



# Department of Defense **INSTRUCTION**

**NUMBER 4630.09**

**July 15, 2015**

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DoD CIO

**SUBJECT:** Communication Waveform Management and Standardization

**References:** See Enclosure 1

1. PURPOSE. This instruction:

a. Reissues DoD Instruction (DoDI) 4630.09 (Reference (a)) in accordance with the authority in DoD Directive (DoDD) 5144.02 and DoDI 8330.01 (References (b) and (c)).

b. Establishes policy, assigns responsibilities, and provides procedures for:

(1) Management, standardization, and reuse of DoD software communication waveforms as outlined in Reference (b) and the Joint Tactical Networking Center Charter (Reference (d)).

(2) Periodically reviewing waveforms as they mature to ensure they provide interoperability, security, and operational value for DoD use.

(3) Fostering innovation by creating a process that allows waveform developers to submit conceptual waveforms for analysis and recommendations before either the developer or DoD make significant investments in duplicative capabilities.

2. APPLICABILITY. This instruction:

a. Applies to OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the DoD (referred to collectively in this instruction as the “DoD Components”).

b. Applies to all information technology (IT) and national security systems (NSS) acquired, procured (systems or services), or operated by any DoD Component to include DoD software communication waveforms, wireless (as defined in DoDD 8100.02 (Reference (e))) products, and associated technology, processes, personnel, programs, and organizations that initiate,

develop, test, and use waveforms. Further details on this applicability are provided by paragraphs (1) through (4):

(1) Applicable DoD waveforms include, but are not limited to, communication protocols used in tactical (e.g., tactical data links (TDL), tactical networking waveforms, line of sight waveforms, and satellite communication waveforms) and strategic environments. This instruction applies to new waveform developments and modifications to existing waveforms.

(2) This applicability extends to non-program of record waveforms as well as DoD IT and NSS acquisitions regardless of acquisition category level, major automated information systems, non-developmental items, and rapid fielding programs developed in response to urgent operational needs (UON).

(3) Applicable waveform and wireless communications software includes, but is not limited to the documented source code for networking waveform software, tactical data link software, application programming interface software, radio services software, tactical communications software, and network management software. References to waveform and wireless communication products includes, but is not limited to, waveforms and wireless communications, associated design/modification documentation, simulation models, test plans, test results, test vectors, porting plans, and the reference implementation for that software.

(4) Applicable waveform-related activities include new waveform development, waveform enhancements, and modifications to existing waveform products.

c. Will not alter or supersede the existing authorities and policies outlined by the United States Code or by DoDI 5000.02 (Reference (f)).

d. Will not alter or supersede the existing authorities and policies of the Director of National Intelligence regarding the protection of sensitive compartmented information (SCI) and special access programs (SAP) for intelligence as directed by Executive Order 12333 (Reference (g)) and other laws and regulations. Application of the provisions and procedures of this instruction to SCI or other SAP for intelligence information systems is encouraged where these provisions and procedures may complement or discuss areas not otherwise specifically addressed.

e. Does **not** apply to:

(1) Technology security and foreign disclosure (TS&FD) processes. Procedures for these activities are governed by the Arms Transfer and Technology Release Senior Steering Group and TS&FD office.

(2) Programs and procurements that use standards-based commercial communications service or commercially available off the shelf (COTS) waveforms, as defined by section 104 of Title 41, United States Code (Reference (h)), unless a standards-based COTS waveform is being modified or enhanced for use in the DoD. COTS equipment is subject to the policy in Reference (e).

(3) Science and technology efforts for research purposes and pre-system acquisition phase only.

3. POLICY. It is DoD policy that:

a. Communication waveforms used by the DoD will be catalogued in the DoD Waveform Information Repository (IR), which will be the authoritative source for DoD waveforms. The IR will contain information and status on all waveforms that are available for potential use or reuse, or are in the review process, and will inform DoD program managers (PMs) of communication waveform products and their stage of maturity.

b. Before beginning or continuing development of a waveform, consideration for using or enhancing existing waveforms will be conducted using the IR and other resources as necessary.

c. Waveforms will be analyzed to ensure that they meet interoperability requirements, security standards, and provide added operational value. Analysis will consider technology that supports waveforms such as radios and network managers and will include technology testing in accordance with the procedures specified in this instruction.

d. Waveforms will enter the review process when a waveform developer, or a DoD Component serving as a waveform sponsor, notifies the DoD CIO of the planned development of new, modified, or enhanced waveforms or the use of independently developed waveforms via submission of a waveform review application for a new, modified, or enhanced waveform, as described in Enclosures 2 and 3.

e. Waveforms for which DoD has sufficient intellectual property (IP) rights and supporting technical information to allow for reuse will be standardized to further DoD interoperability, security, and cost efficiencies. Standardization and technical materials sufficient to create products using that waveform will be made available in the IR in accordance with DoD's IP rights.

f. Waveforms in existence before the effective date of this instruction will be reviewed for compliance with this instruction on a case-by-case basis.

g. Waveforms will provide interoperability with IT and NSS systems and will be compliant with Reference (c).

4. RESPONSIBILITIES. See Enclosure 2.

5. PROCEDURES. See Enclosure 3.

6. INFORMATION COLLECTION REQUIREMENTS. The DD Form 1494, "Application for Equipment Frequency Allocation," located at <http://www.dtic.mil/whs/directives/infomgt/forms/formsprogram.htm>, and referred to in paragraph 3c(1)(c) and 4c(1)(a) of Enclosure 3 of this instruction, has been assigned Office of Management and Budget control number 0704-0188 in accordance with the procedures in Volume 2 of DoD Manual 8910.01 (Reference (i)).

7. RELEASABILITY. **Cleared for public release**. This instruction is available on the Internet from the DoD Issuances Website at <http://www.dtic.mil/whs/directives>.

8. EFFECTIVE DATE. This instruction is effective July 15, 2015.



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Enclosures

1. References
2. Responsibilities
3. Procedures
4. Waveform Application and Analysis Criteria

Glossary

TABLE OF CONTENTS

ENCLOSURE 1: REFERENCES.....6

ENCLOSURE 2: RESPONSIBILITIES.....7

    DoD CIO.....7

    DIRECTOR, DISA .....8

    USD(AT&L).....9

    DOT&E.....9

    UNDER SECRETARY OF DEFENSE FOR INTELLIGENCE (USD(I)) .....9

    DIRECTOR, NATIONAL SECURITY AGENCY/CHIEF, CENTRAL SECURITY  
    SERVICE (DIRNSA/CHCSS).....9

    DoD COMPONENT HEADS.....10

    SECRETARY OF THE ARMY .....11

    CHAIRMAN OF THE JOINT CHIEFS OF STAFF (CJCS).....11

ENCLOSURE 3: PROCEDURES.....12

    WAVEFORM REVIEW PROCESS OVERVIEW .....12

    STAGE 1 CONCEPTUAL STAGE .....16

    STAGE 2 PROTOTYPE STAGE.....17

    STAGE 3 OPERATIONAL STAGE.....20

    STAGE 4 REGISTRATION STAGE.....22

    IR ANALYSIS.....23

ENCLOSURE 4: WAVEFORM REVIEW APPLICATION AND ANALYSIS CRITERIA.....25

    WAVEFORM REVIEW APPLICATION .....25

    WAVEFORM ANALYSIS CRITERIA .....25

GLOSSARY .....27

    PART I: ABBREVIATIONS AND ACRONYMS .....27

    PART II: DEFINITIONS.....28

TABLES

    1. Waveform Review Stages and Disposition Outcomes .....14

    2. Analysis Criteria .....26

FIGURES

    1. Waveform Review Main Process Stages .....13

    2. Waveform Review Process Relationship to DoDI 5000.02 Development .....15

    3. Waveform Review Process Relationship to All Other Development.....15

ENCLOSURE 1

REFERENCES

- (a) DoD Instruction 4630.09, "Wireless Communications Waveform Development and Management," November 3, 2008 (hereby cancelled)
- (b) DoD Directive 5144.02, "DoD Chief Information Officer (DoD CIO)," November 21, 2014
- (c) DoD Instruction 8330.01, "Interoperability of Information Technology (IT), Including National Security Systems (NSS)," May 21, 2014
- (d) Under Secretary of Defense for Acquisition, Technology, and Logistics, "Joint Tactical Networking Center Charter," January 24, 2014
- (e) DoD Directive 8100.02, "Use of Commercial Wireless Devices, Services, and Technologies in the Department of Defense (DoD) Global Information Grid (GIG)," April 14, 2004
- (f) DoD Instruction 5000.02, "Operation of the Defense Acquisition System," January 7, 2015
- (g) Executive Order 12333, "United States Intelligence Activities," December 4, 1981, as amended
- (h) Section 104 of Title 41, United States Code
- (i) DoD Manual 8910.01, Volume 2, "DoD Information Collections Manual: Procedures for DoD Public Information Collections," June 30, 2014
- (j) Chairman of the Joint Chiefs of Staff Instruction 6510.02E, "Cryptographic Modernization Planning," April 1, 2014
- (k) DoD Directive 5143.01, "Under Secretary of Defense for Intelligence (USD(I)), " October 24, 2014, as amended
- (l) Section 142 of Title 10, United States Code
- (m) Chairman of the Joint Chiefs of Staff Instruction 3170.01I, "Joint Capabilities Integration and Development System," January 23, 2015
- (n) Chairman of the Joint Chiefs of Staff Instruction 6610.01E, "Tactical Data Link Standardization and Interoperability," April 10, 2014
- (o) Assistant Secretary of Defense for Research and Engineering (ASD(R&E)), "Department of Defense Technology Readiness Assessment (TRA) Guidance," May 13, 2011
- (p) DoD Instruction 8410.03, "Network Management (NM)," August 29, 2012
- (q) DoD Instruction 4120.24, "Defense Standardization Program (DSP)," July 13, 2011
- (r) DoD Manual 4120.24, "Defense Standardization Program (DSP) Procedures," September 24, 2014
- (s) DoD Instruction 4650.01, "Policy and Procedures for Management and Use of the Electromagnetic Spectrum," January 9, 2009
- (t) Deputy Assistant Secretary of Defense for Systems Engineering, "Program Protection Plan Outline & Guidance," Version 1.0, July 2011
- (u) Under Secretary of Defense for Acquisition, Technology, and Logistics, "DoD Open System Architecture Contract Guidebook for Program Managers," Version 1.1, June 2013

ENCLOSURE 2

RESPONSIBILITIES

1. DoD CIO. The DoD CIO:

a. Oversees implementation of this instruction and serves as the disposition authority for DoD waveform registration and standardization.

b. Coordinates with the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) and other acquisition authorities in the enforcement of this instruction. The DoD CIO will provide waveform analyses and recommendations to USD(AT&L), waveform sponsors, and waveform developers.

c. In coordination with USD(AT&L) and Director, Joint Tactical Networking Center (JTNC), ensures information on registered and reviewed waveforms is present and accessible in the IR.

d. Verifies that the communications waveforms on the DoD waveform list are referenced in the DoD IT Standards Registry (DISR).

e. Issues a memorandum annually to the appropriate DoD Components and stakeholders containing the DoD waveform list.

f. Review each new, modified, or enhanced waveform with technical support and procedures in accordance with Enclosure 3.

g. Reviews the DoD waveform list as necessary to recommend changes to the list, with input from the Defense Information Systems Agency (DISA), Joint Staff, JTNC, Military Departments, National Security Agency (NSA), Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OUSD(AT&L)), and the Office of the Under Secretary of Defense for Intelligence (OUSD(I)). These changes include retiring outdated or redundant waveforms or updating waveform information where inaccurate information is found in the IR. Each waveform on the list will be reviewed at least once annually.

h. Determines the appropriate initial stage for waveform review applications based on maturity and the procedures specified by this instruction.

i. In coordination with USD(AT&L), develops an implementation guide that provides guidance to waveform sponsors, further explains the waveform disposition process, and provides information on how to access and use the IR.

j. In coordination with OSD, Joint Staff, and the Military Departments, develops and maintains a waveform roadmap to show evolution of waveform developments.

k. In coordination with the Director, NSA, OSD, Joint Staff, and the Military Departments, develops and maintains the DoD CIO Radio and Communication Security Modernization Plan. This plan consolidates new waveform and radio development to drive enhanced efficiencies, capabilities, and interoperability throughout DoD in accordance with Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6510.02E (Reference (j)).

l. Uses discretion to modify the procedure of Enclosure 3 of this instruction as needed to accommodate special cases of waveform reviews and cost, schedule, and performance goals.

m. Establishes and maintains a list of DoD users of waveforms, noting specific versions and radios used. This list will be used to aid DoD CIO waveform reviews and to assist in radio frequency spectrum allocation.

n. Ensures waveform dispositions are added to Information Support Plan (ISP) documentation.

o. Provides guidance to and consults with the Secretary of Defense and USD(AT&L), Secretaries of the Military Departments, Director of Operational Test and Evaluation (DOT&E), and the Director of JTNC with respect to:

(1) Waveform test and evaluation in DoD in general.

(2) Specific waveform test and evaluation to be conducted in connection with a major defense acquisition program.

p. Monitors and reviews the waveform testing activities of DoD using designated observers as necessary.

2. DIRECTOR, DISA. Under the authority, direction, and control of the DoD CIO and in addition to the responsibilities in section 7 of this enclosure, the Director, DISA:

a. Provides subject matter expert support to the DoD CIO for the review process of individual communications waveforms.

b. Supports the DoD CIO in ensuring that waveform standards are referenced in the DISR in compliance with this instruction.

c. Provides the DoD CIO with certificates and reports from Joint Interoperability Test Command and any other relevant waveform analysis activities as required by the waveform reviews in Enclosure 3.

d. Conducts additional independent testing when necessary using available DoD test facilities. If needed, uses unique test capabilities beyond what is already available within DoD or commercially.



3. USD(AT&L). The USD(AT&L):

a. As the Defense Acquisition Executive, enforces, with support of the DoD CIO and JTNC, the policies and procedures of this instruction and ensures that these are addressed during systems acquisitions, as appropriate.

b. Ensures that programs that reuse existing waveforms do so by selecting from the list of registered waveforms, while programs that develop new waveforms adequately address them in accordance with this instruction. Priority will be given to rapid acquisitions under UON rules to allow employment in a timely manner while also satisfying the appropriate steps of this instruction.

c. Provides subject matter expert support to the DoD CIO for the review process of individual communications waveforms.

4. DOT&E. The DOT&E:

a. Ensures processes, procedures, and infrastructure are available to operationally test and analyze waveforms used in developments under DOT&E program oversight.

b. With input from JTNC, ensures operational tests of radios and systems that include waveforms as described in Enclosure 3.

5. UNDER SECRETARY OF DEFENSE FOR INTELLIGENCE (USD(I)). The USD(I):

a. Serves as the DoD focal point to the Intelligence Community for waveform policy and oversight matters relating to intelligence information sharing and interoperability of Defense intelligence systems and processes in accordance with DoDD 5143.01 (Reference (k)).

b. Provides subject matter expert support to the DoD CIO for the review process of individual communications waveforms.

6. DIRECTOR, NATIONAL SECURITY AGENCY/CHIEF, CENTRAL SECURITY SERVICE (DIRNSA/CHCSS). Under the authority, direction, and control of the USD(I), consistent with section 142 of Title 10, United States Code (Reference (l)), and in addition to the responsibilities in section 7 of this enclosure, the DIRNSA/CHCSS:

a. Leads, with the support of the other DoD Components and waveform sponsors, the development of suitable technical standards; administrative guidance; key-management protocols, devices, and systems; encryption methods; and other items as required to enable waveforms to comply with applicable security controls.

b. Prescribes the standards, methods, and procedures for secure operation, management, and protection of waveforms.

c. Provides subject matter expert support to the DoD CIO for the review process of individual communications waveforms.

d. Coordinates with the DoD CIO to develop and maintain the DoD CIO Radio and Communication Security Modernization Plan.

e. Coordinates with JTNC on security standards, compliance, and certification.

f. Provides the DoD CIO with NSA certifications as needed for the waveform reviews described in Enclosure 3.

7. DoD COMPONENT HEADS. The DoD Component heads:

a. Plan and budget for waveform sponsorship necessary to comply with this instruction. Identify a representative to serve as the waveform sponsor to complete sponsorship requirements of this instruction.

b. Implement the requirements of this instruction during the systems acquisition process, as communication waveforms are developed, modified, or enhanced.

c. Encourage independent defense industry vendors and ensure U.S. Government development facilities use the procedures of this instruction when modifying registered DoD waveforms or developing new concepts to align efforts with needed DoD capabilities.

d. Provide subject matter expert support to the DoD CIO for the review process of individual communications waveforms as specified in Enclosure 3.

e. Ensure that new, modified, or enhanced waveforms provide new or enhanced capabilities in accordance with their requirements, such as those developed in accordance with CJCSI 3170.01I (Reference (m)).

f. Ensure that updates to the waveforms and wireless communications software products and standards will be submitted to the DoD CIO based on the procedures in Enclosure 3 in a timely manner throughout the lifecycle of each waveform.

g. Notify the DoD CIO of the planned development of new, modified, or enhanced waveforms or the use of independently developed waveforms. This notification is also applicable to any modifications of a COTS waveform for use in the DoD.

h. Facilitate linkage with or integration of existing waveform information sites with the IR.

8. SECRETARY OF THE ARMY. In addition to the responsibilities in section 7 of this enclosure, the Secretary of the Army, through the Director, JTNC:

- a. Performs independent technical tests and analysis as outlined in this instruction and maintains the capability to conduct these analyses.
- b. Coordinates with the DoD CIO, USD(AT&L), DOT&E, waveform developers, and sponsors to develop procedures for test events, schedule tests, and provide cost information to enable developers and sponsors to plan and budget for these test activities.
- c. Provides operational test certification capabilities and delivers certification reports and results to the DoD CIO in compliance with Enclosure 3 of this instruction.
- d. Provides subject matter expert support to the DoD CIO for the review process of individual communications waveforms.
- e. Establishes and maintains a comprehensive IR that centralizes software code, documentation, and artifacts of DoD waveforms to enable authorized programs of record, authorized industry vendors, authorized academia, and DoD research agencies to access content of the IR and contribute to it. The IR will link or integrate with any existing DoD waveform repositories to avoid any duplication and comprehensively catalogue all waveforms.
- f. Provides authorized users with access to the IR.
- g. Provides input to the DoD CIO to assist in the establishment of a list of DoD users of waveforms, noting specific versions and radios used.
- h. Implements authentication and access controls for information in the IR based on IP rights markings (including restrictive notices or legends) governing the waveform information (e.g., software, technical data, and supporting materials). These controls will ensure that users are specifically placed on notice that IR information is provided only to users that are authorized to access and use that information in accordance with applicable IP rights restrictions.
- i. Implements procedures to ensure that users accessing or reproducing waveform information in the IR are subject to appropriate use and confidentiality obligations (e.g., a restricted-use and nondisclosure agreement) in accordance with the IP rights governing the information.

9. CHAIRMAN OF THE JOINT CHIEFS OF STAFF (CJCS). In addition to the responsibilities in section 7 of this enclosure, the CJCS:

- a. Validates requirements for new or modified waveforms in accordance with Reference (m).
- b. Provides subject matter expert support to the DoD CIO for the review process of individual communications waveform applications.

ENCLOSURE 3

PROCEDURES

1. WAVEFORM REVIEW PROCESS OVERVIEW

a. The waveform review process provides a framework for evaluating a waveform at four distinct points during its development, beginning at the conceptual stage. The process allows waveform sponsors and independent vendors to vet new waveform developments and gain a DoD-wide opinion before making significant resource commitments. Similarly, the process allows DoD to evaluate a new waveform's value and capabilities before committing significant DoD resources. The remainder of the process provides for evaluations at other key points to ensure that the waveform is properly matured, tested, documented, and that it ultimately is registered as a DoD waveform.

b. In each of the four stages of the review, the process addresses two different categories of waveform development.

(1) The first category pertains to waveforms that are developed as part of an acquisition program that follows the Defense Acquisition System (DAS) procedures in Reference (f). Waveforms developed as part of an acquisition program will implement the majority of the steps of this enclosure by complying with the existing policy as described in Reference (f). For this category, where supporting documentation is required by the process, it will be provided through the normal DAS Integrated Product Team (IPT) process.

(2) The second category pertains to those waveforms that are procured outside of the DAS processes. As an example, these may be waveforms developed by industry or another entity and presented to DoD for consideration and possible procurement. They might also be waveforms associated with a system that the DoD procures that does not meet the criteria for a DAS program. For waveforms in this category, the process description identifies the requirements for submitting supporting documentation to support the analysis at each phase. Of note, a waveform development that falls into the second category could become a DAS program at some point during its life cycle. At that point, the waveform would fall within the guidelines for DAS developments.

c. Developments and processes completed in accordance with related policies such as those for requirements (Reference (m)), tactical data link standardization (CJCSI 6610.01E (Reference (n))), acquisition (Reference (f)), and interoperability (Reference (c)) are not duplicated or superseded by this process. Those processes remain in force and provide their documents and outcomes to this process as necessary via the IPT process. This minimizes duplication and eases reporting requirements for DoD waveform sponsors.

d. The waveform review process requires a waveform development to have a DoD waveform sponsor before the commitment of DoD funding resources. A waveform development without a waveform sponsor does not have DoD funding. Waveforms require a waveform

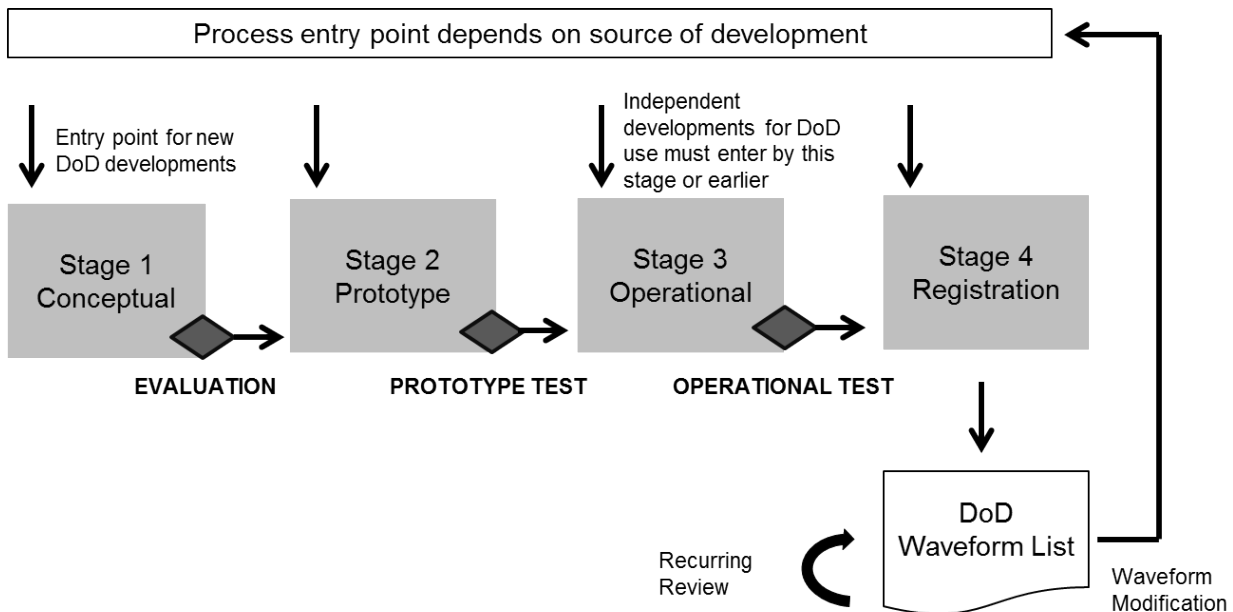
sponsor, at a minimum, before Stage 3 of this process, which is when any field or operational testing occurs. As a waveform develops, the waveform sponsor may change. When this occurs, the requirements specified in this instruction transfer to the new waveform sponsor.

e. Information on all waveforms available or under review for use by DoD, including those developed by public sources (e.g., a U.S. Government laboratory) as well as private entities, will be stored in the IR. The IR will document all waveforms in this waveform review process and contain materials to facilitate reuse of existing capabilities, minimize duplication of effort, and lower the cost of future waveform development. Results of waveform reviews and the DoD waveform list will be provided and stored in the IR. The IR will enable authorized users (e.g., DoD PMs, waveform sponsors, and other waveform developers) to discover existing and developing communication waveforms and their levels of maturity. However, the information in the IR will be made available only to authorized users, and only for authorized uses or purposes, in accordance with any IP rights restrictions governing the information. The IR will integrate with or link to other DoD information repositories to avoid duplication.

f. The procedures of this enclosure analyze DoD waveforms based on the criteria in Table 2 of Enclosure 4. The steps of this process ensure that waveforms are secure, interoperable, and provide new operational value.

g. The stages of this waveform review process progressively steer waveform development toward formal registration by the Office of the DoD CIO and designation as a registered DoD waveform. Figure 1 depicts the main stages of this process. The National Telecommunications and Information Administration must approve each proposed frequency or band before testing.

Figure 1. Waveform Review Main Process Stages



h. The process outlined by this instruction begins with submission of a waveform application for a new, modified, or enhanced waveform. The Office of the DoD CIO will work with the

waveform developer or waveform sponsor to enter the candidate waveform into the process at the appropriate stage. Similarly, if a registered waveform is modified or enhanced beyond its initial capabilities requirements, the Office of the DoD CIO will work with the waveform sponsor to place the waveform in the review process at the appropriate stage.

i. New waveform developments within the DoD are expected to enter the process at Stage 1. At their discretion, independent waveform developers can enter this process for DoD review of their technology, but must do so at either the conceptual or prototype stages (stages 1 and 2 as outlined in sections 2 and 3).

j. The Office of the DoD CIO serves as the disposition authority for waveform reviews, issuing dispositions at each stage as outlined in Table 1. Reviews will be conducted with input from DISA, the Joint Staff, JTNC, the Military Departments, NSA, OUSD(AT&L), and OUSD(I). Review disposition memorandums at stages 1, 2, and 3 are used as input to the acquisition authority, waveform developer, waveform sponsor, and IR as appropriate. At each stage of the review procedure, the Office of the DoD CIO will revisit whether the candidate waveform continues to meet its originally stated requirements or whether requirements changed such that the application should be revisited.

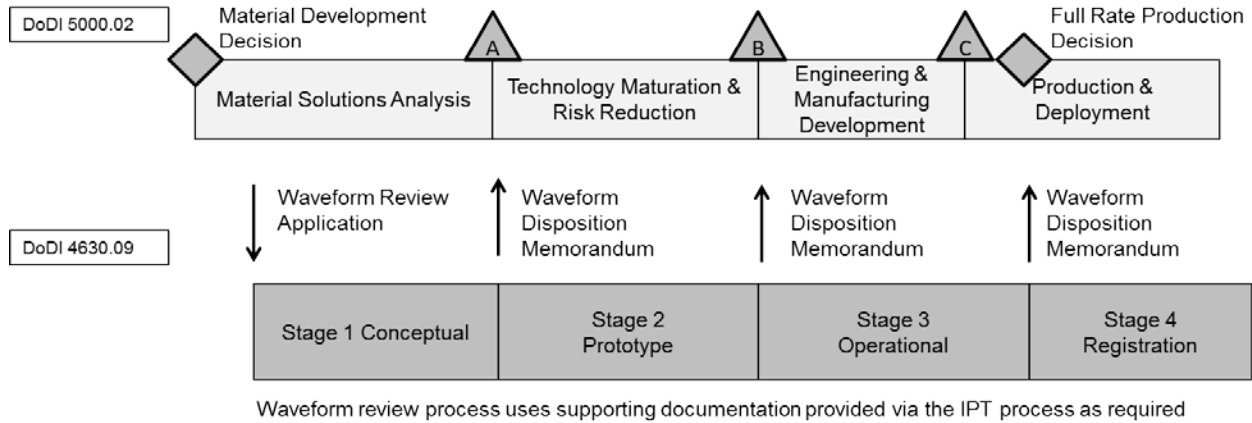
Table 1. Waveform Review Stages and Disposition Outcomes

<b>Stage</b>	<b>Purpose</b>	<b>Disposition Outcome</b>
1 – Conceptual	Determines that new, modified, or enhanced waveform concept does not duplicate existing DoD waveform capabilities	Analysis and recommendation on continued development at Milestone A (MS A), relevant acquisition authority, or waveform developer; charts waveform as providing potential value to DoD
2 – Prototype	Determines technical feasibility of waveform development	Analysis and recommendation on continued development at Milestone B (MS B), relevant acquisition authority, or waveform developer; charts waveform as providing unique capabilities within DoD and functionally attainable characteristics
3 – Operational	Verifies functionality in an operational environment and that interoperability, security, and other standards are met	Analysis and recommendation at the full rate production (FRP)/full deployment decision (FDD), relevant acquisition authority, or waveform sponsor to permit DoD use over a limited timeframe to allow completion of Stage 4
4 – Registration	Verifies cataloging of all waveform materials in IR	Registration as a DoD waveform subject to recurring reviews and storage of waveform materials in the IR

k. Figure 2 provides an overview of the alignment of this waveform review process and DoD developments that follow the Defense Acquisition Management System in Reference (f).

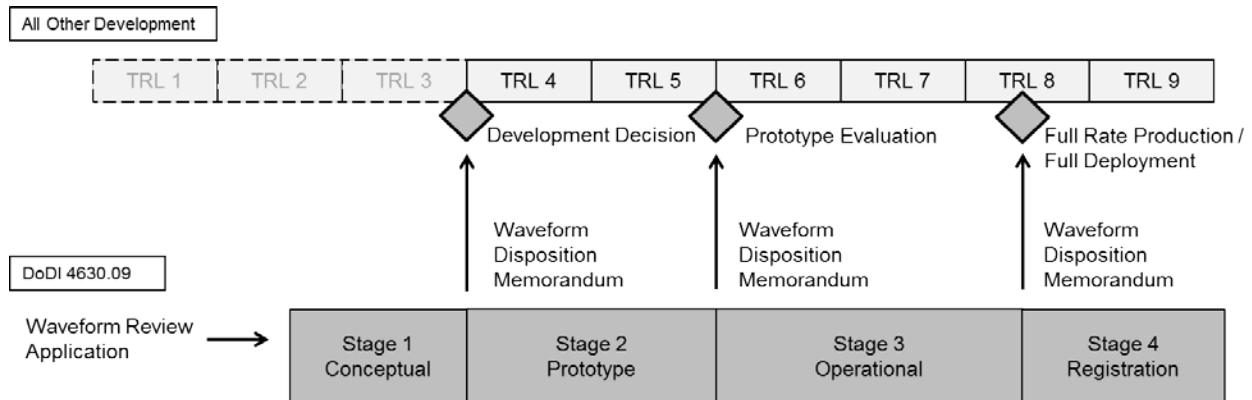
Through this process, the Office of the DoD CIO provides disposition recommendations as input at the MS A, MS B, and FRP/FDD points.

Figure 2. Waveform Review Process Relationship to DoDI 5000.02 Development



1. Figure 3 depicts the relationship between stages of this waveform process and general steps that are taken for the development, modification, or enhancement of a waveform outside the DAS process using technology readiness levels (defined in DoD technology readiness assessment (TRA) guidance (Reference (o))) as a guide to show progressing maturity.

Figure 3. Waveform Review Process Relationship to All Other Development



m. For waveforms in existence on or before the effective date of this instruction, the Office of the DoD CIO will work with the waveform sponsor to determine whether additional effort or information is needed to complete the waveform review process. This determination will also place the waveform into the appropriate stage of the review process.

n. Waveforms that have proposed multiple configuration options should provide a table showing all applicable combinations of options and will undergo a single review for all operating options. Configuration options include any settings for different operating modes or for use in different environments or domains. This table will be updated in subsequent stages and only those combinations submitted for analysis at each stage will be considered for analysis at that time.

o. If multiple DoD Components are sponsoring similar waveform technologies, the waveform sponsors are encouraged to collaborate on submission of the waveform review application. To the extent practical, waveform sponsors will collaborate with all PMs that use a given waveform to gather information and complete requirements of this instruction. The Office of the DoD CIO will work to resolve any differences among submissions of similar waveform technologies.

p. The Office of the DoD CIO will ensure that waveform updates, modifications, or enhancements are tracked by this process. Any change made to a waveform that diverges from its baseline capability requirements and lifecycle sustainment plan submitted as a part of this process will be subject to another review. Changes made to a waveform while in development (before completion of Stage 4) that affect interoperability with the existing waveform or alter the parameters and features outlined by the waveform's specification, require review of the documentation of this process to describe the changes at the next stage. Waveform updates, modifications, and enhancements will be tracked by version numbers.

q. Waveform development carried out under UON will not be delayed during the period when a disposition is pending.

r. For existing waveforms for which DoD does not have sufficient technical information or IP rights to support reuse, the Office of the DoD CIO, in coordination with OUSD(AT&L) or SAE and CAE as appropriate, will work with the waveform sponsor to determine whether to request such additional technical information or IP rights. The determination should be supported by a business case analysis that addresses potential cost and technical tradeoffs. These materials will cover the waveform and wireless communications software products to allow DoD to reuse them.

## 2. STAGE 1 CONCEPTUAL STAGE

a. The purpose of this stage is to analyze initial waveform concepts to determine their potential benefit to the DoD and to determine if they duplicate existing DoD waveform capabilities. The Stage 1 review allows the DoD to analyze the merits of new and innovative technologies before investing in them. This stage limits risks for DoD waveform sponsors by considering whether existing waveforms across the DoD can be used or modified to meet their requirements before new development begins. Similarly, this stage allows waveform developers to obtain a review from the DoD of the potential benefits of the new waveform development to the DoD.

**b. For waveforms being developed under DAS the following steps will occur:**

(1) The waveform sponsor will submit the waveform application as specified by paragraph 1 of Enclosure 4 for the new, modified, or enhanced waveform to the Office of the DoD CIO. In accordance with Reference (f), the application must be submitted at least 45 days before MS A.



(2) In support of the Stage 1 review, the Office of the DoD CIO will review appropriate supplemental material in accordance with Table 2 of Reference (f).

**c. For waveforms being developed outside DAS** the following steps will occur:

(1) The waveform developer or waveform sponsor will submit the waveform application as specified in section 1 of Enclosure 4 for the new, modified, or enhanced waveform to the Office of the DoD CIO.

(2) The waveform developer or waveform sponsor will submit any available supplemental materials to the Office of the DoD CIO to assist in the conceptual stage. Any updates to the documentation are required during a waveform's review. The supplemental materials may be copies of existing program material and will include (if available):

(a) Analysis of alternatives materials, documentation, and results.

(b) Documentation of the warfighter gap being addressed and the interoperability requirements for new, modified, or enhanced waveforms.

(c) Available requirements documentation and any related supporting documentation.

(d) As complete a design and analysis package as possible, designating what unmet DoD needs are being targeted and all configuration variants, modes, domains for which the waveform is intended. This package can be updated as the review progresses.

(e) Development cost estimate and budget covering labor, materials, and indirect costs for maturing the waveform until it reaches operational capability.

d. Once the steps of 2b or 2c are complete, the Office of the DoD CIO will conduct a review with input from DISA, the Joint Staff, JTNC, the Military Departments, NSA, OUSD(AT&L), and OUSD(I) to compare the new, modified, or enhanced waveform concept to existing registered DoD waveforms and requirements documentation provided. This comparison will analyze the ability of the waveform concept to meet criteria in section 2 of Enclosure 4.

e. The Office of the DoD CIO will issue a Stage 1 disposition memorandum for the waveform. The memorandum will provide a recommendation to the appropriate acquisition authority for either interim authorization of the waveform or disapproval with rationale for disapproval and will serve as the DoD CIO's input at MS A. This memorandum will be provided to the waveform developer, waveform sponsor, MS A decision authority, any other relevant acquisition authorities, and the IR as appropriate.

### 3. STAGE 2 PROTOTYPE STAGE

a. The purpose of this stage is to demonstrate feasibility that the new, modified, or enhanced waveform is functionally attainable on at least one prototype, existing, or legacy radio. The prototype can be implemented as an embedded radio that is part of a larger system. The Office of the DoD CIO will provide a waveform review and recommendation for Stage 1 (or entry into Stage 2) before this stage begins.

**b. For prototype development efforts under DAS** the following steps will occur:

(1) The waveform sponsor will submit an updated waveform application at least 45 days before MS B (if there has been no MS A, this would be the initial submission).

(2) In support of the Stage 2, the Office of the DoD CIO will review appropriate supplemental material in accordance with Table 2 of Reference (f).

(3) The waveform sponsor will initiate a Global Information Grid technical profile (GTP) that provides waveform implementation guidance in accordance with the Global Information Grid Technical Guidance Federation (GTG-F) and DoDI 8410.03 (Reference (p)).

(4) If DoD has sufficient technical information and IP rights in the waveform to support reuse, the waveform sponsor will initiate standardization through the Defense Standardization Program (DSP) outlined in DoDI 4120.24 and DoD Manual 4120.24 (References (q) and (r)). The standardization developed or adopted through this process must adequately describe the entire waveform. If DoD does not have sufficient technical information or IP rights to support reuse, the waveform sponsor, in coordination with USD(AT&L) and DoD CIO, will make a determination, supported by a business case analysis that considers potential cost and technical tradeoffs, whether to request such additional technical information or IP rights to support DoD's reuse of the waveform.

**c. For prototype development efforts outside DAS**, a waveform developer may complete a waveform prototype and submit a waveform application without a waveform sponsor. However, since successful completion of this stage denotes authorization to proceed to the operational stage, the waveform developer is expected to obtain a waveform sponsor before the completion of the prototype stage. During this stage the following steps will occur:

(1) The waveform developer or waveform sponsor will submit the following documentation, if available, to the Office of the DoD CIO to support the prototype stage.

(a) Updated, detailed waveform application.

(b) Information support plan with information exchange requirements, in accordance with Reference (c).

(c) DD Form 1494 (Stage 2), in accordance with DoDI 4650.01 (Reference (s)). If numerous DD 1494 forms have been filed, a representative sampling of such forms can be submitted.

(d) Relevant spectrum supportability risk assessment (SSRA) (Reference (s)) material as applicable.

(e) Capability requirements documents. The waveform developer or sponsor will provide available requirements documentation, validated as appropriate.

(f) Relevant development roadmaps for the waveform.

(g) Development cost estimate and budget to include costs for the waveform specifically and any supporting radios or systems (if applicable).

(h) Related documentation that affects or supports use of the waveform.

(2) The waveform sponsor or developer must submit test results showing the performance of the waveform on a prototype. The intent of this test is to analyze and verify as many parameters from the waveform application as possible. For this step, the waveform sponsor or developer will plan and budget to work with JTNC to verify waveform prototype performance through a laboratory prototype test or validate existing prototype test results. To accomplish this, the following activities will occur:

(a) The waveform sponsor or developer will submit any existing test results to the Office of the DoD CIO and JTNC for evaluation. JTNC will rely on submitted test data and existing test facilities before conducting any testing of its own. At the discretion of the Office of the DoD CIO and JTNC, existing test results may suffice to satisfy this prototype test.

(b) As needed, the waveform developer or sponsor will then develop a test plan or identify an existing test plan and submit these plans to JTNC and the Office of the DoD CIO.

(c) As needed, JTNC will oversee any additional testing and may choose to use its own facilities or other, existing laboratory environments to determine waveform interoperability, security, and operational value. For any testing, the waveform sponsor will allow access to a sufficient quantity of the radio systems and any supporting hardware or software, including networking products. This prototype test is shown in Figure 1 as "Prototype Test" and is intended to test the individual waveform model functionality and verify functionality of a working system.

(d) The JTNC will evaluate the results of this prototype analysis or any prior test results and submit a recommendation and all relevant test data to the Office of the DoD CIO.

(3) If applicable, the waveform sponsor will initiate a GTP that provides waveform implementation guidance in accordance with the GTG-F and Reference (p).

(4) If DoD has sufficient technical information and IP rights to permit reuse, the waveform sponsor will initiate standardization through the DSP outlined by References (q) and (r). The standardization developed or adopted through this process must adequately describe the entire waveform. If DoD does not have sufficient technical information or IP rights to support

reuse, the waveform developer or sponsor, in coordination with USD(AT&L) and DoD CIO, will make a determination, supported by a business case analysis that considers potential cost and technical tradeoffs, whether to request such additional technical information or IP rights to support DoD's reuse of the waveform.

d. Once the steps in paragraphs 3b or 3c are complete, the Office of the DoD CIO will conduct a Stage 2 review with input from DISA, the Joint Staff, JTNC, the Military Departments, NSA, OUSD(AT&L), and OUSD(I) based on the review criteria found in section 2 of Enclosure 4. This review will consider the waveform prototype's current capabilities and the potential future capabilities at maturity.

e. The Office of the DoD CIO will issue a Stage 2 disposition memorandum for the waveform. The memorandum will recommend to the appropriate acquisition authority either interim authorization of the waveform or disapproval of the waveform with rationale for disapproval and will serve as the Office of the DoD CIO's input at MS B. This memorandum will be provided to the waveform developer, waveform sponsor, MS B decision authority, any other relevant acquisition authorities, and the IR as appropriate.

#### 4. STAGE 3 OPERATIONAL STAGE

a. The purpose of this stage is to demonstrate waveform maturity and, if available, completeness of software and documentation. This is done by analyzing operational test results and ensuring waveform materials are stored in the IR. The Office of the DoD CIO will provide a waveform review recommendation for Stage 2 (or entry into Stage 3) before this stage begins.

**b. For waveforms developed under DAS**, the following steps will occur:

(1) The waveform sponsor will submit an updated waveform application at least 45 days before the FRP or FDD decision point.

(2) In support of the Stage 3, the Office of the DoD CIO will review appropriate supplemental material in accordance with Table 2 of Reference (f).

**c. For waveforms developed outside DAS**, the following steps will occur:

(1) The waveform sponsor will send the Office of the DoD CIO the completed waveform application, as specified by paragraph 1 of Enclosure 3, and supplemental materials including (if applicable):

(a) Stage 3 DD Form 1494 in accordance with Reference (s).

(b) Any complete SSRA material as described in Reference (s).

(c) The lifecycle sustainment plan for the waveform.

(d) Updated lifecycle cost estimate and budget to include costs for the waveform specifically and any supporting radios or systems (if applicable).

(e) The Program Protection Plan based on the most recent version of Reference (t) (if applicable).

(f) Updates to any other supplemental materials submitted in stages 1 or 2 including: ISP, requirements documentation, development roadmaps, and any other related documentation that affects or supports use of the waveform (as applicable).

(2) The waveform sponsor will work with the Office of the DoD CIO and JTNC to demonstrate operational performance of the waveform by completing the testing outlined as follows:

(a) The waveform sponsor or developer will submit any existing operational test results to the Office of the DoD CIO and JTNC. JTNC will rely on submitted test data and existing test facilities before conducting any testing of its own. At the discretion of the Office of the DoD CIO and JTNC, existing test results may suffice to satisfy this stage.

(b) As needed, the waveform developer or sponsor will then develop a test plan or identify an existing test plan and submit these plans to JTNC and the Office of the DoD CIO.

1. This testing should cover any gaps from prior testing and provide waveform performance data based on capability development documentation, capability production documentation, requirements or specification documentation required by References (f) and (m), or other applicable requirements or specifications.

2. Additional test procedures for standards compliance or interoperability should be considered based on the technology tested. The waveform sponsor will allow access to a sufficient quantity of the radio systems and any supporting hardware or software, including networking products, during this stage and in any future interoperability testing.

3. Testing must include field testing that stresses waveform performance and should include scalability and participation of the waveform in large (e.g., mission level or campaign level) exercises where feasible. If an exception to full scalability testing is granted, modeling and simulation results can be submitted. An analysis will require implementation on a host radio system and consider the conditions under which the waveform was tested.

(c) As needed, JTNC will oversee and facilitate the conduct of the testing on the waveform using the target radio system. This testing is shown in Figure 1 as “Operational Test” with the purpose to demonstrate operational functionality with verified objective values, and to test system interoperability, if applicable. The host radio can include an existing legacy radio, an embedded radio, or a newly developed radio.

(d) JTNC will evaluate the results of this operational analysis or any prior test results and submit a recommendation and all relevant test data to the Office of the DoD CIO.

d. If DoD has sufficient technical information and IP rights in the waveform to support reuse, the waveform sponsor will initiate standardization through the Defense Standardization Program (DSP) outlined in References (q) and (r). The standardization developed or adopted through this process must adequately describe the entire waveform. If DoD does not have sufficient technical information or IP rights to support competitive reuse, the waveform sponsor, in coordination with USD(AT&L) and DoD CIO, will make a determination, supported by a business case analysis that considers potential cost and technical tradeoffs, whether to obtain such additional technical information or IP rights to support DoD's reuse of the waveform.

e. The waveform sponsor will ensure that the waveform's complete software and documentation (e.g., adherence to standards) resides on the IR. All content will be clearly labeled with markings of official release dates and version numbers, as well as all appropriate IP rights notices and restrictive markings. Specific material to be submitted will be in accordance with the JTNC entrance requirements.

f. Once the actions in paragraphs 4b through 4d are complete, the Office of the DoD CIO will conduct a Stage 3 review with input from DISA, the Joint Staff, JTNC, the Military Departments, NSA, OUSD(AT&L), and OUSD(I) based on the criteria listed in section 2 of Enclosure 4. The Office of the DoD CIO will issue a Stage 3 disposition memorandum for the waveform. The memorandum will recommend to the appropriate acquisition authority either interim registration of the waveform or disapproval of the waveform with rationale for disapproval and will serve as the Office of the DoD CIO's input at the FRP or FDD decision point. Interim registration of a waveform will be conditional on a declared time span to allow for completion of Stage 4 activities.

g. Upon successful completion of these steps, the waveform will be noted within the IR as "interim registered." The Office of the DoD CIO may revoke the interim registration if the Stage 4 activities are not completed. An "interim registration" memorandum will be provided to the waveform sponsor, FRP or FDD decision authority, and any other acquisition authorities, as appropriate.

## 5. STAGE 4 REGISTRATION STAGE

a. The purpose of this stage is to ensure that waveform parameters and standards are properly catalogued to the extent possible before adding the waveform to the DoD waveform list. The Office of the DoD CIO will provide a waveform review recommendation for Stage 3 (or entry into Stage 4) before this stage begins. During this stage, the steps outlined by paragraphs 5b through 5e will occur.

b. If DoD has sufficient technical information and IP rights in the waveform to support reuse, the waveform sponsor will complete standardization in accordance with the DSP outlined by References (q) and (r). The standardization achieved through this process must adequately describe the entire waveform. If changes are made to the waveform technical information in the IR, those changes must be documented during this stage.

c. If DoD does not have sufficient technical information or IP rights to support reuse, the waveform sponsor, in coordination with USD(AT&L) and DoD CIO, will make a determination, supported by a business case analysis that considers potential cost and technical tradeoffs, whether to obtain such additional technical information or IP rights to support DoD's reuse of the waveform. The waveform sponsor will also successfully submit the waveform standard to be added to the DISR, if applicable. These steps will make materials available to encourage reuse of the technology.

d. The waveform sponsor will submit the finalized GTP to the Office of the DoD CIO containing minimum interoperability implementation guidance to cover use cases where the waveform is part of a system that connects to the DoD Information Networks (DoDIN).

e. The waveform sponsor will ensure that the lifecycle sustainment plan includes all necessary regression testing requirements and authorities to sustain the waveform.

f. Once the steps in paragraphs 5b through 5d are complete, the Office of the DoD CIO, with input from DISA, the Joint Staff, JTNC, the Military Departments, NSA, OUSD(AT&L), and OUSD(I), will review and finalize a disposition on the waveform. This disposition memorandum will be provided to the waveform sponsor, any relevant acquisition authorities, and the IR. Upon successful completion of these steps, the Office of the DoD CIO will add the waveform to the DoD waveform list.

## 6. IR ANALYSIS

a. The purpose of this recurring activity is to ensure that registered DoD waveforms are well maintained and accurately catalogued over time. This will aid DoD efforts at reuse of existing waveforms and wireless communications products. The steps of this activity apply to waveforms on the DoD waveform list. Paragraphs 6b and 6c outline steps the waveform sponsor and Office of the DoD CIO, respectively, will take to ensure proper cataloging of these waveforms.

b. The waveform sponsor will ensure that a registered DoD waveform's materials in the IR are maintained throughout the waveform's lifecycle. All materials must be marked with accurate release dates and waveform version numbers, and applicable IP rights restrictions. If DoD does not have sufficient technical information or IP rights to support reuse, the waveform sponsor will make a determination, supported by a business case analysis, in coordination with USD(AT&L) and DoD CIO, that considers potential cost and technical tradeoffs, whether to obtain such additional technical information or IP rights to support DoD's reuse of the waveform. Otherwise, if the waveform has sufficient technical information and IP rights to support reuse, the waveform sponsor, with the approval of the Office of the DoD CIO, will submit the following to the IR:

- (1) Minimum standard implementation guidance.
- (2) Updated software and its associated documentation.

(3) Development environment.

(4) Lifecycle sustainment plan, to include all necessary regression testing requirements that will set the thresholds for review and authorities so that the sponsor can maintain and sustain the waveform's lifecycle. For DAS programs, this will be the program Life Cycle Sustainment Plan.

c. The Office of the DoD CIO will review the IR as necessary with input from DISA, the Joint Staff, JTNC, the Military Departments, NSA, OUSD(AT&L), and OUSD(I) to retire outdated, redundant, and inadequately documented waveforms. This review will include verification that the communications waveforms in the DISR match the DoD waveform list. At a minimum, the materials for each waveform in the IR will be reviewed annually. Because of these reviews, the Office of the DoD CIO will revoke waveform registration status for any waveforms that are not maintained. At the conclusion of the review, the Office of the DoD CIO will issue a memorandum to the appropriate DoD Components with the updated DoD waveform list.



ENCLOSURE 4

WAVEFORM REVIEW APPLICATION AND ANALYSIS CRITERIA

1. WAVEFORM REVIEW APPLICATION

a. Waveform review applications will be completed using the format defined on Intellipedia [[https://intellipedia.intelink.gov/wiki/Waveform\\_Portal](https://intellipedia.intelink.gov/wiki/Waveform_Portal)]. Applications will be prepared in accordance with governing classified document directives and submitted via appropriate methods. The waveform developer or waveform sponsor will notify the Office of the DoD CIO point of contact in advance of applications or updates in order to make appropriate preparations.

b. Waveform developers or waveform sponsors will address all waveform parameters with supporting details to verify these parameters. Depending on the stage of the waveform, some parameters may be target values, theoretical interim values obtained from design models, or empirical data collected from laboratory tested or fielded waveforms. These values will be updated as the waveform progresses through the waveform review process.

c. Waveform developers or waveform sponsors will submit supplemental materials as specified in Enclosure 3 for the appropriate waveform review stage. During a review, if new supplemental materials are created or updates to submitted supplemental materials are made, the waveform developer or waveform sponsor will submit copies of those materials to the DoD CIO. Additional supporting materials can be submitted at any point during the waveform review process.

d. Waveform developers or waveform sponsors will ensure that all information submitted with the application are clearly and accurately marked to indicate all applicable IP rights restrictions.

2. WAVEFORM ANALYSIS CRITERIA. A waveform will be analyzed using the criteria listed in Table 2. The same basic criteria are applied for each waveform review stage; however, the criteria and analysis will consider the differences in maturity that are expected at each stage and the specific circumstances of each waveform review.

Table 2. Analysis Criteria

Element	Criteria
Baseline Comparison	<ul style="list-style-type: none"> <li>• Degree of unique features compared to existing registered waveforms and waveforms in development for the intended user application.</li> <li>• Specific general and technical parameters not met by current registered waveforms for the intended application.</li> <li>• Ability to meet unique warfighter needs not met by existing technologies.</li> </ul>
Interoperability	<ul style="list-style-type: none"> <li>• Degree of joint Service interoperability with mission waveforms on the existing DoD waveform list at both networking and information layers to include DoDIN interface and coalition connectivity.</li> <li>• Degree of interoperability to future DoD net-centric capability.</li> <li>• Compliance with commercial, international, and military standards.</li> <li>• Compliance with relevant open architecture standards (e.g., Software Communications Architecture 4.0 and successor releases), as defined in the DoD Open System Architecture Contract Guidebook for Program Managers (Reference (u)), to the best extent possible.</li> <li>• Risks to interoperability in development or engineering activities due to lack of sufficient technical information or lack of IP rights to use or release the information to third parties</li> </ul>
Total-Life Cycle Cost Considerations	<ul style="list-style-type: none"> <li>• Estimation of total life cycle development and support costs: research and development, acquisition, standardization (including configuration management), integration (e.g., porting, testing, and certification) and operation and support costs (e.g., cyber security (program protection/anti-tamper), IA, known modernization initiatives, authority to operate evals).</li> <li>• Potential effect on total life cycle costs based on whether DoD has sufficient technical information and IP rights to support reuse of the waveform (e.g., re-procurement, modification, and sustainment).</li> <li>• Level of funding support over waveform's life cycle.</li> </ul>
Operational Value	<ul style="list-style-type: none"> <li>• Degree of overall operational value for intended application and capability to meet operational requirements (as validated by DOT&amp;E, if applicable).</li> <li>• Level of improvements over registered waveform capabilities for low probability of detection, low probability of interception, low probability of exploitation, anti-jamming, spectrum efficiency, spectrum access flexibility, spectrum sharing, or throughput.</li> <li>• Support for architecture, scalability, and management in networking waveforms.</li> <li>• Support for hardware and software technology integration without impairing functionality or interoperability.</li> </ul>
Security	<ul style="list-style-type: none"> <li>• Compliance with DoD cyber security and information assurance practices including initial accreditation, authorization to operate, and sustain over life cycle.</li> <li>• Level of security afforded by the network and architecture of radios and systems using the waveform (if applicable).</li> <li>• Compliance with anti-tamper, program protection, and technology protection policies for the waveform and devices/systems hosting them.</li> <li>• Conformance with the NSA cryptographic modernization program initiatives.</li> <li>• Conformance with NSA requirements for the development of information assurance IT products.</li> </ul>

GLOSSARY

PART I. ABBREVIATIONS AND ACRONYMS

CAE	Component Acquisition Executive
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
COTS	commercially available off the shelf
DAS	Defense Acquisition System
DIRNSA/CHCSS	Director, National Security Agency/Chief, Central Security Service
DISA	Defense Information Systems Agency
DISR	DoD Information Technology Standards Registry
DoD CIO	DoD Chief Information Officer
DoDD	DoD Directive
DoDI	DoD Instruction
DoDIN	DoD Information Networks
DOT&E	Director of Operational Test and Evaluation
DSP	Defense Standardization Program
FDD	full deployment decision
FRP	full rate production
GTG-F	Global Information Grid Technical Guidance – Federation
GTP	Global Information Grid technical profile
IP	Intellectual Property
IPT	Integrated Product Team
IR	DoD Waveform Information Repository
ISP	Information Support Plan
IT	information technology
JTNC	Joint Tactical Networking Center
MS A	Milestone A
MS B	Milestone B

NSA	National Security Agency
NSS	national security systems
OSI	open systems interconnection
OUSD(AT&L)	Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics
OUSD(I)	Office of the Under Secretary of Defense for Intelligence
PM	program manager
SAE	Service Acquisition Executive
SAP	special access program
SCI	sensitive compartmented information
SSRA	spectrum supportability risk assessment
TDL	tactical data link
TS&FD	technology security and foreign disclosure
UON	urgent operational need
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
USD(I)	Under Secretary of Defense for Intelligence

## PART II. DEFINITIONS

These terms and their definitions are for the purposes of this instruction.

DoD research agencies. DoD agencies responsible for the development of new technologies for use by the military.

DoD waveform list. A list containing authorized waveforms that were reviewed by the DoD and successfully registered through Stage 4 of the process specified in this instruction. As applicable, these waveforms have a relevant standard, GTP, and IR documentation. Waveform registration is subject to review as needed to ensure that the information stored in the waveform repository accurately catalogues the current state of that waveform. Enclosure 3 details the review process and how this list is developed and maintained.

IP rights. The license rights or other legal authorization to use, modify, reproduce, perform, display, release, or disclose intellectual property (e.g., patents, copyrights, trade secrets, trademarks).

IR. The information system site storing the list of proposed and registered DoD waveforms, waveform software code, and supporting design, test, and waveform analysis materials. The site will integrate with existing information repository sites and services by providing links and references. The IR will contain sufficient information to adequately describe the waveform, including, but not limited to, linking to the appropriate software code, hardware description files, data dictionaries, parameters, development environment files necessary for compilation, and documentation to allow a user to assemble and compile or otherwise implement a waveform. The IR will aid the DoD in identifying existing waveforms and development efforts to minimize duplication of effort across the DoD. This site will permit information to be retrieved to facilitate:

Porting the software to various devices, maintaining interoperability and security of these devices, and;

Modification of the software to improve its performance or add new capabilities.

lifecycle sustainment plan. For DAS programs, this refers to the Life Cycle Sustainment Plan from Reference (f). For developments outside DAS, this is the plan used by the Office of the DoD CIO and waveform sponsor to outline waveform sustainment activities, regression testing requirements, and testing thresholds. The plan will provide authority for modifying a waveform within approved performance and security parameters during sustainment. Waveform changes outside of those outlined by this plan will be subject to review by this instruction, beginning with stage 1, 2, or 3, as determined by the Office of the DoD CIO and waveform sponsor.

open systems interconnection (OSI) layer 1 (physical layer). Defines all the electrical and physical specifications for devices. In particular, it defines the relationship between a device and a physical medium.

OSI layer 2 (data link layer). Provides the functional and procedural means to transfer data between network entities and to detect and possibly correct errors that may occur in the physical layer.

OSI layer 3 (network layer). Provides the functional and procedural means of transferring variable length data sequences from a source to a destination via one or more networks, while maintaining the quality of service requested by the transport layer. The network layer performs network routing functions, and might also perform fragmentation and reassembly, and report delivery errors.

review process. The process for analyzing waveforms defined by this instruction. These reviews are intended to ensure interoperability, security, and operational value of waveform technology.

tactical networking waveform. A waveform design to transport formatted and unformatted data in a tactical environment. It may be capable of transporting data in accordance with one or more message standards (e.g., J-Series) in addition to other data (e.g., Internet Protocol packets).

TDL. A means of connecting one platform to another for the purpose of transporting and receiving data with a DoD-approved standardized communications link suitable for transmission of digital information. A TDL is characterized by message format, protocols, and transmission characteristics. A TDL supports near-real-time tactical data exchange between participants using a variety of formatted messages (e.g., Link 16 is optimized to transport J-Series messages).

waveform. An electromagnetic signal-in-space, typically defined by OSI layers 1 through 3, along with the controls and processes for a desired function or application. These processes do not include the message content.

waveform developer. The person, business, group, or organization responsible for designing and developing the waveform.

waveform disposition. The outcome of a waveform review as determined by the Office of the DoD CIO and key stakeholders.

waveform modification. Any change made to a waveform that diverges from the lifecycle sustainment plan submitted in Stage 4 of this process. Waveform modifications will be tracked by version numbers. Changes made to a waveform while in development (before completion of Stage 4) that affect interoperability with the existing waveform or alter the parameters and features outlined by any of the waveform's standardization documentation, require resubmission of the documentation of this process to describe the changes at the next stage.

waveform sponsor. The DoD Component or cognizant authority responsible for all program documentation, periodic reporting, and funding actions required to support the capabilities development and acquisition process for a specific capability proposal.