



METOC SUPPORT ADMINISTRATIVE GUIDE AND GOUGE BOOK

Issue #1

21 August 1998

6 FUNCTIONS OF MARINE AVIATION

- ***AIR RECONNAISSANCE***

Air Reconnaissance plays a vital role in the planning and execution of military operations. It provides a major means of collecting current raw data about the terrain, weather, hydrography, and enemy situation.

- ***ANTI-AIR WARFARE***

Anti-air Warfare's purpose is to gain and maintain air superiority through offensive and defensive actions that destroy or reduce to an acceptable level the enemy air and missile threat.

- ***ASSAULT SUPPORT***

Assault Support provides the commander with an increase in operational and tactical mobility, speed, range, and freedom of action allowing the MAGTF to strike at selected enemy weaknesses at the time and place of our choosing.

- ***CONTROL OF AIRCRAFT AND MISSILES***

Control of Aircraft and Missiles incorporates all the actions and procedures required to integrate the functions of Marine Aviation into a single coordinated system in support of the MAGTF, joint and combined objectives.

- ***ELECTRONIC WARFARE***

Electronic Warfare is the military action involving the use of electromagnetic energy to determine, exploit, reduce, or prevent hostile use of the electromagnetic spectrum through damage, destruction, and disruption while retaining friendly use of the electromagnetic spectrum.

- ***OFFENSIVE AIR SUPPORT***

Offensive Air Support delivers fire power against enemy installations, facilities, and personnel with the purpose of attaining the MAGTF objectives by destruction of enemy resources and isolation of his military force.

Your constructive criticism is always welcome. Send your recommendations for corrections and additions to:

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21 August 1998

Forward

The Purpose of this unofficial document is to provide a "ready Reference" to the Weather Officer and NCOIC. Although the target audience is the new Warrant Officer and SNCO, I think that all Marines that are in the business of providing weather information will find this a useful tool that can be used in your day-to-day operations.

I would like to thank CWO Gepp for doing the research and providing the bulk of the information for the section on "WEB PAGE GOUGE" and the "BIBLIOGRAPHY". I would also like to thank all of those that provided feedback on the initial chop of the document.

Please keep in mind that this is a "living document". With your help and suggestions, I will be updating and re-publishing this document on an annual basis. I will be soliciting your recommendations for improvements during April of 1999 with the intent of distributing the up-dated version during July 1999. However, you may send your submissions to me at any time.

Semper Fidelis

James J. Dixon
Captain USMC

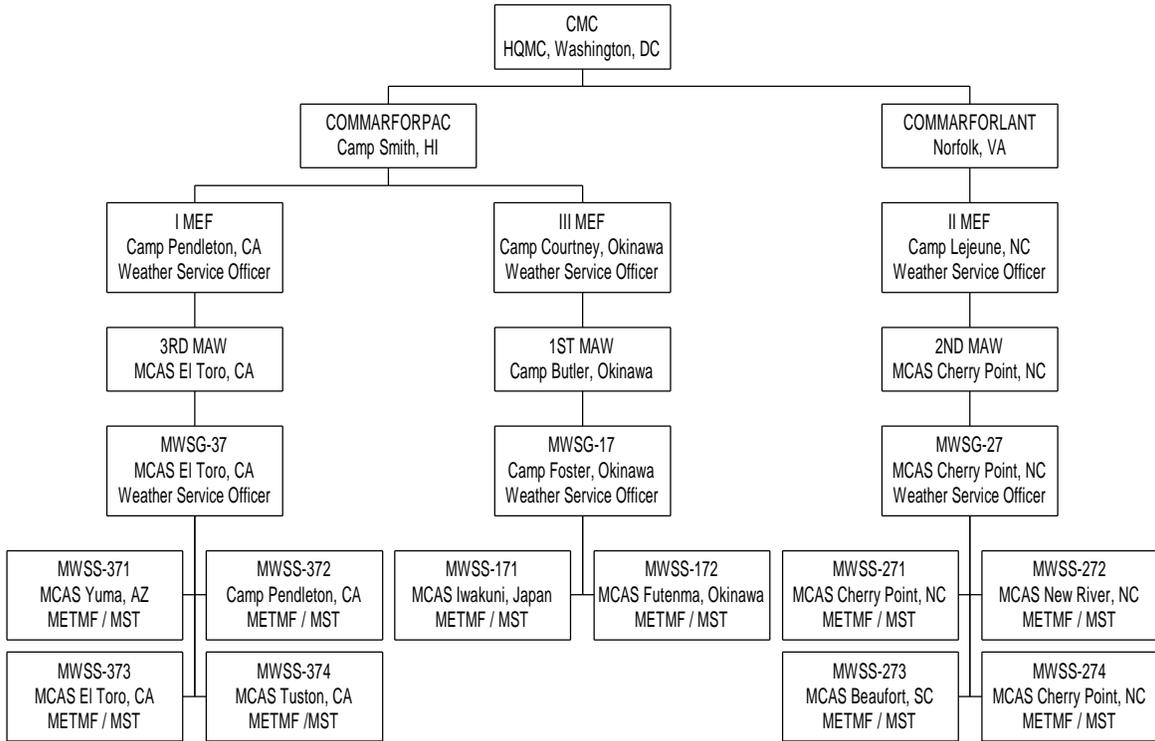
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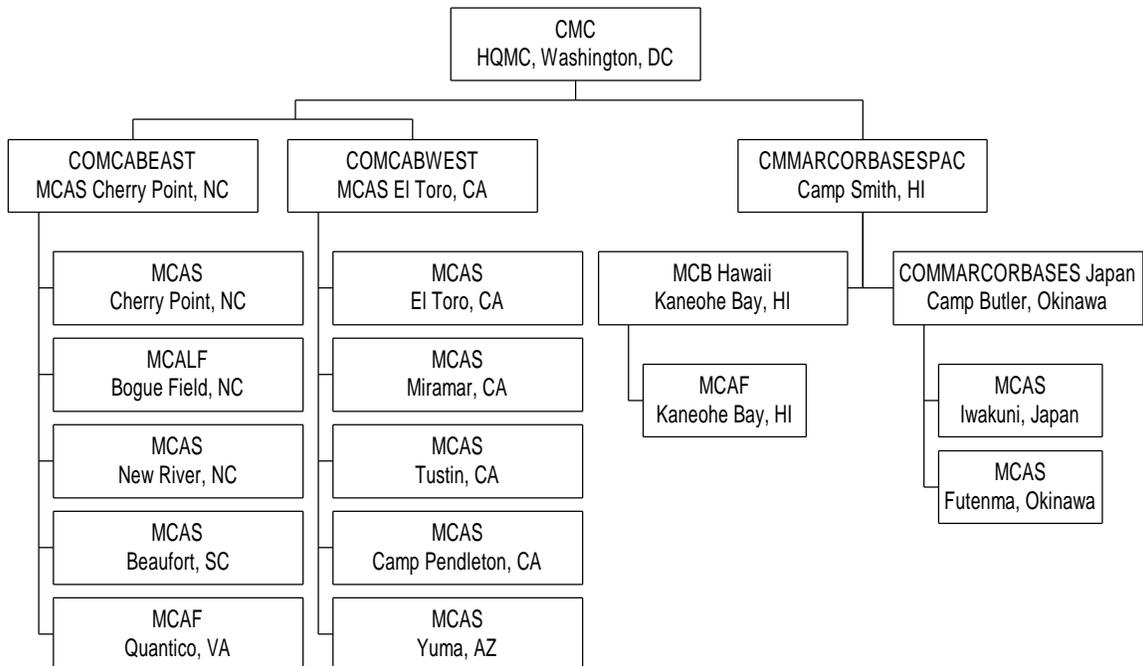
“Leadership is a heritage which has passed from Marine to Marine since the founding of the Corps... mainly acquired by observation, experience, and emulation. Working with other Marines in the Marine leader’s school.”

USMC METOC ORGANIZATION

Fleet Marine Force Organization



Garrison METOC Organization



GRAPHICAL METOC PRESENTATION JUSTIFICATION

Human beings do not normally think in terms of data or even knowledge. People generally think in terms of ideas or images - mental pictures of a given situation. Not only do people generally think in images, they understand things best as images and are inspired most by images.

We can say that an image is the embodiment of our understanding of a given situation or condition. Images apply not only to the military problems that we face but also to the solutions. For example, a well - conceived and presented weather forecast should convey a clear and powerful image of the restrictions and freedoms that the future METOC conditions will impose on the Commander.

People assimilate information more quickly and effectively as visual images than in text. The implications of this are widespread and significant, ranging from technical matters of presentation - the use of maps, overlays, symbols, pictures, and other graphics to display and convey information visually - to conceptual matters of sharing situational awareness and intent.

With this in mind, it is imperative that we present our vital METOC data in a graphical format. Everything from climatology and astronomical data, to present and forecast weather (and its effects) should be put in the most graphical format that your equipment, knowledge, and experience will allow.

As for future systems, (i.e. METMF(R), MOSS NEXT, GFMP-NT, etc.) the resulting output should be not only graphical in nature, but should be automated and seamless to the Weather Marine that is preparing the brief.

Leadership Principles

Be technically and tactically proficient

Know yourself and seek self-improvement

Know your Marines and look out for their welfare

Keep your Marines informed

Set the example

Ensure the task is understood, supervised, and accomplished

Train your Marines as a team

Make sound and timely decisions

Develop a sense of responsibility among your subordinates

Employ your unit in accordance with its capabilities

Seek responsibility, and take responsibility for your actions

METOC INFORMATION MANAGEMENT

Here are some famous examples (out of hundreds): "Weather and terrain have a greater impact on battles than any other physical factor-including weapons" - G.R. Svoboda, Army Weather Support (A. Deepak Publishing, 1986).

Date	Event	Weather Effect
217 BC	Hannibal's invasion of Italy	Freezing of marshland allows invasion by mounted troops across weakly defended terrain
AD 1200s	Genghis Khan's invasion of China	Freezing of marshlands and rivers allows invasion by mounted troops against weakly defended terrain
1708	Sweden's Charles XII's invasion of Russia	Russian winter's cold degrades army mobility and logistics
1812	Napoleon's invasion of Russia	Russian winter's cold degrades army mobility and logistics
1941	Hitler's invasion of Russia	Russian winter's cold degrades army mobility and logistics
1776	Washington crossing to Trenton NJ	Freezing of Delaware river allows unforeseen mobility of American Army
1863	US Civil War	Battles Acoustic propagation disrupts coordination of flanking attacks
1915	German use of poison gas	Wind blows chemicals back onto German lines and destroys 4 Prussian regiments
1939	German blitzkrieg into Poland	Luftwaffe commanders utilize forecast of unusually dry weather
1943	US Army 8th Air Force bombers take heavy losses over Germany	Visual bombsights only work over visual targets so Germans cluster their fighters there
1944	D-Day	Most famous weather forecast of history for conditions favorable to air, sea, and ground operations together-- a rare event
1944	Bombing of Japan	B-29s discover 200+mph jet stream winds: can't reach targets with full bomb-loads and bombsights don't work with 500+ mph ground speeds
1950	North Korean invasion of South Korea	NK planners correctly assess USAF vulnerability and plan attacks during monsoon season
1951	Chinese invasion of Korea	Chinese commanders repeat Genghis Khan's tactic and invade after the Yalu River freezes (US Bombing had destroyed all bridges)
1954	French defeated in Vietnam	Last fortress of Dien Bien Phu located in valley that routinely receives 50% more rain than any other
1966	US Forces in Vietnam	Army material replacement cycle speeded up from 8 years to 2 years due to tropic moisture's degradation of wood, cloth, and electronics
1968	US Army 1st Cavalry Division (Air-mobile)	Clouds force helicopters down into enemy ground-fire and lose 21 after planners erroneously worried more about rain-rates than ceiling and visibility

METOC INFORMATION MANAGEMENT

1972	North Vietnamese cross DMZ	Low ceilings and visibility immunize 160 tank force against US detection
1980	Iranian hostage rescue mission	US Army intelligence officers untrained in meteorology fail to utilize proper weather reconnaissance and pass on forecast of dust effects
1983	Grenada	Weather excluded from planning so approach to Point Salinas Airport is straight through violent thunderstorms; Navy SEALs drown
1990	Desert Storm	Diurnal winds prevent Hussein from launching ballistic SCUD's during day; winds apparently blow chemicals in unsuspected directions
1996	Bosnia	First bridge and camp built in a traditional flood plain; mine detectors fail in snow

Our management of METOC information should facilitate the rapid, distributed, and unconstrained flow of weather information in all directions. At the same time, it should allow us to discriminate as to importance, quality, and timeliness as a means of providing focus and preventing information overload. Our products should enhance the abilities of all concerned to communicate a concept and intent with clarity, intensity, and speed.

We should supply information, as much as possible, in the form of meaningful images rather than as masses of data. This means, among other things, that our systems must have the means of filtering, fusing, and prioritizing information. By filtering we mean assessing the value of information and culling out that which is not pertinent or important. By fusing we mean integrating information into an easily usable form and to an appropriate level of detail. And by prioritizing we mean expediting the flow of information according to importance. All information management should focus on critical information requirements. This demands vision on the part of the weather officer and forecasters and understanding on the part of subordinates in order to recognize critical information when they see it.

Our METOC information management systems should make use of all the various channels and methods by which information flows - implicit as well as explicit and informal as well as formal. Our system must facilitate communications in all directions, not only vertically within the chain of command, and should ensure that information flow is interactive rather than one-way. Our system should provide redundant channels as a safeguard against disruption and battle damage; which channel METOC information follows is less important than whether it reaches the right destination in a timely manner.

Since METOC information is changed by each person who handles it, important information should pass directly between principal users, eliminating intermediaries, such as weather observers or G2/S2 clerks. Whenever possible, person-to-person information should be communicated by word of mouth and face-to-face since humans communicate not only by what they say but also how they say it. The weather officer should personally conduct all briefs that are given to Colonels and above. The desire to have weather officers communicate directly and by voice does not mean that we do not need to keep a record of communications; permanent records can be important means of affirming understanding and for reasons of later study and critique.

Our METOC information management system should be a hybrid exhibiting the judicious combination of broadcast and point-to-point transmission and supply - push and demand - pull.

Generic weather information of value to many users at a variety of echelons may be broadcast, the transmission method which reaches the broadest audience most quickly. However, we must exercise discipline with respect to broadcast transmissions to avoid the danger of information overload. In comparison, we should use point-to-point transmission for information that needs to be tailored to suit the needs of individual users.

METOC INFORMATION MANAGEMENT

Our METOC information management system should also combine the best characteristics of supply - push in the most efficient way to provide much of the information needed routinely - whether broadcast or point - to - point. Through the implicit understanding and shared images of its members, the system should attempt to anticipate the warfighter's needs and should attempt to push routine information to an easily accessible, local data base. Commanders then pull from the database only information they need. In this way, we avoid the danger of information overload associated with supply - push and broadcast and circumvent some of the delays normally associated with demand - pull.

We also recognize that commanders will likely be unaware of the need for certain information, so we must ensure that truly critical, time - sensitive, METOC information is pushed directly to them without delay, even if it means skipping intermediate echelons of command. Echelon - skipping does not mean, however, that intermediate echelons are left uninformed. After critical information has passed directly between the primarily concerned echelons, both those echelons should inform intermediates by normal channels.

God made Warrant Officers to give the junior enlisted Marine someone to worship, the senior enlisted Marine someone to envy, the junior officer someone to tolerate, and the senior officer someone to respect.

H. G. Duncan
Fiction and Fact From Dunk's
Almanac

METMF(R) GOUGE

Meteorological Mobile Facility Replacement METMF(R)

Processing Subsystem (PCS)

Subsystem Specifications

■ Tactical Environmental Support System (TESS)/Next Century (TESS/NC)

- TAC-4, designed to be central server/processor
- Ethernet connectivity within the METMF(R)
- Data repository for workstations and external users
- Classification: Secret/ High
- SIPRNET required to access and disseminate grid fields and METOC data
- Joint and Marine Corps interoperability via MAGTF C4I LAN

■ Geophysical Fleet Mission Program Library (GF MPL)

- IBM 760
- Processes the Geophysical Fleet Mission Program Library (GF MPL), Electro-optical, and other Tactical Decision Aids (TDA)

■ Meteorological Facsimile (METFAX)

- SR-485/08R HS-V1
- Receives and displays graphics and alphanumeric bulletins transmitted from the Naval Meteorology and Oceanography Regional Centers and US Air Force's Global Weather Central.

■ Uninterruptible Power Supply (UPS)

- Standard UPS provided with TAC-4's
- TAC-4, Type U2, 2KVA with power conditioner
- Provides 15 minutes of reserve power to allow for soft shutdown of equipment.

■ Printer

METMF(R) GOUGE

- Tektronix Phaser 350

Communications Subsystem (CSS)

Subsystem Specifications

		Freq Range	Power Output
■ High Frequency (HF)			
- R2368/URR		14 kHz - 29.999 MHz	receive only
-	in-clear data reception		
-	operating temperature: 0 to +50°C		
- RT 7000	Transmit:	1.6 - 29.999 MHz	125 watts
	Receive:	100 kHz-29.999 MHz	
-	long distance voice and data transceiver		
-	operating temperature: -30 to +60°C		
■ Very High Frequency (VHF)			
- AN/VRC-90A		30-87.975 MHz	50 watts
-	frequency hopping - SINCGARS		
-	link to tactical data network (wireless WAN)		
- MCC-520B Dual Transmitter		40 - 50 MHz	up to 250 watts per channel
-	Meteor Burst Master Station for poling remote terminals (sensors)		
- MCC-545A		40 - 50 MHz	100 watts
-	remote terminals (sensors)		
■ Ultra High Frequency (UHF)			
- AN/GRC-171B(V)4		225-399.975 MHz	20 watts (AM) 50 watts (FM)
-	pilot to forecaster secure voice radio utilizing the KY-58 or ANDVT		

METMF(R) GOUGE

- operating temperature: -29 to +49°C
- Portable Satellite Broadcast Receive Terminal (PSBRT) 225-400 MHz - receive only
- Alphanumeric weather data received from the Naval Meteorology and Oceanography Command Theater Center's Fleet Multi-channel Broadcast (FMCB), 75-baud data rate.

Communications Subsystem (CSS)

Subsystem Specifications

■ Local Area Network (LAN)

- Interoperability will be achieved by utilizing the MAGTF C4I infrastructure.
- SIPRNET is a required communications path to receive and disseminate Navy meteorological and oceanographic grid fields and data in support of MAGTF operations.

■ Communications Security (COMSEC)

- KG-84A -- provides covered reception of the Air Force's High Frequency Regional Broadcast (HFRB).
- KG-84C -- provides interface with SIPRNET and MAGTF C4I LAN.
- KWR-46 -- provides connectivity to receive one channel (8 or 15) of the Navy's Fleet Multi-channel Broadcast (FMCB).
- STU III -- provides landline communications with other STU III secure telephones.
- KY-68 -- provides tactical voice telephone communications. Marine Wing Support Squadrons allocate one per METMF(R).
- KY-58 -- provides covered pilot to forecaster voice communications with the AN/GRC-171B(V)4.
- Embedded crypto within AN/VRC-90A (SINCGARS).
- KG-44 -- provides decryption of DMSP weather satellite imagery.

■ Voice Communications

- STU III will be provided with the METMF(R). It provides landline communications to another STU III.

METMF(R) GOUGE

- A tactical phone port will be available for use with the KY-68. The Marine Wing Support Squadrons will allocate one per METMF(R).

Meteorological Satellite Subsystem (MSS)

Subsystem Specifications

■ Sea Space Inc. - Tera Scan System

- TAC 4 processes DMSP, TIROS and Geostationary weather satellite imagery. It will also serve as a back up to the Processing Subsystem (PCS).
 - RAM: 192 mb
 - Hard Drive: two 4 gb (internal), one 4 gb (external)
 - Receiver and frame synchronous card will be inserted in the TAC 4 rack to enable receipt of satellite weather imagery from the defense meteorological satellites, U.S. National Oceanic and Atmospheric Administration (NOAA) TIROS satellites, and Geostationary satellites.
 - Antenna group will be two flat plane antennas weighing 26 pounds for the 18 inch DMSP and TIROS antenna and 50 pounds for the 24 inch Geostationary antenna. They are rated to withstand sustained winds of 70 mph, gusts to 120 mph.

■ - Processes:

DMSP

-High Resolution IR/Vis

-Real Time

-Special Sensor Microwave

Imager (SSM/I) and

Temperature (SSM/T)

NOAA

-High Resolution IR/Vis

-Real Time

-TIROS Operational

Vertical Sounder

(TOVS)

GOES

-Low Resolution IR/Vis

-Near Real Time

-Weather Facsimile

(WEFAX)

METMF(R) GOUGE

Rawinsonde Subsystem (RWS)

Subsystem Specifications

■ Mini-Rawinsonde System - AN/UMQ-12

- Provides upper air data collection.
- Uses OMEGA. Vaisala is under contract to upgrade the AN/UMQ-12 for the reception of GPS. Upgraded to GPS on 1 October 1997.
- GPS rawinsondes are in the Navy supply system.
 - NSN: 6660-01-425-2624
 - Cost: approximately \$176.00
 - Part number: RS80-15G

Local Sensor Subsystem (LSS)

Subsystem Specifications

■ Ceilometer

- Cloud height sensor made by Climatronics Corp.
- Based on Light Detection and Ranging (LIDAR) and backscatter signal
- Range: 25 ft to 12,600 ft
- Resolution: 25 ft
- Operating temperature when connected to main power: -40 to +50°C

■ Temperature

- Made by Coastal Environmental Systems - WeatherPak 2000
- Sensor Range: -50 to +50°C

■ Wind Direction and Speed

METMF(R) GOUGE

- Made by Coastal Environmental Systems - WeatherPak 2000
- Sensor Range: Speed: 0 to 115 kts, Direction: 360°, survivable to 190 kts

■ Humidity

- Made by Coastal Environmental Systems - WeatherPak 2000
- Sensor Range: 0 to 100%

■ Pressure

- Made by Coastal Environmental Systems - WeatherPak 2000
- Sensor Range: 800 to 1100hPa (millibars)

■ Precipitation

- Made by Coastal Environmental Systems - WeatherPak 2000
- Liquid precipitation only
- Sensor Range: Rain Rate: 0.1 to 20 inches per hour

■ Electronic Field Mill Potential

- Made by Airborne Research Associates - F10 Lightning Detector
- Two mode operation: Optical and Field Change
 - Optical Range: 30 miles maximum, visibility dependent
 - Field Change: approx. 5 miles to 100 miles
 - Omni-directional viewing

METMF(R) GOUGE

Remote Sensor Subsystem (RSS)

Subsystem Specifications

- All sensor specifications are the same as the local sensors with the exception of the Electronic Field Mill Potential. The lightning sensor is not part of the remote sensor suite.
- A master station, MCC-520B, for Meteor Burst communications will be located within the METMF(R). It will pulse the remote sensor modems (MCC-545A) periodically for data.
- Number of remote sensor suites per METMF(R): 2

Shelter Subsystem (SSS)

Subsystem Specifications

- **Description**
 - One single Standard International Organization for Standards (ISO) shelter
 - 8 ft by 8 ft by 20 ft
 - Electromagnetic Interference (EMI) rated
 - Two standard Marine Corps environmental control unit's (ECU) will be provided with each METMF(R). Two ECU's are required to offset diverse meteorological climates and the heat produced by the equipment.
 - A common Marine Corps joining corridor, 8 ft by 8 ft by 10 ft will provide the METMF(R) with an additional work area and briefing area.
 - Grounding star lightning protection system will be utilized.

METMF(R) GOUGE

Video Subsystem (VDS)

Subsystem Specifications

- Eight-inch monitors and one 20-inch remote monitor and camera system will comprise the VDS.

Portable Meteorological Subsystem (PMS)

Subsystem Specifications

- **Description**
 - Two Navy Integrated Tactical Environmental Subsystems (NITES) version IV, previously designated the Mobile Oceanography Support System (MOSS), will be provided as part of the METMF(R) system network. Meteorological and Oceanographic data can be accessed by utilizing the MAGTF C4I LAN and reaching back to any METMF(R), Navy OA division aboard ship and/or directly to the supporting Navy Regional and Production Centers.
 - Two NITES/MOSS PC's will support the MEF weather support team (MST) deployment requirements. Introduction of NITES version IV is targeted for FY99.

EOTDA GOUGE

Key Point: Air-to-Ground Weapon Systems Only

Sensor (IR)	Sensor (TV)	Sensor (LASER)
AN/AGM-65D/F/G (Maverick)	AN/AGM-65A/B (Maverick)	AN/AGM-65E (Maverick)
AN/AAS-38 (F/A-18, FLIR)	AN/AVS-6 (ANVIS)	Paveway II (LGB/GBU-10/12/16)
AN/AAS-37 (UV, FLIR)	CATEYES	Paveway III (LLLGB/GBU-24B)
AN/AAQ-16 (CH-53E, FLIR)	Walleye I & II	AN/AGM-114B (Hellfire)
AN/AAR-51 (AV-8B, NAVFLIR)		AN/PAQ-3 (MULE)
AN/TAS-6A (NODLR)		
AN/AWS-1(V)1, (AH-1W, FLIR)		

Standard Sensors employed by the U. S. Marine Corps

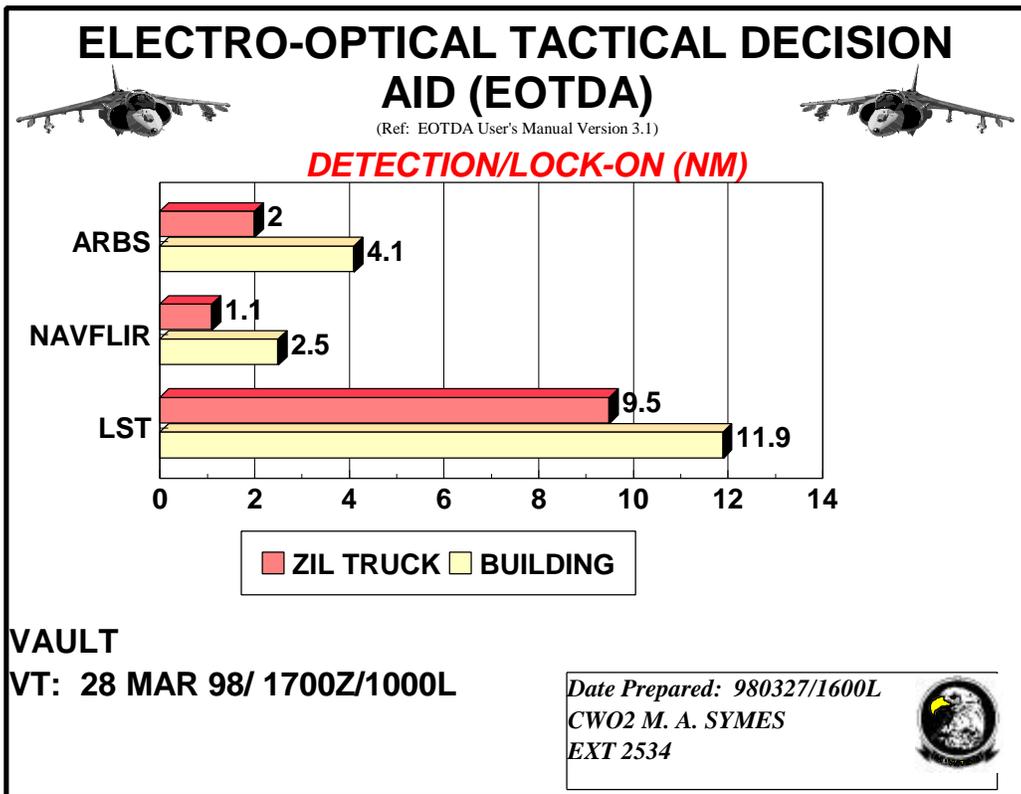
Sensor (IR)	Sensor (TV)	Sensor (LASER)
N/AAR-50 (F/A-18, TINS)	AN/ASB-19(V), (AV-8B, ARBS)	AN/ASB-19(V), (AV-8B, ARBS)
	AN/ASQ-173 (F/A-18, LDT/SCAM)	AN/ASQ-173 (F/A-18, LDT/SCAM)
	AN/AWS-1(V), (AH-1W, CCDTV)	AN/AWS-1(V), (AH-1W, LTD/R)
		AN/AAS-38(A), (F/A-18, LTD/R)

User Defined Sensors employed by the U. S. Marine Corps

- MDT (also called hot spot or star detection) describes the situation in which the target is detected as an unresolved spot or blob that stands out from the background by virtue of its contrast.
MRT: With MRT, the target is perceived as a definite shape, possibly mottled in gray shade, that is distinguishable from its surroundings. MDT range is typically longer than MRT range
- If no distinct boundary layer is present, set to default of 40,000' to save time.
- TV detection ranges represent a 50% probability of target detection.
- Sensors not listed as a standard sensor may be entered into the program as a user-defined sensor. Research of necessary parameters will be required.
- When entering a user defined Laser system, the numbers are entered in reverse order.

EOTDA GOUGE

6. Use mode 1, 3, or 6 for Lasers. Mode 1 is where the designator and receiver are not collocated. Mode 3 is for when they are collocated. Mode 6 is used for collocated systems but includes ranging range.
7. Clutter is used for TV systems only
Complexity is used for IR systems only
8. Target elevation only effects the IR model. The key number to remember is 2000'. If the target is located above 2000' MSL, the model will take into account the increased solar insolation.
9. Only the IR model uses wind data. Wind tends to have a cooling effect on the target.
10. Pilots have little knowledge of what all the numbers in the output mean. Recommend that you construct a bar graph to help them interpret the data. (Example shown below.)



EOTDA GOUGE

EOTDA WORKSHEET GUIDE

COMMENT:

A comment may be entered with up to twenty (20) numbers, letters, and spaces that are used to identify the Operational Data set.

SENSOR ID:

Check the box for each sensor that you would like an EOTDA for. Each sensor has a unique three-digit number associated with it. In most cases, the relationship between IR sensor ID numbers and specific systems names is classified at the CONFIDENTIAL level. For some of the IR sensors, system parameters and / or predicted ranges are classified at the SECRET level when associated with sensor name. This information is therefore classified, and located in the MAWTS-1 CMCC.

VIEW DIRECTION:

Describes the direction of the sensor heading in degrees clockwise relative to true north. For example, if the sensor is pointing westward, enter 270. Usually, this is the same as the "attack" heading of the aircraft. Because some systems are free to rotate, viewing direction is used for entry data rather than aircraft heading.

SENSOR HEIGHT:

Sensor height is the vertical distance above the earth's surface. If your operation involves a "pop-up" maneuver, choose the sensor height that best represents the situation at the point of anticipated detection or lock-on.

COMPLEXITY / CLUTTER:

The term "Complexity" is used for IR systems. Scene complexity characterizes the "Busyness" of the target scene and can have a significant effect on detection range. Complexity describes in general terms the number of objects or patterns in the immediate target vicinity that can be mistaken for the target.

-- A scene is considered to have no [none] complexity if it is virtually uniform on a scale comparable to target size.

-- A scene is considered to provide little [low] complexity if it has relatively few objects in the immediate target vicinity that can be mistaken for the target. Moreover, those objects will typically differ in shape from that of the target.

-- A scene is considered to have moderate [medium] complexity if it contains some confusing objects in the vicinity of the target. Generally the scene will tend to have fewer non-target candidates than highly complex scenes and the confusing objects will differ more in shape from the target.

EOTDA GOUGE

-- A scene is considered to be complex [high], for purposes of target detection, if it contains many confusing objects or patterns which may be mistaken for targets. Moreover, the confusing patterns must be in the immediate target vicinity, usually within a few target dimensions of the actual target location.

The term "Clutter" is used for TV systems. TV clutter level describes the "busyness" of the target area, including both the number of objects comparable in size and shape to the target and the magnitude of the contrast between scene features. Judgments of clutter level must take both of these factors into consideration. Clutter is used only for Night Vision Goggles.

SYSTEM MODE:

This is used for Laser systems only. It is assumed that a laser designator is used to illuminate a target and a receiver picks up the reflected energy. The Laser TDA can be used to calculate ranging, designator, receiver, or collocated designator and receiver range. Mode defines the desired range:

-- Mode 1: Compute maximum lock-on receiver range; user specifies designator range; no ranging range.

-- Mode 2: Compute maximum designator range; user specifies lock-on receiver range; no ranging range.

-- Mode 3: Compute maximum range for collocated designator and lock-on receiver; no ranging range.

-- Mode 4: Compute maximum designator / ranger range; user specifies lock-on receiver range; designator and ranging system are collocated.

-- Mode 5: Compute maximum lock-on receiver / ranger range; user specifies designator range; lock-on receiver and ranging system are collocated.

-- Mode 6: Compute maximum range for collocated designator and lock-on receiver; compute ranging range; all sensors are collocated.

-- Mode 7: Compute ranging only.

DESIGNATOR / RECEIVER / COLLOCATED / RANGER ID:

Each system has a unique three-digit number associated with it. In most cases, the relationship between Laser sensor ID numbers and specific system names is classified at the CONFIDENTIAL level. For some of the Laser sensors, system parameters and / or predicted ranges are classified at the SECRET level when associated with sensor name. This information is therefore classified, and located in MAWTS - 1 CMCC.

ELEVATION:

Target elevation is the altitude above sea level of the target area. It is used in the IR model to compensate for the change in solar down-welling due to altitude.

TARGET ID:

Up to two targets can be considered simultaneously. There are two types of targets: (1) standard menu targets; and (2) user - specified generic targets. Each target has a unique number associated with it. The available targets and their associated numbers are listed on the bottom of the EOTDA worksheet.

EOTDA GOUGE

HEADING:

The target heading is the direction that the front of the target is facing, in degrees clockwise relative to north. For example, enter 270 for a target that faces west. Heading is used as a reference in the computation of parameters such as apparent target size, viewable target facets, heating, and shadow size.

OPERATING STATE:

The EOTDA supports three operating states for ground vehicles: off, idle, and exercised. There are two operating states for the helicopters: off and hovering. The generator has two operating states: off and idle. Operating state is not required input for the ships, the F-4, or the high value targets.

SPEED:

Vehicle speed is required only for mobile targets. Wind speed and target motions have a cooling effect on the target.

BACKGROUND SLOPE / BACKGROUND DIRECTION:

The direction and slope of the immediate background is used in the TV model to account for the target masking (target hidden from view behind a terrain feature) and reflected illumination onto the target. The direction of the down-slope of a sloped background is specified in degrees relative to true north.

ALBEDO:

The general target area reflectivity is the albedo. Albedo has a weak influence in the computation of ranges for the IR model. The EOTDA supports five categories of terrain types. The available choices are listed on the second page of the EOTDA worksheet.

BACKGROUND ID:

The background is the area immediately surrounding the target. The EOTDA supports eight generic background types. Each background type has a set of entries that provide specific information. Refer to the second page of the EOTDA worksheet for generic background types and parameters.

EOTDA GOUGE

<p><u>SENSOR</u></p> <p><input type="checkbox"/> ANVIS-6</p> <p><input type="checkbox"/> CATSEYES</p> <p><input type="checkbox"/> AV-8B (TV-ARBS)</p> <p><input type="checkbox"/> WALLEYE I/II</p> <p><input type="checkbox"/> AV-8B NAVFLIR</p> <p><input type="checkbox"/> F/A-18 FLIR</p> <p><input type="checkbox"/> CH-53E FLIR</p> <p><input type="checkbox"/> NTS FLIR</p> <p style="padding-left: 20px;"><input type="checkbox"/> WIDE</p> <p style="padding-left: 20px;"><input type="checkbox"/> MEDIUM</p> <p style="padding-left: 20px;"><input type="checkbox"/> NARROW</p> <p><input type="checkbox"/> NTS LASER</p> <p><input type="checkbox"/> HELLFIRE SEEKER</p> <p><input type="checkbox"/> MAVERICK SEEKER</p> <p style="padding-left: 20px;"><input type="checkbox"/> LASER</p> <p style="padding-left: 20px;"><input type="checkbox"/> IR</p> <p><input type="checkbox"/> MULE</p> <p><input type="checkbox"/> F/A-18 LTDR</p> <p><input type="checkbox"/> AV-8B (LST-ARBS)</p>	<p>VIEW DIRECTION = _____ DEG TRUE</p> <p>SENSOR/DESIGNATOR HEIGHT = _____ (10-40,000 FT AGL)</p>																					
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<p>LASER MODES</p> <p><input type="checkbox"/> MODE 1 COMPUTE THE MAX LOCK-ON RECEIVER RANGE, DESIGNATION RANGE = _____ KM</p> <p><input type="checkbox"/> MODE 2 COMPUTE MAX DESIGNATOR RANGE, LOCK-ON RECEIVER RANGE = _____ KM</p> <p><input type="checkbox"/> MODE 3 COMPUTE MAX RANGE FOR CO-LOCATED DESIGNATOR AND LOCK-ON RECEIVER</p> <p><input type="checkbox"/> MODE 4 COMPUTE MAX DESIG/RNGFIND RANGE, LOCK-ON RECEIVER RANGE = _____ KM</p> <p><input type="checkbox"/> MODE 5 COMPUTE MAX LOCK-ON RECEIVER/RNGFIND RANGE, DESIGNATOR RANGE = _____ KM</p> <p><input type="checkbox"/> MODE 6 COMPUTE MAX RANGE FOR CO-LOCATED DESIG, LOCK-ON RECEIVER, AND RANGEFINDER</p> <p><input type="checkbox"/> MODE 7 COMPUTE RANGEFINDER RANGE ONLY</p>																						
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EOTDA GOUGE

TARGET POSITION FOR SLOPED BACKGROUND

- AT BASE OF SLOPE
 ON SLOPE
 DOWN-SLOPE DIRECTION = _____ DEGREES TRUE
 DEGREE OF SLOPE = _____ (0-89 DEGREES)

ALBEDO

- CONTINENTAL
 URBAN
 DESERT
 OCEAN
 SNOW

BACKGROUND DATA

GROWING STATE

- DOMANT
 INTERMEDIAT
 GROWING
COVERAGE
 DENSE
 INTERMEDIATE
 SPARSE

SOIL MOISTURE

- DRY
 INTERMEDIATE
 WET

BACKGROUND

- 1 VEGETATION _____
 2 SOIL _____
 3 SNOW _____
 4 WATER _____
 5 CONCRETE _____
 6 ASPHALT _____
 7 SWAMP/MARSH _____
 8 ROCKY FIELD _____

QUARTZ CONTENT

- NONE
 LOW
 HIGH

SURFACE MOISTURE

- DRY
 INTERMEDIATE
 WET

DEPTH MOISTURE

- DRY
 INTERMEDIATE
 WFT

TYPE	SFC MOISTURE	DEPTH MOISTURE
<input type="checkbox"/> AVERAGE	<input type="checkbox"/> DRY	<input type="checkbox"/> DRY
<input type="checkbox"/> LOAM	<input type="checkbox"/> INTERMED	<input type="checkbox"/> INTERMED
<input type="checkbox"/> SAND	<input type="checkbox"/> WET	<input type="checkbox"/> WET
<input type="checkbox"/> CLAY		
<input type="checkbox"/> PEAT		
<input type="checkbox"/> GRAVEL		
<input type="checkbox"/> DESERT		

TYPE	DEPTH	CONDITION
<input type="checkbox"/> FRESH	<input type="checkbox"/> ___ INCHES	<input type="checkbox"/> COMPACTED
<input type="checkbox"/> OLD		<input type="checkbox"/> WINDY AREA
<input type="checkbox"/> RAINED ON		<input type="checkbox"/> LATE SEASON
<input type="checkbox"/> MELTING		<input type="checkbox"/> TUNDRA
		<input type="checkbox"/> UNDISTURBED

DEPTH	CLARITY
<input type="checkbox"/> ___ FEET	<input type="checkbox"/> CLEAR
	<input type="checkbox"/> TURBID

TYPE	CONCRETE	WETNESS
<input type="checkbox"/> ROAD	<input type="checkbox"/> UNCOLORED	<input type="checkbox"/> DRY
<input type="checkbox"/> SIDEWALK	<input type="checkbox"/> BLACK	<input type="checkbox"/> INTERMED
<input type="checkbox"/> RUNWAY		<input type="checkbox"/> WET
<input type="checkbox"/> PARKG LOT	ASPHALT	
<input type="checkbox"/> BRIDGE	<input type="checkbox"/> AGED	
<input type="checkbox"/> HEAVY PAD	<input type="checkbox"/> NEW	

GROWING STATE	COVERAGE	WATER DEPTH
<input type="checkbox"/> DORMANT	<input type="checkbox"/> DENSE	<input type="checkbox"/> ___ FEET
<input type="checkbox"/> INTERMED	<input type="checkbox"/> INTERMED	
<input type="checkbox"/> GROWING	<input type="checkbox"/> SPARSE	

EOTDA GOUGE

GENERIC BUILDING MODEL WORKSHEET

BUILDING NAME _____ WIDTH _____ (M/FT) LENGTH _____ (M/FT)

ROOF TYPE	TEMPERATURE CONTROLLED	NUMBER OF LEVELS
<input type="checkbox"/> INS FRAME WALL	<input type="checkbox"/> YES	<input type="checkbox"/> 1
<input type="checkbox"/> INS LTWT WDFRAME	<input type="checkbox"/> NO TEMP _____ (F/C)	<input type="checkbox"/> 2
<input type="checkbox"/> MASON W/INT INS	INSULATION QUALITY	<input type="checkbox"/> 3 LEVEL HEIGHT _____ (M/FT)
<input type="checkbox"/> MASON W/SANDWICH	<input type="checkbox"/> GOOD	<input type="checkbox"/> 4
<input type="checkbox"/> WDFRAME W/BRICK	<input type="checkbox"/> AVERAGE	<input type="checkbox"/> 5
<input type="checkbox"/> ASH SHINGLE ON WD	<input type="checkbox"/> POOR	NO OF WINDOWS PER LEVEL _____
SURFACE FINISH	STRUCTURE TYPE	WINDOW TYPE
<input type="checkbox"/> WHITE PAINT	<input type="checkbox"/> INS FRAME WALL	<input type="checkbox"/> PLATE GLASS
<input type="checkbox"/> GREEN PAINT	<input type="checkbox"/> INS LTWT WDFRAME	<input type="checkbox"/> PANE GLASS
<input type="checkbox"/> BLACK PAINT	<input type="checkbox"/> MASON W/INT INS	NO OF DOORS PER LEVEL _____
<input type="checkbox"/> PLYWOOD	<input type="checkbox"/> MASON W/SANDWICH	DOOR TYPE
<input type="checkbox"/> CONCRETE, ROUGH	<input type="checkbox"/> WDFRAME W/BRICK	<input type="checkbox"/> SINGLE DOOR
<input type="checkbox"/> BRICK, RED	<input type="checkbox"/> ASH SHINGLE ON WD	<input type="checkbox"/> DOUBLE DOOR
<input type="checkbox"/> MASONRY	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p>THE GENERIC BUILDING MODEL ALLOWS YOU TO DEFINE A BOX STRUCTURE WITH A FLAT ROOF. ALL EOTDA BUILDINGS MUST HAVE FOUR SIDES. HOWEVER, BUILDINGS MAY HAVE BETWEEN ONE AND FIVE LEVELS.</p> </div>	
<input type="checkbox"/> GRANITE		
<input type="checkbox"/> SLATE		
<input type="checkbox"/> MARBLE, WHITE		
<input type="checkbox"/> GLASS		
<input type="checkbox"/> ASPHALT		
<input type="checkbox"/> GRAVEL		
<input type="checkbox"/> GALVANIZED, CLEAN		
<input type="checkbox"/> GALVANIZED, WEATHERED		

LEVEL 2	FRONT	BACK	RIGHT	LEFT
NO OF WINDOWS				
WINDOW TYPE				
NO OF DOORS				
DOOR TYPE				
SURFACE FINISH TYPE				
STRUCTURE TYPE				
LEVEL 3	FRONT	BACK	RIGHT	LEFT
NO OF WINDOWS				
WINDOW TYPE				
NO OF DOORS				
DOOR TYPE				
SURFACE FINISH TYPE				
STRUCTURE TYPE				

EOTDA GOUGE

GENERIC BRIDGE MODEL WORKSHEET

BRIDGE NAME _____

BRIDGE DIMENTIONS

LENGTH	(M/FT)
WIDTH	(M/FT)
HEIGHT	(M/FT)
OUTER SUPPORT WIDTH	(M/FT)
CENTRAL SUPPORT WIDTH	(M/FT)
SUPPORT DEPTH	(M/FT)
RAIL HEIGHT	(M/FT)

<p style="text-align: center;">BRIDGE RAILS SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> UNPAINTED WOOD</p> <p><input type="checkbox"/> TAR – ASPHALT – CREOSOTE</p> <p style="text-align: center;">BRIDGE RAILS MATERIAL</p> <p><input type="checkbox"/> CONCRETE – NORMAL</p> <p><input type="checkbox"/> CONCRETE – VERY DRY</p> <p><input type="checkbox"/> CONCRETE – WET</p> <p><input type="checkbox"/> HARDWOOD</p> <p><input type="checkbox"/> SOFTWOOD</p>	<p style="text-align: center;">BRIDGE SUPPORTS SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> UNPAINTED WOOD</p> <p><input type="checkbox"/> TAR – ASPHALT – CREOSOTE</p> <p style="text-align: center;">BRIDGE SUPPORTS MATERIAL</p> <p><input type="checkbox"/> CONCRETE – NORMAL</p> <p><input type="checkbox"/> CONCRETE – VERY DRY</p> <p><input type="checkbox"/> CONCRETE – WET</p> <p><input type="checkbox"/> HARDWOOD</p> <p><input type="checkbox"/> SOFTWOOD</p>
<p style="text-align: center;">BRIDGE SIDES SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> UNPAINTED WOOD</p> <p><input type="checkbox"/> TAR – ASPHALT – CREOSOTE</p> <p style="text-align: center;">BRIDGE SIDES MATERIAL</p> <p><input type="checkbox"/> CONCRETE – NORMAL</p> <p><input type="checkbox"/> CONCRETE – VERY DRY</p> <p><input type="checkbox"/> CONCRETE – WET</p> <p><input type="checkbox"/> HARDWOOD</p> <p><input type="checkbox"/> SOFTWOOD</p>	<p style="text-align: center;">BRIDGE ROADWAYS SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> UNPAINTED WOOD</p> <p><input type="checkbox"/> TAR – ASPHALT – CREOSOTE</p> <p style="text-align: center;">BRIDGE ROADWAYS MATERIAL</p> <p><input type="checkbox"/> CONCRETE – NORMAL</p> <p><input type="checkbox"/> CONCRETE – VERY DRY</p> <p><input type="checkbox"/> CONCRETE – WET</p> <p><input type="checkbox"/> HARDWOOD</p> <p><input type="checkbox"/> SOFTWOOD</p>

EOTDA GOUGE

GENERIC BUNKER MODEL WORKSHEET

BUNKER NAME _____

BUNKER DIMENTIONS

LENGTH	(M/FT)
WIDTH	(M/FT)
HEIGHT	(M/FT)
DOOR RADIUS	(M/FT)
DOOR THICKNESS	(M/FT)

<p style="text-align: center;">DOOR SURFACES</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> TAR – ASPHALT – CREOSOTE</p> <p><input type="checkbox"/> GALVANIZED – CLEAN</p> <p><input type="checkbox"/> GALVANIZED – WEATHERED</p> <p><input type="checkbox"/> RUSTED STEEL</p> <p style="text-align: center;">DOOR MATERIAL</p> <p><input type="checkbox"/> STEEL</p>	<p style="text-align: center;">SURFACE OF SIDES, FRONT & REAR</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> TAR – ASPHALT – CREOSOTE</p> <p style="text-align: center;">MATERIAL</p> <p><input type="checkbox"/> CONCRETE – NORMAL</p> <p><input type="checkbox"/> CONCRETE – VERY DRY</p> <p><input type="checkbox"/> CONCRETE – WET</p>
<p style="text-align: center;">EARTH SUBSURFACE LAYER MATERIAL</p> <p><input type="checkbox"/> NORMAL AVERAGE SOIL</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL LOAM</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL SAND/SANDY SOIL</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL CLAY</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL PEAT</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p>	<p style="text-align: center;">EARTH SURFACE LAYER MATERIAL</p> <p><input type="checkbox"/> VERY DRY MID-EAST SAND</p> <p><input type="checkbox"/> VERY DRY SOIL SURFACE</p> <p><input type="checkbox"/> NORMAL SOIL SURFACE</p> <p><input type="checkbox"/> WET SOIL SURFACE</p> <p style="text-align: center;">MATERIAL</p> <p><input type="checkbox"/> NORMAL AVERAGE SOIL</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL LOAM</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL SAND/SANDY SOIL</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL CLAY</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p><input type="checkbox"/> NORMAL PEAT</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p>

EOTDA GOUGE

GENERIC POWER PLANT MODEL WORKSHEET

POWER PLANT NAME _____

WATERWAY DIMENTIONS		BUILDING DIMENSIONS	
LENGTH	(M/FT)	LENGTH	(M/FT)
WIDTH	(M/FT)	HEIGHT	(M/FT)
HEIGHT	(M/FT)	WIDTH	(M/FT)

<p style="text-align: center;">DECKS SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p style="text-align: center;">MATERIAL</p> <p><input type="checkbox"/> CONCRETE</p> <p style="padding-left: 20px;"><input type="checkbox"/> NORMAL</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p style="padding-left: 20px;"><input type="checkbox"/> DRY</p>	<p style="text-align: center;">UPPER LEVEL WALLS SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> TAR – ASPHALT – CREOSOTE</p> <p><input type="checkbox"/> GRAVEL (POLISHED)</p> <p style="text-align: center;">MATERIAL</p> <p><input type="checkbox"/> ASPHALT</p> <p><input type="checkbox"/> CONCRETE – NORMAL</p>
<p style="text-align: center;">WINDOWS</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p><input type="checkbox"/> COMMON GLASS</p>	<p style="text-align: center;">ROOF SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p style="text-align: center;">MATERIAL</p> <p><input type="checkbox"/> CONCRETE</p> <p style="padding-left: 20px;"><input type="checkbox"/> NORMAL</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p style="padding-left: 20px;"><input type="checkbox"/> VERY DRY</p>
<p style="text-align: center;">FLOW EXIT AREA SURFACE</p> <p><input type="checkbox"/> BARE CONCRETE – UNCOLORED</p> <p><input type="checkbox"/> BARE CONCRETE – DARKENED</p> <p><input type="checkbox"/> BARE CONCRETE – BLACKENED</p> <p><input type="checkbox"/> WHITE PAINT – ACRYLIC</p> <p><input type="checkbox"/> WHITE PAINT – ZNOXIDE</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT – PARSONS</p> <p style="text-align: center;">MATERIAL</p> <p><input type="checkbox"/> CONCRETE</p> <p style="padding-left: 20px;"><input type="checkbox"/> NORMAL</p> <p style="padding-left: 20px;"><input type="checkbox"/> WET</p> <p style="padding-left: 20px;"><input type="checkbox"/> VERY DRY</p>	

EOTDA GOUGE

COMPOSED TARGET WORKSHEET

COMPOSED TARGET NAME _____

A COMPOSED TARGET CAN ONLY BE USED WITH TV AND LASER SYSTEMS. THE TV AND LASER COMPOSED TARGET IS A BOXED-SHAPED TARGET THAT CAN CONSIST OF A VARIETY OF SURFACE MATERIALS. THE BOX-SHAPED TARGET SHOULD BE USED TO APPROXIMATE TARGETS THAT CANNOT BE MODELED WELL WITH THE OTHER GENERIC TYPES. THE SIMPLIFIED GEOMETRY OF THIS TARGET HAS BEEN FOUND TO WORK WELL IN MANY CASES, ESPECIALLY FOR TANK-SIZED TARGETS. THE INPUT FOR THE COMPOSED TARGET INCLUDE THE OVERALL TARGET LENGTH, WIDTH, AND HEIGHT, THE BASIC TARGET SURFACE MATERIAL, AND UP TO TWO COMPONENT MATERIALS FOR THE TARGETS TOP AND SIDES. THE BASIC MATERIAL SHOULD BE THE PREDOMINANT SURFACE MATERIAL OR THE UNDERLYING MATERIAL FOR A TARGET THAT IS CAMOUFLAGED. THE COMPONENT MATERIAL COULD BE A SURFACE MATERIAL OF LESSER IMPORTANCE OR A CAMOUFLAGE MATERIAL. THE COMPOSED TARGET MODEL COMPUTES AVERAGE REFLECTIVITIES FOR THE BASIC AND COMPONENT MATERIALS.

<p style="text-align: center;">BASIC MATERIAL</p> <p><input type="checkbox"/> WEATHERED GALVANIZED IRON</p> <p><input type="checkbox"/> WEATHERED STEEL ARMOR</p> <p><input type="checkbox"/> ALUMINUM</p> <p><input type="checkbox"/> TITANIUM SURFACE</p> <p><input type="checkbox"/> WEATHERED AIRCRAFT SKIN</p> <p><input type="checkbox"/> AGED CONCRETE</p> <p><input type="checkbox"/> DIRTY PLYWOOD</p> <p><input type="checkbox"/> CAMO CLOTH - GREEN</p>	<p style="text-align: center;">TOP 2 COMPONENT MATERIAL</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT</p> <p><input type="checkbox"/> WHITE PAINT</p> <p><input type="checkbox"/> NAVAL GRAY PAINT</p> <p><input type="checkbox"/> GREEN BURLAP</p> <p><input type="checkbox"/> GLASS</p> <p><input type="checkbox"/> RUBBER</p> <p><input type="checkbox"/> ASPHALT</p> <p><input type="checkbox"/> VEGETATION</p> <p><input type="checkbox"/> SAND</p> <p><input type="checkbox"/> SOIL</p> <p><input type="checkbox"/> SNOW AMOUNT _____%</p>	<p style="text-align: center;">TOP 2 COMPONENT MATERIAL</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT</p> <p><input type="checkbox"/> WHITE PAINT</p> <p><input type="checkbox"/> NAVAL GRAY PAINT</p> <p><input type="checkbox"/> GREEN BURLAP</p> <p><input type="checkbox"/> GLASS</p> <p><input type="checkbox"/> RUBBER</p> <p><input type="checkbox"/> ASPHALT</p> <p><input type="checkbox"/> VEGETATION</p> <p><input type="checkbox"/> SAND</p> <p><input type="checkbox"/> SOIL</p> <p><input type="checkbox"/> SNOW AMOUNT _____%</p>
<p>NOTES:</p>	<p style="text-align: center;">SIDE 1 COMPONENT MATERIAL</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT</p> <p><input type="checkbox"/> WHITE PAINT</p> <p><input type="checkbox"/> NAVAL GRAY PAINT</p> <p><input type="checkbox"/> GREEN BURLAP</p> <p><input type="checkbox"/> GLASS</p> <p><input type="checkbox"/> RUBBER</p> <p><input type="checkbox"/> ASPHALT</p> <p><input type="checkbox"/> VEGETATION</p> <p><input type="checkbox"/> SAND</p> <p><input type="checkbox"/> SOIL</p> <p><input type="checkbox"/> SNOW <input type="checkbox"/> AMOUNT _____%</p>	<p style="text-align: center;">SIDE 2 COMPONENT MATERIAL</p> <p><input type="checkbox"/> GREEN PAINT</p> <p><input type="checkbox"/> BLACK PAINT</p> <p><input type="checkbox"/> WHITE PAINT</p> <p><input type="checkbox"/> NAVAL GRAY PAINT</p> <p><input type="checkbox"/> GREEN BURLAP</p> <p><input type="checkbox"/> GLASS</p> <p><input type="checkbox"/> RUBBER</p> <p><input type="checkbox"/> ASPHALT</p> <p><input type="checkbox"/> VEGETATION</p> <p><input type="checkbox"/> SAND</p> <p><input type="checkbox"/> SOIL</p> <p><input type="checkbox"/> SNOW <input type="checkbox"/> AMOUNT _____%</p>

GF MPL GOUGE

COVER. The COVER program provides a display of radar detection or communication coverage in the vertical plane. COVER is used to determine how a given EM system will perform under given atmospheric conditions in detecting or communicating with a given target or receiver.

Applications. The coverage display can be used for the following applications:

Primary. The primary use of the coverage display is for:

1. Long-range air-search radar, surface-based or airborne.
2. Surface-to-air or air-to-air communications systems.

Secondary. The secondary use of the coverage display is for:

1. Aircraft stationing for attack, ECM, and AEW aircraft.
2. Alert surface units to holes in radar coverage against attacking aircraft or missiles.
3. Hardware performance assessment.
4. Target detection and identification.

Limitations. The coverage display should not be used for the following applications: Airborne or surface-based surface-search radar employed against surface targets. Most types of gun or missile fire-control radar.

LOSS. The LOSS program provides a display of one-way path loss vs. range or path loss for ESM intercept vs. range. LOSS is used to assess the performance of user-specified EM system under given atmospheric conditions. Path loss vs. range is displayed with the system's path-loss thresholds, allowing the determination of maximum detection, communication, or intercept range.

Applications. The path-loss vs. range display can be used for the following applications:

Primary. The primary use of the path-loss vs. range display is for:

1. Long-range air-search radar, surface-based or airborne.
2. To determine the intercept range of a radar or communications system by an ESM receiver.
3. Surface-to-air or air-to-air communications systems.

Secondary. The secondary use of the path-loss vs. range display is appropriate in every situation where a coverage diagram may be employed. In fact, the path-loss vs. range display may be thought of as a horizontal slice of the coverage display.

Limitations. The path-loss vs. range display should not be used for the following application: Most types of gun or missile fire-control radar.

Electronic Counter Measure (ECM) Effectiveness Display. The ECM program provides a measure of airborne jammer effectiveness against surface-based (victim) radar. ECM is used to determine the optimum locations and flight paths of attack and tactical jamming aircraft by evaluating the effectiveness of a jamming device against a victim radar under given atmospheric conditions. Combat mission planners use this program to determine optimum placement and use the ECM assets to prepare aircrew briefs.

Applications. The ECM display can be used for the following application: Jamming of surface-based radar.

Limitations. Victim radar must be surface-based.

Platform Vulnerability (PV). The PV program provides estimates of the vulnerability of the various emitters on a platform to a specified ESM system under varying environmental conditions. This estimate is expressed as the maximum intercept range for each emitter.

Applications. Intercept ranges for surface-to-air, air-to-air, and air-to-surface.

Limitations. The maximum intercept range output is limited to 1000 km (541 nm).

GF MPL GOUGE

GF MPL software is limited to Radar and Communications systems in the 100 MHz to 20 GHz range.

When in doubt, set the antenna type to choice #2 - 'sin x/x'

For emitters not in the Permanent Data Base (PDB), you must have access to:
EA-6B Prowler tactics Guide Vol. II, Parameter sheets (SECRET).
Selected EM System Parameters for Use in the TESS (SECRET).
Last Resort - Contact the MAWTS-1 Weather Service Officer.

**“Know the enemy, know yourself;
Your victory will never be endangered.
Know the ground, know the weather;
Your victory will then be total.”**

**Sun Tzu
The Art of War**

WEB PAGE GOUGE

Why does the Weather Office maintain a Web Site?

The World Wide Web is a great way for anyone to access METOC data. The METOC community can share, receive, and distribute information to the warfighter in an automated fashion, and it provides a redundancy of service. The Meteorological and Oceanographic Integrated Data Distribution System (MIDDS) is designed to be used as a replacement for the weather-vision, and to decrease our workload through automation by combining the functions of the Contel Meteorological Workstation (CMW), Goes tap, and DIFAX machines. These products can be made available to anyone with a few clicks of a mouse button. OICs and NCOIC must ensure that the data and products that we put on our home page is accurate, up to date, appropriate, and is in accordance with applicable regulations and guidelines.

DefenseLINK (<http://www.defenselink.mil>) is the official World Wide Web Information Service from the Department of Defense and is the starting point for locating information on Defense servers around the world. The purpose of DefenseLINK is to provide the public with a single, unified starting point for information about the Department of Defense, its organization and its functions. On the World Wide Web Information Service page (<http://www.defenselink.mil/about.html>) you will find on-line reference to the Official DOD Policy regarding WWW Information Systems as follows:

1. New DOD Web Policy (<http://www.defenselink.mil/polmemo.html>)
2. Air Force Web Policies (<http://www.af.mil/webpolicy/>)
3. DISA Instruction on Internet, Intranet, and World Wide Web (<http://www.disa.mil/info/disawwwq.html>)
4. DOD Instruction 5120.4, "Electronic Newspaper Policy" (http://www.defenselink.mil/5120_4.html)
5. DOD Directive 5230.9, "Clearance of DOD Information for Public Release" (http://www.defenselink.mil/dd5230_9.html)
6. DOD Instruction 5230.29, "Security and Policy Review of DOD Information for Public Release"
7. DOD Policy for Clearing Electronic Information for the Public (<http://www.defenselink.mil/memo.html>)
8. DOD Policy for GILS Implementation: Memorandum from the Deputy Secretary of Defense (<http://www.dtic.mil/c3i/gilsplcy.html>)
9. Guidance for the Management of Army Web sites, 30 October 1996 (http://www.army.mil/da_web_guidance.htm)
10. Past DOD Guidelines for Establishing and Maintaining a DOD Web Information Service (<http://www.defenselink.mil/webguide.html>)
11. Guidelines for Naval Use of the Internet (<http://www.chinfo.navy.mil/navpalib/internet/navyinet.txt>)

WEB PAGE GOUGE

Seems like a lot of stuff. It is. It is recommended that you access and print off the applicable portions of each reference and make it part of your MIDDS SOP. The following text highlights the most important areas that most sites are not in compliance with and what can be done to correct it. It is assumed that you have already complied with all local requirements to get to this point. First, a few definitions (Ref: Getting Started with Microsoft FrontPage 98):

Internet. The global computer network, composed of thousands of Wide Area Networks (WANs) and Local Area Networks (LANs) that use TCP/IP to provide worldwide communications to homes, schools, businesses, and governments. The World Wide Web runs on the Internet.

World Wide Web or web. The graphical Internet hypertext service that uses the HTTP protocol to retrieve Web pages and other resources from Web servers. Pages on the World Wide Web usually contain hyperlinks to other pages, documents, and files.

Web Information Service. A collection of web documents related to a common subject or set of subjects, including the "home page" and the linked subordinate information.

Web site. The physical location of the computer where web documents reside. This term is also commonly used to refer to a web information service.

Home page. The starting point for a Web site. It is the page that is retrieved and displayed by default when a user visits the Web site. The default home page name for a server depends on the server's configuration. On many Web servers it is index.html or default.htm. Some Web servers support multiple home pages

Next, the big "quick fixes":

GILS. Your sight must be registered with the Government Information Locator Service (GILS) at the following URL: <http://www.defenselink.mil/locator/index.html#register>. GILS is an initiative, mandated by the Office of Management and Budget, by which Government agencies use electronic means like the Internet for providing information to the public. DefenseLINK and DefenseLINK Search fulfill this mandate and make finding public Defense information fast and easy. OICs and NCOICs should ensure that their MIDDS server is registered.

WEBMASTER. Each web home page must have a designated author or maintainer who will be responsible for the content and appearance of that page. The individual's name, organizational code, organizational phone number, email address, and date of last revision will be included in the source code for that page.

PRIVACY AND SECURITY NOTICE. A privacy and security notice (<http://www.defenselink.mil/polmemo.html>) must be given to users of each publicly accessible web information service and shall be prominently displayed or announced on at least the first page of all major sections of each web information service. Providing a statement such as "Please read this privacy and security notice." linked to the actual notice is satisfactory. Organizations shall avoid flashy graphics or other indicators that create a misperception of danger, such as skull-and-crossbones logos or "warning" signs. If the web site collects any information on usage or other log files, visitors shall be notified of what information is collected, why it is collected and how it is used. There are many variations of "disclaimers" warnings, etc. The following privacy and security notice may be tailored in the indicated areas by each

WEB PAGE GOUGE

organization sponsoring a publicly accessible web information service. The notice shall be approved by the appropriate local legal authority before use.

Link from Index.html pages -- "Please read this privacy and security notice."

() - Indicates sections to be tailored at the installation level

[] - Indicates hyperlinks

* - Indicates information located at the hyperlink destination indicated

PRIVACY AND SECURITY NOTICE

1. (DefenseLINK) is provided as a public service by the ([Office of the Assistant Secretary of Defense-Public Affairs] and the [Defense Technical Information Center]).
2. Information presented on (DefenseLINK) is considered public information and may be distributed or copied. Use of appropriate byline/photo/image credits is requested.
3. For site management, [information is collected]* for statistical purposes. This government computer system uses software programs to create summary statistics, which are used for such purposes as assessing what information is of most and least interest, determining technical design specifications, and identifying system performance or problem areas.
4. For site security purposes and to ensure that this service remains available to all users, this government computer system employs software programs to monitor network traffic to identify unauthorized attempts to upload or change information, or otherwise cause damage.
5. Except for authorized law enforcement investigations, no other attempts are made to identify individual users or their usage habits.
 - ❑ Raw data logs are used for no other purposes and are scheduled for regular destruction in accordance with [National Archives and Records Administration General Schedule 20].
 - ❑ Agencies subject to DOD Directive 5240.1 shall add the following to paragraph 5: "All data collection activities are in strict accordance with DOD Directive 5240.1 (reference (p))."
6. Unauthorized attempts to upload information or change information on this service are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and the National Information Infrastructure Protection Act.
7. If you have any questions or comments about the information presented here, please forward them to (us using the DefenseLINK [Comment Form]).

* Link from above - "information is collected" to the following text:

DATA COLLECTION. The information below should be tailored, if necessary, to show an accurate example of the specific information being collected.

WEB PAGE GOUGE

Example: Information Collected from (DefenseLINK) for Statistical Purposes

Below is an example of the information collected based on a standard request for a World Wide Web document:

xxx.yyy.com - - [28/Jan/1997:00:00:01 -0500] "GET /defenselink/news/nr012797.html HTTP/1.0"
200 16704 Mozilla 3.0/www.altavista.digital.com

xxx.yyy.com (or 123.123.23.12)-- this is the host name (or IP address) associated with the requester (you as the visitor). In this case, (...com) the requester is coming from a commercial address. Depending on the requester's method of network connection, the host name (or IP address) may or may not identify a specific computer. Connections via many Internet Service Providers assign different IP addresses for each session, so the host name identifies only the ISP. The host name (or IP address) will identify a specific computer if that computer has a fixed IP address.

[28/Jan/1997:00:00:01 -0500] -- this is the date and time of the request

"GET /defenselink/news/nr012797.html HTTP/1.0" -- this is the location of the requested file on (DefenseLINK)

200 -- this is the status code - 200 is OK - the request was filled

16704 -- this is the size of the requested file in bytes

Mozilla 3.0 -- this identifies the type of browser software used to access the page, which indicates what design parameters to use in constructing the pages

www.altavista.digital.com - this indicates the last site the person visited, which indicates how people find (DefenseLINK)

Requests for other types of documents use similar information. No other user-identifying information is collected.

EXTERNAL LINKS. The ability to hyperlink to sources external to your organization is a fundamental part of the World Wide Web, and can add significant value to the functionality of publicly accessible DOD web information services. It is advisable for DOD Components to establish objective and supportable criteria or guidelines for the selection and maintenance of links to external web pages. Links to non-DOD web resources should support the organization's mission. External links should be reviewed periodically to ensure their continued suitability. If the content of a linked external site becomes questionable or objectionable, remove the link.

In accordance with DOD 5500.7-R, no product endorsements or preferential treatment shall be given on publicly accessible official DOD web information services. No payment of any kind shall be accepted in exchange for a link placed on an organization's publicly accessible official DOD web information service. In accordance with reference (j), DOD web information services shall not require or encourage users to choose any specific browser software. Only text or hyperlinked text shall be used to direct visitors to software download sites. Graphics or logos depicting companies/products shall not appear on DOD web information services.

WEB PAGE GOUGE

When external links are included, the head of the DOD Component, or the subordinate organization, is responsible for ensuring that a disclaimer is made that neither the DOD nor the organization endorses the product or organization at the destination, nor does the DOD exercise any responsibility over the content at the destination. This includes credits given to contractors who produce DOD web information services. Organizations must realize that once the decision is made to include a link to one non-DOD site, the organization may have to link to all similar sites. The disclaimer below shall be displayed when linking to external sites. This disclaimer may appear on the page or pages listing external links, or through an intermediate "exit notice" page generated by the server machine whenever a request is made for any site outside of the official DOD web information service (usually the .mil domain). :

"The appearance of this hyperlink does not constitute endorsement by the (Department of Defense/the U.S. Army/the U.S. Navy/the U.S. Air Force/the U.S. Marine Corps, etc.) of this web site or the information, products or services contained therein. For other than authorized activities such as military exchanges and Morale, Welfare and Recreation sites, the (Department of Defense/the U.S. Army/the U.S. Navy/the U.S. Air Force/the U.S. Marine Corps, etc.) does not exercise any editorial control over the information you may find at this location. This link is provided consistent with the stated purpose of this DOD web site."

PERSONAL ARTICLES. Should reflect the following disclaimer. "The views expressed are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government."

FORMS/SURVEY DATA. To better serve our users, in certain instances it is necessary and appropriate to collect information from visitors to web information services. In accordance with the Paperwork Reduction Act of 1995, (PRA), collection of information from the public shall be approved by OMB under some circumstances. Requests for identical information from ten or more members of the public must be approved by OMB, such as surveys using check box, radio button or text form fields. The PRA applies to electronic forms/information collections on web information services that collect standardized information from the public. It does not apply to collection of information strictly from DOD employees or service members. Forms for general solicitations of comments which do not seek responses to standard questions, such as the common opinion-based feedback forms and E-mail links, do not require OMB clearance. Organizations are responsible for ensuring their publicly accessible web information services comply with this requirement and follow procedures in DOD 8910.1-M. For more information about the Paperwork Reduction Act of 1995, contact your local Information Management Control Office.

DOD WEBMASTERS' LISTSERV INSTRUCTIONS. WEBMASTERS

(<http://www.army.mil/weblist.htm>) is a discussion forum (ListServer) on Web policy and Web technology for DOD Web managers. The list will alert webmasters of updates and changes to policy, provide a forum for discussing Web technologies, Web operations and management, and other related topics. The forum is open to those in the .mil and .gov domains. Commercial advertising is not permitted. To subscribe to WEBMASTERS:

Send E-mail to listserv@odcsper-nt1.hqusareur.army.mil
Include the following command in the body of the E-mail:
SUB WEBMASTERS yourfirstname yourlastname

Some examples are found as follows:

1. Privacy and Security Notice (<http://middsknfg.cpp.usmc.mil:9361>)

WEB PAGE GOUGE

2. External Links Disclaimer (<http://middsknfg.cpp.usmc.mil:9361>) Click on Weather Classroom and Weather Glossary.
3. Personal Articles (<http://middsknfg.cpp.usmc.mil:9361>) Click on Weather Classroom and Owing the Weather.

If you would like information to set up the same type of script, contact the Webmaster at Camp Pendleton.

Useful WEB Sites

NRL Monterey: With the METMF(R), you will have access to SSM/I and SSM/T data. This data can assist you in supporting the warfighter. Point your browser to http://www.nrlmry.navy.mil/maos/satellite_training.html for a complete tutorial on this subject.

Marine Corps Doctrine Division: To keep up to date on the latest changes in our doctrine, point your browser to <http://138.156.107.3/docdiv/index.html>. All the latest doctrinal publications can be down loaded from this site.

MAWTS-1: This site will eventually host all the unclassified courseware that MAWTS-1 offers. You can also download the read-ahead materials and view the projected dates of future WTI classes. Point your browser to <http://www.tediv.quantico.usmc.mil/mawts1>.

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“The essence of loyalty is the courage to propose the unpopular, coupled with the determination to obey, no matter how distasteful the ultimate decision. And the essence of leadership is the ability to inspire such behavior.”

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NAVAL METEOROLOGY AND OCEANOGRAPHY CENTERS

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Leadership Traits

Integrity

Tact

Knowledge

Judgement

Courage

Loyalty

Decisiveness

Unselfishness

Dependability

Endurance

Initiative

Bearing

Enthusiasm

Justice

BIBLIOGRAPHY

Newly reporting METOC Officers may need assistance to identify essential reference materials. While it would be extremely useful to consolidate relevant excerpts from all publications in a stand-alone handbook, continuous content revision and classification considerations make that approach impractical. Instead, this bibliography is provided to quickly identify minimum references that should be consulted throughout a tour of duty as a METOC Officer.

ADMINISTRATION

NAVMETOC COMINST 1001.1D	Naval Meteorological and Oceanography Reserve Program
NAVMETOC COMINST 5450.9F	Mission, Organization and Functions of the Naval Meteorological and Oceanographic Command Handbook Program
NAVOCEANO SP 3-P	Catalog of Naval Oceanographic Office Publications
NAVOCEANO SP 3-P(S)	Catalog of Classified Naval Oceanographic Office Publications (U)
NAVOCEANO SP 3-P	Catalog of Naval Oceanographic Office Publications
NAVOCEANO SP 3-P(S)	Catalog of Classified Naval Oceanographic Office Publications (U)
NWP 10-1-10, Ch 4	Naval Writing Publication, Casualty Report
MCO P1020.34	USMC Uniform Regulations
MCO P1200.7	MOS Manual
MCO P1610.7	Performance Evaluation System
RP-49	NAVOCEANO Acronym Dictionary
RP-50	Catalog of Naval Oceanographic Office Classified Publications
RP-51	Catalog of Naval Oceanographic Office Unclassified Publications
SECNAVINST 5216.5C	Navy Correspondence Manual
Report I5588R13-A-01	IG Audit Statement Listing

COMPUTERS

COMET Modules	Cooperative Program for Operational Meteorology, Education & Training (COMET)
CBT Modules	Computer Based Training Systems/Open Systems Training Courses
WSR-88D	WSR-88D Tutorials, CD-ROM

EQUIPMENT/SOFTWARE

Air Force MK-III	Electro-Optical Tactical Decision Aid (EOTDA) Version 3.1 User's Manual. Provides information on installation and use of the software and guidance on interpretation of the products generated.
ASOS	Applicable Operating/Maintenance Manuals
FCM-S4-T994	Federal Standard for Siting Meteorological Sensors at Airports
GF MPL v8.0	GF MPL User's Manual
METMF(R)	Applicable Operating/Maintenance Manuals
MIDDS	Applicable Operating/Maintenance Manuals
MOSS	MOSS Quarterly Reports
IMOSS	Applicable Operating/Maintenance Manuals
NAVMETOC COMINST 13950.1J	Meteorological and Oceanographic Equipment Program (MOEP) Support
NAVO TM 04-92 and TM S5-92	Composite Warfare Oceanographic Support Modules (CWOSM) parts 1 & 2

BIBLIOGRAPHY

NAVOCEANCOM PUB TESS 89-02 Effective Use of EM Products of TESS and GFMP	Presents the basic principles of electromagnetic radiation, its use in object detection systems such as RADAR and FLIR, the effects of the atmosphere on EM propagation, and provides guidelines in the interpretation and effective use of EM propagation products available from assessment programs such as TESS and IREPS.
OPNAVINST 4790.4C	Preventative Maintenance System
WSR-88D	Applicable Operating/Maintenance Manuals

TRAINING

Joint Meteorological and Oceanographic (METOC) Training Handbook	The purpose of this document is to familiarize prospective Joint Task Force METOC Officers on the infrastructure, policies, principles, and responsibilities inherent in providing METOC support to the warfighter and conducting joint METOC operations.
MCO 1510.105	Individual Training Standards (ITS) System for OCCFLD 68, Weather Service
MCI Catalog	Marine Corps Institute Course Listing
METOC 50-1P-0002	Introduction to Forecasting
METOC 50-1T-9601	Oceanography
METOC 50-1T-9602	Atmospheric Refraction & Introduction to Electro-Optics
METOC 50-1T-9603	Basic Surface Chart Analysis
METOC 50-1T-9604	Tropical Synoptic Models
METOC 50-1T-9606	Encoding, Decoding & Plotting the Synoptic Report
METOC 50-1T-9607	Tropical Streamline Analysis
METOC 50-1T-9608	Tower Visibility Observations
METOC 50-1B-0001	Water Vapor Imagery; Interpretation & Applications to Weather Analysis & Forecasting
METOC 50-IT-9609	Satellite Imagery Interpretation in Synoptic & Mesoscale Meteorology
METOC 50-1B-9610/11	A Workbook on Tropical Clouds & Cloud Systems Observed in Satellite Imagery, Vol. I/II
NAVAIR 50-IP-5	Skew-T, Log-P Diagram in Analysis and Forecasting
NAVAIR 50-IP-529	Weather Forecasting Rules
NAVEDTRA 12061	Catalog of Nonresident Training Courses
NAVEDTRA 12853	AG1 & C RTM
NAVEDTRA 43203-C	METOC Forecaster PQS
NAVEDTRA 43204-D	METOC Observer PQS
NAVEDTRA 80370 & 80371A	AG2 VOL 1 & 2 RTM
NAVEDTRA 82850	AG3 RTM
NAVICE	Handbook of Dynamic Meteorology, Oct 1994
NAVMETOC COMINST 1500.2H	Naval Meteorological and Oceanography Command Training and Certification Program
NAVMETOC COMINST 1500.3F	Procedures for Qualification and Certification of Navy & Marine Air Traffic Controllers as Tower Visibility Observers
NAVOCEANOTE 1552	Current Practical Training publications
NAVOCEANO	Status of METOC Training (Quarterly)
NAVWEPS 50-IP-503	Single Station Analysis and Forecasting Technique
NAVWEPS 50-IP-522	Contrails Forecasting Manual
NAVWEPS 50-IP-551	Meteorological Wind Scales
NEPRF Technical Reports	Naval Tactical Applications Guide (Volumes 1-8)

OPERATIONS

Army FM 34-130	Intelligence Preparation on the Battlefield
ATP-17	Naval Arctic Manual
AWP-2	Allied Warfare Pub 2; Nation Meteorological Support Manual

BIBLIOGRAPHY

AWSP 105-52 Vol. I-III	Facsimile Products Catalog
OPORDER 2000, ANNEX H (U)	COMSEVENTHFLT Operations
COMUSNAVCENT OPORDER 1000, ANNEX H (U)	Standardized METOC Support for COMFIFTHFLT Operations
CINCLANTFLT OPORDER 2000, ANNEX H (U)	Standardized METOC Support for CINCLANTFLT Operations
CINCPACFLT OPORDER 2000, ANNEX H (U)	Standardized METOC Support for CINCPACFLT
COMNAVMETOCOM PUB RP-1	Environmental Effects on Weapons and Naval Warfare. Provides a "quick look" reference for METOC personnel to environmental effects on a broad spectrum of naval warfare areas and weapons systems.
COMNAVSPECWARCOM Mission Planning Guide	Provides an overall guide for special operations mission planning, with sections on environmental requirements in the mission planning process
COMNAVSURFLANT/PACIST 3840.1B Joint Surf Manual	Provides environmental support guidance for surf observations to support amphibious missions
COMSECONDFLT OPORDER 2000, ANNEX H (U)	Standardized METOC Support for COMSECONDFLT Operations
COMSIXTHFLT OPORDER 2000, ANNEX H (U)	Standardized METOC Support for COMSIXTHFLT Operations
COMTHRDFLT/COMSEVENTHFLT	Standardized METOC Support for COMTHRDFLT/
FAP (Local)	FMF Personnel Assistance Program
FMFM 1-0	Leading Marines
FMFM 1	Warfighting
FMFM 3-3, Appendix M	Chemical Downwind Message
FMFM 3-1	Command and Staff Action
FMFM 3-21	MAGTF Intelligence Operations
FMH-1	Manual of Surface Observations
FMH-2	Surface Synoptic Codes Summary
FNMOD Asheville CD-ROM	Marine Climatic Atlas of the World including Mediterranean Severe Weather Port Guides
FNMOD Asheville CD-ROM	Global Tropical/Extra-tropical Cyclone
FMH-3	FMH 3-6 HAVE BEEN
FMH-4	COMBINED INTO FMH
FMH-5	3, RAWINSONDE AND
FMH-6	PIBAL OBSERVATIONS
FMH-7	
FMH-11	Weather Radar Observations
FNMOD Asheville CD-ROM	Doppler Radar Meteorological Observations
FNMOD Asheville CD-ROM	International Station Meteorological Climate Climatic Atlas
FNMOD Asheville CD-ROM	Global Historic Fields
FNMOD Asheville CD-ROM	Global Upper Air Climatic Atlas
FXP-5	Amphibious Warfare and Mine Exercises. Provides amphibious warfare, mine warfare and naval special warfare exercise instructions, including associated safety and exercise evaluation information.
Joint Strategic Capabilities Plan, Annex E	Describes SOF, SOF capable forces and forces organized to support SOF
JP 3-02 Joint Doctrine for Amphibious Operations	Provides principles and selected tactics, techniques, and procedures to govern joint activities and performance of forces in amphibious operations.
JP 3-59 Joint Doctrine for METOC Support	Provides doctrine to govern METOC support for joint operations of the Armed Forces in time of war. This includes atmospheric, oceanographic, and space environment phenomena.
Manual #525-6 USSOCOM Critical METOC Thresholds for SOF Operations Manual	Provides critical environmental thresholds used in planning Navy/Air Force special operations missions.

BIBLIOGRAPHY

MCDP 1 Warfighting	Describes the Marine Corps philosophy on warfighting in an easy to read format.
MCDP 1-1 Strategy	Provides a broad perspective and an understanding of how your actions can effect and influence the attainment of our national objectives.
MCDP 1-2 Campaigning	Provides a broad perspective and understanding of the interrelationships among the levels of war.
MCDP 1-3 Tactics	This publication establishes the Marine Corps' philosophy for waging and winning battles.
MCDP 4 Logistics	Describes the theory and philosophy of military logistics as practiced by the United States Marine Corps.
MCDP 5 Planning	Describes the theory and philosophy of military planning as practiced by the United States Marine Corps with the intent of how we can prepare for future action when the future is uncertain and unpredictable.
MCDP 6 Command and Control	Describes the theory and philosophy of command and control for the United States Marine Corps, with the intent of describing how we can reach effective military decisions and implement effective military actions faster than an adversary in any conflict setting on any scale.
MCWP 3-35.7 METOC Support to the MAGTF	Provides a description of the Marine Corps METOC structure, capabilities and support available to the MAGTF. Includes samples of briefs, Annex H to Operations Orders, and standardized MAGTF METOC Products.
Met. O. 716	Cloud Types for Observers
NAVMETOCCOMINST 3140	METOC Codes Manual
NAVMETOCCOMINST 3140.1K United States Navy Meteorological and Oceanographic Support System Manual	Provides a description of the Naval METOC Support System, environmental services and support available to all ships and stations from the Naval METOC Command, consolidates existing requirements for taking and reporting environmental observations, and lists meteorological equipment allowances.
NAVOCEANCOMINST 3140.4B	Turbulence and Icing Procedures
NAVMETOCCOMINST 3140.7F	Fleet Liaison Program
NAVMETOCCOMINST 3140.13E	Employment of Mobile Environmental Teams (MET)
NAVMETOCCOMINST 3140.14D	Procedures for Flight Weather Briefs
NAVMETOCCOMINST 3140.17A	Provision of Environmental Services
NAVMETOCCOMINST 3140.23A	Oceanographic Post-Deployment Reports
NAVMETOCCOMINST 3140.24B	Procedures Governing BOGUS Data Inputs
NAVMETOCCOMINST 3141.1A	Earthquake Observation and Reporting
NAVMETOCCOMINST 3141.2	Surface METAR Observation Procedures
NAVMETOCCOMINST 3142.1A	Pilot Weather Reports (PIREPS)
NAVMETOCCOMINST 3143.1F	Terminal AERODROME Forecast (TAF) Code
NAVMETOCCOMINST 3144.1D	Shipboard Surface Observation Procedures Manual
NAVMETOCCOMINST 3161.4D	Navy Policy on Submission and Dissemination of Oceanographic Data
NWP-27-1 Through NWP 27-6 Series	MCM Planning/Operations
OPNAVINST 3140.24D	Warnings and Conditions of Readiness Concerning Hazardous or Destructive Weather
OPNAVINST 3140.24E	Warnings and Conditions of Readiness Concerning Hazardous and Destructive Weather Phenomena
OPNAVINST 3140.54	Submission of Oceanographic and Meteorological Requirements
OPNAVINST 3140.55	Submission of Requirements for Mapping, Charting and Geodesy (MC&G) Product
OPNAVINST 3141.1	Collection and Reporting of Bathythermograph Observations
OPNAVINST 3710.7Q	NATOPS General Flight and Operating

BIBLIOGRAPHY

Standing Navy Wide OPTASK METOC	Provides a standardized plan for providing METOC support to the various warfare areas within the Navy.
NWP-22B Naval Doctrine for Amphibious Operations	Provides doctrine, techniques, and procedures for planning and executing amphibious operations.
RP-1	Environmental Effects on Weapons & Naval Gunfire
RP-33	Fleet Oceanographic and Acoustic Reference
USCINCPAC Instruction 3140.3	METOC Support to Joint Task Force Operations in PACOM
USCENTCOM Pamphlet 115-2	Joint METOC Support Employment Guide
USEUCOM Directives 55-11	Joint Task Force Headquarters, Policies, Procedures, & Organization
WMO 306 Vol. I & II	International Meteorological Codes Manual

SAFETY

MCO 5100.8E	USMC Ground Safety Health Program
MCO 5100.29	USMC Safety Program
MCO P5102.1A	USMC Ground Mishaps Reporting
OPNAVINST .19B	Afloat Safety Manual
OPNAVINST 5100.23	Ashore Safety Manual Instructions

SUPPLY/FISCAL

COMSPAWARSSYSCOM QL-22	METOC Equipment for Navy METOC Units
COMSPAWARSSYSCOM QL-23	METMF Equipment and Materials Allowance Listing
NAVSUP P-485	Naval Supply Manual
NAVCOMPT Manuals	Financial Management Manuals

SECURITY

OPNAVINST 5510.1H	Security Procedures
DCMS 14 Apr 93	COMSEC Policy and Procedures Manual (CMS-1)
DCMS 19 Oct 90	STU-III COMSEC Material Management Manual (CMS-6)
DCMS Oct 89	STU-III Key Management Plan EKMS-702.01 (Rev Jan 93)

OTHER READINGS

New York: Brassey's (US), Inc. 1991. John M. Collins	Americas Small Wars: Lessons for the Future
<u>Asian Defense Journal</u>	"Americas Secret Warriors: The Buildup of U.S. Special Operations
<u>Assault on Normandy</u>	Personal recollections of US sea service members involved in the June Allied assault on Normandy
<u>Bull Halsey: A Biography</u> by E.B. Potter	An impartial study of Admiral William F. Halsey and his accomplishments in WWII
<u>The Dragon's Breath: Hurricane at Sea</u> by CDR Robert A. Dawes, Jr. USN (RET)	Follows the accounts of the survivors of the USS Warrington, a destroyer lost in the Atlantic in September of 1944, and explores the series of mistakes that lead to the loss of the ship
<u>Decision and Dissent: With Halsey and Leyte Gulf</u> by: Carl Solberg	Written by a junior intelligence officer on Admiral Halsey's staff prior to and during the Battle of Leyte Gulf
<u>Desert Victory: The War for Kuwait</u> by Norman Fiedman	A comprehensive review of Desert Shield/Storm
<u>First to Fight</u> by LTGEN Victor H. Krulak	An Inside View of the USMC
<u>From Shield to Storm</u> by James F Dunnitan and Aston Bay	Comprehensive overview of military actions in the gulf.
<u>Green Berets, Seals Spetsnaz</u> by	US and Soviet Special Military Operations

BIBLIOGRAPHY

John M Collins	
<u>How Navies Fight</u> : The US Navy and its Allies by Frank Uhling Jr.	Analyzes the US Naval operations from the American Revolution to Desert Storm and reveals technology's influence on each conflict
<u>In Many a Strife</u> : General C. Thomas and the US Marine Corps 1917-1956	A Study of the Career of General C. Thomas
<u>Parameters</u> v.18, Pp.62-74, December 1988 LT Henry Koren	"Congress Wades Into Special Operations"
<u>Maritime Operations in the Russo-Japanese War, 1904-1905, Vols. I&II</u>	A study showing the essential differences between maritime and continental warfare, while also exploring their interaction
<u>Nimitz</u> by E.B. Potter	A biography of Admiral Nimitz including opinions on WWII, his contemporaries, and his leaders, including Halsey, Kimmel, King, Spruance, MacArthur, Forrestal, Roosevelt and Truman
<u>Sea Soldiers in the Cold War: Amphibious Warfare, 1945-1991</u>	A study of the operational history of amphibious warfare, principally as refined by the two superpowers, their allies, and their surrogates, covering the entire Cold War period
<u>Sun Tzu The Art of War</u>	Writings of Sun Tzu a master of military tactics.
<u>Typhoon</u> : the Other Enemy The Third Fleet and the Pacific Storm of December 1944	A study analyzing the 1944 storm that claimed 778 men, 3 destroyers, and over 100 aircraft
<u>Mao Tse-tung</u> translated by B.G. Samuel	On Guerrilla Warfare
<u>March 1991 Military review</u> v. 68#9 pp.2-17	Special Operations Status Report - The Iranian Rescue Mission: Why It Failed

OFFICIAL DOCUMENTS

February 1992	Command and Control Briefing
US Special Operations Command, Information Paper	"Amphibious Deception Operation" Undated
US Special Operations Command, Information Paper	"Coalition Warfare" Undated
US Special Operations Command, Information Paper	"Special Reconnaissance" Undated
US Special Operations Command, Information Paper	"The Opening Gambit" Undated
January 1992	Operation Desert Shield/Desert Storm Command Briefing
January 1992	US Special Operation Forces: A Strategic Perspective

DEPARTMENT OF DEFENSE MANUALS

Joint Chiefs of Staff Publications 3-05	Doctrine for Joint Special Operations
Joint Publications 3-50.2 Forces/ Capabilities Handbook	Doctrine for Joint Combat and Search and Reference Text: USA War College: Department of Military Strategy, Planning and Operations

MAGAZINES AND PERIODICALS

Note: A long running and occasionally acrimonious debate involving the capabilities, size and command and control of the special operations community has gone on for most of this decade. The best coverage of that debate has appeared in various magazines. Some of the most important articles are listed here.

Aerospace and Defense Number 9	Special Forces in the Post Cold-War World Science, Vol.9,
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Armed Forces Journal International, pp.36 July 1991,	Special Ops Teams Found 29 Scuds to Barrage Israel 24 hr Before cease-fire
Defense, Jan/Feb 1992, pp. 14-17	Base Force, Living with Success
DISAM Journal, Vol.12, Number 3, Spring 1990	Special Operations Challenge of the 1990's
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Military review, Jun 1991	Today's Air Commandos: USAF Special Operations
Military review, Jun 1991, pp. 2-13	The Strategic Employment of Special Operations Forces
National Guard, February 1992	The Guards 20th Special Forces Provided Comfort to the Kurds
Surface Warfare, Jan/Feb	Sealing Iraq's Fate

Oath of Office

I, (state your name), do solemnly swear that I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office on which I am about to enter. So help me God.

Oath of Enlistment

I, (state your name), do solemnly swear that I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; and that I will obey the orders of the President of the United States and the orders of the officers appointed over me, according to regulations and the Uniform Code of Military Justice. So help me God.

CONVERSION TABLES

LENGTH

1 Millimeter (mm)	= 0.039 in.
1 Centimeter (cm)	= 0.394 in. = 0.033 ft.
1 Meter (m)	= 39.37 in. = 3.281 ft.
1 Kilometer (km)	= 3280.84 ft. = 0.621 mi = 0.540 nm
1 inch (in)	= 25.4 mm = 2.54 cm
1 foot (ft)	= 30.48 cm = 0.305 m
1 statute mile (mi)	= 0.868 = 1609.344 m = 1.609 km
1 U.S. nautical mile (nm)	= 6080.21 ft = 1.152 mi = 1853.248 m = 1.853 km

VELOCITY

1 meter per second (mps)	= 3.6 km hr ⁻¹ = 1.943 kts = 2.237 mph
1 kilometer per hr (km hr ⁻¹)	= 0.278 mps = 0.534 kts = 0.621 mph
1 knot (kts)	= 1.152 mph = 0.515 mps = 1.85 km hr ⁻¹
1 mile per hour (mph)	= 0.868 kts = 0.447 mph = 1.609 km hr ⁻¹

PRESSURE

1 millibar (mb)	= 0.750 mm Hg = 0.0295 in Hg = 1.333 mb
1 standard millimeter of mercury (mm Hg)	= 0.0394 in Hg = 33.864 mb
1 standard inch of mercury (in Hg)	= 25.4 mm Hg = 1013.250 mb
1 standard atmosphere (atmos)	= 760 mm Hg = 29.921 in Hg

TEMPERATURE

	SYMBOL	FREEZING	BOILING	CONVERSION FORMULAE
CELSIUS	C	0	100	$C = 5/9 (F - 32) = K - 273.16$
FAHRENHEIT	F	32	212	$F = 9/5 + 32 = 9/5 (K - 273.16) + 32$
KELVIN	K	273.16	373.16	$K = C + 273.16 = 5/9 (F - 32) + 273.16$

THERMODYNAMIC CONVERSIONS/CONSTANTS

Dry Adiabatic Lapse Rate	5.5° F per 1000 ft 1° C per 100 meters
Moist Adiabatic Lapse Rate	3° F per 1000 ft 0.55° C per 100 meters
Standard Lapse Rate	3.6° F per 1000 ft 0.65° C per 100 meters

CONVERSION TABLES

INCHES TO MILLIBARS

Inches	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
	Millibars									
28.0	948.2	948.5	948.9	949.2	949.5	949.9	950.2	950.6	950.9	951.2
28.1	951.6	951.9	952.3	952.6	952.9	953.3	953.6	953.9	954.3	954.6
28.2	955.0	955.3	955.6	956.0	956.3	956.7	957.0	957.3	957.7	958.0
28.3	958.3	958.7	959.0	959.4	959.7	960.0	960.4	960.7	961.1	961.4
28.4	961.7	962.1	962.4	963.7	963.1	963.4	963.8	964.1	964.4	964.8
28.5	965.1	965.6	965.8	966.1	966.5	966.8	967.2	967.5	967.8	968.2
28.6	968.5	968.8	969.2	969.5	969.9	970.2	970.5	970.9	971.2	971.6
28.7	971.9	972.2	972.6	972.9	973.2	973.6	973.9	974.3	974.6	974.9
28.8	975.3	975.6	976.0	976.3	976.6	977.0	977.3	977.6	978.0	978.3
28.9	978.7	979.0	979.3	979.7	980.0	980.4	980.7	981.0	981.4	981.7
29.0	982.1	982.4	982.7	983.1	983.4	983.7	984.1	984.4	984.8	985.1
29.1	985.4	985.8	986.1	986.5	986.8	987.1	987.5	987.8	988.1	988.5
29.2	988.8	989.2	989.5	989.8	990.2	990.5	990.9	991.2	991.5	991.9
29.3	992.2	992.5	992.9	993.2	993.6	993.9	994.2	994.6	994.9	995.3
29.4	995.6	995.9	996.3	996.6	997.0	997.3	997.6	998.0	998.3	998.6
29.5	999.0	999.3	999.7	1000.0	1000.3	1000.7	1001.0	1001.4	1001.7	1002.0
29.6	1002.4	1002.7	1003.0	1003.4	1003.7	1004.1	1004.4	1004.7	1005.1	1005.4
29.7	1005.8	1006.1	1006.4	1006.8	1007.1	1007.4	1007.8	1008.1	1008.5	1008.8
29.8	1009.1	1009.5	1009.8	1010.2	1010.5	1010.8	1011.2	1011.5	1011.9	1012.2
29.9	1012.5	1012.9	1013.2	1013.5	1013.9	1014.2	1014.6	1014.9	1015.2	1015.6
30.0	1015.9	1016.3	1016.6	1016.9	1017.3	1017.4	1017.9	1018.3	1018.6	1019.0
30.1	1019.3	1019.6	1020.0	1020.3	1020.7	1021.0	1021.3	1021.7	1022.0	1022.3
30.2	1022.7	1023.0	1023.4	1023.7	1024.0	1024.4	1024.7	1025.1	1025.4	1025.7
30.3	1026.1	1026.4	1026.8	1027.1	1027.4	1027.8	1028.1	1028.4	1028.8	1029.1
30.4	1029.5	1029.8	1030.1	1030.5	1030.8	1031.2	1031.5	1031.8	1032.2	1032.5
30.5	1032.8	1033.2	1033.5	1033.9	1034.2	1034.5	1034.9	1035.2	1035.6	1035.9
30.6	1036.2	1036.6	1036.9	1037.2	1037.6	1037.9	1038.3	1038.6	1038.9	1039.3
30.7	1039.6	1040.0	1040.3	1040.6	1041.0	1041.3	1041.7	1042.0	1042.3	1042.7
30.8	1043.0	1043.3	1043.7	1044.0	1044.4	1044.7	1045.0	1045.4	1045.7	1046.1
30.9	1046.4	1046.7	1047.1	1047.4	1047.7	1048.1	1048.4	1048.8	1049.1	1049.4

MILLIBARS TO INCHES

Millibars	0	1	2	3	4	5	6	7	8	9
	Inches									
940	27.76	27.79	27.82	27.84	27.88	27.91	27.94	27.96	27.99	28.02
950	28.05	28.08	28.11	28.14	28.17	28.20	28.23	28.26	28.29	28.32
960	28.35	28.38	28.41	28.44	28.47	28.50	28.53	28.56	28.59	28.61
970	28.64	28.67	28.70	28.73	28.76	28.79	28.82	28.85	28.88	28.91
980	28.94	28.97	29.00	29.03	29.06	29.09	29.12	29.15	29.18	29.21
990	29.23	29.26	29.29	29.32	29.35	29.28	29.41	29.44	29.47	29.50
1000	29.53	29.56	29.59	29.62	29.65	29.68	29.71	29.74	29.77	29.80
1010	29.83	29.85	29.88	29.91	29.94	29.97	30.00	30.03	30.06	30.09
1020	30.12	30.15	30.18	30.21	30.24	30.27	30.30	30.33	30.36	30.39
1030	30.42	30.45	30.47	30.50	30.53	30.56	30.59	30.62	30.65	30.68
1040	30.71	30.74	30.77	30.80	30.83	30.86	30.89	30.92	30.95	30.98
1050	31.01	31.04	31.07	31.10	31.12	31.15	31.18	31.21	31.24	31.27
Proportional	Inches	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
	Millibars	0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3

CONVERSION TABLES

INCHES TO MILLIMETERS

INCHES	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
					MM					
0	0	2.5	5.1	7.6	10.2	12.7	15.2	17.8	20.3	22.9
1	25.4	27.9	30.5	33.0	35.6	38.1	40.6	43.2	45.7	48.3
2	50.8	53.3	55.9	58.4	61.0	63.5	66.0	68.6	71.1	73.7
3	76.2	78.7	81.3	83.8	86.4	88.9	91.4	94.0	96.5	99.1
4	101.6	104.1	106.7	109.2	111.8	114.3	116.8	119.4	121.9	124.5
5	127.0	129.4	132.1	134.6	137.2	139.7	142.2	144.8	147.3	149.9
6	152.4	154.9	157.5	160.0	162.6	165.1	167.6	170.2	172.7	175.3
7	177.8	180.3	182.9	185.4	188.0	190.5	193.0	195.6	198.1	200.7
8	203.2	205.7	208.3	210.8	213.4	215.9	218.4	221.0	223.5	226.1
9	228.6	231.1	233.7	236.2	238.8	241.3	243.8	246.4	248.9	251.5
10	254.0	256.5	259.1	261.6	264.2	266.7	269.2	271.8	274.3	276.9
11	279.4	281.9	284.5	287.0	289.6	292.1	294.6	297.2	299.7	302.3
12	304.8	307.3	309.9	312.4	315.0	317.5	320.0	322.6	325.1	327.7
Proportional	IN	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
	MM	0.3	0.5	0.8	1	1.3	1.5	1.8	2	2.3

FAHRENHEIT TO CELSIUS

°F		°C	°F		°C	°F		°C	°F		°C
From	To		From	To		From	To		From	To	
128.3	130.0	54	83.3	85.0	29	38.3	40.0	4	-4.8	-3.1	M20
126.5	128.2	53	81.5	83.2	28	36.3	38.2	3	-6.6	-4.9	M21
124.7	126.4	52	79.7	81.4	27	34.7	36.4	2	-8.4	-6.7	M22
122.9	124.6	51	77.9	79.6	26	32.9	34.6	1	-10.2	-8.5	M23
121.1	122.8	50	76.1	77.8	25	32.0	32.8	0	-12.0	-10.3	M24
119.3	121.0	49	74.3	76.0	24	31.2	31.9	M0	-13.8	-12.1	M25
117.5	119.2	48	72.5	74.2	23	29.4	31.1	M1	-15.6	-13.9	M26
115.7	117.4	47	70.7	72.4	22	27.6	29.3	M2	-17.4	-15.7	M27
113.9	115.6	46	68.9	70.6	21	25.8	27.5	M3	-19.2	-17.5	M28
112.1	113.8	45	67.1	68.8	20	24.0	25.7	M4	-21.0	-19.3	M29
110.3	112.0	44	65.3	67.0	19	22.2	23.9	M5	-22.8	-21.1	M30
108.5	110.2	43	63.5	65.2	18	20.4	22.1	M6	-24.6	-22.9	M31
106.7	108.4	42	61.7	63.4	17	18.6	20.3	M7	-26.4	-24.7	M32
104.9	106.6	41	59.9	61.6	16	16.8	18.5	M8	-28.2	-26.5	M33
103.1	104.8	40	58.1	59.8	15	15.0	16.7	M9	-30.0	-28.3	M34
101.3	103.0	39	56.3	58.0	14	13.2	14.9	M10	-31.8	-30.1	M35
99.5	101.2	38	54.5	56.2	13	11.4	13.1	M11	-33.6	-31.9	M36
97.7	99.4	37	52.7	54.4	12	9.6	11.3	M12	-35.4	-33.7	M37
95.9	97.6	36	50.9	52.6	11	7.8	9.5	M13	-37.2	-35.5	M38
94.1	95.8	35	49.1	50.8	10	6.0	7.7	M14	-39.0	-37.3	M39
92.3	94.0	34	47.3	49.0	9	4.2	5.9	M15	-40.8	-39.1	M40
90.5	92.2	33	45.5	47.2	8	2.4	4.1	M16	-42.6	-40.9	M41
88.7	90.4	32	43.7	45.4	7	0.6	2.3	M17	-44.4	-42.7	M42
86.9	88.6	31	41.9	43.6	6	-1.2	0.5	M18	-46.2	-44.5	M43
85.1	86.8	30	40.1	41.8	5	-3.0	-1.3	M19	-48.0	-46.3	M44

CONVERSION TABLES

DISTANCE / VISIBILITY CONVERSION

KM	NM	SM	METERS	KM	NM	SM	METERS
0.11	0.05	1/16	100				3700
0.2	0.11	1/8	200	4.02	2.18	2 1/2	4000
0.3	0.16	3/16	300				4500
0.4	0.22	1/4	400				4700
0.5	0.27	5/16	500	4.83	2.6	3	4800
0.57	0.33	3/8	600				5000
			700	6.44	3.47	4	6000
0.8	0.44	1/2	800				7000
			900	8.05	4.34	5	8000
1.01	0.54	5/8	1000	9.66	5.21	6	9600
			1100	11.27	6.08	7	11200
1.21	0.65	3/4	1200	12.87	6.95	8	12800
			1300	14.48	7.82	9	14400
1.41	0.74	7/8	1400	16.09	8.68	10	16000
			1500	17.7	9.55	11	17600
1.61	0.87	1	1600	19.31	10.42	12	19200
			1700	20.92	11.29	13	20800
1.81	0.98	1 1/8	1800	22.53	12.15	14	22400
2.01	1.09	1 1/4	2000	24.14	13.03	15	24000
2.21	1.20	1 3/8	2200	32.19	17.37	20	32000
2.41	1.31	1 1/2	2400	40.23	21.71	25	40000
2.62	1.41	1 5/8	2600	48.28	26.05	30	48000
2.82	1.52	1 3/4	2800	56.33	30.39	35	56000
3.02	1.63	1 7/8	3000	64.37	34.74	40	64000
3.22	1.74	2	3200	73.42	39.08	45	72000
			3400	80.47	43.42	50	80000
3.62	1.96	2 1/4	3600				

MILES PER HOUR TO KNOTS

MPH	0	1	2	3	4	5	6	7	8	9
					Knots					
0	0	1	2	3	3	4	5	6	7	8
10	9	10	10	11	12	13	14	15	16	17
20	17	18	19	20	21	22	23	23	24	25
30	26	27	28	29	30	30	31	32	33	34
40	35	36	36	37	38	39	40	41	42	43
50	43	44	45	46	47	48	49	50	50	51
60	52	53	54	55	56	56	57	58	59	60
70	61	62	63	63	64	65	66	67	68	69
80	70	70	71	72	73	74	75	76	76	77
90	78	79	80	81	82	83	83	84	85	86
100	87	88	89	89	90	91	92	93	94	95
110	96	96	97	98	99	100	101	102	103	103

CONVERSION TABLES

KNOTS TO MILES PER HOUR

Knots	0	1	2	3	4	5	6	7	8	9
	MPH									
0	0	1	2	3	5	6	7	8	9	10
10	12	13	14	15	16	17	18	20	21	22
20	23	24	25	26	28	29	30	31	32	33
30	35	36	37	38	39	40	41	43	44	45
40	46	47	48	49	51	52	53	54	55	56
50	58	59	60	61	62	63	64	66	67	68
60	69	70	71	72	74	75	76	77	78	79
70	81	82	83	84	85	86	87	89	90	91
80	92	93	94	96	97	98	99	100	101	102
90	104	105	106	107	108	109	110	112	113	114
100	115	116	118	119	120	121	122	123	124	126
110	127	128	129	130	131	132	134	135	136	137

KNOTS TO METERS PER SECOND

Knots	0	1	2	3	4	5	6	7	8	9
	MPS									
0	0	1	1	2	2	3	3	4	4	5
10	5	6	6	7	7	8	8	9	9	10
20	10	11	11	12	12	13	13	14	14	15
30	15	16	17	17	18	18	19	19	20	20
40	21	21	22	22	23	23	24	24	25	25
50	26	26	27	27	28	28	29	29	30	30
60	31	31	32	32	33	34	34	35	35	36
70	36	37	37	38	38	39	39	40	40	41
80	41	42	42	43	43	44	44	45	45	46
90	46	47	47	48	48	49	49	50	50	51
100	52	52	53	53	54	54	55	55	56	56
110	57	57	58	58	59	59	60	60	61	61

KNOTS TO KILOMETERS PER HOUR

Knots	0	1	2	3	4	5	6	7	8	9
	KPH									
0	0	2	4	6	7	9	11	13	15	17
10	19	20	22	24	26	28	30	32	33	35
20	37	39	41	43	45	46	48	50	52	54
30	56	58	59	61	63	65	67	69	70	72
40	74	76	78	80	82	83	85	87	89	91
50	93	95	96	98	100	102	104	106	108	109
60	110	113	115	117	119	121	122	124	126	128
70	130	132	133	135	137	139	141	143	145	146
80	148	150	152	154	156	158	159	161	163	165
90	167	169	171	172	174	176	178	180	182	184
100	184	187	189	191	193	195	196	198	200	202
110	204	206	208	209	211	213	215	217	219	221

CONVERSION TABLES

MILES PER HOUR TO METERS PER SECOND

MPH	0	1	2	3	4	5	6	7	8	9
	MPS									
0	0	0	1	1	2	2	3	3	4	4
10	4	5	5	6	6	7	7	8	8	9
20	9	9	10	10	11	11	12	12	12	13
30	13	14	14	15	15	16	16	17	17	17
40	18	18	19	19	20	20	21	21	21	22
50	22	23	23	24	24	25	25	25	26	26
60	27	27	28	28	29	29	30	30	30	31
70	31	32	32	32	33	34	34	34	35	35
80	36	36	37	37	38	38	38	39	39	40
90	40	41	41	42	42	42	43	43	44	44
100	45	45	46	46	46	47	47	48	48	49
110	49	50	50	51	51	51	52	52	53	53

MILES PER HOUR TO KILOMETERS PER HOUR

MPH	0	1	2	3	4	5	6	7	8	9
	KPH									
0	0	2	3	5	6	8	10	11	13	15
10	16	18	19	21	23	24	26	27	29	31
20	32	34	35	37	39	40	42	44	45	47
30	48	50	52	53	55	56	58	60	61	63
40	64	66	68	69	71	72	74	76	77	79
50	81	82	84	85	87	89	90	92	93	95
60	97	98	100	101	103	105	106	108	109	111
70	113	114	116	118	119	121	122	124	126	127
80	129	130	132	134	135	137	138	140	142	143
90	145	147	148	150	151	153	155	156	158	159
100	161	163	164	166	167	169	171	172	174	175
110	177	179	180	182	184	185	187	188	190	192

CONVERSION TABLES

FEET TO METERS

FEET	0	10	20	30	40	50	60	70	80	90
	METERS									
0	0	3.06	6.10	9.14	12.19	15.24	18.29	21.34	24.38	27.43
100	30.48	33.53	36.58	39.62	42.67	45.72	48.77	51.82	54.86	57.91
200	60.96	64.01	67.06	70.10	73.15	76.20	79.25	82.30	85.34	88.39
300	91.44	94.49	97.54	100.58	103.63	106.08	109.73	112.78	115.82	118.87
400	121.92	124.97	128.02	131.06	134.11	137.16	140.21	143.26	146.30	149.35
500	152.40	155.45	158.50	161.54	164.59	167.64	170.69	173.74	176.78	179.83
600	182.88	185.93	188.98	192.02	195.07	198.12	201.17	204.22	207.26	210.31
700	213.36	216.41	219.46	222.50	225.55	228.60	231.65	234.70	237.74	240.79
800	243.84	246.89	249.94	252.98	256.03	259.08	262.61	265.18	268.22	271.27
900	274.32	277.37	280.42	283.46	286.51	289.56	292.61	295.66	298.70	301.75
1000	304.80	307.85	310.90	313.94	316.99	320.04	323.00	326.14	329.18	332.23
1100	335.28	338.33	341.38	344.42	347.47	350.52	353.57	356.62	359.66	362.71
1200	365.76	368.81	371.86	374.90	377.95	381.00	384.05	387.10	390.14	393.19
1300	396.24	399.29	402.34	405.38	408.43	411.48	414.53	417.58	420.62	423.67
1400	426.72	429.77	432.82	435.86	438.91	441.96	445.01	448.06	451.10	454.15
1500	457.20	460.25	463.30	466.34	469.39	472.44	475.49	478.54	481.58	484.63
1600	487.68	490.73	493.78	496.82	499.87	502.92	505.97	509.02	512.06	515.11
1700	518.16	521.21	524.26	527.30	530.35	533.40	536.45	539.50	542.54	545.59
1800	548.64	551.69	554.74	557.78	560.83	563.88	566.93	569.98	573.02	576.07
1900	579.12	582.17	585.22	588.26	591.31	594.36	597.41	600.46	603.50	606.55
2000	609.60	612.65	615.70	618.74	621.79	624.84	627.80	630.94	633.98	637.03
2100	640.08	643.13	646.18	649.22	652.27	655.32	658.37	661.42	664.46	667.51
2200	670.56	673.61	676.66	679.70	682.75	685.80	688.85	691.00	694.94	697.99
2300	701.04	704.09	707.14	710.18	713.23	716.28	719.33	722.38	725.42	728.47
2400	731.52	734.57	737.62	740.66	743.71	746.76	749.81	752.86	755.90	748.94
2500	762.00	765.05	768.10	771.14	774.19	777.24	780.29	783.34	786.38	789.43
2600	792.48	795.53	798.58	801.62	804.67	807.72	810.77	813.82	816.86	819.91
2700	822.96	826.01	829.06	832.10	835.15	838.20	841.25	844.3	847.34	850.39
2800	853.44	856.49	859.54	862.58	865.63	868.68	871.73	874.78	877.82	880.87
2900	883.92	886.97	890.02	893.06	896.11	899.16	902.21	905.26	908.30	911.35
3000	914.40	917.45	920.50	923.54	926.59	929.64	932.69	935.74	938.78	941.83
3100	944.88	947.93	950.98	954.02	957.07	960.12	963.17	966.22	969.26	972.31
3200	975.36	978.41	981.46	984.50	987.55	990.60	993.65	996.70	999.74	1002.79
3300	1005.84	1008.89	1011.94	1014.98	1018.03	1021.08	1024.13	1027.18	1030.22	1033.27
3400	1036.32	1039.37	1042.42	1045.46	1048.51	1051.56	1054.61	1057.66	1060.70	1063.75

CONVERSION TABLES

PRESSURE TABLES

MANUAL METHODS FOR COMPUTING PA AND DA

1. Pressure Altitude.

$$PA = H_a + PAV$$

Where:

PA = Pressure Altitude

H_a = Field Elevation

PAV = Pressure Altitude Variation or (29.92 minus the current altimeter setting) X 1,000

Example:

The field elevation is 1,500 feet with a current altimeter setting of 29.41 ins.

$$PA = 1,500 + (1,000 (29.92 - 29.41))$$

$$PA = 1,500 + (1,000 \times 0.51)$$

$$PA = 1,500 + 510$$

$$PA = 2,010 \text{ feet}$$

2. Density Altitude.

$$DA = PA + (120 Vt)$$

Where:

DA = Density Altitude

PA = Pressure Altitude

120 = Temperature constant (120 feet per 1°C)

Vt = actual temperature minus the standard temperature at the PA

Example: The surface temperature is 30°C. The standard temperature for a PA of 2,010 feet is 11°C.

$$DA = 2,010 \text{ feet} + (120 (30^\circ\text{C} - 11^\circ\text{C}))$$

$$DA = 2,010 + (120 \times 19)$$

$$DA = 2,010 + 2,280$$

$$DA = 4,290$$

RULE OF THUMB FOR ESTIMATING STANDARD TEMPERATURES UP TO ALTITUDES OF 35,000 FEET.

a. Double the altitude (in thousands of feet)

b. Subtract 15

c. Change the sign

EXAMPLE: Altitude is 7,000 feet.

a. $7 \times 2 = 14$

b. $14 - 15 = -1$ (then change the sign)

c. Standard temperature at 7,000 feet is approximately +1°C (Actual temperature is 1.1°C).

CONVERSION TABLES
APPROXIMATE DENSITY ALTITUDE
COMPUTATIONS TO THE NEAREST 100 FEET

		Air Temp.										
	oF	97	90	82	75	68	61	54	47	39	32	25
PA (feet)	oC	36	32	29	24	20	16	12	8	4	0	-4
Sea Level		2500	2100	1600	1100	600	100	-400	-900	-1400	-1900	-2300
500		3100	2700	2200	1800	1300	800	300	-200	-700	-1200	-1600
1000		3700	3200	2800	2400	1900	1400	900	500	-100	-600	-1100
1500		4300	3900	3400	3000	2500	2000	1500	1100	600	100	-500
2000		4900	4500	4000	3600	3100	2600	2200	1700	1200	700	200
2500		5500	5100	4600	4200	3700	3200	2800	2300	1800	1300	800
3000		6300	5700	5200	4800	4300	3800	3400	2900	2500	2000	1500
3500		6800	6300	5900	5400	4900	4400	4000	3500	3100	2600	2100
4000		7500	7000	6600	5900	5500	5000	4600	4100	3700	3200	2700
4500		8000	7500	7100	6500	6000	5500	5100	4600	4200	3600	3200
5000		8500	8000	7600	7100	6500	6100	5600	5200	4700	4200	3700
5500		9100	8600	8200	7700	7100	6700	6200	5800	5300	4700	4300
6000		9700	9200	8800	8300	7800	7300	6900	6400	5900	5300	4900
6500		10300	9800	9400	8800	8400	7800	7400	7000	6400	6000	5600
7000		10800	10400	10000	9500	9000	8500	8100	7600	7100	6700	6200
7500		11400	11000	10600	10200	9700	9200	8700	8300	7800	7300	6800
8000		12100	11600	11200	10800	10300	9800	9200	8800	8400	7900	7500

CONVERSION TABLES

PRESSURE ALTITUDE TABLE - INCHES TO FEET

Inches	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
	Feet									
28.0	1824	1814	1805	1795	1785	1776	1766	1756	1746	1737
28.1	1727	1717	1707	1698	1688	1678	1668	1659	1649	1639
28.2	1630	1620	1610	1601	1591	1581	1572	1562	1552	1542
28.3	1533	1523	1513	1504	1494	1484	1475	1465	1456	1446
28.4	1436	1427	1417	1407	1398	1388	1378	1369	1359	1350
28.5	1340	1330	1321	1311	1302	1292	1282	1273	1263	1254
28.6	1244	1234	1225	1215	1206	1196	1186	1177	1167	1158
28.7	1148	1139	1129	1120	1110	1100	1091	1081	1072	1062
28.8	1053	1043	1034	1024	1015	1005	995	986	976	967
28.9	957	948	938	929	919	910	900	891	881	872
29.0	863	853	844	834	825	815	806	796	787	777
29.1	768	758	749	739	730	721	711	702	692	683
29.2	673	664	655	645	636	626	617	607	598	589
29.3	579	570	560	551	542	532	523	514	504	495
29.4	485	476	467	457	448	439	429	420	410	401
29.5	392	382	373	364	354	345	336	326	318	308
29.6	298	289	280	270	261	252	242	233	224	215
29.7	205	196	187	177	168	159	149	140	131	122
29.8	112	103	94	85	75	66	57	47	38	29
29.9	20	10	1	-8	-17	-26	-36	-45	-54	-63
30.0	-73	-82	-91	-100	-110	-119	-128	-137	-146	-156
30.1	-165	-174	-183	-192	-202	-211	-220	-229	-238	-248
30.2	-257	-266	-275	-284	-293	-303	-312	-321	-330	-339
30.3	-348	-358	-367	-376	-385	-394	-403	-412	-421	-431
30.4	-440	-449	-458	-467	-476	-485	-494	-504	-513	-522
30.5	-531	-540	-549	-558	-567	-576	-585	-594	-604	-613
30.6	-622	-631	-640	-649	-658	-667	-676	-685	-694	-703
30.7	-712	-721	-730	-740	-749	-758	-767	-776	-785	-794
30.8	-803	-812	-821	-830	-839	-848	-857	-866	-875	-884
30.9	-893	-902	-911	-920	-929	-938	-947	-956	-965	-974
31.0	-983	992	-1001	-1010	-1019	-1028	-1037	-1046	-1055	1064

APPROXIMATE HEIGHTS OF STANDARD PRESSURE SURFACES ABOVE MEAN SEA LEVEL

Millibars	Meters	Feet
1000	120	400
850	1500	5000
700	3000	10000
500	5500	18000
400	7200	23000
300	9000	30000
250	10000	34000
200	12000	39000
100	16000	53000
50	20500	67500

CONVERSION TABLES

U.S. STANDARD ATMOSPHERE

Alt (Feet)	MB	Inches of Hg	°C	°F
0	1013.2	29.92	15.0	59
1000	977.2	28.86	13.0	55.4
2000	942.1	27.82	11.0	51.9
3000	908.1	26.82	9.0	48.3
4000	875.1	25.84	7.1	44.7
5000	843.1	24.90	5.1	41.2
6000	812.0	23.98	3.1	37.6
7000	781.8	23.09	1.1	34.0
8000	752.6	22.22	-0.8	30.5
9000	724.3	21.39	-2.8	26.9
10000	696.8	20.58	-4.8	23.3
11000	670.2	19.79	-6.8	19.8
12000	644.4	19.03	-8.8	16.2
13000	619.4	18.29	-10.8	12.6
14000	595.2	17.58	-12.7	9.1
15000	571.8	16.89	-14.7	5.5
16000	549.2	16.22	-16.7	1.9
17000	427.2	15.57	-18.7	-1.6
18000	506.0	14.94	-29.7	-5.2
19000	485.5	14.34	-22.6	-8.8
20000	465.6	13.75	-24.6	-12.3
21000	446.4	13.18	-26.6	-15.9
22000	427.9	12.64	-28.6	-19.5
23000	410.0	12.11	-30.6	-23.9
24000	392.7	11.60	-32.5	-26.6
25000	376.0	11.10	-34.5	-30.2
26000	359.9	10.63	-36.5	-33.7
27000	344.3	10.17	-38.5	-37.3
28000	329.3	9.72	-40.5	-40.9
29000	314.8	9.30	-42.5	-44.4
30000	300.9	8.89	-44.4	-48.0
31000	287.4	8.49	-46.4	-51.6
32000	274.5	8.11	-48.4	-55.1
33000	262.0	7.74	-50.4	-58.7
34000	250.0	7.38	-52.4	-52.2
35000	238.4	7.04	-54.3	-65.8
36000	227.3	6.71	-56.3	-69.4
37000	216.6	6.40	-56.5	-69.7
38000	206.5	6.10	-56.5	-69.7
39000	196.8	5.81	-56.5	-69.7
40000	187.5	5.54	-56.5	-69.7

CONVERSION TABLES

WIND

Definitions:

1. Tropical Cyclone - A non-frontal low-pressure system of synoptic scale developing over tropical or subtropical waters having a definitely closed wind circulation.
2. Tropical Depression - A tropical cyclone in which the maximum sustained wind (one-minute mean) is 33 knots or less.
3. Tropical Disturbance - A distinct system of apparently organized convection, originating in the tropics or subtropics, having non-frontal character, and maintaining its identity for 24 hours or more. In successive stages, it may later be classified as a tropical depression, tropical storm, or hurricane / typhoon.
4. Tropical Storm - A warm-core tropical cyclone in which the maximum sustained surface wind (one-minute mean) ranges from 34 to 63 knots.
5. Typhoon or Hurricane - A warm-core tropical cyclone with maximum sustained surface wind (one-minute mean) of 64 knots or more.
6. Super Typhoon or Hurricane - A typhoon / hurricane in which the maximum sustained surface wind (one-minute mean) is 130 knots or greater.

WIND COMPONENT TABLE

ANGLE BETWEEN WIND DIRECTION AND AIRCRAFT HEADING																											
HEAD WIND COMPONENT								TAIL WIND COMPONENT								CROSS WIND COMPONENT											
Wind	10	20	30	40	50	60	70	80	100	110	120	130	140	150	160	170	10	20	30	40	50	60	70	80	Wind		
5	-5	-5	-4	-3	-3	-2	-2	-1	1	2	3	3	4	4	5	5	1	2	3	3	4	4	5	5	5	5	
10	-10	-9	-9	-8	-6	-5	-3	-2	2	3	5	6	8	9	9	10	2	3	5	6	8	9	9	10	10	10	
15	-15	-14	-13	-11	-10	-8	-5	-3	3	5	8	10	11	13	14	15	3	5	8	10	11	13	14	15	15	15	
20	-20	-19	-17	-15	-13	-10	-7	-3	3	7	10	13	15	17	19	20	3	7	10	13	15	17	19	20	20	20	
25	-25	-23	-22	-19	-16	-13	-9	-4	4	9	13	16	19	22	23	25	4	9	13	16	19	22	23	25	25	25	
30	-29	-28	-26	-23	-19	-15	-10	-5	5	10	15	19	23	26	28	29	5	10	15	19	23	26	28	29	30	30	
35	-34	-33	-30	-27	-22	-18	-12	-6	6	12	18	22	27	30	33	34	6	12	18	22	27	30	33	34	35	35	
40	-39	-38	-35	-31	-26	-20	-14	-7	7	14	20	25	31	35	38	39	7	14	20	26	31	35	38	39	40	40	
45	-44	-42	-39	-34	-29	-23	-15	-8	8	15	23	29	34	39	42	44	8	15	23	29	34	39	42	44	45	45	
50	-49	-47	-43	-38	-32	-25	-17	-9	9	17	25	32	38	43	47	49	9	17	25	32	38	43	47	49	50	50	
55	-54	-52	-48	-42	-35	-28	-19	-9	9	19	28	35	42	48	52	54	9	19	28	35	42	48	52	54	55	55	
60	-59	-56	-52	-46	-39	-30	-21	-10	10	21	30	39	46	52	56	59	10	21	30	39	46	52	56	59	60	60	
65	-64	-61	-56	-50	-42	-33	-22	-11	11	22	33	42	50	56	61	64	11	22	33	42	50	56	61	64	65	65	
70	-69	-66	-61	-54	-45	-35	-24	-12	12	24	35	45	54	61	66	69	12	24	35	45	54	61	66	69	70	70	

Examples:

(1) Flight heading of 150° with a wind of 170° at 45 knots would have a head wind component of -42.

(2) On runway 03 with a surface wind of 070° at 25 knots, the crosswind component would be 16 knots.

CONVERSION TABLES

WIND-CHILL FACTOR CHART

Wind Speed		Temperature											
KNOTS	MPH	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Calm	Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
3-6	5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
7-10	10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
11-15	15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
16-19	20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
20-23	25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
24-28	30	28	13	-2	-18	-33	-48	-63	-80	-95	-110	-125	-140
29-32	35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
33-36	40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
		LITTLE DANGER				INCREASING DANGER				GREAT DANGER			
		Based on < 1 hour exposure with dry skin.				Exposed flesh may freeze within one minute.				Exposed flesh may freeze within 30 seconds.			

“Heat Stress” vs. WBGT Index

The temperature of the air is not always a reliable indicator of how hot or cold a person feels outdoors. Other weather elements such as wind speed, relative humidity, and heat from the sun are an influence. In addition, the type of clothing worn as well as the state of health and metabolism of an individual has an influence on how hot or cold they feel.

The overall effect of excessive heat on the body is known as “Heat Stress”. Important factors contributing to heat stress are air temperature, humidity, air movement, insolation, physical activity, and clothing. There are several charts available to calculate the Apparent Heat Stress Temperature. These tables only consider the air temperature and relative humidity to define what the temperature feels like to an individual. The Marine Corps routinely uses a more accurate way of calculating heat stress: the WBGT index. A good rule of thumb is to add 10 degrees to the WBGT index when Marines are in MOPP gear.

MARINE CORPS MANUAL, SECTION B - LEADERSHIP

Section B-Management

1100. MILITARY LEADERSHIP

1. Purpose and Scope

- a. The primary goal of Marine Corps leadership is to instill in all Marines the fact that we are warriors first. The only reason the United States has a Marine Corps is to fight and win wars. Everything else is secondary. In North China in 1937, Captain Samuel B. Griffith said, "Wars and battles are not lost by private soldiers. They win them, but they don't lose them. They are lost by commanders, staffs, and troop leaders, and they are often lost long before they start." Our leadership training is dedicated to the purpose of preparing those commanders, staffs, and troop leaders to lead our Marines in combat.
- b. Marine Corps Leadership qualities include:
 - (1) Inspiration – Personal example of high moral standards reflecting virtue, honor, patriotism, and subordination in personal behavior and in performance.
 - (2) Technical proficiency – Knowledge of the military sciences and skill in their application.
 - (3) Moral Responsibility – Personal adherence to high standards of conduct and the guidance of subordinates toward wholesomeness of mind and body.

2. Responsibility

- a. The Commandant of the Marine Corps is directly responsible to the Secretary of the Navy for establishing and maintaining leadership standards and conducting leadership training within the Marine Corps.
- b. Commanders will ensure that local policies, directives and procedures reflect the special trust and confidence reposed in members of the officer corps. Full credit will be given to their statements and certificates. They will be allowed maximum discretion in the exercise of authority vested in them, and they will be accorded all prerogatives and prerequisites which are traditional and otherwise appropriate. Except in cases where more stringent positive identification procedures are required for the proper security of classified material and installations, or are imposed by higher authority for protecting privileges reserved for eligible military personnel, the officers' uniforms will amply attest to their status, and their oral statements will serve to identify them and their dependents.
- c. An individual's responsibility for leadership is not dependent upon authority. Marines are expected to exert proper influence upon their comrades by setting examples of obedience, courage, zeal, sobriety, neatness, and attention to duty.
- d. The special trust and confidence, which is expressly reposed in officers by their commission, is distinguishing privilege of the officer corps. It is the policy of the Marine Corps that this privilege be tangible and real; it is the corresponding obligation of the officer corps that it be wholly deserved.
 - (1) As an accompanying condition commanders will impress upon all subordinate officers the fact that the presumption of integrity, good manners, sound judgment, and discretion, which is the basis for the special trust and confidence reposed in each officer, is jeopardized by the slightest transgression on the part of any member of the officer corps. Any offense, however minor, will be dealt with promptly, and with sufficient severity to impress on the officer at fault, and on the officer corps. Dedication to the basic elements of special trust and confidence is a Marine officer's obligation to the officer corps as a whole, and transcends the bonds of personal friendship.

MARINE CORPS MANUAL, SECTION B - LEADERSHIP

- (2) As a further and continuing action, commanders are requested to bring to the attention of higher authority, referencing this paragraph, any situation, policy, directive, or procedure which contravenes the spirit of this paragraph, and which is not susceptible to local correction.
 - (3) Although this policy is expressly concerned with commissioned officers, its provisions and spirit will, where applicable, be extended to noncommissioned officers, especially staff noncommissioned officers.
3. Personal Relations. Effective personal relations in an organization can be satisfactory only when there is complete understanding and respect between individuals. Commanders must:
 - a. Strive for forceful and competent leadership throughout the entire organization.
 - b. Inform the troops of plans of action and reasons thereof, whenever it is possible and practicable to do so.
 - c. Endeavor to remove on all occasions those causes which make for misunderstanding or dissatisfaction.
 - d. Assure that all members of the command are acquainted with procedures for registering complaints, together with the action taken thereon.
 - e. Build a feeling of confidence which will ensure the free approach by subordinates for advice and assistance not only in military matters but for personal problems as well.
4. Relations Between Officers and Enlisted Marines. Duty relationships and social and business contacts among Marines of different grades will be consistent with traditional standards of good order and discipline and the mutual respect that has always existed between Marines of senior grade and those of lesser grade. Situations that invite or give the appearance of familiarity or undue informality among Marines of different grades will be avoided or, if found to exist, corrected. The following paragraphs written by then Major General Commandant John A. Lejeune appeared in the Marine Corps Manual, Edition of 1921, and since that time have defined the relationship that will exist between Marine Officers and enlisted members of the Corps:
 - a. "Comradeship and brotherhood. – The World War wrought a great change in the relations between officers and enlisted men in the military services. A spirit of comradeship and brotherhood in arms came into being in the training camps and on the battlefields. This spirit is too fine a thing to be allowed to die. It must be fostered and kept alive and made the moving force in all Marine Corps organizations."
 - b. "Teacher and scholar. – The relation between officers and enlisted men should in no sense be that of superior and inferior nor that of master and servant, but rather that of teacher and scholar. In fact, it should partake of the nature of the relation between father and son, to the extent that officers, especially commanding officers, are responsible for the physical, mental, and moral welfare, as well as the discipline and military training of the young men under their command who are serving the nation in the Marine Corps."
 - c. "The realization of this responsibility on the part of officers is vital to the well-being of the Marine Corps. It is especially so, for the reason that so large a proportion of men enlisting are under twenty-one years of age. These men are in the formative period of their lives, and officers owe it to them, to their parents, and to the nation, that when discharged from the services they should be far better men physically, mentally, and morally than they were when they enlisted."
 - d. "To accomplish this task successfully a constant effort must be made by all officers to fill each day with useful and interesting instruction and wholesome entertainment for the men."

MARINE CORPS MANUAL, SECTION B - LEADERSHIP

This effort must be intelligent and not perfunctory, the object being not only to do away with idleness, but to train and cultivate the bodies, minds, and the spirit of our men.”

- e. “Love of Corps and Country. – To be more specific, it will be necessary for officers not only to devote their close attention to the many questions affecting the comfort, health, military training, and discipline of men under their command, but also actively promote athletics and to endeavor to enlist the interest of their men in building up and maintaining their bodies in the finest physical condition; to encourage them to enroll in the Marine Corps Institute and to keep up their studies after their enrollment; and to make every effort by means of historical, educational and patriotic address to cultivate in their hearts a deep and abiding love of the corps and country.”
 - f. “Leadership. – Finally, it must be kept in mind that the American soldier responds quickly and readily to exhibition of qualities of leadership on the part of officers. Some of these qualities are industry, energy, initiative, determination, enthusiasm, firmness, kindness, justness, self-control, unselfishness, honor, and courage. Every officer should endeavor by all means in his power to make himself the possessor of these qualities and thereby to fit himself to be a real leader of men.”
5. Noncommissioned Officers. The provisions of paragraphs 1100.3 and 1100.4 above, apply generally to the relationships of noncommissioned officers with their subordinates and apply specifically to noncommissioned officers who may be exercising command authority.

<u>Leadership Traits</u>	
Integrity	Tact
Knowledge	Judgement
Courage	Loyalty
Decisiveness	Unselfishness
Dependability	Endurance
Initiative	Bearing
Enthusiasm	Justice

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

Abbreviations can often be used to serve a useful and acceptable purpose. However, good judgment must be used in determining where and when they should be used. Within the military services there are many terms and abbreviations that are unique to the craft. It is not expected that we know all these terms, but as they are encountered we should become familiar with their meaning. The following list covers many of the more common terms and abbreviations.

AAA	Antiaircraft Artillery
AAC	Antiaircraft Control (Net)
AADC	Area Air Defense Commander
AAI	Antiaircraft Intelligence (Net)
AAW	Anti-air Warfare
AAWC	Anti-air Warfare Commander (USN)
ABCCC	Airborne Battlefield Command and Control Center
ACA	Airspace Coordination Area Airspace Control Area Airspace Control Authority
ACC	Air Combat Command
ACE	Aviation Combat Element
ACFT	Aircraft
ACEOI	Automated Communications Electronics Operating Instruction
ACLOS	Automatic Command Line of Sight
ACLS	Automatic Carrier Landing System
ACM	Air Combat Maneuver
ACO	Airspace Control Order
ACP	Airspace Control Plan
ACT	Air Combat Training
ADA	Air Defense Alert (Net) Air Defense Artillery (US Army) Air Defense Area
ADC	Air Defense Coordinator
AEGIS	Airborne Early Warning/Ground Environmental Integration Systems
AEW	Airborne Early Warning
AFLD	Airfield
AFATDS	Advanced Field Artillery Tactical Data System
AGL	Above Ground Level
AGM	Air-to-Ground Missile

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

AGS	Aviation Ground Support
AIC	Air Intercept Controller
AIM	Air Intercept Missile
AIZ	Air Intercept Zone
AIS	Airborne Instrumentation Subsystem
ALE	Airborne Counter Measures Ejection Release
ALO	Artillery Liaison Officer Air Liaison Officer (USAF)
ALT	Altitude
AMC	Air Mission Commander Air Mobility Command
AMSL	Above Mean Sea Level
AMRAAM	Advanced Medium Range Air to Air Missile
ANGLICO	Air/Naval Gunfire Liaison Company
AO	Aerial Observer Air Officer Area of Operation
AOA	Amphibious Objective Area
AOB	Air Order of Battle
AOC	Air Operations Center (USAF) Air Operations Control (Net)
AOI	Area of Influence
AOR	Area of Responsibility (JFC only)
AR	Air Refueling
AREC	Air Resource Element Coordinator (USN) Armed Reconnaissance
ARM	Anti-radiation Missile Armstrong Arm Ordnance
ARTY	Artillery
ASC	Air Support Coordinator
ASC (A)	Assault Support Coordinator (Airborne)
ASE	Aircraft Survivability Equipment Air Support Element
ASCIET	All Service Combat Identification Evaluation Team
ASLT	Air Support Liaison Team
ASM	Air-to-Surface Missile
ASO	Air Surveillance Officer (USAF)

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

ASOC	Air Support Operations Center (USAF)
ASP	Academic Support Package
ASR	Assault Support Request
ASW	Antisubmarine Warfare
ASWO	Assault Support Watch Officer
ATACMS	Army Tactical Missile System
ATBM	Anti Tactical Ballistic Missile
ATGM	Antitank Guided Missile
ATA	Actual Time of Arrival Airport Traffic Area
ATACC	Advanced Tactical Air Control Center
ATC	Air Traffic Control
ATCF	Air Traffic Control Facility
ATDL-1	Army Tactical Data Link-1
ATDS	Airborne Tactical Data System (E-2)
ATF	Amphibious Task Force
ATO	Air Tasking Order
AWACS	Airborne Warning And Control System (E-3)
AWC	Assistant Weapons Controller
A2C2	Army Airspace Command and Control
BAI	Battlefield Air Interdiction
Bald Eagle	TRAP quick reaction helicopter-borne company
Bandit	Known enemy aircraft, does not necessarily imply clearance to fire.
BCP	Battery Command Post
BCD	Battlefield Coordination Detachment (USA)
BDA	Bomb Damage Assessment Battle Damage Assessment
BDZ	Base Defense Zone
Bingo	Fuel Required for ACFT RTB
BLT	Battalion Landing Team
BMNT	Beginning of Morning Nautical Twilight
Bogey	Radar or visual contact which is unidentified
Buzzer	Slang for electronic jamming

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

BVR	Beyond Visual Range
C2 W	Command and Control Warfare
C3	Command, Control and Communications
C3I	Command, Control, Communications and Intelligence
CA	Command Action (Net)
CADS	Combat Airspace Deconfliction System
CAFMS	Computer Assisted Force Management System
CAP	Combat Air Patrol
CATF	Commander Amphibious Task Force
CAS	Close Air Support
CBR	Chemical, Biological, & Radiological
CBU	Cluster Bomb Unit
CCIR	Commanders Critical Intelligence Requirements
CCS	Command and Control Subsystem
CE	Command Element
CEP	Circular Error Probability. The radius of a circle into which 50% of missile/bombs/shells will fall; measure of accuracy of a weapon system
CEO	Communications Electronic Officer
CEOI	Communications Electronics Operating Instruction
CFL	Coordinated Fire Line
CFR	Crash Fire Rescue
CI	Counter Intelligence
CIC	Combat Information Center
CI/D	Combat Information/Detection (Net)
CINCLANTFLT	Commander-in-Chief, Atlantic Fleet
CINCPACFLT	Commander-in-Chief, Pacific Fleet
CIT	Counterintelligence Team
CLF	Commander Landing Force
CMCC	Classified Material Control Center
CNX/CANX	Cancel
COC	Combat Operations Center
COMMARFORLANT	Commander Marine Forces Atlantic

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

COMMARFORPAC	Commander Marine Forces Pacific
COMMINT	Communications Intelligence
COMSEC	Communications Security
CONUS	Continental United States
COS	Current Operations Section
CP	Control Point Contact Point
CRC	Control and Reporting Center
CRE	Control and Reporting Element
CRP	Control and Reporting Post Combat Readiness Percentage
CSAR	Combat Search and Rescue
CSSE	Combat Service Support Element
CSP	Contingency Support Package
CSS	Contingency Support Study
CTAPS	Contingency Theater Automated Planning System
CTT	Commanders Tactical Terminal
CV	Conventional Aircraft Carrier
CVN	Nuclear Powered Aircraft Carrier
CVW	Carrier Air Wing
CWAR	Continuous Wave Acquisition Radar (HAWK)
CWC	Composite Warfare Commander (USN)
DACT	Dissimilar Air Combat Training (ACT involving different types of aircraft, e.g., F-18 vs. F-5)
DARO	Defense Airborne Reconnaissance Office
DAS	Direct Air Support Direct Air Support (Net) Deep Air Support Direct Access Service
DASC	Direct Air Support Center (Also IDASC - Improved Direct Air Support Center)
DASC(A)	Direct Air Support Center (Airborne)
DIAM	DIA Manual
DEFCON	Defense Readiness Condition
DCT	Digital Communications Terminal
DDS	Display And Debriefing Subsystem

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

DF	Direction Finding
DIA	Defense Intelligence Agency
DIPFAC	Diplomatic Facility Graphic
DISUM	Daily Intelligence Summary
DLAN	Deployed Local Area Network
DMA	Defense Mapping Agency
DME	Distance Measuring Equipment
DPICM	Dual Purpose Improved Conventional Munitions
DR	Dead Reckoning
DS	Direct Support
DTG	Date-Time-Group
DWAN	Deployed Wide Area Network
EA	Electronic Attack
EAF	Expeditionary Airfield
ECM	Electronic Countermeasures
ECMO	Electronic Countermeasures Officer
ECCM	Electronic Counter Counter Measure
EID	Electronic Identification
EENT	Ending of Evening Nautical Twilight
EEI	Essential Elements of Information
ELINT	Electronic Intelligence
EMCON	Emission Control
EO/EOCM	Electro-optics/Electro-optical Countermeasures
EOB	Electronic Order of Battle Enemy Order of Battle
EOTDA	Electro-Optical Tactical Decision Aid
EP	Electronic Protection
EPW	Enemy Prisoner of War
ESC	Electronic Security Command
ES	Electronic Warfare Support
ETA	Estimated Time of Arrival
EW	Electronic Warfare Early Warning

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

EW/C	Early Warning and Control
EWO	Electronic Warfare Officer (USAF)
EWRT	Early Warning Radar Team
FAAD	Forward Area Air Defense (USA)
FAAWC	Force Anti-air Warfare Commander (USN)
FAC	Forward Air Controller
FAC(A)	Forward Air Controller (Airborne)
FACS FAC	Fleet Area Control And Surveillance Facility
FACP	Forward Air Control Post (USAF)
FAD	Fighter Air Direction (Net)
FARP	Forward Arming and Refueling Point
FBH	Force Beach Head
FEBA	Forward Edge of the Battle Area
FEZ	Fighter Engagement Zone
FFA	Free Fire Area
FFCC	Force Fires Coordination Center
FIC	Fleet Intelligence Center
FIIU	Force Imagery Interpretation Unit
FLIR	Forward Looking Infrared
FLOT	Forward Line of Own Troops
FO	Forward Observer
FOB	Forward Operating Base Friendly Order of Battle
FOE	Focus of Effort
FOS	Future Operations Section
FOUO	For Official Use Only
FOX-1	Radar Guided Missile shot (Example: AIM-7)
FOX-2	Infrared Guided Missile shot (Example: AIM-9)
FOX-3	Active Missile shot (Example: AMRAAM)
FM	Frequency Modulation
FP	Firing Platoon (HAWK)
FROG	Free Rocket Over Ground
FSC	Fire Support Coordinator

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

FSCC	Fire Support Coordination Center
FSCL	Fire Support Coordination Line
GAIL	Glide Angle Indicator Light (GAIL) System
GBAD	Ground Based Air Defense
GBDL	Ground Base Data Link
GBU	Guided Bomb Unit
GCA	Ground Controlled Approach
GCCS	Global Command and Control System
GCE	Ground Combat Element
GCI	Ground Control Intercept
GENSER	General Service
GMT	Greenwich Mean Time (Zulu)
GOB	Ground Order of Battle
GP	General Purpose
GPS	Global Positioning System
GS	General Support
GSE	Ground Support Equipment
HAHO	High Altitude High Opening Parachute Delivery
HALO	High Altitude Low Opening Parachute Delivery
HARM	High Speed Antiradiation Missile
HAWK	Homing All the Way Killer
HCS	Helicopter Coordination Section
HCZ	Helicopter Control Zone
HD	Helicopter Direction (Net) Helicopter Director
HDC	Helicopter Direction Center
HDC	Helicopter Direction Center (USN)
HDZ	Helicopter Drop Zone
HE	High Explosive
HEDP	High Explosive Dual Purpose
HERS	Helicopter Expedient Refueling System
HERO	Hazards of Electromagnetic Radiation to Ordnance
HF	High Frequency

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

HIDACZ	High Density Airspace ControlZone
HLA	Helicopter Landing Area
HLZ	Helicopter Landing Zone
HMD DASC	High Mobility Downsized Direct Air Support Center
Hostile	A known threat Aircraft: implies clearance to fire
HPI/HIPIR	High Powered Illuminator Radar (HAWK)
HR	Helicopter Request (Net)
HST	Helicopter Support Team
HUC	Helicopterborne Unit Commander
HUD	Heads-up Display
HUMINT	Human Intelligence; collection by agents
HMMWV	High mobility multi-purpose wheeled vehicle
HVA	High Value Asset
HVAA	High Value Airborne Asset
IADS	Integrated Air Defense System
IAS	Intelligence Analysis System
ICAO	International Civil Aviation Organization
ICBM	Intercontinental Ballistic Missile
ICN	Interface Coordination Net
ICO	Interface Coordination Officer Interface Control Officer
ICU	Interface Control Unit
IDENT	To identify by means of a transponder code
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
IFSAS	Initial Fire Support Automated System
IJMS	Interim JTIDS Message Specification
IMC	Instrument Meteorological Conditions (See IFR)
IMINT	Imagery Intelligence
INTREP	Intelligence Report
INTSUM	Intelligence Summary
IOC	Initial Operational Capability
IOM	Install, Operate, and Maintain

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

IP	Initial Point
IPB	Intelligence Preparation of the Battlefield
IR	Infrared
IRBM	Intermediate Range Ballistic Missile
IRCM	Infrared Countermeasures
IRCCM	Infrared Counter Counter Measures
IRSTS	Infrared Search and Track Set
IT/ITT	Interrogator/Interrogator Translator Team
IW	Information Warfare
IWO	Intelligence Watch Officer
I&W	Indications and Warning
Jamming	The deliberate radiation of electromagnetic energy with the object of degrading the use of the enemy's electronic equipment
JADO	Joint Air Defense Operations
JATO	Jet-assisted Takeoff
JEAP	Joint Electronic Analysis Program
JDISS	Joint Deployable Intelligence Support System
JEZ	Joint Engagement Zone
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
Jink	The random motion of an aircraft (up/down and left/right) in order to avoid enemy ground fire
JINTACCS	Joint Interoperability of Tactical Command and Control Systems
JMEMs	Joint Munitions Effectiveness Manuals
JMCIS	Joint Maritime Command Information System
JOG (A,G,R)	Joint Operations Graphic (Scale 1:250,000) (A= Air, G= Ground, R= Radar)
JOTS	Joint Operational Tactical System
JSIPS	Joint Source Imagery Processing System
JSTARS	Joint Surveillance Target Attack Radar System
JTADS	Joint Tadi-A Distribution Systems
JTAR	Joint Tactical Airstrike Request
JTAO	Joint Tactical Air Operations
J-TENS	Joint Service Tactical Exploitation of National Systems

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

JTF	Joint Task Force
JTIDS	Joint Tactical Information Distribution System
KIAS	Knots Indicated Air Speed
Knot	Nautical mile per hour
LAAD BN	Low Altitude Air Defense Battalion
LAAM BN	Light Antiaircraft Missile Battalion
LAR	Light Armored Recon
LAN	Local Area Network
LASHE	Low Altitude Simultaneous Hawk Engagement
LAV	Light Armored Vehicle
LIC	Low Intensity Conflict
LLTR	Low Level Transit Route
LOD	Line of Departure
LEASAT	Leased Satellite
LF	Landing Force
LFOC	Landing Force Operations Center
LGB	Laser-guided bomb
LOC	Lines of Communication (roads, railroads, canals, etc)
LOS	Line of Sight
LST	Laser Spot Tracker Landing Ship Tank
LZ	Landing Zone
LZCT	Landing Zone Control Team
MACCS	Marine Air Command and Control System
MACG	Marine Air Control Group
MACH	The speed of sound
MACS	Marine Air Control Squadron
MAFC	Marine All-Source Fusion Center
MAG	Marine Aircraft Group
MAGTF	Marine Air Ground Task Force
MALS	Marine Aviation Logistics Squadron
MANPADS	Man Portable Air Defense Systems
MASS	Marine Air Support Squadron

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

MATCALCS	Marine Air Traffic Control and Landing System
MATCD	Marine Air Traffic Control Detachment
MAW	Marine Aircraft Wing
MBT	Main Battle Tank
MC	Missile Controller (TAOC)
MC and G	Mapping Charting and Geodesy
MCAT	Mechanized Combined Arms Team
MCCRES	Marine Corps Combat Readiness Evaluation System
MCE	Modular Control Equipment (USAF)
MCLOS	Manual Command Line of Sight
MCR	Multi-channel Radio
Maverick	The AGM-65 air-to-ground missile (TV, laser, IR)
MDS	Mission Display System
Meaconing	The generation or retransmission of a radio navigational signal in order to confuse navigation
MEDEVAC	Medical Evacuation
MEF	Marine Expeditionary Force
MEF (FWD)	Marine Expeditionary Force (Forward)
METMF	Meteorological Mobile Facility
METOC	Meteorology and Oceanography
MEU	Marine Expeditionary Unit
MEWSS	Mobile Electronic Warfare Support System
MEZ	Missile Engagement Zone
MIZ	Missile Intercept Zone
MIJI	Meaconing, Interference, Jamming, Intrusion
MIL	Short for milliradian (Trigonometric ratio denoting angular measurement) 10= 17.78 mils 1' = 1 mil @ 1000' slant range 6400 mils in a circle
MLA	Mission Load Allowance
MLRS	Multiple Launch Rocket System
MMT	Marine Air Traffic Control Mobile Team
MOBA	Military Operations in Built up Areas
MOPP	Mission Oriented Protective Posture

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

MOSS	Mobile Oceanography Support System
MOUT	Military Operations in Urban Terrain
MRB	Motorized Rifle Battalion
MRBM	Medium Range Ballistic Missile
MRD	Motorized Rifle Division
MLRS	Multiple Launch Rocket System
MRR	Minimum Risk Route Motorized Rifle Regiment
MSC	Major Subordinate Command
MSI	Multispectral Imagery
MSL	Mean Sea Level
MSR	Main Supply Route
MSPF	Maritime Special Purpose
MSEL	Master Scenario Events List
MTDS	Marine Tactical Data System
MTACS	Marine Tactical Air Command Squadron
MTI	Moving Target Indicator
MULE	Modular Universal Laser Equipment
Music	Electronic Jamming observed on radar
Mutual Support	Two or more friendly aircraft providing each other aid in visual lookout, jamming, weapons employment, etc. Two or more units able to deliver effective fire into or over the site of an adjacent, like weapon.
MUX	Multi-channel/Multiplexed Radio Systems
MWCS	Marine Wing Communications Squadron
MWSG	Marine Wing Support Group
MWSS	Marine Wing Support Squadron
NAI	Named Areas of Interest
NATO	North Atlantic Treaty Organization
NATOPS	Naval Air Training and Operating Procedures Standardization Program
NAVFAC	Naval Facility
NBC	Nuclear, Biological, and Chemical
NCA	National Command Authority
NCTR	Non-Cooperative Target Recognition

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

NEO	Non-combatant Evacuation Operation
NFA	No-fire Area
NGLO	Naval Gunfire Liaison Officer
NIIRS	National Imagery Interpretation Rating Scale
NIS	National Intelligence Survey Naval Investigative Service
NISC	Naval Intelligence Support Center
NM	Nautical Mile
NOB	Naval Order of Battle
NORAD	North American Air Defense Command
NORDO	Short for "no radio" (e.g., radio failure)
NOTAM	Notice to Airmen; flight advisory bulletins
NSA	National Security Agency
NSC	National Security Council Naval Space Command
NSFS	Naval Surface Fire Support
NTCSA	Naval Tactical Command System Afloat
NTDS	Naval Tactical Data System
NTS	Night Targeting System (AH-1)
NVD	Night Vision Device
NVG	Night Vision Goggles
NWIP	Naval Warfare Information Publication
NWP	Naval Warfare Publication
OAS	Offensive Air Support
OAT	Outside Air Temperature
OC(A)	Operational Commander (Airborne)
OCAC	Operation Control and Analysis Center
OGD	Obstacle Gain Defraction
OIR	Other Intelligence Requirements
OOB	Order of Battle
OPCON	Operational Control
OPLAN	Operations Plan
OPSEC	Operations Security

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

ONC	Operational Navigation Chart (Scale 1:1,000,000)
OSCC	Operational System Control Center (SYSCON)
OTC	Officer in Tactical Command
PAR	Pulse Acquisition Radar (HAWK) Precision Approach Radar (MATC)
PAWS	Prototype Analyst Workstation
PDS	Passive Detection System
PHIBGRU	Amphibious Group
PHIBROM	Amphibious Squadron
POL	Petroleum, Oil, and Lubricants
Port	Left-hand side
POW	Prisoner Of War
PRF	Pulse Repetition Frequency
PRI	Pulse Repetition interval
PW	Pulse Width
RAC	Refueling Area Coordinator
RADCON	Radiation Control
Radint	Radar Intelligence
RAOC	Rear Area Operations Center
RAS	Rear Area Security
RCC	Rescue Coordination Center
RF	Radio/Radar Frequency
RFA	Restricted Fire Area
RFI	Request for Information
RGR	Rapid Ground Refueling
RHAW	Radar Homing and Warning (same as RWR)
RIO	Report In/Out
RLT	Regimental Landing Team
RO	Radio/Radar Operator
ROA	Restricted Operations Area
ROC	Rules of Conduct Required Operational Capability Reconnaissance Operations Center
ROE	Rules of Engagement

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

ROZ	Restricted Operations Zone
R&S	Reconnaissance and Surveillance
RT	Radio Transmission(s) or transmitters
RRT	Radio Recon Team
RTB	Return to Base
RTF	Return To Force
RWR	Radar Warning Receiver
SA	Situational Awareness
SAAFR	Standard Use Army Aircraft Flight Route
SAAWC	Sector Anti-air Warfare Commander (USN) Sector Antiair Warfare Coordinator (USMC)
SAC	Strategic Air Command Senior Air Coordinator (TACC)
SAC(A)	Supporting Arms Coordinator (Airborne)
SACC	Supporting Arms Coordination Center
SACLOS	Semi-Automatic Command Line of Sight
SAD	Senior Air Director (DASC/TAOC)
SAFE	Selected Area for Evasion
SAM	Surface-to-Air Missile
SARC	Surveillance and Reconnaissance Center
SAR	Search and Rescue Synthetic Aperture Radar
SARH	Semi-Active Radar Homing
SCAR	Strike Coordination and Reconnaissance
SCATANA	Security of Air Traffic and Navigational Aids
SCI	Sensitive Compartmented Information
SCIF	Sensitive Compartmented Information Facility
SCR	Single Channel Radio
SEAD	Suppression of Enemy Air Defense
SEAL	Sea, Air, Land (special warfare group)
SERE	Survival, Evasion, Resistance, Escape
SHF	Super High Frequency
Shrike	AGM-45 ARM
SID	Surveillance Identification Director (TAOC)

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

Sidearm	AGM-122 ARM
Sidewinder	AIM-9 IR homing air-to-air missile
SIF	Selective Identification Features (a coded for of IFF)
SIGINT	Signals Intelligence
SINGARS	Single Channel Ground and Airborne Radio System
SLAR/SLR	Side-looking Airborne Radar
SO	Surveillance Operator (TAOC)
SOC	Special Operations Capable; MEU(SOC)
SOJ	Stand-off Jamming
Sortie	An aircraft takeoff/land cycle
Sparrow	The AIM-7 SARH air-to-air missile
Sparrowhawk	TRAP quick reaction helicopterborne platoon
Spintcom	Special Intelligence Communications
SATCOM	Satellite Communication
SPE	Systems Planning & Engineering
SPIE	Special Patrol Insertion/Extraction
Spotrep	Spot Report
Squawk	To identify oneself by means of IFF
SRAM	Short-Range Attack Missile (AGM-69)
SRBM	Short-Range Ballistic Missile
SRIG	Surveillance, Reconnaissance, Intelligence Group
SSM	Surface-to-surface Missile
SSES	Ships Signals Exploitation
SSO	Special Security Office(r)
Starboard	Right-hand side
STD	Senior Traffic Director (TAOC)
STOL	Short Take-off and Landing
SWD	Senior Weapons Director (TAOC)
SWO	Senior Watch Officer
TAC	Tactical Air Commander (USMC)
TAC(A)	Tactical Air Coordinator (Airborne)
TACAN	Tactical Air Navigation Aid

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

TACC	Tactical Air Command Center (USMC) Tactical Air Control Center (USN)
TACGRU	Tactical Control Group (USN)
TACP	Tactical Air Control Party (USMC/USAF)
TACRON	Tactical Control Squadron (USN)
TACS	Theater Airspace Control System (USAF)
TACTS	Tactical Aircrew Combat Training System
TAD	Tactical Air Direction (Net) Tactical Air Director
TADC	Tactical Air Direction Center
TADIL	Tactical Digital Information Link
TADIL A	A data link that employs two or more stations (HF or UHF) in a netted configuration
TADIL- B	A point to point data link (multi-channel or wire).
TADIL- C	A UHF data link used between air control agencies and interceptors
TADIL-J	A secure UHF, Jam resistant data link which uses JTIDS for information exchange from air, ground, maritime, EW and intelligence platform.
TADIT-B	Tactical Data Information Exchange
TAI	Target Area of Interest
TAFDS	Tactical Airfield Fuel Dispensing System
TAMPS	Tactical Aircrew Mission Planning System
TAOC	Tactical Air Operations Center
TAOM	Tactical Air Operations Module
TAR	Tactical Air Request (Net)
TARPS	Tactical Aerial Reconnaissance Pod System (F-14)
TARCAP	Target Combat Air Patrol
TASM	Tactical Air to Surface Missile
TASS	Tactical Automated Switching System
TATC	Tactical Air Traffic Control (Net) Tactical Air Traffic Controller (TAOC/DASC)
TAWO	Tactical Air Watch Officer
TCA	Terminal Control Area Tactical Control Assistant
TCAC	Technical Control and Analysis Center
TCO	Tactical Combat Operations

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

TDAR	Tactical Defense Alert Radar (LAAD)
TDC	Track Data Coordinator
TDCC	Tactical Data Communication Central
TDECC	Tactical Display And Engagement Control Console (HAWK)
TDMA	Time Division Multiple Access
TEAMS	Tactical EA-6B Mission Planning System
TECHCON	Technical Control Facility
TEEP	Training Exercise Employment Plan
TENCAP	Tactical Exploitation of National Capabilities
TERS	Tactical Event Reporting System
TERPES	Tactical Electronic Reconnaissance Processing & Evaluation System
TEWT	Tactical Exercise Without Troops
TGT	Target
THAAD	Theater High Altitude Air Defense
TLAM	Tomahawk Land Attack Missile
TMD	Theater Missile Defense
TO	Takeoff Tactical Officer (HAWK)
TOS	Time On Station
TOT	Time On Target
TOW	Tube Launched, Optically Tracked, Wire-Guided Anti-tank Missile
TPFDL	Time Phased Force Deployment List
TRAP	Tactical Recovery of Aircraft and Personnel
TRAP BROADCAST	Tactical and Related Applications Broadcast
TRE	Tactical Receive Equipment
TSDF	Time Slot Duty Factor
TTO	Transit to Objective
TTT	Time To Target
TUT	Technology upgrade to TEAMS
UAV	Unmanned Aerial Vehicle
UHF	Ultra-high Frequency
VMC	Visual Meteorological Conditions
VFR	Visual Flight Rules

GLOSSARY OF ACRONYMS AND TERMS (GOAT)

VHF	Very-high Frequency
VISCAP	Visual (Non-Radar) Combat Air Patrol
WP	White Phosphorous
WSO	Weapons Systems Officer
WTI	Weapons and Tactics Instructor
WTTP	Weapons and Tactics Training Program
WX	Weather
WWMCCS	World-Wide Military Command and Control System
Z	ZULU (Greenwich Mean Time)