

A.1.0 APPENDIX A - COMMAND, CONTROL AND COMMUNICATIONS MISSION AREAS - DESCRIPTION OF CURRENT SYSTEM OR SITUATION

The Command, Control and Communications (C3) Mission Elements addressed for the E-2C aircraft in this appendix include the following.

- Early Warning
- Air Control (including weapon control)
- Surface Control
- Communications Management

The C3 mission area consists of the exercise of authority and direction by a properly designated commander over assigned and attached forces to accomplish the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations to accomplish the mission.

This appendix will consider naval aviation assets specifically designated as command and control platforms, i.e., the E-2C and will address the various command and control mission areas and how aviation mission planning is currently being conducted to support C3 mission areas.

In the development of a Joint Mission Planning System (JMPS) architecture, this appendix will examine how the current mission planning process is used to support C3 mission areas and how it supports the objectives of the JMPS effort. The following items will be included:

- Connectivity with command, control, communications, computer and intelligence surveillance and targeting (C4ISR&T) networks;
- How well the current planning process supports collaborative and distributive mission planning;
- How compliant the current mission planning architecture (hardware, software, connectivity, etc.) is to the Defense Information Infrastructure Common Operating Environment (DII COE); and
- Existence of a standardized C3 Mission Planning Guide for the C3 Platform (E-2C, J-STARS, E-6, E-3, etc.).

In addition, this appendix will identify any sources of mission planning information and any other automated mission planning systems that will be utilized in the mission planning process. A listing of mission planning data sources will allow the mission planning program office to identify areas of commonality among the data producers, as well as identifying mission planning applications that are common to C3 platforms.

Figure A1 represents a generic mission planning process that provides a general point of reference for addressing the C3 mission. What is not illustrated is the origination of the tasking and the required post-operations debriefing. Those areas will be addressed in the main body of the Concept of Operations (CONOPS).

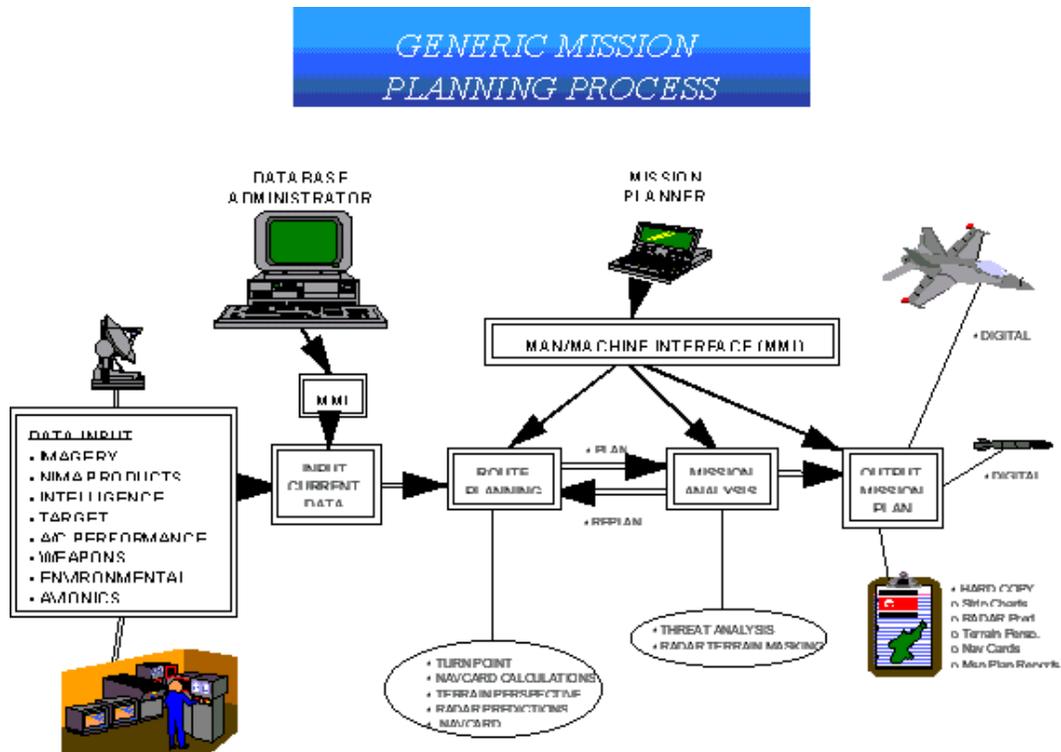


Figure A1. Overview of the Mission Planning Process.

The following sections discuss the current mission planning process, deficiencies, limitations, and concepts for a new or modified approach for these mission elements.

A.1.1 OPERATIONAL POLICIES AND CONSTRAINTS

Tactical Automated Mission Planning System (TAMPS) 6.2K is the baseline for current C3 planning functionality. Navy Portable Flight Planning Software (N-PFPS) 3.01 is the baseline for flight planning functionality.

A.1.1.1 Security

The highest level of classification of information used in supporting the C3 mission is Top Secret/Special Compartmented Information (SCI).

A.1.1.2 OPNAVINST 3710 Series

During normal Continental United States (CONUS) training, the pilot will file a DD Form 175 as required. During Carrier Air Wing (CVW) operations, mission planning kneeboard cards are developed and distributed to the aircrew. The pilot and copilot will take approximately 30-60 minutes to develop a flight plan.

A.1.2 OPERATIONAL MISSION PLANNING

The conduct of combat operations involves the coordinated orchestration of a variety of platforms to meet specific goals and objectives. Before the aircrew of C3 platforms can begin actual mission planning preparation for their specific aircraft, a variety of players have been at work defining the battle plan in which the C3 platform will be the eyes and ears of the commanders. These players are the Joint Forces Air Combat Commander (JFACC)/Composite Warfare Commander (CWC), the Carrier Air Group (CAG) Commander, the mission planning teams, the Carrier Intelligence Center (CVIC), Combat Operations, and their respective warfare liaison officers. The JFACC/CWC will generate the tasking and drive the planning timeline. CAG is the final decision authority on the soundness of the plan and its execution. CAG can provide support to the planning process by providing early direction to the planning team. The mission planning team actually develops the plan and works out the details. CVIC supports the planning process by providing current information on threats and the tactical situation. Combat Operations supports the mission planning teams with tactical information and Air Wing concerns. The warfare liaison officers help plan any integration of Joint/Combined/surface ship assets.

At the unit level, operational mission planning for C3 platforms becomes more complex as a function of the number of missions being tasked. The E-2C aircrew is normally performing more than one mission function during a flight evolution. The mission commander is ultimately responsible for the overall mission effectiveness and platform employment, however, other members of the crew are responsible for various segments of the mission and are actively involved in planning those segments and briefing the mission commander on the overall plan. The mission commander will oversee this process and provide guidance as required to meet the goals of the tasking.

Due to the variety of sensors available to the E-2C in accomplishing the desired mission, the E-2C mission commander ensures each sensor operator develops a plan for optimizing sensor performance in support of the overall mission.

A.1.2.1 Tasking

Reception of Airborne Early Warning (AEW)/C3 tasking depends on the environment.

A.1.2.1.1 ATO

For Joint/Combined operations, the Air Tasking Order (ATO) is the primary source for tasking. This tasking is reflected on the Air Plan or the squadron flight schedule. Prior to the formal receipt of the ATO, informal liaison with the JFACC staff provides advance warning of impending flight operations and allows aircrew more time for mission planning.

A.1.2.1.2 Battle Group ATO

For a Carrier Battle Group (CVBG), the flight tasking comes via a Battle Group ATO which is used to build the Air Plan. Combat Operations distributes most of the tasking information to the mission planning teams via memo, message, or by voice.

A.1.2.2 Research & Study

Research addresses the need for each mission team to have common data and analysis regarding targets, threats, assets, and environment. While the Air Wing and ship's company intelligence personnel perform a majority of these activities, C3 aircrew focus on the following areas.

- Development of a Communications/Data Link Plan - Plain/Secure Voice, Data Links, Network Libraries
- Environmental Information - Detection ranges and how affected by stationing (radar shadowing, clutter, land/sea interface, low flyers, etc.)
- Combat Identification (ID) - Positive ID of all players
- Electronic Support (ES) Information Integration
- Rules of Engagement (ROE)
- Crew coordination/Crew tasking

Air Wing Tactical Notes (TACNOTES), the Advanced Mission Commander Course (AMCC) Manual, and individual mission commander's experience are primary sources of information for these areas.

A.1.2.3 Concept Development

Initial Planning (Concept Development) is dynamic and interactive. The basic concept of operations is constructed to quickly develop an initial answer to the questions: who, what, when, where, and how. Each squadron representative provides a particular expertise that allows the mission team to quickly brainstorm a reasonably complete, conceptual plan. The brainstorming process involves such activities as selecting appropriate ordnance, determining threat avoidance and suppression techniques, exploiting terrain, and determining the best approach and timing for the mission.

For C3 aircrew, the development of the AEW/C3 plan encompasses nearly all other warfare areas. The AEW/C3 representative participates with the mission team in establishing waypoints or locations. Examples include:

- Tanker orbits
- Ingress points
- Target egress locations
- Spiderpoints

(i.e., route control points defined by the E-2C element to manage mission aircraft), etc.

The mission team establishes the preferred mission altitude profile (e.g., high-low-high; low-low-high; high-high-high, etc.) and the recommended Suppression of Enemy Air Defense (SEAD) plan (i.e., concurrent or sequential).

A.1.2.4 Concept of Operations Briefing

Mission Leaders provide a Laptop CONOPS briefing to the CAG when all areas discussed above have been completed.

A.1.2.5 Detailed Element Planning

The detailed element planning process begins by collating and reading all pertinent message traffic for the event. When afloat, a walk-around to the various command and control and intelligence spaces (e.g., Combat Direction Center-CDC, Tactical Fleet Command Center-TFCC, Supplemental Plot-SUPPLOT, CVIC, etc.) provides amplifying information needed to develop a plan. The Naval Strike Air Warfare Center (NSAWC) Strike Planner's Checklist lists the minimum considerations when developing a mission command and control plan. Consideration is given to tactical call signs overall mission control, Emission Control (EMCON) procedures, Identification Friend or Foe (IFF) procedures, data link requirements (LINK 4/11/16), secure communications, E-2 command and control functions, etc. Most C3 plan development is performed manually using pencil and paper, converted to kneeboard cards, and delivered to the appropriate mission team members. Figure A2 illustrates the Mission Planning Cycle.

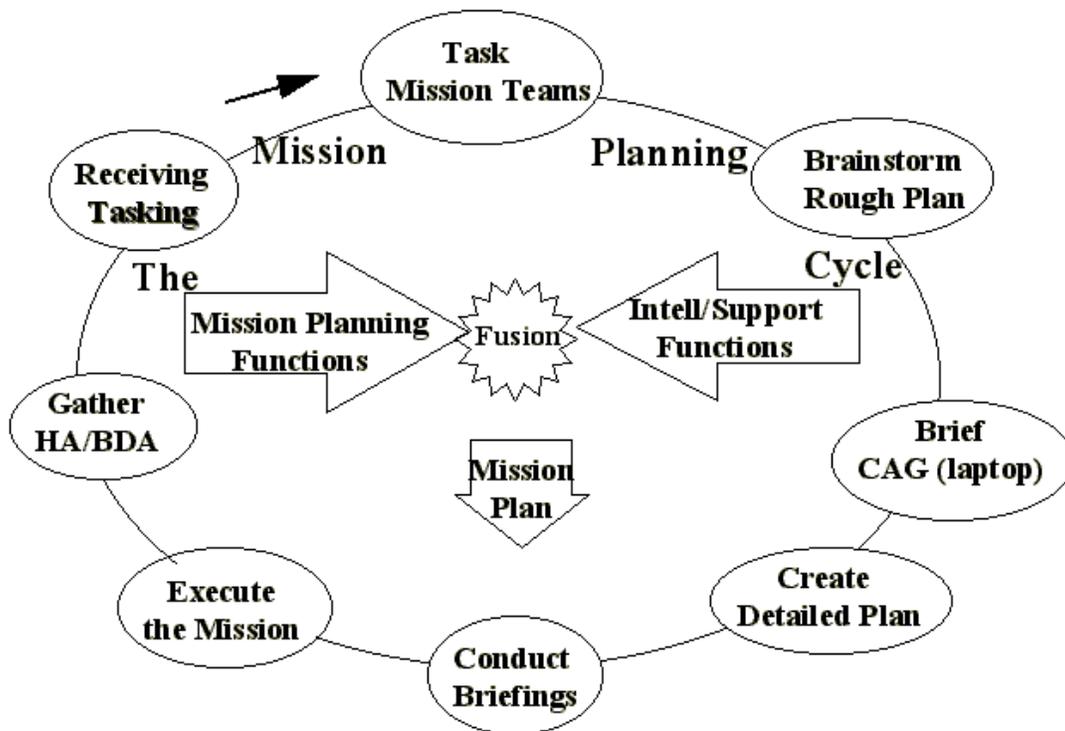


Figure A2. The Mission Planning Cycle.

A.1.2.5.1 Early Warning

Specific tactical procedures are defined in the NSAWC Strike Leader's Checklist and the AMCC manual.

A.1.2.5.2 Air Control

Specific tactical procedures are defined in the NSAWC Strike Leader's Checklist and the AMCC manual.

A.1.2.5.3 Surface Control

Specific tactical procedures are defined in the NSAWC Strike Leader's Checklist and the NSAWC AMCC manual.

A.1.2.5.4 Communications Management

Specific tactical procedures are defined in the NSAWC Strike Leader's Checklist and the NSAWC AMCC manual.

A.1.2.6 Detailed Administrative Planning

Detailed administrative planning is covered in the Strike Leader's Checklist. The E-2C mission element leader coordinates with the mission leader to ensure C3 aspects of the checklist are covered. Some of the tasks addressed are as follows.

- Weapons Release & Control Checks
- Flight Admin Timing - Determining the Recovery Plan
- Rendezvous - position/altitudes/airspeeds/formation/push times
- Tanking Plan
- Launch/Recovery Plan
- Return to Force (RTF) Procedures
- Post Mission Reporting

A.1.2.7 Validated Aggregate Planning

Once the detailed planning is complete, the E-2C mission commander Element Leader presents the final information to the Mission Leader. The Mission Leader uses this information to update the layout of the entire mission. This is done both graphically and textually.

A.1.2.8 Create Aircraft Data Load

The E-2C requires a data load from TAMPS via the TAMPS Interface Device (TID) for loading the Joint Tactical Information Distribution System (JTIDS) Network Libraries (JNL) in the E-2C aircraft computer. The E-2C navigation upgrade and "Hawkeye 2000" require a Global Positioning System (GPS) data load from TAMPS via the Mission Data Loader (MDL). GPS data load capability in N-PFPS will be available in June 1999.

A.1.2.9 Rehearse Mission

Mission rehearsal is currently unavailable.

A.1.2.10 Aircrew Briefing

Mission briefs usually take the form of a "gaggle brief" in which the mission lead briefs all mission aircrews at one time. After the gaggle brief, the elements break up and brief element specifics. Aircraft specific Naval Aviation Training and Operating Procedures Standardization (NATOPS) briefs complete the mission briefing cycle.

The final product of the planning process will be a kneeboard pack, relevant messages (ATO, Special Instruction - SPINS) and the data transfer devices (DTD) for the aircraft.

A.1.2.11 Execute

Mission Execution is accomplished using multiple sensors, communications, and data links.

A.1.2.12 Postflight Debriefing

Aircrew from each aircraft participate in the post-flight debrief.

A.1.2.13 Postflight Data Analysis

Postflight data analysis is currently manual. There are no automated interfaces for E-2C postflight data analysis.

A.1.3 USER OR INVOLVED PERSONNEL

In the mission planning process, the E-2C crew interacts with the following people:

- Combat Operations
- Mission Planning Team
- Warfare Commanders
- CAG
- JFACC/CWC
- Judge Advocate General (JAG) Officers (ROE issues)
- CVIC (Intelligence personnel)
- Squadron representatives
- Liaison personnel (Joint/Combined/Warfare representatives)

A.1.3.1 Security

All E-2C aircrew are cleared to the Top Secret/SCI level.

A.1.4 SUPPORT CONCEPT

The E-2C aircrew relies on the following sources of information for mission planning support:

- OPTASKS - Hardcopy
- ATO, Airspace Control Order (ACO), SPINS- Hardcopy
- Tactical Electronic Order of Battle (OOB): - Hardcopy
- Warfare Commander Daily Intentions - Hardcopy
- Active Air Routes, Friendly Air Movements - Hardcopy
- Rules of Engagement - Hardcopy
- Friendly Force/Hostile Force Laydown - Joint Maritime Command Information system (JMCIS)
- Integrated Refraction Effects Prediction System (IREPS) - Hardcopy

- Mapping, Charting, Geodesy, & Imagery (MCG&I) Products - National Imagery Mapping Agency- (NIMA)
- Weather - Ashore, aircrew receive Meteorological and Oceanographic (METOC) data from Flight Operations; Afloat METOC information comes from the meteorological detachment assigned to the carrier.
- Intelligence - Provided by CVIC
- JTIDS Data Loads - Provided through the TAMPS via the TID
- GPS Data Loads - Provided through TAMPS via MDL and N-PFPS in June 1999 via the MDL.

A.1.4.1 Training Command/Fleet Replacement Squadron Mission Planning

A.1.4.1.1 Flight Plans

Flight plans are developed through coordination between the Mission Commander (CICO) and the Plane Commander (CAPC). The CICO determines the optimum mission station, to include orbit pattern and length, altitude, and duration. The CAPC files a flight plan, if required, and determines what final requirements will be needed to maintain such an orbit and safely recover.

A.1.4.1.2 N-PFPS

N-PFPS E-2C Flight Performance Modules will be released in version 3.1 (April 1999).

A.1.4.1.3 Checklists

There are squadron specific forms or checklists used in the planning process.

A.1.4.1.4 NATOPS

When operating from ashore, the CAPC references NATOPS to determine take-off parameters (rotation speed, critical field length, etc.), and bingo numbers. The mission crew references the Operational Task (OPTASK) LINK to determine the appropriate information needed to enter the current operating data link. In addition, the aircrew uses range manuals and Letters of Instruction (LOIs).

A.2 JUSTIFICATION FOR AND NATURE OF CHANGES

A.2.1 JUSTIFICATION FOR CHANGE

A review of the current operating procedures associated with carrier mission operations reveals a system based on manual processes.

The current and future volume of information required to coordinate Joint Operations in an information intensive C3 environment has increased the time to plan and deconflict C3 missions.

A.2.1.1 Imposed New Requirements

A.2.1.1.1 Connectivity to Command, Control, Communications, Computers & Intelligence (C4I) Nodes

Current military doctrine describes a strict hierarchy for command and control of military forces. Figure A3 best illustrates that structure.

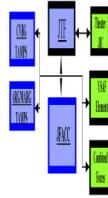


Figure A3. Joint Task Force (JTF) CONOPS.

Lessons Learned from Operation Desert Storm were replete with criticism over the lack of adequate connectivity between Joint Services resulting in ATOs being delivered by aircraft throughout the theater of operations. Even today, the C3 mission planner has access only to the full, hardcopy, ATO. Extracting mission related information from the ATO is a time-consuming, manpower intensive effort.

A.2.1.1.2 Collaborative and Distributive Planning

The current planning process aboard the aircraft carriers entails the collection of routine information from with a variety of people and departments with key elements of information needed for the overall mission package. This search for information is critical for the command, control and communications element (E-2C). There must be a capability to conduct collaborative planning among the mission planning elements.

The ability to conduct secure distributive planning, i.e., with other services, is critical to joint operations. Regardless of the C3 mission area (Early Warning, Air Control, Surface Control, or Communications Management), there is a critical need for timely and effective distributive planning.

A.2.1.1.3 Compliance with Department of Defense (DoD) Doctrinal and Information Management Requirements (Joint Vision 2010, DII COE Mandate, IT-21, etc.)

Current directives mandate compliance with doctrinal and information management requirements meant to assist the war-fighter. C3 aircrew are unable to comply with current DOD doctrine on information management since much of the C3 mission planning process is manual. Existing mission planning systems are not built to currently operate on the DII COE. TAMPS extracts a subset of threat information from the DII COE. To enable use of shared information resources across DoD, JMPS will be required to operate on the DII COE. TAMPS is used primarily for JTIDS Network Library loads.

A.2.1.1.4 Standardized C3 Mission Planning Guide

There is no current mission planning guide specifically addressing a C3 mission planning process for the major C3 mission areas.

A.2.1.2 Deficiencies and Limitations of Current System

Critical information needed to reduce risk in mission planning and execution is unavailable in an efficient and timely manner. The current mission planning process requires direct connectivity and interoperability to the following data sources and systems:

- OPTASKS - Hardcopy
- ATO, ACO, SPINS - Hardcopy
- Tactical Electronic Order of Battle - Hardcopy
- Warfare Commander Daily Intentions - Hardcopy
- Active Air Routes, Friendly Air Movements - Hardcopy
- Rules of Engagement - Hardcopy
- Friendly Force/Hostile Force Laydown - JMCIS
- IREPS - Hardcopy
- MCG&I Products - NIMA
- Weather - Ashore, aircrew receive METOC data from Flight Operations; Afloat METOC information comes from the meteorological detachment assigned to the carrier
- Intelligence - Provided by CVIC
- JTIDS Data Loads - Provided through the TAMPS via the TID
- GPS Data Loads - Provided through TAMPS via MDL and N-PFPS in June 1999 via the MDL
- Notices to Airmen (NOTAMS)
- Foreign Area Officer (FAO) / International Civil Aviation Organization (ICAO)
- JMCIS Red/White/Blue force lay-downs
- Measurement & Signature Intelligence (MASINT)/Infrared Intelligence (IRINT)
- Imagery Product Archiving (IPA)
- Non-DoD law enforcement threat and operational data: Federal Bureau of Investigation (FBI), Drug Enforcement Agency (DEA), Customs/United States Coast Guard (USCG), National Aeronautical and Space Administration (NASA)
- WING TACNOTES
- MCM 3-1

A major revision of the C3 mission planning process is necessary to capitalize on information management techniques and technologies.

A.2.1.2.1 Tasking

Critical to the success of the tasking phase, the ATO and its changes must be disseminated by the JFACC in a timely manner to all ATO assets. The tasking of missions and subsequent changes must be received and acknowledged by mission planners in a timely manner.

A.2.1.2.2 Research and Study (including information request)

C3 mission planners require a large amount of information for mission planning. This includes the following:

- Command organization
- Communications plan (call signs, frequencies, data link, etc.)
- EMCON plan
- Weapons release policies
- Weather information, intelligence information
- Weather, etc.

As a result, C3 mission planners must request outside support to assist in mission planning. The information sought may come from a vast array of sources and requires time to accumulate. The agencies or individuals that are assisting may also be supporting other requirements or agencies and can not provide their full attention to a specific mission. The result is that the timely accumulation of data may be delayed or inaccessible.

A.2.1.2.3 Concept Development

As stated in the previous section, Initial Planning (Concept Development) is dynamic and interactive. For C3 aircrew, the development of the AEW/C3 plan encompasses all the other warfare areas. Currently, the C3 element leader must collect information on the overall task force structure. This is crosschecked with the communications plan to ensure there is no conflict among the assigned frequencies, and to ensure a proper understanding of the ROE. Finally the Element Leader checks with the other element leaders to ensure compliance with the assigned directives (ROE, Comm Plan, EMCON, etc.).

The process described above is abbreviated, and is designed to show the complexity of the relationships that must be addressed when designing applications to support an essentially unregulated and non-standard planning process.

A.2.1.2.4 Concept of Operations Brief

Mission leaders will generally provide the CAG with a laptop Concept of Operations briefing when all the element tasks have been completed.

A.2.1.2.5 Detailed Element Planning

A.2.1.2.5.1 Command, Control & Communications Mission Elements

The following identifies current mission planning deficiencies for C3 Mission Planning. The deficiencies can be grouped into categories that identify the basic problems with our current planning system and with the C3 mission planning process.

A.2.1.2.5.1.1 Current Automated Planning System

- a. Operationally unreliable (difficult to operate UNIX system, planning process is not intuitive, footprint is too big).
- b. System primarily used for JTIDS Network loading.
- c. Current planning process relies on the aircrew to manually input mission information into the aircraft avionics systems.

A.2.1.2.5.1.2 C3 Mission Planning Process

- a. The E-2C community relies on the NSAWC "Strike Leader's Planning Checklist for Strike Missions. The crews also rely on standard NATOPS checklists for aircraft safety checks. There is no uniquely C3 community standard mission planning guide that covers all the C3 mission areas. Lack of a "standard C3 mission planning process" prevents effective mission risk assessment (missing a critical step in a non-standard process).
- b. Mission Planners use numerous, non-standard planning tools to aid in mission planning. Collaborative and Distributive Mission Planning.
- c. Current planning process does not support the capability to conduct effective and timely concurrent planning with agencies outside of the immediate vicinity.

A.2.1.2.5.1.3 Tasking

Current C3 Tasking is electronically or manually/verbally received and is not tied into other mission planning agencies. Currently, ATO tasking is not received by C3 Mission Planners in a timely fashion and does not accurately reflect mission critical information.

A.2.1.2.5.1.4 MCG&I

In the course of conducting mission and intelligence analysis, C3 mission planners must compete with other warfare elements for access to MCG&I information. Information and products (e.g. maps, elevation data, photography, etc.) are often outdated, inaccurate and limited in quantity. In addition, once this information is obtained, it must be manually manipulated into useful products for mission planning (e.g. overhead transparencies, knee-board cards, etc.) and is not capable of being entered into existing automated planning tools or aircraft DTDs. In summary, the issues are access, reliability of the data, and utility of the products.

A.2.1.2.5.1.5 Weather

Environmental information (e.g. current and forecast weather, imagery, sun/moon illumination, tidal information, etc.) is received from numerous sources. This includes the weather forecaster, closed circuit television (TV), electronic messages, software programs (Marine Corps Light Level Calendar, Electro-Optical Tactical Decision Aids (EOTDA), etc.) and IREPS predictions. As a result, mission planners waste time searching for a reliable source of information.

A.2.1.2.5.1.6 Intelligence

- a. C3 Mission planners currently rely on outside sources for vital intelligence information essential for mission planning. Planners submit a Request for Information (RFI) to CVIC either verbally or electronically, who will research the request and provide that data back

to the mission planner. The resulting information will only be as good as the request, since there is no standard format to the request.

b. For C3 Mission planners, the collection of intelligence information concerning Enemy, Friendly, or Neutral OOB, is totally dependent upon outside agencies. Information that is found to be useful, must be manually analyzed and inputted into the planning process. Information can be used in the current Automated Planning System, but must be entered in manually.

A.2.1.2.5.1.7 Aircraft Performance

Determining aircraft performance for all C3 aircraft is done manually without the aid of an approved automated system that calculates those items required by NATOPS (Take Off and Landing Data (TOLD), etc.) or those items essential for mission planning (e.g. fuel consumption, best range, speed, etc.). As a result, valuable mission planning time is spent calculating and re-calculating vital information to ensure errors are eliminated. Incorporate N-PFPS flight performance modules in JMPS.

A.2.1.2.5.1.8 Planning

C3 Mission planners conduct mission route planning with the aid of numerous tools. This includes the limited use of TAMPS (when available and operating), N-PFPS, Falcon-View, and most commonly, by hand. The approach to route planning is dependent upon the mission at hand and the time available for planning. A mission that must be executed quickly, with the benefit of time, is typically done by hand, using existing maps and charts, and manually determined information such as distances, time, fuel consumption, etc. If time is available, mission planners may use TAMPS. Once route planning is complete, aircrew must manually transcribe this information on to a map or chart, kneeboard card program and/or manually enter information into an aircraft Navigation/GPS system. Migrate N-PFPS flight planning functionality, ease of use, and rapid turnaround into JMPS.

A.2.1.2.5.1.9 Communications

a. Communications planning for C3 Missions requires detailed coordination and planning between mission planners and external agencies in regards to frequency availability, security and procedures. Once the coordination, planning, and deconfliction has been completed however, this information is manually loaded into the aircraft. Current practice is not timely and prone to error as aircrew rush to enter data prior to launch.

b. The Communications Plan must be manually verified and deconflicted from tasking sources and existing OPTASKS. The Communications Plan needs to be electronically entered into JMPS with automatic error checking and deconfliction.

c. JMPS must be capable of providing a HAVEQUICK data initialization and frequency load.

A.2.1.2.5.1.10 Defensive Electronic Countermeasures (DECM)

a. Current DECM planning requires detailed coordination between mission route planners, intelligence agencies, and maintenance. Mission planners determine the type of defensive countermeasures required for the mission after an analysis of enemy threat systems.

Planners rely on publications (e.g. MCM 3-1) to provide information on the best countermeasures to employ.

b. Based upon on the information available on the threat, the route, countermeasure availability, ROEs, etc., mission planners coordinate with maintenance for the upload in ordnance. E-2C requires an automatic load of the mission package countermeasure inventory (who is equipped with what). Aircrews are then required to manually input in the aircraft countermeasure systems, the appropriate programming sequence.

A.2.1.2.5.1.11 Load Planning

Aircraft load planning (e.g. personnel, cargo, and fuel) requires manual input into planning process.

A.2.1.2.5.1.12 Mission Products

A system is required to produce products mission planners use such as strip charts, knee-board cards, maps, execution checklists, communication cards, routes cards, etc. (currently produced from a variety of sources). User-configurable reporting is also required. The particular format varies from unit to unit. If a locally produced program is not available, then it may be done by hand, and copied. Inordinate amounts of time are spent creating the products that are used by aircrew for briefs and flights.

A.2.1.2.5.1.13 Briefing

Operational mission planning often requires limited time for research, planning and briefing. Mission planners are often left with poorly constructed briefing products (e.g. overheads, maps, whiteboards, etc.) that do not clearly portray the planned mission. Briefs are making use of limited computer produced products and these are typically non-standard from unit to unit. Requirement: Systems should be capable of routinely producing mission briefing packages from planning products with minimum user manipulation (reduce operator tweaking and resulting in wasted time).

A.2.1.2.6 Detailed Administrative Planning

Detailed administrative planning is covered in the Strike Leader's Checklist. As previously discussed, there is currently no standard methodology for addressing these issues. The E-2C element leader must coordinate with all the element leaders that will be involved in, and support, the specific strike mission.

A.2.1.2.7 Validate Aggregate Plan

To validate the Aggregate Plan, mission planning coordination/deconfliction is conducted manually, using existing mission planning products to identify and solve coordination/deconfliction problems. This is usually done prior to the concept of operations brief, but may be done at the detail planning level as well. Overlays of routes, communications plans, load plans, fire support, etc. are compared to each other and double checked for accuracy. Issues that cannot be resolved at the mission planner's level, are passed to a higher level for resolution. Element leaders are responsible for disseminating changes to their respective units.

A.2.1.2.8 Create Aircraft Data Loads

C3 aircrews (E-2C) currently use the TID for loading their aircraft with the JNL and GPS waypoints (E-2C GP-II also had map loads). Currently, there is no capability of digitally displaying maps or charts in the E-2C group II aircraft. Any additional information (communications plan information, electronic order of battle, etc.,) must be entered manually into aircraft avionics systems. There is currently no capability to record and replay a mission for post-flight analysis.

Table A1. Aircraft Data Loads.

Aircraft	Current	JMPS	
		Paper Load	Digital Load
E-2C Group 0	Nothing	Nothing	Nothing
E-2C Group II	JTIDS Network Load Map Loads	JNL MAP Loads	JNL MAP Loads
E-2C Group II Nav Upgrade	GPS JNL MAP Loads	GPS JNL MAP Loads	GPS JNL MAP Loads
E-2C Hawkeye 2000	GPS JNL	GPS JNL MAP Loads (NIMA) CEC IRST Electronic Support (ES)	GPS JNL MAP Loads (NIMA) CEC IRST Electronic Support (ES)
Administrative (All aircraft)	GPS JNL	Parsed ATO Data EOB Comm Plans ICAO	Parsed ATO Data EOB Comm Plans ICAO

A.2.1.2.9 Rehearse Mission

A rehearsal capability is necessary for C3 deconfliction of tasked missions.

A.2.1.2.10 Aircrew Briefing Deficiencies

A.2.1.2.10.1 Mission Briefs

Aircrew do not always have access to all mission briefs that encompass the entire mission. Their scope is typically limited to their particular mission and does not involve discussions of external agencies involved. This is due to a lack of space (e.g. Wardroom space on ship, etc.) where only the key mission planners are able to attend. Facilities do not exist at all land/ship-based units that allow video transfer of this information. There is no video teleconferencing (VTC)/electronic whiteboard/E-mail capability with non-organic assets.

A.2.1.2.10.2 Briefing Tools

Aircrew briefs usually use whiteboards and overheads to detail mission briefs. The preparation of these briefs requires enormous amounts of time and is often plagued with inaccuracies and insufficient detail. As a result, key information is often overlooked or not sufficiently covered. There is no capability to transfer mission planning products, overlays or graphics electronically into presentations.

A.2.1.2.10.3 Briefing Redundancy

Redundancy in briefings occur when large-scale missions are planned and flown. The information that is presented to the Marine Air-Ground Task Force (MAGTF) commander is covered again at the Air Mission Commander's Brief and then at the Flight Leader's Brief.

A.2.1.2.10.4 Gaggle, NATOPS, SOPs

JMPS should not only host a "gaggle brief" format, but also include provisions for aircraft specific NATOPS briefs adjusted by each unit to include Standard Operating Procedure (SOP). All briefs should be available for other squadrons to view in JMPS.

A.2.1.2.11 Execute Mission

Mission planning typically ceases upon mission execution. Mission execution is tracked by the on-station E-2C via onboard sensors. Updates or changes to the mission plan in-flight require manual manipulation of data into existing aircraft systems. Downlink of information (e.g. updated routes, threats, Landing Zone-LZ changes, etc.) are not transferred automatically to aircrew. All updates must be manually entered.

A.2.1.2.12 Post Flight Debrief

Post Flight Debriefs are verbal and cover mission planning, briefing, execution and safety. They may vary in length and detail dependent on mission complexity. Due to different aircraft recovery times and operating tempo, not all key personnel may be present.

This debrief is not usually captured in a standardized format for historical data. Data that may be recovered is saved locally and is rarely incorporated in future mission planning. Data storage is typically a hard copy of planning products and any notes taken. Most post flight debriefs remain at the local unit and are not accessible to outside units unless requested.

JMPS should have a standard debrief mission replay and critique of each member's performance with a shared comments page.

A.2.1.2.13 Post Flight Data Analysis

Post flight data analysis is limited to historical data retrieved from maintenance and operations flight data. This typically records flight times, aircrew, mission training codes, and aircraft maintenance information. The retrieval of this information for future mission planning requires coordination with those agencies and is limited in detail.

A.2.2 DESCRIPTION OF NEEDED CHANGES

A.2.2.1 Connectivity to C4I Nodes

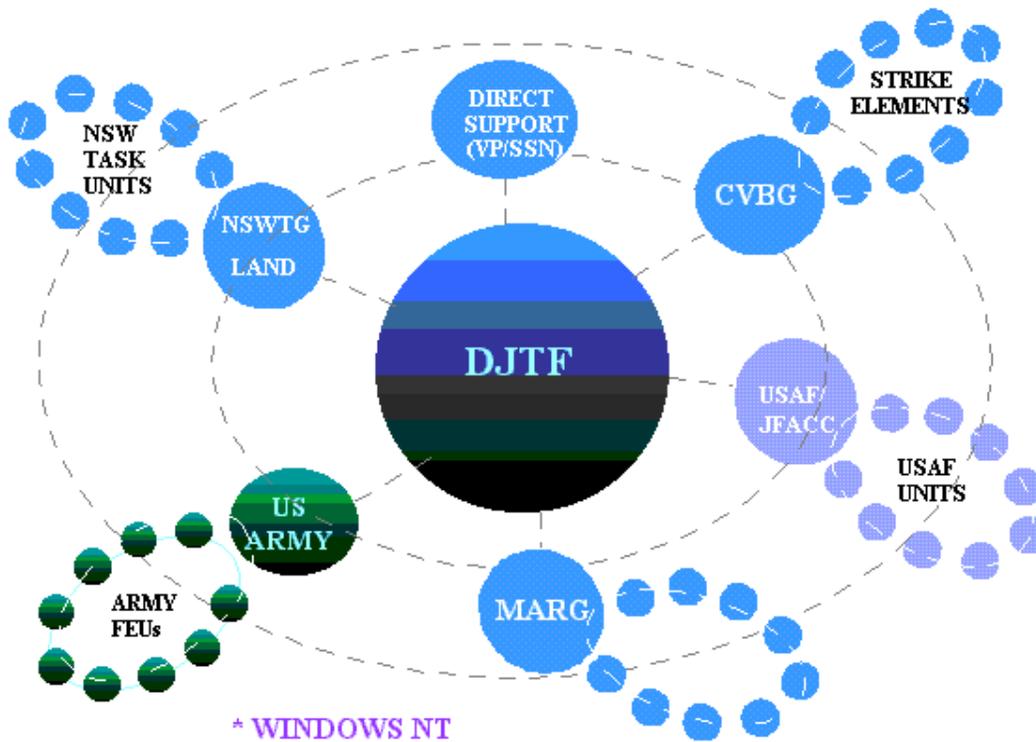


Figure A4. Distributive JTF.

A teleconferencing capability would permit the Joint Task Force (JTF) commander to immediately communicate or allow the National Command Authorities (NCAs) to communicate their intentions and objectives. Mid-level command elements can provide the details of the plan (targets, ROE, communications plans, etc.). Using distributed network capabilities, the units that implement the plan would better understand the information required to execute the plan. Data production elements (weather, intelligence, NIMA, etc.) are then able to tailor their products to support the plan, unlike the current situation where the information is filtered until the executing units have little idea of the ultimate objectives.

A.2.2.2 Collaborative and Distributive Planning

The current mission planning process of running all over the carrier to get essential information is inefficient, time-consuming, and prone to error. A collaborative planning capability that allows access to critical mission planning information via the secure Local Area Networks (LANs) and Wide Area Networks (WANs) such as Secret Internet Protocol Routing Network (SIPRNET), or Joint Worldwide Intelligence Communications Systems (JWICS) that would use web technology and distributed databases is critical to improving the overall mission planning process. Figure A5 illustrates that proposed capability.

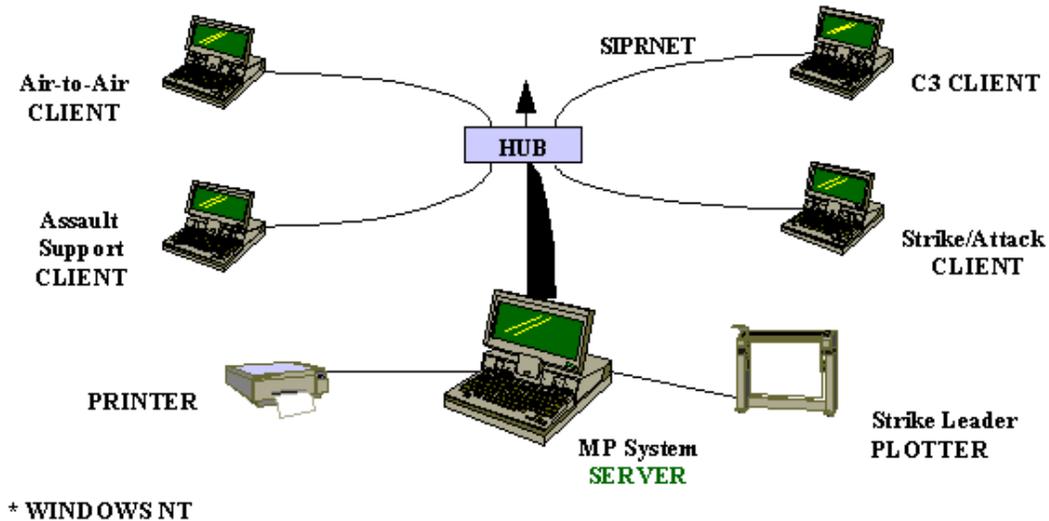


Figure A5. Collaborative Planning in the Mission Planning Cycle.

Figure A6 illustrates a capability required to meet the current deficiency identified in the current C3 mission planning process. By centralizing the common data elements into a Mission Warfare Planning Center, with connectivity via web sites to key data suppliers (e.g., Intel, weather, logistics, etc.), we cut down on the current "search for the key information," and allow the Mission Leader to focus on tactics and not be overwhelmed by administrative challenges.

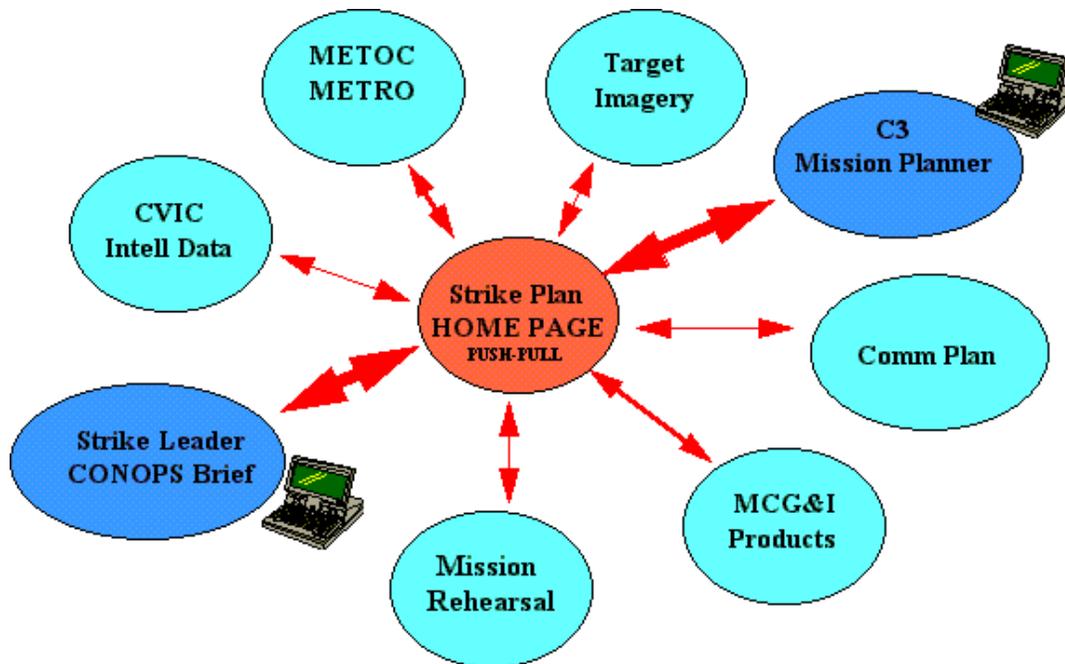


Figure A6. Draft Mission Warfare Planning Center Web Page Network.

A.2.2.3 Compliance to DII COE

All the areas of deficiency can be addressed with current Commercial Off-the-Shelf (COTS) and Government Off-the-Shelf (GOTS) products compliant with DII COE and IT-21 directives.

A.2.2.4 Standardized C3 Mission Planning Guide

There is no standardized mission planning process for any of the mission areas identified for the E-2C aircraft. There are squadron checklists and SOPs, along with sections of the Strike Leader's Checklist that address C3 mission planning concerns, but there are no community standards for C3 mission planning. Members of the C3 community recognize that the community must agree on a standard process for mission planning if they are to take full advantage of the information management tools in the commercial market. This requirement is currently being addressed at NSAWC.

A.2.3 PRIORITIES AMONG THE CHANGES

Changes to the mission planning process must come from the user community. The architecture in which that process will operate has been defined in DII COE directives. Better connectivity to C4I nodes which will provide collaborative and distributed planning capabilities is required. It is also understood that the current planning process (e.g., the gaggle briefing, the lack of focus in collecting mission planning information, etc.) needs to change. The information management tools being introduced are moving the data at a greater rate, but a mission planning system is required to organize the vast amount of information into a form that supports mission planning. The system should consolidate the information, from receipt of tasking to the final debrief, into a manageable package for the Mission Leader.

A.3 CONCEPT FOR A NEW OR MODIFIED SYSTEM

A.3.1 BACKGROUND, OBJECTIVES, AND SCOPE

JMPS is a joint Air Force-Navy effort to develop a mission planning architecture that permits interoperability between war-fighting forces down to the unit level.

A new or modified system must meet the stated objective identified within this JMPS document. Those objectives center on the following:

- a. Connectivity to C4I nodes
- b. Compliant with DII COE directives
- c. Provide a collaborative and Distributive Planning Capability
- d. Reflect the needs of the user community

This section provides the near-term vision for mission planning (2001-2005) from the planner's perspective.

A.3.2 OPERATIONAL POLICIES AND CONSTRAINTS

The new system must conform to the requirements and policies discussed in Section A.1.1 and A.2.1.1 above.

A.3.3 DESCRIPTION OF THE NEW OR MODIFIED SYSTEM

The JMPS architecture permits a C3 aircrew to contact a central nexus via wide area networks for all of its mission planning information. Using a IT-21 compliant laptop containing the approved mission planning process and collaborative/distributive COTS applications, the E-2C aircrew will access a series of web sites for critical mission planning information (e.g., mission composition, communications plan, weather, threat information, etc.). The JMPS architecture permits the aircrew to conduct collaborative mission planning sessions with other units afloat or ashore who comprise the mission package to allow coordination and deconfliction. The E-2C aircrew will access a web site that contains intelligence, ATO tasking, GPS and JNL data for download. After mission execution, the aircrew will download essential flight information for mission debrief and re-construction.

A.3.3.1 Tasking

Through the use of collaborative and distributive software located in their IT-21 compliant laptop, the aircrew will tie into ship or shore LAN and receive its initial tasking for an impending air strike via conferencing software. After the initial notification, the aircrew will access JMPS, and the rough plan that the strike team has put together. After CAG's approval the web site may be used for detailed planning and displayed on a spreadsheet with element composition, call signs, radio frequencies, altitudes, etc.

A.3.3.2 Research and Study

The aircrew will make extensive use of the available links within the ship's LAN to access web sites designed to display current data from those agencies supporting the mission planning process. These will include the following:

- Rules of Engagement
- Combat Search and Rescue (CSAR) Information
- SEAD Requirements
- Target Area:
- Target Folders with aimpoints, delivery maneuvers, fragment patterns, and other weaponeering information
- Mission Flight Parameters
- Ingress: Altitudes, Formations, Routes, Speeds, Go-No Go Criteria
- Egress: IFF, No Radio (NORDO), RTF, etc.
- Timelines
- Deconfliction
- Launch Sequence and Times
- Time on Target (TOT)
- Weather
- Mission Rehearsal

A.3.3.2.1 Rules of Engagement

The JAG will provide the ROEs to JMPS for posting on the ROE Web Site.

A.3.3.2.2 Meteorology

The aircrew(s) will access the ship's METOC web site to gather climatologic information that may affect C3 sensors and communications capabilities.

A.3.3.2.3 Asset Availability

The embarked aviation squadrons will provide the JMPS with a daily aircrew/aircraft readiness status that will be displayed on the Logistics Information Web Site. The aircrew will have the ability to assess this information and determine which aircraft will be available for the mission.

A.3.3.2.4 Target Study

Although not carrying any ordnance themselves, the E-2C aircrew will need to know the nature of the target being attacked. Targeting information will be available via the SIPRNET on the Target Web Site maintained for upload into JMPS.

A.3.3.2.5 Target Analysis Tools/Sources

Target analysis tools will be available to the targeteers/weaponeers charged with maintaining the target folders.

A.3.3.2.6 Friendly Situation/Disposition

Prior to the actual strike mission, the Maritime Commander, in whose Area of Responsibility (AOR) the battle group will be operating, deploys maritime patrol assets in his region to determine the disposition of forces within the battle group's area. This information is communicated to the battle group daily. The current plot, which can be accessed via a video conferencing capability, portrays the current disposition of friendly forces in the area.

In addition, the Maritime Commander issues a NOTAM warning to avoid a specific area due to military maneuvers. The key factor in this will be the ability of the E-2C aircrew to communicate with the mission aircraft to avoid blue-on-blue engagements. Close liaison with the Maritime Commander's Tactical Support Center (TSC) will ensure that maritime patrol forces maintain a situational awareness of the area and communicate any changes to the on-station E-2C aircrew.

A.3.3.2.7 Enemy Order of Battle/Threat Situation

As discussed in the main body of this document, the aircrew will have access, via their JMPS laptops, to a consolidated picture of the enemy order of battle from a variety of intelligence sources. CVIC is charged with maintaining an accurate picture of enemy forces as updated by external and internal intelligence collection assets. Based on inputs from national and organic intelligence systems, CVIC will maintain a highly accurate picture of the enemy situation.

A.3.3.2.8 Threat Analysis Tools/Sources

As discussed in the main document, CVIC maintains a continuous picture of the threat environment and provides access, via the JMPS architecture, to aircrew accessing its threat status web site.

A.3.3.3 Concept Development

In the JMPS environment, the various element leaders will be able to work in a distributed manner during Concept Development (Initial Planning). Each will create concept routes, then electronically passing them to the Mission Commander/Mission Leader to aggregate into an overall mission plan. Figure A7 shows that process.

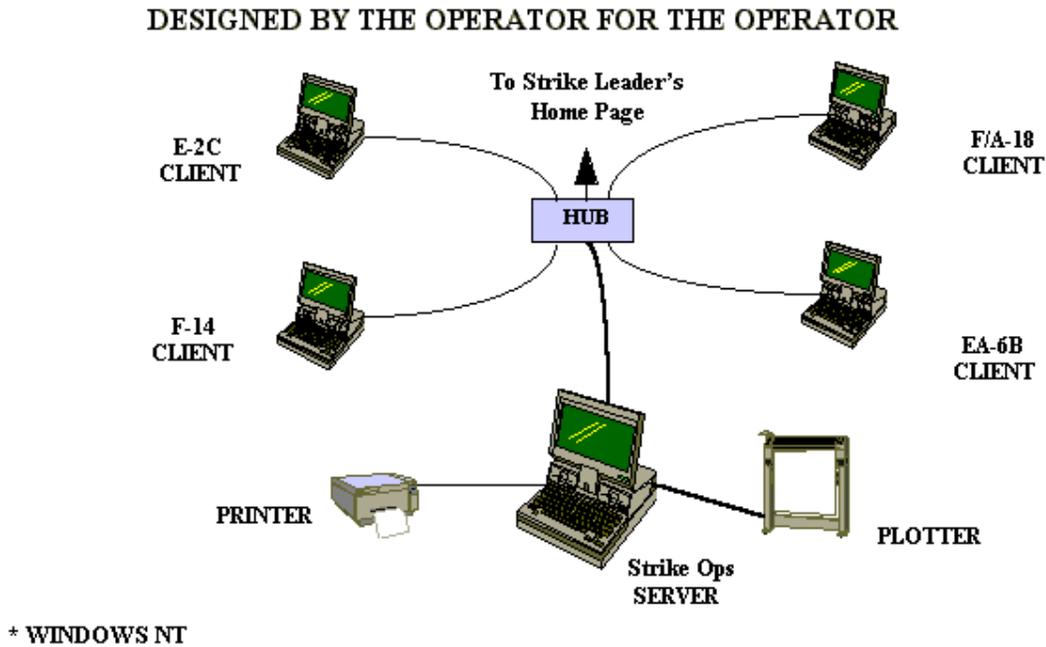


Figure A7. Collaborative and Distributive Mission Planning.

A.3.3.3.1 Mission Planning and Coordination Tools

The aircrew will have access to mission planning tools that will be supported through the JMPS architecture. Not every mission element will have a requirement for specific tools or mission planning applications. By designing web sites that allow specific users access for special capabilities, such as driver software for common load devices, the JMPS architecture allows tailoring of requirements. For example, transport aircraft may not require access to moving map software, whereas some of the tactical aircraft might.

A.3.3.3.2 Strike/Mission Planning Team Composition

The Mission Leader will designate the mission planning team, which will include an element leader from the E-2C squadron. The JMPS architecture will permit the different team members to communicate, as illustrated in Figure A7, using collaborative and distributive COTS applications resident within the JMPS workstations (laptops or desktops). The Mission Leader communicates with the team in a conference mode, using the ship's LAN to link with each of the element leads, who in turn communicate with their task unit planners.

A.3.3.3.3 Concept Plan Development Process

The development of a concept plan involves the assimilation and correlation of a tremendous amount of information and the formulation of a plan of action. The JMPS architecture will assist in correlating this vast array of information into a coherent and manageable picture of the battle-space. This architecture will provide the Mission Leader, the Element Leaders, and the unit planners with the ability to plan in a distributive and collaborative fashion as depicted in Figure A7. This capability will permit the E-2C element leaders and flight crews to get a comprehensive view of the entire operation.

A.3.3.3.3.1 Preparation

The E-2C aircrew will use their workstations to access the mission planning home page to get the necessary information they will need for planning their mission. JMPS will use onsite and offsite (Joint service, intelligence) sources to ensure that the mission plan is constructed from a "common operational picture" accessible to all participants. Figure A8 shows the capability that the JMPS architecture will provide the mission planner.

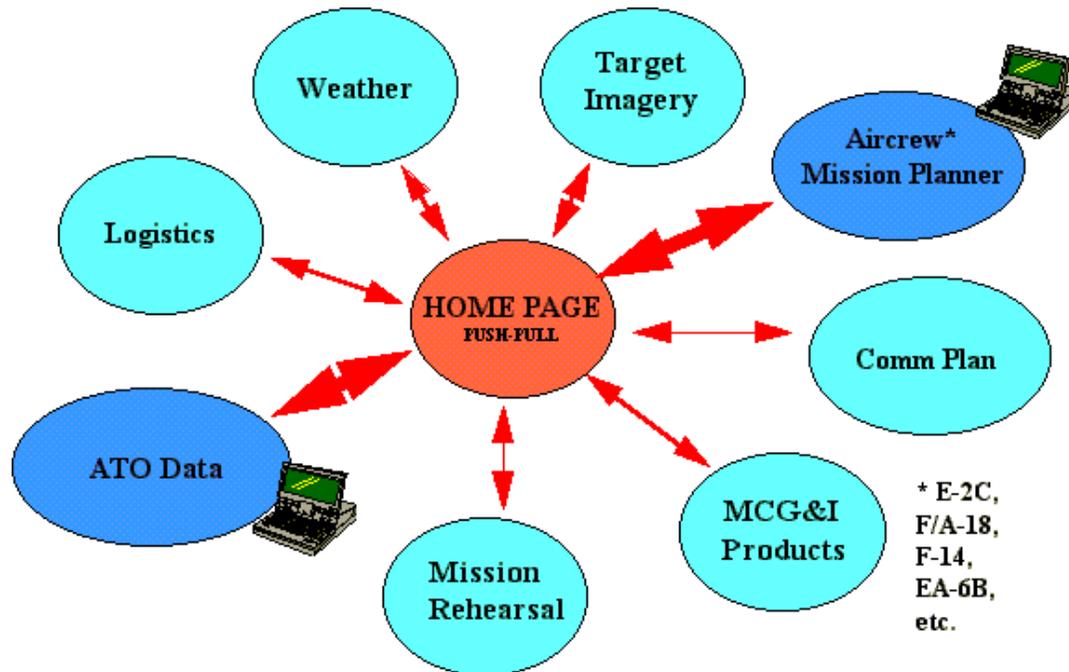


Figure A8. Support to Strike Mission Planning Home Page.

A.3.3.3.3.2 Methodology

The development of a C3-specific mission planning guide that provides the combat aircrew with a standardized methodology for developing a mission in support of a mission package is required. The JMPS will incorporate that capability, i.e., the ability for a community to tailor its mission planning process onto a laptop, and also incorporate COTS conferencing applications that permit collaborative and distributive planning among the various element leaders participating in the strike planning process.

Of interest to the E-2C community will be the capability to download and collate all mission-related products.

A.3.3.3.3.3 Evaluation and Assessment

The E-2C aircrew will be able to display all or selected missions in the proper temporal and spatial sequencing from launch to recovery, or for any subset of the mission plan.

A.3.3.3.3.4 Inter-Department Coordination

As illustrated in Figure A8, the E-2C aircrew will be able to review the end-to-end concept fly-through visualization to determine the adequacy of the planned mission support. JMPS interface

with the aircraft carrier - nuclear powered CV(N), CVW, and Flag information management systems will ensure that the mission planners maintain the required situational awareness throughout the planning process.

A.3.3.4 Concept of Ops Brief

JMPS connectivity will provide instant access to information resources used by the mission team to develop the mission concept. As a recipient of the data, the E-2C aircrew will be able to see a graphic representation the mission plan. JMPS must be capable of producing top level brief with chart, red/white/blue lay-down, blue forces involved, and metro.

A.3.3.5 Detailed Element Planning

The E-2C aircrew will plan their missions by referring to their community unique mission planning process for their specific task (i.e., communications maintenance, early warning, etc.). With their community specific mission planning process, they will use the mission planning homepage to access the information necessary to plan their missions. A depiction of the connectivity required/desired is provided in Figure A9.

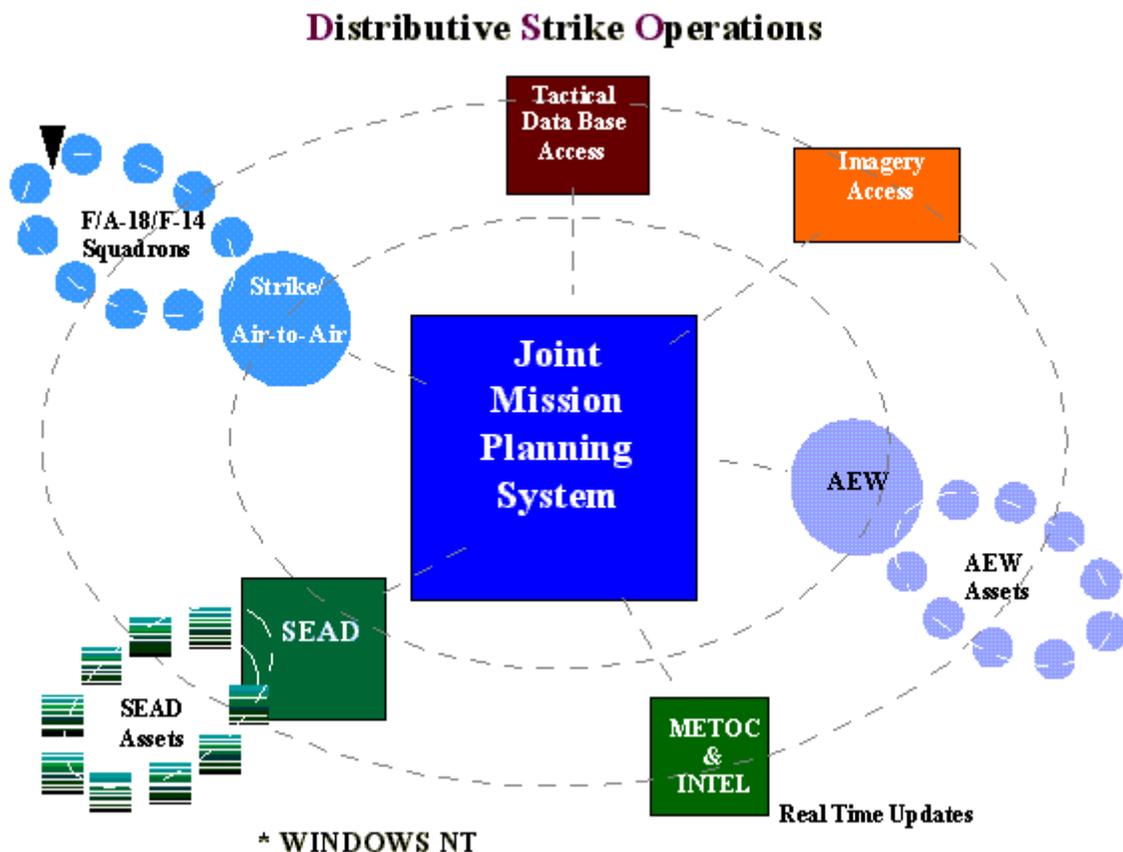


Figure A9. Distributive Mission Operations.

Also depicted is the connectivity available between the different communities to coordinate all aspects of the mission package. What are not depicted are the capabilities that will be resident

within the Naval Strike Warfare Planning Center. These consist of, but are not limited to links to logistics information, simulation applications, ROEs, historical files on previous mission packages, etc.

A.3.3.6 Detailed Administrative Planning

The JMPS architecture will provide the E-2C flight crew with access to a variety of mission planning tools to support the administrative planning of strike and mission planning to include the following:

- Aircraft Preparation Support
- Flight Administration Timing
- Rendezvous
- Tanking
- Launch/Recovery Administration
- RTF

A.3.3.6.1 Aircraft Preparation Requirements

JMPS will provide the E-2C flight crew with the architecture that will permit access to mission planning tools that define and review aircraft movements and build up times, weapons release and control checks, and ordnance loading priorities.

A.3.3.6.2 Flight Administrative Timing

The E-2C flight crew requires access, via the JMPS architecture (afloat and ashore), to flight timing and scheduling applications to automatically determine the Launch Sequence Plan (LSP) and rendezvous times based on the plan's tactical timeline. The tools will account for rendezvous, tanking, and egress times to ensure that time on target requirements are met. The E-2C aircrew will be able to access the LSP to determine the time interval between each aircraft launch (e.g., one minute per aircraft). The tools will provide the E-2C flight crew with the ability to see a tabular and graphic depiction of the launch and recovery of all elements in the plan.

A.3.3.6.3 Rendezvous

The JMPS architecture will permit the E-2C flight crew to access tools that will automatically determine rendezvous time, position, altitude, and airspeed based upon formation, and required push time from rendezvous.

A.3.3.6.4 Tanking

The E-2C flight crew will have access to tools that will plan strikes with the objective of optimizing the tanking process. When tanking is required, the tool will develop a receiver sequence plan to optimize the flow of the strike package and support aircraft.

A.3.3.6.5 Launch/Recovery Administration

The JMPS architecture will provide the E-2C aircrew with the collaborative tools to monitor the development of the CV launch and recovery plans. These plans will account for the CV position and intended motion (PIM), launch plan: primary and weather backup, CV ops mode (ready

deck/cyclic), EMCON condition/ case, sequence, minimum fuel, airborne/alert tanker, and blue water/bingo/diverts.

A.3.3.6.6 Return to Force

The JMPS architecture will provide the E-2C aircrew with the tools for RTF planning. These tools will account for routes, altitudes, airspeeds, RTF IFF procedures, FEZ MEZ deconfliction, Red Crown, Delouse (Feet-Wet), NORDO/damaged aircraft RTF, damaged aircraft divert fields, and Medium Range Recovery (MRR).

A.3.3.7 Validate Aggregate Plan (Coordination/Deconfliction)

The JMPS architecture will provide the Strike Leader/Mission Commander with the capability to seamlessly integrate detailed mission element plans into an aggregate strike/mission plan. The strike leader/mission commander will have the visualization tools to review and coordinate detailed aspects of the plan with mission element/unit planners. The E-2C aircrew, as the on-scene command and control node, will be able to review timelines and preview the strike/mission in 2D or 3D. Additionally, the E-2C aircrew will be able to overlay Restricted Operating Zones, Weapons Free Zones, Fighter Engagement Zones, Special Use Airspace, Drop / Landing / Extraction Zones, and Air Refueling Areas.

The JMPS system architecture will permit the E-2C aircrew to identify potential mission/route and event timing conflicts and provides tools to collaboratively resolve the conflict.

The E-2C aircrew will be able to use the JMPS architecture to access interactive tools which highlight all points where strike routes intersect, according to the planner-defined criteria for intersection. The E-2C aircrew will be able to define intersection criteria, including as a minimum, time, distance, and altitude. The E-2C aircrew will be able to select any intersection point, and display information, including the time, location, and altitude, of each of the route points that comprise the intersection.

The E-2C aircrew will also use a frequency deconfliction tool to review and deconflict radar, communication, EW, and data link channels to be used during the mission.

A.3.3.8 Create Aircraft Data Loads and Flight Aids

The production of aircraft and weapon data loads will be a by-product of the mission planning process. Once the strike plan is approved, appropriate data can be electronically transferred to the data loaders for the appropriate platform and/or weapon.

At this time the E-2C aircrew planner can generate hardcopies of mission plans, strip charts, kneeboard cards, radar prediction printouts, other flight aids, and reports. The E-2C aircrew planner will be able to specify format, and to edit, annotate, save and print various items related to a given mission.

A.3.3.9 Rehearse Mission

Toward the end of E-2C element planning and before the overall strike briefing, sortie rehearsal is an important aspect of building mission familiarization and situational awareness. Following the

determination of element route profiles, the sortie rehearsal module simulates a mission "fly-through" using an imagery database to provide a cockpit view of the terrain and the threat to be encountered during strike execution. The E-2C aircrew will be able to rehearse element execution and build visual familiarization with the flight profile, threat, terrain, target approach, and weapons release point.

Using the sortie rehearsal module, the E-2C aircrew will be capable of electronically receiving mission route, threat, and target data. Route data will consist of both position and timing data. Threat and target data will contain position and threat envelopes, Closest Point of Approach (CPA) data, time to impact, and probability of kill. Terrain, and troop concentrations will be provided when the mission is inside the threat envelope. The sortie rehearsal module will overlay these data on its imagery database in a manner that allows 3-dimensional views and fly-through of the ingress, egress, and target areas. The E-2C aircrew will be able to select cockpit view profiles for overall package or each element of a mission. As rehearsal time may be short, the imagery database of the sortie rehearsal module will permit multiple, simultaneous rehearsals to better accommodate the periodically high demand for this capability.

The sortie rehearsal module will be capable of producing 3-dimensional video files with HUD view, route, and threat overlays. E-2C requires mission replay capabilities that provide a "big picture" replay of the mission. These video files will be distributed to the Mission Commander for use during the overall mission briefing. The files will also be useful for element briefings (particularly for the attack element).

A.3.3.10 Aircrew Brief

Overall strike briefings will be conducted from the JMPS architecture and associated large screen display systems. Using automated systems and the Large Screen Display, which will be connected to the ship's Integrated Video System (IVS) for viewing at remote locations throughout the ship (e.g., ready rooms). The Strike Leader/Mission Commander will use the Large Screen Display to augment his electronic presentation of graphics and text that were developed during the planning process. Presentations from Air Intelligence (AI) and Meteorology representatives may be given "live" or via electronic connection from remote IVS sites. The briefing will be interactive, with feedback from remote strikers occurring via a secure video-teleconferencing capability.

In a similar manner, element briefings, such as the E-2C briefing, will also be electronically conducted as illustrated in the Collaborative and Distributive Planning illustration in Figure A9.

E-2C aircrew flight briefs will continue to be face-to-face meetings, but will make greater use of the sortie rehearsal module. During man-up of aircraft, aircrew will physically connect the data load units to the aircraft and/or weapons for data up-load.

A.3.3.11 Execute Mission

The E-2C aircrew will execute the mission as planned and rehearsed. Mission execution is, however, a dynamic process in which the aircrew may have to react to unexpected situations. Typically, the strike leader/mission commander will have planned contingency options based on the actual number of aircraft operating avionics systems, potential threats, and targets. The actual situation will dictate which contingency is executed. For example, an interdiction mission might

include a primary and secondary target. Based on real time battlespace update (e.g., from a remote Unmanned Aerial Vehicle-UAV sensor) and real-time target designation from C3 assets, the strike leader/mission commander may execute the primary or secondary target mission. In the future, pre-planned contingency targeting will migrate to real-time retargeting including "Sensor-to-Shooter." This will entail real-time data transfer of electronic sensor data, GPS data, and video among command and control centers, mission planners and shooters to enable rapid assessment of situation and near real time update of mission plans.

A.3.3.12 Post Flight Debrief

As part of the strike Folder format, the results of the strike will become a part of the electronic folder to capture the specifics of the execution. Information added to the strike Folder from the aircraft executing the strike and from the post mission debrief will include cockpit video (Forward Looking Infrared Radar-FLIR, Heads-Up Display-HUD view, Radar and Electro-Optical-EO sensors), aircraft digital data recorder information, debrief data collected by the Intelligence Officers in CVIC, Lessons Learned (compiled by Strike and Element Leads) and Battle Damage Assessment (BDA) imagery and data. Sources of imagery include Tactical Air Reconnaissance Pod System (TARPS) DI, UAV imagery, and national sensors. The JMPS architecture will provide the capability to transfer this imagery to the Joint Services Imagery Processing System - Navy (JSIPS-N) strike planning archive.

These provisions will create a repository of information detailing both the planning and the execution and results for analysis and review, as well as building a database of strike tactics and employment details on which future plans can be built. This data may be used for assessing strike coordination, to flag threat parameter changes, updates to the tactical order of battle and other purposes. By accessing previous strike Folders, this historical database can be used at the outset of strike planning for a review of lessons learned and previous strikes with similar factors (decreasing the requirement to "reinvent the wheel").

As a debrief tool for use in reviewing strike execution post mission, the above data elements that are added to the strike Folder will be available for viewing on the Large Screen Display.

A.3.3.13 Post Flight Data Analysis

The JMPS architecture will provide the capability to read, process, reduce, analyze, store, retrieve, and display maintenance, avionics, sensor, and mission data recorded during the E-2C flight.

A.3.4 USERS/AFFECTED PERSONNEL

Key personnel in the E-2C mission planning process include: CVW/ARG/MAGTF and Squadron Intelligence Officers, CVW/ARG/MAGTF Operations Officer, CVN Strike Operations Officer, CVW/ARG/MAGTF Meteorological Officer, CVN Ordnance Handling Officer, CVW Ordnance Officer, CVN Aircraft Handling Officer, CVN Air Boss, and CVW and Squadron aircrew.

There are three functional planners: the Flight Planner, Mission Planner, and Force/Strike Planner.