Can You Hear Me Now?

The JCEOI - Another Facet of Spectrum Management

By the DON CIO Spectrum Team

To use a current phrase, "being on the same page," is not adequate for military communications. If your unit or aircraft is not on the correct frequency, with the correct call sign and encryption scheme, coordinated operations are in jeopardy and potential friendly fire situations develop rapidly. The establishment and use of effective tactical communications are instrumental to successful training and peacetime operations — and they are critical in combat situations. Vital command and control (C2) mechanisms rely on the ability to quickly transmit information across the battlefield and throughout the world.

Individually, the military services are well trained and knowledgeable in their use of service-specific communication procedures. However, joint operations significantly complicate standard operating procedures and introduce a myriad of factors that must be overcome to ensure joint communications meet and exceed C2 requirements. Some of these complications include the use of new technologies and equipment, unfamiliar communication equipment capabilities and stovepipe, proprietary type equipment issues.

Most joint communication interoperability factors are overcome by establishing communication plans that create and assign common procedures and standards. To this end, the U.S. military uses a number of communication documents. For example, the Navy's primary communication control document is called an Operational Tasking of Communications (OPTASKCOMS). The overall operational plan (OPLAN) includes an Annex K that serves as the communication plan for all services.

Unique to aviation missions is the Air Tasking Order (ATO) used to task and disseminate projected sorties, capabilities and forces for targets and specific missions to components, subordinate units and command and control agencies. The Communications Electronics Operating Instructions (CEOI) are issued to control and promulgate communication procedures and standards.

The CEOI (known by the U.S. Army as the Signal Operating Instructions or SOI) is widely used by the Army and the Marine Corps, and to a lesser extent by the Navy and the Air Force. When jointly used, the CEOI is called the Joint CEOI or JCEOI. The JCEOI is the most widely used communication control document in any given area of operation. It is used by aviators, communicators and technical personnel in control facilities and joint staff positions.

What is the JCEOI?

JCEOIs are the primary controlling document for single channel radio communications in joint operations and exercises. The Single Channel Ground and Airborne Radio System (SINCGARS) is a family of Very High Frequency (VHF), Frequency Modulated (FM) radio sets. SINCGARS is capable of short- or long-range operation for voice or digital communications. It can be used for single channel operation or in a jam-resistant, frequency-hopping mode, which can be changed as needed. Since SINCGARS provides the primary means of command and control for infantry, armor and artillery units, formal coordination and automated tools are vital.

The JCEOI is the "telephone directory" for single-channel radio communications. A JCEOI details radio information for joint forces, service-specific elements and units including:

- Daily changing and non-changing frequency assignments
- SINCGARS cue, manual and net identification assignments
- Call sign assignments (example: Xray 3 Tango)
- Call words assignments (example: shooter)
- Daily changing code words (example: sign and countersign words for challenge and reply)

Other information found in JCEOIs, includes document handling instructions, controlling authority data, effective dates and reproduction instructions. Because of the sensitive information in JCEOIs, they are almost always classified documents.

How is JCEOI information used?

A lesson learned from the Vietnam War was that the use of non-changing radio frequency assignments and call signs often resulted in the compromise of information because the enemy was able to find and exploit radio frequencies and the information they carried. Because of that, modern JCEOI information is routinely provided in 10 individual time periods as displayed in Tables 1, 2 and 3 on the next page.

Who is responsible for creating the JCEOI?

Every individual unit and organization that uses single-channel tactical radio in a joint operation is generally assigned its single channel information (frequency assignments, call signs, etc.) in the JCEOI. Given the multitude of units and organizations involved, JCEOIs are often significantly large. Because of their overall size, individual services often reproduce and disseminate only the information they require.

JCEOI Individual Time Period Information	
Time Period	Day of the Month
1	1/11/21/31
2	2/12/22
3	3/13/23
4	4/14/24
Etc.	Etc.

Table 1.

Call Sign	Time Period					
Unit	*01*	*02*	*03*	*04*	*05*	*Etc.*
Radio Battalion	*Z2M*	*X7M*	*F5H*	*Q0N*	*F0Y*	

Table 2.

Frequency	Time Period					
Unit	*01*	*02*	*03*	*04*	*05*	*Etc.*
Radio BN Command	*4.6710*	*10.5150*	*9.0890*	*10.2580*	*8.7015*	

Table 3.

Although JCEOIs can be formatted in many different ways, a standard JCEOI assignment looks like the tables above. This JCEOI for Radio Battalion assigns the call sign "Zulu Two Mike" for time period 01 (used on the 1st, 11th, etc., day of the month). Additionally, the frequency for Radio Battalion is 4.6710 MHz (a HF assignment) for time period 01. The use of changing call signs and frequencies with encryption, provides a high degree of secure operations.

Creating a JCEOI is a complex, difficult task that requires a comprehensive understanding of all unit and equipment requirements, as well as an understanding of coordinating shared information that exists in other communication control documents. The JCEOI is considered a living document that is routinely updated.

The genesis of JCEOI development begins in initial planning conferences and continues throughout the entire planning period. Communications personnel, including spectrum managers (aka frequency managers), interpret the overall concept of operations, identify the supporting units and organizations, and begin to craft the JCEOI. In almost all cases, the actual development of JCEOIs is done by spectrum managers.

The spectrum manager's role in JCEOI development presents an interesting dichotomy in joint operations because the most widely used communications control document is created by some of the junior-most servicemen and women. Generally, spectrum managers are E-6s and E-7s, well trained and knowledgeable, with specialized training in spectrum management, including JCEOI development.

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Automated capability for creating the JCEOI

There are two automated tools that are widely used by spectrum managers to create JCEOIs. The oldest is the Revised Battlefield Electronics Communications Equipment Operating Instructions System (RBECS). The newest is the Joint Automated Communication System (JACS). While both programs are capable of compiling and generating JCEOIs, both programs fall short of providing all single-channel radio information used in today's joint operations.

Neither the RBECS nor the JACS program is capable of supporting advanced communications equipment such as Enhanced Position Location Reporting System (EPLRS). EPLRS is a synchronous Time Division Multiple Access (TDMA) system that provides the basic tactical functions of identification, position location and navigation information automatically to a centralized Net Control System or Land Mobile Radio (LMR) trunking. LMR trunking allows automatic sharing of a small number of radio frequencies (channels) between large numbers of radio users' information.

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Because of the deficiencies in RBECS and JACS and other factors, the Military Communications Electronics Board (MCEB) authorized the development of a new JCEOI program in early 2004.

Military operations with international partners and continued joint service deployments have made the modernization of communication tools a priority. Expanded use of sensors, unmanned aerial vehicles and sophisticated weapons systems, which are all spectrum-dependent, require more precise communication planning and operational implementation. Our spectrum managers — those who prepare the JCEOIs and those who execute those plans in the field — are working hard to ensure our ability to communicate and recognize friend from foe.

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