Demonstrate image placement.

— Establish visual perspective (aerial and linear.)

— Demonstrate pacing and timing.

— Identify principles of the 180-degree rule (action axis).

— Achieve overlapping action.

— Record cut-ins and cutaways.

— Achieve changes in screen direction.

INTRODUCTION

In today's visual society, video has become one the most important tools in the PA/VI community's toolbox. And, MCs are expected to do a lot more than shoot simple home videos. You have the important responsibility of visually telling the story of each Soldier, Sailor, Airman and Marine in the fleet or field, and you must be able to tell that story in a way these men and women deserve. This is not a task you should take lightly.

Unlike some of the older arts that take years of training to produce an acceptable product, anyone can quickly learn how to capture video. However, video techniques must be mastered before you can become an accomplished videographer. Mastery of the fundamentals is the foundation upon which you will build your professional skills as an MC. The important story you're trying to tell depends upon this knowledge. And, while the technology may change, knowing your equipment and the basics of good shooting and editing remain the same. This chapter will familiarize you with the basics of a video camera, the types you will use to do your job, and the practice of using them.

CAMERA OPERATIONS

In order to shoot the best video, under any conditions, you must have an understanding of how to use the equipment you're given. Today, videography is characterized by a rapid growth in the development of technology and ideas. Each year, millions of videos are captured and an astonishing array of new cameras and imaging systems enter the market. One of the great attractions of the video field is the ease with which basic skills can be learned.

Most professional cameras use an optical prism block directly behind the lens. This prism filters the image into the three primary colors – red, green and blue – and directs each color into a solid state (silicon resin) imaging device to translate the optical image into a video signal. These devices, either a charge-coupled device (CCD) or active pixel sensor (CMOS image sensor) are

mounted to the face of the prism. Some high-end consumer cameras also do this, producing a higher-resolution image, with better color fidelity than is normally possible with just a single video pickup.

STUDIO CAMERAS

The studio camera is the backbone of the television industry. It is mounted on a dolly pedestal so the camera operator may wheel it to different locations with relative ease during shot changes.

Television is the process of converting reflected light rays from a subject or scene into electrical impulses and reproducing these impulses at a distant receiver. Television technicians monitor and adjust the video levels of the studio camera with the camera control unit (CCU), usually located in the control room. The CCU consists of a waveform monitor (an oscilloscope that displays a video signal graphically), television monitor and shading control.

Studio cameras are expensive, ranging in price from under $5,000 to more than $100,000. However, the more expensive cameras deliver high-quality images in a variety of production conditions. Initial models used analog technology, but are now obsolete, replaced by digital models. Studio cameras are light and small enough to be taken off the pedestal and the lens changed to a smaller size to be used on a cameraman's shoulder, but they still have no recorder of their own and are cable-bound. Cameras can be mounted on a tripod, a dolly or a crane, thus making the cameras much more versatile than previous generations of studio cameras.

Figure 4-1, Electronic newsgathering camera.

ENG and EFP CAMERAS

ENG (electronic newsgathering) video cameras, see figure 4-1, were originally for use by news camera operators. However, these cameras have become the dominant style of professional video camera for most uses in the Navy. An ENG camera is similar to the smaller consumer camcorder, but with some notable differences:

- ENG cameras are larger and heavier, and usually supported by a shoulder stock on the cameraman's shoulder, taking the weight off of the hand, which frees it up to operate the lens zoom control. The weight of the camera also helps dampen small movements

- Three CCDs are used instead of one; one for each primary color

- ENG cameras have interchangeable lenses

- All settings, white balance, focus, and iris can be manually adjusted, and automatics can be completely disabled

- The lens is focused manually and directly, without intermediate servo controls. However the lens zoom and focus can be operated with remote controls in a studio configuration

- Professional connectors – BNC (Bayonet Neill-Concelman) for video and XLR for audio. There are at least two XLR audio inputs

- A complete timecode section is available, allowing time code presets; and multiple cameras can be time code-synchronized with a cable

- "Bars and tone" are available in-camera bars. Color bars provide an industry standard reference signal that simplifies the calibration of setting levels for cameras, monitors and recording equipment when duplicating and transmitting the picture. The color bars are SMPTE (Society of Motion Picture and Television Engineers)

- Recording is to a professional medium like some variant of BETACAM, DVCPRO, direct-to-disk recording or flash memory. If as in the latter two, it's a data recording, much higher data rates (or less compression) are used than in consumer devices

- The camera is mounted on tripods and other supports with a quick-release plate

- A rotating behind-the-lens filter wheel, for selecting 85A and neutral density (ND) filters

- Controls that need quick access are on hard physical switches, not in menu selections

- Gain select, white and black balance, color bar select, and record start controls are all in the same general place on the camera, irrespective of the camera manufacturer. Audio is adjustable manually, with easily accessed physical knobs. Changing the gain for audio and video levels can also affect picture contrast. An adjustment to gain will also increase the level of picture contrast.

VISUAL STORYTELLING BASICS

Videography is a visual art, and it follows many of the same composition basics as photography.

CENTER of INTEREST

Each shot should only have one principal idea, topic, or *center of interest* to which the audience's attention is directed. Two or more equally dominant figures, objects or actions in a single scene compete with one another for the viewer's attention, thus weakening the picture's effectiveness. Subordinate elements within the shot must support and focus attention on the principal feature so it alone is emphasized.

A shot without a dominant center of interest or one with more than one dominant center of interest is puzzling to a viewer. Subsequently, the viewer becomes confused and wonders what the shot is all about. We can prevent this confusion from occurring through the selective placement of our subjects within the scene.

The specific topic, idea or object to be portrayed must be set in your mind as you prepare to shoot a video. When there is nothing in the shot to attract attention to a particular area or object, the

eyes wander throughout the scene. The center of interest may be a single object or numerous ones arranged so attention is directed to one definite area

When the center of interest is a single object that fills most of the shot area or one that stands out boldly, such as a white sail against a background of dark water, attention is attracted immediately to it. As may be expected, not all subjects are as simple to arrange or as bold and impressive.

Image Placement

Although it's called the center of interest, you will rarely place subjects in the center of the frame. Doing so results in ineffective and uninteresting images. Placing the center of interest to one side (preferably the right, dominant side) strengthens the image and increases interest.

A simple method for placing the center of interest in a dominant position is to utilize the *rule of thirds*, (see figure 4-2) dividing the frame into three equal parts, vertically and horizontally. (*Sound familiar?)* The four points where these lines intersect are compositionally strong. Placing the center of interest at one of these areas is a good way to start composing a picture. Using only this method to compose however will produce predictable mechanically composed images. As a loose rule, though, this *rule of thirds* method helps prevent bisecting the picture.
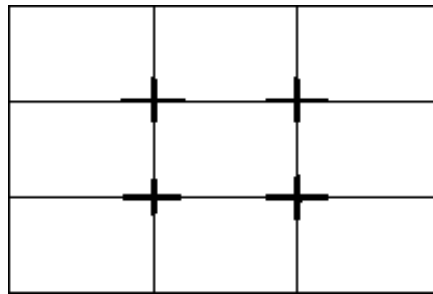
Figure 4-2, Rule of Thirds.

Image Quality

The single greatest influence on image quality is the brightness level. When the brightness level is too low, the recorded image looks grainy and flat. By familiarizing yourself with the brightness level of the subject, you can improve your recordings tremendously. In situations where the light level exceeds 100,000 lux, such as snow-covered scenes or a beach scene on a clear summer day, an ND filter is required. Under other daylight and bright, indoor conditions, the automatic iris is capable of adjusting to provide excellent results. However, in a low-light situation, such as spaces aboard ship, auxiliary lighting may be required to provide clear, sharp images. Another alternative, when available on your camcorder, is to increase gain. By increasing the gain, you increase the level of amplification of the video signal. This increases the contrast and provides a higher-quality recorded image.

In some situations, such as high-contrast scenes or backlit subjects, you must adjust the iris manually. Just like the aperture on a still camera, when the subject is backlit, open up the iris. When the subject is too bright, you must close down the iris.

FRAMING

Framing in videography is the positioning of subject matter within the frame. This definition appears to be very similar to the purpose of composition itself. Admittedly, the difference between the two is so slight that many people use the terms interchangeably. But, take a closer look. Framing is concerned with the positioning of the subject matter in the frame. Composition is concerned with the arrangement of all the pictorial elements of a scene, which includes more than just the subject itself. A scene can have the subject properly framed yet still be poorly composed. Generally, five factors affect framing: field of view, headroom, nose room, close-up and background (see figure 4-3).
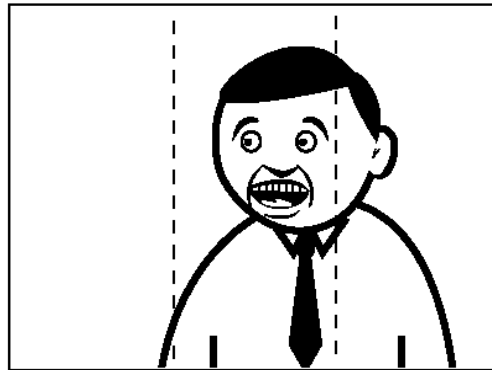
Figure 4-3, Framing

Field of View

Field of view refers to how wide or how close the subject appears relative to the camera. It is broken down into five steps: extreme long shot, long shot, medium shot, close-up and extreme close-up. When videotaping people, there are three additional ways of referring to these shots: bust shot, knee shot, two shot and three shot. Another shot commonly used in production is the over-the-shoulder shot.

Headroom

Headroom refers to the location of the subject's head within the frame. It is important to leave some space above your talent's head when composing shots, regardless of shot type. Additionally, it is important to remember that most professional video cameras lose approximately 10 percent of the image they see in their viewfinder. If a shot is composed extremely tight in the viewfinder, chances are you will actually be cutting off part of your subject when the video enters post-production (see figure 4-4).
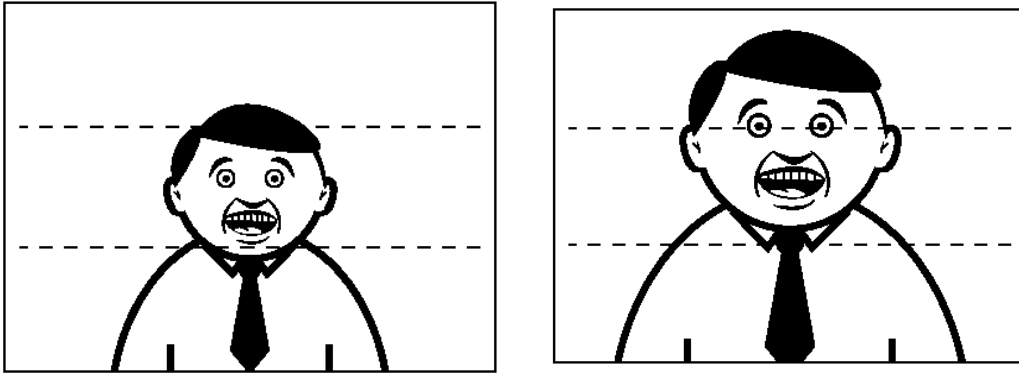
Figure 4-4, Proper (left) and Improper (right) use of headroom.

Nose room / Lead room

Nose room and lead room (see figure 4-5) refers to the fact that we must leave room in front of a person or object when they are pointing, looking or moving in a certain direction. It is especially important when showing a person as he or she moves, since it helps indicate the direction of travel. If there is no head room as a person moves, it appears as if they are bumping the edge of the frame.

Figure 4-5 – Proper (left) and Improper (right) use of nose room.

Close-ups

A close-up is a normally a full-face shot that fills the screen. When framing a close-up it is important that you take a few steps to eliminate potential confusion. Allow for headroom and show part of the subject's shoulders. When shooting tight close-ups, cut off the top of the subject's head still keeping part of the shoulder in the scene. This is a reference point for your audience.

Backgrounds

Returning after a shoot only to find that an unsightly object appears as if it is growing out of your subject's head is frustrating. Therefore, when you are shooting, always look behind your subject and main center of interest to check out your background. Look for trees, telephone poles,

streetlights, etc. Objects, such as these, in the background can ruin an otherwise perfect shot. It is also important to ensure the horizon is level when you are shooting.

Cut-off Lines

In addition to those five factors listed above, cut-off lines, or cut-off points must be considered when you are framing your shot. When photographing people, there are natural cut-off points that should be avoided – the eyes, nose, mouth, chin, neck, breasts, elbows, waist, knees and ankles. Framing a person so that any of these points sits at the very top or bottom of the screen makes it appear as if the subject's body stops at the edges of the screen. A shot framed in such a manner is very distracting for the audience.

The framing techniques listed here can also be employed when shooting still photographs and working with multimedia products (chapter 5).

VISUAL PERSPECTIVE/SCREEN DEPTH

Perspective is defined as the apparent sense of depth in a picture based on the relative distance and positions of subjects in the frame. It is the relationship of the images in your shot.

Increasing Perspective Results

To increase perspective effects and the apparent sense of depth within your frame, try the following techniques:

- Shoot from camera angles that provide the greatest number of planes or facets of the subject. Angle-on-angle shots, recorded so that the front, side, top and bottom are seen, create more depth than the same subject shot head-on. This is particularly true of large, static subjects such as machinery, buildings and signs

- Position subjects so that they partially overlap. This helps indicate spatial relationships and the audience can determine which objects are nearer by their known size

- Have subjects move between other subjects and objects so that they are partially covered at different times as they travel. Also, move the camera so that it shoots through or past foreground objects as it follows its subject

- Move the subject toward or away from the camera as opposed to straight across the screen. As the image size changes, perspective is increased.

Viewpoint and Camera Angle

The proper viewpoint or camera angle is an important factor in good composition. Repositioning your subject within the viewfinder frame and changing the camera viewpoint or camera angle are two simple ways of controlling composition. Photographing from a different viewpoint or camera angle can often add drama and excitement or even bring out an unusual aspect of a subject. Most of the subjects you photograph are three-dimensional and should be photographed from an angle (to the right or left of and/or from higher or lower than the subject) that allows the viewer to see more than one side of the subject. The photographer should study the subject from different sides and angles. Walk around the subject and look at it from all viewpoints. See it from elevated and low positions as well as from eye level to find the best composition. This greatly assists in composing the subject for the best balance and helps to select a background that compliments, not distracts from the subject.

The terms viewpoint and camera angle are often used in conjunction with one another and sometimes used interchangeably. They can also have different meanings depending on how they are applied.

- Viewpoint – the camera position in relationship to the subject

- Camera angle – the angle in which the camera lens is tilted.

A shot of Sailors marching, made from ground level with the camera held horizontal with reference to the ground, may be referred to as a low viewpoint, (or camera position); however, when this shot is taken again, again from ground level, but with the camera pointed up, it may be referred to as a low camera angle. Likewise, shooting from an elevated or high position, with the camera again held horizontal with reference to the ground, or even pointed straight down, can be referred to as a high viewpoint. If the camera is not held horizontal to the ground or pointed straight down, but pointed at some angle between horizontal and vertical, the camera position could be referred to as a high camera angle.

Eye-Level Shots

With the camera held horizontal, eye-level shots are usually made at a height of about 5 1/2 feet, the height from which the average adult sees, and with the camera horizontal. With the camera held at eye level but pointed up or down, the camera position changes and you have either a low or high camera angle, respectively.

Low Viewpoint and Low Camera Angle

Low viewpoints and low camera angles can add emphasis and interest to many ordinary photographs. A low viewpoint can be used to distort scale or add strength to a picture or to emphasize certain elements within the picture. A low camera angle is achieved when the camera angle is located below the point of primary interest and pointed upward. Low angles tend to lend strength and dominance to a subject and dramatize the subject. Low angle shots are used when dramatic impact is desired. This type of shot is very useful for separating the subject from the background, for eliminating unwanted foreground and background, and for creating the illusion of greater size and speed.

High Viewpoint and High Camera Angle

High viewpoints and high camera angles help orient the viewer, because they show relationships among all elements within the picture area and produce a psychological effect by minimizing the apparent strength or size of the subject.

Like framing, varying camera angles and viewpoints work with still photography.

BASIC SEQUENCE AND SHOT PROGRESSION

Basic Sequence

The basic sequence is the foundation for story continuity. It's a fancy term to accurately describe your video's form and function. Story continuity is the smooth, uninterrupted flow of visual and audio references, which, when assembled in order, tell a story.

Long Shot (LS)

The orderly flow of visual references starts with the long shot. The long shot introduces the scene to the audience and shows the entire area of action for a particular scene – location, people and objects. It is relative to the subject or the location. The subject must be large enough to be recognized, but small enough to establish the location. Compose the long shot loosely, so that people or objects can freely move about and indicate that there is action at the location. Although vital to establishing the scene, the long shot should be used sparingly in a television production. The small size of the TV screen makes it difficult to see everything that's included. In motion pictures, the long shot is used more frequently since the large proportions of the movie screen allow the audience to see all the detail (see figure 4-6).

Medium Shot (MS)

The next shot in the sequence is the medium shot. The medium shot introduces the subject or action by narrowing the center of interest for your audience, typically answering the "what" question of a scene. The medium shot bridges the long shot to the close-up. The subject is the same as in the long shot, now the camera is positioned closer to the subject so that it fills the frame. Like the long shot, the medium shot is composed a little looser so the subject can move if necessary. The medium shot is a transition between the long and close-up shot. It is an essential shot. Many new videographers believe that omitting the medium shot from the sequence achieves a stronger introduction to the main action. The omission shocks the viewer and sometimes is useful, but consistently ignoring the medium shot only results in confusing the audience. If the audience becomes confused, the story is lost (see figure 4-6).

Close-Up (CU)

The final shot is the close-up shot. The close-up is an important and powerful image that draws the audience into the story, focusing attention on the important subject or action. It is the culmination of the basic sequence and should not be used haphazardly. It may seem to be an obvious element to a visual story, but it took early moviemakers years to discover because it defines our subject or action. Selecting the wrong close-up will overlook the point you're trying to make with your story. Using too many close-ups will, once again, confuse the audience as to what's going on and what they should be paying attention to (see figure 4-6).

Figure 4-6, Long shot, medium shot and close-up shot (left to right).

Shot Timing

With each shot, it is imperative that you record extra footage – two to three seconds – before and after the main action. This gives editors "editing handles" before and after our edited clips to leave room for transitions. This will greatly reduce the time required during post-production, making the editing process easier.

Relativity

Relativity is the relationship between the shot you are currently recording, the shot you just recorded, and the shot you will record next. When we discuss shot relativity, we are referring to the distance within a shot that separates the long shot from the medium shot and the medium shot from the close-up. They are all relative to the subject matter being documented, not the location of the shoot (see figure 4-7).

Some believe the location of a shoot, such as indoors or outdoors dictates the distance within each shot. This is not the case. Simply because you have more shooting area outdoors doesn't always mean there will be greater distances between shots. For example, the distances between shots while shooting a parade might be greater than the distances between shots while shooting a picnic in a park. The picnic scene has less to establish than the parade. Also, simply because you have less shooting area indoors does not dictate that we will have smaller distances between shots. A mobility staging area for deploying personnel would have a greater area than that of a military member clearing a weapon. These are relative.

Subject matter dictates the relative distances between shots. For example, a physically larger subject, such as a change of command, will require composing the shot to incorporate all the pictorial elements into the frame. A physically smaller subject, such as a Sailor opening an MRE, does not require as much distance within the frame. Again, it is all relative to the subject matter. Relativity depends on how the camera operator chooses to emphasize the subject within the frame, maintaining story continuity. When we use proper shot relativity, what we see in the close-up will determine the emphasis of our story.

Figure 4-7, A DINFOS student reading his study guide here dictates the distance between the three shots above.

Static Screen Direction

Static screen direction refers to the direction the subject directs his eyes within the shot. Screen direction must be established and maintained even when the subject does not move about within the scene. The direction in which the subject looks should match throughout a series of

consecutive shots. The direction the subject faces can be different from the direction that the subject looks; therefore, the static screen direction is the direction in which the subject is looking. Subjects moving in one direction only in a series of video shots is said to be constant. To maintain static screen direction, the camera operator must remain on one side of the action axis.

Action Axis (180-degree rule)

The easiest method to establish and maintain screen direction is the use of the action axis, an imaginary line that travels across the scene. When there is only one subject in your shot, the line runs through this person and (roughly) perpendicular to the camera's line of sight. When there are two subjects, the line passes through both of them. As long as you keep your camera on the same side of this line, you can set up any shot you want and the subjects will always maintain the correct screen direction. Move across the action axis with your camera, and the screen direction will be wrong.

When the subject moves to a new location a new action axis is established using the *old* action axis as a reference. Some videographers think of the action axis as a left-to-right or right-to-left movement instead of an imaginary line. While essentially correct, it complicates shooting since the travel line must be re-examined for every new camera set-up. If the camera is *always* on the same side of the axis, *directional continuity is maintained*.

The only exception to the rule of recording on one side of the action axis is shooting a neutral shot. In this instance, the camera is placed on the action axis with the camera pointed directly toward the subject (see figure 4-8).
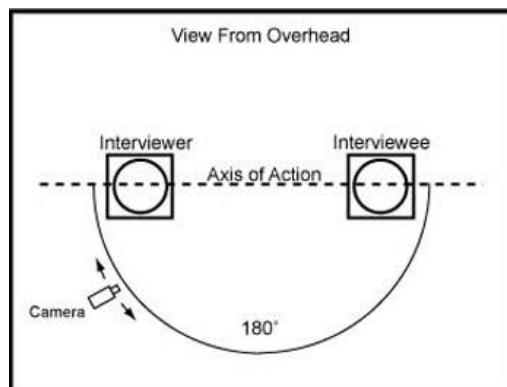
Figure 4-8, Example of moving camera along in relation to the action axis.

Overlapping Action

While watching a television show, have you ever wondered how the action can appear to be seamless from one shot to the next? The appearance of unbroken action from shot to shot can determine the success or failure of a production.

Successful continuity demands a smooth, uninterrupted flow of action from one shot to the next. Continuity is destroyed when there are sudden gaps in the movement between shots. The audience should never be aware of any change in the camera angle or image size. To achieve this smooth flow of images, you must apply the technique of overlapping action. The overlapped shots are later matched and assembled into a story by the editor.

When using a single camera, overlap is attained by *controlled action*, (a situation when all phases of the production can be thoroughly managed). If you do not have complete control over all phases of the video production, overlap may be achieved by using more than one camera. Overlapping action is the extension of activity, at the beginning and end of a scene. By overlapping action between shots you can vary image size, composition, and camera angles and still achieve perfect continuity (see figure 4-9).

Figure 4-9, Example of lack of attention to detail when creating overlapping action.

Factors Affecting Overlapping Action

Before recording overlapping action, consider these factors: the story; control of the action; the subject's action, body position and facial expressions; and dialogue.

If you are shooting from a script, the story is already written down for you. You just have to translate the written words into pictures. Sometimes though, the story is merely an idea and you make it up as you go. If you have a strong story concept, however, you have what you need to overlap the action with or without a script.

Before shooting, your subject must understand the action you desire. You must exercise complete control of your subject and the action. *Rehearsing the shot* is often necessary so the subject knows exactly what is expected from them, allowing the action to be repeated if required. If, however, a position is uncomfortable, or the action is unnatural, listen to the suggestions of the subject; they often have good ideas that will make your story better.

When shooting overlap, the subject's actions, body positions and facial expressions must exactly mirror the last few seconds of the previous scene. This is difficult if your subject isn't

completely aware of the objective of overlapping the action. Take the time to explain this to your talent beforehand and you'll find it easier for them to duplicate their actions during the shoot.

In addition to the action, the last few seconds of dialogue must be repeated. This may seem obvious, but videographers often forget to have the subject repeat their last few lines. When the story is edited later this omission creates a jump in action.

Obtaining Overlapping Action

In a controlled-action situation, obtaining overlap with a single camera is relatively easy. You dictate when the recording begins and when it ends. Since you have command of the situation, you tell the subject to start and stop the action. If there is a problem, you can re-record the scene to your satisfaction.

During the recording, the subject performs the scene according to your direction. After you have finished recording you then compose the next shot. In this shot, the subject repeats the last few seconds of action (and dialogue) from the previous shot. Many novice videographers make the common mistake of having the subject repeat the whole action from the earlier shot. This is *wrong*. This is not overlapping the action; it is merely a re-hash of action with which the viewer is already familiar.

The correct method is to have the subject repeat a small bit from the former scene then move the story along with new action. The action in each shot must reach its natural point of termination. This allows the subject to have a reference for the next shot and the overlap appears to be unforced. The keys to achieving normal overlapping action are planning and rehearsal. Describe the desired action to your subject and let them do it a few times, without recording. Once the subject is comfortable with the scene, then shoot it.

How long should overlap be? Some editors are comfortable with only two to three seconds of overlap, while others want five to seven seconds. A good rule of thumb is to pick a point where there is a natural "pause" in movement or conversation. Overlap four to five seconds of the previous scene. This guarantees editorial options without wasting a lot of videotape.

Recording overlap in a situation when you have no control of the action (uncontrolled action) is far different from a controlled action shoot. It is more difficult, but *uncontrolled action* can be overlapped. In most cases you'll shoot overlap in an uncontrolled situation by having two or more cameras shoot the scene. The videographers must coordinate their roles and actions on the set.

By using different focal lengths and camera angles, the separate cameras record the same subject at the same time, obtaining overlapping action. This can be difficult, even under the best circumstances, but videographers who fully understand their individual roles should have no problem getting all the overlap they need. Care should be used when employing two or more cameras, however. Without planning, simple continuity errors, such as crossing the action axis, can ruin a project that you can't "do over."

When documenting an uncontrolled scene by yourself, it's still possible to obtain overlap. Look for action that is often repeated, such as in the firing of a weapon. The squeeze of the trigger, the ejection of spent shells, etc. These are things that you can shoot almost any time during the action. Try to anticipate what is going to happen. If you're *reacting* to what's going on, you're too late. When possible, find out as much information about the event *before* you start shooting. It is also important to record cut-ins and cutaways to cover major jumps in action. Changing your image size and camera angle also helps mask minor jumps that often occur during uncontrolled action.

Cut-ins and Cutaways

A story that grabs the audience's attention goes beyond the basic sequence. It includes shots that pull the viewer *into* the story in addition to shots that *divert* their attention from the inessential. You are still using the basic sequence, only now you are inserting additional shots to make the story more interesting. These shots, the cut-in and cutaway are critical in maintaining story continuity. Cut-ins and cutaways preserve continuity in five distinct ways:

1. Bridging time and distance

2. Diverting audience attention from jumps in action

3. Building interest or drama

4. Replacing hidden action

5. Covering changes in screen direction.

Bridging Time and Distance

"Omit the inessential." Unfortunately, this simple rule of videography is often ignored. The audience gets bored quickly when forced to watch scenes or shots that have no bearing on the outcome of the story. For this reason cut-ins and cutaways are used to bridge time.

If you documented the construction of a bunker, for example, it would be tiresome to see every sandbag being filled and placed around the pit. Instead, adding a cut-in of a sandbag being filled and a cutaway of the LPO supervising the working party ties the establishing shot of the initial construction to the re-establishing shot of the completed bunker. This greatly condenses the time needed to show this entire action.

Distance is also affected by cut-ins and cutaways. The audience doesn't need to see every step a subject takes moving from one location to another. By inserting a cut-in or cutaway to the sequence, you can omit shots that don't add to the story. Inserting cut-ins of truck tires rolling, and cutaways of exit signs with the names of towns into a sequence of a convoy traveling cross-country, helps the audience understand that a great distance has been covered.

You can *expand* time and distance by inserting additional cut-ins and cutaways. If you want to portray a long road run by a ship's crew, adding extra cut-ins of their feet moving and of the faces of the Sailors, leads the audience to believe that the journey took longer and covered a greater distance than it actually did.

Diverting Audience Attention from Jumps in Action

A jump in action could be anything that distracts the audience from your story: a chair that changes position from one shot to the next, a clock that reads 30 minutes later from the previous shot, or a person appearing in the scene who wasn't shown in the establishing shot. These jumps are not breaks in the story continuity, but breaks in the *visual* continuity. If the attention isn't diverted from a jump in action, the audience becomes distracted and confused.

The average person has difficulty remembering more than two scenes immediately preceding the scene currently viewed. A jump in action is most noticeable in the next scene. Inserting a cut-in or cutaway masks the jump, creating a smoothly flowing scene.

Building Interest or Drama

An otherwise dull story is energized by the skillful use of cut-ins and cutaways. Cut-ins of important actions or dialogue stimulates audience interest. Cutaways of secondary subjects and bystanders reacting to what is happening helps emphasize important actions. For example, in a story of a medical assistance visit to an isolated village, a series of cut-ins showing syringes being filled and children receiving inoculations increases the interest of the audience. Cutaways of villagers watching the corpsmen work emphasizes the action, helping the audience to understand the importance of the visit.

If the story requires a sense of drama or tension, cut-ins and cutaways provide the vehicle. A cut-in to the microphone and mouth of an air traffic controller as she speaks to a pilot and cutaways to firefighters waiting along the runway create a sense of drama as an aircraft makes an emergency landing.

Replacing Hidden Action

Action, which cannot be recorded for reasons beyond the control of the videographer, can be implied by cut-ins and cutaways. As a personnel specialist types information into a computer, a cut-in of fingers dancing on the keyboard or of the clerk doing the typing indicate that administrative work is in progress. A following cutaway shows a card emerging from the printer. A few seconds of cut-ins and cutaways clearly show the process of making an identification card. This same technique may be used on any subject that cannot be recorded because there is no image or for events too dangerous to allow a camera to be present.

Controlled Action

As the name implies, in controlled action you can control all aspects of a production. This includes actors, their actions, the set lighting, and sound recording, if any. You usually work from a well-developed script that includes all the details. If the actors speak, the dialogue is in the script. If the action is described by a narrator, the narration is in the script. If the film is silent, the titles appear in the script. Examples of controlled-action films include training films, some documentaries and historical records, and many publicity or recruiting films. Controlled action, motion-media productions are most often produced by personnel with specialized "C" school or university training. As a non-specialized MC, you will be faced with uncontrolled or semi-controlled action elements of a production or film.

Uncontrolled Action

In a controlled-action situation, everything is normally written in the form of a detailed shooting script. Predictable filming is performed and there are few crises, except the occasional human oversights and mechanical malfunctions. The foundation of uncontrolled-action videography is the basic shot sequence (LS, MS and CU). The other world of motion-video recording (uncontrolled action) is full of crises and surprises. Success primarily is due to good reflexes, accurate guesswork and quick thinking. Careful planning is not the most significant factor. Most of your motion-media assignments will be uncontrolled or semi-controlled action.

Your success as a maker of uncontrolled-action video depends on your knowledge of the capabilities and operation of video equipment. You must also possess a high level of technical skill. There is neither time nor opportunity for research or practice while doing this kind of assignment. You must be prepared in advance. News, sports, special events, and on site-coverage of ongoing activities make up the bulk of this type of assignment. Another class of uncontrolled action is the documentation

of events that follow a known course or pattern, such as parades and ceremonies. These are called semi-controlled, because you know in advance approximately what is going to happen, even though you cannot influence it for recording purposes. Both types of assignments are challenging, exciting, and usually welcomed by confident camerapersons. But, they can be "unfortunate experiences" for those not properly prepared to cope with them. Remember, when shooting video without a tripod, you should deeply inhale, and then partially exhale before shooting.

Uncontrolled and Semi-Controlled Actions

Obviously you cannot develop a specific, detailed plan for shooting uncontrolled or semi-controlled action. You must get as much information about the assignment as possible and in as far in advance as possible. This information helps to provide an estimate of requirements for equipment, supplies, scheduling of personnel, transportation, camera positions, lighting, and other technical details.

Whenever you are assigned to cover distinguished visitor (DV) arrivals, award presentations or special events, you should immediately contact the person or agency in charge of the project. This person is usually the PAO. The PAO can furnish you the full scope of your assignment and provide the following basic information:

- Name and rank or title of the person(s) involved

- Place and time of arrival

- Complete schedule of activities.

When possible, you should personally inspect the location and route of the proposed action (site survey). If this cannot be done, try to get drawings, maps, plans, or photographs of the area. Eyewitness descriptions or pictures of similar events also may be helpful. Ask questions about the location of the subject, the type and direction of movement, and the sequence of actions to be recorded.

With this information, you can draft a rough plan. By working closely with the project officer, you should be kept reasonably well informed and can arrange the shoot in a logical order. Be careful, however, not to "plan yourself into a trap." Expect last-minute changes in your plan, and, therefore, keep alternative plans in mind and ways they can be put into effect quickly. Next, determine shooting requirements and the number of cameras and people you need. Check probable camera locations for the long, medium, and close-up shots. Determine the amount of tape you require, and consider the possibility of some unplanned requirements. Determine whether you will need transportation and additional equipment.

For example, your shop has received the following assignment:

The CNO and his party are expected to arrive aboard your ship tomorrow. The flag requires complete photographic coverage of all official activities of the CNO and his party while on the ship. The division chief has assigned you to cover the motion media.

After you check with the officer in charge of the event, you find that the CNO and his party are expected to arrive by aircraft at 1 p.m. local time. The party consists of the CNO and three aides. The purpose of this visit is to inspect the ship and to present several awards. The CNO and his party plan to depart at 5 p.m. local the same day.

With this information you can now plan your shooting outline. In an event of this kind, you cannot expect to stage or control many shots.

The shooting outline not only serves as a "program" for planning the sequence of coverage, but it also provides a basis for determining camera placement (SEE PREVIOUS CHAPTERS), movement, and shot framing (SEE ABOVE).

MOVEMENT

Good video needs movement — movement in front of the camera, movement of the camera itself and movement of the picture itself (one picture replacing another). The movements necessary for good television are divided into the following three categories:

- Primary movements

- Secondary movements

- Tertiary movements.

Primary Movement

Movement in front of the camera, usually by the talent, is referred to as primary movement. Primary movement toward or away from the camera is stronger than lateral movement, thus creating more emphasis. Diagonal movement is the strongest and most dramatic type of primary movement. Exits and entrances are more impressive when they occur toward or away from the camera. Remember: you should always lead the lateral movement of the talent with your camera. The viewer wants to know where the subject is going, not where he has been.

Secondary Movement

Secondary movement refers solely to the movement of the camera and is normally done in production studios. Secondary movements follow primary movements or to change or adjust picture composition. You also may use them to emphasize or dramatize a certain portion of a production. The secondary movements you will become familiar with are as follows:

- Pan – A pan is horizontal movement of the camera on a stationary pedestal. It is used to follow the primary action. When panning you should avoid *dead space* between subjects. Do this by positioning the subjects diagonally instead of laterally. Prior to making a pan with a camera on a tripod, you should ensure the tripod and camera are level

- Tilt – Tilting is simply pointing the camera up or down. The reasons for tilting the camera are similar to those for panning. For example, the height of an object can be shown by gradually tilting up or on it or by tilting down on something. This builds suspense

- Dolly – A dolly is a piece of equipment that normally requires a small crew to operate. You can dolly-in to increase the size of an object gradually on the screen or dolly-out to decrease the size of the object on the screen. Likewise, dollying decreases or increases the field of view. A zoom lens can be used for the same purpose as a dolly.

- Zoom – A zoom lens can be used for the same purpose as a dolly. During a zoom, the camera does not move; therefore, perspective does not change as it does when using a dolly

- Truck – A truck is a piece of equipment that is basically a tripod with wheels. The camera is used to follow lateral subject movement or you could truck the camera along the objects. In either case, camera-to-subject distance does not change

- Pedestal – A pedestal is used to raise or lower the camera. Pedestalling can provide the audience with a view looking down on the subject or up at the subject. A pedestal may also be used to compensate for tall or short camerapersons or subjects.

Tertiary Movement

Tertiary movement results from a sequence of shots from two or more cameras. When two or more cameras are used, the director selects from a variety of shots to determine what shot will be telecast and at what time. When more than one camera is used, the director can easily emphasize, de-emphasize, or show action and reaction in rapid or slow succession.

Recording from a Moving Vehicle

Sometimes you may have to record from a moving vehicle, such as a truck or a boat. For this type of assignment, the problem of holding the camera steady becomes even more difficult. In this situation you should handhold the camera, because a tripod transmits vibrations and movements from the vehicle to the camera. Keep your weight on the balls of your feet, and keep your knees flexed so you can sway and bend as the vehicle rolls, pitches, or bounces. Watch the horizon in the viewfinder. A tilted or wobbly horizon is very detracting when being viewed. When shooting from moving vehicles you should use a short focal-length lens and a fast shutter speed.

Covering Changes in Screen Direction

Unexplained changes in screen direction also break the continuity of your story. Cut-ins and cutaways help cover these movements. To do this, the shot must have no screen direction of its own. In these neutral shots the subject moves directly toward or directly away from the camera.

Changes in Screen Direction

If a subject constantly moves in only one direction throughout a video, the audience becomes bored from the repetition and the movement is farcical. Your stories will often call for logical and reasonable changes in screen direction.

The first key to screen direction is that *any change in screen direction must be motivated*. The usual reasons for varying direction are to show a return to the starting point, to show the subject has moved to a new location that is in another direction, or to avoid physical obstacles in the path of the subject or videographer. Regardless of the technique you employ, the two key shots utilized when changing screen direction are medium shots and close-ups. There are four ways to change screen direction:

1. Show the change on screen

2. Use neutral shots

3. Use prominent landmarks

4. Use cut-ins and cutaways.

Show the Change on Screen

The simplest way to change screen direction is showing the change on screen. If the established screen direction is right-to-left, the subject moves in that direction, and then while the camera is still recording, the subject turns in the frame and moves along a new action axis traveling left-to-right.

Use Neutral Shots

Recording a neutral shot allows you to cross the old action axis and establish a new direction of travel. If you use a tail-away shot, follow with a head-on shot to tell the audience there is more to come, unless it is the end of the story. If you use a head-on shot, however, you don't need an additional neutral shot. The next shot can be on the other side of the old action axis.

Remember: *Neutral shots must be absolutely centered in your frame.*

Use Prominent Landmark

A more difficult and rarely used technique to change screen direction involves using a prominent landmark in the background to orient the audience. This approach takes some planning and is *limited to objects that can be immediately recognized*. The static screen direction and placement of a landmark, such as a statue or building, orients the audience to the changes in dynamic screen direction of the subject.

Use Cut-ins and Cutaways

Cut-ins and cutaways do not show the change in screen direction, they merely mask it. The cut-in and cutaway must be a neutral shot. Since the average person has difficulty remembering the two scenes immediately preceding the current scene, cut-ins and cutaways should be used in pairs in order to mask the change.

PACING and TIMING

Broadcast news reporters will tell you that in any story, pace is everything. This means that the viewer will lose interest if a story does not develop or is dull, boring or predictable. Simply put, when you watch a program, the pace either feels right, or it doesn't.

When capturing a story in the field or fleet, it is *content that dictates pace*. Is the action fast-paced? Is the story quiet and serene? These are questions that must be answered to understand and determine the pace of a story.

But shot length is only one element of pacing. The composition within sequences is just as important. A subject may seem to move slower or faster simply by moving the angle of the camera in relation to the action. Focal length, lens to subject distance and lens perspective all play a part in determining pace. If a long shot is of a subject running from left to right and the medium shot is of the same person running toward the camera, the pace of the person seems to be at two different speeds. So even if it's right, but it looks wrong, it *is wrong*.

Timing while videotaping concerns compressing real time into filmic time. In a briefing or documentary, an entire day's activities can be shown in a five-minute presentation. Planning shot sequences is the key, one shot ahead, your current shot, and one behind. In essence, video of the

President arriving at a naval air station may take 45 minutes from touch down to the time he climbs into a vehicle. But, that story can be told in a series of shots lasting no more than 45 seconds.

ADDITIONAL SHOTS

The basic sequence is the foundation of video storytelling; however, such storytelling is not limited to the three shots of this basic sequence. There are many variations of each that are used in addition to the basic sequence. Sometimes these additional shots are used instead of, or along with shots in the basic sequence. Three common shots are the extreme long shot, the full-figure shot, and the extreme close-up. Used properly, these shots can enhance your story by providing important information to the audience.

Extreme Long Shot (ELS)

The extreme long shot provides the audience with a distant view of an area. It establishes physical character or a distinctive atmosphere and always precedes the long shot in the basic sequence. It is best recorded from a high vantage point to provide more viewing area.

Full-Figure Shot (FFS)

The full-figure shot is a variation of the medium shot depicting the whole subject. It shows the subject from head to foot, containing very little headroom or footroom. It is often used in place of the traditional medium shot.

Extreme Close-up (ECU)

The extreme close-up often follows the close-up in the basic sequence. It magnifies the subject for detailed examination completely filling the screen. It is often used for dramatic emphasis or to show important details within a scene. A scene shot to the right of an edit control unit, showing someone's hands using the equipment is an example of an extreme close-up.

VARIATIONS OF THE BASIC SEQUENCE

You're now familiar with the shot sequencing and the various types of shots. Hopefully, you understand how the visual storyteller uses these shots and the sequence to piece a story together, shot by shot. While the basic sequence of long shot, medium shot, and close-up is the most common sequence used to tell a story, it is not by any means, the only one. There are numerous variations available, depending on the information you are trying to convey or the way you want the audience to react.

Extended Sequence

Adding the extreme long shot, full-figure shot and extreme close-up to your shot progression changes the basic sequence into the extended sequence. This new shot progression enriches the visual quality of your story and enhances audience attention. It is important to understand however, that you do not have to insert all additional shots to be considered an extended sequence. It can be only one, or a combination, if desired.

The extreme long shot, when added, impresses the audience with the huge scope of the scene. A large military base, vehicle convoy, or aircraft-parking ramp can be impressive opening shots to introduce a sequence. Such massive shots set the scene for what follows by putting your audience

in the proper mood and giving them the overall picture before introducing characters and establishing the story line.

Including more medium and full-figure shots improves your storytelling ability. These additional shots provide more information to help explain complicated ideas. For instance, in a sequence of a division officer talking to his shop, the first medium shot shows the face of the captain and the back of the head and shoulders of the Sailors. The second medium shot then shows the face of the LCPO as he acknowledges the DIVO's words and the back of the head/shoulders of the DIVO.

You can also emphasize or show tiny details by using the extreme close-up. When placed in the sequence extreme close-ups help the audience understand complex and minute details certain jobs require.

Reverse Sequence

Sometimes it is desirable to startle, confuse or withhold information from the audience. When this is the case, a close-up may be used as a dramatic tool for opening a sequence. Then the sequence continues backward to the long shot. This is called reverse sequencing. Let's start with a close-up of a set of eyes, move to a medium shot of a Navy SEAL in camo paint, then out to a long shot showing this Sailor in full combat gear, camouflaging himself in the jungle. That simple reversal of the basic sequence immediately draws our viewer into the story, making them want to see more.

A properly planned, effectively recorded reverse sequence will enhance your story, as long as you don't overuse it. Using too many reverse sequences not only bores the audience, but the punch of your story will get lost. A good rule of thumb is to use the reverse sequence only after you've determined the action requires immediate attention.

VIDEO EDITING

Non-linear editing is an amazing process. Gone are the days where we made linear edits. Linear meant that everything was laid out in sequence and no changes could be made to an earlier time in that sequence without affecting the rest of that sequence. With non-linear editing you can move, cut or add media at any point of the sequence without messing up the rest of it. Knowing how to edit is an important tool for MCs to have in their toolbox. You might be able to shoot great video, but if you don't know how to put it all together, your job isn't complete. The orderly structuring of facts, ideas and abstract suggestions in any visual-editing process is continuity. This section will give you the basic fundamentals you'll need to become a skilled basic editor and help you achieve your final goal – having a product that tells an effective memorable story.

EDITING HARDWARE and SOFTWARE

Let's first take a tour of the hardware components that make up a non-linear editing system. Regardless of the particular system you use, the basic components are the same.

- Central processing unit – the computer portion of the system that contains computer-related hardware and software

- Monitors – one flat-panel or two 16:9- or 4:3-aspect ratio monitors used for viewing

- DVCam Deck — used to input and output video

- Speakers or headphones – for listening

- Keyboard and mouse – for controlling the editing software.

PROJECT HIEARCHY

Project

The project is at the top of the project hierarchy. It is a non-linear editing system's device for organizing your work. The project contains all files associated with your project. When you create a new project, navigate to the drive where you will save your project and name your project. Everything you do in this project will be saved in this location. The project folder contains all files of your project like the video, audio, graphics and project settings.

Bin

A bin is the electronic equivalent of a physical bin in which film is stored for retrieval during editing. The bin is simply a file containing clips and sequences and provides a simple way to organize a group of like elements. Bins are stored in the project folder and organize your assets, such as video clips, audio files, still images, graphics and sequences. Each listed media asset is a link. The files themselves remain in their file folders, while the assts are stored in bins. Bins behave like folders as a way to organize your assets visually within an editing program.

Clip

A clip is stored in a bin and contains information about the source of the material – tape name, start and end time codes, and so on – and the way you want the information to be captured.

Sequence

A series of shots or scenes that includes a beginning, middle and end (like a chapter in a book). A short movie can contain a single sequence, or several sequences can be put together to create a longer movie.

A sequence is your edited program. You create a sequence by editing clips together. A sequence is stored in a bin and holds references to its clips. The internal drive is the storage device on the system. The drive works like desk drawers and contains folders and files for storing information including applications, projects and bins. The basic editing model for editing system is very simple. There are three steps to converting raw footage to master tape:

- Digitize or capture

- Edit

- Output.

Creating a sequence can be as simple as stringing together as series of shots with some narration or music or more complicated with multiple audio tracks, sound effects, dissolves, wipes or special effects.

Now that you have seen the basics of an editing system, you need to know how to get that great video you shot into your editing system or program of choice. All systems have some way of capturing or importing your media. It's very important to understand this tool and function because without it you can't actually accomplish anything.

Once capturing, or importing, is complete it's time to become familiar with your footage and begin to think of an outline of how you want your video to flow. The next phase in the editing process is to sup-clip all of your useable footage.

Sub-Clipping

The process of going through your media and making it into smaller, more manageable files is called sub-clipping. Organization of your files is very important, but sub-clipping also benefits you. Sub-clipping gives you the chance to become familiar with your footage. Knowing your footage inside and out is important and will help speed up the process when you go to actually put the video together. You will know what shots you have and what shots you don't.

Once you have all your video captured, organized and sub-clipped. It's time to produce your spot, prime cuts video or All Hands Update. The two basic editing techniques you'll use in video are *continuity editing* and *compilation editing*.

NOTE: The editing procedures and techniques in place at your command may differ from what is portrayed in this section.

Continuity Editing

Continuity editing is the most commonly used method of editing video for news or feature releases. It is used when the storytelling is dependent on matching consecutive scenes. Continuity cutting consists of matched cuts in which continuous action flows from one shot to another. The three transitional devices associated with continuity cutting are the cutaway, cut-in and crosscutting.

Cutaway

When the action shown is not a portion of the previous scene, a transitional device, known as a cutaway, is used to change positions, movements or characters or to denote a lapse of time. This eliminates a mismatch, or jump cut, that would cause the segment to appear jerky or out of sequence.

Cutaways are often termed *protection, reaction, insert or cover shots* and are thought of as secondary action shots. For example, if the main story is about a parade, cutaways of close-up shots of the crowd would be suitable. Children may be shown watching intently, eating candy or applauding; adults may be wearing different expressions of emotion or carrying children on their shoulders. These shots are of human interest and are related to the primary action, but are not actually a part of it. If you have a good selection of cutaways, you can make a great story out of an otherwise drab and commonplace event. The cutaway can cover a multitude of camera operator errors and result in the formulation of an exciting segment. Cutaways should last between three and five seconds.

Cut-ins

Another method used to denote a lapse of time is the cut-in. Unlike the cutaway, the cut-in is a part of the primary action, rather than the secondary action. For instance, to denote a person climbing a long flight of stairs, you establish the individual at the start of the climb, and then cut to a close-up of feet as they take the steps. After you establish the shot (three to five seconds), you cut back to the person at the top of the stairs. A person can appear to walk a city block in just a few seconds by showing feet walking or a hand carrying a briefcase.

Crosscutting

Crosscutting is the old standby of editing. In crosscutting, you use shots from two different actions or events that will finally be related. A time-honored example is the "meanwhile, back at the ranch" style, or the hero riding hard to save the life of the heroine who has been chained to a buzz saw by the villain. The action would be cut back and forth between the desperate rider and the saw as it comes dangerously close to the heroine's head, showing the progress of each, then finally relating them as the rider arrives at the last moment to save the heroine.

Compilation Cutting

The second method of editing is compilation cutting. This is used in documentary-style stories of surveys, reports, history or travelogues. Segments can be tied together through narration, but not always. The narrative explains the shots, which may have little or no matching relation. These shots or scenes may be long or short shots, or they may go from long shots to close-ups without any special transitions. Compilation cutting is used for putting together Prime Cuts.

Once you're done with your rough cut, trimming is used to tighten up transitions, change the length of a scene, or adjust the timing and pacing of your story.

The technical side of the editing process is fairly easy to learn. With today's technology, the procedure is almost foolproof. Some editing systems allow you to use time-code editing to set all of your edit in and out points ahead of time, including special effects, graphics and audio and video mixes and dissolves. The capabilities of your editing system will control the number of special effects you will be able to use with your video. The latest software programs available allow you to produce professional looking, broadcast quality video, with minimal manpower. Nevertheless, a good editor must have a thorough knowledge of many related skills to provide viewers with a simple, yet effective, message.

Exporting

There are a variety of ways one can export a video project and each editing system has its own unique workflow. Nearly all non-linear editors allow you to export your edited video. The format you use is usually determined by the customer. However, it's your job as to ask where the video will air. Will it be viewed on the Web or in a large auditorium? The answers to those questions will determine what compression needs to be applied to the exported video. If the file size is too large it will not play well on a computer. If the file is too small and you attempt to project it in a large venue the video will look pixilated. It's important to understand the video you edit is considered to be in its rawest format and when you export, you are either compressing or transferring the editing files to tape. The exporting process can be expedited if you mix down the video tracks in advance. This process is also known as compression. Compressing and or exporting can become very involved. In fact, there are several good programs out there used explicitly for compression/exporting. For more information on compression refer to Chapter 7 of this manual.

SUMMARY

The sharing of thoughts and facts through the spoken word and vivid imagery shapes our lives. As an MC your job is to portray events in a clear, concise and interesting way. In this chapter you were introduced to the basics of a video camera and the most important tool there is for visual storytelling – the basic sequence. Remember, continuity is the thread that binds your video together. Once continuity is broken, the audience becomes confused and eventually loses interest in your video. Visual continuity preserves the essence of your story. Consistently using clean entrances and

exits provides a logical transition of the comings and goings of characters in the scene. The lack of directional continuity will always distract the observer from the story. Use the action axis to establish and maintain screen direction. You will often need to change the subject's screen direction, but remember this change requires a motivation and must not break the continuity of your story.

As you become more experienced in the art of visual storytelling, you will find that maintaining continuity is not hard, but it requires you to be ever vigilant against those jumps that can disrupt your narrative. The last thing we discussed was basic editing and how to get the video you captured onto your computer. Depending on where you're assigned will determine what editing software you use. Therefore, we only discussed the basics of all professional editing systems. In the next chapter will discuss the basics of multimedia and how it applies to your job.

Now that you have thoroughly reviewed the videography chapter, take some time to visit the [video gallery](#) on Navy.mil. As you review these videos, look for the lessons you learned here. Keeping up with industry standards and reviewing what others are doing will keep your product fresh and up-to-date.

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CHAPTER 5

MULTIMEDIA

Learning Objectives*: Upon completing this chapter, you should be able to do the following:*

— Define multimedia.

— Explain difference between raster and vector graphics

— Define principles of design for various multimedia projects.

— Understand the principles of animation.

— List the stages of authoring a movie.

— Explain Section 508 compliance in relation to website management.

INTRODUCTION

As taken from the pages of the Defense Information School's (DINFOS) handbook on multimedia authoring, multimedia simply defines product created by incorporating different elements of media, such as text, audio, still and motion images, animation, etc. It's taking the many forms of storytelling you have learned in this module and the previous manual and putting them together as a package to better convey your message.

In this chapter, we will speak of specific multimedia products and touch on the basics of each:

- Digital graphics

- Multiple-page layouts

- Electronic presentations

- Movie authoring and animation

- Websites.

DIGITAL GRAPHICS

In addition to the written word, photographs and video, all of which have been discussed in previous chapters, digital graphics play a key role in the creation of multimedia products. For our purposes, digital graphics fall into two categories – raster and vector (see figure 5-1).

In this chapter, we will focus on vector graphics, because we more often equate raster images to photography vice digital graphics. However, photos are as important to multimedia products as vector graphics.
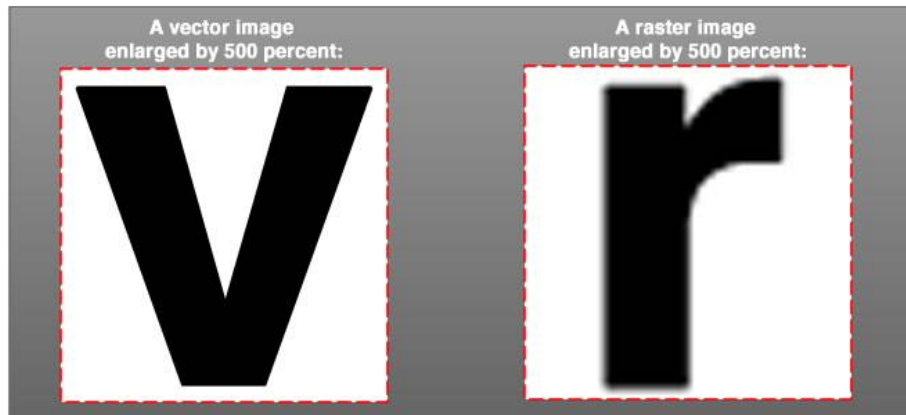
Figure 5-1, A vector image enlarged vs. a raster image enlarged proportionally.

Raster graphics use pixels to create an overall image and are often referred to as bitmap files. Raster graphics are resolution dependent, which means that you cannot increase their size without losing quality, see figure 5-1. Vector graphics are considered object-oriented graphics and are created from points, lines, shapes and curves that are based on mathematical formulas. These elements are filled with color, blends, tints or gradients, while lines have a stroke attribute, such as a solid or dashed line with different thicknesses and colors. Separate parts of a vector graphic are individual objects that can be changed independently of each other.

Vector graphics are resolution-independent, meaning when you reduce or enlarge the image you are only changing the mathematical formula that defines the object. This attribute makes vector-drawing programs ideal for artwork, such as logos, that need to be displayed or printed at different sizes. Vector software should not be used to edit photographs, because photographs are raster images made up of pixels and cannot be separated into individual objects.

Raster-based Software

Raster images create an image using a point, or hundreds of points, of light in a matrix. These images are slower to manipulate and create than vector graphics, but more spontaneous and easier to learn. A multi-layering, raster-based matrix with distinct grid-mapped forms is called raster-based imagery. Raster-based images create painterly (like a painting) effects and encourage creativity. They also require an enormous amount of processor power and memory that can slow program execution. To modify or create in the raster mode is to work at the pixel level which can be time consuming and tedious. Examples of programs that are raster-based are Adobe Photoshop™, Microsoft Paint™ and Corel Photo Editor™.

Vector-based Software

Vector-based software is ideal for drawings, charts, graphs and diagrams. It creates an image by defining line, position, shape, and fill pattern. You plot, or vector, a series of points to define a shape. This shape is calculated into a mathematical formula called an algorithm. Image manipulation and editing is automatically calculated by the computer when you change parameters, making modifications easy and fast. The use of a vector-based program requires preplanning and more computer savvy than a raster-based program. Examples of vector-based programs include Adobe Illustrator™ and Corel Draw™.

Using Software Programs

In order to become proficient with graphics and graphics software, you must practice, practice, practice. However, remember that computer equipment and software can never replace your own creativity and ingenuity. You must gain the knowledge to master the program or programs and use these tools wisely. Sit down, read the owner/user manual, and experiment with the computer.

Drafting, drawing and painting are distinctly different functions and not all programs will be equally adept at processing all three. Base your choice of program on command requirements. Also, let your software drive your hardware. Select a software program that fulfills the needs of the command and allows for some growth. Purchase hardware based upon software requirements. Invest in the very best monitor possible. All of this affects the graphics resolution, the ease of processing, and the final product.

Vector Terms

Now that you understand the basics behind vector graphics and how they are different from raster graphics, let's talk about some terms you need to know before you start using vector-based software.

Bézier Curve (pronounced Bez-ee-ay) – Developed by the French engineer Pierre Bézier, these curves are the basis for all images formed in a vector-based drawing. Originally created to put designs of aircraft on a computer, they were later used for designing cars. A Bézier curve is a combination of points on a path with anchor points at the ends of the path and two points coming out of the anchor points to control the amount and direction of curve. These points are called direction points. The concept behind all these lines and curves is to control the shape of the curve by moving the direction points.

Paths – Vector-based programs use paths to create objects that make up the drawing of the image. A path is a shape formed by lines connected at points, called anchor points. Paths can be changed and are easy to manipulate. Paths can be moved, resized and colored. The three basic types of paths are open, closed and compound.

- An open path is a path that has two distinct end points with any number of anchor points in between. Straight lines, arcs or curve lines are all examples of open paths

- A closed path is a path that forms an enclosed area with no starting or stopping point within that closed path. However, there can be any number of anchor points along the path. Examples of closed paths would be a circle, rectangle or star

- A compound path is a combination of open and closed paths. A compound path can be any shape or size. It can be easily identified because the open areas of the shape allow you to see through it. A doughnut drawing would be an example of a compound path.

Fill – To fill means to add color or pattern to an open area inside a path. A gradient can be created and used to fill an object. A closed path, a circle for example, will be filled in the inside of the path area. An open path, an arc for example, will be filled inside the path, but will stop at the invisible straight line connecting the end points.

Stroke – To apply a stroke means to take a path defined by the shape and trace it. A stroke can be applied to any path. A stroke color or pattern can be changed using the color or swatches palette. A stroke weight or thickness can be changed using the stroke palette. The Miter Limit option determines how far the stroke sticks out on a sharp corner.

Anchor Points join two segments of a path and can be edited. They can be placed manually or using the tools provided to place an anchor point where needed. It is important that you use as few anchor points as needed to create a path. Be careful when editing, you must remember that using more anchor points makes it more difficult to edit. That being said the more anchor points you use the more precise and detailed edits you are able to make. Four types of anchor points:

- Smooth Points have a curved path and no noticeable, abrupt change of directions, like an "S"

- Straight Corner Points occur where two straight lines meet, typically at a corner or anywhere there is an abrupt, distinct angle formed at the juncture of two paths, like a "V"

- Curved Corner Points are found at the junction of two curved lines that abruptly change directions when they meet, like the number "3"

- Combination Corner Points are found where a straight line meets a curved line, like the number "5".

Viewing Modes – Most vector-drawing programs provide three viewing modes to view your designs – outline, preview and preview-selected.

- Outline Mode displays the paths for the objects you have drawn; it shows no color, shading or other graphical effects

- Preview Mode shows what you will get when you print the illustration

- Preview Selected Mode shows the stroke, fill and color of the independent selection only.

Digitizing Tablets – A digitizing tablet (see figure 5-2) is an input device to help you enter drawings and sketches into a computer. It is most needed when converting an analog drawing or image, or re-drawing a low-resolution graphic. Operation consists of an electronic tablet, wireless mouse and/or pen. A pen (also called a stylus) looks like a simple ballpoint pen but uses an electronic head instead of ink. The tablet contains electronics that enable it to detect movement of the cursor or pen and translate the movements into digital signals that it sends to the computer. Each point on the tablet represents a point on the display screen in a fixed manner. This differs from mice, in which all movement is relative to the current cursor position. The static nature of digitizing tablets makes them particularly effective for tracing drawings.

Figure 5-2, Example of digitizing tablet.

FILING GRAPHICS

According to the SECNAVINST 3104.1A, <u>Navy Visual Information Program Policy and Responsibilities</u>, the marking and filing of all graphics must be made in the same manner as photographic images to include security classification, VIRIN and name of creator.

The VIRIN format, as of February 1, 2011, changed. See chapter 7 for more information.

MULTIPLE-PAGE LAYOUTS

Brochures, newspapers, newsletters, event programs, etc., are a few examples of multiple-page layouts you may be assigned to create during your time as an MC. Each brings together digital graphics with the other types of media we have discussed throughout this manual. Strategically placing these items together to create such a product is referred to as layout and design.

Layout and design affects the placement of different items as well as the relationships among them. It's like identifying your favorite ingredients and making your favorite dish. You need to know which ones and how much of each you need to use. The principles of design determine what you do with these items and how you do it. Within a layout, these principles also affect where you place the items and why.

PRINCIPLES of DESIGN

The four principles of design are balance, rhythm, emphasis and unity. When creating a layout, think about how each of these principles will enhance your layout, make it visually appealing or better communicate your message to your audience.

Balance

Balance is the perceived equal distribution of weight in a design. Balance refers to how items are arranged horizontally or vertically in a design. It creates a feeling of steadiness and of things looking as if they belong where they are. Layouts that are balanced seems complete to the eye. The two approaches to balance are symmetrical and asymmetrical.

Symmetrical balance is also known as formal balance. It is the arrangement of elements so they are evenly distributed to the left and the right of the center. In other words, one side mirrors the other, and all items on the page are centered and balanced. Symmetrical balance communicates strength and stability. It is mostly used for traditional or conservative layouts.

The opposite approach is asymmetrical balance, or informal balance. It is the arrangement of an object or objects of different weight on the page, which are not placed uniformly. Asymmetry relies greatly upon the optical weight of elements. Optical weight is a system of visual measure based upon the following ideas:

- Dark elements weigh more than lighter ones

- Color weighs more than black and white

- Big elements are heavier than smaller ones

- Bright hues are more weighty than muted hues

- Irregularly shaped elements have more weight than normal shapes.

Balancing an asymmetrical design requires the use of such elements as color, value, size, shape and texture. Asymmetry brings contrast, variety, excitement, movement, surprise and informality to your layout. It is most appropriate for pieces that entertain and inform.

Rhythm

Rhythm is used to achieve movement and is the visual progression of repeating elements in a varied pattern. Rhythm is often associated with music; for example, a waltz with a smooth, flowing rhythm or a polka with a lively rhythm.

The two key elements of using rhythm in your layout are repetition and variation. Repetition is the repeating of similar visual items in a consistent manner, and variation is a change in the size, placement or form of visual elements.

Repetition unifies a layout. For example, to make text easy to read, use even columns. However, too much repetition without variation can make for a boring layout. To vary your layout, you can add headlines, sub-headlines and images. Headlines are discussed in Module 1, Chapter 6.

Rhythm communicates feeling or mood. To establish a calm and relaxing mood, you should place your elements at regular intervals, creating a smooth, even rhythm. To establish a more dynamic mood, vary the size and spacing of the elements. The latter is used often in advertisements to keep an audience's attention.

Emphasis

In design, emphasis means that one element stands out amongst the others, capturing more of a reader's attention. As the layout and design editor, you emphasize the element you want people to notice first and foremost. Color is a great way to emphasize an element.

Remember back to the previous chapters on photography and videography. Do you recall that within both types of media, having a focal point within the images was vital to good storytelling? The same is true with layout and design. In any product, you must have a focal point or a spot in your layout that captures your reader's attention and keeps him there to check out the rest of the piece. Having too many focal points, however, confuses your reader. Emphasizing everything means emphasizing nothing.

After you choose the element you want to emphasize, you can choose from several methods to call attention to it. Generally, a focal point is created when an element differs from the others. For example, if you are working with a vertical layout, you can use a horizontal item, such as a horizontal photo, as your emphasized element. Other ways to use emphasis include:

Unity

Unity helps the elements of your layout look like they belong together, by providing visual cues to your reader that tells them which parts of the layout go with other parts of the layout. For example, in a newspaper, unity holds together a headline, story and the associated image.

Three ways to unify your elements are by grouping, repeating or using grids. Grouping means that the elements are close together on the page. Repeating elements through color, shape and texture create unity. If you are using an image of the American flag, you could pull out the color blue from the flag and use it for other elements on the page. A grid system, also referred to as modular design, is a division of page space into columns, margins or space. A grid establishes a framework for text, graphics and images.

Variety keeps unified layouts from being boring. For example, you can create a theme with circles in your layout. Circles and the variations of circles in different sizes and shapes create unity, but variety, at the same time. The elements remain related within the circular design, yet varied enough for interest.

ELEMENTS of DESIGN

The process of layout and design is neither an exact science nor magic. Layouts are tried and discarded many times before the right one is found. However, knowing the basic principles and elements of design and how to use them will help you make good choices. In this section, we will discuss seven elements of design often used in the industry – line, shape, texture, space, size, value and color.

In any given layout, it is important to know which of these elements are necessary and which are not in order to create a successful, clutter-free layout.

Lines

Lines are everywhere. There are straight lines, curved lines and squiggly lines; fat lines, skinny lines and dotted lines. Lines are used to organize, direct your reader's attention, or create mood, rhythm or movement.

- Horizontal lines can represent rest or relaxation in one instance or stability in another

- Vertical lines often show strength

- Vertical lines suggest movement

- Curved lines suggest many things depending on how they are used. They can show weakness, or they can show elegance, beauty or gracefulness.

Shape

Shape is any element with a given form that has height and width. Shapes communicate ideas. For example, a logo used for an international company could use a circle to represent the earth. Unusual shapes attract attention. Arranging text into a shape can be used to draw attention.

Shape enhances a layout in three ways – gives your reader a place to begin by acting as a focal point, sustains the reader's interest by breaking up pages with an overabundance of text, and organizes and separates to add variety.

In layout and design there are three common types of shapes. Geometric shapes, like circles, triangles, squares and rectangles, are regular and structured. These shapes make excellent building blocks for design. Natural shapes include animal, plant and human. They are irregular and fluid. For example, instead of using a rectangular shape on your page, you could use ivy (if appropriate) to give the page a light, airy feeling. Lastly, abstract shapes are simplified versions of natural shapes. An example of an abstracted shape is the symbol of handicap accessibility, which includes a figure in a wheelchair.

Texture

Texture gives a design the look or feel of a surface. Think about the many textures you encounter every day – the bark of a tree, the roughness of the sidewalk, the smoothness of a sink

basin, grooves on a steering wheel, the short or long fur on your pet, etc. In design, texture communicates through an imagined sense of touch.

Texture creates a particular mood, while adding dimension and richness. To demonstrate this, try printing your layout on different textures of paper using embossed type. Embossing means to create a raised surface.

Two types of texture are used in layout and design – tactile and visual. Tactile texture can be felt, while visual texture creates the illusion of texture on a printed piece. Wallpaper is an example of visual texture. Patterns often lead to visual texture. When an image or line is repeated many times, the patterns of lights and darks add dimension to the surface. Patterns make excellent backgrounds and borders in layouts; they add rhythm and movement.

Space

Space is defined as the distance or area between two items. Effective use of space in design leads to attractive, organized and functional layouts. When designing a layout, you must think about where you are going to place the text and imagery. How much space must you place around and between each item? You must also consider your total amount of work space on the page, how each element works together, and the overall appearance of your layout.

The space between and around the items is referred to as white space or negative space. It creates a rest for the eye and visually organizes the layout. White space between columns of text, for example, provides boundaries to allow the reader to move through the text easily.

Placement and value of shapes on a page create spatial relationships and focal points among the items on the page.

Size

The fifth element is size, which is how big or small something is. Size plays an important role in ensuring the layout is functional, attractive and organized. You can contrast small and large items to attract attention, reinforce importance or create relationships.

Value

Value is the darkness or lightness of an item, giving it shape or texture. In design, every item as a value. When laying out pages, an item's value is affected by its background and the other items around it. For example, a lot of text in a small area on the page will cause the paper to look gray.

Value can express a theme or mood. Using black, white and gray in your design adds power or changes the mood. Value establishes contrast by subtly blending shades of color or black and white. Low contrast creates a calm, quiet mood; high contrast conveys a feeling of drama or excitement. Using only light values gives a piece an unstable, subtle feeling.

Movement and direction can be affected by value as well. If you place a single black dot on a white background, you get great contrast between the foreground (the dot) and the white background. If you add a second dot below the first, the dots will appear to have equal importance. If you give the second dot a 50-percent shade, the value of the second dot creates movement and direction (see figure 5-3).
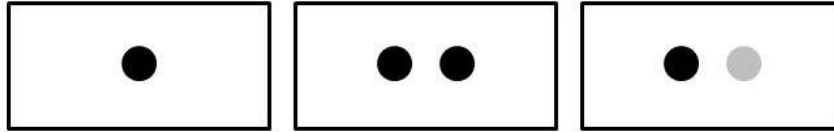
Figure 5-3, Example of changing the value of an item within a layout.

Color

The final element of a good design is color, which is the ultimate tool for symbolic communication. Decisions about color should be made with much thought to ensure the success of your layout.

Color conveys mood, identifies objects and relays messages. Like value, color also can evoke moods and emotions.

How you use color, however, makes a difference in the final product. You can pick a color from a photo for a background color in the layout to achieve a specific look. Repeating colors from a photos of a sunset gives you a gentle, soft feeling throughout Using contrasting colors with the same photo will give you a different look altogether. If you surround the same photo with lots of black, you create action and drama.

PAGE LAYOUTS

Now that you have looked at the principles and elements of good design, it is time to talk a little about the actually laying out the pages of that brochure, newspaper or retirement program. Page layout is the actual arrangement of type, photos, graphics, illustrations, etc. It involves the position of headings, the number of columns of text, borders, and the placement of graphics.

A good design makes it easy for your audience to receive the intended information. It requires elements to be arranged so they are aesthetically pleasing. There is no single correct formula for producing layouts or shortcuts to learning effective techniques. To be successful, the layout must stop readers and redirect their attention to the information you want them to read.

A good layout must be well organized and attractive to the reader to effectively communicate your message. A good layout succeeds when it gets the message across quickly.

The most important decisions you will make in creating your layout is deciding who is your target audience. You must also decide if the product is going to be printed or Web-based. How will it be distributed? If the product is going to be displayed on the Web only, you should use the RGB color mode rather than CMYK print color mode. (RGB = red, green, blue; CMYK = cyan, magenta, yellow, and key or black)

An Organized Layout

A good layout is organized when it provides a visual path for readers to follow. It shows the reader where to start and where to go second, third, fourth, etc. The better the organization, the faster the reader will get the message. Organization allows the reader to move smoothly and easily across the layout. If the viewer has to work at it, she will get bored or frustrated and lay the product aside.

Organization takes time and is perfected through trial and error. The process is similar to that of putting together a jigsaw puzzle. Best practice is to keep putting the pieces together in different ways until they fit together comfortably, emphasizing the items to the proper degrees.

An Attractive Layout

A good layout attracts your reader, grabbing her attention and pulling her into the information. A poorly designed layout fails to communicate. When designing and layout out your product, ask yourself these three questions:

- Does it work?

- Is it properly organized?

- Is it attractive?

If you can answer yes to all of these questions, you can say that you have a good layout. You should always get a second and third opinion, however.

PAGE ELEMENTS

Page elements, not to be confused with the elements of design, are the main ingredients that make up your layout. These include text, graphics, photos and illustrations, bleed, borders, rule lines, guidelines and grids, gutters, and margins.

Measurements

The system of measurement in graphic design includes the pica and the point. A point is defined as exactly 1/72 of an inch; therefore, there are 12 points in a pica and six picas to the inch. Type is always specified in points, and page elements are measured in points and picas.

TEXT, TYPE and COPY

Text, type and copy refer to the written information on your page. In the following paragraphs, we will discuss the factors to consider when working with text, type and copy.

Leading

Leading (pronounced led-ding) refers to the spacing between lines of text. It is measured in points, vertically from the baseline of a line of type from the baseline of the line below it. Leading is proportional to line length. Long lines of text require more spacing between lines. The default in most desktop publishing programs is usually 20-percent greater than the type size (e.g. for 10-point type, add two points to leading).

Closer text fits more text on a page, but decreases legibility. Looser leading spreads text out to fill a page and makes the document easier to read. Leading can also be negative. In this case, the lines of text are so close that they overlap or touch. Leading that is too tight makes it difficult for the reader to separate the words and phrases and to find the beginning of a line.

Line Length

Line length is the width of the line of type, column or page – in picas or points as set by the typographic commands. The length of a line depends upon the size of the type. Too long of lines

makes it harder for the reader to find the beginning of lines. Long lines make scanning difficult as well. Lines that are too short break up phrases. A good line length for optimal readability is 55-60 characters or nine to 10 words.

Kerning

Kerning refers to the horizontal space between letters. It can also mean to improve the appearance of type by adjusting the spacing between specific pairs of letters, such as AV, AY, FA, AW, PA and AT. Comfortable spacing between letters leads to visual balance, allowing the reader to move smoothly along the text. Kerning becomes more important as type size increases, as in large displays and headlines.

Type Size

As written above, text is measured in points with 72 points in an inch. Most documents use 10-point or 12-point type, or within the common range of 8 to 24 points. Small text is more difficult to read than larger text, but text that is too large becomes cumbersome and wastes paper and space.

Casing

Uppercase characters are capital letters; lowercase characters are small letters. The term casing traces its heritage to the days when typesetters kept capital letters in a tray above the lowercase letters.

Lowercase letters are easier to read than capital letters. Readers read quickly when they recognize the shapes of letters, and capital letters often appear to be in the same, square shape, vice lowercase letters. Writing with all caps adds emphasis, however.

Typeface

Typeface is the letters, numbers or symbols that make up a type that shares common characteristics, such as stroke width and the presence or absence of serifs. Although sometimes used interchangeably with font, they are not the same. Typeface is a set of one or more fonts, in one or more sizes. A font describes the style of typeface, such as bold or italic. For example, Times New Roman, Arial and Courier are the most common typefaces. Arial bold or Arial italic is a font.

Using different typefaces will not lead to better design or layout. It is best to stick to one or two typeface families throughout your layout. Choose a typeface that is simple and legible.

Typefaces can be divided into two categories – serif and sans serif. Serif letters are composed of thick and thin lines terminated with small cross strokes. One example of a serif typeface is Times New Roman. Serif is easier to read than sans serif, and serif improves readability by leading the eye along the line of type (see figure 5-4).

E   E

Figure 5-4, Example of serif letter and sans serif letter.

San-serif letters are constructed of strokes relatively even in weight. Arial is a sans-serif typeface. Sans serif is clean and simple in appearance. Sans serif is not recommended for large areas of solid text, but can be used in headlines and/or sub-headlines. For more information on headlines and captions, see chapter six of the first module.

Body Text

Body text is the main text used in your layout. It is the most important information the reader needs to know. Body text is generally 14 points or smaller and remains consistent throughout your publication. Italic or bold fonts should not be used for body text.

Pulled Quotes

A pulled quote is a short quotation that is pulled out of the story to attract attention and possibly entice the people to read the story. It also helps break up long columns of text. Pulled quotes are larger than body text, but smaller than the headline text, usually 18 to 24 points.

Indentations

Indentations are the positioning of text, so a margin of the line or lines appears a fixed distance from the left or right. Indentations affect visual configuration. The three basic types of indentations are regular, flush and hanging.

A first-line indent is an example of regular indentation and is often used to begin a new paragraph. Indents can be made from the left margin only or on the left and right, known as flush. The latter is used often to highlight a long quote or to bring attention to a particular passage. Hanging indents are frequently used for bibliographic entries, glossary terms, resumes, and outlines or bulleted lists.

Graphics and Photos

Every publication needs imagery to communicate concepts differently than words and to help sell the information. Graphics can be line drawings, art, digitized photographs or video images, or a combination of these. A photo adds visual interest to the layout. These are among the most important elements in the layout, because of their ability to capture a reader's attention without saying a word.

Bleed

A bleed is a photo or illustration that runs off a page or extends past the margin of the page. A full bleed means the printed elements extend beyond the four edges of a page.

Borders

A border is a decorative line or box used with text, graphics or tables. Borders keep it all organized and give the appearance that everything on the page goes together. Almost anything can form a border to a picture or a graphic. It may be as simple as a line around the edge of the page or a gold band to form a frame around another graphic.

Rules

Rule is another name for a line in graphic design. Rules are the horizontal or vertical lines used as decorative elements and as functional parts of the overall layout to separate, offset or anchor

areas of the page. They are used for forms, graphs and other graphic material. Lines divide and create organization.

Rule is a line of unvarying thickness, normally expressed in points, although some programs use inches by default. A hairline rule is the smallest. Rules can be solid or created from round, square or diamond-shaped dots. Rules can be made of dots and dashes in a pattern.

Guidelines and Grids

Guidelines and grids are used to align page elements. Gridlines help maintain consistency, determine orderly placement of text and graphics, and keep balance on the page. A grid is an invisible structure used to provide visual organization for text and graphics. A grid's influence may be evident in the width of columns, the uniformity of space around photographs, or the consistent placement of repeating elements from page to page.

Margins

As you read earlier, white space on a page is important to the layout's design, as it gives your layout breathing room. The most obvious white space on any page is found in the margins – top, bottom, left and right – or the empty space between the trim (where the page is cut) and the live printing area (primary text and graphics) of the page.

Traditional layout and design theory tells us that the more space devoted to margins in comparison with text and graphics leads to a more formal design and increases readability. Generous margins say elegance and simplicity. On the other hand, limited margins that leave little space can make your document look cheap, or mass produced. However, in today's cost-cutting, do-more-with-less business practices, skimpy margins are used more frequently and have become the norm.

Gutters

The inside margins or blank space between two facing pages in multiple-page document is known as the gutter. It is that extra space used to accommodate the binding in books and magazines. The amount of gutter needed varies depending on the binding method. The term gutter is sometimes used to describe the alley, as well, or space between columns of text in a page layout.

ELECTRONIC PRESENTATIONS

Another form of communicating the Navy's message is via projected media or electronic presentations, sometimes referred to as slide shows or command briefs. No matter the term, a presentation is a presentation anytime someone stands in front of several people and gives them information with support from projected information. An electronic presentation can also be viewed directly on a computer monitor in a personal setting.

In this section we will discuss how this multimedia product, like multiple-page layouts, pulls together more than one form of media – text, images, video, graphics, etc. – to best communicate your information. We will also speak about the other forms of projected media, which are not as widely used in today's digital environment.

The most important consideration when creating an electronic presentation is your audience. The presentation must convey information or educate your audience in some way. But each presentation is not created equally. For example, a briefing intended for your skipper will not necessarily be the same as one created for the crew. Nonetheless, the presentation must be professional.

The key to a successful presentation is organization. If the information you are presenting is not organized properly, the presentation will be ineffective. Successful organization can be achieved by following a simple five-step process.

FIVE-STEP PROCESS

Planning is the first step in developing a presentation. Planning begins when you sit down with your customer (or leadership) to discuss the target audience, desired outcome, content, specific multimedia requirements, and deadline. Always clarify any misunderstandings you have or the customer has before wrapping up the planning stage.

Design is the next phase of this process. After properly planning the job order, begin designing the look of the presentation. Work out the general layout and look at the presentation on paper first. From this roughest of drafts, develop thumbnails, roughs and comprehensive drawings to serve as blueprints for the final product. These blueprints should be shown to the customer prior to continuing on with the process. This will ensure that you are on the same page with your customer before you invest more time in the process.

Once the presentation is designed on paper and approved by the customer, the third step, production, begins. It is at time that you establish a files management directory for the presentation. A well-organized folder structure can reduce time spent searching the computer for necessary files. It also makes archiving the presentation easier for future recall. Within the folders, you should organize photos, graphics, videos, audio and text to be used in the presentation. You may want to keep an originals folder as well for back-up purposes.

Once the directory is established and source images digitized, it is time to create the presentation. Select the appropriate page setup for the presentation. Select a preformatted design template, or format the color scheme and masters manually. Once the slide master is formatted, create the slides. First, place all the content and then add supporting images. Add presentation effects such as transitions, animation and hyperlinks last.

After the presentation is complete, the next step is testing. Testing requires a quality-control check. To do this, proofread for accuracy and evaluate for effective design and legibility. It is also important to test the performance of the presentation by rehearsing on the system and in the exact location of the final presentation.

Delivery is the final step in the process. Once the quality-control check is complete, print viewgraphs, shoot slides, or save the electronic presentation in its final output format.

INFORMATION ARRANGEMENT

A good presentation includes an introduction, body, major points, summary and a closure. However, a presentation, depending on its purpose, can be structured in many ways. You could follow a pre-formatted template or you could design one unique to the presentation itself. When a pre-formatted template is selected, all slides within the presentation can be generated with placeholders that often include step-by-step instructions of what information to place when and where.

Navy presentations may not always be created using a pre-formatted template, but they do typically follow a general format. The first slide is the introduction or title slide, which is used as an opening for the speaker to introduce himself and the overall topic. The second slide contains the purpose or objective. This slide allows the speaker to discuss the reason or reasons for the presentation and to state the goals to be achieved. Next is the overview slide, listing the main topics

of discussion in the order each will be discussed. Slides specific to each topic follow. This is where you will most likely find graphics, audio, video and images to support the information being presented. This is where you can get the most creative.

After the topic slides comes the summary slide. The summary slide reiterates the topics discussed and allows the speaker to review the material covered. The final slide in the presentation is the closing slide. During this time, the speaker can review the objectives and open the floor to questions.

LAYOUT and DESIGN

Two of the most important factors when preparing a presentation are simplicity and legibility. Slides should not be a verbatim copy of what is being stated by the presenter. They should be used like headlines or signposts to point the direction of the presentation. Slides may also be used to illustrate and explain ideas the audience may find complex, for instance, the important elements of a table of figures may be better demonstrated if plotted as a graph. Research shows that each slide will only be looked at for approximately seven seconds, so remember to keep it simple.

Legibility is the "bottom line" and depends on a combination of factors. Font choice, text, colors, graphics, and layout all have an effect on the legibility of a slide.

Using Text Effectively

At any given point in time, the audience will have two senses with which to absorb a presentation – sight and sound. Don't overemphasize the importance of the spoken word; give equal importance to the slides. A good criterion for measuring the quality of slides is to go through them in sequence and ask whether the major themes are readily apparent with no spoken words. Similarly, a good criterion for measuring the quality of spoken words is to talk without any slides. These are harsh tests because neither the spoken word nor slides are adequate alone. If the spoken words and slides are both strong individually, all that remains is to be sure they are properly arranged.

Type

Type is the basic building block of a presentation. Often it is irresistibly compelling and sometimes absolutely imperative to design a presentation with more than one typeface in it. You may find more than one element on a slide such as a title, body text, labels, and image captions. Within these dynamics on the slide, a relationship is established that is concordant, conflicting, or contrasting.

Concordant – A concordant relationship occurs when only one type family is used. This keeps the slide harmonious, and the arrangement tends to appear quiet and rather sedate or formal. It is a good technique. To add more interested, however, you can use the regular style for one block of text and a bold italic for another.

Conflicting – A conflicting relationship occurs when separate typefaces that are similar in style, size and weight are used – such as Times New Roman and Garamond. The similarities are disturbing because the visual attractions are not the same, but neither are they different enough so as not to conflict with each other. Most often, conflicting text gives the appearance of a mistake rather than an effective difference between two elements.

Contrasting – A contrasting relationship occurs when you use separate typefaces that are clearly distinct, such as Impact and Helvetica. The visually appealing and exciting designs that attract your attention typically have a lot of contrast built in, and the contrasts are emphasized. Using two

contrasting typefaces in a presentation can add visual excitement. However, it is important that both of the contrasting typefaces are legible when projected onto the screen.

The choice of typeface used in a presentation has major impact on its legibility. The legibility of projected text differs from that of printed text, because the resolution of printed text is much higher than that of projected text. What looks good on paper may not project as nicely on the big screen.

Most experts recommend using sans-serif typefaces for electronic presentation. They believe that sans-serif typefaces hold up very well when projected and are easy to read, even from the back of a room. However, others argue that slab-serif fonts are also a good choice for electronic presentations, because they are more consistent in their thickness than other serif typefaces. Slab serifs can be identified by their thick, block-like serifs. Clarendon and Rockwell are examples of slab-serif typefaces. Whatever your choice, always check the readability when projected before the final presentation.

Text Size

Aside from using the right typeface, size also plays an important role in the legibility of text. Again, opinions vary on the perfect size for text on slides, but the consensus is to use text no smaller than 24-point for electronic presentations and 35mm slides. For overhead viewgraphs, the consensus is 18-point.

What matters most is the text must be easily read when projected on the screen. Before the final presentations, try one of the following methods to ensure you have chosen the right text size. First method is to display the slide full screen on the computer monitor, stand about nine feet away, and read the text. If it is easily read, the text is a good size. With a printed viewgraph, place the slide on the floor at your feet. If you can read the text without bending over, more than likely the text size is good.

General Text Guidelines

For consistency and simplicity, limit the amount of fonts used in a presentation to no more than two. In most cases, using a variation of the same font works very well, for example, Arial bold italic for the title and Arial bold for the body text. A second font can be introduced to highlight key points and phrases.

Remember the one thought, one paragraph idea introduced in newswriting? The same applies here – one topic, one slide. Focus on one point with each slide, and break up complex topics into smaller, more digestible segments. If there is too much information to fit on one slide, spread the information across multiple slides. This will give the audience time to absorb the information. Another good practice is to use bullet statements with each bullet representing a new thought about the main topic and use key phrases where possible. The concept of accuracy, brevity and clarity works well here; eliminate non-essential words, such as articles and other words not essential to your message.

A good rule of thumb to follow for placing text on a slide is the "6 x 6 rule", which means to use no more than six lines per slide, not including the title, and no more than six words per line. This does not mean there can't be more than six lines of text on a slide, because it is not always possible to condense the information that much. However, by keeping this rule in mind, it serves as a reminder to focus on the important words and eliminate any unnecessary words.

Use "Initial Capitals" when typing text rather than all capital letters. "Initial Capitals" is also known as sentence case or upper-lower case. Writing with ALL CAPITAL LETTERS makes the text hard to read and is the written equivalent of shouting. When learning to read, we learn by reading

uppercase and lowercase letters. Studies demonstrate we also read using shape recognition. Each letter has a distinct shape that is based on the construction of the letter. Likewise, so do words. We become very adept at quickly recognizing words without actually reading every letter.

Another tip is to keep all information within a safe area on the slides. The safe area, about ½ inch from the edge, compensates for any overlap or edge loss when projecting the slides.

Using Color Effectively

The primary purpose of color in a presentation is to create an attractive environment for the message. Studies show that a color presentation is more memorable and effective. The use of color can contribute to a presentation in several ways. Color choices can influence the mood and receptiveness of your audience. In a darkened room, audience attention can wander. Color provides the visual variety necessary to maintain audience interest. It can focus audience attention on a particular point in an individual slide. Finally, color can be used to enhance meaning and clarify information.

A presentation color palette establishes a consistent environment throughout. The color choices in a color palette can be broken down into three main areas – format, highlight and text.

Format Colors – Colors used in the basic design of a presentation are the format colors. These include the background colors and any colors used for recurring items, such as graphics and logos. When creating 35mm slides and electronic presentations, the format colors will usually be the darkest colors on a palette; on overhead transparencies, they will be a combination of dark and light colors, depending on the format design.

Highlight Colors – Highlight colors are those added to a palette for illustrations, chart and graph elements, text bullets, and other graphic objects that have meaning and content. These colors should fall in the midrange of brightness; bright enough to stand out from the background, but dark enough to support white or lightly colored text. Similar highlight colors are used for overhead transparencies, 35mm slides and electronic presentations.

Text Colors – Text colors include the basic text color, title and subtitle colors, and special colors for highlighting body text. In 35mm slides and electronic presentations, these colors should be the lightest in the palette so they will stand out against the format and highlight colors. On overhead transparencies with medium-light or light backgrounds, these will be the darkest colors.

Color Contrast

Color contrast is the relative difference between two adjacent colors. The difference may be in hue, as in red and green; it may be in saturation, as in light pink and primary red; or it may be in brightness, as in brick red and primary red. The difference may also be a combination of both, as in yellow and dark blue.

Contrast is defined in terms of foreground and background objects. In presentation design, text and graphics are the foreground objects that rest on the slide background color. High contrast is essential to readability and clarity in slide design, so it's important to select highlight colors for text and graphics that contrast strongly with the background. The best way to provide contrast is through a combination of brightness and hue.

When two objects with high color contrast, such as red and cyan, touch each other on a slide, a thin, white line may be seen where they touch. This effect is known as haloing. When two complementary colors touch, the slight overlap of the beam causes the colors to mix, creating a white

edge. Most haloing can be eliminated by placing a thin, black border around the complementary-colored objects, or giving the text a black drop shadow. The black line will interrupt the overlap.

Warm, Cool and Neutral Colors

Color can be divided into three main categories: warm, cool, and neutral. Warm colors are the colors of fire: reds, oranges, and yellows. Cool colors are those of water and air: greens, blues, and violets. The only truly neutral colors white, black and grays. However, subdued versions of warm and cool colors such as browns, tans, and slate blues, also serve as neutral colors since they usually have a lot of gray in them.

Warm colors draw attention in the presentation. Slides with a preponderance of warm colors stimulate the audience and cause feelings of heat and energy. However, warm, bright backgrounds are much too flashy for slides. The intensity of the colors will tire the audience. Dark reds and oranges can be used in backgrounds, but carefully, since it is difficult to find cool, contrasting colors that work well with them for foreground objects.

Cool colors have a more relaxing effect on an audience than warm colors. In general, slides with mostly cool colors make an audience more receptive and passive. Dark, cool colors are ideal for backgrounds because they contrast well with warm color highlights, forcing the audience to pay attention to the content rather than the background. Brighter cool colors can also be used, which would be overwhelmed by a warm background, as highlights.

True neutral colors act as a blank slate for the highlight colors used with them. Without an addition of some color (either with a logo or format graphics), neutral backgrounds can be very boring. Warm neutral colors, such as brown and tan, or cool neutral colors, such as blue gray, can be used to avoid the bland gray look. Neutral tones are the perfect background for a full range of highlight colors, both warm and cool. In a presentation, various combinations of warm, cool, and neutral colors can be used to influence the audience.

The background, because of its large area, will have a more profound effect on the general mood of an audience than the highlight colors used with it. Warm backgrounds are generally suitable for presentations that are intended to excite and stimulate the audience, such as sales and marketing meetings. Cool backgrounds are best suited to presentations that require the audience to be relaxed and receptive to information, such as business and scientific presentations. Neutral backgrounds (especially gray) serve as a backdrop for the other colors, so the highlight colors will have more effect on the audience.

Enhancing the Message with Color

In a presentation, anything that helps the audience concentrate on the speaker and the slides is a plus. Color is one of the strongest tools for guiding an audience. The following are some techniques for using color to enhance the message.

Use color to increase legibility – Strong contrast will increase readability. Unless deliberately trying to create a watermark effect, use enough contrast to create a visible edge where any object touches the background. Without proper color contrast, objects will appear weak and out of focus.

Use color to maintain audience attention – To keep the audience awake, use occasional splashes of color. Color visually stimulates the audience, keeping them alert and interested. Color also adds variety. Use colorful charts and graphs as well as colorful graphics and photographs to illustrate the point.

Use color to emphasize or de-emphasize points – Color can be used to call attention to a line of text or part of a graph, or it can be used to draw attention away from certain information. Large, low-contrast elements will seem less important than smaller, brighter ones. Instead of underlining important words within a text block, put them in a bright, contrasting color. Put the most important element in a bright color to direct the audience's attention to it. Use darker colors for data that is not as important to diminish its impact.

Use color to link related presentation elements – For example, if a briefing contains several references to different departments within your command, you can select a signature color for each department. The audience will identify with each color, and it will be easier to read and understand the slides.

Use gradient fills for depth and realism – Using gradient fills for backgrounds adds drama and depth to slides. It also enhances contrast between background and foreground elements.

Other Guidelines for Using Color

Limit the variety of colors used. Five colors are the maximum for graphs and charts. For word charts, limit yourself to two main colors with a third for highlighting.

- Use color to show relationships between elements

- Keep colors consistent

- Use bright colors to emphasize information

- Understand that cool colors recede to the background; warm colors advance to the foreground

- Use colors like blue and green for less important elements or large areas

- Establish a color palette and stick with it

- Avoid red-green combinations.

ELECTRONIC PRESENTATION PRINCIPLES of DESIGN

The four principles of design for electronic presentations are proximity, alignment, repetition and contrast.

The principle of proximity states that related items in a layout should be grouped closer together and unrelated items farther apart. When several items are in close proximity, they become one visual unit rather than several separate units. This helps with organization by reducing clutter.

Although elements are separated to indicate their relationships with other elements, alignment shows all elements in the layout belong to the same piece. Lack of alignment is probably the biggest cause of unpleasant-looking layouts. The principle of alignment states that nothing should be placed in the layout arbitrarily. Every element should have a visual connection with another element whether they are in close proximity or not. The purpose of alignment is to unify the layout.

Repetition strengthens unity. Color, shape, texture, spatial relationships, line thickness, fonts, text sizes, and text placement can all be repeated.

Often the most important visual attraction is contrast. The principle of contrast states that if two items are not the same, make them different, REALLY different.

Tables, Charts and Graphs

Most military presentations are based upon statistical data. So, you must be able to provide this statistical information through well-prepared graphics that communicate visually and can stand alone or be supplemented with written or spoken words. Therefore, you must be proficient in the basic techniques of producing tables, charts and graphs.

Tables

The two basic types of tables are general purpose and special purpose. Although their construction is the same, there are basic differences.

General purpose tables present a broad range of data on a specific subject, while special purpose tables highlight a particular aspect of a study.

General purpose tables are quite long and cumbersome; special purpose tables are usually brief and to the point.

A table should contain a title, body, captions, footnotes and source and preparation data.

Title – tells the viewer what is being compared and where and when the data applies. Never sacrifice clarity for brevity when deciding upon your title.

Body – the information should be presented simply and clearly, so it must be arranged systematically to emphasize the important points. Columns are vertical listings, and rows are horizontal. Column headings are called boxheads, and row headings are stubs.

Captions – Captions are related to the title of the table. Detailed captions eliminate the possibility of misunderstanding. Captions give unit of measurement being used. These captions, although different from photo captions, do explain what is in a table.

Boxheads contain caption information for vertical columns

Stubs contain information in horizontal rows. They are usually listed in some logical order – numerical, alphabetical and geographical. Stubs should be clear and complete to prevent misunderstanding.

Footnotes – Clarify items that are not completely self-explanatory. To draw attention to a footnote, use an asterisk or some other graphic symbol, but don't use the same one for different footnotes. Footnotes should be placed to the left, directly below the body of the table.

Source and Preparation Data – To be complete and effective, you must include the source of the data, the preparer's identifying information, and the date the table was prepared. It is standard to display this information in the lower left and right corners of the table, aligned vertically.

Tables do not have standard graphic elements, like you may find in charts and graphics. Therefore, an effective table relies on good information and line-width hierarchy. Text hierarchy means that separate groups of text have different characteristics. For example, the title should be the largest and boldest text in the table. This draws attention to the important elements and assists in visually organizing the information. Line-width hierarchy means using different line widths or styles to separate components.

Charts and Graphs

Well-constructed charts and graphs make for effective statistical data presentation. The possible variations in design are endless, limited only by your imagination. The value of a good chart or graph lies in the statistic that we take in 75 percent of all information through sight.

Overcrowding, however, in charts and graphs obscures information and defeats the purpose of your graphic to display information quickly and simply. Information contained in a graph or chart must be accurate, timely and clear. These graphics help audiences reach conclusions.

Major components of charts and graphs include a title, scale (range of values), items being charted, legend, and source and preparation data.

Title – Same rules apply as in tables. It gives the audience the what, where and when.

Scale – The scale, or range of values, is usually listed on the left side of the chart or graph and shows the unit of measurement and numbers. The scale caption is derived from the title and must be shown. It is usually centered above or to the left of the scale.

Most scales start at zero and extend to the highest needed value.

If a scale does not start at zero, it gives a false impression, misleading the viewer.

The interval of value is also important. You should select an interval that makes the information appear clear and uncluttered. Usually the smallest value determines the interval.

Items being charted – These items are usually listed along the bottom of the chart or graph. The name of each is centered immediately below the line or space where its value is plotted.

Legend – The legend identifies the data plotted. The more types or trends of data, the more essential the legend. In the legend block, each type or trend of data is associated with a distinguishing mark – line or color. Generally, the legend is placed in the lower right corner

Source data – The source of the information is placed in the lower left corner of the chart as in a table. The source is essential, because without it, the chart loses validity.

Preparation information – The preparation data shows the data and the agency that request the chart in the lower right-hand corner of the chart.

Charts and graphs may be designed in several different ways; however, there are some basic charts from which all other charts are derived. These are the bar graph, pie graph, line graph, flow chart, and organizational chart.

OTHER FORMS of PROJECTED MEDIA

In addition to electronic presentations, other forms of projected media include overhead viewgraphs and 35mm slides. An overhead viewgraph is more commonly known as a transparency.

An overhead viewgraph, which is typically 11 x 8.5 inches, is projected onto a screen using an overhead projector. It is projected with the same ratio as a television or computer monitor – 4:3. When creating a viewgraph using today's most-popular software, the default size is 10 x 7.5. This size uses an aspect ratio of 4:3, where 2.5 inches is the unit of measurement.

Transparency film for copiers and printers is not very durable and is damaged easily. To prevent damage during handling, you should place it inside a document projector or mount it.

The quality of a viewgraph depends upon the resolution of the image and the resolution quality of the printer. The resolution of the image (number of pixels per inch) determines the smoothness of the printed or projected image. The resolution of a computer-generated image and a data projector is based on picture elements or pixels. Monitor resolution is 72 pixels per inch (ppi). Dots per inch, or dpi, determine the resolution of a printer and refer to the number of dots the printer is able to reproduce within an inch.

The more pixels an image has the smoother or detailed the printed image will appear. The higher the dpi of a printer, the greater the concentration of dots printed and the smoother the printed will appear. Most laser printer typically print at 300 to 600 dpi. When developing images for presentation, you should use 150- to 200-ppi resolution that will be printed to a transparency film for the overhead viewgraph.

Overhead projectors, once popular in classrooms and business conference rooms, have mostly been replaced by data projectors. Data projectors take images from a computer and display them directly onto a wall or big screen.

Data projectors are one of two types, portable or fixed. Portable projectors are generally smaller, less expensive, weigh less and are not as bright as fixed ones. They range from three to 20 pounds and cost between $550 and $6,000. Some portable projectors are small enough to fit in the palm of your hand. Fixed projectors are just that, fixed or mounted in a conference or presentation room. They typically weigh between 13 and 30 pounds and can cost anywhere from $1,000 to $25,000. The additional cost does mean increased quality in most cases. These projectors have at least 2,000 lumens, which mean these projectors can be used in a moderately bright room.

MULTIMEDIA AUTHORING AND ANIMATION

Some presentations created today take multimedia to a new dimension by providing a means of interaction between the viewer and the production. This process is known as authoring a movie and involves many stages. Movie is the authoring term for a project and will be used often in this section.

The authoring process takes a development team through multiple stages and builds a working prototype to demonstrate how a movie will work.

STAGES of AUTHORING a MOVIE

Movies are created in many stages. Most often these development stages are very specific. At times it may be hard to see any separation of the stages, but you should never leave any stage out. There are six general stages for authoring a movie, starting with the concept and finishing with the distribution and delivery. As you go through the stages, you may find yourself going back to certain stages to reevaluate certain aspects or to make decisions based on other stages.

Concept

The concept stage is sometimes referred to as the question-and-answer stage. When creating a movie, the three most important aspects to keep in mind are the target audience, the purpose of the product and the product itself. Before you create a movie, you need an idea and an audience.

You must also ask yourself about the comprehension level of your target audience, the purpose of the presentation (inform, entertain or educate), the format of the end product, and the desired delivery method.

Planning

Before you begin working on the movie, you have to know what you have to work with and when your customer wants the project completed. You must also consider your budget, your manpower, and your equipment (hardware, software, etc.). The next step in planning is to gather your content.

Organization and development are important elements of the planning stage and are keys to the success of the movie. During planning, you should also identify your topic, develop a story line, write a script and create a storyboard, most likely in that order.

A script is the written organization that details the scenes of your production. It should contain the who, what, when and where aspects of your planning. Script writing is similar to writing the story of your production and leads you right into the design stage.

Design

This stage begins with brainstorming; put everything you can think of for the design of your production on paper first. A detailed design plan needs to show what and where text, still images, sounds, animations, and video clips will be placed. A house or high-tech fighter plane would not be built without blueprints. The same goes for multimedia. The design work is not just for your benefit but also for your customers. By working with the customer with the blueprint, you can avoid issues later, because the customer can see ahead of time what his product will look like.

One of the best things you can do for your multimedia program is provide yourself with a script before you begin. A script for multimedia is typically set up to provide not only the dialogue or narration, but also the action, sound and music that is to take place at the same time. The scripting processing continues as the design team creates thumbnails, comprehensives (scamps), and storyboards, for every scene and prepares flowcharts of all the interactive connections in the movie.

Thumbnails are small, quick sketches used to work out general layout and structure within each scene. You can use a template or sketch thumbnails alongside the script. Both practices are common.

Scamps, or comprehensives, are pencil layouts of every scene that shows how the text and images will be positioned. People are going to be working from these plans, so they need to be descriptive and accurate.

Flowcharts organize the content. An informational flowchart is presented as a box diagram, with lines that show the access routes among its parts, a navigational blueprint. It shows how you plan to take the user through the movie. The flowchart shows links between scenes. The ideal flowchart is a clear, easy-to-follow specification of a program's topic categories, levels, and links.

Storyboards look like comic strips and are similar to scamps only with a lot more information to show how the elements appear in each scene. Storyboards list all actions and options of each scene, such as animation, moveable objects, audio, video, proposed interface, and navigational tools. Storyboards do not have to be elaborate, but they must show progression. Storyboards give everyone associated with the project a chance to share and understand the visual concept the director and writer are after. If a scene works on paper, chances are it will work in the program.

The best multimedia designs are transparent to the user. They create an environment where the user forgets he is relating to a machine and feels motivated to explore. Good design calls attention to the content of the production, rather than calling attention to itself. Screens and graphics will appear to have a texture that can be revealed by dramatic lighting effects. Colors should be harmonious. The movement through the program will feel comfortable, and users will easily learn how to work their way through the program.

Production

The production stage combines the planning and design efforts into an electronic media. Production includes recording, obtaining and creating images, sounds, and video, then saving these as source files to be used by all members of the team. Decisions are made on file names, formats and file structure for these source files. Good organization maximizes production time.

During production, you should also be visualizing final product, so most likely you will have to refer back to the concept stage. This will help you determine screen size, image sizes and possibly the frames per second (fps) rate of videos. Most movies will be made for show on a video or computer screen. With this in mind, you will more than likely make the screen 640x480 pixels and images no larger than 640x480 pixels at 72ppi. Videos run at 15 to 30fps. While the movie is being brought together, testing must be done to make sure it matches the designs and functions properly.

Testing

Testing is a never-ending, continuous process done throughout the development of the movie. All decisions should be tested and checked whether they are on paper or in the program. Proofreading the script, scamps and storyboards will help prevent embarrassing moments later. In the concept stage, you should have identified the target audience and system to be used for the movie. It is imperative that during the testing phase that you test your product with members from the target audience and on the target system to ensure you are reaching your mark.

A popular testing method is to use an independent, third-party tester. You give the tester a finished prototype and basic instructions. From this, the user should be able to understand and navigate through the movie. Third-party testers are usually used to find bugs missed during production. If testing is successful, it is time to move to the final stage – distribution and delivery.

Distribution/Delivery

Distribution, and/or delivery, of the product should be done only after the movie has been tested and all glitches fixed. Once the movie is generated, it will be distributed onto some type of media – compact disc or DVD, server or website.

CD-ROM (compact disc read only memory) – small optical disc made of plastic that stores up to 700 megabytes (MBs) of information.

DVD-ROM (digital versatile disk-read only memory) – a disc with a capacity of up to 25-times greater than that of a CD and offers digital-quality images for superior multimedia processing. DVDs store more than four gigabytes (GBs) of information. Following these steps will help you save time and money.

Key here is ensuring that the product you created is compatible for distribution.

INTERACTIVE MULTIMEDIA

Multimedia is typically divided into two categories, linear and nonlinear. Linear productions progress without any navigational control by the viewer, such a cinema presentation. Linear follows a sequence of a line, starting at a beginning and running through to an end without jumping around. Nonlinear productions and presentations give the viewer or user navigational control, such as in a computer game or computer-based training. In other words, nonlinear multimedia is interactive.

Interactive media, like other forms of multimedia, integrates electronic text, graphics, video, sound, etc., into a structured digital environment that allows its audience to interact with the data. Authoring software is capable of providing the links that join these elements and make a multimedia movie interactive. The digital environment includes, but is not limited to, the Internet, telecommunication and interactive digital television.

There are four categories of interactive programs – presentations, catalogs, games and computer-based training. Your information, audience and project goals help determine the most appropriate design model.

Presentations – An interactive presentation is like show and tell, through which you have a story to tell or a message to convey. These presentations can be learning experiences for the viewer. To ensure the material is absorbed and the viewer is motivated to retain the information, the presentation must be memorable, entertaining, and most importantly easy to navigate.

Catalogs – Catalogs are used for direct access to information. Without leaving the home screen, the viewer can typically navigate through the presentation. Interactive catalogs employ a search engine and a transaction component. The search engine enables the user to access information from a text field or hypertext-linked index. The transaction component provides the user with the tool to actually select (and purchase) items.

Computer-based training – Computer-based training (CBT) includes any application that provides the user with a specific learning agenda. Information is absorbed by the user at her own pace, which allows her to advance through the presentation as she retrieves the information and qualifies it at each level. The two distinguishing characteristics of CBTs are simulation of real-life events and scoring. The ability to simulate real-life events is one thing that makes computer-based training so valuable. True CBT programs will include the ability to record user responses and measure user progress.

Computer games – Computer games are the foundation for most, if not all, of today's multimedia industry. The objective for computer games is to make the game more challenging as you progress through it and become more proficient.

Hypermedia is an example of nonlinear multimedia. It provides a structure of linked elements through which the user can navigate. The World Wide Web is an example of hypermedia, where hyperlinks help the user move from one website to another.

To navigate through a production means to move through the piece using interactive connections, comparable to a road map, blueprints. The user has selection options, buttons to click, such as a "next" button or an arrow.

Understanding the terms we associate with authoring will lend a better understanding to the principles of animation

PRINCIPLES OF ANIMATION

Animation is a series of graphic images that are displayed fast enough to trick our eyes into believing there is movement. If done well, animation can add a great deal to the movie. If it is improperly done or if there is too much animation on a single page, it can be distracting and annoying.

Animation is often a better choice than video in education and training, because animation can be used to simplify complex concepts. Animation is good for showing changes over time, transitions and transformations of elements, and relationships among objects. The movies we see in theaters and on television are just sequences of still pictures seen in rapid succession. Because the changes are relatively small, going from one picture to the next, we perceive motion. Essentially, animations are created by changing an arrangement ever so slightly from one frame to the next.

Cell Animation

The very first filmed animations were drawn – and filmed – frame by frame. This meant that an artist had to draw thousands of pictures even for a short film. Consequently, drawings in the earliest cartoons are generally not very sophisticated. Cell animation, also known as frame animation, was created in the early 20th century, making it possible to create feature-length animations.

With cell animation, a scene is divided into layers. Characters and props are painted onto clear acetate cells, which are laid over background paintings on an animation stand. A single background painting may appear for several seconds in a scene. Then, only the characters need to be redrawn from one frame to the next.

Time and money can be saved, however, by having multiple cells for the characters and props, separating the parts that change rapidly from those that don't. Also, cells can be reused as backgrounds and sequences (e.g: a "walk" sequence). Although cell animation reduces the amount of drawing needed, it also complicates the filming process — each frame is now an arrangement of pictures. To minimize the confusion that might arise, timing sheets keeps track of the animation stand, the camera movements and the corresponding audio.

Key frames and Tweening

Some animators draw a sequence of pictures and have the resulting motion look the way they want. More often, an animator will first draw the frames showing key points in the action (key frames) and then draw the frames that make the transition from one key frame to the next (in-betweens). In large productions, the more senior animators draw the key frames, and then have others draw the in-betweens. Software available today can do some of this tweening for you. If your key frames show an object in different positions, or at different sizes, you can fill in all of the in-between stages. Tweening is the process of filling in the frames between the key frames to make the animation appear fluid.

Morphing

Morphing is a technique used with frames to create the illusion of one object changing into another. Morphing is generally created using a process referred to as shape tweening. Key frames are set and the computer generates the between frames. By displaying a series of frames that create a smooth transition, it appears that one shape actually becomes another. Although tweening and morphing are time consuming when done manually, creating frame-based animation is actually simple with a computer and animation software.

Other Types of Animation

Path-based animation is also known as vector animation. This type of animation creates animated objects by following an object's transition over a line or vector path. It tracks the beginning, direction and length that an object travels. The path the line takes can be straight or curved and can be drawn on a path.

Script-based animation uses programming languages to create animation. By using a set of program commands, frames can be substituted for other frames, thereby creating a sequence of movement or animation.

Constraints of Animation

Despite the great flexibility computer animation gives us, the medium does impose some constraints. Being aware of these constraints will help you to plan better animations.

When you zoom in on a raster image, each pixel in the image is mapped to several pixels on the screen. Because of this, the image will start to look like it's made up of little boxes. When you zoom out, only some of the image pixels get mapped to the display. Details can and do get lost.

A raster image is a fine grid that stores exactly one pure color for each grid square (or pixel) in the image. The computer displays a raster image by mapping image pixels to display pixels; that is, the color of a pixel on the screen corresponds to the color of one of the pixels in the image. A raster image contains no information about the object(s) that the picture represents.

Knowing the terminology and principles and becoming familiar with the authoring software in your shop are the first steps in becoming an effective multimedia illustrator. From there you will be well equipped to develop and create movies, training videos, and incorporate animation to your projects.

WEBSITES

The Internet and more specifically the World Wide Web have become so intertwined into our everyday lives that many cannot remember what life was like without it. However, to fully appreciate the power and complexity of the Internet one has to look at its humble beginnings.

During the Cold War in the mid-1960s, the need for a decentralized communications system was apparent. A concept to connect computers together throughout the country that didn't rely on a single route between two points was devised. This system was known as a "packet switching network", where data would be broken into "packets" and routed through the network on whichever path was available at the time of transmission. A packet is a unit of data which has been formatted for transmission over a packet switching network. With such a system in place, communication could take place in spite of parts of the network being unavailable.

Originally implemented for the government and a few universities, the Internet was an emergency military communications system operated by the Department of Defense's Advanced Research Project Agency (ARPA) and used for research in education and defense. This operation was referred to as ARPANET.

Over time, every U.S. university that received defense-related funding possessed ARPANET computers. Gradually, the Internet transformed from government purposes to a communications tool for scientists. As more scholars came online, the administration of the system transferred from ARPA to the National Science Foundation.

In the late 1980s, businesses began using the Internet and the administrative responsibilities were once again transferred. During this time, the foundation of the Internet was being expanded as the military and the corporate world upgraded their computers and networks to grow with the demand of new users. This infrastructure has grown from a few computers into literally millions of computers connected together using cables, phone lines, and even satellites to cover almost the entire Earth.

To communicate between locations through this large network, computers use a communication protocol known as IP (Internet protocol). This protocol, running on each computer connected to the Internet, ensures that communication breakdowns do not occur and the networked computers can communicate with each other and exchange data properly.

Every computer connected to the Internet has a unique IP address. If a duplicate IP address exists, an error is given to the computer using the same IP. To exchange computer information over the Internet, a computer protocol known as transmission control protocol Internet protocol (TCP/IP) prepares the data to be sent and received. TCP/IP ensures that a Windows™ network can exchange data with a Unix™ or Macintosh™ network and vice-versa.

Unlike telephones that exchange analog signals with a direct electrical connection, computers communicate by breaking the data into separate data packets. These packets are passed off to different computers and network routers across the Internet until the data arrives at the destination. Some of these data packets arrive to the browser at different times. The TCP/IP protocol reassembles the packets into data that Web browsers display as a complete Web page.

It is important to understand the difference between Internet and the World Wide Web. The Internet is the physical network made of smaller networks made by the connecting of computers on those networks. The World Wide Web (WWW) is a system for organizing data over a network. The WWW is the system that we use to communicate, publish content and share digital media on Internet.

The U.S. government controls the Internet's "root" — the master file that lists what top-level domains are authorized to operate on Internet. There are plans to transfer this responsibility to the Internet Corporation for Assigned Names and Numbers, or ICANN, which would be governed by an international community. Currently, there is much argument over whether a change in responsibility over Internet would be beneficial to the world or not, because of the many technical and cultural challenges this transfer has been delayed.

Unlike the Internet, no one entity is in control of the World Wide Web. Because the World Wide Web is considered open to the public, many developers can develop for, and utilize the web to publish content. What we usually pay for is the physical connection to the World Wide Web, any services we might subscribe to that reside on the WWW, or storage space we require online.

All laws pertaining to the World Wide Web and how content is governed are handled by local governments and authority over content for the web is handled geographically. For example, in Arabic countries, content is more strictly controlled and many western websites are not available to their citizens.

The future of the World Wide Web continues to brighten with every innovation. If you wish to know more about the World Wide Web and the guidelines for operating on the Web, click HERE.

The ease of access to Internet and the World Wide Web has changed the way we use and exchange information. We can now keep up with the news, weather, and stocks with just a click of the mouse or an app on our cell phones.

Web 2.0

Web 2.0 changed the way users and designers use the Web. Web 2.0 sites let users to interact and collaborate with one another socially and professionally through user-generated content. This differs from static websites in that the viewer can do more than just browse through the content, which is created and controlled by the sites webmaster. Examples of Web 2.0 include social networking sites, blogs, wikis and video-sharing sites.

WEBSITE ESSENTIALS and TERMS

For Navy public affairs and visual information professionals, the Internet has become a vital part of our communication strategy. Through static websites, interactive websites and social media, the Internet now ranks up there with television, print productions and radio for telling the Navy's story. Although MCs use commercial social media sites on the Web, static websites are typically designed, created and maintained in-house.

Before you can design or administer a website; however, it is important to learn the concepts, terms and procedures used to create and maintain websites.

Governing Instruction

The governing instruction for website maintenance and development is <u>SECNAV Instruction 5724.47</u> (series), Department of the Navy Policy for Content of Publicly Accessible World Wide Web Sites. And, according to this instruction, the management, including oversight, of all content on official, publically facing Navy websites is a public affairs function.

So, before jumping in to create your command's website, it is imperative that you familiarize yourself with this instruction as well as all others pertaining to military webmasters. Policies for Web and other Internet-based capabilities (ibC) can be found on the <u>DoD webmaster page</u>.

Web Browsers

A web browser is a client software program that resides on the computer you use to view pages and navigate through the World Wide Web. When you request a page on a website, your browser connects with a web server. The browser processes Web pages from the serve and displays the pages for you. Depending on your browser's features, you might be able to view or interact with multimedia files, read e-mail, shop online, or use other advanced features.

Browsers used today, such as Internet Explorer ™, Mozilla Firefox™, and Safari™, display Web pages differently. As a designer, you must be aware of how different browsers behave by testing different sites and your own site on them.

Internet Service Provider

An Internet Service Provider (ISP) maintains the server where your computer sends requests as well as the space required to store your Web pages.

Web Server

Content available on the Internet is stored on Web servers. When you make a request from a Web server, an IP connection is made across the Internet between the client making the request and the host running the Web-server software. As soon as the Web server satisfies a request, the Internet connection between the client and the host breaks. A page containing images or links to other pages

all require separate connections. Often, it takes many requests to retrieve all the information on one Web page.

Uniform Resource Locator (URL)

Every piece of information on the Web has a unique address. This address is called a Uniform Resource Locator, or URL. A URL is an address that reflects the location of a file on Internet. This information might include a Web document, a file on a file-transfer site, or an e-mail address. A URL is made up of several parts (see figure 5-5):

- Protocol tells you how you are going to get to the information, such as with HTTP, HTTPS or FTP (file transfer protocol)

- The domain is the Internet host name, or the textual identifier, of the site

- The directory path is the place, or folder, within the site to locate the requested information

- The page name is the file name of the page you're requesting.

http://   www.navy.mil/   navydata/   our_ships.asp

| Protocol | Domain | Path | Page Name |
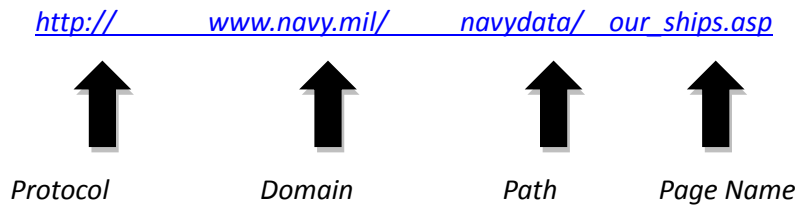
Figure 5-5, Example of Uniform Resource Locator (URL)

Domain Name Server (DNS)

The DNS system forms one of the largest and most active distributed databases on the planet.

When you use the Web or send an e-mail message, you use a domain name to do it. For example, the URL "http://www.navy.mil" contains the domain name "navy.mil", so does the e-mail address user@navy.mil.

Names like "navy.mil" are easy for people to remember. This isn't true for machines. For all computers connected to the Internet, an IP address is assigned to refer to that unique machine. For example, the machine that people refer to as "www.navy.mil" has the IP address 207.114.197.94. Every time you use the domain name, you use the DNS to translate the domain name into the machine-readable IP address.

New processes are being developed to keep up with the demand for needed URLs, as current methods cannot handle the number of required URLs.

ELEMENTS OF A WEBSITE

The Web is based on a set of rules for exchanging text, images, sound, video, and other multimedia files. The set of rules is known as the hypertext transfer protocol, or HTTP. Web pages are exchanged over the Internet because browsers and Web servers both understand HTTP.

A Web page is any page you see when you open the Internet. Every new screen you click on is a Web page. A website is a collection of Web pages. It can be made up of one page or millions.

A homepage is the starting point for your website. It is similar to a title page or a table of contents for a written document and it is the most common access point for the website. It also contains hyperlinks to subsequent pages within the site.

Within your website, you can also include a site map as a guide to the different pages through which your viewers can surf to find information. To view an example, check out the site map for the Navy Personnel Command's website. Typically, site maps display items hierarchically, breaking down the website's information into increasingly specific subject areas.

A website may also contain downloadable documents, images, video, text and more; you are limited only by your imagination (and regulations as to what can and cannot be posted).

HTML

Hypertext Markup Language (HTML) is a special language used by Web designers to format Web pages. HTML consists of a series of simple-to-learn tags that indicate page elements, structure, formatting, links, and more. Web browsers read these HTML tags and format the text and styles that appear on the viewer's computer screen. Tags are enclosed by the lesser than (<) and greater than (>) brackets and may be written in capital or lower case letters. (NOTE: An emerging alternative use of the term "tag' is to describe the classification of content by readers used with photos, blogs, etc.)

<html> *<head>* *<title>Your Page Title</title>* *</head>* *<body>*
This area will contain everything that will be visible through a web browser, such as text and graphics. All of the information will be HTML coded.
</body> *</html>*
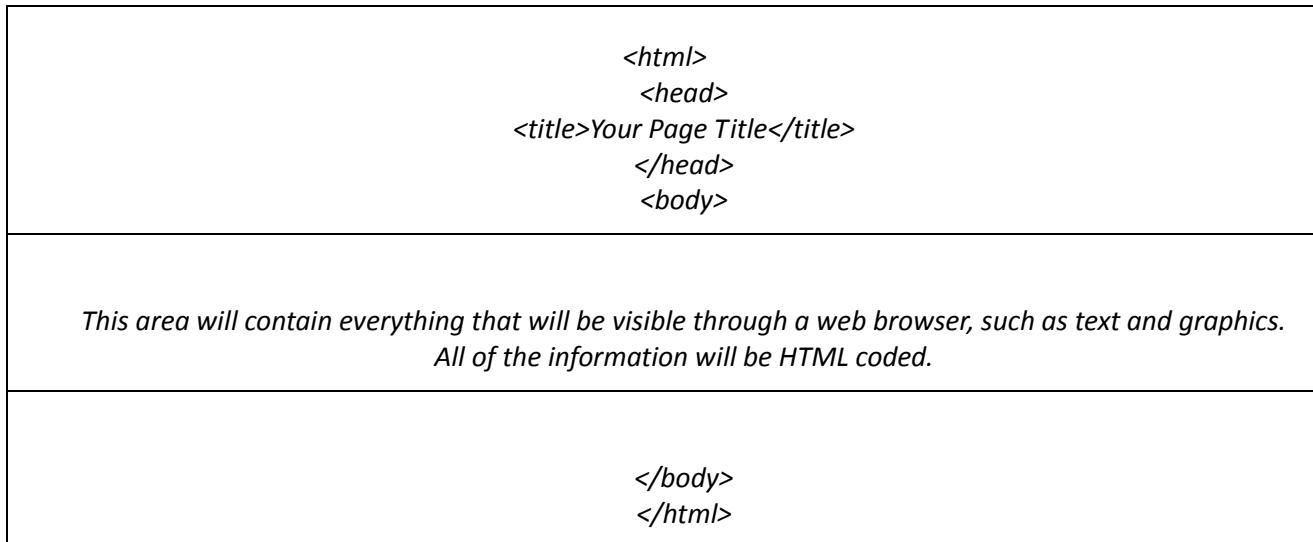
Figure 5-6, Three main sections of HTML.

A Web page is made up of three main sections of HTML, each defined by a tag (see figure 5-6). The first is the html section. This area is defined by <html></html> tags. Everything between these tags is considered part of the Web page. The second section is the head section, found between <head></head>. In addition to the title of your page, you will also find keywords, page description information, special elements like cascading style sheets (CSS), and other information required to make the page display correctly. The last section is the body. This is where you will place items, or content, that will be seen by the viewer.

DINFOS training as well as online tutorials are available to help you grow your Web design skills, such as HTML coding. It is imperative that you stay up to date on current trends in Web design.

Plug-ins are software modules that add specific features or services to a larger system. HTML, although it does what it does well, does not have the innate ability to display a movie file or run a

video game. Plug-ins increase HTML's functionality. They are invisible to the user and are called upon whenever an element needs one. On the down side, plug-ins require you to work outside standard HTML and not everyone has access to the same plug-ins. Some of the most popular plug-ins are Adobe's Flash™ and Shockwave™, Apple's Quick-Time player™, and ActiveX™.

Cascading Style Sheets (CSS) is a style language used to describe how content appears on a screen. Content is the information you want to communicate to your user. Content comes in many forms – text, images, videos, and sound. CSS separates your content from the structure rules for how it will be displayed. Structure elements, for example, can dictate what color the text appears, where on the page and image is placed, or whether or not a border is displayed.

CREATING WEB PAGES

Your options for creating Web pages differ greatly from those for the printed page. If you design pages using HTML, you don't have complete control over how the reader receives the page, the size of the page, the width of the text column, the fonts, or size of text.

For this reason, you can use WYSIWYG Web-authoring tools vice HTML coding. WYSIWYG stands for "what you see is what you get." WYSIWYG editors have graphical interfaces that make writing HTML more like using a word processing or page layout program.

In the beginning, the goal of WYSIWYG authoring tools was to spare authors from ever having to touch an HTML tag. Today, their role has shifted toward making document production more efficient and automated while still providing access to the HTML source. An editor can help keep track of page links, images, files and folders and make sure all required files make it to the Web server when it's time to upload.

Having a WYSIWYG editor does not eliminate the need to understand how HTML or CSS works, but it does remove some of the pressure of memorizing large amounts of tags or rules. A good WYSIWYG editor should be able to write W3C (World Wide Web Consortium) standards compliant code and include software tools to assist in writing handicap-accessible sites.

Even though you don't have to enter the HTML tags to create your Web page with a WYSIWYG editor, you still need to know a few things about the capabilities of HTML and how they control what you can present on your page.

Stages of Web Creation

The process of developing a website is no different than developing any type of media project. Many of different elements and resources need to be determined throughout the project. Each stage of authoring helps the authoring team to properly accomplish long term goals. Let's take a look at the different stages of authoring — concept, planning, design, production, testing, and distribution/delivery.

Concept

Like other multimedia projects, you have to have an idea or concept in mind before you begin developing a website. You must also consider your customer, your audience and the purpose of the site. Will the site be for informational purposes only, or will it be used to educate or entertain?

Planning

After you have an idea, a purpose, and you know your target audience. You must plan, schedule, and account for any resources, before you can begin the design phase. You must also know when your customer wants the project completed.

Design

You have probably heard the phrase, "It's not finished until the paperwork is done." In website production, "You haven't begun until the paperwork is done." is more true. Before you begin full production and begin putting things together in your website, it all needs to be on paper first. Most websites start with drawings, such as with storyboards in multimedia authoring and videography.

Web designers also use flowcharts when putting together sites. A flowchart is the navigational control to your website, and it is the plan of how you will take the customer through the website. Most flowcharts start by placing the scamps (small images that represent the content) into an organizational chart like pattern. The flowchart is then used to organize content and show the links between screens in your title. When creating the interface and navigational controls, you must again look at the concept stage and keep the user in mind.

The interface design and controls should be intuitive, or feel natural, simple and consistent. . Another consideration in the design phase is style. Consider how colors, photos, illustrations and backgrounds will be used. Color and shape have a lasting effect on the end user and are often over looked. The design work you do now not only benefits you, but also benefits your customers as well. . Remember, your customer is the final decision maker. At this point, if the design isn't right, you have only exchanged paper.

Production

With the design work accepted and the concept in full view, it is time to begin production. The production stage is where the pieces of the site begin to come together. Each person on the production team begins to gather raw files and prepare them for production. The source files are brought together and placed where they can be used by all members of the team. The obtaining, and creating of images, sounds or even video will continue throughout the production phase. It is in this stage, as you recall, where you also build your file structure to best organize your items.

Testing

Testing, as with all multimedia products, is vital to a website. Testing can happen at any point along the stages of authoring. Testing websites can be a challenge, since you have to test on a wide variety of machines and browsers. Always test your site in more than one browser, and on more than one computer – newer computers and older models as well as computers that run on different operating systems. It is also important to have someone unrelated to your project team test your site. One bad link can ruin a user's experience with your site and reduce the effectiveness of your site.

Other items to consider when testing your website:

Logical appearance – Does the site communicate its purpose well? Can I tell what this site is about at first glance?

Ease of navigation – Does the site navigate logically? Is the content on the site broken up logically? Are the subpages (links) retrieved with ease?

Broken links – When you click does it go where you thought it should? Do documents, images and/or videos load properly?

Too much or too little information on a single page – Is the page too crowded? Is there too much dead space?

Usability issues – Any and all usability issues should be looked at and corrected as early as possible. Test, test, test your site.

Distribution/Delivery

When you have completed all other processes and your customer has reviewed and approved the site, you go live with the site and begin advertising it. Remember, you must ensure you have read all required policies and instructions to ensure you are compliant. It is most likely that you client (leadership) will be unaware of these regulations, so it is in your best interest to have such knowledge.

Layout and Design

An HTML page is one column of continuous text with graphics that flow along with the text, as if they were text characters themselves. This text-stream model limits control over page layout; for example, it controls how you can set up layouts that use multiple columns, layered text and graphics, or rotated text. The text model means page proportions and line breaks will vary depending on size of the monitor or window in which the page is viewed, and the preferences set in a Web browser. As a rough guideline, you might design for the line length produced by a Web browser using a default font on a 640-480 pixels screen.

Using HTML, you cannot specify a precise horizontal and vertical position for a graphic. For example, if you position a graphic at the bottom right of a page as it appears on your monitor and a reader decides to make the window narrower, the graphic probably will move to the next line down and may end up on the left side of the page. The only way to constrain a layout is to place everything into tables. You can also use WYSIWYG — authoring software.

As for deciding where to put the information, it is best to follow the same principles you would use when creating multiple page layouts (see above). However, there are some elements that are specific to Web design.

Text

When placing text on your website, you should refer back to the do's and don'ts for page layouts and electronic presentations, previously mentioned in this chapter. These rules have been refined for years, and they work well. It is also important to consider placement of text. Centered text is hard to read. Left-justified text, where text is lined up on the left side of a page, is the best practice. Titles and similar elements can be centered, however, to show emphasis.

Other tips for using text include …

- Use uppercase and lowercase letters, vice ALL CAPS, except with titles or items you are trying to emphasize

- Italics should only be used to draw attention to text. Overuse makes text hard to read

- Overuse of bold text minimizes its affect, and like italics, decreases legibility

- Keep terminology simple and easy to understand. Remember your audience.

Graphics

When you're considering what images to include, keep in mind that images take longer to download than text. Some browsers don't display graphics at all, and some readers turn off graphics to speed up their browsing. You should also keep image file sizes as small as possible by reducing the image size and the number of colors (the color palette) of the images.

You want your homepage to load very quickly, so no graphic should be so large it takes a long time to download. In Web design always be aware of your download speeds. Be sure to resample or reduce the image resolution in an image-editing application. Scaling an image in a WYSISWYG editor does not change its file size and won't speed downloading. You can use an image-editing application to resize or resample high-resolution images. A resolution of 72 pixels per inch is high enough for most images, because it is the resolution of most Web users' monitors. Ensure you use a compression method and save in the graphic in the correct file format.

Data compression is storing information in a format that requires less space than usual. Data compression is particularly useful in communication because it enables devices to transmit the same amount of data in fewer bits. It is important to consider what images to include in a Web page. It is imperative to learn how to correctly compress files to effectively transmit data via the Internet.

There are basically two types of compression methods for images, lossy and lossless. Lossy compression creates smaller files by discarding some information about the original image. It removes details and color changes it deems too small for the human eye to differentiate. Lossless compression, on the other hand, never discards any information.

The graphic file formats most browsers support are Graphic Interchange Format (GIF) and Joint Photographer Experts Group (JPEG). GIF is a lossless compression method, while JPEG is a lossy compression method.

GIF is the best used with illustrations with areas of solid color, such as line art and logos. GIF formats compress files by reducing repetitive areas, such as large areas of solid color. The more repetition in an image, the more the image can be compressed. This format uses a palette of up to 256 colors to represent the image, and supports background transparency.

JPEG is designed to preserve broad color range and subtle brightness variations of continuous-tone images, such as photographs and images with gradients. This format represents images using millions of colors, thus yielding the best results for compressing full color photographs.

PNG, Portable Network Graphic, was designed specifically to outperform and replace GIF. PNG can match 99 percent of GIF functions. PNG files are typically larger than JPEG or GIF images because a PNG file does not include JPEG's lossy compression, and it can contain more colors than a GIF. So PNG is best suited for small images, navigation buttons, and thumbnails with fine details you don't want mangled by JPEG compression.

Web Links

The most significant difference between a printed page and a Web page is a link, which lets you arrange pages in a website. When you click a link, the Web browser jumps you to the page set as the link's destination.

Links appear as specially marked text or images on a page. Each page can have several links, with each link leading directly to another page within your site or to pages on any other Web server in the world. There are three different types of links – a link within the same Web page, a link to another Web page within the same website, and a link to another website.

Section 508 Law

Accessibility of your content is not only good practice it is the law. As federal employees we are obligated to make our website content accessible to people with disabilities. In 1998, Congress amended the Rehabilitation Act with Section 508 with the intent to breaking barriers for people with disabilities so that they have the exact access to information as other citizens. Under Section 508 (29 U.S.C. '794d), agencies must give disabled employees and members of the public access to information that is comparable to the access available to others.

Accessibility is not a hurdle that you must overcome. In fact, by designing and keeping accessibility in mind you are more likely doing a better job of communicating, period. If you are already designing with W3C standards then accessibility is almost automatic.

Find out more about accessibility, Section 508 standards, and incorporating 508 compliance into your design by exploring the Web-based course "Designing Accessible Websites" on the [Section 508 website](). This site provides full online training courses and contact information to 508 coordinators for your organization.

SUMMARY

In this chapter we discussed multimedia and how bringing together graphics, images, text and video can be incorporated into your public affairs and visual information plan. More specifically, you learned about digital graphics, multiple page layouts, movie authoring, electronic presentations and websites.

As an MC, it is important to keep your audience in mind when creating your project. All of your creativity and originality will be wasted if your message does not reach your audience. Simplicity and legibility are the keys to an effective presentation.

Further training in multimedia is available at DINFOS via such courses as the Basic Multimedia Illustrator or Digital Multimedia courses or by working on the job with a Shipmate who already possesses these skills. For more information talk to your supervisor and visit the [DINFOS academics Web page]().

CHAPTER 6

PRINT PRODUCTION

Learning Objectives: *Upon completing this chapter you should be able to do the following:*

—Describe desktop publishing.

—Identify different types of desktop printers.

—Explain the processes of mat cutting and print mounting.

—Explain binding and finishing.

—Describe characteristics paper.

—Describe job control and job order logs.

INTRODUCTION

In 1440, Johannes Gutenberg developed what is arguably one of the most important inventions in modern times, a mechanical moveable-type printing press (see figure 6-1). Today, print production continues to be as an important an industry as ever before in disseminating information. In the Navy, operation of today's print production belongs in the hands of mass communication specialists.

As an MC, you will also need to have a basic understanding of printing. In this chapter will discuss the various methods you'll use to produce posters, programs, newsletters and training manuals. These valuable communication products add yet another tool for delivering the Navy's message.
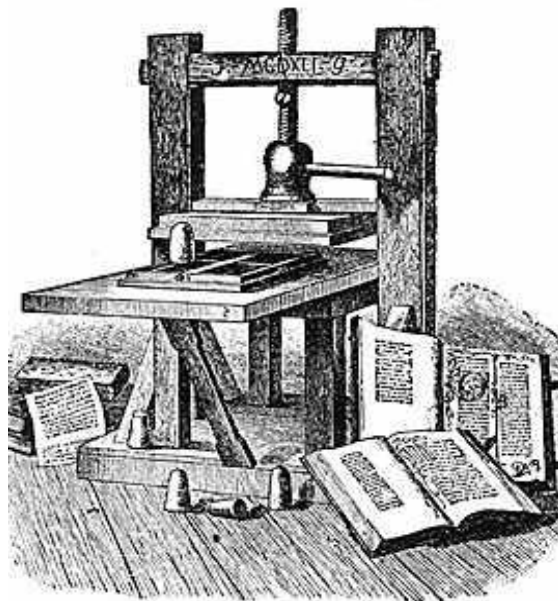

Figure 6-1, Illustration of first printing press, invented by Johannes Gutenberg around 1440.

DESKTOP PUBLISHING PROGRAMS

The term desktop publishing (DTP) came to light in the 1980s upon development of a specific type of software for creating materials for print; however, desktop publishing today encompasses more than just print communication and uses many different types of software. As technology improves so does the capabilities of the software programs we use.

One thing to keep in mind when learning about DTP is that it is easy to confuse DTP with graphic design. MCs use programs like Adobe Illustrator™, Flash™ and Dreamweaver™ to develop concepts, ideas and arrangements for visually communicating a specific message. The *mechanical process* you'll use to turn those ideas of newsletters, posters, and other projects into digital files for printing is DTP.

DTP software is used to create materials for visual communication. Most of the DTP software capabilities can be broken into three basic categories – composition, layout and graphics. These categories combine to make a comprehensive package for designing and publishing multimedia material.

COMPOSITION

Composition defines the sizes and styles of type, the amount of space between horizontal letters and vertical lines, and the coding of the text copy to meet standards. You can edit text directly or input text from documents created in a word processing program and imported into the DTP software.

LAYOUT

Layout, as has been discussed in previous chapters, involves the arrangement of text and graphics on a page. Electronic pasting moves text from one portion to another and incorporates illustrations into the text. Some features include multiple columns, column widths, and gutter space manipulation, printing vertically or horizontally on a page, automatic copy fitting, automatic page numbering, and adding headers and footers.

GRAPHICS

Desktop publishing software can scan or import illustrations/graphics from hard copy or digital data via scanners or other programs as well as add images, borders, lines, arrows and more. You also can alter or edit images by shrinking or expanding them to create a layered four-plate color separation for color reproduction.

DESKTOP PRINTERS

Printers provide a hard copy printout of data stored electronically inside the computer or from a disk. Many printers are primarily used as local peripherals and are attached by a printer cable or, in newer printers, a USB cable to a computer that serves as a document source. Some printers, commonly known as network printers, have built-in network interfaces, typically wireless and/or Ethernet-based, and can serve as a hard copy device for any user on the network. Individual printers are often designed to support both local and network connected users at the same time. In addition, a few modern printers can directly interface to electronic media such as memory cards, or to image capture devices such as digital cameras, scanners; some printers are combined with a scanners and/or fax machines in a single unit, and can function as photocopiers.

DIGITAL PRINTING

Digital printing is printing using digital techniques developed for computer printers such as ink-jet or laser printers. The process differs from lithography, flexography, gravure and letterpress printing in several ways:

- Every print can be different, because printing plates are not required, as in traditional methods

- There is less waste chemical and paper, because there is no need to bring the image "up to color" and check for registration and position

- The ink or toner does not permeate the substrate as does conventional ink, but forms a thin layer on the surface and may in some systems be additionally adhered to the substrate by using a fuser fluid with heat process (toner) or UV curing process (ink)

- Because there is less initial setup, it is useful for rapid prototyping, and cost effective for small print runs.

Digital printing is used for personalized printing or variable data printing (VDP or VI), for example personalized children's books, which are customized with the specific child's name and images. Print-on-demand (POD) systems also use digital printing, for short run books of varying page quantities, and binding techniques.

Digital prints can also be done on photographic paper, exposed with RGB laser lights from computer files, and processed in photographic developers and fixers. These prints are continuous tone images and have the dyes imbedded in emulsion layers within plastic coatings. They can be very archival.

Photographic papers are available in a variety of paper surfaces, such as matte, semi-matte, luster, high luster, pearl, and glossy. The use of different paper surfaces depends on the final application of the print. There are two paper surfaces that are used frequently in Navy imaging facilities: glossy and matte. Paper that has a smooth, glossy surface provides a print with higher contrast and higher densities or color saturations, resulting in an apparently sharper image. This is due to the direct reflection quality of the paper surface. Glossy papers are always used for photographic prints that are used to show fine detail, such as equipment damage or intelligence photographs.

Light reflected from matte paper is diffused and provides a softer, lower contrast image. Because of the lower contrast, subject detail does not appear as sharp as an image on glossy paper. Matte papers are used commonly for portraiture and scenic photographs.

PRINTER TYPES

The ink-jet, Noritsu™ ink-jet, laser, thermal transfer, continuous tone die sublimation, and color phase change are nonimpact printers that you may find in a Navy shop.

Ink-jet Printers

Ink-jet printers' spray electrically charged ink through tiny nozzles in the printing element. The ink passes through an electrically charged field that forms the image in matrix form. These printers offer very high-quality resolution and print up to 300 dots per inch (dpi).

Noritsu Ink Jet Printers

Noritsu ink jet printer is the high-quality, digital-imaging equipment ideal for compact space and does not use photographic chemical and solution to develop prints. Noritsu is unique among companies that produce one-hour photofinishing equipment in that they do not produce consumer photographic products, such as film, photographic paper and chemistry.

Laser Printer

A laser printer directs a beam of light that electrically charges an image on a photosensitive drum. Toner attracts and adheres to the dots on the drum and a heating element fixes the image on the paper. These printers can print in excess of 20,000 lines per minute.

Thermal-Dye Transfer Printers

Thermal-dye transfer printers are often called dye sublimation or dye-diffusion thermal-transfer printers.

This system provides high-quality and an environmentally safe method of transferring images to print and transparency materials without using chemicals.

The thermal-dye transfer printing process uses thousands of tiny heating elements that come in contact with "donor ribbons." Each donor ribbon releases a gaseous color dye when heated. Three-color printers have cyan, magenta and yellow ribbons (CMY); four-color printers also include a separate black ribbon (CMYK). The amount of heat from each element controls the amount of dye being transferred to the print material. The blend of the gaseous colors creates a continuous-tone image.

The quality of a thermal-dye transfer print resembles a print made from conventional silver-halide paper. The resolution of thermal-dye transfer printers ranges from 160 to 300 dpi. Resolution is limited by the thermal printing head. Thermal-dye transfer printers can produce prints from 3.5 by 5 inches up to 14 by 17 inches.

Color Phase Change

A color phase change uses Pantone certified colors in a wax medium. Like continuous tone dye sublimation, this is a thermal transfer, but it does not require specially coated paper.

REPRODUCTION EQUIPMENT

A Navy graphics shop contains a wide variety of equipment necessary to produce a variety of high-quality products, from books, posters, brochures and invitations. To use the equipment effectively and safely, you must have a working knowledge of its characteristics, limitations, and operating and maintenance procedures. However, before using any such equipment it is imperative for safety and efficiency to ALWAYS review user's manuals. Know the equipment before you begin production!

DIGITAL DUPLICATION

Digital duplicator is a high-speed digital printing system designed mainly for high-volume photocopying and printing. When printing or copying multiple quantities (generally more than 20) of the same original, it is typically far less expensive per page than a conventional photocopier, laser printer or inkjet printer.

In 1986, the RISO™ Kagaku Corporation introduced the Risograph digital duplicator. It uses duplicator technology but improves on it; it improves upon the traditional mimeograph machine in that the operator does not have to create a stencil. The stencil, called a master, is made by use of a scanner and thermal print head. Also the master is automatically removed as a new one is created and placed in a disposal box. This way the operator should not have to touch the used master material that is coated in ink.

A digital duplicator like the RISO™ is often more cost-efficient than a copier, especially when duplicating high volumes. For smaller print runs the main cost is in the master material. This ranges between 40 and 80 cents per master, depending on the manufacturer. When spread over 20 or more copies the cost per copy is close to photocopiers at 2 to 4 cents. With every additional copy, the costs decrease. At 100 prints the master cost per copy is only .004 to.008 cents per copy, and the cost of the paper printed upon begins to dominate. A master is capable of making 4,000 to 5,000 prints.

The RISO™ has five selectable print speeds (60 to 130 sheets per minute) and a scanning resolution of 400 dpi. It can scan documents for reproduction ranging in size from a business card (2"x 3.5") to ledger size documents (11" x 17"), with an output size ranging from 4" x 6" to 11" x 17". The RISO™ also has a capacity of up to 1,000 sheets of 16-pound bond and can accommodate various substrates ranging from 13-pound bond to 110-pound index stock.

PAPER RECOMMENDATIONS

Print production is more than just reproducing words, images and graphics on a piece of paper. It's about conveying a message and delivering information to an audience. The paper you choose to print your product, therefore, becomes as important as the message, because people can hold the paper in their hands and become familiar with it. The paper is an important part of the overall product.

As you read above, with today's cost-effective, high-volume printers, paper often becomes the most costly portion of print production. So, understanding paper and picking the right paper is of the utmost importance.

Paper is typically defined by its finish, grade and basic weight.

- *Finish* refers to the texture of the sheet. Is it coated or uncoated? Is it smooth, woven, ribbed, glossy or matte

- *Grade* describes the papers classification based upon the type of pulp used, paper treatments, and the end use of the paper. Common paper grades include bond, book, Bristol, cover and newsprint.

    —Bond paper is lightweight, high-quality, durable writing paper used for letterhead and stationary.

    —Book paper is used when publishing books, as the name implies.

    —Bristol paper, named for the town of Bristol, England, is used for brochures, tickets, tags, paperback book covers, file folders and more.

—Cover paper is thick and durable. Also referred to as card stock, cover paper is used for business cards, postcards, playing cards, catalog covers and scrapbooks to name a few products.

—Newsprint is low-cost paper used to print newspapers and other advertising material.

- *Basis Weight* of paper is measured in pounds. The weight of 500 sheets, which is equals a ream of paper cut to a standard size, is its basis weight. And the basis weight is not the same for all paper grades. For example, a ream of letter-size, all-purpose paper you use with your desktop printer may have a basis weight of 20 pounds. This doesn't mean that the ream weighs 20 pounds. It means that with 500 17 x 22-inch sheets of that particular paper weighs 20 pounds.

- *Paper density* is also an important factor to consider when choosing paper for your product. Paper density is a measure of area density. For example, paper that lets in little or no light (poster board) is said to be dense or heavy. Paper that lets in a little bit of light is lightweight.

DIGITAL DUPLICATING TIPS

Photo / Half-Tone Processing

If the original you are duplicating contains photographs or half-tone images, or a multi-colored original is used, select PHOTO or DUO processing by holding down the LINE / PHOTO key on the machine. The current selection will appear in the main display. Since the image is processed graphically, degrees of shading are accurately reproduced.

Producing Enhanced Fine Lines

When producing fine lines, press the IMAGE PROCESSING SELECTION key in the sub-control panel. When this feature is selected, the corresponding indicator lights and "FINE" will appear in the main display. If the original has a colored background, this background may show up on your prints. In that case, cancel this feature. This feature is not available in the duo-processing mode.

Changing Image Contrast on Prints

To achieve different tones on printed copies from those of an original, adjust the scanning contrast manually by canceling the auto-scanning contrast adjustment mode. When this mode is selected, the auto-adjustment indicator will light up. In this case, the scanning contrast will be adjusted automatically according to the darkness of the original being scanned.

Changing Print Density

When the density indicator is lit, you can change print density by manually adjusting the lighter or darker keys. When the print density setting is changed, press the TEST PRINT key to check the results with proof copies.

Note: if the print density levels do not provide the desired result, adjust the scanning contrast and create another master.

Adjusting Horizontal and Vertical Print Positions

The print position can be adjusted vertically (up and down) a maximum of up to +/- ¾" (20mm) depending on the model used and horizontally (right and left) +/- ¾" (20mm).

Storing Setting in Memory

The memory feature is flexible tool for automating frequently used or complicated combinations of settings. You can store up to 20 combinations of frequently used or complex print-job settings and apply them to new print jobs whenever necessary.

Protecting Confidential Documents

After printing is complete, the master remains on the print cylinder (drum). Copies of this master can be printed at any time by pressing the START key. To protect confidential documents from unauthorized duplication, press the CONFIDENTIAL key to discard the master after printing.

Return to Initial Settings

To return all the settings to initial status, including print position and reproduction percentage, turn the power off and on again, or hold down the ALL RESET key for more than one second.

Changing Print Color

To print with an optional color cylinder (drum), simply remove the existing cylinder (drum) from your Risograph and replace with the color of choice. When a print cylinder (drum) other than the black one is in place, a "color" message will appear in the main display.

Replacing the Master Roll

If the leading edge of master roll is inserted too far beyond the green films, the excess portion will be automatically cut off. If the strip that has been cut off remains inside the machine, an advisory message will appear in the main display to advise you to remove it. Be sure to remove the cut-off strip.

Preventing Defective Prints

Clean the thermal print head after every two master rolls. Lift up the scanner table and open the master loading unit. Then gently wipe the thermal print head (inside the unit) several times with a soft cloth or tissue dampened with a small amount of alcohol before wiping the thermal print head.

If the machine is not used for a long period of time, ink on the surface of the print cylinder (drum) may dry. Dry ink on the print cylinder (drum) may cause faint or blurred printing.

Using accessories

The *Digitizer III* can be used to edit and adapt originals to be scanned and printed. You can divide an original into areas to create customized prints, using editing features such as framing, screening, outlining, stamping, and reversing. This accessory also provides a feature making it easy to create multicolor prints.

SCANNERS

A scanner allows you to copy a photograph, a drawing, or a text page into the memory of the computer. It does this by measuring tonal or color values and converting them into a binary code that the computer can digest. You may then "clean-up" the image using the appropriate software program before printing a final copy for reproduction. A scanner is particularly useful for copying large amounts of text or images not previously saved on disk that now require revision. When using a scanner, be careful not to violate an existing copyright. To review copyright restrictions, review the SECNAV instructions for copyright and visual information responsibilities.

The four types of scanners are the hand scanner, the flatbed scanner, the copystand scanner, and the slide scanner.

- **Hand scanners** are useful for small-quantity scanning. They read portions or excerpts from a document page into the memory of the computer

- **Flatbed scanners** scan pages out of a book. They scan an entire one- or two-page spread in one view

- **Copystand scanners** are capable of scanning three-dimensional objects

- **Slide scanners** scan slides and transparencies into memory. Scanners used to scan slides and transparencies require a mirrored or reflective attachment.

BINDING AND FINISHING

Binding and finishing is the final stage in creating a printed product. The work required for turning printed sheets into books, magazines, catalogs and booklets is classified as binding. The specialized production of displays, labels, tags, packaging, and a variety of other advertising materials is classified as finishing. Embossing, stamping and other decorative touches used to enhance a book's design also fall into the finishing category. Binding and finishing may be completed at a single facility or by separate suppliers of specific services. Some printers have in-line binding or finishing units attached to their presses, some purchase and use dedicated binding and finishing machinery, and others rely on the services of outside firms.

PAPER CUTTER

The most abused tool in the shop is the paper cutter. Because of this abuse, do not trust the scale at the top of the cutter for accuracy. When you use the cutter, do not force it to cut more material than it can easily handle. Cut only paper or light cardstock. Paper cutters come in a variety of sizes with the most common measuring 36 inches in blade length.

GUILLOTINE CUTTERS

Guillotine cutters are used to square blank sheets before printing and separate printed sheets before binding. These machines are available in a number of models and sizes, but all have several similar components: a knife, cutting stick, table, side and back gauges and a clamp (see figure 6-2).

The cutter's long, heavy knife, which is bolted to a bar mounted near the front of the machine, descends to the bed, slicing through a stack of paper. When properly set and adjusted, the knife will cut through one sheet of paper the full length of the blade and barely rest upon the cutting stick evenly. The knife bar snubber holds the knife in its up position, while the cutter is idling or if the cylinder

becomes worn. If the knife drifts down from its up position, an adjustment is necessary. The knife angle, also called the bevel, is determined by the characteristics of the material to be cut. Hesitation during cutting is an indication of an incorrect beveling of your blade. Consult your operator's manual for sharpening specifications. Different knives are manufactured for materials of varying hardness.

Figure 6-2, Guillotine cutter

Another important cutter component, the cutting stick, is inserted into a groove on the cutter table immediately beneath the cutting knife. Were it not for the cutting stick, the knife would become dull easily or even break because it would hit the metal cutting table every time it sliced through a pile of sheets. Regularly rotate your cutting stick (up to eight times per stick) to ensure a clean cut and long-lasting knife edge.

Side and back gauges position sheets accurately under the knife, squaring them before cutting. The side gauges are stationary, while the back gauge can be moved to accommodate various cut-off lengths. A back gauge that is divided into two or more segments is called a split gauge and allows for the trimming of booklets on more than one side at a time.

Positioning the Back Gauge

To position the back gauge, turn the handwheel located in the center of the table and move the back gauge back and forth. Then, read the distance on the tape and move the back gauge past the size needed. You should stop and return the back gauge forward to the mark. By going past the mark and coming back to it, you take the slack out of the back gauge screw and have an accurate cut each time.

To lock the back gauge in place to prevent it from moving while you are positioning paper, tighten the locking thumbscrew. Avoid continuous heavy jogging against the back gauge of the cutter as this can knock your back gauge out of square. To make stock slide as easily as possible on the cutter table as well as maintain and preserve the cutting bed, wax the table with paste wax.

The cutter clamp is a metal bar that runs parallel to the knife and, like the knife, is placed at a 90-degree angle to the table. It has two functions. First, it expels air from the pile of sheets prior to cutting. Secondly, it holds the pile firmly in place during the process.

FOLDING

Some products you will create in your shop will require folding. This includes, but is not limited to, pamphlets, maps, brochures, and programs. After printing these products, the sheets are folded into **signatures** that may consist of four pages, eight pages, 16 pages, or some other multiple of two. These jobs are said to be **folded to print**. Press sheets with printing only one side of the form are **folded to paper** because backup register is not a consideration (see figure 6-3).

Machine folding employs one of two basic folds: a right angle or a parallel fold. The right-angle fold is made by first folding the sheet in half and then rotating it and folding it in half again. Additional right-angle folds follow this sequence. A basic parallel fold is made by folding a sheet of paper twice so that the two folds are made in the same direction. A variety of configuration can be made from right-angle and parallel folds, including accordion folds, signature folds, gate or panel folds, over and over folds, French folds, and letter folds. Folding is completed on a variety type of folders. A combination or table top folder is what is most often found in the Navy, which incorporates features of both buckle and knife folders in one machine.
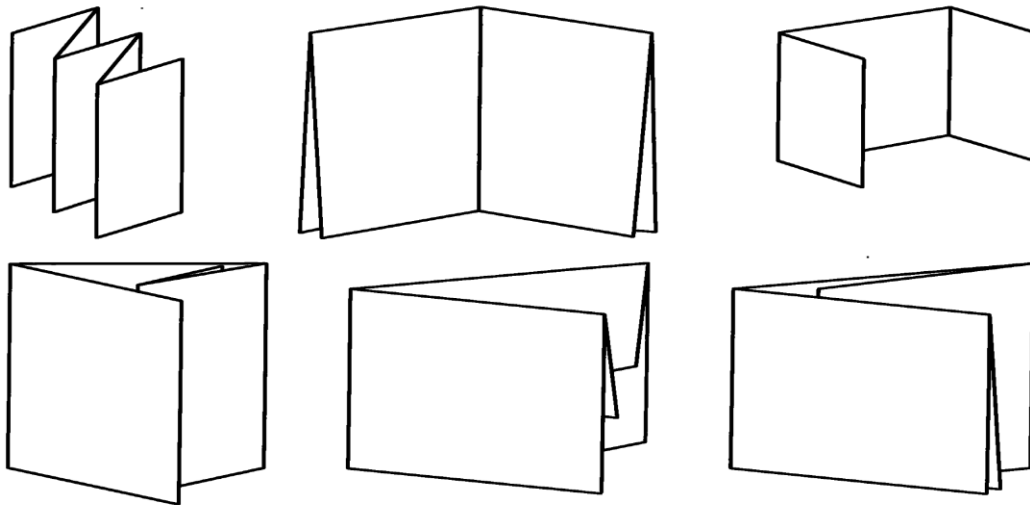
Figure 6-3, Common folds (left to right, top to bottom): accordion, eight-page signature, gate, over-and-over, French with heads in, and letter.

Combination Folders

The combination buckle plate/knife folder ("combi") integrates buckle and knife folding. Parallel folds are executed with buckle plates in the first folding station and subsequent right-angle folds are produced in the knife folder section. To create folds parallel to the first right-angle fold, buckle plates are also used. Conveyor tapes forward the sheets through the folder.

Combination machines are ideal for folding medium-size sheets, which often require a variety of different folds. They work well with heavier stock because the thick bulk does not have to pass through as many rollers, and paper grain direction is less of a problem.

PAPER DRILLS

Paper drilling is basically drilling large quantities of paper, or other materials, with round holes. Paper drills can be manual, motorized or fully automated. During the paper drilling process, hollow paper drill bits are clamped into a driven spindle which drills into the pile of paper. Paper drill bits are available in different sizes and with different coating qualities.

Depending on the type of paper drill, either the paper drill bits are lowered into the pile or the table is lifted. Paper drilling machines can be equipped with a different number of spindles which are each built into one paper drill head. The range starts with one- and two-spindle paper drills for small volumes and office purposes and reaches up to paper drilling platforms with more than 20 spindles and paper drill heads.

Applications for paper drilling are file holes for different ring binders, loose-leaf collections, rows of holes for wire comb binding and tags. Many products processed on a paper drilling machine are stationary. Additionally catalogs, manuals and brochures are drilled on a paper drilling system to be able to file them in a binder.

BINDING METHODS

There are several different binding methods; however, in this manual we will discuss the four contemporary binding specialties – mechanical, adhesive or perfect, saddle- and side-wire stitching, and thread sewing, which involves case binding. Of the four specialties, mechanical and saddle and side stitching is most commonly encountered in the Navy.

Mechanical Binding

In mechanical binding, wire or plastic coils, plastic combs, or metal rings are used to permanently join individual sheets of paper together as books or booklets, with the independent binding device often forming the backbone of the publication. Mechanical binding can be costly, but it allows the product to open flatly. A notebook is an example of mechanical binding.

Adhesive Binding

Adhesive, or perfect, binding done in the small Navy print shop is not the same as that done in large commercial print shop binderies, which specialize in that kind of work. Bookbinding is an art in itself. Therefore, it has no place in the small-job shop. However, almost all print shops do the simpler forms of adhesive binding, called padding, which is a standard operation in any small print shop. Padding is the process of making pads or tablets by cementing the edge of the stack of sheets. A pad generally consists of from 50 to 100 sheets of paper and chipboard back.

Saddle and Side-Wire Stitching

Brochures, pamphlets, and thin magazines bound with staples driven through the centerfold along the backbone are some examples of items saddle stitched with wire. This type of stitching is typically the most economical, and like mechanical binding, it allows your products to open flatly.

Products side stitched with wire are fastened together by inserting preformed staples through the side of the booklet or brochure parallel to the backbone. It is important to distinguish between stitching, in which wire is used, and sewing, which relies on thread to secure the signatures (pages) of a publication.

Saddle and side stitchers range from small hand or foot-powered models to large automated machines. Signatures to be side stitched are stacked (gathered) one on top of the other, much as signatures are stacked for perfect binding. Saddle stitched signatures, on the other hand, are inserted, meaning that outer signatures are dropped over inner ones. Saddle stitching, remains the best method of joining publications that are up to ¼ in. (6mm) thick.

Thread Sewing

Thread or cord is used during the thread-sewing bindery process to stitch a book together. Adhesives are also used. After the thread sewing is complete, the book covers are attached using the case binding technique. This process is the most-expensive of the binding processes, and it is usually reserved for hardback books, fine literature, and reference books.

MAT CUTTING AND FOAM BOARD MOUNTING

A mat is a border made of paper or illustration board that compliments as it surrounds an image. Matting a picture is done for protection, ease of handling, framing and appearance. Before displaying or presenting a certificate, a photograph, or a piece of artwork to an individual, you should mount, mat, and if possible, frame it.

Mats

A mat focuses your attention on the image within the mat. When used in a frame, mats protect image surfaces from direct contact with the glass that may trap moisture and cause mildew. When used alone, mats protect image areas from fingerprints and smudges.

Tools

To cut a mat requires skill and patience. You need a pencil, a rule, a steel straightedge, a crafts knife with a sharp blade, sandpaper or an emery board, tape, a mat board, and a backing board. You may be fortunate enough to have a handheld mat cutter or, better still, a carriage-type mat cutter.

Mat Cutter

The two basic types of mat cutters are handheld mat cutters and carriage units. Hand-cut mats require great skill and a steady hand. Carriage units ensure uniformity, speed and accuracy. Carriage units cut oval, round, rectangular, square and fancy-cut mats. They may be large and mounted on a wall or they may be small tabletop units. Both types of mat cutters require a plentiful supply of fresh blades.

Mat Proportions

The width of the top and the sides of a mat are equal. The width of the bottom of the mat is slightly larger in dimension than the top and sides. A good ratio to work with is 3 to 4. When deciding upon inner proportions, ensure you leave 1/8 inch to ½ inch to allow for overlap. This will keep your photograph or document from slipping.

Cutting a mat by hand

The first step when cutting a mat by hand is to prepare the blade for your knife. The key to successful mat cutting is using a sharp blade in your knife and having a stable table. When cutting,

you should place the steel straightedge on the mat and cut along the inside edge. That way, if your knife should slip, the cut would be on the portion of the mat you intended to discard. It is also important to begin your cuts at the corners – hold the knife at a right angle to the mat to make a square cut and at a lesser angle to make a bevel cut. Once you begin cutting, you must maintain the same angle of cut for all sides of the mat, see figure 6-4.

STEP	ACTION
1	Determine overall dimension and measure the opening of the frame.
2	Measure the image area you want exposed through the mat
3	Cut the mat board and a back board the same size as the opening in the frame or the overall desired dimension
4	On the surface of the mat, lightly mark the dimensions of the mat opening
5	Place the steel straightedge on the mat surface to guide your blade
6	Beginning at the corners, cut through the mat board
7	Remove the unwanted portion of the mat
8	Using a piece of sandpaper or an emery board, remove jagged or rough edges
9	Carefully remove pencil lines with a non-abrasive eraser
10	Place a piece of tape along the top edge of the image with the sticky side half on the back of the image and half exposed
11	Carefully position the mat over the image area and press down over the tape
12	Put the back board behind the matted image and place in the frame. If you are not framing the matted image, secure the back board to the back of the mat board with double-sided tape.

Figure 6-4, Instructions for cutting a mat by hand.

CUTTING a MAT with a CARRIAGE TYPE CUTTER

Cutting a beveled mat with a carriage-type cutter is easier than cutting one by hand. Some carriage devices cut straight-edged mats, while other cutters cut oval or round mats. You can use a combination of both types for creative or decorative cuts. The devices maintain a precise angle of cut while you draw the cutting blade across a fixed beam. The blade remains the key to cutting a successful mat, see figure 6-5.

STEP	ACTION
1	Determine overall dimension and measure the opening of the frame.
2	Measure the image area that you want exposed through the mat.
3	On the back side of the mat, mark the dimensions of the desired opening
4	Adjust the cutter stops on the carriage to correspond with the measurements of the inside diameter of the mat, or the major and minor axis of a round or oval mat.
5	Position the mat board face down and align with the left edge of the mat cutter. Apply pressure to the carriage to secure the mat board in place.
6	Insert the blade approx. 1/16th inch above the corner and draw the blade down the carriage beam to just beyond the bottom corner. The stops on the carriage will stop your stroke.
7	Reposition the mat board for each side. The carriage for a round or oval mat will cut the mat in one continuous circular movement.
8	Remove the unwanted portion of the mat.
9	Smooth out jagged or rough edges with sandpaper or emery board.
10	Place and attach the image into the mat and the mat onto the backboard.

Figure 6-5, Instructions for cutting a mat with carriage-type cutter.

PRINT MOUNTING

Like matting, print mounting is a technique used for the displaying or exhibiting of a print, such as a painting, illustration or photograph. The difference between mounting and matting, however, is the way the print is attached to the board. When a print is matted, it is attached to the back of the board and the image is placed behind a cut opening. When matted, a print is often taped into place; thus, the matting can be temporary. Generally, prints that are framed are matted. When a print is mounted, it is attached to the face of a mounting board. In both cases, the board enhances the picture by providing a broad border as well as protecting the edges against damage.

When preparing a print for display, your goal should always be to show off the print in the best possible manner. And, simplicity is most often the best strategy. Stay away from elaborate artwork or fancy lettering as these elements will distract the viewer away from the image.

For exhibition and display, prints are often mounted or matted on a stiff (cardboard-like) board, often called card stock. Card stock used for mounting photographic prints should be free of acid or sulfur that can deteriorate the print quality. Card stock is available in various sizes, colors, textures and weights. There are no hard-and-fast rules for mounting prints, but the card stock should complement the print. The mount should be large enough to balance and support the picture, and the texture and color should complement the overall tone.

The way the print is placed on the mounting board is important. Prints mounted at odd angles or in a corner of the mount will unbalance the photograph. The bottom border on most mounts is the widest border of all. Normally, prints are mounted so the top and side borders of the mount are equal. To provide balance, you should ensure the bottom border is 25 to 35 percent wider than the top and side borders.

Mounting the print onto the card stock is done usually using either the wet or dry method.

WET METHOD

Liquid adhesives, such as rubber cement and spray-on adhesives, can be used to mount prints. These adhesives are easy and clean to use. After they dry, the excess adhesive can be removed easily by rubbing it lightly. The drawback to using rubber cement and spray-on adhesives is that they are not permanent. In time the print may loosen and peel off the mount. This makes rubber cement the ideal adhesive for temporary mounts used in displays or for copying. Gum arabic (natural gum made of hardened sap), glue or paste should be avoided whenever possible. These adhesives are known to stain the print or smear out from around the edges of the print. This causes smudges on the mounting board.

DRY METHOD

A dry print-mounting method that uses a pressure sensitive adhesive is often used with Navy graphics. Pressure-sensitive adhesives come in a variety of sizes in both rolls and sheets. These adhesives form a permanent bond and are easy to use for resin-coated papers.

To use these materials, you simply apply the print to the sticky surface of the mounting material, then peel off the protective backing and apply it to a mounting board. If the print is not aligned correctly, you can remove the print and reapply it. Once the print is correctly in place, you must apply pressure to the print and mounting board. Normally, this is done by running the print and mounting board through a specially designed roller assembly. This assembly applies pressure to the materials being mounted.

Pressure-sensitive adhesive material contains tiny beads of adhesive. The pressure breaks these beads and releases the adhesive. Once pressure is applied to the materials being mounted, a permanent bond is formed.

A dry-mount press can also be used to mount photographic prints. With a dry-mounting press, heat is used to fuse a mounting tissue between the print and the mounting surface.

A dry-mount press is designed to provide uniform pressure and heat. Even pressure is an important aspect of good, dry mounting. Adequate pressure helps squeeze out air from between the adhesive, print and mounting board. You should operate a dry-mount press at the temperature recommended by the manufacturer of the mounting tissue. It is better to use a slightly lower temperature to mount prints than a temperature that is too high. Excessive temperatures may cause damage to the print. When temperatures are too high for resin-coated (RC) papers, the resin coating may blister or bubble.

Porous materials, such as mounting board and rag-stock paper, absorb moisture from the air. This moisture becomes trapped between the layers and causes blisters and bubbles in the finished work. For best results, you should pre-dry the materials before beginning the dry-mounting process. This can be done by heating the mounting board or paper in the mounting press to remove the moisture.

The time required to form a good bond varies when you are using a dry-mounting press. You should mount the prints for a minimum amount of time – the time required to squeeze out air and moisture from the materials and to activate the adhesive. Because different materials have different thicknesses and heat conducting characteristics, you must experiment to determine what amount of time is required to form a good mount. Whenever possible, you should use scraps of materials that are the same as your finished work to determine the best time and temperature for dry-mounting prints. Make notes of the process to reduce time during the next job.

The final stage of finishing for some photographs is to frame them. There are an infinite number of colors and materials available for framing photographs. The same principles apply for framing photographs that apply to mounting or matting prints. Remember to keep it simple and choose a frame that complements the photograph, rather than distracts from the picture.

MOUNTING DISPLAY PRINTS

Many photographers categorize their work as both art and science, and they want their photographs, or images, to be viewed, appreciated, and most importantly, to communicate a message. This is the reason that the salon mount came into use. In photography, to salon mount your image means to mount for exhibition. To mount display prints, you should begin by selecting a mounting board two to f our inches larger than the print size. Your selection of color should complement the photograph. Thickness of the board is optional.

The preferred placement of prints for salon mounting is near the *optical center*. This allows for pleasant placement of the photograph while leaving room for the photographer's name and print title below the print. The steps for mounting prints are as follows (see figure 6-6).

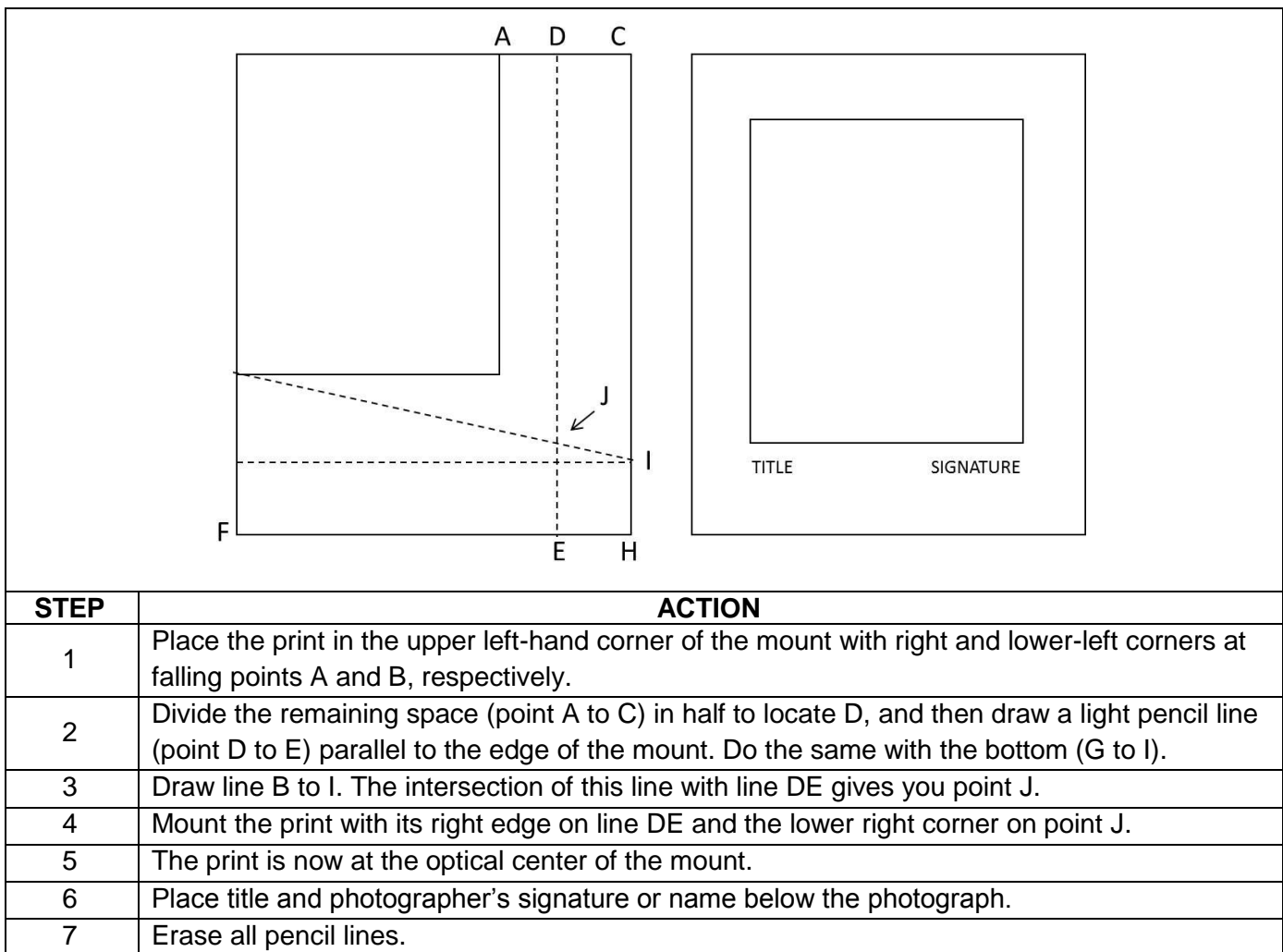| STEP	ACTION
1	Place the print in the upper left-hand corner of the mount with right and lower-left corners at falling points A and B, respectively.
2	Divide the remaining space (point A to C) in half to locate D, and then draw a light pencil line (point D to E) parallel to the edge of the mount. Do the same with the bottom (G to I).
3	Draw line B to I. The intersection of this line with line DE gives you point J.
4	Mount the print with its right edge on line DE and the lower right corner on point J.
5	The print is now at the optical center of the mount.
6	Place title and photographer's signature or name below the photograph.
7	Erase all pencil lines.

Figure 6-6, Instructions for salon mount.

LAMINATOR

The primary purpose of laminating is to embellish or protect printed documents or images for such things as paperback books, report covers, magazine covers, posters, cards and postcards, in-shop displays, etc. Lamination is most often done with heated roll laminators. Heated roll laminators can vary in size from office-based pouch laminators to industrial-sized machines. Such industrial machines are primarily used for high-quantity/quality output by printers or print finishers. Some machines can double as laminator for the front and provide adhesive to the back of the prints to ease the process of mounting onto the foam board. As with all equipment, refer to user's manual before using your shop's laminator.

ENGRAVER

An engraver routes letters and images below the surface of metals and plastics. Personnel nametags, doorplates, desk plates, and shipboard signage are all examples of engraved products. Engraving is also done on plaques and trophies and shadow boxes.

REPRODUCTION OF MONEY

Before reproducing money in any and all print products that come through your shop, make sure you have reviewed the law that guide the use of money as illustrations, Section 411 of Title 31 of the Code of Federal Regulations. This law provides guidelines for the use of money in illustrations as dictated by the law in accordance with the Counterfeit Detection Act of 1992, Public Law 102-550.

U.S. CURRENCY

The Counterfeit Detection Act of 1992, Public Law 102-550, in Section 411 of Title 31 of the Code of Federal Regulations, permits color illustrations (see figure 6-7) of U.S. currency provided …

- The illustration is of a size less than three-fourths or more than one and one-half, in linear dimension, of each part of the item illustrated

- The illustration is one-sided

- All negatives, plates, positives, digitized storage medium, graphic files, magnetic medium, optical storage devices, and any other thing used in the making of the illustration that contain an image of the illustration or any part thereof are destroyed and/or deleted or erased after their final use.

Figure 6-7, Proper use of currency in illustrations.

OTHER OBLIGATIONS AND SECURITIES

Photographic or likenesses of other United States obligations and securities and foreign currencies are permissible for any non-fraudulent purpose, provided the items are reproduced in black and white and are less than three-quarters or greater 1.5 times the size, in linear dimension, of any part of the original item being reproduced. Negatives and plates used in making the likenesses must be destroyed after their use for the purpose for which they were made. This policy permits the use of currency reproductions in commercial advertisements, provided they conform to the size and color restrictions.

Motion picture films, microfilms, videotapes, and slides of paper currency, securities, and other obligations may be made in color or black and white for projection or telecasting. No prints may be made from these unless they conform to the size and color restrictions.

EXTERNAL COMMITMENTS

In addition to and external to the command, Navy shops have obligations and responsibilities defined by instruction and practice. Know the commitments of the shop to provide support to units external to your command. These commitments should exist in the form of written agreements. Agreements between units typically define reoccurring services and the basis for financial reimbursement. Although you need not know the intricacies involved in establishing agreements between units, you must know if your shop has such commitments, the extent of the obligation, and the format for finding. These factors can determine how your shop orders supplies and schedules work loads.

- Interservice Support Agreement (ISA) – A formal agreement that defines reoccurring services and the basis for reimbursement.

- Joint Interservice Regional Support Group (JIRSG) – Use on DoD installations.

- Memorandum of Agreement (MOA) – An agreement supplements an ISA, defines a general area of responsibility, and establishes responsibility for reoccurring services.

- Memorandum of Understanding (MOU) – This type of agreement also supplements an ISA. It also identifies expectations of reoccurring support.

JOB CONTROL

The *Navy Visual Information (VI) Management and Operations Manual,* enclosure (1) of SEC-NAVINST 3104.1A, [Navy Visual Information Program Policy and Responsibilities](#), governs the administration and operation of Navy (VI) activities and functions.

The ability to track photographic jobs within your facility quickly and accurately depends on your shop's job-control system. When a system is not used correctly, photographic requests, prints, and other requirements may be lost or misplaced. This causes an inordinate delay in customer service that has a negative impact on your relationship with other entities.

JOB-ORDER FORM

ALL work performed by Navy VI activities must be documented on a job order form. This form is used to maintain close control of in phases of services. The job-order form serves several purposes; they are as follows: as an official request for visual information (VI) services, as the authority to perform the work, as a record of the time and materials used to complete the job, and as a receipt for

the finished work. Navy imaging facilities may use the Request for Audiovisual Services, OPNAV 5290/1, or a locally created, in-house form.

As a minimum, an in-house form must contain the following information:

- Job order number

- Customer signature block with a disclaimer that the service requested is official work and essential to mission accomplishment

- Product security classification

- Other information required by your facility to accomplish the request officially.

JOB ORDER LOG

All VI activities should assign job order numbers to job orders and should contain data sufficient to avoid duplication of numbers, identify the requesting activity, identify the product, and account for the final disposition of the job, be it a photographic print, multimedia product, or print product. Job order numbers should be set to #1 at the beginning of each fiscal year, which runs from Oct. 1 to Sept. 30 each year. Job order logs must only contain unclassified information. A separate job-order log is maintained for classified work requests.

SUMMARY

In this chapter we discussed print production and how this form of visual information supports our missions, both internally and externally. Whether you're stationed at sea or at a shore command, the production shop will be one of the busiest work centers at your command. Almost every organization within the DoD has a need for the type of services offered by MCs, and it's imperative that you have a basic understanding of desktop publishers, desktop printers and finishing equipment.

To further your knowledge in print production, check out your equipment's user's manuals, the Navy VI Management and Operator's Manual and The Lithographer's Manual 9th edition, created by the Graphics Arts Technical Foundation.

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CHAPTER 7

File Management and Transmission

Learning Objectives: *Upon completing this chapter, you should be able to do the following:*

—*Describe elements of Visual Information Record Identification Number (VIRIN)*

—*Describe process of embedding information into image file*

—*Describe various file formats*

—*List various forms of file transmission*

INTRODUCTION

Mass communication specialists who produce or manage Department of Defense imagery should take care in properly submitting visual information with captions that are accurate, clear, concise, and in accordance with DoD standards. A properly indentified piece of visual information will allow the viewer to know the who, what, when and where about the still image, motion imagery, graphic or multimedia production. This chapter will discuss how to properly identify, embed and transmit visual information in accordance with DoD Visual Information (VI) requirements.

Before continuing on with this chapter, however, it is a good idea to familiarize yourself (download and read) OPNAVINST 3104.1A, Navy Visual Information Program Policy and Responsibilities. Within this instruction, you will find the Navy VI Management and Operations Manual. Like the AP Stylebook used in your writing, this instruction should be within your grasp at all times.

VISUAL INFORMATION RECORD IDENTIFICATION NUMBER (VIRINs)

In accordance with DoD VI requirements, each non-production unit of media that satisfies the definition of official DoD VI record material shall be assigned a visual information record identification number, or VIRIN (pronounced veer-in). Thus, unless discarded, each original 35mm transparency or negative; each original digital still image; and each roll of motion picture film, videotape, or other storage media that is recorded or produced by persons acting for or on behalf of DoD activities, function, or missions shall be assigned a VIRIN.

The VIRIN is assigned at the acquisition level by the originator (i.e., photographer, videographer, producer, graphic artist). Any photograph, digital image, or individual item of media containing motion imagery that is forwarded to the Defense Imagery Management Operations Center (DIMOC), Navy Visual News Service (NVNS) and the Defense Visual Information Center (DVIC) shall have a VIRIN.

STILL IMAGES

VIRINs uniquely identify every image shot by military photographers by using four fields of information – the date the image was shot, the military service affiliation of the photographer, an identification of the photographer, and a sequence number. The VIRIN consists of 15 data elements in

the following format: **YYMMDD-S-VISIONID-NNN**. Following is a description of the data elements for the VIRIN fields (with a hyphen between each field):

Field 1 (YYMMDD): The year, month and day of acquisition or origination.

Field 2 (S): The Service affiliation or status of the camera operator or originator. The code abbreviations are:

A = Uniformed member, civilian employee, or contract employee of the Army
N = Uniformed member, civilian employee, or contract employee of the Navy
F = Uniformed member, civilian employee, or contract employee of the Air Force
M = Uniformed member, civilian employee, or contract employee of the Marine Corps
G = Uniformed member, civilian employee, or contract employee of the Coast Guard
D = Other Civilian or contract employee of the Department of Defense
O = Person not falling into one of categories above

Field 3 (VISION ID): Historically, the last four digits of the originator's social security number were used in this Field 3. However, as of Feb. 1, 2011, this process has changed in an effort to protect personnally identifiable information. Field 3 must now consist of the originator's Vision ID code.

To receive a Vision ID code, you must register with DIMOC. Regular contributors should register at https://vipro.defenseimagery.mil. People who have never contributed VI content to either DoD or Navy.mil must go to https://vipro.defenseimagery.mil/newvipro. If your connectivity is limited or you have issues registering, e-mail DIMOC at dimocops@dma.mil.

Field 4 (NNN): Image or unit of media number in sequential order (beginning with 001 for that same day). Numbering should follow the approximate order in which each unit of media was acquired or originated by the person identified in Fields 2 and 3 on the day identified in Field 1, starting with 001 and continuing consecutively as necessary up to 999. Field 4 of the VIRIN shall reflect the approximate order of a given person's acquisition or origination activities on a given day, without regard to variables such as media, so that no two units of media are assigned identical VIRINs.

Here is an example: **110131-N-AANNN-004**

Additional Notes

- Fields 2 and 3 for an image created by more than one individual shall reflect the individual who was the lead creator or head of the team responsible for creating the image

- Copies shall bear the VIRIN of the original, even if conversions between analog and digital, or changes in medium, format, compression or size occur during the copying process

- Imagery or other units of media which are derived from existing, VIRIN-bearing materials, but which differ significantly in appearance relative to that from which derived, shall, upon creation and unless discarded, be assigned their own VIRIN

- A good rule of thumb is to use the VIRIN as the image's file name

- When the Vision ID of the photographer is unavailable, use "XXXXX" in this field.

MOTION IMAGERY

All submitted motion imagery (such as a videotape, digital file or disc) must be assigned a means of easy identification. Much like still images, VIRINs uniquely identify every piece of video shot by military videographers. Motion media can also be identified by the use of slates and caption sheets by using four fields of information in the VIRIN – the date the imagery was shot, the service affiliation of the videographer, a VIRIN ID of the videographer, and a sequence number. This information is particularly useful to an editor when dealing with a large project that may have multiple tapes or files. Follow the still image guidelines to derive a VIRIN for motion imagery. A VIRIN slate, if possible, should be recorded at the beginning of each scene.

The consolidation of the motion imagery of separate camera original media on to a single videotape, film reel, or storage device must include all applicable VIRINs.

Like a still image, the VIRIN of a video sequence should be used as the filename of the electronic version(s) of the sequence and as the filename of the corresponding run sheet. Naming each file with the VIRIN ensures run sheets and sequences are properly kept together when received.

Video Captions

When writing captions for motion imagery, all the rules in the preceding chapters on style and content apply. The descriptive information provided will necessarily be broader since the caption must describe more than a single image. Provide captions for the sequence and each shot.

Caption information should appear in both the slate and on DD Form 2537, Visual Information Caption Sheet, or in a similar format.

Slates

All video sequences should include a slate at the front of the sequence that contains the following:

- VIRIN

- Videographer name and rank

- Videographer contact information (e-mail and phone number). This information will be deleted during the editing process before the imagery is released to the public.

The release status of the video:

- Released

- Not released

- FOUO (for official use only)

- Not reviewed

- The name, rank and contact information of the releasing authority

- A brief description of the sequence. An example follows:

—U.S. Sailors conduct flight operations aboard the Nimitz-class aircraft carrier USS Ronald Reagan (CVN 76) July 21, 2007, while under way in the Indian Ocean.

The placement of a slate on the video sequence does not replace the requirement to send a caption sheet with the video, either using DD Form 2537 or a text document.

Caption Sheets

The two types of captions for video are sequence captions and shot captions.

A *sequence caption* describes the contents of the entire video sequence. It clearly identifies the documented activity to include the date and location the video was shot. It should also include the following information:

- Full name, rank and title of the person or persons featured in the video, only if included in the entire video sequence. If not featured in the entire sequence, place this information in the shot caption

- Full name and model number of all featured equipment, vehicles, aircraft, or ships, if included in the entire video sequence. If not featured in the entire sequence, place this information in the shot caption

- A brief explanation of the purpose of the event, exercise or operation. Why is the documented action happening and/or why is it significant

- Public release status and instructions at the end of the sequence caption (see above). An example:

—U.S. Navy Air Traffic Controller 2nd Class Esther R. Hines plots ship coordinates in the amphibious air traffic control center aboard USS Iwo Jima (LHD 7) May 2, 2007. Iwo Jima is conducting an expeditionary strike group exercise in preparation for an upcoming deployment. (U.S. Navy video by Mass Communication Specialist 1st Class April Myers/Not Released)

—Not cleared for public release by Lt. John Doe, USS Navy Ship PAO, john.doe@navy.mil, DSN 456-7890.

Shot captions

Shot captions are shot-by-shot breakdowns of the video sequence that include information pertinent only to that section of time code. If the information is applicable to the entire sequence, place it in the sequence caption (see above).

- Place the time code in hour/minute/second/frame format

- Include changes of camera field of view. Use the following abbreviations to indicate camera field of view:

—ES – establishing shot

—LS – long shot

—MS – medium shot

—CU – close up

—ECU – extreme close up

- Place release status at the end of each shot caption

- Examples of properly constructed shot captions:

—00:02:01:14MS – U.S. Navy Capt. John Smith presents a diploma to Seaman Joe Dean. (Released)

—00:02:08:05MS – U.S. Navy Capt. John Smith presents a diploma to Seaman Larry Owens. (Released)

—00:02:15:22LS – Graduates march in review. (Not Released)

DIGITAL FILE NAMING

Keeping track of and organizing image files are of essential importance when working with still and video images. As mentioned above, a good organization method is to use the product's VIRIN as the file name, unless the software you are using does not support the VIRIN's format. If system software does not support long file names, use the standard 8.3 file name convention. The first six characters are the date in VIRIN format with the last two characters of the VIRIN added (the sequence number). Make sure that the file extension reflects the file format that is used. An example of a digital still image file in 8.3 format would be 980430-N-AANNN-005 becoming 98043005.jpg. (See file formats below for amplifying information).

FILE FORMATS

File formats are machine languages that save each binary digit or bit in a file according to special codes that tell the program how to arrange and present the information. Special codes for one program are not necessarily the same special codes for other software. In this section, we will discuss several terms associated with image files as well as the most common types of file formats you will see in your work as an MC. These formats are listed in alphabetical order vice order of common usage.

ADVANCED AUDIO CODING (AAC)

AAC was developed to improve upon the MP3 audio format and uses a more advanced form of compression. According to some listening tests, AAC files encoded at lower bitrates (like 96 Kbps) sound as good as or better than MP3s encoded at higher bitrates (like 128 Kbps) despite their smaller size. The current version of the AAC codec was developed as part of the MPEG4 standard. Files may appear with the ".m4a" or ".mp4" filename extension. Songs with DRM (digital rights management) usually have an ".m4p" extension (with the "p" at the end to denote "protected").

AUDIO INTERCHANGE FILE FORMAT (AIFF)

AIFF is an audio format for Macintosh™ operating systems commonly used for storing uncompressed, CD-quality sound. This format is similar to WAV files used in Microsoft Windows™-based systems. AIFF is considered a lossless container format.

APPLE LOSSLESS

Apple™ Lossless (also known as Apple Lossless Encoder, ALE, or Apple Lossless Audio Codec, ALAC) is a lossless audio codec developed to provide full, CD-quality audio in about half the space of the original file.

ENCODED AUDIO FORMAT (AU)

Used primarily on Sun or UNIX systems, AU is an audio format commonly used for posting sound clips on the Internet. AU files can be played back on Windows, Macintosh, and other operating systems.

ADVANCED VIDEO CODING HIGH DEFINITION (AVCHD)

AVCHD is a high-definition digital video format that can record in 1080i and 720p and still maintain a reasonably small file size. AVCHD files are based on the MPEG4 codec. The advent of high-definition (HD) televisions and displays spurred the development of this format, which uses the same resolution as HDTV signals. AVCHD video files can also be burned to Blu-ray discs™.

AUDIO/VIDEO INTERLEAVED (AVI)

AVI is a file format for storing and playing back movie clips with sound on Windows™-based PCs. An AVI file is organized into alternating ("interleaved") chunks of audio and video data. AVI is a container format, meaning that it specifies how the data will be organized, but is not itself a form of audio or video compression. AVI is the type of file created when DV clips are imported from a digital camcorder to a PC. These clips are often referred to as DV-AVIs, because they contain full-quality digital video content.

BITRATE

Bitrate is the average amount of data required to store one second of music, expressed in kilobits per second, or Kbps, with audio compression. Some codecs like MP3, WMA, and AAC allow files to be encoded at different bitrates. Generally, as bitrate decreases, so does the sound quality of the resulting file, as well as the amount of memory required to store it.

BITMAP IMAGE (BMP)

BMP is a standard format used for storing images on Windows-based PCs. BMP images can either be compressed or uncompressed. This type of file also sometimes appears with the ".DIB" extension.

CODER-DECODER (CODEC)

Codec is software that takes a raw data file and turns it into a compressed file. Because compressed files only contain some of the data found in the original file, the codec is the necessary "translator" that decides what data makes it in to the compressed version and what data gets discarded. Different codecs translate in different ways, so a file compressed using the one codec will be different from a file compressed using another codec. Sometimes the difference is noticeable, sometimes not, but it's good to be aware of what codecs are best for what you're trying to do in order to maintain the best ratio of file size to quality.

COMPRESSION

Because it takes up so much space, video must be compressed before it is put on the web. To compress means to pack the information into a smaller space. As discussed in previous chapters, the two types of compression are lossless compression and lossy compression.

DIGITAL VIDEO (DV)

DV is the format used by most digital camcorders. Although the DV format employs a form of lossy video compression (applied in real-time as you record with your camera), this format is still memory-intensive. When transferred to a computer, a DV clip requires roughly 1 GB of storage per five minutes of video. Clips are usually stored on the computer as QuickTime™ or .avi files. Despite its use of compression, DV can provide a clean image with up to 520 lines of resolution. DV uses a type of compression known as "intraframe" — that is, it encodes video at the full standard frame rate of 30 frames per second. This allows frame-by-frame editing. In contrast, video codecs like MPEG1 or MPEG2 tend to handle video sequence by reducing the number of full frames per second and encoding the differences between frames, making precise editing more difficult. These are known as "interframe" forms of compression.

GRAPHICS INTERCHANGE FORMAT (GIF)

GIF creates a table of up to 256 colors from a pool of 16 million. If the image has fewer than 256 colors, GIF can render the image exactly. When the image contains many colors, the software that creates the GIF will use any of several algorithms to approximate the colors in the image with the limited palette of 256 colors available. Better algorithms search the image to find an optimum set of 256 colors. Sometimes GIF uses the nearest color to represent each pixel, and sometimes it uses *error diffusion* to adjust the color of nearby pixels to correct for the error in each pixel.

GIF achieves compression in two ways. First, it reduces the number of colors of color-rich images, thereby reducing the number of bits needed per pixel, as just described. Secondly, it replaces commonly occurring patterns (especially large areas of uniform color) with a short abbreviation. Instead of storing "white, white, white, white, white," it stores "five white."

Thus, GIF is lossless only for images with 256 colors or less. For a rich, true color image, GIF may "lose" 99.998 percent of the colors.

JOINT PHOTOGRAPHIC EXPERTS GROUP (JPEG)

JPEG is optimized for photographs and similar continuous tone images that contain many, many colors. It can achieve astounding compression ratios even while maintaining very high image quality, while GIF compressions are unkind to such images. JPEG works by analyzing images and discarding kinds of information that the eye is least likely to notice. It stores information as 24 bit color.

It is important to remember that the degree of compression of JPEG is adjustable. At moderate compression levels of photographic images, it is very difficult for the eye to discern any difference from the original, even at extreme magnification. Compression factors of more than 20 are often quite acceptable. Good graphics programs allow you to view the image quality and file size as a function of compression level, so that you can conveniently choose the balance between quality and file size. A form of this codec known as Motion JPEG is used by some digital cameras and camcorders for storing video clips of relatively small file size. With Motion JPEG, each frame of video is captured separately and reduced in size using JPEG compression.

LOSSLESS DATA COMPRESSION

Lossless data compression retains all of the data of the original file as it is converted to a smaller file size. When a lossless file such as a TIFF is opened, algorithms restore all compressed information, creating a duplicate of the source file. Lossless compression is generally preferred for creating high-quality or professional-grade audio and video files where retaining fine detail is important.

LOSSY DATA COMPRESSION

In lossy data compression, some source file information is discarded to conserve space. When the file is decompressed, this information is reconstructed through algorithms, usually resulting in some loss of sound quality or image detail when compared to the original. Generally, the higher the resolution of a compressed file, the slighter the degradation. An MP3 file with a resolution of 256 Kbps, for example, tends to sound more like the source file than one made at 64 Kbps.

MUSICAL INSTRUMENT DIGITAL INTERFACE (MIDI)

A MIDI file does not contain actual audio data; it contains commands that let MIDI-capable synthesizers recreate a specific musical passage. MIDI protocol has been used for years as a way for electronic musical instruments, like digital keyboards and sequencers, to communicate with each other. Computer sound cards typically feature the ability to interpret MIDI files into music. Since they don't actually contain the music itself, but rather the commands used to recreate music, MIDI files are a lot smaller than audio files like MP3s, WMAs, or WAVs. MIDI files are small and manageable enough that it's not uncommon to find them embedded in web pages, adding a sonic element to the surfing experience. They usually appear with the ".MID" filename extension.

MOVING PICTURE EXPERTS GROUP (MPEG)

The Motion Picture Experts Group is a committee that sets international standards for the digital encoding of movies and sound. There are several audio/video formats that bear this group's name. In addition to their popularity on the Internet, several MPEG formats are used with different kinds of A/V gear:

MPEG1

MPEG1 is a format often used in digital cameras and camcorders to capture small, easily transferable video clips. It is also the compression format used to create video CDs, and commonly used for posting clips on the Internet. The well-known MP3 audio format (see definition below) is part of the MPEG1 codec.

MPEG2

Commercially produced DVD movies, home-recorded **DVD** discs, and most digital satellite TV broadcasts employ MPEG2 video compression to deliver their high-quality picture. MPEG2 is a form of lossy compression that rivals the DV format when it comes to picture quality. Because MPEG2 is a "heavier" form of compression that removes a larger portion of the original video signal than DV, it is more difficult to edit with precision. The MPEG2 codec allows for selectable amounts of compression to be applied, which is how home DVD recorders and hard disk video recorders can offer a range of recording speeds. MPEG2 is considered a container format.

MPEG4

MPEG4 is a flexible MPEG container format used for both streaming and downloadable Web content. It is the video format employed by a growing number of camcorders and cameras.

MP3 (MPEG1, Audio Layer 3)

MP3 is the most popular codec for storing and transferring music. Though it employs a lossy compression system that removes frequencies judged to be essentially inaudible, MP3 still manages to deliver near-CD sound quality in a file that it is only about a $1/10^{th}$ or $1/12^{th}$ the size of a corresponding uncompressed WAV file. When creating an MP3 file, you can select varying amounts of compression depending on the desired file size and sound quality.

MP3PRO

MP3PRO is an updated version of the original MP3 codec. These small, low-bitrate files contain much more high-frequency detail than standard MP3 files encoded at similar low bitrates. The high-frequency portion of the audio signal is handled by an advanced and extremely efficient coding process known as spectral band replication (SBR), while the rest of the signal is encoded as a regular MP3. That means that when you play an MP3Pro file on non-MP3Pro-compatible software, you will only hear the non-SBR-encoded portions (so you'll lose the highs altogether). However, when encoded and played back using a fully compatible audio program, mp3Pro files deliver very good sound quality using low bitrates.

QUICK TIME™ MOVIE (MOV)

An MOV is a file format for storing and playing back movies with sound. This type of file contains composition information, but no movie data, which takes up minimal disk space.

RAW

RAW is an image file of minimally processed data received from a digital camera. Most camera manufacturers have their own proprietary version of the RAW image format, and their own file suffixes. Professionals prefer shooting in RAW because the additional information these large files contain allows greater flexibility in post-production editing. Because the image is basically unprocessed, as compared to a JPEG image, RAW files can retain very subtle color variations and fine detail. Color changes, contrast adjustments, and other manipulations of a RAW image yield significantly fewer digital artifacts than the same changes made to a comparable JPEG file.

REALMEDIA™

RealMedia is one of the most popular formats for streaming content on the Internet RealMedia includes the RealAudio codec for sound clips and RealVideo codec for movies. RealAudio and RealVideo files are often given the common RealMedia ".rm" file extension. RealMedia is a container format that's often heavily compressed for streaming over dial-up Internet connections. RealMedia variable bitrate (RMVB) has been developed for VBR streaming files.

SOUND DESIGNER II (SDII)

SDII is an audio format for Macintosh™ operating systems which is often employed by pro-quality sound editing software applications. SDII files, like AIFF and WAV files, are capable of storing uncompressed CD-quality audio.

SECURE DIGITAL MUSIC INITATIVE (SDMI)

The Secure Digital Music Initiative was established to standardize digital music file specifications throughout the industry. The primary purpose was to create a uniform copyright protection protocol that would work with a variety of digital players, software programs, and download sites. SDMI-compliant devices and files have special coding to recognize and comply with the requirements imposed on copyright-protected materials.

PORTABLE NETWORK DOCUMENT (PNG)

PNG is a lossless storage format; however, in contrast with common TIFF usage, it looks for patterns in the image that it can use to compress file size. The compression is exactly reversible, so the image is recovered exactly.

PHOTOSHOP™/PAINTSHOP™ (PSD/PSP)

PSD/PSP are proprietary formats used by graphics programs. These are the preferred working formats as you edit images in the software, because only the proprietary formats retain all the editing power of the programs. These packages use layers, for example, to build complex images, and layer information may be lost in the non-proprietary formats such as TIFF and JPEG. However, be sure to save your end result as a standard TIFF or JPEG, or you may not be able to view it in a few years when your software has changed.

TAG IMAGE FILE FORMAT (TIFF)

TIFF is a flexible container format for digital still images, commonly used in desktop publishing. TIFF images can incorporate various forms of compression (like JPEG) or can be uncompressed. Some digital cameras offer a special TIFF mode for capturing uncompressed photos; however, these files require many times more storage space than JPEGs and can quickly fill up your camera's available memory.

WAVEFORM AUDIO FILE FORMAT (WAV)

WAV is a standard audio format for Windows™ operating systems, often used for storing high-quality, uncompressed sound. WAV files can contain CD-quality (44.1 KHz/16-bit) audio signals. However, CD-quality WAV files require relatively large amounts of memory – roughly 10MB per minute of music. WAV is a container format.

WINDOWS MEDIA AUDIO (WMA)

WMA is one of today's most pervasive Internet audio formats. Though not as popular as MP3, proponents of lossy WMA claim that it can outperform MP3 in the area of sound quality, particularly with files encoded at lower bitrates such as 64 or 96 Kbps. This performance advantage makes it

handy for applications like portable digital audio players, where total play time is limited by a finite amount of internal memory.

WINDOWS MEDIA VIDEO (WMV)

WMV is Microsoft's™ proprietary lossy compression format for motion video. It is used for both streaming and downloading content via the Internet.

EMBEDDING INFORMATION

When submitting visual information, you must embed pertinent information about the image into the image's file information. This information is called information interchange model caption (IPTC), or metadata. The metadata contains identification, contact information, the caption and keywords about the photograph. Embedded information makes the file searchable on the computer and/or the Internet. While some metadata is written by the camera, most is input by the photographer after downloading. Different commands use various software programs to embed information. For detailed guidance on embedding caption and metadata information, consult your commands specific editing software manual. A DOD caption cross reference sheet is available at the following websites:

- http://www.defenseimagery.mil/learning/captionstyle/metadataref.html

- http://www.chinfo.navy.mil/visualnews/training.html

TRANSMISSIONS

So, you have your image or video file with all required information attached or embedded, to include VIRIN info and metadata. Now what? In today's world of up-to-the-minute news coverage, there's a constant demand for current images of activities throughout the Department of Defense showing the department's activities, exercises and operations.

Your next step is to move your product from your command to the rest of the world. There are several options for moving these files. As a general rule, however, you should use either file transfer protocol (FTP) or fast file transfer (FFT).

FILE TRANSFER PROTOCOL (FTP)

A simple network protocol based on Internet Protocol (the method or protocol by which data is sent from one computer to another on the Internet known as the host) as well as a term used when referring to the process of copying files when using FTP technology. To transfer files with FTP, you use a program often called the "client." The FTP client program initiates a connection to a remote computer running FTP "server" software. After the connection is established, the client can choose to send and/or receive copies of files, singly or in groups. To connect to an FTP server, a client requires a username and password as set by the administrator of the server.

FAST FILE TRANSFER (FFT)

Fast File Transfer (FFT) is a client-server based transmission application that allows users to transmit computer files of any type and size (files larger than 1 GB are routinely moved) using Windows based computers over IP-based networks much faster and more reliably than File Transfer Protocol (FTP) methods. Using multiple data threads, the application speeds transmission of files by "flooding" the available bandwidth, throttling itself to ensure that the network is available for other

network activity. Such error handling ensures that upon successful transmission completion, there is no corruption in the files transmitted. The client application itself is easy to install and use. The installer is a standard application installer. There is no licensing information needed as all licensing is done at our receiving servers. When the client is launched, enter the username, password and host address of the FFT server.

For more information, check out Navy Visual News Service's guidance on <u>sending files.</u>

SAFEGUARDING CLASSIFIED MATERIAL

Modern methods of conducting war and safeguarding our nation require a tremendous amount of information. This information is stored in books and files, aggregated into reports, gathered by intelligence activities, and transferred in the form of letters, messages, photographs, and audio and video recordings. This information is sifted and organized in the minds of the people directing the war effort and those keeping the peace. Much of this information is extremely valuable to our enemies, and, therefore, must be kept classified and safeguarded in the interest of national security.

In performing your job as a Navy MC, you may have access to classified information. Therefore, you MUST become aware of the importance of safeguarding all classified information to which you have access.

Classification categories, procedures, and related security information pertaining to the Navy are contained in the *Department of the Navy Information and Security Program Regulation,* OPNAVINST 5510.1 (series).

SUMMARY

Congratulations, you have reached the end of the MC basic rate training manual. Through these pages, you have learned the basics of what is required of you to perform your duties in telling the story of America's Navy. Specifically, in this chapter, however, we discussed moving your visual information products from your command to higher headquarters as well as basic information on file types and file terminology.

Your learning should not stop here. You must take this information and begin building a toolbox that will move you from where you are now and transform you into an expert in the mass communication field.   Good luck and see you about the fleet!

APPENDIX I

MC ACRONYMS – MODULES 1 & 2

AAC	*Advanced Audio Coding*
AFRTS	*Armed Forces Radio and Television*
AIFF	*Audio Interchange File Format*
ARPA	*Advanced Researched Project Agency*
ASD(PA)	*Assistant Secretary of Defense for Public Affairs*
AU	*Encoded Audio Format*
AVCHD	*Advanced Video Coding High Definition*
AVI	*Audio/Video Interleaved*
BMP	*Bitmap Image*
BNC	*Bayonet Neill-Concelman*
CBT	*Computer Based Training*
CCD	*Charged Coupled Device*
CCU	*Camera Control Unit*
CD-ROM	*Compact Disc Read Only Memory*
CE	*Civilian Enterprise*
CHINFO	*Chief of Information*
CMY	*Cyan, Magenta and Yellow*
CMYK	*Cyan, Magenta, Yellow & Key (black)*
CODEC	*Coder-Decoder*
COMCAM	*Combat Camera*
CP10	*Continuing Promise 2010*
CSS	*Cascading Style Sheets*
CU	*Close-Up*
DIMOC	*Defense Imagery Management Operations Center*
DINFOS	*Defense Information School*
DMA	*Defense Media Activity*
DNS	*Domain Name Server*
DoD	*Department of Defense*
DoN	*Department of the Navy*
DPI	*Dots Per Inch*
DSLR	*Digital Single Lens Reflex*
DTP	*Desktop Publishing*

DTS	*Direct to Sailor*
DV	*Distinguished Visitor*
DV	*Digital Video*
DVD-ROM	*Digital Versatile Disk-Read Only Memory*
ECU	*Extreme Close-Up*
EEFI	*Essential Elements of Friendly Information*
ELS	*Extreme Long Shot*
ENG	*Electronic Newsgathering*
EOD	*Explosive Ordnance Disposal*
EV	*Exposure Valve*
FFS	*Full-Figure Shot*
FFT	*Fast File Transfer*
FHTNC	*Fleet Hometown News Center*
FOIA	*Freedom of Information Act*
FPS	*Frames Per Second*
FTP	*File Transfer Protocol*
GBS	*Gigabytes*
GIF	*Graphic Interchange Format*
GN	*Guide Number*
HTML	*Hypertext Markup Language*
IBC	*Internet-based capabilities*
IP	*Internet Protocol*
IPC	*Intermediate Photojournalism Course*
IPTC	*Information Interchange Model Caption*
ISA	*Interservice Support Agreement*
ISO	*International Standards Organization*
ISP	*Internet Service Provider*
JFC	*Joint Force Commander*
JIRSG	*Joint Interservice Regional Support Group*
JPEG	*Joint Photographer Experts Group*
K	*Kelvin*
LaDR	*Learning and Development Roadmap*
LS	*Long Shot*
MBs	*Megabytes*
MC	*Mass Communication Specialist*
MIDI	*Musical Instrument Digital Interface*

MILPERSMAN	*Military Personnel Manual*
MOA	*Memorandum of Agreement*
MOU	*Memorandum of Understanding*
MOV	*Quick Time Movie*
MPEG	*Moving Picture Experts Group*
MS	*Medium Shot*
MWR	Morale, Welfare and Recreation
NAVCO	*Navy Office of Community Outreach*
NAVINFO	*Navy Offices of Information*
ND	*Neutral-Density*
NJROTC	*Navy Junior Reserve Officers Training Corps*
NECs	*Navy Enlisted Classifications*
NEOCS	*Navy Enlisted Manpower and Enlisted Classification and Occupational Standards*
NKO	*Navy Knowledge Online*
NPASE	*Navy Public Affairs Support Elements*
NRTC	*Nonresident Training Course*
NVNS	*Navy Visual News Service*
OIC	*Officer In Charge*
OPDOC	*Operational Documentation*
OPREPS	*Operational Reports*
OPSEC	*Operational Security*
PAG	Public Affairs Guidance
PA Regs	Public Affairs Policy and Regulations
PA/VI	*Public Affairs and Visual Information Team*
Pixels	*Picture Elements*
PNG	*Portable Network Document*
POD	*Plan of the Day*
POD	*Print on demand*
POM	*Plan of the Month*
POW	*Plan of the Week*
PPI	*Pixels Per Inch*
PSD/PSP	*Photoshop/Paint Shop*
RC	*Resin Coated*
RDT&E	*Research, Development, Test and Evaluation*
RGB	*Red, Green, Blue*

RIMPAC	*Rim of the Pacific*
RMVB	*RealMedia Variable Bitrate*
RSS	Really Simple Syndication
SAPP	*Security, Accuracy, Propriety and Policy*
SDII	*Sound Designer II*
SDV	*SEAL delivery team*
SECDEF	*Secretary of Defense*
SECNAV	*Secretary of the Navy*
SDMI	*Secure Digital Music Initiative*
SITE	*Shipboard Information, Training and Entertainment*
SITREPS	*Situational Reports*
SLR	*Single Lens Reflex*
SME	*Subject-Matter Expert*
SMPTE	*Society of Motion Picture and Television Engineers*
TCP/IP	*Transmission Control Protocol/Internet Protocol*
TECDOC	*Technical Documentation*
TIFF	*Tag Image File Format*
TTL	*Through The Lens*
URL	*Uniform Resource Locator*
VI	*Visual Information*
VIDOC	*VI Documentation*
W3C	*World Wide Web Consortium*
WAV	*Waveform Audio Format*
WMA	*Windows Media Audio*
WMV	*Windows Media Video*
WWW	*World Wide Web*

APPENDIX II

REFERENCES USED TO DEVELOP THE TRAMAN

Adobe® Systems Creative Suite 3 Dreamweaver User's Manual

Adobe® Systems Creative Suite 3 InDesign User's Manual

Adobe® Systems Creative Suite 3 Photoshop User's Manual

Ang, Tom. "Digital Photography: An Introduction." ISBN 0789499762

Associated Press Stylebook and Briefings on Media Law

Blair, Raymond N. (Graphic Arts Technical Foundation). "The Lithographer's Manual (9th edition). ISBN 088362169X

CHINFOINST 5720.8 Public Affairs Tactics Manual

DINFOS Bindery Handout

DINFOS Broadcast Writing Style Guide

DINFOS Color Management

DINFOS Digital Imagery Enhancement and Editing

DINFOS Computer Fundamentals

DINFOS Digital Audio and Video Editing

DINFOS Digital Color and Page Design

DINFOS Handout Reference for Electronic Presentations

DINFOS Input and Output Devices

DINFOS Intermediate Photojournalism Course Handbook (Functional Area 1)

DINFOS Multimedia Authoring

DINFOS Public Affairs Leadership Department Training Resources Web page (http://www.dinfos.dma.mil/Dinfosweb/Students/pald.aspx#)

DINFOS Telecommunications and Web Design

DINFOS Vector-Based Graphic Design

DINFOS Video Production Student Guide FA I (Foundation of Video Concepts)

DINFOS Video Production Student Guide FA II (Foundation of Videographic Production)

DINFOS Video Production Student Guide FA III (The Art of Videographic Production)

DINFOS Video Production Student Guide FA IV/V (The Art of Video Documentation and Culmination)

DOD Directive 5230.16 Nuclear Accident and Incident Public Affairs Guidance

DODINST 5040.02 Visual Information

DODINST 5040.05 Alteration of Official DOD Imagery

DODINST 5040.07 Visual Information Production Procedures

DODINST 5120.2 Armed Forces Radio and Television Service

DODINST 5120.4 Department of Defense Newspapers, Magazines and Civilian Enterprise Publications

DODINST 5400.13 Public Affairs Operations

DOD Principles of Information

DOD Webmasters Guidance (http://www.defense.gov/webmasters/)

JOINT PUB 3-61 Joint Public Affairs Doctrine

Naval Enlisted Manpower and Personnel Classifications and Occupational Standards

NAVEDTRA 14208 Photographer's Mate Advanced NRTC

NAVEDTRA 14209 Photographer's Mate Basic NRTC

NAVEDTRA 14321 Journalism Basic NRTC

NAVEDTRA 14332 Illustrator Draftsman (Equipment)

NAVEDTRA 14333 Illustrator Draftsman (Executionable Practices)

NAVEDTRA 14334 Illustrator Draftsman (Presentations Graphics)

NAVEDTRA 14335 Journalism Advanced Nonresident Training Course

NAVPERS 15560D Military Personnel Manual

Navy Visual News Training (https://www.chinfo.navy.mil/visualnews/training.html)

NIKON® Autofocus Speedlight SB-800 Instruction Manual

NIKON® Digital Camera D300 User's Manual

OPNAVINST 3104.1 Navy Visual Information Program Policy and Responsibilities

OPNAVINST 3104.3 Navy Combat Camera Program Policy, Responsibilities and Procedures

OPNAVINST 3432.1 Operations Security

OPNAVINST 5510.1 Department of the Navy Information and Personnel Security Program Regulation

OPNAVINST 5720.2 Embarkation in U.S. Naval Ships

OPNAVINST 5726.8 Outreach: America's Navy

Sabin, William A. "The Gregg Reference Manual: A Manual of Style, Grammar, Usage, and Formatting (10th Edition)" ISBN 0073545430

SECNAVINST 5211.5 Privacy Act Program

SECNAVINST 5720.42 Freedom of Information Act

SECNAVINST 5720.44 Public Affairs Policy and Regulations

SECNAVINST 5724.3 Fleet Hometown News Program Policy and Regulations

SECNAVINST 5420.47 Navy Policy for Content of Publicly Accessible World Wide Web Sites

SECNAVINST 5870.4 Copyright

U.S. Counterfeit Detection Act of 1992 (http://www.secretservice.gov/money_illustrations.shtml)

U.S. Navy Regulations

U.S. Navy Style Guide (http://www.navy.mil/submit/view_styleguide.asp)

U.S. Navy Website (http://www.navy.mil)

U.S. Rehabilitation Act (Section 508) (http://www.section508.gov)

U.S. State Department Guidelines for Producing High Quality Photographs for U.S. Travel Documents

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Assignment Questions

ASSIGNMENT 1

Textbook Assignment: "*Introduction to Visual Information", Chapter 1.*

1-1. Which of the following products is NOT an example of visual information?

1. Illustrations
2. Command Brief
3. All Hands Update
4. Public Affairs Guidance

1-2. Which of the following military leaders is responsible for the implementation and administration of the Navy's visual information program?

1. Chief of Information
2. Director, Combat Camera
3. Chief of Naval Operations
4. Director, Defense Media Activity

1-3. Which of the following Navy policies governs the use, management and assignment of Navy visual information?

1. OPNAVINST 3104.1
2. OPNAVINST 3104.3
3. DOD Directive 5040.1
4. SECNAVINST 5720.44

1-4. Which of the following Navy policies governs combat camera responsibilities and procedures?

1. OPNAVINST 3104.1
2. OPNAVINST 3104.3
3. DOD Directive 5040.1
4. SECNAVINST 5720.44

1-5. Which of the following government entities supports worldwide DoD and other government agencies with the right imagery at the right place and time?

1. Defense Media Activity
2. Defense Visual News Service
3. Defense Imagery Management Operations Center
4. Defense Video & Imagery Distribution System

1-6. DoDINST 5040.05 outlines which of the following aspects of visual information?

1. Copyright
2. Visual Information Tactics
3. Alteration of Official Imagery
4. Joint PA Support Element Operations

1-7 Which of the following techniques often goes against DoD and Navy VI ethics when enhancing imagery?

1. Dodging & Burning
2. Cropping & Scaling
3. Masking an area of the image in support of criminal investigations
4. Cloning area for placement in separate image

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ASSIGNMENT 2

Textbook Assignment: "Lighting and Color*", Chapter 2.*

2-1. What happens to light when it travels through a transparent medium, such as glass ?

1. It stops
2. It speeds up
3. It slows down
4. It bounces back

2-2. What happens to light when it strikes a rough surface?

1. It stops
2. It is absorbed
3. It reflects back in many directions
4. It reflects back at the same angle

2-3. Which of the following types of reflection occurs when light strikes a smooth surface?

1. Diffused
2. Specular
3. Conflicted
4. Translucent

2-4. Which of the following is NOT a factor that affects reflected light?

1. Color
2. Intensity
3. Direction
4. Sharpness

2-5. Which of the following terms describes the type of medium only transmits a portion of light, and objects behind such media are not clearly seen?

1. Diffused
2. Opaque
3. Transparent
4. Translucent

2-6. Which, if any, of the following colors theoretically represents the absence of light?

1. Gray
2. Black
3. White
4. None of the Above

2-7. Which of the following colors is not one of the three colors of light as seen in the visible spectrum?

1. Red
2. Blue
3. Green
4. Yellow

2-8. What happens to light when it passes through a prism?

1. It intensifies
2. It changes direction
3. It lessens in intensity
4. It separates light into the visible spectrum

2-9. Which of the following terms describes what happens to light during a solar eclipse?

1. Dispersion
2. Diffraction
3. Refraction
4. Inversification

2-10. Which of the following types of light is seen as a glare?

1. Diffused
2. Fluorescent
3. Plane Polarized
4. Tungsten Halogen

2-11. Which of the following items is the most important ingredient in photography?

1. Light
2. Color
3. Subject
4. Placement

2-11. Which of the following factors determines the quality of sunlight?

1. Direction and Strength
2. Direction and Time of Day
3. Strength and Cloud Coverage
4. Time of Day and Cloud Coverage

ASSIGNMENT 3

Textbook Assignment: **"***Photography***"***, Chapter 3.*

3-1. Which of the following steps is the first you should take upon being assigned a new DSLR camera?

1. Talk to your LPO
2. Clean the camera's lens
3. Go out and shoot test shots
4. Read the camera's user manual

IN ANSWERING QUESTIONS 3-2 THROUGH 3-9 SELECT THE PHOTOGRAPHIC TERM THAT MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

3-2. Widest angle at which light entering a lens produces a usable portion of the circle of illumination at the focal plane.

1. Angle of field
2. Depth of field
3. Shutter angle
4. Asymmetrical junction

3-3. The usable portion of the circle of illumination.

1. Exposure
2. Angle of field
3. Depth of field
4. Circle of good definition

3-4. Variable opening through which light passes into a camera.

1. Iris
2. f/stop
3. Shutter
4. Aperture

3-5. Range of acceptably sharp focus in front of and behind the center of interest.

1. Exposure
2. Perspective
3. Depth of field
4. Circle of good definition

3-6. Thin sheet that covers the camera's charge-coupled device (CCD).

1. Iris
2. Shutter
3. Aperture
4. Diaphragm

3-7. Derived from the a Latin phrase meaning dark chamber, it is a light box used to capture images.

1. Iris
2. Camera
3. Diaphragm
4. Digital imaging

3-8. Amount of light falling on a unit area of a digital sensor.

1. f/stop
2. Exposure
3. Light index
4. Shutter speed

3-9. Controls the amount of light passing through the lens and striking the CCD.

1. f/stop
2. Exposure
3. Depth of field
4. Shutter speed

3-10. What happens to the depth of field when you lower your f/stop?

1. It expands
2. It disappears
3. It is shallower
4. It is shallower Nothing changes

3-11. Which of the following terms best describes the length of time the shutter stays open?

1. CCD release
2. Shutter speed
3. Light duration
4. Aperture control

3-12. Which of the following situations occurs when you use a higher shutter speed?

1. Faster shutter speed, shorter exposure
2. Faster shutter speed, longer exposure
3. Slower shutter speed, shorter exposure
4. Slower shutter speed, longer exposure

3-13. Which, if any, of the following actions best describes what happens when you put your camera on the "bulb" setting?

1. Slows the shutter speed
2. Speeds up the shutter
3. Keeps shutter open when shutter release button is held
4. None of the above

3-14. Which of the following shutter speeds lets you a) blur action and b) freeze action?

1. a) 1/60   b) 1/250
2. a) 1/250   b) 1/60
3. a) B   b) 1/500
4. a) 1/500   b) B

3-15. Which of the following actions is controlled by the ISO setting?

1. Stops release of shutter
2. Changes focus from auto to manual
3. Determines depth of field
4. Controls amount of light that enters DSLR

3-16. Which of the following terms best describes the common rule for estimating correct daylight exposure?

1. Obscura
2. Mnemonic
3. Sunny f/16
4. Equivalent exposure

3-17. Which of the following terms describes the doubling and halving relationship between the aperture and the shutter?

1. Obscura
2. Mnemonic
3. Sunny f/16
4. Equivalent exposure

3-18. Which of the following is NOT a reason for knowing understanding basic exposure settings?

1. Light meters are mechanical; they may be inconsistent, wrong, or even fail
2. Light meters can't think for themselves; you may want to override reading if special lighting situations
3. You may want to control depth of field and stop action vice the camera doing it
4. All of the above

IN ANSWERING QUESTIONS 3-19 THROUGH 3-22 SELECT THE TYPE OF LENS THAT MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

3-19. Less than 40mm focal length and used in confined spaces or when photographer wants to cover a large area.

1. Macro
2. Fisheye
3. Telephoto
4. Wide-angle

3-20. Used for close-up photography and is capable of producing life-size images?

1. Macro
2. Fisheye
3. Telephoto
4. Wide-angle

3-21. Greater than 58mm focal length and appears to compress the perspective of an image.

1. Macro
2. Fisheye
3. Telephoto
4. Wide-angle

3-22. Makes objects appear to diminish in size rapidly as the distance from the camera increases and objects close to the camera appear far apart.

1. Macro
2. Fisheye
3. Telephoto
4. Wide-angle

3-23. In photographic terms, which of the following best describes astigmatism?

1. Optical center of the lens
2. Hyperfocal distance from the lens
3. Lens aberration that causes an off-axis point
4. Out-of-focus image, resulting from improper lens adjustment

3-24. Dyed in a specific manner in order to absorb light of certain colors.

1. Filter
2. Flash
3. Snoot
4. Scrim

3-25. Measures light.

1. Filter
2. Snoot
3. Lens hood
4. Light meter

3-26. Three-legged support for the camera.

1. Tripod
2. Hot shoe
3. Monopod
4. Lens hood

3-27. Electronic storage device.

1. Coaxial
2. Share point
3. Tandem cord
4. Memory card

3-28. Keeps strong sunlight from striking the lens.

1. Snoot
2. Barn door
3. Lens hood
4. Light meter

3-29. High-voltage light source that produces momentary high-intensity light.

1. Filter
2. Flash
3. Shutter
4. Light stream

3-30. At what distance from the subject's face should you hold the light meter when taking a reading?

1. 3 inches
2. 4 inches
3. 5 inches
4. 6 inches

3-31. Which, if any, of the following methods of measuring light is being used when the light meter is held at the position of the subject with the photoelectric cell toward the camera?

1. Incident
2. Reflected
3. Integrated
4. None of the Above

3-32. Which of the following occurs when light is transmitted through a filter?

1. The color of light is modified
2. The amount of light is reduced
3. The vibration direction of the light rays is limited
4. All of the above

3-33. Which of the following type of filters reduces the amount of light without changing the reproduction of colors?

1. Gelatin
2. Polarizing
3. Monochrome
4. Neutral density

3-34. What type of filter changes the way your camera sees and treats light and reduces the effects of haze?

1. Gelatin
2. Polarizing
3. Monochrome
4. Neutral density

3-35. What color is a light meter calibrated to see?

1. White
2. Black
3. Dark gray
4. Middle gray

3-36. Which of the following light meter methods requires you to take two readings from a scene – highlighted area and shadow area?

1. Bracketing
2. Darkest object
3. Brightest object
4. Brightness range

3-37. When employing the substitution light meter method of tiny objects or in a confined space, what can you use to take the place of the subject's gray tones?

1. Black card
2. White card
3. Camera bag
4. Back or palm of hand

3-38. Which of the following photo terms is defined as "the pleasing arrangement of subject-matter elements within the image"?

1. Contrast
2. Exposure
3. Composition
4. Center of interest

3-39. Tic-tac-toe like pattern that divides an image to locate the possible center of interest.

1. Pattern
2. Perpendicular
3. Rule of thirds
4. Dynamic symmetry

3-40. Center of interest found by drawing or imagining a diagonal line from one corner to another, then a perpendicular line to the first line from the third line?

1. Pattern
2. Perpendicular
3. Rule of thirds
4. Dynamic symmetry

3-41. Which of the following composition techniques appears to make an image appear harmonious?

1. Unity
2. Pattern
3. Balance
4. Harmony

3-42. Which of the following describes a line that directs the viewer's eyes to an image's center of interest?

1. Leading
2. Symmetrical
3. Asymmetrical
4. Perpendicular

3-43. Strength, rigidity, power and solidarity.

1. Curved
2. Vertical
3. Diagonal
4. Horizontal

3-44. Peace, tranquility and speed.

1. Curved
2. Vertical
3. Diagonal
4. Horizontal

3-45. Movement, action and speed

1. Curved
2. Vertical
3. Diagonal
4. Horizontal

3-46. Grace, smoothness and dignity

1. Curved
2. Vertical
3. Diagonal
4. Horizontal

3-47. What photo composition technique provides unity and structure through repetition?

1. Pattern
2. Texture
3. Volume
4. Framing

3-48. What photo composition technique brings realism and character to an image?

1. Pattern
2. Texture
3. Volume
4. Framing

3-49. Which of the following terms best describes the relationship of objects within an image?

1. Balance
2. Harmony
3. Symmetry
4. Perspective

3-50. Which of the following types of photos is NOT an example of controlled-action?

1. Sports shot
2. Group shot
3. Studio portrait
4. Environmental shot

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ASSIGNMENT 4

Textbook Assignment: "*Videography*", Chapter 4.

4-1. Which of the following terms best describes the conversion of reflected light rays from a subject or scene into electrical impulses?

1. Television
2. Waveform
3. Oscilloscope
4. Studio camera

4-2. How many charge-coupled devices (CCDs) are found inside an electronic newsgathering (ENG) camera?

1. None
2. 1
3. 2
4. 3

4-3. Which of the following adjustments made to a video camera increases image contrast?

1. Gain
2. Tripod
3. Color bars
4. Neutral density filter

4-4. Which of the following situations occurs when a shot has more than one topic or center of interest?

1. Distributes focus
2. Increases interest
3. Weakens effectiveness
4. Focuses viewer's attention

4-5. Which, if any, of the following methods place a shot's center of interest in a dominant position?

1. Rule of thirds
2. Dominant factor
3. Dynamic symmetry
4. None of the above

4-6. Which of the following adjustments has the most influence on image quality?

1. AV
2. Brightness
3. Depth of field
4. Center of interest

4-7. Which of the following is NOT a factor that affects framing?

1. Noseroom
2. Headroom
3. Field of view
4. White balance

4-8. What percentage of an image is lost when shooting with most professional video cameras?

1. 5
2. 10
3. 15
4. 18

4-9. For which of the following reasons is it necessary to leave lead room for your subject when he or she is moving?

1. Reduces shadows

2. Improves audio quality

3. Ensures proper depth of field

4. Keeps subject from appearing to bump the edge of the frame

4-10. In addition to clearing your frame of unsightly objects, what other object must you pay close attention to visually in the background?

1. Cut-off points

2. Passing ships

3. A level horizon

4. Sunset lighting

IN ANSWERING QUESTIONS 4-11 THROUGH 4-14 SELECT THE VISUAL INFORMATION TERM THAT MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

4-11. Framing issues that may make a subject appear as if her body stops at the edge of the screen.

1. Close up

2. Headroom

3. Perspective

4. Cut-off point

4-12. Apparent sense of depth based upon the relative distance and position of the subject in the frame.

1. Unity

2. Balance

3. Viewpoint

4. Perspective

4-13. Full face shot with headroom and room for the subject's shoulders.

1. Close up

2. Full length

3. Lead room

4. Headroom

4-14. The camera position in relationship to the subject.

1. Unity

2. Balance

3. Viewpoint

4. Perspective

4-15. Which of the following shooting techniques adds drama and excitement to the frame?

1. Shooting in adequate natural light

2. Shooting from different viewpoints

3. Shooting from different angles

4. All of the above

4-16. Which of the following terms best describes a video story's foundation of continuity?

1. Viewpoint
2. Basic sequence
3. Establishing shot
4. Camera angle variation

IN ANSWERING QUESTIONS 4-17 THROUGH 4-19 SELECT THE VIDEO SHOOTING TERM THAT MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

4-17. In a shooting sequence, it introduces the scene and shows the entire area of action

1. Close up
2. Long shot
3. Medium shot
4. Camera angle

4-18. Focuses attention on an important subject or action.

1. Close up
2. Long shot
3. Medium shot
4. Camera angle

4-19. Narrows the center of interest, answering the "what" of a scene.

1. Close up
2. Long shot
3. Medium shot
4. Camera angle

4-20. When shooting a basic sequence, how much extra footage at a minimum should be included before and after the shot's main action to leave room for transitions and to ease the editing process?

1. None, time and b-roll too costly
2. 2-3 seconds
3. 5-6 seconds
4. 10 seconds

4-21. Which of the following items dictates the relative distance between shots?

1. Location
2. Transitions
3. Time of day
4. Subject matter

4-22. Which of the following reasons is the basis for always shooting on the same side of the action axis?

1. Avoid cut-off points
2. Emphasizes center of interst
3. Maintains directional continuity
4. Allows shooter to stay within basic sequence

4-23. Which of the following shooting techniques works to achieve a smooth, uninterrupted flow from one shot to another?

1. Overlapping
2. 180-degree rule
3. Basic sequencing
4. Static screen directional shooting

4-24. When shooting to achieve a smooth, uninterrupted flow of action, which of the following is NOT a factor to be considered?

1. Story
2. Dialogue
3. Control of the action
4. Indoors vs. outdoors shooting

4-25. Which of the following ways do cut-ins and cutaways preserve continuity?

1. Builds interest
2. Bridges time and distance
3. Covers changes in screen direction
4. All of the above

4-26. Which, if any, of the following events is considered semi-controlled action shooting?

1. Sports
2. Ceremonies
3. Hard-news situations
4. None of the above

IN ANSWERING QUESTIONS 4-27 THROUGH 4-32 SELECT THE MOVEMENT THAT MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

4-27. Movement in front of the camera, usually by the talent.

1. Panning
2. Primary
3. Dollying
4. Secondary

4-28. Sequence of shots from two or more cameras.

1. Tilting
2. Tertiary
3. Panning
4. Primary

4-29. Horizontal movement on a stationary pedestal following the primary action.

1. Dollying
2. Tertiary
3. Panning
4. Primary

4-30. What type of video shot is absolutely centered and allows the shooter to cross the action axis and establish a new direction of travel?

1. Cutaway
2. Long shot
3. Neutral shot
4. Extreme long shot

4-31. Which of the following variations to the basic sequence always precedes a long shot and establishes physical character?

1. Cut-in
2. Full figure
3. Neutral
4. Extreme long shot

4-32. Which, if any, of the following variations to the basic sequence could startle, confuse or withhold information from the viewer?

1. Reverse sequencing
2. Cut-ins and cutaways
3. Extended sequencing
4. None of the above

4-33. Which of the following terms best describes the organizing of footage into smaller, more manageable files?

1. Continuity
2. Digitizing
3. Sequencing
4. Sub-clipping

4-34. Which of the following terms best describes the orderly structuring of facts, ideas and abstract suggestions during the editing process?

1. Continuity
2. Digitizing
3. Sequencing
4. Sub-clipping

4-35. Which of the folllowing devices is NOT associated with the most commonly used method of video editing?

1. Cut-in
2. Cutaway
3. Crosscutting
4. Compilation

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ASSIGNMENT 5

Textbook Assignment: "*Multimedia", Chapter 5.*

5-1. Which of the following MC skills can be incorporated into a multimedia production?

1. Writing
2. Photography
3. Layout and design
4. All of the above

5-2. What happens to the quality of a) raster images and b) vector images when you increase their size?

1. a) decreases b) decreases
2. a) nothing b) decreases
3. a) decreases b) nothing
4. a) nothing b) nothing

5-3. Which of the following items should NOT be edited using vector-based software?

1. Charts
2. Drawings
3. Diagrams
4. Photographs

5-4. Which of the following actions helps improves multimedia production skills?

1. Practice
2. Experimenting
3. Reading graphics software manuals
4. All of the above

IN ANSWERING QUESTIONS 5-5 THROUGH 5-9 SELECT THE VECTOR TERM FROM THE LIST BELOW THAT MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

A. Fill   D. Miter Limit

B. Path   E. Anchor Point

C. Stroke   F. Bézier Curve

5-5. The basis for all vector drawings.

1. B
2. D
3. E
4. F

5-6. A tracing around an object that can be colored or patterned.

1. A
2. C
3. E
4. F

5-7 Adds color or pattern to an open area.

1. A
2. B
3. C
4. D

5-8. A shape formed by lines collected at a point.

1. B
2. D
3. E
4. F

5-9. Which of the following instructions dictates policy for the marking and filing of all Navy graphics?

1. OPNAVINST 3432.1
2. SECNAVINST 3104.1
3. CHINFOINST 5230.16
4. SECNAVINST 5720.44

5-10. Which of the following terms best describes the actual placement of itmes on a page as well as the relationships among the items?

1. Perspective
2. Layout and design
3. Multiple-page layout
4. Raster-graphic design

IN ANSWERING QUESTIONS 5-11 THROUGH 5-14 SELECT THE TERM THAT BEST MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

5-11. Demonstrates movment and communicates feeling or mood?

1. Unity
2. Balance
3. Rhythm
4. Emphasis

5-12. Visual cues to tell the reader what elements belong together on a page.

1. Unity
2. Balance
3. Rhythm
4. Emphasis

5-13. Equal distribution of weight from the elements on a page.

1. Unity
2. Balance
3. Rhythm
4. Emphasis

5-14. Highlights one element over another, capturing the reader's attention.

1. Unity
2. Balance
3. Rhythm
4. Emphasis

5-15. Which of the following examples DOES NOT create unity in a layout?

1. Kerning
2. Leading
3. Spacing
4. Grouping

5-16. Horizontal lines in a layout communicate which of the following messages?

1. Strength
2. Elegance
3. Movement
4. Relaxation

5-17. Curved lines in a layout communicate which of the following messages?

1. Strength
2. Elegance
3. Movement
4. Relaxation

5-18. In which of the following ways does using shapes enhances a layout?

1. Sustains interest
2. Organizes elements
3. Provides a starting point
4. All of the above

5-19. Which of the following items is considered an abstract shape?

1. Tree
2. Circle
3. Square
4. Handicap symbol

5-20. Which of the following design terms BEST describes the space between and around items in a layout?

1. Gutter
2. Galley
3. Leading
4. White space

5-21. What type of mood is created by using high-contrast colors in a layout?

1. Calming
2. Instability
3. Confusion
4. Excitement

5-22. Which of the following design elements is considered the ultimate tool for symbolic communication?

1. Size
2. Color
3. Shape
4. Texture

5-23. What is the main purpose of a good design layout?

1. Directs reader's attention
2. Conveys intended message
3. Aesthically pleasing to the eye
4. All of the above

5-24. A 72-point headline is of what vertical length?

1. ¼ inch
2. ½ inch
3. 1 inch
4. 1 ½ inches

5-25. What, if any, of the following occurs when tight leading is used within your layout?

1. Fills the page
2. Airs out sentences
3. Decreases legibility
4. None of the above

5-26. What is the target line length for optimal readibility?

1. 10 characters
2. 25 characters
3. 55 characters
4. 100 characters

5-27. What is the minimum point size you should use for text in a layout?

1. 7
2. 8
3. 10
4. 12

5-28. Times New Roman is an example of what design element?

1. Stroke
2. Kerning
3. Typeface
4. San serif font

5-29. What are the three types of indentions used in layouts?

1. Flush, hanging and regular
2. Flush, pulled and regular
3. Hanging, pulled and regular
4. Hanging, kerned and pulled

IN ANSWERING QUESTIONS 5-30 THROUGH 5-34 SELECT THE DESIGN ELEMENT THAT BEST MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

5-30. Invisible structure used to provide visual organization during layout process.

1. Grid
2. Gutter
3. Border
4. White space

5-31. Horizontal or vertical line used to offset areas on a layout.

1. Rule
2. Bleed
3. Border
4. Grid system

5-32. Photo or illustration that extends beyond a page margin.

1. Rule
2. Bleed
3. Gutter
4. Border

5-33. Decorative line or box used to give the layout an organized appearance.

1. Grid
2. Rule
3. Gutter
4. Border

5-34. Blank space between to facing pages.

1. Grid
2. Rule
3. Gutter
4. Border

5-35. Which of the following steps should be the first taken during the development of an electronic presentation?

1. Design
2. Testing
3. Planning
4. Production

5-36. Which, if any, of the following factors are the most important to consider when creating an electronic presention?

1. Text and color
2. Number of slides
3. Simplicity and legibility
4. None of the above

5-37. What type of graphical relationship is created by using only one family of type in an electronic presentation?

1. Conflicting
2. Contrasting
3. Concordant
4. Combination

5-38. What type of graphical relationship is created by using separate, but clearly distinct, typefaces in an electronic presentation?

1. Conflicting
2. Contrasting
3. Concordant
4. Combination

5-39. Which of the following typefaces are recommended for use in electronic presentations?

1. Serif only
2. Slab-serif only
3. Sans-serif only
4. Slab-serif and sans-serif

5-40. Which of the following guidelines should be followed when creating presentation slides?

1. All caps for text
2. Three topics per slide
3. Six lines per slide, six words per line
4. All of the above

5-41. On average, what amount of time does a viewer spend reading each slide?

1. 2-second glance
2. 5 seconds
3. 7 seconds
4. 15 seconds

5-42. Which of the following types of color is best suited for use on slide backgrounds, when you want to create a receptive and passive atmosphere for your audience?

1. Cool colors
2. Warm colors
3. Bright colors
4. Neutral colors

5-43. Which of the following guidelines should be followed when using and deciding upon colors for your electronic presentation?

1. Avoid red-green combinations

2. Use bright colors for emphasis

3. Establish color palette and stick to it

4. All of the above

IN ANSWERING QUESTIONS 5-44 THROUGH 5-45 SELECT THE PRINCIPLE OF DESIGN FOR PRESENTATIONS THAT BEST MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

5-44. Major cause of unappealing layouts.

1. Contrast

2. Proximity

3. Alignment

4. Repetition

5-45. Most important visual attraction for electronic presentations.

1. Contrast

2. Proximity

3. Alignment

4. Repetition

5-46. When developing graphics for your electronic presentation to be given via an overhead projector, what concentration of dots per inch should you strive for?

1. 72

2. 150

3. 300

4. 600

IN ANSWERING QUESTIONS 5-47 THROUGH 5-49 SELECT THE MOVIE AUTHORING STAGE THAT BEST MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

5-47. Development of story line and writing of the script.

1. Design

2. Testing

3. Planning

4. Concept

5-48. Question-and-answer stage needed to establish the project and its purpose.

1. Design

2. Testing

3. Planning

4. Concept

5-49. Stage during which members of your intended audience review the product.

1. Design

2. Testing

3. Planning

4. Concept

5-50. Which of the following terms describes a type of multimedia production that is interactive, such as with computer-based training and games?

1. Linear

2. Nonlinear

3. Horizontal

4. Perpendicular

5-51. Which of the following terms best describes the process of filling the frames between the main points of action for fluidity in an animated production?

1. Keying
2. Walking
3. Morphing
4. Tweening

5-52. Which of the following Navy policies is the governing instruction for the maintenance and development of websites?

1. OPNAVINST 5040.05
2. OPNAVINST 5112.3
3. SECNAVINST 3104.1
4. SECNAVINST 5724.27

5-53. Which of the following terms best describes the unique address given to the location of a file on the Internet?

1. File transfer site
2. Domain name server
3. Internet protocol address
4. Uniform resource locator

5-54. During which stage of website creation would you use drawings, flowcharts and storyboards to map out ideas for pages?

1. Design
2. Concept
3. Planning
4. Production

5-55. Which of the following guidelines is a best practice when deciding upon text and where to place it on your website?

1. Use all caps
2. Center all text
3. Left-justify body text; center titles
4. Use common acronyms to save space and keep the page clean and simple

5-56. Which of the following guides should you adher to when placing grahics on your website?

1. Keep images at 300 dpi
2. Do not compress images
3. Reduce images for quicker downloading
4. Only link to images on Navy.mil

5-57. Which of the following sections of the 1973 Rehabilitation Act established requirements for the public access to electronic information and information technology for people with disabilities?

1. Section 501
2. Section 503
3. Section 505
4. Section 508

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ASSIGNMENT 6

Textbook Assignment: *"Print Production", Chapter 6.*

6-1. Who is credited with inventing the mechanical moveable-like printing press?

    1. Martin Cooper

    2. Chester Carlson

    3. George Eastman

    4. Johannes Gutenberg

6-2. Which of the following is NOT a basic category of desktop publishing software?

    1. Digital

    2. Layout

    3. Graphics

    4. Composition

6-3. What type of desktop printer sprays electrically charged ink through tiny nozzles to form an image of high-quality resolution?

    1. Laser

    2. Inkjet

    3. Thermal-dye

    4. Digital duplicator

6-4. What type of desktop printer uses thousands of tiny heating elements that come into contact with donor ribbons to release color?

    1. Laser

    2. Inkjet

    3. Thermal-dye

    4. Digital duplicator

6-5. Which of the following terms best describes the high-speed printing system designed for high-volume photocopying and printing?

    1. Laser

    2. Inkjet

    3. Thermal-dye

    4. Digital duplicator

IN ANSWERING QUESTIONS 6-6 THROUGH 6-8 SELECT THE CHARACTERISTIC OF PAPER THAT BEST MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

6-6. Determined by the type of pulp used, treatments and end use for the paper.

    1. Finish

    2. Grade

    3. Basis weight

    4. Paper density

6-7 Texture of the paper

    1. Finish

    2. Grade

    3. Basis weight

    4. Paper density

6-8. Measurement of paper's compactness (how much light the paper lets in).

    1. Finish

    2. Grade

    3. Basis weight

    4. Paper density

6-9. Which of the following actions should you take when you begin to notice defective prints when using a digital duplicator?

1. Change the print color
2. Replace the master roll
3. Clean the thermal print head
4. Change the print density setting

6-10. Which of the following types of scanners has the capability of scanning three-dimensional objects?

1. Slide scanner
2. Hand scanner
3. Flatbed scanner
4 Copystand scanner

6-11. Which of the following types of scanners has the capability for small-quanity scanning?

1. Slide scanner
2. Hand scanner
3. Flatbed scanner
4 Copystand scanner

6-12. Which of the following is another term used synomously with the knife angle of a paper cutter?

1. Draft
2. Bevel
3. Snubber
4. Cutting stick

6-13. Which of the following items keeps a paper cutter's knife from dulling too easily or breaking every time it's used?

1. Draft
2. Bevel
3. Snubber
4. Cutting stick

6-14. Which of the following terms best describes the metal bar that runs parallel to the knife that holds paper firmly in place during cutting?

1. Stock slide
2. Back gauge
3. Cutter clamp
4. Thumbscrew

6-15. Which of the following is NOT a common fold of paper used in print production?

1. Gate
2. French
3. Tabletop
4. Accordion

IN ANSWERING QUESTIONS 6-16 THROUGH 6-19 SELECT THE BINDING METHOD THAT BEST MATCHES THE DESCRIPTION GIVEN AS THE ANSWER.

6-16. Also known as padding, this method makes tablets or pads by cementing the edge of a stack of paper sheets.

1. Adhesive
2. Mechanical
3. Thread-sewing
4. Saddle-stitching

6-17. Allows for flat binding and uses coils, combs or metal rings to join sheets of paper.

1. Adhesive
2. Mechanical
3. Thread-sewing
4. Saddle-stitching

6-18. Uses staples through the centerfold along the backbone of brochures or thin magazines?

1. Adhesive
2. Mechanical
3. Thread-sewing
4. Saddle-stitching

6-19. Most expensive binding process, usually reserved for fine literature and reference books?

1. Adhesive
2. Mechanical
3. Thread-sewing
4. Saddle-stitching

6-20. Which of the following terms describes the type of mat cutter used in photo matting?

1. Emery
2. Carriage
3. Guillotine
4. Precision

6-21. Which of the following describes a major difference between matting and mounting a print for display?

1. Matting enhances the image
2. Matting is only used for photographs
3. A matted print is a protected print
4. A matted print is placed behind a cut opening; the mat surrounds the print

6-22. In which of the following print-mounting methods is the bond often temporary?

1. Dry
2. Wet
3. Porous
4. Pressure

6-23. Which of the following rules IS NOT in adherence to the Counterfeit Act of 1992 for the use of money in illustrations?

1. The illustration must be one-sided
2. The illustration must be an actual-size duplication of the actual currency
3. The illustration must be less than 3/4s or more than 1 ½ the size of the actual currency
4. All files used in the making of the illustration must be destroyed following use

6-24. In what policy guidance will you find the Navy Visual Information Management and Operations Manual?

1. OPNAVINST 3104.1
2. CHINFOINST 5720.8
3. DoD Directive 5040.02
4. SECNAVINST 5720.44

6-25. What is the purpose of a mandatory job order log used to track visual information products?

    1. Inventory materials used

    2. Maintain close control of services

    3. Provide receipt for finished works

    4. All of the above

ASSIGNMENT 7

Textbook Assignment: **"**_File Management and Transmission", Chapter 7._

7-1. Who assigns the Visual Information Record Identification Number (VIRIN)?

   1. Defense Imagery Management Operations Center (DIMOC)
   2. The originator
   3. Navy Visual News Service (NVNS)
   4. Chief of Information (CHINFO

7-2. You are preparing a VIRIN for the third photograph shot on April 4, 2011. Which of the following examples is in the proper format?

   1. 040411-N-SQ684-003
   2. 110404-N-SQ684-001
   3. 110404-M-SQ684-003
   4. 110404-N-SQ684-003

7-3. How many data elements does a VIRIN consist of?

   1. 4
   2. 5
   3. 13
   4. 15

IN ANSWERING QUESTIONS 7-4 THROUGH 7-7 MATCH THE FIELD FROM THE LIST THAT MATCHES THE DESCRIPTION GIVEN AS THE ANSWER

      A. Field 1   C. Field 3

      B. Field 2   E. Field 4

7-4. The year, month and day of acquisition or origination

   1. B
   2. D
   3. A
   4. C

7-5. The originator's Vision ID code

   1. A
   2. C
   3. D
   4. B

7-6. The image or unit of media number in sequential order

   1. C
   2. D
   3. B
   4. A

7-7. The service affiliation or status of the camera operator or originator

   1. C
   2. A
   3. D
   4. B

7-8. What information should be included on a VIRIN slate for a video?

1. Videographer name and rank
2. Brief description of the sequence
3. Release status of the video
4. All of the above

7-9. Which form is used for writing captions for motion imagery?

1. DD Form 10700
2. DD Form 2537
3. DD Form 1348
4. DD Form 2533

7-10. What are the two types of captions for video?

1. Total and Sequence
2. Sequential and Total
3. Sequence and Shot
4. Total and Shot

7-11. Which video caption type describes the contents of the entire video sequence?

1. Total
2. Sequential
3. Shot
4. Sequence

7-12. If system software does not support long file names, what information should the file name include?

1. Date in VIRIN format and last two characters of the sequence number
2. Date in VIRIN format and Vision ID
3. Description of the image or video
4. None of the above

7-13. Which file format is organized into alternating ("interleaved") chunks of audio and video data used for storing and playing back movie clips with sound on Windows™-based PCs?

1. MOV
2. DV
3. AVI
4. GIF

7-14. Which software takes a raw data file and turns it into a compressed file?

1. TIFF
2. RAW
3. CODEC
4. MIDI

7-15. Which file format is optimized for photographs and similar continuous tone images that contain many, many colors?

1. JPEG
2. GIF
3. MPEG1
4. BMP

7-16. What describes the average amount of data required to store one second of music, expressed in kilobits per second, or Kbps, with audio compression?

1. FTP
2. Bitrate
3. FFT
4. CODEC

7-17. Which file format is a flexible MPEG container format used for both streaming and downloadable Web content?

1. MP3
2. MPEG1
3. MPEG2
4. MPEG4

7-18. Which file format is a flexible container format for digital still images, commonly used in desktop publishing?

1. GIF
2. TIFF
3. MOV
4. JPEG

7-19. Which file format is a standard audio format for Windows™ operating systems, often used for storing high-quality, uncompressed sound?

1. AIFF
2. MIDI
3. MP3
4. WAV

7-20. Which file format employs a lossy compression system and is the most popular codec for storing and transferring music ?

1. MP3
2. WAV
3. MIDI
4. WMV

7-21. What is metadata?

1. File format commonly used to compress data for desktop publishing
2. File that contains commands that let MIDI-capable synthesizers recreate a specific musical passage
3. Pertinent information about the image embedded into the image's file information
4. Uniform copyright protection protocol that would work with a variety of digital players, software programs, and download sites

7-22. What information is contained in metadata?

1. Contact Information
2. Caption
3. Keywords about the photograph
4. All of the above

7-23. Which of the following is a preferred method to transfer image and video files to DIMOC?

1. Federal Express
2. E-mail
3. FTP
4. Social media site

7-24. Which client-server based transmission application allows users to routinely transmit large computer files using Windows based computers over IP-based networks?

1. FFT
2. HTTPS
3. HTTP
4. FTP

7-25. How should you keep information that is extremely valuable to our enemies?

1. Censored and classified
2. Classified and safeguarded
3. Uncensored and unclassifed
4. Unclassified and safeguarded

7-26. What policy governs the safeguarding of classified material in the Navy?

1. OPNAVINST 5510.1(series)
2. SECNAVINST 5216.5(series)
3. SECNAVINST 5720.44(series)
4. OPNAVINST 3104.1(series)