



DoD INSTRUCTION 4650.06

POSITIONING, NAVIGATION, AND TIMING (PNT) MANAGEMENT

Originating Component: Office of the Department of Defense Chief Information Officer

Effective: June 16, 2016

Releasability: Cleared for public release. Available on the DoD Issuances Website at <http://www.dtic.mil/whs/directives>.

Reissues and Cancels: DoD Instruction 4650.06 "DoD Positioning, Navigation, and Timing (PNT) Executive Committee and Working Groups," November 24, 2009

Incorporates and Cancels: DoD Instruction, 4650.07, "Precise Time and Time Interval (PTTI) Management," November 23, 2011; DoD Instruction 4650.9, "Celestial Reference Frame (CRF) Management," April 15, 2015

Approved by: Terry Halvorsen, Department of Defense Chief Information Officer

Purpose: This issuance, in accordance with the authority in DoD Directives (DoDD) 5144.02 and 4650.05:

- Implements policy, assigns responsibilities, and prescribes procedures for PNT, precise time and time interval (PTTI), and celestial reference frame (CRF) management, in accordance with the guidance in the National Security Presidential Directive 39 (NSPD-39) and Section 2281 of Title 10, United States Code.
- Establishes policy and assigns responsibilities of DoD participants in domestic civil forums, international government, and civil PNT forums.
- Establishes the DoD PNT Executive Management Board (EMB) to oversee the governance process in support of the Council for the Oversight of the DoD PNT Enterprise (referred to in this issuance as the "PNT Oversight Council").
- Assigns responsibilities and prescribes procedures for the EMB, DoD PNT Working Group (WG), and DoD Navigation Warfare (Navwar), DoD PTTI, and DoD CRF WGs.

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SECTION 1: GENERAL ISSUANCE INFORMATION

1.1. APPLICABILITY. This issuance applies to OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff (CJCS) 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 DoD (referred to collectively in this issuance as the “DoD Components”).

1.2. POLICY. In accordance with DoDD 4650.05, the DoD PNT enterprise:

a. Serves three principal functions for the United States:

(1) Provides and protects the effective use of military Global Positioning System (GPS) and other PNT services by U.S. and allied forces anywhere in the world.

(2) Prevents the effective use of PNT services by adversaries in areas of military operations.

(3) Preserves civil GPS PNT services to non-combatants outside areas of military operations.

b. Provides PNT information essential to the execution and command and control of military missions and to the efficient operation of information networks necessary for continuous situational awareness by Combatant Commanders and other senior decision makers.

c. Requires cooperation with other federal departments and agencies in the management and operation of dual-use PNT systems.

d. Requires participation in domestic civil and international government and civil PNT forums in which coordinated U.S. Government positions must support DoD objectives.

1.3. INFORMATION COLLECTIONS. The DoD CIO Positioning, Navigation, and Timing Capabilities Inventory, referred to in Paragraph 2.1.v., has been assigned report control symbol DD-CIO(A)2559 in accordance with the procedures in Volume 1 of DoD Manual 8910.01.

SECTION 2: RESPONSIBILITIES

2.1. DOD CHIEF INFORMATION OFFICER (DOD CIO). The DoD CIO:

- a. Develops and implements this issuance.
- b. Coordinates policy related to space-based PNT systems and for international PNT activities with the Under Secretary of Defense for Policy (USD(P)).
- c. Coordinates policy affecting the acquisition of PNT systems, including GPS, with the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)).
- d. Provides overall guidance on national and international matters related to PNT and achieving PNT superiority through Navwar principles.
- e. Chairs the DoD PNT EMB, oversees the secretariat which provides administrative support for the PNT Oversight Council, and directs the EMB to perform the functions described in Section 3.
- f. Establishes DoD PNT WGs to support the DoD PNT EMB, as necessary.
- g. Designates representatives to serve on the DoD PNT, Navwar, PTTI, and CRF WGs, as necessary (see Section 3 for details on WG composition and functions).
- h. Confirms the coordination of DoD PNT policy and capabilities among the DoD Components, as appropriate, and with organizations outside DoD, including the North Atlantic Treaty Organization and federal civil departments and agencies, as required.
- i. Consolidates DoD inputs to the Federal Radionavigation Plan.
- j. Approves and distributes PNT service performance standards for the GPS Standard Positioning Service, the GPS Precise Positioning Service, and others, as appropriate.
- k. Participates in the National Executive Committee for Space-Based PNT in accordance with NSPD-39.
- l. Along with the other National Executive Committee for Space-Based PNT participants, provides support to the National Space-Based PNT Coordination Office (NCO), as appropriate.
- m. Coordinates and communicates with the Policy Board on Federal Aviation WG in all areas of common interest and responsibility.
- n. In coordination with the Under Secretary of Defense for Intelligence (USD(I)) and other federal departments and agencies as required, ensures that necessary capabilities are available to identify, locate, and mitigate any interference that adversely affects the use of PNT for military operations.

o. Provides guidance for the overall development, coordination, and approval of major DoD PTTI policies and plans, and serves as the final authority in consolidating DoD PTTI programs.

p. Requires that the procedures for DoD PTTI management in Section 4 are implemented through the DoD PTTI Manager.

q. Coordinates with the DoD PTTI Manager on PTTI policy negotiations between DoD and other federal departments and agencies and international organizations.

r. Provides guidance for the overall development, coordination, and approval of major CRF and Earth orientation parameters (EOP) policies and plans, and serves as the final authority in consolidating CRF programs.

s. Through the DoD CRF Manager, ensures that the procedures for DoD CRF management in Section 5 are implemented.

t. Provides guidance for the overall development, coordination, and approval of DoD PNT objectives and positions regarding matters addressed in domestic and international PNT forums, and acts as the final authority in resolving issues, as required.

u. Designates an office of primary responsibility (OPR) agency for each specific domestic and international PNT forum which addresses matters of substantive interest to DoD and for which DoD CIO determines that submitting a guidance package is required in accordance with Section 6. A guidance package is not normally needed, and an OPR will not normally be identified, for PNT Forums organized in accordance with other interagency or DoD guidance that already constrains participation.

v. Conducts an annual survey of the DoD Components to collect PNT capability inventory information to support annual Navwar assessments and monitor PNT modernization progress.

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

a. Coordinates with the DoD CIO on matters of PNT research, development, test, and evaluation (RDT&E) and PNT acquisitions to confirm that approved PNT policies are implemented in acquisition activities subject to USD(AT&L) oversight.

b. Coordinates with the DoD CIO on the designation of joint program offices and associated organizations for developing and acquiring of PNT systems.

c. Coordinates on PNT-related international cooperation strategies as they pertain to this issuance.

d. Designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CFR WGs, as necessary (see Section 3 for details on WG composition and functions).

2.3. ASSISTANT SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING (ASD(R&E)). Under the authority, direction, and control of the USD(AT&L), the ASD(R&E):

- a. Develops and maintains the DoD PNT Science and Technology Roadmap to support future operational concepts requiring PNT technologies.
- b. Coordinates with the DoD CIO regarding DoD research programs concerning PNT.
- c. Coordinates with the DoD PTTI Manager regarding DoD research programs concerning PTTI.
- d. Coordinates with the DoD CRF/EOP Manager regarding DoD research programs concerning CRF and EOP.

2.4. UNDER SECRETARY OF DEFENSE (COMPTROLLER)/CHIEF FINANCIAL OFFICER, DEPARTMENT OF DEFENSE (USD(C)/CFO). The USD(C)/CFO designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CFR WGs, as necessary (see Section 3 for details on WG composition and functions).

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

- a. Provides intelligence support on PNT-related matters and designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CFR WGs, as necessary (see Section 3 for details on WG composition and functions).
- b. Coordinates with the DoD CIO on items identified in Paragraph 2.1.n.

2.6. DIRECTOR, NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA).

Under the authority, direction, and control of the USD(I), and in addition to the responsibilities in Paragraph 2.13., the Director, NGA:

- a. Maintains the standard for the terrestrial reference frame (TRF) for the other DoD Components.
- b. Coordinates with the Superintendent of the United States Naval Observatory (USNO) to maintain overall consistency between the CRF and the TRF, and the mathematical transformation between these two reference frames as determined by USNO and disseminated through the USNO EOP data series.
- c. Coordinates with the Intelligence Community to ensure consistency and avoid errors in the translation between the CRF and the TRF.

2.7. DIRECTOR, DEFENSE INTELLIGENCE AGENCY (DIA). Under the authority, direction, and control of the USD(I), and in addition to the responsibilities in Paragraph 2.13., the Director, DIA, leads efforts in producing all-source intelligence analysis on PNT-related matters.

2.8. DIRECTOR, NATIONAL SECURITY AGENCY/CHIEF, CENTRAL SECURITY SERVICE (DIRNSA/CHCSS). Under the authority, direction, and control of the USD(I), and in addition to the responsibilities in Paragraph 2.13., the DIRNSA/CHCSS provides, validates, and verifies sufficiency of security solutions during the development, integration, and operation of all segments of the GPS, in coordination with the Secretary of the Air Force.

2.9. USD(P). The USD(P):

- a. In coordination with DoD CIO, develops, coordinates, and monitors implementation of DoD policy, strategy, and planning related to space-based PNT systems.
- b. Provides oversight and guidance to the DoD CIO on international matters as they pertain to this issuance, including oversight and guidance relating to exports and technology transfers of PNT systems and associated technologies.
- c. Coordinates with the DoD CIO on items identified in Paragraph 2.1.b.
- d. Designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CRF WGs, as necessary (see Section 3 for details on WG composition and functions).

2.10. GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE (GC DOD). The GC DoD provides legal advice on PNT-related matters and designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CRF WGs, as necessary (see Section 3 for details on WG composition and functions).

2.11. DIRECTOR OF COST ASSESSMENT AND PROGRAM EVALUATION (DCAPE). The DCAPE:

- a. Reviews PNT programs and plans, including supporting cost and force effectiveness analyses prepared by the Military Departments.
- b. Designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CRF WGs, as necessary (see Section 3 for details on WG composition and functions).

2.12. DIRECTOR OF OPERATIONAL TEST AND EVALUATION (DOT&E). The DOT&E:

- a. Establishes policies and prescribes procedures for the conduct of PNT-related operational test and evaluation.
- b. Designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CRF WGs, as necessary (see Section 3 for details on WG composition and functions).

2.13. DOD COMPONENT HEADS. The DoD Component heads:

a. In accordance with the Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01H and in compliance with DoD Instruction (DoDI) 4650.08, identify and document PNT-related operational capabilities and, for those DoD Components with acquisition authority, conduct research, development, test, and evaluation on PNT equipment and modify and procure such equipment to provide inter- and intra-Service and allied coalition commonality, while leveraging commercial technologies to the maximum extent possible.

b. Acquire:

(1) PNT equipment that provides protection against adversary disruption.

(2) Capabilities to identify, locate, and mitigate interference that affects the use of GPS for military operations.

(3) Capabilities to deny PNT to adversaries without unduly disrupting civil or commercial use outside of an area of operations.

c. Provide responses to surveys conducted by DoD CIO to collect PNT capability inventory information, in accordance with Paragraph 2.1.v.

d. Designate, in writing, one principal Component representative to the DoD PNT EMB and other representatives to the PNT, Navwar, PTTI, and CFR WGs, as necessary (see Section 3 for details on WG composition and functions). Provide the principal Component representative's name, staff agency, and office code to the DoD CIO.

e. Appoint and oversee the activities of a DoD Component PTTI coordinator who will coordinate the respective Component's PTTI operational and research programs with the DoD PTTI Manager and serve as a PTTI WG member. Provide the name and contact information of the Component PTTI coordinator to the DoD PTTI Manager.

f. Appoint and oversee the activities of a DoD Component CRF/EOP coordinator who will coordinate the respective Component's CRF/EOP operational and research programs with the DoD CRF/EOP Manager and serve as a CRF/EOP WG member. Notify the DoD CRF/EOP Manager of the Component's appointed CRF/EOP coordinator and associated contact information.

g. When assigned as the OPR for a specific domestic or international PNT forum, designate a principal representative who will be responsible for preparing and submitting to the DoD CIO a guidance package in advance of the forum and for the post-event report following the forum (see Section 6 for details on, and deadlines for, delegation preparation and reporting procedures for PNT forums).

2.14. SECRETARIES OF THE MILITARY DEPARTMENTS. In addition to the responsibilities in Paragraph 2.13. and in coordination with the USD(AT&L) and DoD CIO, the Secretaries of the Military Departments assign representatives to support joint program offices for developing and acquiring PNT systems.

2.15. SECRETARY OF THE NAVY. In addition to the responsibilities in Paragraphs 2.13. and 2.15., the Secretary of the Navy, through the Oceanographer of the Navy:

- a. Serves as the DoD PTTI Manager and the CRF/EOP Manager.
- b. Develops and maintains the standards for PTTI services, EOPs, and the CRF for the other DoD Components.

2.16. SECRETARY OF THE AIR FORCE. In addition to the responsibilities in Paragraphs 2.13. and 2.14., the Secretary of the Air Force:

- a. Develops, procures, and modernizes the major components of the GPS in a timely and synchronized manner.
- b. Operates and maintains the GPS constellation and ground control segment.
- c. Performs GPS systems engineering and integration with other stand-alone and augmentation systems, as required, to oversee GPS compatibility and interoperability.
- d. Develops updates to the GPS Standard Positioning Service Performance Standard and Precise Positioning Service Performance Standard, and forwards them to the DoD CIO for approval and publication.
- e. When acting in his or her capacity as the Principal DoD Space Advisor:
 - (1) Consults with the USD(AT&L), USD(I), DoD CIO, USD(P), and the CJCS on significant changes to the GPS program as appropriate.
 - (2) Issues guidance on acquiring PNT space systems.
- f. Supports the DoD CIO's radio spectrum responsibilities assigned in DoDD 5144.02 by ensuring GPS radio-frequency compatibility and interoperability with other radionavigation satellite systems. Defends the GPS spectrum at the International Telecommunications Union and other forums, as necessary.

2.17. CJCS. In addition to the responsibilities in Paragraph 2.13., the CJCS:

- a. Recommends DoD positions on PNT matters affecting the North Atlantic Treaty Organization and individual nations in coordination with the USD(P) and DoD CIO.
- b. Coordinates the development of CJCSI 6130.01 with the DoD CIO, USD(P), USD(AT&L), and the Principal DoD Space Advisor.
- c. Participates in the National Executive Committee for Space-Based PNT in accordance with NSPD-39.

d. Supports the National Space-Based PNT Coordination Office in conjunction with the other members of the National Executive Committee for Space-Based PNT, as appropriate.

e. Validates DoD PNT-related capabilities. Reviews civil PNT-related capabilities that are identified and submitted through the Interagency Forum for Operational Requirements and approves or identifies DoD concerns with any civil requirements within the established interagency process.

2.18. COMMANDER, U.S. STRATEGIC COMMAND (USSTRATCOM). In addition to the responsibilities in Paragraph 2.13., the Commander, USSTRATCOM:

a. Implements space-based PNT operations and identifies joint PNT-related capability needs.

b. Integrates and coordinates space-based PNT and Navwar capabilities across DoD in accordance with DoDI 4650.08.

c. Develops joint concepts of operations and tactics, techniques, and procedures for space-based PNT capabilities for which he or she has responsibility.

d. Participates in the development and maintenance of DoD PNT service performance standards for the GPS Standard Positioning Service, the GPS Precise Positioning Service, and others, as appropriate.

e. Provides operational support to the Navwar, PTTI, and CRF WGs, as necessary.

f. Notifies DoD space-based PNT users of leap second insertion.

2.19. COMMANDER, U.S. CYBER COMMAND. In addition to the responsibilities in Paragraph 2.13., the Commander, U.S. Cyber Command designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CRF WGs, as necessary (see Section 3 for details on WG composition and functions).

2.20. COMMANDER, U.S. NORTHERN COMMAND In addition to the responsibilities in Paragraph 2.13., the Commander, U.S. Northern Command designates representatives to the DoD PNT EMB and PNT, Navwar, PTTI, and CRF WGs, as necessary (see Section 3 for details on WG composition and functions).

SECTION 3: PNT EXECUTIVE MANAGEMENT BOARD AND WORKING GROUPS

3.1. DOD PNT EMB.

a. Composition. The DoD PNT EMB will be composed of:

- (1) The DoD CIO, who will chair the EMB.
- (2) One principal representative, designated in writing, to represent each of these officials:
 - (a) Secretaries of the Military Departments.
 - (b) CJCS.
 - (c) USD(AT&L).
 - (d) USD(P).
 - (e) USD(C)/CFO.
 - (f) USD(I).
 - (g) Commandant of the Marine Corps.
 - (h) Chief of Staff, U.S. Air Force.
 - (i) Commander, USSTRATCOM.
 - (j) Commander, USNORTHCOM
 - (k) Commander, USCYBERCOM
 - (l) GC DoD.
 - (m) Director, DIA.
 - (n) Director, NGA.
 - (o) Director, National Security Agency.
 - (p) DCAPE.
 - (q) DOT&E.
 - (r) Oceanographer of the Navy.

(s) Chief, National Guard Bureau

(3) Other members whom the Chair may invite to participate in the Committee, as necessary.

b. Function. The DoD PNT EMB will:

(1) Oversee the governance process in support of the PNT Oversight Council.

(2) Develop topics and recommendations for PNT Oversight Council action through regular meetings and a systematic coordination process.

(3) Function as the primary advisory body to the DoD CIO on all DoD PNT policy matters.

(4) Advise the DoD CIO regarding the overall management, supervision, and decision making processes for DoD PNT matters, including biennial review of the Federal Radionavigation Plan and other plans requiring DoD review (e.g., architecture products relevant to DoD PNT systems).

(5) Establish additional WGs to support the EMB, as required.

3.2. DOD PNT WG

a. Composition.

(1) The DoD PNT WG will be chaired by a staff representative designated by the DoD CIO.

(2) The DoD PNT WG membership will be composed of representatives for each of the officials listed in Paragraph 3.1.b. Each DoD PNT EMB principal must designate a DoD PNT WG representative in writing.

(3) DoD PNT WG leads may assign additional WG members, as required, to help formulate organizational positions for their respective DoD PNT EMB principals. This will ensure that DoD PNT WG representatives have ready access to EMB principals who represent their organizations on PNT matters.

b. Function. To accomplish its objectives in support of the DoD PNT EMB, the DoD PNT WG will:

(1) Develop recommendations for EMB action through regular meetings and a systematic coordination process.

(2) Support consistent engagement by EMB principals in discussions regarding all PNT matters affecting DoD and the United States.

(3) Promote regular information sharing with EMB principals so that they will be fully informed when actions are raised for decision.

(4) Develop a collaborative environment among DoD PNT WG colleagues and facilitate the DoD CIO to:

(a) Efficiently manage EMB actions.

(b) Prepare the Deputy Secretary of Defense to co-chair the National Space-Based PNT Executive Committee.

(c) Execute responsibilities related to the GPS assigned in NSPD-39.

(5) Establish ad hoc working groups to address specific issues for DoD PNT WG and EMB consideration. Potential focus areas include PNT security and cybersecurity, PNT international cooperation, and PNT science and technology.

3.3. DOD NAVWAR WG

a. Composition. The DoD Navwar WG will be:

(1) Tri-chaired by designated staff representatives from the Offices of the DoD CIO and CJCS and USSTRATCOM.

(2) Composed of one representative from each of the following offices to deal with Navwar matters affecting planning and operations:

(a) Office of the USD(AT&L).

(b) Office of the USD(P).

(c) Office of the USD(I).

(d) Joint Staff.

(e) United States Army.

(f) United States Marine Corps.

(g) United States Navy.

(h) United States Air Force.

(i) USSTRATCOM.

(j) United States Northern Command.

(k) National Security Agency.

- (l) DIA.
- (m) National Reconnaissance Office.
- (n) National Guard Bureau.

(3) Other members whom the Chair may invite to participate in the DoD Navwar WG, as necessary.

b. Function. To support the objectives of the DoD PNT EMB, the DoD Navwar WG advises and assists in the development and integration of Navwar-related policy and capabilities. The DoD Navwar WG will:

- (1) Review and comment on Navwar-related policy, doctrine, directives, and instructions.
- (2) Within existing corporate processes, such as the Joint Capabilities Integration and Development System, review and advise on annual USSTRATCOM assessments of existing and potential Navwar capabilities and capability shortfalls, in accordance with DoDI 4650.08.
- (3) Within existing corporate processes, review and advise on Navwar employment options. This includes advising on and helping write overarching Navwar Concepts of Operation, where requested.
- (4) Review and recommend content to Navwar intelligence products, such as DIA's Biennial Navwar Assessment and Intelligence Preparations of the Battlespace.
- (5) Review and comment on the annual assessment of Navwar operational capabilities produced by the USSTRATCOM Joint Navigation Warfare Center.
- (6) Provide a joint forum to facilitate the compatibility of technologies and applications related to Navwar.

3.4. DOD PTTI WG

a. Composition.

- (1) The PTTI WG will be chaired by the Superintendent, USNO.
- (2) The PTTI WG membership will consist of the DoD Component PTTI coordinators appointed in accordance with Paragraph 2.13.e.
- (3) DoD PTTI WG leads may assign additional WG members to help formulate positions for their respective DoD PNT EMB principals, as required.

b. Function. In support of the DoD PNT EMB, the PTTI WG will meet at least quarterly and will:

- (1) Review and comment on PTTI-related policy, doctrine, and DoD issuances.
- (2) Within existing corporate processes, such as the Joint Capabilities Integration and Development System described in CJCSI 3170.01, review and advise on the assessment of existing and potential PTTI capabilities and capability shortfalls.
- (3) Function as the single body that develops PTTI recommendations for the DoD PNT EMB action through regular meetings and a systematic coordination process.
- (4) Provide a joint forum to facilitate the compatibility of technologies and applications related to PTTI.
- (5) Review and validate existing and future PTTI requirements of the DoD Components. Develop annual summaries of PTTI requirements and PTTI system implementation status to support assessment of PNT capabilities in accordance with DoDI 4650.08.
- (6) Review DoD research programs concerning PTTI and participate in OSD PNT Science and Technology Roadmap development.
- (7) Review and comment on PTTI matters that are identified by the PTTI Manager in accordance with Section 4.

3.5. DOD CRF WG

a. Composition.

- (1) The DoD CRF Manager will chair the CRF WG.
- (2) The CRF WG membership will consist of the DoD Component CRF/EOP coordinators appointed in accordance with Paragraph 2.13.g.
- (3) DoD PNT WG leads may assign additional WG members to help formulate organizational positions for their respective DoD PNT EMB principals, as required.

b. Function. In support of the DoD PNT EMB, the CRF WG will meet at least quarterly and will:

- (1) Review and comment on CRF- and EOP-related policy, doctrine, and DoD issuances.
- (2) Within existing corporate processes, review, assess, and advise DoD CIO on existing and potential CRF and EOP capabilities and capability shortfalls.
- (3) Function as the single body that develops CRF and EOP recommendations for the DoD PNT EMB to act upon through regular meetings and a systematic coordination process.
- (4) Provide a joint forum to facilitate compatibility of technologies and applications related to the CRF and EOP.

(5) Review and validate existing and future CRF and EOP requirements of the DoD Components. Develop annual summaries of CRF and EOP requirements and their implementation status.

(6) Review DoD research programs concerning the CRF and EOP, and participate in OSD PNT Science and Technology Roadmap development.

(7) Review and comment on CRF and EOP matters identified by the CRF/EOP Manager in accordance with management procedures in Section 5.

SECTION 4: PTTI MANAGEMENT PROCEDURES

4.1. DOD PTTI MANAGER. The DoD PTTI Manager will:

- a. Ensure interoperability in PTTI operations.
- b. Maintain the master time and frequency standard for DoD and the underlying timing reference for coordinating all U.S. Government PNT systems.
- c. Make standard time and frequency information available to users.
- d. Coordinate DoD PTTI standards with recognized national and international standards.
- e. Advise the DoD CIO on the coordination of time scales.
- f. Develop and publish detailed information concerning DoD PTTI reference standards.
- g. Advise the DoD CIO on PTTI policy matters involving the DoD Components and participate in PTTI policy negotiations between DoD and other federal departments and agencies and international organizations.
- h. Provide notification of leap second changes:
 - (1) Submit an “All DoD” message for the DoD CIO to transmit notification of a pending leap second insertion no later than 2 months before the insertion of a leap second. Submit a follow-up “All DoD” message leap second reminder to be sent out by the DoD CIO 1 month before the insertion of a leap second.
 - (2) Coordinate with Commander, USSTRATCOM, to ensure operational users are notified no later than 1 month before the insertion of a leap second.
- i. Develop annual summaries of PTTI requirements and status, in coordination with the DoD Components. Provide a copy of the summary to the DoD CIO.
- j. Review and validate the DoD Components’ existing and future PTTI requirements and maintain a database containing users of precise time and frequency and their requirements within DoD.
- k. Maintain a website of PTTI information including, but not limited to, such elements as Master Clock performance characteristics, dissemination systems and their characteristics, equipment required to access various dissemination systems, definitions, relevant documents, and frequently asked questions. Ensure the data is widely publicized.
- l. In coordination with the ASD(R&E) and appropriate DoD Component heads, coordinate DoD research programs concerning PTTI.

m. Provide time and frequency advice to government and DoD contractor personnel on a reimbursable basis for services such as:

- (1) Consulting on DoD acquisition programs related to PTTI.
- (2) Helping prepare the Military Critical Technologies List.

n. Coordinate all DoD time calibration and testing services offered by DoD organizations and laboratories.

(1) Maintain calibration and testing services on a reimbursable basis for time standards, transfer devices, and systems.

(2) Maintain a database of calibration and testing results to support DoD users' system engineering and procurement requirements.

o. Represent DoD in national and international forums on PTTI topics, in coordination with the DoD CIO.

4.2. DOD COMPONENTS. The DoD Components will:

a. Ensure the PTTI activities of the DoD Component comply with the standard established by the Department of the Navy at the USNO, and maintain specific time scales, as required, so that the relationship of each scale to the established standard is known.

b. Prescribe technical requirements for the coordination of PTTI techniques, procedures, and periodic calibration of systems.

c. Prescribe in-house procedures for the development, coordination, and consolidation of their respective PTTI requirements.

d. Assist the DoD PTTI Manager by providing technical information on current and prospective PTTI requirements in the format prescribed by the DoD PTTI Manager.

e. Ensure that PTTI requirements for systems and programs of the DoD Component and user agencies are coordinated with and approved by the DoD Component PTTI coordinator.

f. Prescribe requirements for precise time that are consistent with operational and research needs for accuracy.

SECTION 5: CRF/EOP MANAGEMENT PROCEDURES

5.1. DOD CRF/EOP MANAGER. The DoD CRF/EOP Manager:

- a. Serves as chair of the DoD CRF WG.
- b. Requires interoperability in CRF and EOP operations.
- c. Maintains the standard CRF for DoD and the underlying CRF and EOP reference for coordinating all U.S. Government PNT systems.
- d. Serves as the authoritative source for standard CRF and EOP data and information and makes them available to users.
- e. Provides coordination of CRF and EOP standards with recognized national and international standards.
 - (1) Advises the DoD CIO on coordinating the definition of the CRF and the models of EOP prediction.
 - (2) Issues detailed information concerning DoD reference standards for CRF and EOP.
- f. Supports the Joint Capabilities Integration and Development System process for matters of intelligence, surveillance and reconnaissance, space situational awareness, and strategic systems related to the CRF.
- g. Advises the DoD CIO on CRF and EOP policy matters involving the DoD Components and participates in CRF and EOP policy negotiations between DoD and other U.S. Government departments and agencies and international organizations.
- h. Develops annual summaries of CRF and EOP requirements and status, in coordination with the DoD Component CRF/EOP coordinators. Provides a copy of the summary to the DoD CIO.
- i. Reviews and validates existing and future CRF and EOP requirements of the DoD Components and maintains a database containing users of CRF and EOP within DoD and their requirements.
- j. Maintains a website that consists of CRF and EOP information, including, but not limited to, astrometric catalogs, EOP data and models, application software, definitions, relevant documents, and frequently asked questions.
- k. Maintains an information technology system, in cooperation with the Director, Defense Information Systems Agency, for the production and dissemination of CRF and EOP data and information.

l. Coordinates DoD research programs concerning CRF and EOP, in coordination with the ASD(R&E) and DoD Component CRF/EOP coordinators.

m. Provides CRF and EOP advice to the government and government contractors on a reimbursable basis for services such as:

(1) Consulting on DoD acquisition programs related to PNT.

(2) Helping prepare the Militarily Critical Technologies List.

n. Informs the DoD CIO and the DoD Component heads of the office and contact information of the principal USNO staff members involved in executing the duties of the DoD CRF/EOP Manager.

o. Represents DoD in national and international forums on CRF and EOP topics, in coordination with the DoD CIO.

5.2. DOD COMPONENTS. The DoD Components:

a. Coordinate the Component's CRF and EOP operational and research programs in conjunction with the DoD CRF/EOP Manager and provide representatives to serve as members of the CRF WG.

b. Refer all Component CRF and EOP users to the standard established by the Superintendent, USNO.

c. Prescribe standards for the coordination and implementation of tactics, techniques, procedures, and dynamic upkeep of CRF and EOP data for DoD systems.

d. Develop Component procedures for the development, coordination, and consolidation of CRF and EOP standards.

e. Prescribe CRF and EOP standards that are consistent with operational and research needs for accuracy.

f. Provide technical information on current and prospective CRF and EOP standards to the DoD CRF/EOP Manager in the format he or she prescribes.

SECTION 6: DELEGATION PREPARATION AND REPORTING PROCEDURES FOR PNT FORUMS

6.1. DESIGNATED OPR AGENCY. The DoD CIO will designate an OPR agency as specified in Paragraph 2.1.u. The designated OPR agency for each PNT forum will:

a. Determine the name, staff agency, and office code of each member of the DoD delegation, for international government and civil forums. A listing of the DoD delegation will be included with the guidance package for DoD coordination.

b. At least 2 weeks before each domestic or international PNT forum, prepare and submit a guidance package to the DoD CIO. Guidance packages will identify the purpose of the meeting or event, the overall objective(s) of DoD participation, specific items of DoD interest in the meeting or event agenda as appropriate, and anticipated issues and recommended DoD positions with respect to those issues. Guidance packages also will include copies of relevant background documents.

c. Within 2 weeks after each domestic or international PNT forum, prepare and submit to the DoD CIO a written post-event report summarizing meeting or event discussions, action items, issues, decisions, satisfaction of DoD objectives, and follow-on requirements, if any.

6.2. DISTRIBUTION. The guidance package and post-event report will be distributed through the DoD PNT EMB and DoD PNT WG as appropriate and determined by the DoD CIO.

GLOSSARY

G.1. ACRONYMS.

ASD(R&E)	Assistant Secretary of Defense for Research and Engineering
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CRF	Celestial Reference Frame
DCAPE	Director of Cost Assessment and Program Evaluation
DIA	Defense Intelligence Agency
DIRNSA/CHCSS	Director National Security Agency/Chief, Central Security Service
DoD CIO	Department of Defense Chief Information Officer
DoDD	DoD directive
DoDI	DoD instruction
DOT&E	Director, Operational Test and Evaluation
EMB	Executive Management Board
EOP	Earth orientation parameters
GPS	Global Positioning System
Navwar	Navigation Warfare
NGA	National Geospatial-Intelligence Agency
NSPD	National Security Presidential Directive
OPR	Office of Primary Responsibility
PNT	positioning, navigation, and timing
PSA	Principal Staff Assistant
PTTI	precise time and time interval
TRF	terrestrial reference frame
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
USD(C)/CFO	Under Secretary of Defense (Comptroller)/Chief Financial Officer, Department of Defense
USD(I)	Under Secretary of Defense for Intelligence
USD(P)	Under Secretary of Defense for Policy
USNO	U.S. Naval Observatory
USSTRATCOM	U.S. Strategic Command
WG	working group

G.2. DEFINITIONS. Unless otherwise noted, these terms and their definitions are for the purpose of this issuance.

CRF. A reproducible and current series of coordinates describing the positions of natural exo-atmospheric objects (identified in this issuance as “celestial”) within the framework of a specific coordinate system in a given field of interest, and upon which the relative positions of other objects of interest (e.g., targets, intelligence sources, man-made objects, navigational impediments, Earth-orbiting objects) may be measured. The DoD Components’ utilization of the CRF includes, but is not limited to, the purpose of determining objects of interest’s positions, orientations, motions, orbits, and intent.

EOP. The values that describe the mathematical relationship between the terrestrial reference frame and the celestial reference frame. This relationship is defined by the coordinates of the Earth’s pole (polar motion), the rotation angle about the pole (Universal Time or UT1), precession, and nutation.

leap second. Time is occasionally adjusted by 1-second increments to ensure that the difference between a uniform time scale defined by atomic clocks does not differ from the Earth’s rotational time by more than 0.9 seconds. In order to keep this cumulative difference less than 0.9 seconds, a leap second is added to the atomic time to decrease the difference between the two. This leap second can be either positive or negative depending on the Earth’s rotation.

Master Clock. The underlying product for all precise time and time interval products. The single authoritative clock providing the real time representation of Coordinated Universal Time for all of DoD. An ensemble of clocks maintained at the USNO is used to ensure the accuracy and consistency of the authoritative clock.

PNT forum. A meeting or conference venue at which PNT matters are formal agenda topics.

precise time. A frequency (time interval) requirement accurate to within 1 microsecond.

PTTI. A reference value of time and time interval (frequency).

REFERENCES

- Federal Radionavigation Plan, current edition
- Chairman of the Joint Chiefs of Staff Instruction 3170.01I, “Joint Capabilities Integration and Development System,” current edition
- Chairman of the Joint Chiefs of Staff Instruction 6130.01, “CJCS Master Positioning, Navigation, and Timing Plan (MPNTP), current edition
- DoD Directive 4650.05, “Positioning, Navigation, and Timing (PNT)”, June 9, 2016
- DoD Directive 5144.02, “DoD Chief Information Officer (DoD CIO),” November 21, 2014
- DoD Instruction 4650.08, “Positioning, Navigation, and Timing (PNT) and Navigation Warfare (Navwar),” February 5, 2015
- DoD Manual 8910.01, Volume 1, “DoD Information Collections Manual: Procedures for DoD Internal Information Collections,” June 30, 2014, as amended
- National Security Presidential Directive 39, “U.S. Space-Based Positioning, Navigation, and Timing Policy,” December 8, 2004
- United States Code, Title 10