



## Communicators Operations Badge

# Basic Skills for a Communicator Module

# Basic Skills for a Communicator

- **Modules- Basic Knowledge of Communications**
  1. **History of Communications**
  2. **Types of Communications**
    - a) **Visual**
    - b) **Spoken**
    - c) **Messenger**
    - d) **Wire**
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  5. **Licensing & Authority**
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    - b) **Procedure Words**
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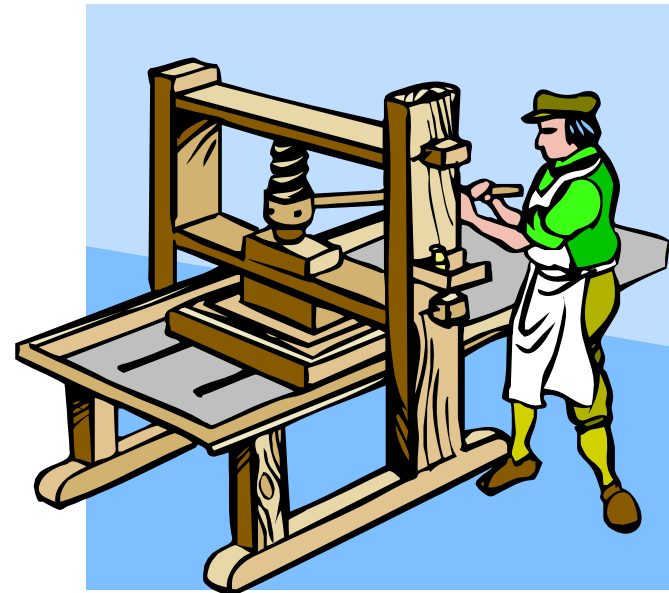
# History of Communications

## History of Communications Timeline

- 3000 B.C. - The Egyptians created a picture language called hieroglyphics.
- 105 A.D. - Chinese began using paper and ink.
- 450 A.D. - Asia used Block Printing.
- 1539 A.D. - Mexico began using the first printing press in the Western Hemisphere.
- 1639 A.D. - The first press in the American Colonies was established in Cambridge, Mass.
- 1665 A.D. - The "London Gazette" was the first English newspaper.
- 1738 A.D. - The first daily newspaper was the "Pennsylvania Evening Post and Daily Advertiser".
- 1828 A.D. - The first comprehensive dictionary was published by Noah Webster.
- 1844 A.D. - Samuel Morse transmitted the first public telegraph message.
- 1858 A.D. - The first Transatlantic cable was laid.
- 1876 A.D. - Alexander Graham Bell invented the telephone.
- 1878 A.D. - Thomas Edison invents and patents the recording of sound onto cylinders and discs.
- 1906 A.D. - First wireless communication of human speech.
- 1919 A.D. - First broadcast radio station KDKA licensed in Pittsburgh, Pennsylvania.
- 1936 A.D. - First television broadcast made in London, England.
- 1941 A.D. - First commercial television began in the United States.
- 1941 A.D. - Z3 computer developed by German engineer Konrad Zuse.
- 1954 A.D. - Color television broadcast standards are set in the U.S...
- 1957 A.D. - Satellite first sent information back to earth.
- 1959 A.D. - U.S. and Russian rockets sent information back to earth from distances beyond the moon.
- 1962 A.D. - "Telestar I", a satellite, first beamed television programs between the U.S. and Europe.
- 1971 A.D. - Intel 4004 chip developed an integrated microprocessor chip, for the computer, that could be programmed for different needs.
- 1976 A.D. - JVC markets the first VCR with the VHS (instead of Beta) format.
- 1985 A.D. - Television began to be broadcast in Stereo.
- 1994 A.D. - High Definition TV standards agreed on in the U.S..
- 1999 A.D. - Intel introduces the Pentium III processor, taking personal computing to new highs.

# History of Communications

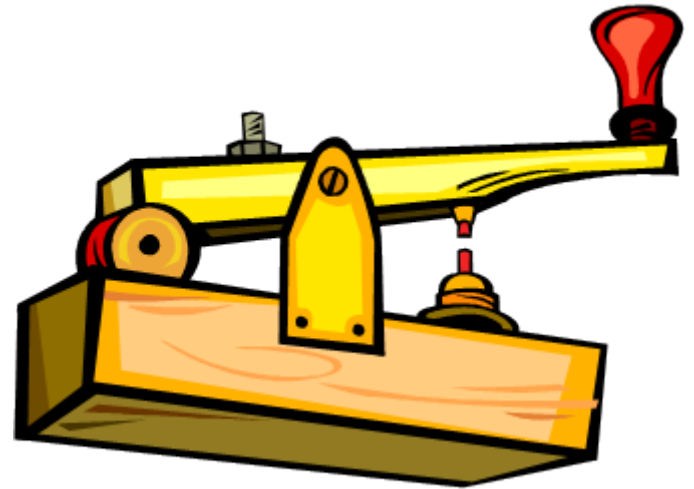
- Early communications were operated in various expressions to include:
  1. hieroglyphics
  2. story telling
  3. drums
  4. smoke signals
- Printing Press:
  - Rome developed a printing press in 1465.
  - The mechanics of printing changed little between 1450 and the 1800s, when the power press was introduced.
  - In 1728 Ben Franklin opened his own printing office in Philadelphia
  - Ben Franklin printed newspaper he called The Pennsylvania Gazette and the Poor Richard's Almanac
  - He used his printing press to bring the news to the people. Today we use modern versions of these printing presses to print books, magazines, and newspapers.



# History of Communications

## Electric Telegraph

- The inventor was Samuel Finley Breese Morse in 1832
- Morse's idea was to string a wire between two points, maybe miles apart. A key at one end is pressed and it closes the electrical circuit which sends a pulse of electricity through the wire. When the key is let go very fast, the pulse of electricity sent through the wire is a dot. If the key is held down 3 times longer, the pulse is a dash.
- Dashes and dots mixed together form different letters of the alphabet and when sent from a person at one end of the wire to another person at the other end of the wire, these dashes and dots would spell out words.
- On May 24, 1844, Morse stretched wires from Washington D.C. to Baltimore, New York and sent the message, "What hath God wrought!" through the telegraph machine. The telegraph was a success.
- In 1874, engineer and inventor Thomas Edison invented quadruplex telegraphy, where two messages could be sent in each direction at one time.
- In 1915, the multiplex telegraphy let eight or more messages be sent at one time. Because of this and the invention of the teleprinting machines during the mid-1920s the Morse Code telegraph system wasn't needed anymore.



# History of Communications

## Telephone:

- A telephone is an instrument that sends and receives information, usually by means of electricity.
- The word telephone comes from Greek words meaning far and sound. The telephone is one of our best ways to communicate.
- Alexander Graham Bell invented the telephone in Boston in 1876, 120 years later there are over 360 million telephone numbers, and that figure grows each year.
- Cordless phones do not have wires connected to them, that is why they are called cordless phones, but they still need to have vicinity within the range of a unit that is wired to the telephone system.
- Cellular phones are true wireless phones.



# History of Communications

- Radios
  - Radio's send information through a process called electromagnetic waves. These waves are measured by a metric measurement called a hertz
  - The term hertz is named after the early radio pioneer Heinrich Hertz.
  - Because electromagnetic waves travel in a straight line and earth is round, long distance travel for radio waves are made in the ionosphere, this is known as short wave signals or low frequency.
  - Wave length in short distance communication is called high frequency and does not use the ionosphere to reflect signals.
  - Radios are made up of two main components; a transmitter and a receiver that send signals back and forth.



# History of Communications

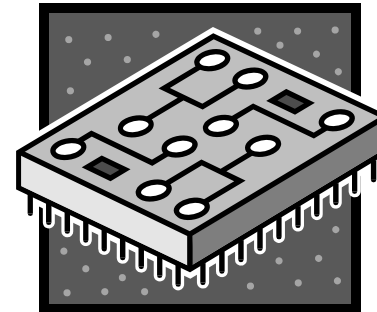
- Television
  - Television means to see from afar
  - In television, images and sounds travel electronically, that is, by means of electrical energy
  - A television camera changes the light that is reflected from a scene into electronic signals
  - Then a device called a transmitter sends out the signals (along with signals for the accompanying sound, which has been picked up by a microphone)
  - Finally, a television receives the signals and changes them back into sound and picture images



# History of Communications

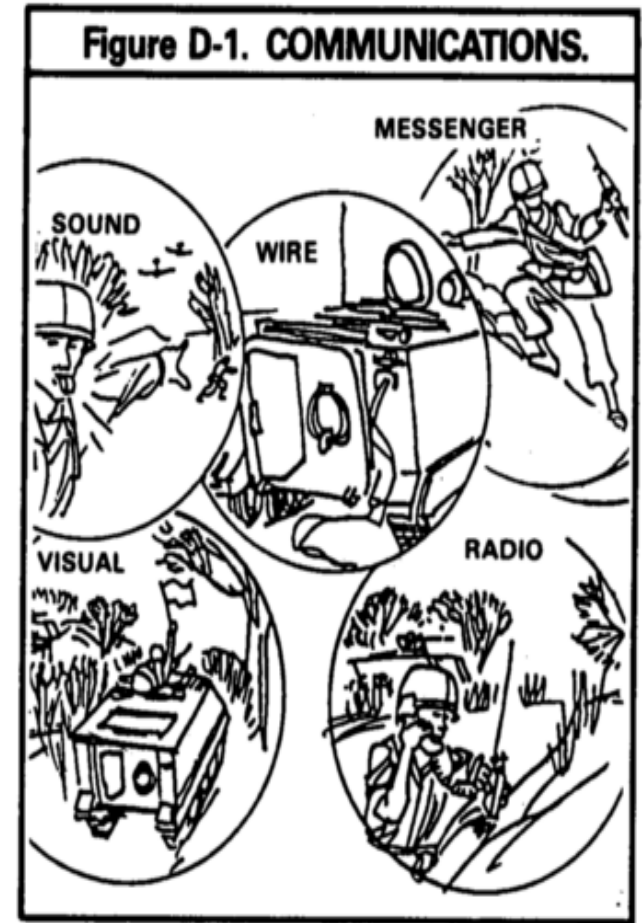
- Computers

- Konrad Zuse is popularly recognized in Germany as the "father of computer" and his Z1, a programmable automation system built between 1936 and 1938, has been called the first computer in the world
- Herman Hollerith was the first American to help in the invention of the computer in 1890. He invented the Tabulating Machine which was used by the U.S. Government
- Later the company changed its name to International Business Machines, we know the today as IBM, one of the worlds largest computer companies
- In the 1940-1950's one single computer filled an entire room and weighed about 30 tons. In the 50's and 60's the computers were smaller and faster, but still too big and expensive for home use
- In the 1970's smaller computers were designed for smaller businesses and the microprocessors were introduced



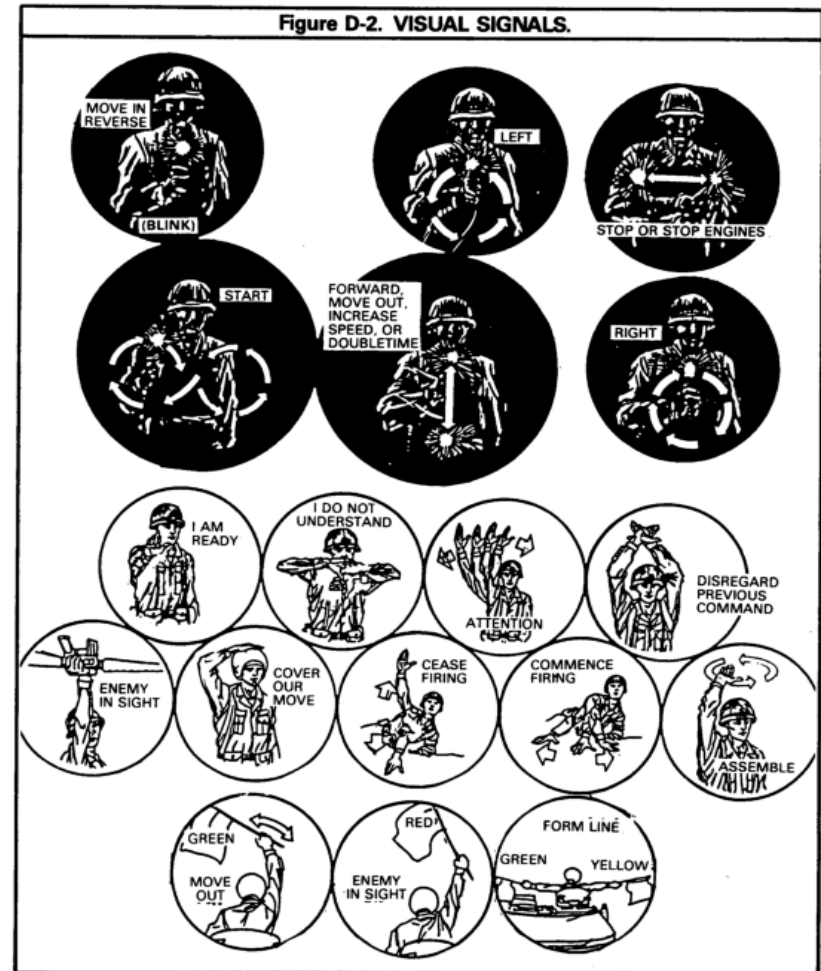
# Types of Communications

- **Communication** is the process of exchanging information usually via a common system of symbols. "Communication studies" is the academic discipline focused on communication forms, processes and meanings, including speech, interpersonal and organizational communication.
- Types:
  1. Visual
  2. Sound
  3. Messenger
  4. Wire
  5. Radio



# Types of Communications

- Visual signals are the most common means of communicating in squads and platoons. Arm-and-hand signals, flags, flashlights, and pyrotechnics can be used to rapidly transmit messages and instructions. A disadvantage is that these signals may be seen by the enemy, but using the terrain properly lessens that chance.



# Types of Communications

- Sound communications include such simple devices as whistles, horns, gongs, and explosives. Sound signals are used mainly to attract attention, transmit prearranged messages, and spread alarms. Sound signals work but only for short distances. Loud noises cut down the range and reliability of sound signals. They are also open to any interception, so their use may be restricted for security. To avoid any misunderstanding, sound signals must be simple. They are usually prescribed by the unit SOP and the SOI.



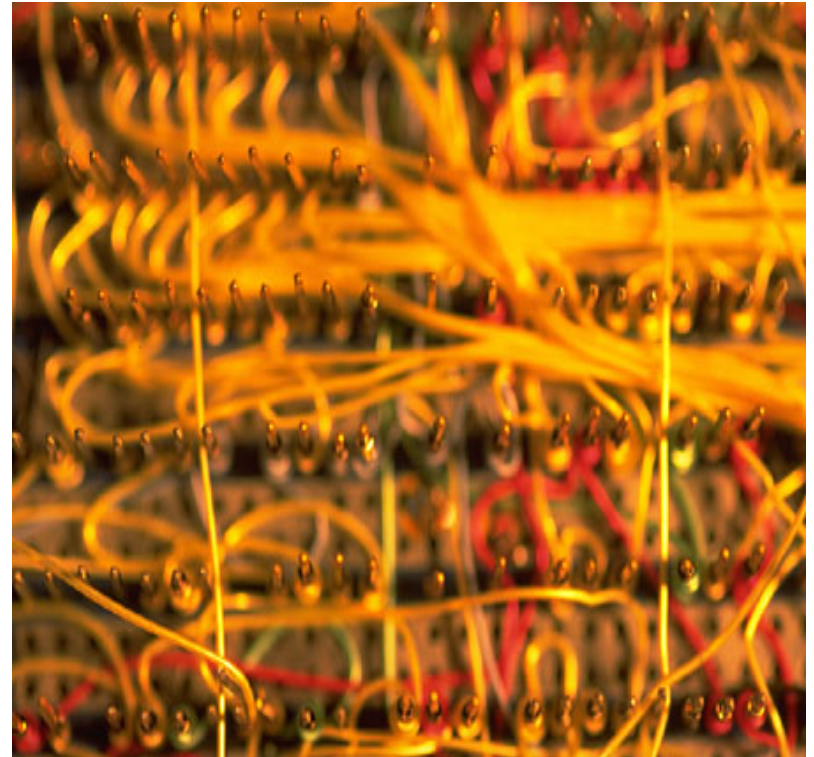
# Types of Communications

- **Messengers** are fairly secure means of communicating and usually the best way to send long messages that cannot be delivered personally by a commander. Using a messenger, though, is the slowest means of sending information, and it depends on the messenger not being delayed, captured, or killed.
- Messages sent by messenger should be clear, concise, and complete. No unnecessary words should be used. If there is a chance the messenger might be captured, the message should be in code using the operational code in the CEOI.



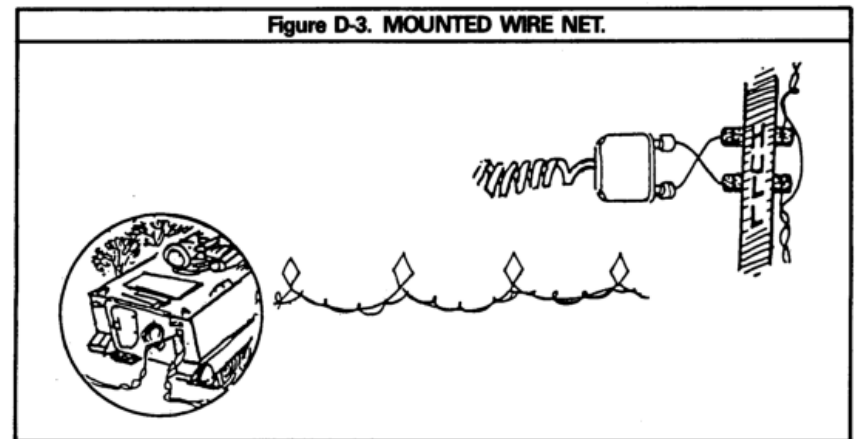
# Types of Communications

- **Wire communications should be used whenever a platoon expects to stay in one place more than an hour. When possible, the whole platoon is tied together through the use of a wire net. The wire net consists of field wire laid among carrier teams and dismount teams. All field communications wire (WD-1 and combat assault) consists of two independently insulated strands twisted together to form one wire. There are several ways the platoon wire net can be set up, depending on whether the platoon is totally mounted or partially dismounted.**



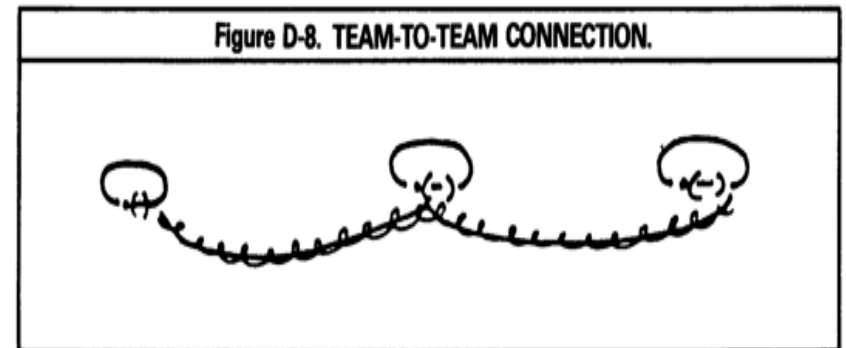
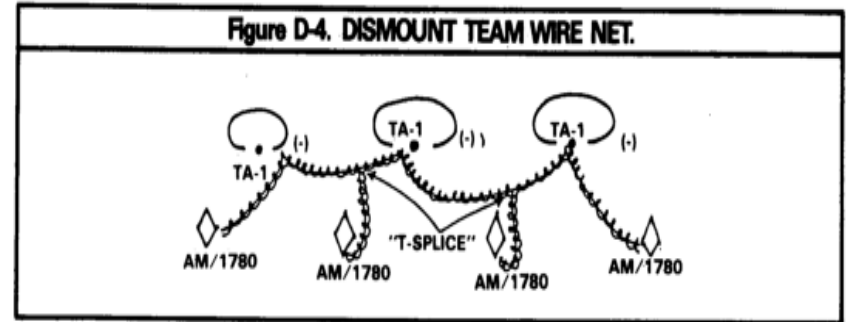
# Types of Communications

- In the **mounted mode**, the wire is laid from vehicle to vehicle and connected to the terminals on the right rear of each vehicle. Because TA-1 telephones (which are sound powered) are being used, one strand of the wire must be cut, the insulation stripped away and the wire ends attached to the wire terminal connectors on the right rear of the APC. The TA-1 is connected to the terminals on the inside of the vehicle by using a short length of wire.



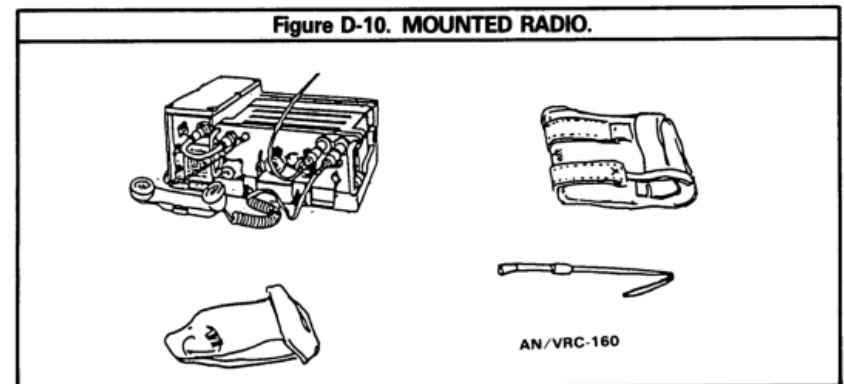
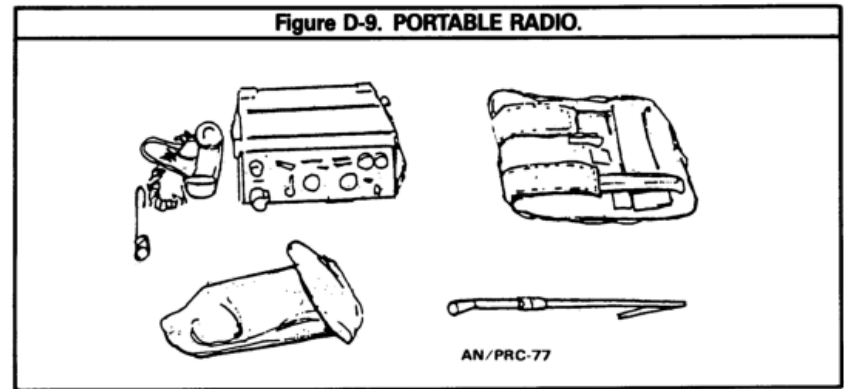
# Types of Communications

- In the **dismounted mode**, situations are of two types.
- (1) In the first type, the platoon occupies one position with both the carrier element and the dismount element deployed. The wire net would be made by connecting all the platoon carrier teams and dismount teams together by wire.
- In the second type of dismounted situation, the dismount element is in a position different from that of the carrier element. In this placement, the dismount teams would use their TA-1 telephones to establish a platoon hot loop among themselves. When using the TA-1, one of the wires must be cut and the insulation stripped back to connect the wire to the telephone binding posts. The telephones do not have to be on the same single wire. Only one wire needs to be cut to connect the telephone. The wire net is laid from team to team until all teams are connected to it.



# Types of Communications

- Because Threat forces have an extensive radio intercept capability, radio is used within the platoon only when messages cannot adequately be sent by other means. If a radio transmission is intercepted, the enemy can usually find out where a unit is and what it is doing.
- When radios are used, transmissions must be short and to the point. The sender must know what he wants to say before he transmits. This helps to keep messages short and the radio net open for others to use. Also, it reduces vulnerability to enemy intercept.



# Advantages/Disadvantages of Types of Communications

- A. Advantages

- (1) Wire. More secure than radio, less subject to interference from weather, terrain, and man-made objects.
- (2) Radio. Suited for use when on the move or when terrain/water makes wire communications impractical. Increased range.
- (3) Messenger. Most secure.

- B. Disadvantages -

- (1) Wire. Requires more time and manpower to install.
- (2) Non-Secure Radio. Lack of security, susceptible to enemy jamming/interception.
- (3) Messenger. Time consuming / very slow.

# Radio Spectrum

- The term “radio frequency spectrum” (or simply, “spectrum”) describes a range of frequencies of electromagnetic waves used for communication and other purposes, such as radar. The radio spectrum is a part of everyone's daily lives, whether they think about it or not. It provides a basis for a wide and diverse range of services and industries, including broadcasting, cellular telephones, wireless Internet connections, paging, radar, navigation, air traffic control, microwave services, satellites, and even garage door openers. Spectrum is crucial to the work of police and fire departments, it is essential to air and ground transportation systems, and, as important as any of these, it is used by the military for everything from two-way radios to precision guided weapons to radars.
- Spectrum management involves "allocation" and "assignment" of spectrum. An allocation describes use (e.g., broadcasting, fixed, mobile, etc.); allocations are made internationally and domestically. An assignment authorizes a person to use a discrete radio frequency channel under specified conditions.

# Radio Spectrum

- Under the Communications Act of 1934, the [Federal Communications Commission \(FCC\)](#) licenses spectrum use within the United States by all parties ***except*** *Federal Government agencies*. **NTIA**, through its Office of Spectrum Management, assigns frequencies to Federal Government spectrum users under authority delegated from the President, through the Secretary of Commerce. Federal agencies are represented to NTIA through the Interdepartment Radio Advisory Committee (IRAC), which advises NTIA. In addition, by statute, NTIA acts as the President's principal adviser on telecommunications policies generally, and must develop, in cooperation with the FCC, a long-range plan for management of the spectrum.
- The United States Department of Commerce, of which NTIA is a part, has a long history of involvement in radio regulation. Under the Radio Act of 1912, the Department of Commerce issued licenses for commercial radio use. The Radio Act of 1927 established the independent Radio Federal Commission and the basic structure of radio regulation that was carried into the Communications Act of 1934 and the Federal Communications Commission.



# Licensing & Authority

- The Federal Communications Commission (**FCC**) is an independent United States government agency, directly responsible to Congress. The FCC was established by the Communications Act of 1936 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC's jurisdiction covers the 50 states, the District of Columbia, and U.S. possessions.
- There are several requirements that must be fulfilled both under the Military and Civilian sectors before obtaining licensure depending on the environment and context in which the communications is being presented.
- Local Public Safety agencies such as fire, rescue, and law enforcement require a FCC license. State agencies require FCC licenses also.
- Only Federal Government Agencies, military, and Federal Home Land Security Agencies require NTIA approval. National Guard falls under the Department of Defense NETCOM.
- All Land Mobile Radio and Tactical communications in the Virginia Defense Force falls under the Virginia Army National Guard/NGB/NETCOM umbrella.

# Licensing & Authority

- **1. MILITARY**

- **(NTIA) Radio Regulation and Licensing Department (RRLD)**

- **A. Fixed and Mobile Service Division (FMSSD)**

- **Authority to Install and Operate Government Radio Communications**

- **Request for Frequencies (VHF/Low, VHF-Hi, UHF)**

- Request to Division G-6 Frequencies (14 days prior to use)
  - Location of Operation. Address & Latitude and Longitude
  - Purpose
  - Size of Transmitter (Watts)
  - Height of Antenna.
  - Duration
- G-6 Runs propagation model.
- Notifies VAARNG- JOC on operational request. Goes to Frequency Manager
- JOC approves
- Requesting Unit operates by military operational guidelines
- Unit report to G-6.
- License terminated.

# Licensing & Authority

- **2. Civilian/Public Safety**
- **B. FCC Licensing Department (Public Safety/Commercial Licensing)**
- Forms Found on line under [www.fcc.gov/ULS](http://www.fcc.gov/ULS)
- **ULS: Universal Licensing Service:**
- **Form FCC: 601**
- Requirements:
  1. Duly accomplished application form for Authority to install and Operate Private Radio Communications Network
- A. Administrative Requirements:
  - a. Justification of Request
- For Corporation/Partnership
  1. SEC Certificate of Registration/Partnership
  2. SEC Articles of Incorporation/Partnership and By-laws
- For Sole Proprietorship
  1. Certificate of Registration from the Bureau of Domestic Trade
- c. Proof of Business Engagement
  1. Exporters - Copy of the export documents, certificates of registration from the Board of Investments
  2. Contractors - Copies of updated contracts in the proposed locations
- Security Agencies - Updated copy of the license to Operate issued by the appropriate authorities and copies of contract from clients

# Licensing & Authority

- **Civilian/Public Safety Continued:**
- d. Mayor's Permit for each proposed location
- e. Audited Financial Statements of Assets and Liabilities
- f. Income Tax Return (current)
- B. Technical Requirements:
  1. Network Diagram showing the exact location of stations (including number of building, street, town, city, province) and shaded topographical map showing area coverage of the network signed and sealed by a registered Electronics Communications Engineer (ECE)
  2. Distances between Repeater/Fixed/Land Stations/flow of traffic/proposed
  3. Zip Codes for each proposed Repeater/Fixed/Land Locations
  4. Service Area and/or Points of Communication
  5. Proposed Frequency Band
  6. Mode of Operation (simplex/duplex)
  7. Bandwidth and Emission
  8. Effective Radiated Power
  9. Geographical Coordinates for each proposed Repeater/Fixed/Land Stations
  10. Antenna Particulars for each proposed Repeater/Fixed/Land

# Messaging Format (Military)

- **1-1. INTRODUCTION**

- Radio is the principal means of communications in most tactical units. It is used for command, fire control, exchange of information, administration and logistics, and liaison between and within units. It provides rapid station--to-station communications in highly mobile situations, and because it is adaptable to rapidly changing situations, it is more likely to be used in the initial stages of combat operations. Because of this, it is essential that all radio operators have a thorough understanding of radiotelephone procedures.

- **1-2. DEFINITIONS**

- a. **Radiotelephone Procedures**. Radio-telephone procedures is a uniform system in which everyone uses the same procedures to save time, help eliminate confusion, and provide a degree of security.
- b. **Radio Net**. A radio net is a group of radio stations controlled by one station, capable of direct communications with each other using a common frequency.

# Messaging Format (Military)

- **1-3. OPERATING RULES**

- a. **Write messages down.** To use circuit time more efficiently, all messages or their substance should be written down prior to transmission. Those messages which must be delivered by the receiving operator, or which are preceded by the proword MESSAGE, shall be written down.
- b. **Short transmissions.** Transmissions by radiotelephone shall be as short and concise as practicable, consistent with clarity. The use of standard phraseology (i.e. prowords) enhances brevity.
- c. **Natural phrases.** Radiotelephone transmissions should be clear, with natural emphasis on each word (except the prescribed pronunciation of a numeral), and should be spoken in natural phrases, not word by word.
- d. **Pause.** If it is technically practicable, the operator shall, during the transmission of a message, pause (release the 'push-to-talk' (PTT) switch) after each natural phrase and interrupt his transmission momentarily to allow another station to break in if necessary.
- e. **Listen.** To avoid interfering with other traffic, an operator shall listen to make certain that a circuit (frequency) is clear before making a transmission there.
- f. **Test signal.** When it is necessary for a station to initiate test signals, either for the adjustment of a transmitter before making a call or for the adjustment of a receiver, such signals will not continue for more than 10 seconds, and will be composed of spoken numerals (1, 2, 3, etc.) followed by the call sign of the station transmitting the signal. (This usually applies only to AM radios).

# Messaging Format (Military)

- **1-4. TRANSMISSION SECURITY**

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- a. Radio transmissions are considered secure only when the radio is used with its associated security equipment or authorized operations code. However, even the simple act of keying a transmitter gives the enemy useful information.

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- b. In the interest of security, transmissions by radiotelephone will be as short and concise as possible, consistent with clarity. Since personnel other than trained operators frequently operate radiotelephone equipment, all personnel must be cautioned that radiotelephone transmissions are subject to enemy interception and, when used without security equipment or operations codes, have no transmission security.

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- c. Adherence to prescribed procedure is mandatory. Unauthorized departures from or variations in prescribed procedures create confusion, reduce reliability and speed, and tend to nullify security precautions.

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- d. The following basic rules are essential to transmission security and must be strictly enforced on military radiotelephone nets.

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- (1) The following practices are **strictly forbidden**:

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- (a) Violation of radio silence.

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- (b) Unofficial conversation between operators.

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- (c) Transmitting on a directed net without permission.

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- (d) Excessive tuning and testing.

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- (e) Transmitting the operator's personal sign or name.

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- (f) Unauthorized use of plain language.

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- (g) Use of other than authorized prowords.

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- (h) Unauthorized use of plain language in place of applicable prowords.

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- (i) Linkage or compromise of classified call signs and address groups by plain language disclosures or association with unclassified call signs.

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- (j) Profane, indecent, or obscene language.

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- (2) The following practices are to be avoided:

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- (a) Use of excessive transmitting power.

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- (b) Excessive time consumed in tuning, changing frequency, or adjusting equipment.

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- 
- (c) Speaking at speed beyond the capabilities of the receiving operators.

# Messaging Format (Military)

- **1-5 PHONETIC ALPHABET**
- To avoid confusion and errors during transmissions, special procedures have been developed for pronouncing letters and numerals. The phonetic alphabet must be used to transmit code groups. Individual letters of the alphabet, or to spell difficult and unfamiliar words. The words of the phonetic alphabet, which is a word alphabet and not a code, are pronounced as shown in Figure 1-1.
- a. **Numerals** will be transmitted digit by digit except multiples of thousands may be spoken as such. However, there are special cases, such as in anti-air warfare reporting procedures in which normal pronunciation of numerals is prescribed and this rule does not apply. For example, 17 would then be SEVENTEEN.
- b. **Artillery Fire** In conduct of artillery fire when calling for fire, the pronunciation of whole hundreds is “HUNDRED” instead of “ONE ZERO, ZERO”, For example, 100 would be spoken as “ONE HUNDRED”.



# Messaging Format (Military)

- **1-6. PROCEDURE WORDS**
- Procedure Words (Prowords) are used to aid the radio operator and to keep transmission time to a minimum. They must be committed to memory and used verbatim. A complete understanding of the prowords and their meaning is essential for the expeditious handling of radio traffic. The following is a list of prowords discussed in this reference note; however, a complete list of prowords may be found in Allied communication Publications (ACP) 125 (\*).





# Messaging Format (Military)

- | <u>PROWORD</u>   | <u>MEANING</u>  |
|------------------|---|
| • DO NOT ANSWER  | Stations called are not to answer this call, receipt for this message, or otherwise transmit in connection with this transmission. It will be ended with the proword OUT. |
| • FROM           | The originator of this message is indicated by the address designation (call sign) immediately following.   |
| • I AUTHENTICATE | The group that follows is the reply to your challenge to authenticate.  |
| • I READ BACK    | The following is my response to your instructions to read back.   |
| • I SAY AGAIN    | I am repeating the entire transmission or the portion indicated.  |
| • I SPELL        | I will spell the next word phonetically.  |
| • I VERIFY       | That which follows has been verified at your request and it is repeated. (This proword is to be used only as a reply to the proword VERIFY.)                              |

# Messaging Format (Military)

<u>PROWORD</u>	<u>MEANING</u>
• RELAY	Transmit this message to all addresses or to the address designations (call signs) immediately following.
• ROGER	I have received your last transmission satisfactorily.
• SAY AGAIN	Repeat all of your last transmission. When followed by additional identification data, it means "Repeat (portion indicated)".
• SILENCE	(Repeated three times) Cease transmission on this net immediately. Silence will be maintained until lifted. (If on a nonsecure net, it <u>must</u> be followed by transmission authentication).
• SILENCE LIFTED	Silence is lifted. (If on a nonsecure net, it <u>must</u> be followed by transmission authentication).
• SPEAK SLOWER	Your transmission is at too fast a speed. Reduce speed of transmission.
• THIS IS	This transmission is from the station whose designation (call sign) immediately follows.
• THIS IS A DIRECTED NET	From now until further notice this net is directed.

# Messaging Format (Military)

- NOTE: The following are not listed as prowords, but are normally referred to as operating words.
- AFFIRMATIVE    Yes, or permission is granted.
- NEGATIVE                    No, or permission is denied.
- NOTE: Additional prowords concerning signal strength and readability are found in para 1-14 of this Reference Note.

# Messaging Format (Military)

- **1-7. NET CONTROL STATION**

- The net control station (NCS) is the radio station that controls and directs the operation of the net. the station serving the senior commander is normally designated the NCS.

- a. **Authority.** The NCS has complete **technical** control over the operation of the radio net, but does **not** have control over local administration of the individual stations in the net. However, within the scope of its authority, its decisions are absolute. Some of the duties and responsibilities of the NCS are as follows:

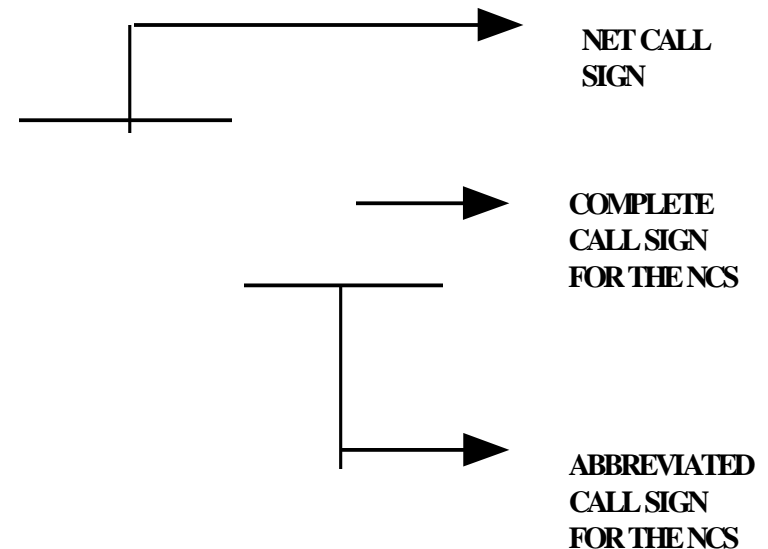
- 
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- (1) Opens and closes the net.
- (2) Admits or releases a station from the net.
- (3) Determines the type of net (free or directed).
- (4) Maintains circuit discipline.
- (5) Supervises the flow of traffic.
- (6) Maintains transmission security.
- (7) Imposes or lifts emergency silence.
- (8) Directs the net to use full or abbreviated calls.
- (9) Directs the net to use full or abbreviated procedure.
- (10) Corrects errors in operating procedures.
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# Messaging Format (Military)

- b. **Alternate NCS**. The alternate NCS should be appointed prior to any operation. It takes charge of the net whenever the NCS has to leave the net or becomes inoperative. The station serving the next senior commander is normally designated the alternate NCS; however, any station in the net could be
  - designated.
- c. **Operation**. A radio net can operate in one of two ways; as a free net or a directed net. In either net, stations must usually request permission from the NCS to enter or leave the net.
  - (1) **Free Net**. A free net is one where stations may exchange traffic without prior permission from the NCS. Unless otherwise directed by the NCS, radio nets will operate as free nets.
  - (2) **Directed Net**. When traffic is heavy, or when operators are inexperienced in handling net traffic, the NCS may order a directed net. In this case, no station will call another station without first calling the NCS and requesting permission. A disadvantage of using a directed net is that it increases the volume of traffic; thereby, increasing the chances of the enemy being able to intercept or locate the stations.

# Messaging Format (Military)

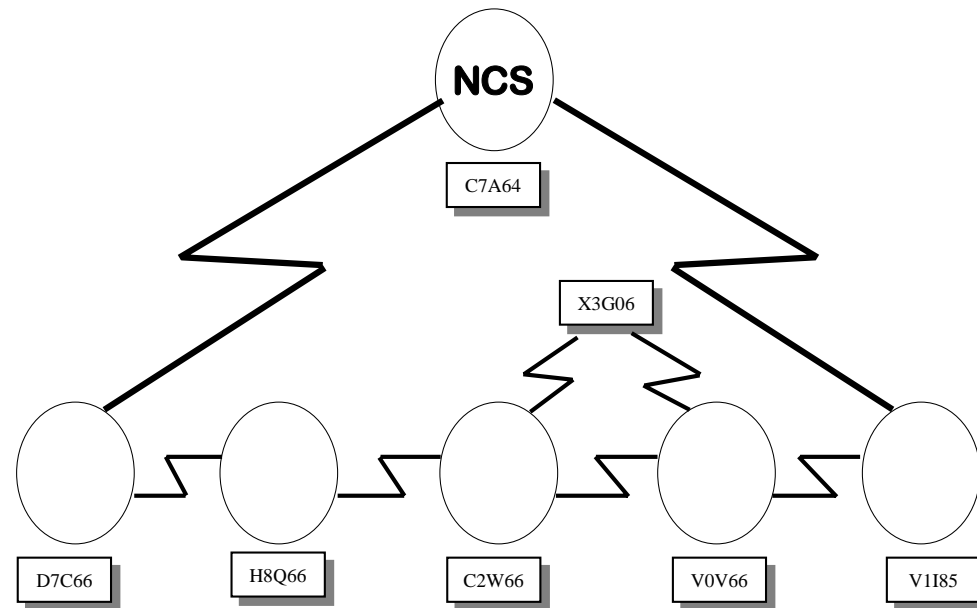
- Call signs are used in radiotelephone communications to identify a communications facility, a command, an authority, or a unit
- figure 1-8a. Call Sign Structure



# Messaging Format (Military)

- a. **Full Call Signs**. Full (complete) call signs consist of a letter-number-letter combination and a suffix. An expander may also be added. Full call signs are used as follows:
  - (1) When first establishing (opening ) a net.
  - (2) When reporting into a previously established net.
  - (3) When operating in a net not normally operated in or when relaying a message to another net.
  - (4) When directed by the NCS.

# Messaging Format (Military)



- b. **Abbreviated Call Signs.** Dropping the first two characters (letter-number) of a full call sign makes an abbreviated call sign.

# Messaging Format (Military)

- c. **Types of Call Signs**. There are three types of call signs: individual, collective and net. Refer to Figure 1-8b above.
- (1) An individual call sign represents a single station in the net, i.e., D7C66, C2W66, etc.
- (2) A collective call sign (X3G06 in figure 3 above) represents a predetermined group of stations within a net. It is used when two or more stations in the net are called more frequently than the other stations. It may also be used when two more stations are operating together, i.e., as part of a “task force”.
- (3) A net call sign represents all stations (excluding the NCS) in the net. It is made up of the first three characters (letter-number-letter) of the call sign for the NCS.
- (4) Stations respond to collective and net call signs in alphabetical order based on the first letter of their abbreviated call sign.

# Messaging Format (Military)

- **1-9. RADIO CALLS**
- The call is that portion of the transmission that identifies the station(s) being called and the station calling by their call signs. The two types of calls are:
  - a. **Single Call**. A single call is one in which only one call sign precedes the proword THIS IS. A single call may be an individual, a collective, or a net call sign.
  - b. **Multiple Call**. A multiple call is one in which two or more call signs precede the proword THIS IS. Called stations answer a multiple call in the order called. The calling station will normally place the call signs in alphabetical sequence.

# Messaging Format (Military)

- **1-12. MESSAGE FORMAT**
- Each message transmitted by radio is divided into three principal parts; the heading, the text, and the ending. Each part may be divided into several elements. Each message contains only those elements essential to the transmission of that particular message.
- a. **Heading**. The heading may include any or all of the following elements, which, when included, are transmitted in the order shown. (The separation sign (-) is used in this reference note to facilitate recognition of different elements).
- b. **Text**. The text is the actual message that is to be transmitted.
- c. **Ending**. The ending may contain all or any of the following elements.

