Naval Concept of Operation

For the

Joint Mission Planning System (JMPS)

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1.0 SCOPE

1.1 IDENTIFICATION

This Concept of Operations (CONOPS) describes the Joint Mission Planning System (JMPS) in terms of users' needs it will fulfill, its relationship to existing systems and processes, and representative ways it can be used. This CONOPS only covers Department of the Navy (DON) operations. The various missions that DON forces perform were divided into 12 warfare areas.

1.1.1 Command, Control, and Communications (C3)

The C3 warfare area includes Early Warning, Air Control, Surface Control, and Communications Management missions (Appendix A).

1.1.2 Counter-Air

The Counter-Air warfare area includes interceptors, strike aircraft, anti-aircraft guns, Surface-to-Air Missiles (SAMs), and Electronic Counter-Measures (ECM) to destroy air and missile threats before or after they are launched. Counter-Air missions are composed of Offensive Counter-Air (OCA) and Defensive Counter-Air (DCA) missions (Appendix B).

1.1.3 Interdiction

The Interdiction warfare area includes Close Air Support (CAS), Forward Air Control (Airborne) (FAC(A)), Strike Coordination and Reconnaissance (SCAR), Armed Reconnaissance, Suppression of Enemy Air Defense (SEAD) and Deep Air Strike (DAS) missions (Appendix C).

1.1.4 Search and Rescue (SAR)/Combat Search and Rescue (CSAR)

The SAR/CSAR warfare area includes missions to search for, rescue, and evacuate friendly forces both in and out of a threat environment (Appendix D).

1.1.5 Aerial Refueling

An Aerial Refueling mission is a coordinated effort between the Refueling Element Lead, Mission Leaders, and other Element Leaders of a mission to identify refueling needs and generate a Tanking Plan (Appendix E).

1.1.6 Expeditionary Forces

Expeditionary Forces are responsible to the Marine Air Ground Task Force (MAGTF) Commander for the execution of Anti-air Warfare, Offensive Air Support, Assault Support, C3, and General Aviation Support (Appendix F).

1.1.7 Air Sea/Land Delivery

The Air Seal/Land Delivery warfare area includes Airdrop, Air-Landed Passengers, Air Movement, and Air Supply (Appendix G).

1.1.8 Reconnaissance (RECCE)

RECCE warfare areas include Tactical Air (TACAIR), Tactical Reconnaissance Pod System (TARPS), Advanced Tactical Airborne Reconnaissance System (ATARS), System-oriented High-range-resolution Automatic Recognition System (SHARP), Unmanned Aerial Vehicles (UAVs), and Maritime missions (Appendix H).

1.1.9 Maritime

Maritime warfare areas include Under Sea Warfare (USW), Surface Warfare (SUW), Mine Warfare (MIW), Mine Countermeasures (MCM), Naval Surface Fire Support (NSFS), Communications Relay (COMREL), and Maritime Intercept Operations (MIO) (Appendix I).

1.1.10 Electronic Warfare (EW)

EW areas include Information Warfare (IW), EW, Electronic Attack (EA), Electronic Protect (EP), and Electronic Surveillance (ES) (Appendix J).

1.1.11 Special Operations (SPECOPS)

SPECOPS include Maritime Special Operations (MSO), Direct Action (DA), Special Reconnaissance (SR), Foreign Internal Defense (FID), Unconventional Warfare (UW), Combating Terrorism (CBT), Coalition Support (CS), CSAR, Counter-Drug Activities (CD), Counter-mine Activities (CM), Humanitarian Assistance (HA), and Security Assistance (SA) missions (Appendix K).

1.1.12 Training

The Training mission area encompasses all phases of Student Naval Aviator (SNA) training (Appendix L).

1.2 SYSTEM OVERVIEW

JMPS will provide the infrastructure, information, automated tools, and decision aids needed to plan: aviation missions ranging from basic flight training to joint, multi-aircraft combat strikes; aerospace vehicle missions (UAV and air-launched weapons), and SPECOPS. In addition, JMPS will provide the capability to support contingency target planning, time-critical targeting, and the prosecution of mobile threats, including in-flight re-targeting. JMPS will provide planners with continuous support during aircraft surge operations for extended periods of time. An aviation squadron or combat element will use JMPS to pre-plan missions.

JMPS will provide the mission planner with unit-level mission planning support for every phase of a mission, ranging from the preflight planning, departure, ingress, attack/cargo delivery, egress,

recovery, and post-mission debrief. From the receipt of tasking, be it in a squadron flight schedule, Air Tasking Order (ATO), which also contains the Airspace Control Order (ACO), Fragmentary Order (FRAGORD), or other source -- JMPS will provide the mission planner with the information management tools and access to data to develop a flight plan or combat mission, simple or complex. For combat operations, JMPS will provide the mission planners with a distributive and collaborative mission planning capability that will permit the coordination of all combat elements.

JMPS will provide mission planners with the tools to assess the threat situation, disposition of friendly and neutral forces, Rules of Engagement (ROE), terrain, weather and other factors in the selection of weapons, development of ingress and egress routes, and target area tactics.

JMPS will provide the Warfighter with the flexibility to plan missions on laptops, desktop systems, or workstations, either stand-alone or connected to a secure network. JMPS will provide the Warfighter with a "Load and Go" capability that will allow them to download and update a local database on a portable JMPS system and deploy to a remote location with a mission planning capability.

The plan for maintaining JMPS is being written by Space and Naval Warfare Systems Command (SPAWAR). The JMPS Naval Project is being sponsored by N62/N88, using PMA-233 as the acquisition manager. The developer has not been selected, however, the support agencies include: Prototype, Development, and Testing Sites; Operational Test and Aircrew Training Sites; Systems Administration Training and Data Base Training Sites; and Fleet Support and Logistics Support Sites.

Documents relevant to system development, doctrinal philosophy, and systems maintenance are listed in Section 2.

1.3 DOCUMENT OVERVIEW

This CONOPS has been developed using Data Item Description (DID) DI-IPSC-81430 as a general guide and tailored to meet Naval Air Systems Command (NAVAIR) requirements.

Section 1.0 describes the scope of the JMPS Naval CONOPS. The system is identified and a general overview is provided.

Section 2.0 lists Referenced and Other Applicable Documents for the JMPS CONOPS.

Section 3.0 describes the Current System or Situation. Background information, a general description of the current systems and situation, users, and the support concept are discussed and identified.

Section 4.0 states the Justification for and Nature of Changes. General deficiencies are listed as well as common deficiencies associated with the various phases of the generic mission planning flow.

Section 5.0 discusses the Concept for a New or Modified System. This section describes the desired state for mission planning operations with JMPS.

Section 6.0 contains Operational Scenarios. Three scenarios are provided: Element, Multi-Element, and expeditionary.

Section 7.0, Summary of Impacts. The impacts on operations, organizations, and component system programs are summarized.

Section 8.0, Analysis of the Proposed System. This section discusses the advantages, disadvantages and limitations of JMPS.

Section 9.0, the Notes section contains a list of abbreviations and acronyms used in the main body and appendices of this CONOPS.

Detailed mission area operational concepts are provided in appendices and follow the general format of sections 3, 4, and 5 of this main body.

2.0 REFERENCED AND OTHER APPLICABLE DOCUMENTS

1. DI-IPSC-81430, *Data Item Description Operational Concept Description (OCD)*, Dec 94.
2. MIL-STD-2036, *General Requirements for Electronic Equipment Specifications*.
3. *Mission Planning Systems Acquisition Support Plan (ALSP)*, draft Dec 98.
4. A-50-9301C, *Navy Training System Plan (NTSP) for Mission Planning Systems*.
5. *Forward ... From the Sea*, Department of the Navy, Chief of Naval Operations, Mar 97.
6. *Naval Aviation…Forward Air Power…From The Sea*, Office of Naval Operations, Dec 97
7. NDP 1, *Naval Warfare*, Department of the Navy, 28 March 1994
8. NDP 5, *Naval Planning*, Department of the Navy, Chief of Naval Operations
9. JV 2010, *Joint Vision 2010*, Joint Chiefs of Staff
10. NWP 5-01, *Naval Operational Planning*, Department of the Navy
11. FMFM 3-1, *Command and Staff Action*, USMC, MCCDC, Quantico, Virginia, 1982.
12. Memorandum, *Implementation of the DoD Joint Technical Architecture*, OSD, AUG 22 1996
13. NSAWC TACNOTE, "Strike Planner's Checklist", Enclosure (1) to *NSAWC Air Wing Strike Warfare TACNOTE*, Jan 97
14. *Copernicus ... Forward, C4I for the 21st Century*, June 1995.
15. *Information Technology for the 21st Century (IT21)*, COMSPAWARSYSCOM, Aug 97.
16. JMPS-SG-1.0, *Specification Guideline for the Joint Mission Planning Segment (JMPS)*, Version 1.0, 15 Oct 97, NAVAIR PMA-233 and Electronic Systems Center ESC/AC
17. *Joint Doctrine, Capstone and Keystone Primer*, Joint Chiefs of Staff, 15 July 1997.
18. Joint Pub 3-01.2, *Joint Doctrine for Theater Counterair Operations*, JCS, 1 Apr 86.
19. Joint Pub 3-03, *Doctrine for Joint Interdiction Operations*, Joint Chiefs of Staff, 10 Apr 97.
20. Joint Pub 3-04, *Doctrine for Joint Maritime Operations (Air)*, 31 July 1991, JCS.
21. Joint Pub 3-55, *Doctrine for Reconnaissance, Surveillance, and Target Acquisition Support for Joint Operations (RSTA)*, Joint Chiefs of Staff, 14 Apr 93.
22. Joint Pub 3-55.1, *Joint Tactics, Techniques, and Procedure for Unmanned Aerial Vehicles*, JCS, Aug 93.
23. Joint Pub 3-56.1, *Command and Control for Joint Air Operations*, JCS, Nov 1994.
24. OPNAVINST 3710.7x, *NATOPS General Flight and Operating Instructions*, CNO.
25. PEO (CU) XXXX/XX, *Concept of Operations for the CVN 68 Naval Strike Warfare Planning Center Installed Configuration*, 1 Dec 97, NAVAIR PMA-281 and PEO(CU)
26. DoD Directive 5200.28, *Security Requirements for Automated Information Systems (AISs*)

27. MCM 3-1, *Threat Reference Guide and Countertactics*, DoD

3.0 CURRENT SYSTEM OR SITUATION

3.1 BACKGROUND, OBJECTIVES, AND SCOPE

The Department of the Navy has identified a requirement for mission planning capabilities that provide various types of pertinent data to the planner, aids in considering this data, develops an optimal mission execution plan, generates briefing materials and in-flight aids, and transfers data between the mission planning system and the weapon system. The current mission planning environment has various levels of mission planning capabilities, which differs by mission area and from aircraft to aircraft. This section describes a generic mission planning flow that loosely applies to all naval aircraft. These generic mission flow events will be used to show the duplicity of effort of many of the current planning systems that exist today. Specific mission planning processes are covered in the appropriate appendices.

3.2 DESCRIPTION OF CURRENT SYSTEM OR SITUATION

There are many mission planning systems/tools in use today. No single system currently meets all of the mission planner's requirements. Since there are so many systems in use, we will forego descriptions of those systems. One aspect that all mission planning systems have in common is their operating environment. Current mission planning systems generally operate in controlled environments meeting the requirements of MIL-STD-2036, General Requirements for Electronic Equipment Specifications.

Figure 1 shows a generic mission planning process that is common at some level to all warfare areas. Various tools are used in each element to aid the mission planner in collecting required information and generating the required mission planning products (i.e., flight plan, mission plan brief, kneeboard charts, mission data loads, etc.).

3.2.1 Generic Mission Planning Flow

3.2.1.1 Tasking

Tasking consists of a combination of specific target tasking, operational procedures, and commander's intent. Tasking is received through the Air Operations Center from the Joint Forces Air Component Commander (JFACC). Once received, an ATO can be parsed in the Tactical Strike Coordination Manager (TSCM) to break out the individual elements.

Day-to-day mission tasking during Joint Task Force (JTF) operations is promulgated via the ATO, which also contains the ACO. The ATO includes power projection missions as well as supporting missions such as SEAD, Target Combat Air Patrol (TARCAP), Reconnaissance, Tanking, or Signals Intelligence (SIGINT).

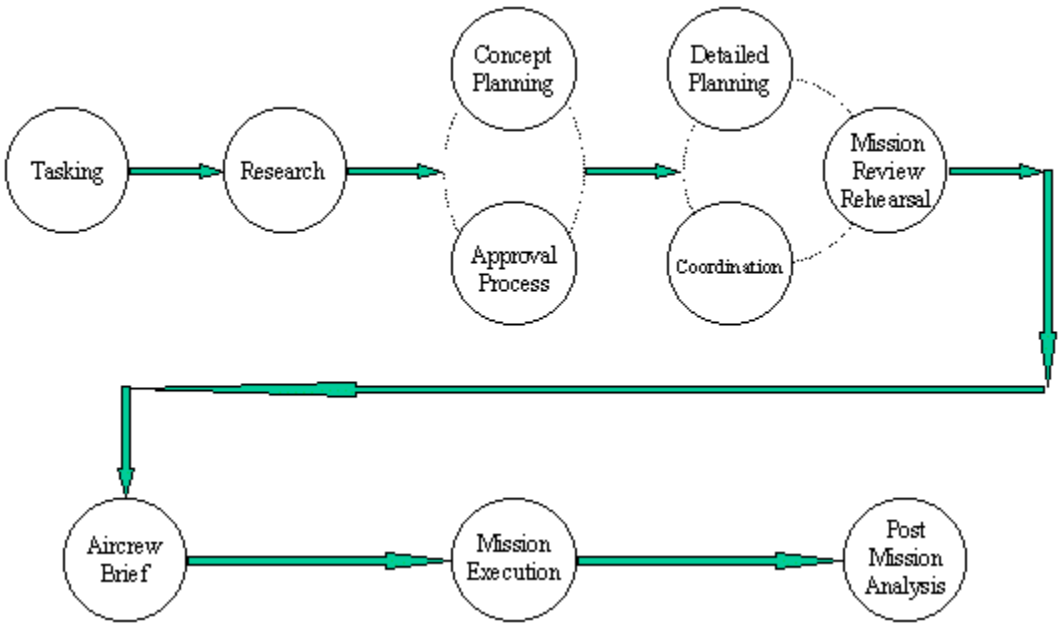

FIGURE 1. Generic Mission Planning Flow.

Specific mission tasking may also be promulgated via a variety of means, with the major differences dependent on whether the target list is part of a standing Operations Order (OPORDER), Contingency Plan (CONPLAN), or day-to-day tasking based on execution of an ongoing campaign plan. Standing target lists are included as parts of theater OPORDERs or CONPLANs. Specific mission tasking may be at a variety of classification or compartment/ Special Category (SPECAT) levels. The Carrier Airwing (CVW) Targeting Officer maintains the local target list(s) for each of these standing OPORDER/CONPLANs and provides the list to the CVW Target Control Board for assignment to individual strike teams. These strike teams then conduct contingency mission planning. Standing OPORDER/CONPLANs also contain operational procedures and commander's intent, but often only to a general extent. Specific operational procedures will be promulgated via Battlegroup Operational Tasking (OPTASK), CVW Tactical Notes (TACNOTEs), and upon execution, by the theater Special Instructions (SPINS) promulgated by the JTF Commander.

Non-ATO missions inputs are received by individual units and scheduled by CVW Operations and nuclear aircraft carrier (CVN) Strike Operations, and promulgated via the Air Plan. They include force defense and Intelligence, Surveillance, and Reconnaissance (ISR) missions (e.g., Surface Surveillance Coordination (SSC), Combat Air Patrol (CAP), Airborne Early Warning (AEW), and SIGINT).

Day-to-day operational procedures are promulgated by Battlegroup OPTASK, CVW TACNOTEs, and detailed JTF Commander SPINS. These include inter-service coordination, tanking, force defense procedures (e.g., RTF), ROE, and Air Traffic Control. These documents are assembled by the CVW Mission Planning Airwing Intelligence Officers (AIOs) and made available as planning materials to the strike planning teams and individual mission planners.

3.2.1.2 Research

Research addresses the need for each mission planning team to have common data and analysis regarding targets, threats, assets, and environment. Airwing and ship's company intelligence personnel largely perform this effort. The primary research activities involve threat analysis, target development and nomination, combat assessment, order of battle maintenance, and tactical reconnaissance. These activities increasingly rely on imagery and image processing equipment.

TSCM, the Tactical Automated Mission Planning System (TAMPS), AV-8 Mission Planning System (MPS), and the Special Warfare Automated Mission Planning System (SWAMPS) can be used during this phase to aid planners in building up their mission folders.

3.2.1.3 Concept Planning / Approval Process

The ATO comes out the day before or a squadron gets assigned a strike verbally from Carrier Air Group Operations (CAG OPS) anywhere from a day to a week prior. In the ATO, the mission lead is told what the target is, how many planes to use, what ordnance is needed, where the tankers are, how to contact them, who the mission leader needs to talk to during the flight and when they are to be on target.

The mission leader puts the collected data together and prepares a short (5-10 minutes) brief for the Carrier Air Group (CAG) commander, usually in his stateroom (CAG Laptop), so that CAG gets an idea of what the strike will entail. This is also the time for the strike leader to ask CAG for external asset support, if required. The CAG provides amplifying information at that brief and lets the strike leader know if what the strike leader wants to do is feasible or if changes must be made. The Concept of Operations Briefing is optional and depending upon Squadron and Wing Standard Operating Procedures (SOPs) may not always occur.

In the Concept Planning Phase, TSCM, TAMPS, SWAMPS, and the Tactical EA-6B Mission Planning System (TEAMS) may be used to aid the planner further define the mission plan and prepare the CAG Laptop.

3.2.1.4 Detailed Planning

In the Detailed Planning Phase, TAMPS, TEAMS, Navy Portable Flight Planning System (N-PFPS), and SWAMPS may be used to aid the planner. Using available tools, the mission planner collates the different detailed element plans to create the overall administrative plan. This administrative plan consists of the line-up (aircrew and aircraft type), ordnance load plan, frequency, launch, rendezvous, formation, tanking, and Return to Base plans. These details concern coordination between elements as well as coordination with assets external to the strike itself, such as the ship's flight deck control or airfield flight line, ordnance department, and organic/non-organic tankers. Other possible areas are described in the following paragraphs.

3.2.1.4.1 Availability of Weapons, Fuses, Pods

Mission planners must go to individual squadrons to obtain information on the availability and inventory of aircraft stores, such as drop tanks, jamming pods, bomb racks, or TARPS/Forward Looking Infrared (FLIR) pods.

3.2.1.4.2 Miscellaneous Support

Upon completion of a mission plan, numerous miscellaneous tasks must be accomplished prior to the overall mission brief. These tasks include the printing of strike kneeboard cards, en route weather forecasts, communications cards, cards of the day, and data loads. Also, the latest imagery of the target/target area is reproduced for each strike element for distribution during the mission brief.

3.2.1.4.3 Flight Administrative Timing

The overall timing of the mission planning process as well as timing for the mission briefing, man-up, and launch is determined by the mission commander. Once the timing for the various planning evolutions is determined, the mission commander passes the information to the Operations Officer for inclusion in the Air Plan. This information is passed to the Operations Officer over a phone or is hand written and carried.

3.2.1.4.4 Rendezvous

Rendezvous locations, altitudes, and airspeeds are determined by the mission commander and briefed to all participants. Overhead rendezvous altitudes are specified in CVW TACNOTES or individual squadron SOPs.

3.2.1.4.5 Tanking

If tanking is required, careful consideration should be given to the hose to receiver ratio, sour tanker backup plan, and receiver sequencing to optimize the flow of the strike package and support aircraft. The development of an unambiguous and accurate tanking plan is a critical element of a successful mission. The plan must provide the tanking sequence, airspeed, begin and end points, handling of stragglers, and identification of the "drop dead time."

3.2.1.4.6 Launch/Recovery

A Launch Sequence Plan (LSP) and Recovery Plan is developed by the mission commander and passed through the Strike Operations Officer, Air Operations, Air Boss, Handler, Navigator, and Operations Officer if required. The LSP and Recovery Plans are hand carried to the above listed personnel for their chop and approval. After suggested changes are made, a final LSP and recovery plan is distributed to appropriate personnel and to all participants during the mission briefing.

3.2.1.4.7 Return to Force (RTF)

RTF procedures are normally promulgated by strike operations on a daily basis, or by specific mission. Normal RTF procedures are handled via proper Identification Friend or Foe (IFF) mode squawk and radio communication through the E-2. However, these procedures become especially critical in a combat environment when returning aircraft are disabled (e.g. loss of radio communications and/or IFF capability due to normal system failure, battle damage, etc.). RTF procedures normally include a specific ingress corridor, a specific altitude, and a specific airspeed and may include specific maneuvers at specific points in space, to provide for a manual identification of the aircraft, as friendly to the battle group/force. Following these procedures assists in preventing blue-on-blue engagements and delousing of potential enemy aircraft inbound to the force.

3.2.1.5 Coordination

Element Leaders must coordinate with one another and resolve conflicts during the development of their respective plans. In the end, the mission commander must ensure that each element is integrated into a cohesive and comprehensive plan.

Once the detailed plans are complete, the Element Leaders present final information on their individual elements to the Mission Commander. This information is used to update the layout of the entire strike both textually and graphically.

Textually, the essential information is drawn out of each element plan (fuel requirements, weapons load out, timing information, etc). This information is centrally placed on a series of spreadsheets and charts, depicting the pertinent portions of the strike package and their inter-relations.

For the Coordination Phase, TSCM, SWAMPS, and N-PFPS can be used to aid planners in deconfliction.

3.2.1.6 Mission Review/Rehearsal

When the iterations of detailed planning and coordination are nearing completion, a series of mission reviews are usually conducted. These reviews examine the entire mission as it stands, from end-to-end to ensure that no parts have been left out or to identify areas that require additional detail.

A mission rehearsal may be performed at this stage if required/desired by the mission leader. This may consist of viewing video simulations of terrain, sensor or weapon predictions and view-through-the-heads-up display (HUD) presentations. Mission rehearsal may also consist of practice runs of personnel locations and movements. This is applicable to the Expeditionary Forces and Special Operational Forces (SOF) mission areas.

Using capabilities within TSCM, TAMPS, SWAMPS, N-PFPS, or the Tactical Operational Preview Scene (TOPSCENE), mission planners can rehearse or even fly-though their planned missions.

3.2.1.7 Aircrew Brief

The mission commander conducts aircrew mission briefs, with information from the Meteorology and Oceanographic Center (METOC) and an intelligence brief or update by AIOs.

Element Leaders perform element briefs after the main mission brief. Following the element briefs, aircrews conduct flight briefs for their aircraft or flight. Prior to man-up, aircrew get a maintenance brief and read the aircraft discrepancies log for the aircraft assigned in maintenance control. During man-up of aircraft, aircrews physically connect the data load units to the aircraft and weapons for data up-load.

Again, mission planning tools are used to aid the mission planner during the Aircrew Brief (TSCM, N-PFPS, AV-8MPS, SWAMPS).

3.2.1.8 Mission Execution

This is the phase where the actual flights or ground assaults occur. Kneeboard cards and RECCE tapes can be annotated as the mission is being executed as well as HUD video recorded.

3.2.1.9 Post Mission Analysis

Upon recovery, the mission commander holds a mission debrief for all participants in an appropriate space. If not collocated, participants can hold a debrief over the phone. Issues that address planning, briefing, execution and safety are discussed. Overall lessons learned or After Action Reports relating to the mission are recorded for entry into the appropriate data files for future missions. Next, element or unit debriefs are conducted for each flight in the mission. This includes specific learning or training objectives, tactics employed or any other airmanship issues to promote appropriate leadership skills for wing, lead, or mission commander training. Depending on the type of mission and recording devices used, a tape playback session is planned. Tape playback is used for shot/targeting validation, Battle Damage Assessment (BDA)/Bomb Hit Assessment (BHA), ROE, and mission recall.

The primary purpose of a post-mission report is to evaluate the effectiveness of a mission, extent to which objectives have been met, necessity for re-strike, or decision to execute the next sequential event in the campaign plan. Currently, only SWAMPS provides the capability to aid the Warfighter in Post Mission Analysis.

3.3 USERS OR INVOLVED PERSONNEL

Users and support personnel for mission planning systems and tools come from every warfare area throughout the DON and other external agencies that provide data products. Fleet Commanders, Battle Group Commanders (BGCs), Carrier Intelligence Center (CVIC) personnel, Mission Leads, Element Leads, and the actual warfighters themselves are just a small sampling of those who use mission planning systems and tools. Navy Sea Air Land (SEALS) Teams, the Navy and Marine reserves, and training commands also rely on these systems and tools.

3.4 SUPPORT CONCEPT

PMA-233 is funded by N62 and N88 to purchase, distribute and maintain fleet mission planning systems. Support for mission planning systems is defined in detail in the Mission Planning Systems Acquisition Logistics Support Plan (ALSP) (draft dated 7 December 1998. The mission planning systems support concept which will migrate from TAMPS/TSCM/N-PFPS to JMPS is designed to provide a high degree of operational readiness with minimal support requirements at the organizational level and depot support level. A two-level maintenance philosophy has been implemented for mission planning systems. Direction and guidance for support of mission planning systems is provided in the User Logistic Support Summary, and annex of the ALSP.

3.4.1 Logistics

PMA-233 is supported by Space Warfare Systems Center (SPAWARSYSCEN) San Diego Detachment Philadelphia serving as the In-Service Engineering Activity and Logistics Agency for mission planning systems. SPAWAR is responsible for development of all elements of logistic support, including the development of technical documentation and training materials. Additionally, SPAWAR serves as the Depot Maintenance Manager for mission planning hardware and the Inventory Control Point for spares and repair parts. SPAWAR maintains an around the clock product support desk to field telephone or Secret Internet Protocol Routing Network (SIPRNET) electronic mail (e-mail) fleet queries and provide immediate problem resolution.

PMA-233 is supported by Naval Air Warfare Center-Weapons Division (NAWC-WD) Point Mugu as the Software Support Activity (SSA) for mission planning systems. NAWCWD Point Mugu maintains control of mission planning software configurations, collects System Trouble Reports (STRs) on fielded software, and makes maintenance releases to correct deficiencies as required.

3.4.2 Training

Billet requirements for mission planning support and maintenance personnel and mission planners are identified in the Navy Training System Plan (NTSP) for Mission Planning Systems A-50-9301C. The NTSP also identifies sources of training for database administrators/system administrators and maintenance personnel and a complete continuum of training for Navy and Marine Corps aviators to grow their mission planning skills in coordination with their increasing experience and proficiency as aviators.

4.0 JUSTIFICATION FOR AND NATURE OF CHANGES

4.1 JUSTIFICATION FOR CHANGE

Joint Vision 2010, *Forward ... From the Sea*, and *Naval Aviation … Forward Air Power ... From the Sea* establishes warfighting doctrine which drives Naval Aviation mission planning system requirements for the 21st century (Figure 2). The following sections summarize the impact of these visions on JMPS.

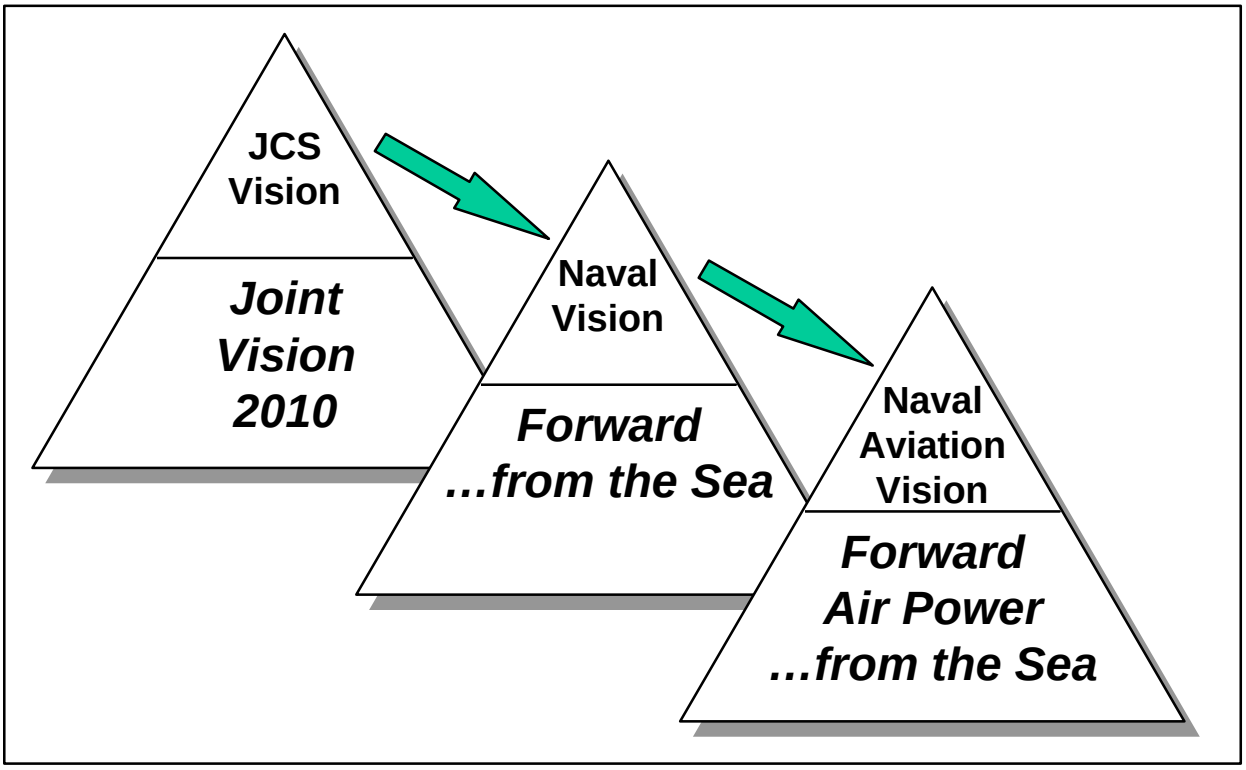

FIGURE 2. The Naval Aviation Vision.

4.1.1 Joint Vision 2010

Joint Vision 2010 (JV 2010), developed by the Joint Chiefs of Staff (JCS), is the conceptual template for how America's Armed Forces will leverage technological opportunities to achieve new levels of effectiveness in joint warfighting in the 21st century. Focused on achieving dominance across the range of military operations through the application of new operational concepts, this template provides a common direction for developing unique capabilities within a joint framework of doctrine and programs. Effective military operations require the ability to respond with a mix of forces, anywhere in the world, on a moment's notice. Interoperability is essential for these joint operations. Information must flow seamlessly and quickly among the Department of Defense's (DoD's) sensors, processing and command centers, and shooters, to enable dominant battlefield awareness and operations inside the enemy's decision loop. This vision of future warfighting embodies the improved intelligence and command and control available in the information age and goes on to develop four operational concepts: Dominant

Maneuver, Precision Engagement, Full Dimensional Protection, and Focused Logistics. JV2010 imposes several new requirements on mission planning systems.

a. Fully Joint operations will require coordination, interoperability, collaboration and deconfliction between services when planning operations.

b. A higher tempo of operations will require more rapid and responsive planning.

c. Develop plans using dominant battlespace awareness provided by accurate, near real time "picture" of the locations of friendly and enemy forces.

d. Real-time information will drive parallel, not sequential, planning and real-time, not prearranged, decision making.

e. Develop plans with enhanced economy of force using fewer platforms and less ordnance.

f. Use low observable technologies to mask operations, provide tactical surprise, and improve survivability.

g. Plan the precision engagement of targets using longer range, standoff weapons using near real time sensor products and accurate target location data.

h. Provide near real time sensor-to-shooter planning capability.

4.1.2 Forward … From the Sea

Forward ... From the Sea sets the Navy's direction for operational supremacy in the next century based upon the *Joint Vision 2010* template for joint combat operations, emerging technology, and innovative operational concepts. *Forward ... From the Sea* promulgates the Chief of Naval Operation's (CNO) guidance on operational primacy. It directs how Naval Forces operate Forward ... From the Sea to deliver precision naval fires (strike, interdiction and fire support) to accomplish strategic, operational and tactical objectives.

NDP 1, *Naval Warfare*, translates the strategic direction in *Forward...From the Sea* into doctrinal reality. It provides a framework for detailed Navy and Marine Corps doctrine and introduces what we do; how we fight; and the importance of readiness, flexibility, self-sufficiency, and mobility in expeditionary operations. NDP 5, *Naval Planning*, supports NDP 1 by discussing the contribution of planning to our combat readiness. It explains why we plan, describes the planning process, and develops doctrine for planning naval operations. Detailed information on how to plan is found one echelon down in NWP 5-01, *Naval Operational Planning*, and FMFM 3-1, *Command and Staff Action*, which contain current guidelines and formats for naval operation planning. *Forward ... From the Sea* imposes several new requirements on mission planning systems.

a. Using naval operational maneuver capability, develop plans with speed, deception and surprise to create and exploit enemy vulnerabilities.

b. Support speed of command by providing tools to integrate information, assess the situation, rapidly plan a course of action, and immediately execute.

c. Develop plans which engage the enemy with precision limiting collateral damage, lessening the risk to our forces, and achieving maximum impact.

d. Develop plans with smart targeting, so that ordnance is directed against key targets for greatest impact, and rapid, accurate battle damage assessment.

4.1.3 Naval Aviation…Forward Air Power…From The Sea

Naval Aviation … Forward Air Power ... From the Sea describes the Naval Aviation Vision and provides an integrated roadmap that charts where it is going and how it intends to get there. It discusses the critical roles of Naval power, effective crisis response requirements, and the impact of continuing advances in military technology. *Naval Aviation … Forward Air Power ... From the Sea* imposes several new requirements on mission planning systems.

a. More multi-mission platforms will require greater emphasis on mission area specific tools rather than platform specific tools.

b. Develop plans using a mix of low observability, countermeasures, threat avoidance, tactics, and standoff weapons to achieve tactical objectives.

c. Use real-time fused sensor data and intelligence to plan the effective employment of aircraft and weapons.

d. Support Sensor-to-Shooter mission planning.

4.1.4 Joint Technical Architecture (JTA)

The United States (US) Armed Forces are increasingly involved in the support of Crisis Support Teams, especially during peacetime or low intensity operations. These Crisis Support Teams are structured as JTFs and typically operate within a two-echelon Command and Control (C2) context. For the JTF staff to plan and perform effectively, it needs access to a variety of hardware and software resources that are well integrated and mobile. To achieve this capability the Office of the Secretary of Defense mandated a Joint Technical Architecture for all emerging systems and systems upgrades. The JTA is the result of collaboration among the Services, Joint Staff, Under Secretary of Defense for Acquisition and Technology (USD (A&T)), Assistant Secretary Defense for Command, Control, Communication, and Intelligence (ASD (C3I)), Defense Information Systems Agency (DISA), Defense Intelligence Agency (DIA), and other elements of the Intelligence Community. The JTA specifies a set of performance-based, primarily commercial, information processing, transfer, content, format and security standards. These standards specify the logical interfaces in command, control, communications, computers and intelligence (C4I) systems and that directly support them. This architecture addresses requirements for a flexible, evolvable environment which will support the rapid integration of new software modules in a few person-hours to a few person-weeks of effort. The architecture promotes software interoperation and continued evolution of software components as well as exploiting the continued evolution of the hardware and software infrastructure.

For most weapon systems, mission planning serves as the critical interface between force and unit-level C4I systems and the weapon system itself. The JTA approach is intended to reduce cost and cut development and fielding time by enhancing software portability, use of Commercial Off-The Shelf (COTS) products, ease of systems upgrade, and hardware independence. System developers shall use the JTA to facilitate the achievement of interoperability for new and upgraded systems. Interoperability is crucial to Information Superiority—the capability to collect,

process, analyze and disseminate information while denying an adversary the ability to do the same. JTA imposes several new requirements on mission planning systems.

a. Provide interoperability with C4I systems in the exchange of information, intelligence, intentions, and other mission planning data.

b. Use COTS components which are compliant with JTA requirements.

c. Develop software components which are reusable and portable.

4.1.5 Defense Information Infrastructure (DII) Common Operating Environment (COE)

Copernicus … Forward, C4I for the 21st Century, is the DON's strategy that responds to *C4I for the Warrior* (C4IFTW) and the Navy's operational concept, *Forward ... From the Sea*. It establishes a framework for naval C4I systems, developing an architecture for information delivery to mission commanders, Battlegroup (BG), Amphibious Ready Groups (ARG), and Joint Task Groups (JTG). The Copernicus framework is an interactive set of tools linking the C2 processes for warfighters at all echelons of command to support the flow of sensor-to-shooter information. The goal is to seamlessly link information from the sensor, through processing systems, to the shooter, including all associated communications systems,

The Joint Maritime Command Information System (JMCIS) was prompted by the Navy's Copernicus Architecture initiative and the inception of the C4IFTW Concept. The Navy defined the Copernicus Architecture to provide the doctrinal, technological and organizational C4I infrastructure needed to move into the 21st Century. The Joint Staff published the C4IFTW Concept envisioning a world where the warrior would be supported by a global C4I infrastructure that provided tailored, fused information via seamless strategic and tactical connectivity. Although JMCIS was originally conceived to solve Navy C4I problems, it has proven so successful that the JMCIS architecture provided the initial common core for the Global Command and Control System (GCCS) and remains compatible with the current GCCS COE. To ensure GCCS interoperability is maintained, JMCIS, now renamed GCCS-Maritime (GCCS-M) will consist of Navy-unique applications built off the common GCCS software core using the DII COE and common integration standards.

The DII COE concept is best described as an architecture that is fully compliant with the DoD JTA. The COE is a "plug and play" open architecture designed around a client/server model. The COE is *not* a system; it is a *foundation* for building an open system. Functionality is easily added to or removed from the target system in small manageable units called *segments*. The DII COE originated with a simple observation about C2 systems: certain functions (mapping, track management, communication interfaces, etc.) are so fundamental that they are required for virtually every C2 system. If these common functions could be extracted, implemented as a set of extensible, low-level building blocks and made readily available to system designers, development schedules could be accelerated and substantial savings could be achieved through software reuse. Moreover, interoperability would be significantly improved if common software were used across systems for common functions. This observation led to the development of the DII COE which is planned for use in systems throughout DoD. Office of the Secretary of Defense (OSD) has

directed that TAMPS migrate to the DII COE. The DII COE imposes several new requirements on mission planning systems.

a. Level 5 compliance: Meet minimum essential DII compliance to ensure that mission planning applications are segmented, installable using the COE installation tools, operate with the COE kernel, and can at least federate on a platform.

b. Level 7 compliance: Meet additional interoperability requirements by using COE services to integrate information, and by requiring that legacy mission planning applications do not duplicate the functionality provided by the COE services.

4.1.6 Information Technology for the 21st Century (IT21)

IT21 is a Fleet driven re-prioritization of existing Fleet C4I programs to provide an integrated personal computer (PC) based architecture that supports Fleet tactical and non-tactical support mission areas. The warfighters have stated that four network capabilities are needed.

a. Classified and unclassified E-mail with attachments using COTS packages that provide enterprise-wide services (such as automatic directory synchronization).

b. The Common Operational Picture (COP) must be a fusion of ground, sea, and air forces shared at the desktop with the time lateness appropriate for the users needs. This includes providing information required to employ our own forces that are in the COP.

c. The Information Technology (IT) infrastructure must be extended to a large "critical mass" of people in order to enable the organization(s) to move to a robust, modern IT infrastructure as an everyday tool for doing their business. IT in itself will generally not save money or large amounts of time, rather it will enable the real savings through process improvement.

Network-centric warfare requires all of the above to be in place, plus the ability to surge up capabilities such as throughput (i.e., bandwidth), to support increased operations for war and contingencies.

4.2 DESCRIPTION OF NEEDED CHANGES

4.2.1 Deficiencies and Limitations of Current System

The current mission planning system has many deficiencies or shortcomings that hinder planners in all mission areas. These deficiencies are discussed in the paragraphs below. General deficiencies are listed first and then deficiencies are listed as they apply to each specific mission planning event. Each warfare area appendix also contains a section discussing deficiencies.

General Deficiencies:

- The current planning system does not support "Single Window Mission Planning." The system does not allow the simultaneous creation, editing, and display of multiple routes on one screen.
- The current planning system does not provide the look and feel of commercial applications with which most users are familiar.

- The current planning system is not intuitive to the user. Interfaces are not standardized across all MPMs and there are no methods to stop a task started inadvertently. Additionally, the current system does not provide a capability for the user to customize interfaces, including preferences and defaults.
- The current planning system does not provide multilevel security.
- The current planning system does not provide training as an embedded feature.
- The current planning system's System Administrator (SA) and Data Base Administrator (DBA) require too much training. The system does not provide an intuitive and reliable interface.
- The current planning system does not provided the capability to plan a mission from the target back, launch point forward, or from any specified intermediate point or stop.

4.2.2 Tasking

Tasking mission planners can be a time consuming process that involves several layers of command over an extended period of time or it can be a simple process that involves nothing more than a verbal command given shortly before mission execution. The current mission planning system does not have the flexibility to handle a wide spectrum of tasking scenarios and it does not have the capability to automatically parse tasking orders from one mission planning workstation. Furthermore, the mission planning system does not provide the capability for a Mission Commander or Strike Leader to electronically task detailed element planners, weaponeers, and intelligence personnel and it does not provide the capability to track the progress of the planning process. Lastly, the current mission planning system does not provide a program for creating tailored flight schedules for training and/or readiness purposes.

4.2.3 Research

With the current mission planning system, users are frequently limited in their access to information, such as intelligence, weather, and threat data, which is required to complete mission planning. As a result, mission planners must request support from personnel that may be assisting other requirements or agencies and the accumulation of data may be delayed or inaccessible. There is a need for on-line, web-like interactive information sources including but not limited to:

- ROE, TACNOTES, Tactical Procedures (TACPROS), and Tactical Manual (TACMAN) information.
- Weather and environmental information (e.g. forecast weather, imagery, sun/moon illumination, tidal information, etc.).
- Availability of resources (i.e. aircraft, aircrew, weapons, stores, reconnaissance assets, etc.).
- Threat and target information to include Desired Mean Point of Impact (DMPI), target construction, defenses, no hit areas, multi-spectral imagery.
- Friendly and enemy order of battle to include current and projected movements.

The current mission planning system does not automatically provide the information listed above and it does not automatically create planning folders and populate them with required information. Additionally, the current system does not provide access to a large screen display that has the most current threat information and a common operating picture for neutral, friendly, and enemy forces.

4.2.4 Concept Planning

During the initial phase of mission planning, conceptual plans are discussed and general thoughts are formulated on how best to accomplish the assigned mission. A major deficiency with the current planning systems is that it does not allow for a distributive collaborative planning capability among interested parties with the capability to use an electronic white board , video teleconferencing (VTC), or a large screen display for development of mission/strike concept plans. Also, the current system does not provide the capability to automatically generate concept routes and timing control points based on terrain avoidance and minimum attrition; it does not provide a common operational picture on which to overlay conceptual routes; and it does not provide concept planners access to TACMAN and Joint Munitions Effectiveness Manual (JMEM) weapon options, ordinance availability, and threat information.

The current mission planning system does not provide an attrition risk assessment for the strike/mission package as a whole, including individual aircraft attrition, with the capability to perform automated or manual “what if” effectiveness/deconfliction analysis for optimizing losses versus target damage.

4.2.5 Detailed Planning

The current mission planning system has the capability to perform fuel planning, however it is accomplished by performing route planning on TAMPS and then duplicating the route on N-PFPS for fuel calculations. The necessity of performing fuel planning on two separate system adds time to the limited mission planning timeline and may impact the success of this process.

The current mission planning system does not provide Mapping, Charting, Geodesy, and Imagery (MCG&I) data and tools for route planning, targeting, moving map data loads, radar terrain masking, and perspective scenes. It also does not allow for a seamless integration, layering, and display of maps, charts, imagery, and weather data with other mission planning objects such as routes and threats. Additionally, the current system does not provide the capability to seamlessly integrate mission planning and mission rehearsal by allowing the creation or modification of a route from a mission rehearsal module to a mission planning system.

The current mission planning system does not provide a tool to produce sensor prediction displays based on environmental data and terrain considerations. It also does not provide the capability for emitter propagation predictions or sensor performance predictions.

4.2.6 Coordination/Mission Brief

Mission planning coordination is conducted manually, using existing mission planning products to identify and solve coordination/deconfliction issues. A deficiency exists due to the inability to automatically deconflict multiple missions and to coordinate efforts between separate missions.

Also, there are several deficiencies regarding aircraft data loads. One deficiency is the time it takes to download mission data and support data. For multi-aircraft missions, multiple Data Transfer Devices (DTDs) have to be loaded and when the time to load each DTD is summed, the aggregate time can be extensive. Another deficiency with the current planning system is the inability to verify what was loaded in the DTD versus what is on the planning system. The current planning system uses a checksum validation rather than an actual data comparison.

Mission planning/briefing products such as strip charts, kneeboard cards, maps, checklists, communication cards, and route cards are produced from a variety of sources and in a variety of formats. Often times these products are produced by hand and are very time consuming to create. A deficiency exists in the automatic production and the format standardization of mission planning and briefing products.

4.2.7 Aircrew Brief

The current mission planning system does not have the tools or ability to generate, display or print mission briefing products, which are critical to the completion of the planning process. As stated in the paragraph above, these products are available from a variety of sources and require a great deal of time to produce; therefore, a deficiency exists in the automatic production of aircrew briefing products in a standardized format from a single mission planning system.

4.2.8 Mission Execution

Currently, there is little information available to a Mission Commander or a strike leader to enable real time tactical updates of a mission plan. They must rely on ultra-high frequency (UHF)/very-high frequency (VHF) radio updates through command and control platforms on a secure net. The current system does not automatically receive updates on track files, mobile target locations, data from electronic sensors, and imagery, which is necessary to rapidly re-plan/re-target airborne missions. Additionally, a deficiency exists for real time updates on all orders of battle which are critical to the successful completion of re-planned airborne missions.

4.2.9 Post Mission Analysis

The current mission planning systems does not have the capability to electronically archive mission results information, including imagery, UAV data, aircraft digital data recordings, AIO debrief notes, and cockpit video. This type of information is needed in order to conduct a thorough analysis to evaluate mission success, to determine damage assessment, and to develop lessons learned. Also, it does not have the tools which allow for the automatic production and transmission of required post mission reports and messages.

5.0 CONCEPT FOR A NEW OR MODIFIED SYSTEM

5.1 BACKGROUND, OBJECTIVES AND SCOPE

JMPS will be the primary naval tactical automated information systems tool available to aircrew for planning aviation/special operations missions. JMPS will provide access via available networks to information sources necessary for comprehensive mission preparation. With few exceptions, JMPS will not maintain and operate those source databases. JMPS is intended to be primarily a pre-mission planning tool, but post-mission and real-time mission applications for inflight replanning are expected. JMPS is also intended to operate without connectivity to outside data sources. Considering the mission generation flow starting with mission initiation at higher levels and proceeding through the tasking organizations to the tactical units, JMPS functionality will initiate when tasking (of any kind) is received in the tactical organization.

5.2 OPERATIONAL POLICIES AND CONSTRAINTS

There are no known policy constraints. Operational constraints are inherent in the operating environment described below, primarily the need for speed of response, flexibility to adapt to changing needs, operations in a stressful physical environment, and portability (use anywhere). Security constraints will be addressed in the following paragraphs.

5.3 DESCRIPTION OF NEW OR MODIFIED SYSTEM

JMPS will be used for all levels of mission planning, from basic planning through complex force-level missions. The vision for JMPS is for planners to sit down at a JMPS terminal, receive tasking, collect all necessary data, coordinate with other planners at other terminals/sites, prepare, optimize and validate a flight, mission or strike plan, generate aircraft data load cartridge, visualize the mission/strike, and create a brief without ever having to leave the computer terminal. Using browser-based technology, the planner should be able pull data from any site accessible via SIPRNET. Planning functions will be accomplished within the timeline requirements established according to mission type.

a. JMPS will operate on computer hardware ranging from a standalone laptop with minimal computing resources (e.g., single processor, available random access memory (RAM), available disk drive space) to multiple networked, multi-processor workstations with substantial computing resources. The system will provide improved reliability, stability and availability. The intended operational environment for JMPS includes all locations that support aviation operations or training, including remote sites. This environment can be described as follows:

    - Home port air station
    - On Detachments from parent organization (i.e. without external support)
    - Squadron deployed land-based
    - At Centers of Excellence (e.g., NSAWC- Fallon)
    - Airborne (with or without wireless connectivity)
    - Onboard aviation capable ships (in CVIC, ready rooms, etc.)

- Land-based expeditionary operations
- During transition from ship-to-shore
- Shore (stand-alone or networked)
- Shore with ship-to-shore transmission link
- Special Operations

b. JMPS will operate in either a networked mode or standalone. JMPS will be connected to DII COE application programs in CVIC or other locations via direct access large area network (LAN)/wide area network (WAN) network connections, or remote access via satellite-capable link or SIPRNET. When connected, the user will have access and download capability to information systems such as Joint Services Imagery Processing System – Navy (JSIPS-N), GCCS-M, GCSS-M, Joint Deployable Intelligence Support System (JDISS), Image Product Library (IPL), etc. available elsewhere on the network. A "Load and Go" capability will be provided in which a planner can download/replicate LAN accessible data to a local database on a laptop and then deploy to a remote location with the capability to plan or refine missions. In this mode, JMPS will be functional whether remotely connected to a LAN/WAN or not.

c. JMPS must be user-friendly and intuitive. Mission planning windows need with the look and feel of "Microsoft Office"-type applications. The planner will have the capability to customize the window, menu, toolbars, and other aspects of the user interface. JMPS will memorize these preset preferences and associate them with the user for subsequent log-ons. JMPS basic flight planning will be efficiently accomplished using preset or user-defined defaults, such as call sign, aircraft serial number, unit, home station, communication frequencies, IFF/selective identification feature (SIF) codes, etc. The planner will be able to specify other preferences such as platform type, configuration and load, tactical area of interest, display formats, kneeboard card and strip chart formats. Frequent interruptions can be expected, so JMPS features will include "pick up where you left off" type functions. User displays will be tailored for mission type, including pick-lists of products desired.

d. JMPS will provide a complete and comprehensive electronic reference library. The planner will have electronic access to reference materials including but not limited to OPNAVINST 3710, Digital Aeronautical Flight Information File (DAFIF), Naval Air Training and Operating Procedures Standardization (NATOPS), SOP's, Notices to Airmen (NOTAMS), TACMANs, JMEM's, MCM 3-1, and TACNOTES. Data reflecting or affecting flight must be properly certified for accuracy.

e. JMPS will embed tailored levels of training or help functions, from simple prompting such as Pull Down Menu items, to "JMPS Help" or wizards, and checklists to guide planners through the process. The planner will have access to number of different types of checklists (Flight Planning, Mission Planning, Weaponeering, Strike Planning, etc) which may be customized by the user. Appropriate tutorials will be available, as will on-line help over the Internet.

f. JMPS will provide a "Single Window Mission Planning" interface. The system will simultaneously display and allow the creation and editing of multiple routes. These routes may consist of multiple platforms and weapons. For example, if an F/A-18 route and a

HARM-shooter route are linked at a given point, then the planner may reposition that point, simultaneously updating both routes.

g. JMPS will support collaborative mission planning between planners (Mission Commanders, Element Leaders, Unit Planners, Weaponeers and Targeteers) at various geographic locations and levels including CAG, MAGTF and JTF. JMPS will also support collaborative efforts of multiple planners from all services working together to define complex and effective strikes against multiple targets in depth. Mission planners will collaborate with weaponeers, targeteers, intelligence, and other support functions as required. This will include the capability to interoperate and exchange intentions, targeting data, routes, plans, intelligence, imagery, and other information; coordinate attacks; define mission support requirements; and deconflict the battlespace. Within the constraints of security and Operational Security (OPSEC) requirements, planners may view, edit and copy any mission information on a remote JMPS. Users at different JMPS sites will be able to remotely access, mutually view, share, and use mission planning information at other JMPS sites. Additionally, JMPS will contain collaborative tools such as electronic white board (with e-pen or light pen capability), e-mail, secret Internet chat, and video teleconferencing technologies via the DII COE and the SIPRNET.

h. JMPS will produce products for mission execution. These include kneeboard products such as jet route logs, maps and charts, hardcopy imagery, and data loads, using the DTD, for aircraft and weapon operational flight programs (OFPs). JMPS will have the ability to download from JMPS all necessary mission/Global Positioning System (GPS) data to a DTD for loading data into the aircraft reader.

i. A multilevel security system will ensure compartmentalization between systems and user data. This will preclude access to information for which the user is not authorized. This capability will also resolve security issues associated with remote access to planning databases and systems.

The output of JMPS or, as appropriate, outputs from GCCS, or GCSS will be viewed, edited, and manipulated on a Large Screen Display/Closed Circuit Television, the results of which will then be captured as a file and/or printed. This capability will streamline briefings and aid comprehension of critical aspects of the flight plan.

5.3.1 Operational Environment

Current mission planning systems generally operate in controlled environments meeting the requirements of MIL-STD-2036, General Requirements for Electronic Equipment Specifications.

5.3.2 Representative Mission Planning Process with JMPS.

The following discussion builds on the material presented in Section 3 and projects how JMPS should function. Simple missions will require little or no collaboration with other aircrew, local departments, or outside agencies. Assuming that complex missions will drive the functionality required of JMPS, discussion will be on that basis.

5.3.2.1 Receive Tasking

JMPS will absorb tasking in whatever form it is delivered and transform it into a readily manageable electronic format. The planner will be able to parse the tasking, manipulate it, make tasking assignments to other planners, and be able to move tasking or present it in any formats necessary to convey intent to other members of the planning team. Very rapid turnaround time requirements can be expected.

5.3.2.2 Research

Research will generally involve accessing numerous databases quickly. In a crisis planning scenario, demand for access to data can skyrocket, but planner accessibility to the physical hardware or network must not be significantly affected. JMPS will need user-friendly human interfaces to allow and facilitate fast and logical collection of information. Information security issues (i.e. accessing multiple levels of classified information and collecting that data into products) must be seamless to the user. JMPS browser architecture will be able to reach back past the local network LAN via SIPRNET/Defense Information Systems Network (DISN) to worldwide data repositories. Information/data bases accessible on the LAN will be prepared for JMPS information requests and will have tailored products available. This may include periodic "smart push" from these databases to the JMPS server. Via LAN/WAN access, the planner will access METOC, MCG&I, COP, route imagery, intelligence, target folders, and other data. Standard "Microsoft Office"-like functions and e-mail applications need seamless integration for real-time interoperability/data exchange at the user interface. Planner requests for large data files, e.g. images, will be routine. Some non-digital data such as photos and paper charts will need to be digitized. Planners will need the ability to manage, manipulate, archive, and print large data files. If LAN access is unavailable or LAN bottlenecks are anticipated, data storage media, which can be reproduced and hand-carried, will be needed.

5.3.2.3 Concept Planning and Approval Process

This evolution will be conducted collaboratively by a subset of the eventual full mission planning team. Planners may not be collocated. In a shipboard scenario, all the concept planners can be expected to spend some time in a collocated group. JMPS should contain tools that facilitate the effectiveness of this meeting-like working venue. Regardless of the scenario, electronic whiteboard functions between isolated planners will be imperative. This collaborative function means that all the planners can access and alter (if authorized) the planning of the rest of the team. The plan, itself a growing database of information, must have configuration management functions. All of the elements of mission planning represented by the appropriate planning requirements, e.g. as from the Strike Planning Checklist, must have automated features to speed the covering (in an abbreviated mode for this concept phase) of needed planning items. JMPS will also contain intelligent decision support aids to assist the planner in identifying courses of actions (COAs), assessing risks, and down-selecting to the best plan. Tools to predict mission element effectiveness or overall mission results will be used. The electronic whiteboard must be able to include JMPS-equipped planners remote from the LAN but accessible over SIPRNET or other means. Planners will work in a converge-diverge-converge method, building the plan by both consensus and planning leader dictates. Much of this process will be an abbreviated run through the items the comprise detailed planning, discussed below. In the final convergence step of this phase, the planners will perform a murder board evolution, requiring the ability to coalesce all the

planning effort results into an informal presentation form. As required at the completion of this phase, the approval authority, e.g. CAG, or a designated representative will be presented with the concept plan for approval. This may require preparation of special briefing materials, it may be an entirely electronic briefing, viewed remotely, or it may simply be a senior officer review of the archived material in the plan's database, done concurrently with the ongoing planning.

5.3.2.4 Detailed Planning

Detailed planning begins shortly after individual mission or planning assignments are made, probably before the concept planning and approval are completed. Detailed planning is iterative, with many small coordination and planning events being executed simultaneously. The planners' main needs are fast access to relevant data, the ability to view other aspects of the plan as the plan evolves, and tools that minimize the burden of low value administrative tasks and maximize the intellectual content of the plan. With intelligent help from JMPS, courses of action for mission execution will be considered and finalized. Typical functions that will happen during this phase are: threat analysis, route auto-generation based on threat avoidance, time on target, terrain avoidance, low observable considerations, etc.; route deconfliction; automated fuel calculations (certified); communications and frequency plan; targeteering including Precision Guided Munitions (PGM) special considerations and JMEM calculations; weaponeering including accessing ordnance inventory, verifying legal ordnance loads, and certifying weaponeering solutions; imagery analysis; sensor performance predictions; and target area study. During this phase, production of the final plan commences, with focus on the products needed for the aircrew and for the final briefing. Mission elements will have tools to develop plans graphically and textually and then predict results (e.g. SEAD or counter-air plans). Late changes in plans (e.g. target changes based on BDA, route changes for deconfliction with other missions, or ship/sub movements) are to be expected, so JMPS must help planners absorb and react to the impacts of those changes. JMPS will have intelligent applications for the planners, so that data entry by the planner can be as front-loaded, automated, and time-efficient as possible.

5.3.2.5 Coordination

Once the planning process has reached a critical mass and all the essential elements of the plan are known, final coordination will take place. This phase covers coordination among mission elements, local support departments, and outside agencies. For example, the aircraft launch plan will be finalized with the handling officer, the ordnance load plan will be finalized with the ordnance officer, the helo wave serial assignment table will be finalized with the operations officer, and the tanking plan will be finalized by the air operations center of the JFACC. While some preliminary contacts between force elements and outside agencies may occur in the concept and detailed planning phases, during the coordination phase the coordinated plans and commitments are accepted by the responsible authority. This phase will require tools that can communicate relevant mission plan contents to the coordinating contacts. Collaborative planning between dispersed and disparate agencies (joint military, coalition, DoD, and possibly non-DoD agencies) can be expected. Any planning products not completed during detailed planning are finalized.

5.3.2.6 Mission Review and Rehearsal

Aircrew will study the products that have been developed, visualize events expected during the mission, and otherwise "pre-fly" the mission. Included is route and target area study, wherein the aircrew will attempt to memorize visual cues for route and target recognition. To the extent permitted by modeling and simulation capabilities, certain aspects of the mission may be rehearsed using real-time, or slower than real-time simulation. Rehearsal functions will be tailorable for individual rehearsal, or group rehearsal at the element or total mission level. The planning and rehearsal functions will be linked so that rehearsal feedback can be addressed quickly as changes occur in the plan. If networked, the rehearsal function will permit access to the latest data/imagery. In an "offline" mode, individual rehearsal functions will still be functional, since rehearsal of one mission will overlap planning evolutions for other missions.

5.3.2.7 Aircrew Briefing

This phase brings group closure to the planning phase. Ideally, preparations accomplished before the briefing mean that no surprises be surface at the briefing. Generally, last minute updates including weather updates are presented. JMPS support of this phase will facilitate broad-based dissemination of the mission plan, in venues ranging from single large or small group presentations to electronic presentations to remote sites. For complex missions, a series of smaller element briefings will follow the large mission briefing. Any changes in plans revealed in the large mission briefing will be assimilated into the element plans and planning products at that time.

5.3.2.8 Mission Execution

The planning products previously developed are used in mission execution. The mission data contained on the DTD are loaded into the aircraft before launch. Inflight mission results will be captured on various flight systems for post-mission analysis. The possibility of inflight mission changes exists. JMPS will facilitate mission changes in two ways. First, for large aircraft, the JMPS will be portable and operable onboard the aircraft. There may or may not be connectivity to a LAN/WAN or planning database via a wireless network. Mission re-planning in this case is simply an airborne subset of the pre-launch version. In the case of tactical aircraft without JMPS onboard, JMPS will support inflight re-planning or re-targeting at the server. Information needed in the cockpit will be prepared and formatted on the ground or onboard ship by the JMPS LAN server and transmitted to the cockpit over network linkages beyond JMPS scope.

5.3.2.9 Post Mission Analysis

After the flight, post-mission data will be returned in numerous formats, including DTD's, HUD tapes, BDA reports, TARPS data, Electronic Support Measures (ESM) reports, off-board sensor reports, aircrew verbal debriefings, etc. Two basic needs will be fulfilled with this data. First is the tactical need for combat feedback to determine damage and the need for restrikes. JMPS will not have a direct role in data collection for this purpose although JMPS could supplement existing systems and processes accomplishing this. Second is the need for feedback for training and improvement of the mission performance of the force. The central process will be the aircrew debriefing in which face-to-face feedback is given. JMPS will support the feedback process by automating and facilitating collection and organization of the data, including presentations for

debriefing in the same venues as the aircrew briefing. An archive will retain mission feedback data for lessons learned or use in subsequent missions.

5.4 USERS OR INVOLVED PERSONNEL

Users and support personnel for mission planning systems and tools come from every warfare area throughout the DON and other external agencies that provide data products. Fleet Commanders, BGCs, CVIC personnel, Mission Leads, Element Leads, and the actual Warfighters themselves are just a small sampling of those who use mission planning systems and tools. SEALS, the Navy and Marine reserves, and training commands also rely on these systems and tools.

5.5 SUPORT CONCEPT

PMA-233 will be responsible for the procurement, distribution and logistics support of JMPS hardware. Support for JMPS is identified in the ALSP, and the NTSP for Mission Planning Systems A-50-9301C.

5.6 Software Embedded Supportability Tools

The JMPS architecture will include embedded supportability tools to support electronic distribution of software components, database and system administrative functions, and on-line training and help functions.

6.0 OPERATIONAL SCENARIOS

While not intended to be inclusive of all possible scenarios that may be planned by Navy/Marine Corps aircrews and planners, the following three scenarios are provided. These examples are included to give a sampling of mission types and their associated levels of complexity, and the products that JMPS will be required to provide to the mission planner. These scenarios involve from one to several aircraft and cover a range of tactics and doctrine.

6.1 SINGLE ELEMENT SCENARIO

6.1.1 Type of Mission

The example used here is an aircraft ferry flight, or what is more commonly referred to as a "cross-country" flight.

Tasking for this flight will be received through the squadron's daily flight schedule. This mission must be launched within 1.5 hours from receipt of the tasking.

6.1.2 Composition

This mission consists of a single aircraft. This may be either a fixed-wing or rotary-wing aircraft.

6.1.3 Mission Objective and Scope

The aircrew is required to plan a flight that will take the aircraft from a West Coast Naval Air Station across the United States to an East Coast Naval Air Station. The transit will consist of a series of legs, as the entire mission cannot be accomplished in one continuous flight due to fuel requirements. The planner will have to perform new mission planning at each refueling stop along the way to the final destination.

6.1.4 Required Products

For the purposes of this mission, the following minimum list of products must be generated for each leg by JMPS:

- Kneeboard cards to include GPS waypoint and route navigation information, communications listings and fuel performance
- Printed high altitude and/or low altitude airways chart depictions
- A DD-175 flight plan
- A mission data loader (MDL) upload to be inserted into the aircraft
- Other products as required for flight

6.2 MULTIPLE ELEMENT SCENARIO

6.2.1 Type of Mission

Deep Air Strike (DAS). This mission will originate from a single aircraft carrier at sea. This mission must be launched within 12 hours from receipt of the tasking.

6.2.2 Composition

- 8 F-14/FA-18 Fighter Element
- 8 F-14/FA-18 Striker Element
- 4 FA-18 SEAD Element
- 4 S-3B Tanker Element
- 2 EA-6B Jammer Element
- 2 E-2C Command And Control Element
- 1 F-14 TARPS (Reconnaissance Pod) Element

6.2.3 Mission Objective and Scope

This mission is commonly known as an Alpha Strike. It consists of several elements from the carrier's embarked airwing, all working together as a single strike package to accomplish the mission.

The Strike Leader will receive tasking for this mission via an ATO and will parse this information, using JMPS, to the various units assigned to the strike. The intent is to launch from the carrier, ingress through hostile territory, target and destroy a cluster of headquarters buildings and return all aircraft to the carrier for an Emission Control (EMCON) recovery.

The strike package is to avoid or render ineffective any enemy surface-to-air defenses along the flight route. This will require detailed threat analysis and targeting for any ground threats that cannot be avoided to reach the target. Ground threats will be targeted by the SEAD element in conjunction with the Jammer element.

Adequate protection is to be provided to the Strike element and the Jammer element against any airborne threat. Again, detailed threat analysis must be performed to determine the level, extent and locations of all possible airborne threats, and to devise a tactical plan to counter that threat. This is the role of the Fighter element.

Targeteering and weaponeering must be performed by the Strike element in order to achieve the desired level of destruction. This determination is based on many factors including available ordnance in the ship's inventory, number of aircraft assigned, composition of the target, applicable environmental data and any other pertinent factors.

Overall command and control of the strike package is the responsibility of the Command And Control element. This requires a detailed coordination with the Strike Leader as to mission tactics and unique C2 requirements.

A post mission reconnaissance flight is also required to evaluate BDA/BHA. This is the responsibility of the TARPS element and will require extensive sensor prediction calculations, threat analysis and fuel calculations.

The Strike Leader must gather all the planning information from the various elements, ensure a fine level of coordination has been achieved, and be sure that the intent of the mission will be satisfied. Fuel requirements, ordnance requirements, and launch and recovery sequences must be passed to the appropriate departments onboard the carrier. Approval for the plan must be achieved at both the conceptual stage and again before the final brief.

Post mission analysis will be performed after all elements of the strike have recovered aboard the carrier. Intelligence and aircrew debriefs will be conducted at all levels and the strike planning and results information will be archived for future reference.

6.2.4 Required Products

For the purposes of this mission, the following minimum list of products must be generated for the various elements by JMPS:

- All required briefing materials (slides, charts, imagery etc.)
- Kneeboard cards to include GPS waypoint and route navigation information, communications listings and fuel performance
- Strip charts of the various routes
- Imagery of the targets
- Command and Control plan
- Weaponeering card (Z-Diagrams, fuse/laser/emitter codes)
- Mission rehearsal products
- Launch Sequence Plan
- Ordnance Plan
- Tanking Plan
- MDL uploads

6.3 EXPEDITIONARY OPERATIONS SCENARIO

6.3.1 Type of Mission

Non-combatant Evacuation Operations (NEO). This mission will originate from several amphibious ships as part of an ARG and possibly from shore locations as well. This mission must be launched within two hours from receipt of the tasking.

6.3.2 Composition

As part of a Marine Expeditionary Unit, Special Operations Capable (MEU (SOC)),

- HMLA(AH-1W, UH-1N)
- HMM (CH-46E)
- HMH (CH-53E)
- VMA (AV-8B)

6.3.3 Mission Objective and Scope

The MEU(SOC) Commander will receive verbal tasking via the communications network to evacuate civilian personnel from an American Embassy. These personnel are to be airlifted from the Embassy and deposited aboard the various amphibious ships of the ARG. This is the responsibility of the HMM and HMH elements.

Adequate protection is to be provided to the lift assets as they perform the evacuation mission. This is the responsibility of the HMLA and VMA elements.

The elements for this mission may be spread throughout the ships comprising the ARG and may even be at a shore-based location as part of an ongoing detachment. This will require collaborative and distributive planning in order to achieve the required level of coordination. Some units may not have access to the ship's intelligence or imagery databases, but may still require this information. Time is a critical factor for mission success.

The NEO Mission Commander must gather all the planning information from the various elements, ensure a fine level of coordination has been achieved, and be sure that the mission can be accomplished. Fuel requirements, ordnance requirements and launch and recovery sequences must be passed to the appropriate departments onboard the ships. Approval for the plan must be achieved at both the conceptual stage and again before the final brief.

Post mission analysis will be performed after all elements of the mission have recovered aboard the ships. Intelligence and aircrew debriefs will be conducted at all levels and the NEO planning and results information will be archived for future reference.

6.3.4 Required Products

For the purposes of this mission, the following minimum list of products must be generated for the various elements by JMPS:

- All required briefing materials (slides, charts, imagery etc.)
- Kneeboard cards to include GPS waypoint and route navigation information, communications listings and fuel performance
- Helicopter Wave and Serial Assignment Tables (HWSAT)
- Landing Zone Diagrams
- Weaponeering cards
- Ordnance plan
- Strip charts of the various routes
- Imagery
- Hover performance calculations
- Launch sequence plans
- Mission rehearsal products
- MDL uploads

7.0 SUMMARY OF IMPACTS

The development, integration and fielding of JMPS will have operational, organizational and developmental impacts on the entire mission planning community and the associated support agencies and developers. This section summarizes the impacts of those changes.

7.1 OPERATIONAL IMPACTS

JMPS will impact combat operations by increasing the efficiency of the planning process in several ways.

- Close the gap between data available somewhere in the various national, theater, and local C4ISR and situational awareness systems, and data physically available to the mission planner when it is needed.
- Present the planner with a tool, accessible when it is needed, which performs all the functions needed for effective mission planning support.
- Ready and organized access to data repositories (e.g. intelligence, imagery, weather, MCG&I, etc.).
- Collaboration in a fully virtual planning environment among non-collocated planners.
- Flexibility for iteration of plans in response to changing environments.
- Production of products needed for mission execution.
- Communication media to facilitate and enhance briefings.
- Feedback mechanisms to incorporate postflight results into future mission plans.
- Use automation to enhance productivity in the time-critical planning environment, i.e. allow the planner to focus on the content of the plan rather than expending effort in performing the actual process steps to produce the plan.
- Reduce specialized training needed to maintain an expert level of competence in mission planning.

7.2 ORGANIZATIONAL IMPACTS

The JMPS system described in this CONOPS will have some significant organizational impacts upon all of the organizations that support mission planning:

- Each organization with responsibility over JMPS must participate on the JMPS Integrated Product Team (IPT). A fully functional IPT composed of all organizations cognizant over requirements, acquisition, funding and operational governing mission planning is a must for successful development and life cycle support. Under the leadership of the IPT, clearly established responsibilities within stakeholder organizations must be created. The IPT must become a collaborative management entity staffed with qualified representatives empowered to make decisions and implement them in every aspect.

- An SSA will be required. JMPS will be a very software intensive evolutionary development in a very fluid fielding environment, which is being continuously redefined as programs/concepts like IT-21, DII-COE, and GCCS evolve. An SSA will be the foundation of the life cycle support structure.
- Databases accessed or accessible via JMPS may or may not contain data valid for the JMPS mission planners' purposes. JMPS will enable access to databases that never were intended for near real-time use. Database owners must understand the operational uses of their product and ensure their products meet the need or are appropriately annotated.

Given current acquisition process dependence on COTS hardware and software, it can be assumed that operational units will need sustained "help desk" support. This may be in conjunction with other hardware or software support programs in place for the operator.

7.3 IMPACTS DURING DEVELOPMENT

During the development effort, it is expected that Fleet Users, JMPS IPT, DISA, OPTEVFOR, and NAVAIR personnel will be required to attend requirement reviews, design reviews, in-process reviews, test readiness reviews, Fleet User Interface Working Groups (FUIWGs), Aircrew Systems Advisory Panels (ASAPs), and Operational Advisory Groups (OAGs).

A number of factors will make transition of JMPS to the fleet a difficult and risky process.

- JMPS will be an evolutionary development program, a series of products of increasing functionality will be delivered over a long or possibly indefinite development period. While this is good software development practice by delivering functional prototypes (beta releases) and early capability to the user and getting early feedback as a result, it creates difficulty in training and configuration management for the user.
- DII-COE compliance is, at the time of this writing, mandated but the DII-COE interfaces are not fully defined. The "plug and play" functionality that eventually will be realized with DII-COE is of vital importance to the success of JMPS interoperability with the systems it will depend on. Depending on the rate at which DII-COE reaches maturity and acceptance in other programs, there may be unplanned interoperability issues.
- JMPS will be a system of systems, dependent on other systems, such as GCCS tools and databases (e.g. Joint Mapping Tool Kit (JMTK), Modernized Integrated Data Base (MIDB)) and platform OFPs, themselves in development.
- While JMPS is being developed, the Navy will be supporting TAMPS 6.X products as well as N-PFPS. Some aircraft and weapon systems will be transitioned to JMPS while still being supported by TAMPS and N-PFPS products. A smooth transition will require that aircrew and support personnel be trained on using JMPS, and possibly DII COE, and GCCS. Additionally, these systems will require trained database administrators and system administrators. This training is best accomplished prior to squadron deployment. CVs and MAGTF units must also be equipped with NT workstations/laptops and other DII COE required equipment prior to deployment.

Component-based testing and asynchronous release may potentially conflict with standard Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL) procedures.

8.0 ANALYSIS OF THE PROPOSED SYSTEM

8.1 SUMMARY OF ADVANTAGES

JMPS will provide the following new and enhanced capabilities:

- An, accessible, easy-to-use system which may be used as a flight planner, combat mission planner, or force/strike planner.
- Infrastructure, automated tools, decision aids, and timely information to more rapidly plan Naval aviation missions and strikes.
- Connectivity and tools for collaborative planning and deconfliction between mission/strike, element, unit, and other Naval and JTF planners.
- More Warfighter/planner focus on plan content (the real intellectual value) versus the planning procedure.
- Tools for automated processing of ATO and other tasking as well as contingency target planning, time-critical targeting, and the prosecution of mobile threats including in-flight re-targeting.
- Integrated set of C4I tools and databases on the DII COE/GCCS available to the planner
- GCCS COP accessibility for mission planning
- Capacity for continuous planning support during aircraft surge operations for extended periods of time.
- Integrated tools with a large screen display for mission rehearsal, briefing, playback, and debriefing.
- Flexibility to plan missions on laptops, desktop systems, or workstations, either stand-alone or connected to a secure network.
- “Load and Go” capability in which a Warfighter can download and update a local database and then deploy to a remote location with the capability to plan missions.
- Reduced training requirements; familiar user interface similar to office desktop software.
- Modern information management technology, tools, and methods will simplify system and database administration.

8.2 SUMMARY OF DISSADVANTAGES/LIMITATIONS

Potential Degraded or Missing Capabilities:

- DII COE standards for the Windows NT environment are not mature.
- Validity/verification of databases accessed by JMPS for use in near real-time applications.

8.3 ALTERNATIVES AND TRADE-OFFS CONSIDERED

The JMPS Migration Study will explore alternative solutions and conduct trade-offs.

9.0 NOTES

9.1 ACRONYMS

5D	Demand Driven Direct Digital Dissemination
A/A	Air-to-Air
AAA	Anti-Air Artillery
AAW	Anti-air Warfare
ABCCC	Airborne Battlefield Command and Control Center
ACA	Airspace Control Authority
ACE	Aviation Combat Element
ACO	Airspace Control Order
ADRG	Arc Digitized Raster Graphic
AEW	Airborne Early Warning
AFSOC	Air Force Special Operations Command
AI	Airwing Intelligence
AIO	Airwing Intelligence Officer
AIP	ASUW Improvement Program
AIRLANT	Naval Air Forces U.S. Atlantic Fleet
ALSP	Acquisition Logistics Support Plan
AMCC	Advance Mission Commander Course
AOB	Air Order of Battle
AOR	Area of Responsibility
APS	Advanced Planning System
ARCP	Air Refueling Control Point
ARG	Amphibious Readiness Group
ARIP	Air Refueling Initial Point
ARSOC	Army Special Operations Command
ASAP	Aircrew Systems Advisory Panel
ASD (C3I)	Assistant Secretary of Defense for Command, Control, Communication, and Intelligence
ASDS	Advance Swimmer Delivery System
ASR	Assault Support Request
ASTAC	Assistant Tactical Controller
ASUW	Anti-Surface Warfare
ASW	Anti-Submarine Warfare
ATACS	Automated Tactical (Manual Supplement)
ATARS	Advance Tactical Airborne Reconnaissance System
ATF	Amphibious Task Force
ATO	Air Tasking Order

ATTG	Automated Tactical Target Graphics
AV-8 MPS	AV-8 Mission Planning System
BARCAP	Barrier Combat Air Patrol
BDA	Battle Damage Assessment
BE	Basic Encyclopedia
BG	Battle Group
BGC	Battle Group Commander
BGIXS	Battle Group Information Exchange System
BHA	Bomb Hit Assessment
BIT	Binary Digit
BVR	Beyond Visual Range
C2	Command and Control
C2W	Command and Control Warfare
C3	Command, Control, and Communication
C3CM	Command, Control, and Communication Countermeasures
C3I	Command, Control, Communications, and Intelligence
C4I	Command, Control, Communications, Computers, and Intelligence
C4IFTW	Command, Control, Communications, Computers, Intelligence for the Warfighter
C4IL	Command, Control, Communications, Computers, Intelligence and Logistics
C4ISR&T	Command, Communication, Control, Computers, Intelligence Surveillance, Reconnaissance, and Targeting
CA	Covert Action
CAG	Carrier Air Group (Commander)
CAP	Combat Air Patrol
CAPC	Plane Commander
CAS	Close Air Support
CBT	Computer-Based Training
C-Cell	Contingency Cell
CD	Counter-Drug
CDC	Combat Direction Center
CFL	Coordinated Fires Line
CHUM	Chart Update Manual
CIC	Combat Information Center
CICO	Mission Commander
CINC	Commander in Chief
CINCLANTFLT	Commander in Charge, Atlantic Fleet
CIPB	Collaborative Intelligence Preparation of the Battlespace
CM	Countermine
CNATRA	Chief of Naval Training

CNO	Chief of Naval Operations
CNSWC	Commander, Naval Special Warfare Command
CO	Commanding Officer
COA	Course of Action
COD	Carrier Onboard Delivery
COE	Common Operating Environment
COMINEWARCOM	Commander, Mine Warfare Command
	COMM Communication
COMNAVSPECWARCOM	Commander, Naval Special Warfare Command
COMREL	Communication Relay
CONOPS	Concept of Operations
CONPLAN	Contingency Plan
CONUS	Continental United States
COP	Common Operational Picture
COTS	Commercial Off-The Shelf
CP	Control Point
CPI	Coastal Patrol and Interdiction
CS	Coalition Support
CSAR	Combat Search and Rescue
CTAPS	Contingency Theatre Automated Planning System
CUDIXS	Common-User Digital Information Exchange System
CV	Aircraft Carrier
CVBG	Carrier Battle Group
CVIC	Carrier Intelligence Center
CVN	Nuclear Carrier
CVW	Carrier Airwing
CWC	Composite Warfare Commander
DA	Direct Action (Mission)
DAFIF	Digital Aeronautical Flight Information File
DAS	Deep Air Strike
DASC/HDC	Direct Air Support Center/Helicopter Direction Center
DBA	Data Base Administrator
DCA	Defensive Counter-Air
DCHUM	Digital Chart Update Manual
DDS	Dry Dock Structure
DEA	Drug Enforcement Administration
DECM	Defense Electronic Countermeasure
DI	Digital Imagery
DIA	Defense Intelligence Agency
DID	Data Item Description
DII	Defense Information Infrastructure
DISA	Defense Information Systems Agency

DISN	Defense Information Systems Network
DIWS	Digital Imagery Workstation Suite
DIWSA	Digital Imagery Workstation Suite Afloat
DMA	Defense Mapping Agency
DMPI	Desired Mean Point of Impact
DoD	Department of Defense
DON	Department of the Navy
DSS	Decision Support System
DSU	Data Storage Unit
DTD	Data Transfer Device
DTED	Digital Terrain Elevation Data
DTW	Direct Threat Warning
E&E	Evasion and Escape
E&R	Evasion and Recovery
EA	Electronic Attack
EALT	Earliest Anticipated Launch Time
ECCM	Electronic Counter-countermeasures
ECM	Electronic Countermeasures
ECP	Egress Control Point
EID	Electronic Identification
ELINT	Electrical Intelligence
E-Mail	Electronic Mail
EMCON	Emissions Control
EO	Electro-Optical
EOB	Electronic Order of Battle
EOB	Enemy Order of Battle
EOD	Explosive Ordnance Disposal
EOIR	Electro-Optical Infra-Red
EOTDA	Electro-Optical Tactical Decision Aid
EP	Electronic Protect
ES	Electronic Support
ESM	Electronic Support Measure
ESMO	Electronic Support Measure Operator
ETF	Electronic Target Folder
ETF	Engine Torque Factor
ETIRMS	EA-6B Tactical Information and Report Management System
EVAL	Electronic Evaluator
EW	Electronic Warfare
EWAC	Electronic Warfare Aircraft Commander
EWSSA	Electronic Warfare Software Support Activity
FAC(A)	Forward Air Controller (Airborne)
FAO	Foreign Area Office

FARP	Forward Arming and Refueling Point
FBI	Federal Bureau of Investigation
FEBA	Forward Edge of the Battle Area
FEZ	Fighter Engagement Zone
FID	Foreign Internal Defense
FLIP	Flight Information Publications
FLIR	Forward Looking Infrared Receiver
FLOT	Forward Line of Own Troops
FLTCINC	Fleet Commander-in-Chief
FOB	Forward Operating Base
FPM	Flight Performance Module
FRAGORD	Fragmentary Orders
FRS	Fleet Replacement Squadrons
FSCL	Fire Support Coordination Line
FUIWG	Fleet User Interface Working Group
FY	Fiscal Year
GB	Gigabytes
GCCS	Global Command and Control System
GCCS-M	Global Command and Control System - Maritime
GCE	Ground Combat Element
GCI	Ground Control Interception
GCSS	Global Combat Support System
GEN-X	Generic Expendable Decoy
GOB	Ground Order of Battle
GOTS	Government Off-The Shelf
GPS	Global Positioning System
GRP	Grid Reference Point
HA	Humanitarian Assistance
HARM	High-speed Anti-Radiation Missile
HF	High Frequency
HIGE	Hover in Ground Effect
HMI	Human-Machine Interface
HOGE	Hover Out of Ground Effect
HUD	Heads-Up Display
HVA	High Value Asset
HVACAP	High Value Asset Combat Air Patrol
HWSAT	Helicopter Wave and Serial Assignment Table
I&W	Indications and Warnings
IAD	Immediate Action Drill
IADS	Integrated Air Defense System
ICAO	International Civil Aviation Organization
ID	Identification

IDBTF	Integrated Data Base Transaction Files
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
IM	Information Management
IMC	Instrument Meteorological Conditions
INTEL	Intelligence
IOC	Initial Operational Capability
IP	Initial Point
IPA	Imagery Product Archiving
IPL	Image Product Library
IPT	Integrated Product Team
IP-WAN	Internet Protocol - Wide Area Network
IR	Infra-Red
IRCM	Infra-Red Countermeasures
IRDS	Infrared Detection System
IREPS	Integrated Radar Effects Prediction System
IRINT	Infrared Intelligence
IS	Intelligence Specialist
ISAR	Inverse Synthetic Aperture Radar
ISR	Intelligence, Surveillance, and Reconnaissance
IT	Information Technology
IT21	Information Technology - 21st Century
IUSS	Integrated Undersea Surveillance System
IVS	Integrated Video System
IW	Information Warfare
JAG	Judge Advocate General
JAWS	Joint Analytic Worldwide System
JCS	Joint Chiefs of Staff
JDISS	Joint Deployable Intelligence Support System
JEZ	Joint Engagement Zone
JFACC	Joint Forces Air Component Commander
JFC	Joint Force Commander
JFSOCC	Joint Forces Special Operations Component Commander
JIC	Joint Intelligence Center
JMCIS	Joint Maritime Command Information System
JMEM	Joint Munitions Effectiveness Manuals
JMPS	Joint Mission Planning System
JNL	JTIDS Network Libraries
JOA	Joint Operations Area
JOG	Joint Operations Graphic
JOTS	Joint Operational Tactical System
JSF	Joint Strike Fighter

JSIPS-N	Joint Services Imagery Processing System - Navy
JSOTF	Joint Special Operations Task Force
JSOW	Joint Stand-Off Weapon
JTA	Joint Technical Architecture
JTAR	Joint Tactical Airlift Request
JTF	Joint Task Force
JTG	Joint Task Group
JTIDS	Joint Tactical Information Distribution System
JTIMS	Joint Tactical Information Management Software
JV2010	Joint Vision 2010
JWAC	Joint Warfare Analysis Center
JWICS	Joint Worldwide Intelligence Communications System
LABOP	Laboratory Operator
LAMPS	Light Airborne Multi-Purpose System
LAN	Local Area Network
LAT	Latitude
LOC	Lines of Communications
LONG	Longitude
LSD	Large Screen Display
LSP	Launch Sequence Plan
LZ	Landing Zone
MAC	Maritime Air Controller
MAGTF	Marine Air-Ground Task Force
MANPADS	Man-Portable Air Defense System
MAS	Maritime Air Support
MASINT	Measurement and Signature Intelligence
MAST	Mobile Ashore Support Terminal
MAWTS	Marine Aviation Weapons and Tactics Squadron
MB	Megabytes
MCG&I	Mapping, Charting, Geodesy, and Imagery
MCM	Mine Countermeasures
MDL	Mission Data Loader
MEDEVAC	Medical Evacuation
METOC	Meteorologic and Oceanographic
MEU (SOC)	Marine Expeditionary Unit, Special Operations Capable
MEZ	Missile Engagement Zone
MFD	Multi-Function Display
MHz	Megahertz
MICF	Mobile Integrated Command Facility
MIDB	Modernized Integrated Data Base
MIO	Maritime Interception Operation
MISREP	Mission Report

MIW	Mine Warfare
mm	Millimeter
MMI	Man-Machine Interface
MOB	Missile Order of Battle
MOCC	Mobile Operations Control Center
MPA	Maritime Patrol Aircraft
MPM	Mission Planning Module
MRR	Medium Range Recovery
MSC	Maritime Sector Commander
MSO	Maritime Special Operations
MU	Memory Unit
NAIC	National Air Intelligence Center
NASA	National Aeronautical and Space Administration
NATO	North Atlantic Treaty Organization
NATOPS	Naval Air Training and Operating Procedures Standardization
NAV	Navigation
NAVAIR	Naval Air Systems Command
NAVCENT	Naval Center
NAVOCEANO	Naval Oceanographic Office
NAVSOF	Naval Special Operations Forces
NAVSPECWARGRU	Naval Special Warfare Group
NAVSPECWARUNIT	Naval Special Warfare Unit
NAWC-WD	Naval Air Weapons Center - Weapons Division
NBC	Nuclear, Biological, and Chemical
NCA	National Command Authority
NCC	Naval Component Commander
NCCS	Naval Command and Control System
NCTR	Non-Cooperative Target Recognition
NEC	Naval Enlisted Classification
NEF	Naval Expeditionary Force
NEO	Non-combatant Evacuation Operation
NFA	No Fire Area
NFC	Numbered Fleet Commander
NFO	Naval Flight Officer
NGIC	National Ground Intelligence Center
NIIRS	National Imagery Interpretability Rating Scale
NIMA	National Imagery and Mapping Agency
NIPRNET	Non-secret Internet Protocol Routing Network
NIS	National Input Segment
NM	Nautical Mile
NOB	Naval Order of Battle

NORDO	No Radio
NOTAMS	Notice to Airmen
N-PFPS	Naval Portable Flight Planning Software
NSAWC	Naval Strike and Air Warfare Center
NSFS	Naval Surface Fire Support
NSW	Naval Special Warfare
NTSP	Navy Training System Plan
NVD	Night Vision Device
NVG	Night Vision Goggles
NWP	Naval Warfare Publication
OAAW	Offensive Anti-air Warfare
OAG	Operational Advisory Group
OAS	Offensive Air Support
OCA	Offensive Counter-Air
OFP	Operational Flight Program
ONC	Operational Navigation Chart
OOB	Order Of Battle
OPAREA	Operation Area
OPCON	Operational Control
OPEVAL	Operational Evaluation
OPINTREP	Operational Intelligence Report
OPLAN	Operational Plan
OPORD	Operations Order
OPORDER	Operations Order
OPS	Operations
OPSEC	Operational Security
OPSO	Operations Officer
OPSUM	Operational Summary
OPTASK	Operational Tasking
ORD	Operational Requirements Document
OS	Operations Specialist
OSD	Office of the Secretary of Defense
OSP	Operational Support Products
OTCIXS	Office-in-Tactical Command Information Exchange System
OTH/DCT	Over-the-horizon detection, classification and targeting
PAX	Passengers
PC	Patrol Craft
PC	Personal Computer
Pd	Probability of Damage
PGM	Precision Guided Munitions
PLO	Patrol Leader's Orders
PMA	Program Manager, Air

PMW	Program Manager, War
POL	Petroleum, Oils, and Lubricants
PPDB	Point Positioning Data Base
PRF	Pulse Repetition Frequency
PTW	Precision Targeting Workstation
PW	Pulse Width
RAM	Random Access Memory
RECCE	Reconnaissance
REMRO	Remote Radar Operator
RF	Radio Frequency
RFI	Request for Information
RFL	Restrictive Fire Line
RGR	Rapid Ground Refueling
RIO	Radar Intercept Officer
RMC	Return to Military Control
ROE	Rules of Engagement
RTB	Return to Base
RTF	Return to Force
RTM	Radar Terrain Mask
RWR	Radar Warning Receiver
RZ	Rendezvous Point
SA	Security Assistance
SA	Systems Administrator
SAG	Surface Action Group
SAM	Surface-to-Air Missile
SAR	Search and Air Rescue
SAR	Synthetic Aperture Radar
SATCOM	Satellite Communications
SBS	Special Boat Squadron
SBU	Special Boat Unit
SCAR	Strike Coordination and Reconnaissance
SCC DIM	Sea Component Commander, Daily Intentions Message
SCI	Sensitive Compartmented Information
SDV	SEAL Delivery Vehicle
SEAD	Suppression of Enemy Air Defense
SEAL	Sea-Air-Land (Team)
SENSO	Sensor Operator
SEVAL	Senior Evaluator
SHARP	System-oriented High-range-resolution Automatic Recognition System
SHF	Super-high Frequency
SIF	Selective Identification Feature

SIGINT	Signals Intelligence
SIMAS	Sonar In situ Mode Assessment System
SIPRNET	Secret Internet Protocol Routing Network
SLAP	Solar/Lunar Almanac Prediction
SME	Subject Matter Expert
SNA	Student Naval Aviator
SOC	Special Operations Command
SODARDS	Special Operations Debrief and Retrieval System
SOF	Special Operations Forces
SOP	Standing Operating Procedure
SPA	Strike Planning Archive
SPAWAR	Space Warfare (Command)
SPAWARSYSCEN	Space Warfare Systems Center
SPECAT	Special Category
SPECBOATRON	Special Boat Squadron
SPECEVAL	Special Evaluator
SPECOPS	Special Operations
SPINS	Special Instructions
SPTREQ	Support Requests
SR	Special Reconnaissance
SRTD	Signals Research And Target Development
SSA	Software Support Activity
SSC	Surface Surveillance Coordination
SSO	Special Signals Operator
STKW	Strike Warfare
STR	Software Trouble Report
STRIKEPROS	Strike Procedures
STRUM	SIGINT Technical Report
SUCAP	Air-to-Surface Armed Combat Air Patrol
SUPPLOT	Supplemental Plot
SUW	Surface Warfare
SWAMPS	Special Warfare Automated Mission Planning System
TACAID	Tactical Aid
TACAIR	Tactical Air
TACAN	Tactical Control and Navigation System
TACCO	Tactical Coordinator
TACELINT	Tactical Electronic Intelligence (Report)
TACLEAD	Tactical Leader
TACMAN	Tactical Manual
TACNOTE	Tactical Note
TACON	Tactical Control
TACP	Tactical Air Control Party

TACPRO	Tactical Procedure
TADIXS	Tactical Digital Information Exchange Systems
TAMPS	Tactical Automated Mission Planning System
TAO	Tactical Actions Officer
TARCAP	Target Combat Air Patrol
TARPS	Tactical Air Reconnaissance Pod System
TASKORD	Task Order
TCC	Tactical Command Center
TCP	Tactical Control Point
TCS	Tactical Communication Station
TDA	Temperature Deviation Analysis
TEAMS	Tactical EA-6B Mission Planning System
TECHEVAL	Technical Evaluation
TFCC	Tactical Fleet Command Center
TGT	Target
TID	TAMPS Interface Device
TIMS	Training Information Management System
TLM	Topographic Line Maps
TMV	TSC Mobile Variant
TOLD	Take-Off and Landing
TOPSCENE	Tactical Operational Preview Scene
TOT	Time On Target
TPC	Tactical Pilotage Charts
TRAP	Tactical Recovery of Aircraft and Personnel
TSC	Tactical Support Center
TSCM	Tactical Strike Coordination Manager
TTP	Tactics, Techniques, and Procedures
TV	Television
UAV	Unmanned Aerial Vehicle
UDF	User Data File
UHF	Ultra-High Frequency
UPC	Unique Planning Components
US	United States
USA	United States Army
USAF	United States Air Force
USCG	United States Coast Guard
USD (A&T)	Under Secretary of Defense for Acquisition and Technology
USMC	United Stated Marine Corps
USMTF	United States Message Text Format
USN	United States Navy
USW	Under Sea Warfare
UW	Unconventional Warfare

VBSS	Visiting Board, Search and Seizure
VERTREP	Vertical Replenishment
VFR	Visual Flight Rules
VHF	Very-High Frequency
VID	Visual Identification
VIP	Very Important Person
VOD	Vertical Onboard Delivery
VTA	Visual Target Aid
VTC	Video-Teleconference
WAN	Wide Area Network
WASEX	War at Sea Exercise
WESPAC	Western Pacific
WVS	World Vector Shoreline