

Collaborative Mission Planning (CoMP)

Warfighter Analysis Workshop (WAW)



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14 February 2007

MEMORANDUM FOR CC: 352 SOG, 19 OSS, 2 OSS, 11OG, 951 ELSG, AFSOF/AOC, 335FS,
SFWSLANT, 9 FS, 1 SOW

FROM: USAF C2ISRB/CC
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SUBJECT: Final Report on the Collaborative Mission Planning (CoMP) Warfighter Analysis
Workshop (WAW), 6 and 7 Dec 06

On 6 and 7 Dec 2006, the Command, Control, Intelligence, Surveillance and Reconnaissance Battlelab (C2ISRB) conducted a Warfighter Analysis Workshop (WAW), employing a sample technology, to solicit warfighter input on a capability enabling tactical level units to conduct machine-to-machine collaborative mission planning. In addition, the C2ISRB gathered warfighter input on the desired interface and functionality of this capability. The workshop results and analysis are attached for further consideration.

The workshop demonstrated a strong warfighter need for the implementation of a machine-to-machine collaborative mission planning capability with established access to mission planning information boundaries. Interest was sufficient for the C2ISRB to recommend the capability be given further consideration by the mission planning community or a major command for possible incorporation into future mission planning programming efforts.

For any questions regarding this report, please contact the lead on the CoMP concept, Lt Col Daniel Bergeron at Daniel.Bergeron@langley.af.mil, DSN: 575.9807, Comm 757.225.9807, or Mr. Michael Hemler at Michael.Hemler.ctr@langley.af.mil, DSN: 575.9833 / Comm 757.225.9833.

//signed//
KEVIN B. DAMATO, Lt Col, USAF
Commander

Attachment: Collaborative Mission Planning (CoMP) Warfighter Analysis Workshop (WAW)
Final Report

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SUMMARY

BACKGROUND

The Command and Control & Intelligence, Surveillance and Reconnaissance Battlelab (C2ISRB) hosted a Warfighter Analysis Workshop (WAW) for a concept called Collaborative Mission Planning (CoMP) on 6 and 7 Dec 06. In the initial stages of the development process the C2ISRB conducts WAWs to solicit warfighter input on the proposed initiative. The WAW served two purposes, to determine if the proposed collaborative mission planning capability was worthy of further consideration as a Battlelab initiative or elsewhere and, if deemed worthy for additional development, to compile a basic functionality requirements list to be associated with the capability. The workshop attendees were drawn from varied flying platforms and intelligence backgrounds to capture a broad range of operational perspectives. Participants included strike fighter, bomber, air refueling and special operations mission planners, platform operators and intelligence personnel. Experience ranged from first assignment officers through field grade officers with a correspondingly wide range of combat and operational experience.

METHODOLOGY

WAW participants were first assembled in front of workstations where they had the opportunity to view a candidate technology for CoMP from Collaboration Technologies Incorporated (CTI). Following what was dubbed a "walk through" scenario, the attendees were brought into a conference room where their comments were captured via GroupWare Systems collaborative software. On the second day of the workshop, attendees again assembled in front of workstations featuring the CTI capability and followed a second scenario. They again met in the main conference room for additional groupware questions.

ANALYSIS

Initially, questions were framed to baseline the current state of mission planning and the employment of collaborative techniques to perform the mission planning process via access to a virtual mission planning room. Responses to the WAW questions varied greatly depending on each mission design series' (MDS) mission; however, during discussions on the subject questions, respondents revealed wherever and whenever real world mission planning activities occurred, planning is normally confined to telephonic and electronic (email) conversations with additional reliance on the Portable Flight Planning System (PFPS), the Joint Mission Planning System (JMPS) and the Air Force Mission Support System (AFMSS). Planning using the applications is generally restricted to internal planning versus outside collaboration due to a lack of interoperability between units employing different software versions. Regardless of the mission planning method, the participants stated mission planning activities are greatly curtailed or sometimes even halted during combat or contingency operations. This is due to the lengthy process involved in mission planning and the inability to ensure the planners involved in the mission planning process are available simultaneously.

DETERMINATION

The general lack of conformity between organizations, the reliance on telephonic and email point to point communications and the inability to effectively mission plan during combat and contingency operations illustrates the need for a collaborative capability that enables units at different geographic locations to communicate with the various existing tools during

the mission planning process. The attendees agreed that the capabilities offered by a tool such as CoMP would enhance their ability to collaboratively mission plan.

Participants suggested the following for the collaborative mission planning tool:

- Real time information capability regardless of when a planner enters the collaboration session.
- Information integrity (i.e., consistent, reliable, accurate, and timely).
- Ability to collaborate across multi-security levels and to control access through extension/denial of permissions.

The participants requested permissions to mission planning information are controlled depending on the individual and circumstances. Responses ranged from total visibility for mission commanders to greatly limited visibility for most individual activities. Additionally, visibility to mission planning information did not translate into access, which was interpreted to include the ability to modify information. In every consideration of user access to mission planning data, participants would implement some level of access restriction. Intelligence and, to a lesser extent, weather were viewed as other key components in the planning process and there was broad consensus for total visibility. When asked to consider what they wanted to make available to others, the answers were much more restrictive. The most common answer was access to route information. Repeatedly during the discussions, participants indicated mission planners should have the ability to limit access as they deemed necessary. However, respondents were generally split as to ability to access and modify data. On the liberal access end, participants suggested that the only limitation would be limited ability to modify other's routes. Where access was given to modify, participants requested a single intelligence lead be designated to deconflict the intelligence input. Access beyond primary players was largely limited and tied to operational scenarios. These restrictions applied to joint and coalition forces, ground forces, base support agencies, and non-government agencies.

Participants requested a wide variety of information for performing the mission planning process. They requested access to anything and everything necessary for mission planning, upon demand. Of particular interest were routing information, intelligence, weather, ordnance data, positions of ground forces, and information on data linked weapons that the operator could expect to encounter in their area of operations. Participants were polled to determine and specify those data elements with applicability to the broadest audience, data with a moderate level of operational users and data with limited operational use. This assessment determined the greatest return on an investment if the CoMP concept were further developed. Detailed information can be found in the main body of the report.

Participants unanimously requested easy to use chat and voice capabilities. The majority also requested customizable display functionality. In a polling exercise, the participants rated the ability to view, transfer and properly geo-position routes across multiple maps, scales and imagery as their greatest requirement. In a companion poll, they rated the ability to collaborate in a secure environment across multiple security levels as most important when operating between and within a LAN.

Finally, participants were polled regarding CoMP as a candidate capability. The attendees overwhelmingly found the demonstrated capability user friendly, intuitive and worthy of further consideration. Furthermore, while the participants did not have the opportunity to view the candidate product communicate across different version of PFPS or JMPS in the lab setting, the enabling concept detailed in the application was of great interest.

SECTION 1: BACKGROUND AND EXPERIENCE

QUESTION: What is the current aircraft you operate and how many hours do you have in your primary crew position?
ANALYSIS: The attendees covered strike fighter aircraft, both AF and USN, bombers, air refuelers, special ops as well as intel. The attendees were generally company grade or junior field grade officers. Some had less operational experience than those who normally attend one of the warfighter analysis workshops.
QUESTION: What other aircraft have you operated and how many hours do you have in each?
ANALYSIS: Most attendees were familiar with one airframe only. If they had experience in another airframe, it was normally less than 500 hours. Only one participant had significant flying time outside of their current MDS.
QUESTION: What is your highest level of qualification? (IP/AC/CP/Formation lead/Msn Cmdr)
ANALYSIS: The majority of the participants have performed the role of mission commander. This experience level increases the value of their responses to later questions on mission commander access.
QUESTION: Detail (in unclassified terms) your combat experience / contingency operations experience. Include your experience in the aircraft, AOR HQ and any CAOC or ground field experience you may have.
ANALYSIS: Combat experience among the attendees varied vastly. Approximately 2/3 of the participants had some combat experience. Their responses needed to be weighed more greatly in later sections dealing with combat access.
QUESTION: Provide background on any major / large force training experience you may have (e.g., RED FLAG).
ANALYSIS: Nearly all participants had some experience in a major or large force training exercise. This experience aids in bridging lack of combat experience.
QUESTION: What experience do you have in joint mission planning? With whom?
ANALYSIS: The attendees were evenly split regarding joint mission planning. Of those who had joint experience, it was fairly extensive. On the other end were those with o experience.
QUESTION: Are you a graduate of a weapons school? Which MDS?
ANALYSIS: Just under half were weapons school graduates. Weapons school completion was not a criteria, but relevant for background.

SECTION 2: COLLABORATION

QUESTION: How often do you mission plan with others (outside your unit)? What percentage of your mission planning is devoted to composite force training?

ANALYSIS: There was some degree of mission planning occurring across every MDS; however, the amount of time spent mission planning and the number of agencies participating in the process varies greatly. The most common agency mentioned in the mission planning process was air refueling. The respondents needed to obtain the times and altitudes for refueling.

QUESTION: In your operational combat experience, how often do you conduct composite force training?

ANALYSIS: Responses to this question were varied and ranged from always conduct composite force training to very limited training. On the high end were the SOF forces that conduct composite force training on every mission solely as a function of their mission. On the opposite end were the long range bombers as they generally conduct long out and back missions without the need to collaborate with other platforms. In the middle ground, most respondents identified a need for connectivity with ground forces.

QUESTION: Does the urgency of the mission affect your ability to collaborate with others? Include medical, rescue.

ANALYSIS: The urgency of the mission definitely affects the ability of the participants to collaborate with other units. Unfortunately, in contingency situations where collaboration with other units is most critical, mission planning is often the first thing to be discarded. This lack of collaboration during time-constrained situations, like contingency operations, makes the need for an automated or semi-automated capability the more valuable. The addition of such an ability may reduce the reliance on post-takeoff updates to the crews as the primary means of information receipt, which is the primary means of receiving updates.

QUESTION: In potential future conflicts, what role do you see for composite force training?

ANALYSIS: The respondents were in strong agreement that as future missions evolve to include more joint flavor and more coalition interaction with allied nations, the need to conduct composite force training will continue to grow. Respondents also concurred that the increase in composite force training mandates that mission planning opportunities increase. The importance of a machine to machine capability to achieve this composite force training is paramount.

SECTION 3: TOOLS AND TECHNIQUES

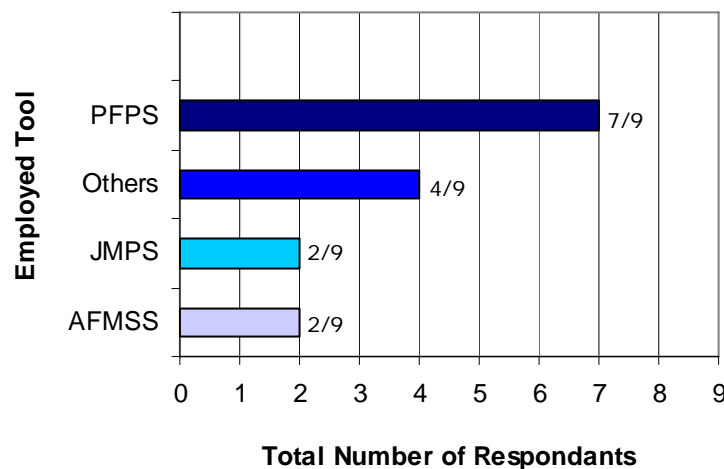
QUESTION: What mission planning tools do you use today? Electronic, manual?

ANALYSIS: Responses to this question reflect the lack of standardization among mission planners. A broad array of tools and techniques are currently being employed. Various versions of PFPS are widely employed and some units are using AFMSS. Feedback indicated there is a growing reliance on JMPS as the System of Record; however, it is unclear how it ties, if at all, to PFPS or any other mission planning tool. In addition, there is a significant amount of telephonic collaboration, which is a result of the lack of a machine to machine capability to mission plan. Phone lines are easily available, provide assured communications and are common to all. Therefore, telephonic collaboration remains the primary tool for mission planning. The problem with telephonic communications is the subjective interpretation of verbal information as opposed to the clarity of visual presentation.

The general lack on conformity between organizations and the reliance on telephonic point to point communications illustrates the attendees' desire for a cohesive capability to unite the various tools and enable different units to communicate with each other in the mission planning process.

NOTE: The candidate software from Collaboration Technologies Incorporated (CTI) which was demonstrated during the WAW employed only one version of PFPS. The C2ISRB lab was not configured to demonstrate collaboration between different versions of PFPS.

NOTE: The number of responses reflects the number of tools that are currently being used by the various organizations. The numbers point to the fact that there is a lack of standardization even within a single MDS or multiple MDS flying wing.



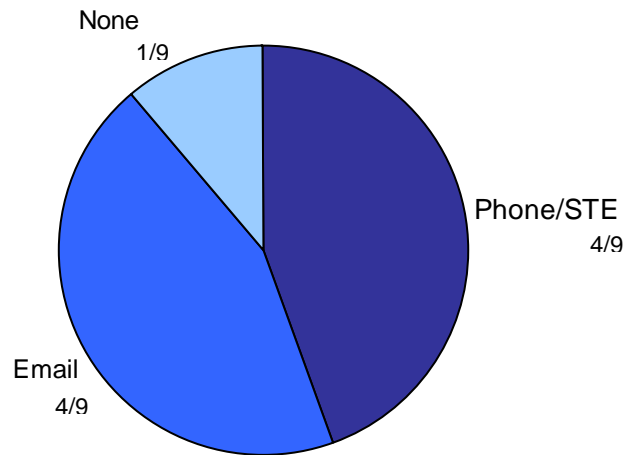
NOTE: Of the nine attendees, several used more than one method to communicate. This accounts for the totals exceeding the number of attendees.

QUESTION: Considering the mission planning tools at your disposal today, what is your ability to collaboratively mission plan with other platforms/units? Consider the reliance on specific tools/techniques, like voice/STE, and the benefits/limitations to these tools.

ANALYSIS: Where mission planning is utilized, participants rely on telephonic or email (NIPR or SIPRNet) coordination with other units. The responses need to be framed within

the context of the current mission planning process and constraints as opposed to the automated process demonstrated during the WAW.

Current Collaboration Techniques Employed



QUESTION: How much time is currently required to collaboratively mission plan? How many people are involved in the current process? In your response, consider the ease of use and the technologies at your disposal. Be sure to differentiate between mission planning which occurs the day prior to the event and that which occurs on the day of the event.

ANALYSIS: Once again, the responses to this question followed the pattern of previous questions regarding the current process. Time requirements are dependent upon a number of considerations: span, available resources, mission type, number of participating units, and platform type (e.g., some MDSs only required minimal data for mission planning).

The responses indicate that, if a further pursuit of a collaborative mission planning capability is planned, the candidate technologies which make up that mission planning capability must be tailorable to mission type.

QUESTION: How many collaboration sessions are normally required to complete the process? How do the other collaborators know when the process is complete? Include all MDSs.

ANALYSIS: Responses were dependent on various factors due to the variance in collaboration requirements. For example, long range bomber units may operate solely with minimal or no collaboration. With other platforms, initial mission planning is completed and updated with subsequent "follow on" sessions.

QUESTION: Describe the current process for collaboratively mission planning with other PFPS and JMPS users. Include in your response the benefits/limitations and the version of mission planning software you are using, if known.

ANALYSIS: Consensus indicates no current means of collaborative mission planning with other PFPS or JMPS users exists beyond the passage of ROUTE files via email or telephonic contacts.

SECTION 4: IMPROVING THE PROCESS

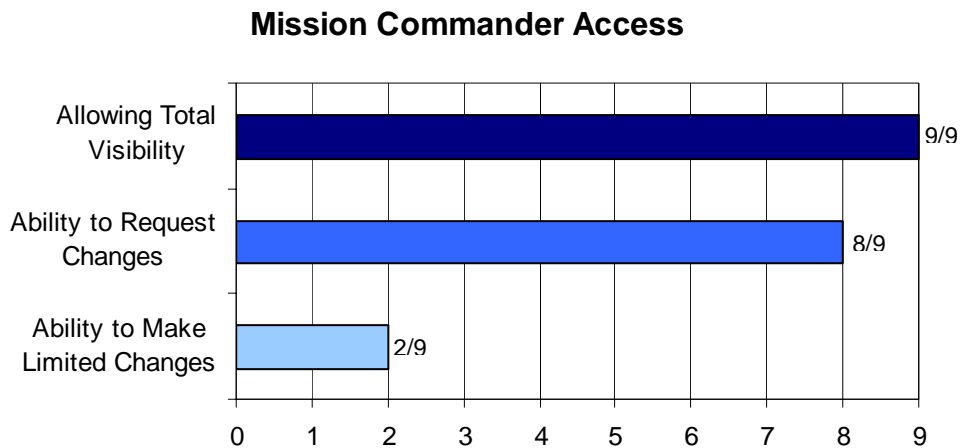
QUESTION: Where is the greatest need to enhance collaborative mission planning? Clarify what you see as aiding your ability to collaboratively mission plan over the present methodology?

ANALYSIS: Participants repeatedly indicated they require real time data. Mission planners want to view events as they evolve; whether that be early or late to the mission planning process that they would participate in within the construct of a virtual mission planning room. Participants want information to be consistent, reliable, accurate and include all pertinent mission planning information including, at a minimum, threat information, tankers, routes, and timing along the route to enable deconfliction/air space management as well as hook up times for air refueling operations. Additional needs included a web conference room to allow participants at different multi-level security (MLS) to communicate, incorporation of the ground picture, weapons flight path tracking, roles and permissions to control access, ability to view target/kill boxes.

SECTION 5: MISSION COMMANDER/MISSION ACCESS

QUESTION: Mission Commander Access. What visibility does the mission commander / package commander need to have? Should there be any restrictions on access?

ANALYSIS: All respondents agreed that the mission commander should have total visibility to mission data and most agreed that the mission commander should be able to request changes to the mission planning process. A significantly smaller number indicated the mission commander should have the ability to make those changes at will. Those that considered the ability to make changes as valid placed limitations on what information could be modified.



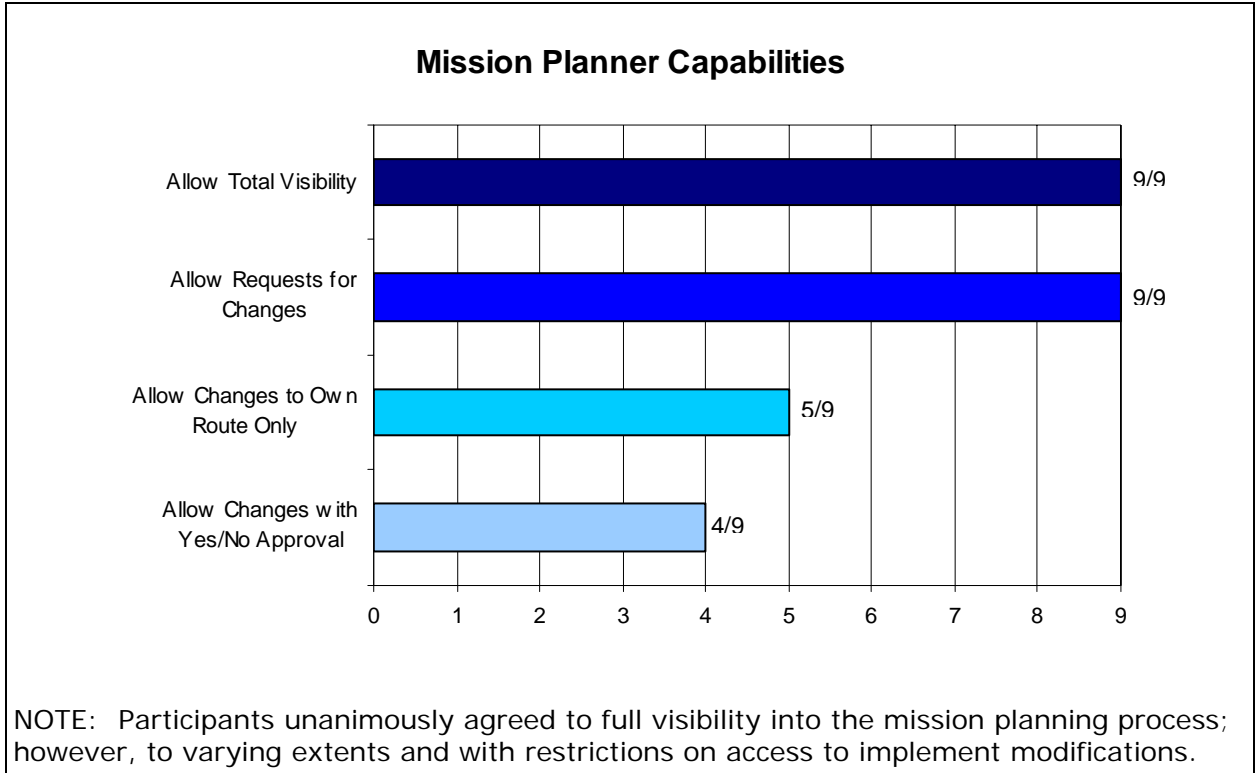
NOTE: While all attendees would allow mission commanders to have full visibility of the mission, a subset of the participants would enact some degree of restriction to access.

QUESTION: Mission planner user access: What visibility should the mission planner/user have to mission planning data? What restrictions should there be on the mission planner access?

ANALYSIS: Similar to the approval given for visibility to mission commanders, participants were open to the idea of granting visibility into the planning process to other mission planners. As with the mission commander, the respondents wanted to extend visibility into their own route planning to other mission planners. However, while they considered access into the mission as critical, they did not want others to have the ability to modify their routes.

QUESTION: Others can see your route in this proposed configuration. Do you want the other collaborators to be able to access and modify your routing? If you concur with the access, what inputs to TTPs or ROEs will need to be documented.

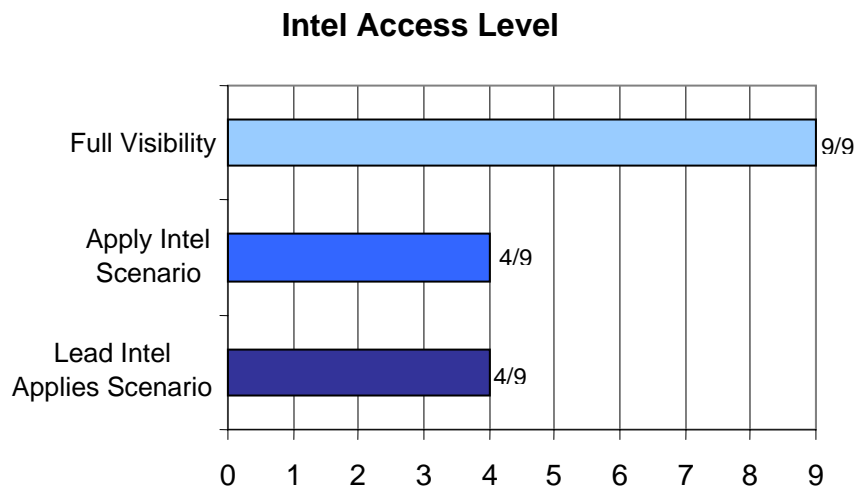
ANALYSIS: All participants previously indicated their acceptance of visibility by mission planners and the mission commander. With the proposed configuration, participants indicated greater restrictions to access would be needed (i.e., being able to modify the information). All agreed that the users should have the ability to request changes, but those requests should include a feature that allows the change to be accepted or denied. Nearly half of the respondents favored some sort of filter or approval process for requested changes.



SECTION 6: INTELLIGENCE AND CAOC ACCESS

QUESTION: Intelligence user access. What visibility should the intelligence user have to the mission planning data? Should the intel SME have access to the full suite of mission planning data? If not, what restrictions should be put in place?

ANALYSIS: Intelligence information and, in turn, intelligence visibility to the mission planning process proved to be a solid requirement. All commented that mission planning visibility should be granted to intelligence personnel. From this point of agreement, positions varied. Nearly half (4/9) thought that the access should stop at the application of the intel scenario on the route data. Four commented that an intel lead needs to be established for a mission so that multiple inputs are not introduced. Similar comments were made that any intelligence input requires that some precedence or priority be given when considering intel injects. Additional comments reflected the need to pull the ground picture into the mix. Strike aircraft operators, in particular, wanted the ground liaison officer (GLO) to be able to input blue force positions to reduce the probability of fratricide.



NOTE: Participants agreed on granting visibility into the mission planning process and felt modification permissions should be restricted. There was general agreement that an intel lead needed to roll up intelligence information prior to allowing standardization modifications.

SECTION 7: SECTION 7: EXTENDED ACCESS

QUESTION: Joint forces (What other participants should be granted access and to what degree? How would you envision the best way for this information to be presented?)

ANALYSIS: Responses consistently favored access for joint partners involved in mission planning. As with previous responses, comments were impacted by the relevance of the circumstances (i.e., situation dependent).

QUESTION: Coalition forces (What other participants should be granted access and to what degree? How would you envision the best way for this information to be presented?)

ANALYSIS: As with the joint access, respondents reiterated the need for those outside agencies involved in the mission planning process to have access to data. These same respondents also indicated that support should be scenario dependent with joint access.

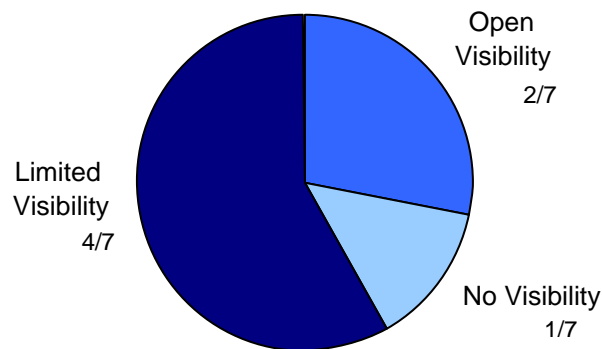
QUESTION: Ground forces (What other participants should be granted access and to what degree? How would you envision the best way for this information to be presented?)

ANALYSIS: Overwhelmingly respondents said ground forces/TACP/ASOC requires visibility because the various platforms need access to the ground picture. Respondent comments included "entry of ground order of battle," "definitely need the ground picture," and "need them more than they need us."

QUESTION: Base support agencies (What other participants should be granted access and to what degree? How would you envision the best way for this information to be presented?)

ANALYSIS: There was wide disparity among the respondents concerning who should have access. Access here is understood to be visibility. A majority of the respondents requested information from the base support functions, like intelligence, weather, fuels, maintenance and munitions. They also preferred the information be a one-way feed.

Base Support Agency Access



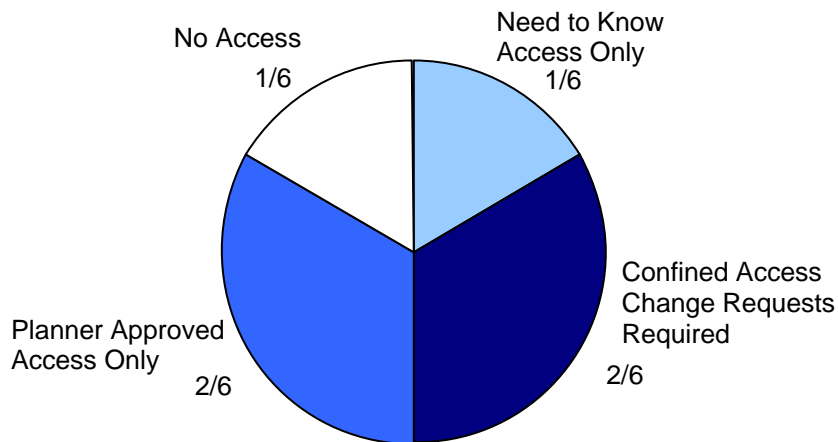
NOTE: A majority of respondents would restrict base support agencies' visibility, but would require information from these same agencies.

QUESTION: Others (What other participants should be granted access and to what degree? How would you envision the best way for this information to be presented?) Think about other government agencies, NGOs, etc. (Situations like

natural disasters require collaboration with other than military.)

ANALYSIS: The consensus was that visibility is the preferred degree of access; however, no outright access into the mission planning process data itself for modification. One participant added that those granted access would require “a need to know.” Two participants commented that others could submit requirements for changes; two commented that they wanted to control access and one commented that they would not grant access.

Access for Other Agencies



NOTE: As the distance from the core mission planning functions grows, the participants extended less and less access.

SECTION 8: SECTION 8: DATA FROM OTHERS

QUESTION: Describe what data elements/fields/information you need to see from others when you collaboratively mission plan?

ANALYSIS: Participants requested a variety of information. Some want any and all information available. Others specified the following: intelligence, mission board, routes, long range weapon routes, ISR, weather, fuels, offloads, air refueling, threats, real time information, ground information, SOF picture, CAS, BDA, and time sensitive targets. Most participants requested real time and routing data. The bottom line is that the mission planners want whatever they may need to accomplish the task at hand and they want it readily available.

QUESTION: What information falls into the "nice to have" and "not necessary" categories?

ANALYSIS: Participants had a lengthy list of requests including the following:

- Ability to toggle all routes on/off with a single click
- Information on hover containers
- Directive and broadcast chat functions
- Icons for alerts
- Ability to show/hide routes
- Ability to display information such as timing and fuels status
- Link 16 picture overlay
- Tailored digital/elect checklist
- Custom add-ins

The only item indicated as "not necessary" was a chat capability not directed at a specific mission.

SECTION 9: DATA TO OTHERS

QUESTION: Describe what data elements/fields/information you need others to see from you when you collaboratively mission plan.

ANALYSIS: Answers varied significantly between the respondents. Half of the WAW participants stated that others should be able to view their route. Other answers were unique and included weapons remaining, loadout, threats (to be passed to intel), air refueling requirements, any modifications to TOT, support requirements, Commander's intent/objectives. Participants consistently requested the ability to pass information from their mission planning process thereby requiring visibility. Participants specified that ability should be able to be tailored to allow the mission planner to restrict access.

QUESTION: What information that you currently receive from the other planners falls into the "nice to have" and "not necessary" bins?

ANALYSIS: The predominant response to the question was ordinance loadout. Fuels and available "playtime" was the second most common response. Other responses included a target pop up to enter attack mode, route info and asset location. There was only one response regarding unnecessary functionality, that being having the entire flight plan information and targets.

SECTION 10: OTHER DATA/RECIPIENTS

QUESTION: What information do you need to see from data linked equipped weapons? How do you need to have that information provided/presented?

ANALYSIS: Participants commonly responded that they needed to see both the position of weapons and type in the air in order to avoid them in the planning process. Other responses included Predator feeds, situation updates, and the positions of ground/friendly forces. The communications methodology was seen more as a chat function than a machine to machine interface.

QUESTION: What other participants (intel, maintenance, fuels, etc.) should have access to the various data elements? What information do these individuals need to see? What do you want them to see?

ANALYSIS: The response ranged from no outside access to access to anyone the mission planner determines is a part of the process. Respondents that supported granting some access agreed the access to intelligence personnel would vary in degrees. The other function routinely mentioned for access to data elements was weather.

QUESTION: Detail your impressions of the importance to blue force tracking planning? How important is blue force tracking (ground forces location/activity) to your mission success?

ANALYSIS: Blue force tracking (BFT) location reduces the risk of fratricide and is critical for execution, though not critical, for mission planning. The mission planning process does not rely on BFT. Position data changes from the time of planning to the time of execution; as such, the BFT may no longer be relevant.

SECTION 11: GROUP DATA ELEMENTS

Priority 1 (All)
ANALYSIS: Item relevance varies in the mission planning process; however, they had the greatest applicability across the various platforms. NOTE: There is no indication of prioritization with the items shown here. The information merely reflects those items that the group collectively agreed upon as the most universal requirements.
<ol style="list-style-type: none"> 1. C2 Agencies 2. Mission CC 3. Contact Info 4. Weather <ul style="list-style-type: none"> Winds at altitude Winds 5. Callsigns 6. Control pts 7. Control times 8. Block Altitudes 9. EMCON
Priority 2 (Most)
ANALYSIS: Most of the data elements fell into the second category meaning the data was applicable to most platforms. This does not indicate that these items are less important than those in the "ALL" category. For instance, an attendee noted the UAV positions were an extremely important to his platform operations as they occupy the same airspace. However, those platforms operating outside of the UAV operational space do not require this information.
<ol style="list-style-type: none"> 1. Available jamming 2. Blue Force 3. Jammer orbits 4. DCA CAPS 5. OCA CAPS 6. Ground picture 7. Refueling Duration 8. Illumination 9. SAR/CSAR 10. Duress words 11. SARNEG 12. TACP contact info 13. Terrain 14. DAIFIF 15. Coalition assets 16. UAVs 17. Weapons 18. Refueling altitudes 19. Refueling Off load 20. Tanker configuration 21. Tanker Orbits
Priority 3 (Few)
ANALYSIS: The data elements included in this group were only valuable to a

limited number of platforms. Inclusion in this list does not indicate these items are any less valuable than items previously identified.

1. Jamming PODs
2. Support asset capabilities
3. Overhead support
4. Rendezvous types
5. JSTARS freq
6. BDA
7. RJ sensor data
8. Sensor data info (push and pull)
9. Chum
10. Classification levels
11. Players in the kill chain
12. TAM (JASSM IR Imagery)

SECTION 12: DISPLAY

12.1 INTELLIGENCE & WEATHER

QUESTION: Intelligence/Threats. How would you like to see intelligence/threat information displayed? Updated?

ANALYSIS: Participants were unanimous regarding the need for threat information; however, the manner of presentation varied greatly. Participants requested automatic updates of threat information in real time using a flash audio or visual alert update. Other requests included, a filterable and scaleable threat display capability, the ability to turn the threats on /off at will, and deconfliction among various intel agencies. Participants wanted the display to include: threat rings, weapons loadout, blue force position, threat aircraft/airfields and weapon systems.

QUESTION: Weather. What weather information is critical for display? To what mission type? How would you like would to see that information displayed, updated?

ANALYSIS: Along with intelligence, weather displays were a generally agreed upon capability for a mission planning tool. The following were the most consistent weather data element requests: a general overview picture of weather for overlay, wind data, solar/lunar illumination data, tactical decision aid information applicable to the platform, hazard information (i.e., icing, turbulence, severe weather), cloud layers (i.e., height and coverage), satellite and radar imagery with date stamps, in-flight visibility and sea state information for ditching.

12.2 VIEWS

QUESTION: What information should be displayed on the mission planning screen for the Combined Air Operations Center view? What mission planning information should be displayed in the CAOC for the JFACC?

ANALYSIS: In general, the attendees agreed that the CAOC view should consist of the completed and approved mission planning picture. The picture would be confined to a display of routes, targets, threats and the LINK 16 status. This is similar to the display currently provided through the GCCS-J COP software.

QUESTION: What information should be displayed on the mission planning screen for the Global view (STRATCOM/TRANSCOM/etc)? What mission planning information should be available to joint interests?

ANALYSIS: Most participants indicated mission planning information visibility should be restricted to a completed picture. The visibility should include only the routes and the communications link. There should be no ability to modify any of the information. It should be strictly a view capability.

QUESTION: What information should be displayed on the mission planning screen for the Red order of battle / intel preparation of the battlefield?

ANALYSIS: The overall consensus indicated all threat information should be available to the planners. Information included air to air, AAA, SAAM, ship and surface threat data. Participants requested filter capability allowing them to view only the information relevant to their operation.

QUESTION: What blue force tracking information if displayed along with red order

of battle would provide better SA during mission planning?
ANALYSIS: Any information related to the ground and air order of battle, especially position and possible future movements, is of interest.
QUESTION: Output through other display mechanisms. Tools like the Warfighter's Edge (WEdge) provide a means to display information from the mission planning process. Who do you see as the users who would be satisfied by an output of a screen to WEdge for display rather than a direct PFPS/JMPS picture?
ANALYSIS: Responses to this question were few and varied. Only half of the participants provided a response and those responses were split between WEdge and TASKVIEW.
QUESTION: How would you organize mission planning (virtual mission planning rooms (VPMRs)) in the absence of a CAOC or Air Tasking Order? How would you initiate, route and organize the VPMR without an ATO?
ANALYSIS: The responses varied so greatly that a single solution or preferred methodology could not be determined.

12.3 ADDITIONAL CAPABILITIES

QUESTION: Chat capability / Multiple chat rooms. What benefits/disadvantages do you foresee to the incorporation of a chat capability? Are there other chat capabilities which should be considered for inclusion?
ANALYSIS: Responses indicated a chat capability was desired. Respondents requested the capability be easy to use and allow multiple chats or restrict the conversation to a single point.
QUESTION: Video conferencing. Video conferencing can be employed through video teleconferencing or sharing video such as a fly through rehearsal. Would either of these capabilities be something you would want to have added to the basic mission planning functionality?
ANALYSIS: Respondents did not feel this was required capability. It was considered a "nice to have" addition that would allow video conferencing fly through video.
QUESTION: Voice. Voice has been the standard means of collaborating to date. If the capability shown becomes a reality, would you still desire voice capability?
ANALYSIS: Participants unanimously and strongly requested a voice capability be added to the mission planning software.
QUESTION: Customizable displays.
ANALYSIS: Most respondents replied they would like a customizable display, but the shortness of the responses indicates that it is either not high on the priority list or the intent of the question was unclear. Recommend removing this question.
QUESTION: Virtual "fly throughs"/mission rehearsals.
ANALYSIS: Respondents indicated this is a "nice to have" feature. Currently other capabilities provide this functionality; however, they are not widely employed due to insufficient time in the current mission planning process to incorporate the fly throughs.
QUESTION: How should the VPMR be used for persist/review of missions (e.g., lost power, evacuation, etc.)?
ANALYSIS: Responses to this question indicated the attendees did not comprehend the

intent. Responses focused on information retrieval during conditions of power loss as opposed to the configuration of the virtual mission planning room.

QUESTION: Any other capabilities not listed?

ANALYSIS: Responses were varied and included: training programs, greater exploitation of PFPS and JMPS functionality, mission fly outs, and maintaining point control.

12.4 PRIORITIZATION OF COLLABORATIVE NEEDS

Voting Key: Participants were asked to rate four (4) candidate collaborative mission planning capabilities as to their value to their particular mission. Items were rated on a scale from most important to least important. Most Important earned 1 point, Important rated 2 points, Somewhat Important was awarded 3 points and Least Important earned 4 points. Ten (10) individuals voted in the process. The lowest average score rates as the greatest priority of the capabilities.

Collaborative Planning Capabilities Mean	
2.70	Provide collaborative weapons delivery planning.
2.10	Coordinate between internal and external mission packages and mission timing.
1.80	View and integrate overlays and data from multiple sources (e.g., OOB, force lay down).
1.20	View, transfer and properly geo-position routes and mission data across multiple maps, scales, and imagery.

ANALYSIS: The participants rated the ability to accurately view, transfer, and geoposition mission routes and data across multiple maps, scales and imagery as their highest priority. During discussions prior to Groupware activity, participants defined this capability as shared information files between their mission planning applications. The second highest priority of the choices given was the ability to view and integrate overlays and data from multiple sources. This brings in many of the needed data elements which are currently not integrated into mission planning in an automated fashion. Close behind this requirement is the ability to coordinate the internal and external mission packages and timing. This is effectively the function of CoMP. On the far end of the scale is the ability to provide collaborative weapons delivery planning.

Participants were then asked to vote on a second group of capabilities with regard to collaborative mission planning between internal organizations and with those external to the flying squadron. As before, the point scale was a 4-point scale ranging from 1 point for Most Important to 4 points for Least Important. In this vote, ten (10) individuals participated.

Collaboration Between Intra and Inter-LAN Planners Mean	
3.30	Provide ability to collaboratively view/edit routes in a tabular format.
3.30	Support video teleconference (VTC) capabilities.
2.70	Save the interaction of a collaborative session to an electronic format, including maintaining an interaction log.
2.10	Provide tools such as white-boards and chat rooms and email message capability.

2.00	Receive notification of electronic review/approval/validation of mission plans.
1.90	Perform mission preview (single and multiple missions) in a collaborative environment.
1.70	Collaborate in a secure environment across multiple secure levels.

ANALYSIS: The participants identified the ability to collaborate in a secure environment across multiple secure levels as their most pressing need. During open discussions prior to groupware sessions, the attendees repeatedly pointed to this capability as a critical needs, especially when dealing with special operations, joint and coalition forces. Mission preview/mission rehearsal/fly-throughs received the second best score. Closely following the preview capability were notifications of mission planning validation and other collaborative capabilities (i.e., whiteboards, chat rooms and email).

12.5 HUMAN SYSTEMS INTEGRATION (HSI)

Voting Key:

Participants were then asked to assess the human factors element of the collaborative mission planning process within the context of the demonstrated candidate collaborative mission planning capability. Participants could score their responses on a scale where Not Applicable (NA/1 point), Very Poor (VP/2 points), Poor (P/3 point), Fair (F/4 points), Adequate (A/5 points), Good (G/6 points), Outstanding (O/7 points). The nine (9) respondents to the questions
 Total number of voters (N): 9

HSI Mean		
1	5.78	How well did COMP ensure commands are consistent in their placement across multiple screens, panels, or windows; in their wording; and in their method of activation?
2	5.78	Please rate your overall impression of COMP. (i.e how well of a job does it do in enhancing your ability to perform your AOC mission). Please provide detailed feedback both positive and/or negative on how to enhance COMP. ANALYSIS: The impressions of CoMP were very high with three of nine rating it GOOD and three as OUTSTANDING.
3	5.56	How well did CoMP provide a user friendly interface? Please provide positive and/or negative feedback on its ability to interact with the operator. ANALYSIS: The respondents agreed that the interface presented was GOOD.
4	5.56	How well did CoMP contribute to a complete picture for mission planning? Please provide positive and/or negative feedback. ANALYSIS: The users viewed the ability to obtain a complete picture of mission planning as GOOD. In general, the respondents felt there was sufficient information available in the CoMP construct to effectively mission plan.
5	5.33	How well did COMP provide a consistent look /feel across its menus/windows/subcomponents? Was it easy to navigate? Please provide

		<p>positive and/or negative feedback.</p> <p>ANALYSIS: Responses to this question typically were that the CoMP provided a GOOD look and feel and was easy to navigate.</p>
6	5.33	<p>How well did COMP assist you in making informed decisions (How well did it help in your decision making process)?</p> <p>ANALYSIS: Participants were most divided on this question. The average score would reflect an AVERAGE to GOOD rating. However, responses generally fell on either the low end or the high end of the scale.</p>
7	5.11	<p>How well did the tools available to you in COMP present the information required for you to perform your tasks? Please provide positive and/or negative feedback.</p> <p>ANALYSIS: Most responded with AVERAGE to GOOD marks and comments were generally positive.</p>
8	4.78	<p>How often was essential information buried (e.g., blocked or obstructed by other windows or pop-ups)?</p> <p>ANALYSIS: The responses to this question ranged from FAIR to GOOD. Some participants desired a more user friendly cascading of information.</p>
9	4.67	<p>How well did COMP aid you in quickly locating necessary information? Please provide positive and/or negative feedback.</p> <p>ANALYSIS: The results were fairly evenly split between FAIR and GOOD.</p>
10	4.56	<p>How well did COMP help you to integrate information from multiple sources? Please provide positive and/or negative feedback.</p> <p>ANALYSIS: While this response received the overall lowest average score, the results are somewhat deceptive. Four of nine rated the ability to integrate as GOOD. Two lower end scores drove the overall average lower.</p>

Ballot Items in Original Order	
QUESTION: How well did CoMP contribute to a complete picture for mission planning? Please provide positive and/or negative feedback.	
ANALYSIS: The general consensus indicated that CoMP provides a significant increase in capability over the present methodologies and users would benefit from such a capability.	
QUESTION: How well did CoMP provide a user friendly interface? Please provide positive and/or negative feedback on its ability to interact with the operator.	
ANALYSIS: Those who responded to this question indicated CoMP is straightforward and easy to use. To maintain ease of use, respondents advised development should avoid any proprietary add-ins that could complicate the software operating procedures.	
QUESTION: How well did COMP provide a consistent look /feel across its menus/windows/subcomponents? Was it easy to navigate? Please provide positive and/or negative feedback.	
ANALYSIS: There were few responses to this question thereby eliminating a clear cut	

analysis. Comments included: "easy to navigate," request the implementation of a drop-down menu in place of a file menu, and incorporate a menu on PFPS to reflect all players available for collaboration.

QUESTION: How well did the tools available to you in COMP present the information required for you to perform your tasks? Please provide positive and/or negative feedback.

ANALYSIS: Analysis unavailable due to the lack of response.

QUESTION: How well did COMP help you to integrate information from multiple sources? Please provide positive and/or negative feedback.

ANALYSIS: Although there were only three responses to this question, the responses provide the following recommendations: incorporate a mission board for quick reference mission information and direct chat to a specified user.

QUESTION: How well did COMP ensure commands are consistent in their placement across multiple screens, panels, or windows; in their wording; and in their method of activation?

ANALYSIS: Analysis unavailable due to the lack of response.

QUESTION: How well did COMP aid you in quickly locating necessary information? Please provide positive and/or negative feedback.

ANALYSIS: Again, responses were extremely limited. One recommendation was made to incorporate timing information.

QUESTION: How often was essential information buried (e.g., blocked or obstructed by other windows or pop-ups)?

ANALYSIS: While there were only two responses to this question, the replies both mentioned pop-ups. The respondents differed on the modifications; however, they were both related to chat functionality.

QUESTION: How well did COMP assist you in making informed decisions (How well did it help in your decision making process)?

ANALYSIS: Analysis unavailable due to the lack of response.

QUESTION: Please rate your overall impression of COMP. (i.e., how well of a job does it do in enhancing your ability to perform your AOC mission). Please provide detailed feedback both positive and/or negative on how to enhance COMP.

ANALYSIS: The candidate version of CoMP almost unanimously received favorable reviews. Some commented they would take the software "as is." Most participants noted there were minor software bugs requiring repair and additional details to build in; however, the capability was highly desired by the attendees.

SECTION 13: WRAP UP

QUESTION: Who else should be involved/would be interested in following this initiative?

ANALYSIS: Responses were varied and included: unmanned aerial vehicle operators, special operations forces, other services, search and rescue, ground forces, support functions like maintenance, weather, and ISR assets. Several respondents requested a 'test run' in a semi-operational configuration. It was also recommended that a Beta version of the software be provided to select flying squadrons for evaluation in a limited flying experiment.

QUESTION: What other technologies are you aware of that have similar capabilities as CoMP?

ANALYSIS: One respondent identified Acrobat Connect by Adobe as the collaborative mission planning capability most comparable to the demonstrated CoMP capability. This respondent recommended it be evaluated against other CoMP candidates in the event that the collaborative mission planning concept is selected for technology transition. The same respondent also noted that the ability to collaborate between versions of PFPS and JMPS was outside the ability of other collaboration tools. This capability is the strength of CoMP.

CONCLUSION

The current state of mission planning communication between organizations and, in turn, operational-level planning visibility lacks in several aspects. Participants noted that the general lack of software application conformity between organizations hinders collaborative mission planning and presently no capabilities exist to bridge the various mission planning applications between both internal and external locations, regardless of the MDS. As a result, mission planners defer to telephonic and email point to point communications as their primary methods of mission planning. The lengthiness of the point to point collaborative mission planning process further contributes to a tendency to reduce or even abandon collaborative mission planning between units during peace and wartime operations.

A collaborative mission planning application would enable units to not only communicate internally between various applications, but also between units at disperse geographic locations. The machine-to-machine interface would reduce the numerous point to point communications and enable mission planners utilize the mission planning tools more effectively and efficiently during combat, contingency and surge operations.

The C2ISRB, upon thorough analysis of the responses from attendees at the Collaborative Mission Planning (CoMP) Warfighter Analysis Workshop (WAW), recommends the capability be given further consideration by the following:

- Mission Planning System Program Office for development and incorporation into the mission planning suite of tools and as a potential tie into the Air Operations Center (AOC) Weapon System (WS).
- A major command for further review and operational assessment.

Although the candidate software program from CTI Inc. was used for the CoMP WAW, the C2ISRB does not make any recommendations for this specific program, but rather for the ability to collaboratively mission plan. This ability would provide significant military utility at the tactical level, as well as the needed visibility at the operational level for situational awareness in a dynamic combat environment.