CHENNAULT EVENT #4, JOINT ALL DOMAIN OPERATIONS: INTEGRATED TASKING ORDER DESIGN AND EXECUTION AFTER ACTION REPORT

The first steps in the development of a truly integrated tasking process that effectively integrates and synchronizes all combat capabilities across all domains.

Abstract

This After Action Report captures exploration by the Air Force of the integration of combat capabilities across all domains. Employing the Stanford Design Thinking Model, the event participants visualized the problems that prevent integration. Employing the model process, the team developed three prototypes that will address some of the problems. This report describes the process and the prototypes.

Mr. Allen Moore, Air Force Lessons Learned, ivan.moore.4@us.af.mil

Executive Summary

Chennault Event 4, the latest of the Chennault series, took a different tack than the previous events to explore Joint All Domain Operations (JADO).[1] The first event, held in December 2019, sought to identify seams and shortfalls between current Air Force doctrine and the doctrine required for highly-integrated, effective JADO. The second event, held in February 2020, explored the doctrinal changes needed to better execute JADO targeting. Event 3, held in June 2020, focused on identifying doctrine changes needed to improve the integration of cyberspace capabilities into air operations. This event, held at the Curtis E. LeMay Center for Doctrine Development and Education and at distributed sites across the Air Force employed the Stanford Design Thinking Model to begin the creation of a viable integrated tasking order. The Doctrine Directorate of the LeMay Center was the sponsor for the event. Due to ongoing Coronavirus concerns in the Air Force, most of the participants contributed via voice and chat on the Commercial Virtual Remote (CVR) Environment[2]. The discussions were held at the unclassified level.

The Chennault Event 4, JADO: Integrated Tasking Order objective was to create a viable ITO for the joint force. But the event planners faced a hurdle. Previous events had brainstormed and identified ideas using traditional approaches. This Chennault needed to create something that does not currently exist. The DOD does not own or have access to a tool, method, or processes to synchronize and identify opportunities for cross-domain convergence effects in a JADO environment. So, the Chennault Planners looked outside the DOD community and selected the Stanford Design Thinking Process to aid the development of a novel integrated tasking order

[1]This is the fourth of a series of scheduled events that explore doctrinal changes needed to fully implement JADO in Air Force and joint operations. Contact Mr. Allen Moore, Curtis E. LeMay Center for Doctrine Development and Education, Air Force Lessons Learned Directorate, ivan.moore.4@us.af.mil to request the AARs for the first three events.

[2]The Department of Defense created the Commercial Virtual Remote (CVR) Environment to support the Department's move towards a large-scale telework posture in response to the COVID-19 national emergency. This new tool provides the DOD with enhanced collaboration capabilities for DOD teleworkers to facilitate continuity of operations throughout the duration of the emergency. The CVR Environment provides a central place for unclassified virtual collaboration. Capabilities include: Chat, Video, Virtual Meetings, Screen Share, Document Collaboration and Storage

(ITO). The LeMay Center's Strategy and Concepts Directorate led the employment of the methodology.

To empathize with fielded forces in a peer conflict trying to execute taskings under degraded communications conditions is difficult. The participants sought to visualize problems the leadership and fielded forces will have to overcome in order to command, communicate and execute all domain operations in an integrated fashion.

Out of the first two phases of the process, the participants generated nine problem sets.

1. **Differences in timelines for planning purposes in the various domains and the electro-magnetic spectrum.**
2. **Lack of education on what cyber, space and IO "can bring to the fight," which has been limited due to classifications and stovepipes.**
3. **Identify "sushi menu" for commander to choose from in planning.**
4. **Warfighters at all levels need to be educated and trained to enable JADO.**
5. **How might we better understand and mitigate the high classification of weapon system capabilities and their limitations for the JADO joint force organization in order to more efficiently employ all available military resources?**
6. **How might we synchronize the planning, execution and assessment activities of the air, space and cyber tasking cycles to ensure an integrated and mutually supported plan for joint operations?**
7. **How might we ensure continuity of communications from the strategic, operational and tactical level to ensure continued C2 of JADO forces to effectively operate in a contested or denied environment?**
8. **Enable the JFC to effectively conduct C2 across all domains so as to coordinate lethal and nonlethal effects across land, sea, air, space and cyberspace.**
9. **The JFC lacks an ability to design a plan that incorporates all-domain options and identifies the optimal combination of effects available in order to achieve strategic and operational objectives at the lowest possible cost in lives and treasure. The JFC lacks the ability to efficiently conceptualize how to employ JADC2 in order to timely inform, integrate and delegate authorities to forces so that all available platforms are employed to predict, achieve, synchronize and control cascading effects to support stakeholders while ensuring effective feedback mechanisms.**

They culled these down to the top 4 and from these they created three prototypes that can answer or mitigate the specific problems. Prototype #1 was *Education: JADO Cours*e. The prototype designers envisioned the Joint All-Domain Course to be a 100% company-grade attendance course on how the Air Force and Space Force contributes to the Joint fight across all domains, and includes highlights on mission-type capabilities (CAS, Cyber, Reconnaissance, Space, etc.) with additional JADO education expanding to other PME, such as the NCOA. It would be a 4-5

week course that is open to the sister services. Students would study Air Force and Space Force doctrine, joint doctrine and the tools necessary to perform a near-peer adversary threat assessment. The course would terminate with a practical warfighting exercise. Additional courses would be added at the field-grade and senior leader level

Prototype #2 was the *ITO Tasking Process*. The ITO would be published daily with tasking and purpose to direct the actions of a Joint Force Commander (JFC). The ITO encompasses eight days. All eight days would be published to provide the joint force guidance in the event communications are degraded. As the days moved from T-7 to T-0, the mission type orders became more specific, more detailed and more focused. If something broke communications, the daily ITO would provide guidance for the out days that forces would be able to act upon. In the out days, forces would assess their ability to provide the combat capability at the time and place desired, would begin to maneuver capabilities so as to be in place for the tasking, or if not able, provide feedback to the C2 organization. There would be a request for forces (RFF) function that the lower echelons can deliver to the All Domain Coordination Cell to enable whatever task is being presented. Within the C2 function (All Domain Operations Center or ADOC), there would be at least three joint service O-6s who stayed with the ITO around the clock as it moved from T-7 to T-0.[3] This design is similar to the football concept that has been discussed in earlier Chennault Events for the AOC. The purpose is to ensure continuity along the process so that the original strategic intent of the planners is not lost.

Prototype #3 is the *VOLTRON*. The *Variable Output Labeled and Tagged Rational Ontological Network* (VOLTRON) is a concept for a centrally located, distributively supported knowledge management network. The objective is to have a database managed as a wiki. VOLTRON would reside on TOP SECRET, SECRET (or SECRET RELEASABLE), and UNCLASSIFIED networks. Employing the concept of tearlining, the same entry resides on every network, just at a different classification level. Anyone on the networks could build or edit a wiki entry, however the designers envision a process where specific units and organizations are tasked with keeping the wiki entry up to date. VOLTRON is a collection of knowledge management sites that everyone has access to. It would maintain capability entries from the Air Force and Space Force, but equally important from the other services and USCYBERCOM. Coalition partners would be encouraged to provide and maintain their capabilities in VOLTRON. Threats would be identified as well as supporting functions such as airlift, tanker, medical and logistics. Tags would also identify if a SAP/STO capability that can affect a target (no details, just an icon and contact information for planning awareness at all levels). The entries would include capabilities of specific system as well as its vulnerabilities.

The purposes are multiple. One is education. If we want our Air Force and Space Force officers and NCOs to be informed about joint and coalition capabilities, it is not enough to send them to a class. There must be a central reference product that they can refer to after the course. Secondly, there needs to be central reference point that joint planners can go to that provides them with planner level information. VOLTRON could automatically fill in information in an ITO and could be linked to COPs and mission planning software. User-defined operational

[3]This would likely require at least 21 joint O-6s assigned to the football, since the process is ongoing 24 hours per day and seven days per week.

pictures that are customized to the knowledge and purpose of the user could be created. VOLTRON would improve COA development, support decision making, assist in the management of emerging threats and enable the ability to identify and act on opportunities in real-time.

Introduction

Chennault Event 4 took a different tack than the previous events to explore Joint All Domain Operations (JADO).[4] The first event, held in December 2019, sought to identify seams and shortfalls between current Air Force doctrine and the doctrine required for highly-integrated, effective JADO. The second event, held in February 2020, explored the doctrinal changes needed to better execute JADO targeting. Event 3, held in June 2020, focused on identifying doctrine changes needed to improve the integration of cyberspace capabilities into air operations. This event, held at the Curtis E. LeMay Center for Doctrine Development and Education and at distributed sites across the Air Force employed the Stanford Design Thinking Model to begin the creation of a viable integrated tasking order. The Doctrine Directorate of the LeMay Center was the sponsor for the event. Due to ongoing Coronavirus concerns in the Air Force, most of the participants contributed via voice and chat on the Commercial Virtual Remote (CVR) Environment[5]. The discussions were held at the unclassified level.

The Chennault Event 4, JADO: Integrated Tasking Order objective was to create a viable ITO for the joint force. But the event planners faced a hurdle. Previous events had brainstormed and identified ideas using traditional approaches. This Chennault needed to create something that does not currently exist. The DOD does not own or have access to a tool, method, or processes to synchronize and identify opportunities for cross-domain convergence effects in a JADO environment. So, the Chennault Planners looked outside the DOD community and selected the Stanford Design Thinking Process to aid the development of a novel integrated tasking order (ITO). The LeMay Center's Strategy and Concepts Directorate led the employment of the methodology.

---

[4]This is the fourth of a series of scheduled events that explore doctrinal changes needed to fully implement JADO in Air Force and joint operations. Contact Mr. Allen Moore, Curtis E. LeMay Center for Doctrine Development and Education, Air Force Lessons Learned Directorate, ivan.moore.4@us.af.mil to request the AARs for the first three events.

[5]The Department of Defense created the Commercial Virtual Remote (CVR) Environment to support the Department's move towards a large-scale telework posture in response to the COVID-19 national emergency. This new tool provides the DoD with enhanced collaboration capabilities for DoD teleworkers to facilitate continuity of operations throughout the duration of the emergency. The CVR Environment provides a central place for unclassified virtual collaboration. Capabilities include: Chat, Video, Virtual Meetings, Screen Share, Document Collaboration and Storage

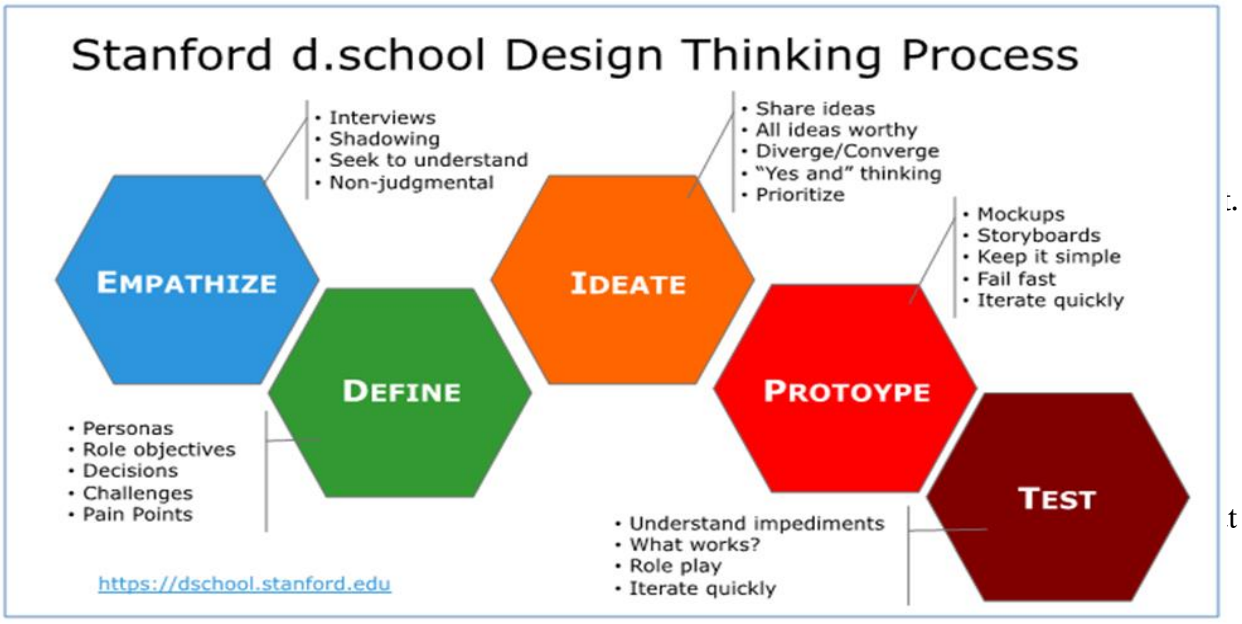


Figure 1: The Stanford Design Thinking Process

Using the Stanford process, it was recognized that the event will not capture a complete ITO. Instead the tool takes the team in baby steps toward the final product. It was believed that this method invites exploration to determine the real problem, facilitates creative and critical consideration of potential solutions and provides iterative prototyping and testing of simple components to final solution. The process has the potential to save time and money. The process is relatively quick and simple, employs testing early which identify and allow for minor failures before any commitment of resources and expenditures are made. The participants of the workshop were directed to look at the problem from a joint perspective, not limited to just the domains the Air Force operates in.

The event lasted four days. For the first two days, 24 and 25 August, the participants were tasked to conduct the empathy, define and ideate phases of the Stanford process. To cap the ideate phase, they selected the best problem statements from which prototypes could be developed. On 27 and 28 August, the LeMay participants created JADO prototypes. On 1 September, the prototypes were presented to all the participants for feedback. On 14 September, the event and the resulting prototypes were out briefed to the LeMay Center Commander and senior staff.

STANFORD DESIGN THINKING PROCESS:

EMPATHY AND DEFINE PHASES

To empathize with fielded forces in a peer conflict trying to execute taskings under degraded communications conditions is difficult. The participants sought to visualize problems the leadership and fielded forces will have to overcome in order to command, communicate and execute all domain operations in an integrated fashion. One problem identified was the transmission of targeting information to the fielded forces for execution. The loss of secure communications in the field is very damaging to JADO. The fielded forces require a shared understanding of terms. For example, even the non-kinetic effect (NKE) domains such as cyber and space talk to themselves in lethal terms. If systems were built that recognized more adroit terminology, such as deny, deceive, disrupt, degrade and destroy, then the joint force would be more capable to employ multiple domains in an integrated form and courses of action (COAs) would be more nuanced, the participants noted the vulnerability of satellite communications and the need for backup capabilities.

Some discussed the lack of a common mission control capability between the different domains and the lack of an omnipresent view of operations. They also discussed common operating pictures (COPs). It was expressed that the COP for leadership should display differently than the COP for lower echelons. How are the various domains such as information operations, space, and cyber mapped? Maybe thinking of a COP as a map is too limiting in the multi-domain world we desire to operate in.

They discussed at what level an ITO should reside. There was no consensus and the level at which the ITO is generated needs further analysis. They also asked themselves what an ITO should look like. The current Air Tasking Order (ATO) is not broken. It is a well-proven process, although space and cyberspace capabilities are not well represented, requiring supplemental and independent tasking processes. However, it can be inflexible, especially in the time horizon. It was suggested that an ITO could consist of measures of performance (MOPs). The timelines of the various domains, appropriate authorities and level of clearances all need to be accounted for. The different time frames between the different domains makes coordinating and implementing a NKE much more difficult than a kinetic one. There was disagreement as to which was more difficult for NKE, the various timelines or the authorities required. Either way, these two complications makes bringing in all the domains under a single ITO very difficult.

There was a discussion with respect to mission type orders (MTOs). What should they look like to be successful in a communications-degraded environment? If the objective of JADC2 is to synchronize and converge multiple effects across multiple domains at the time and location of the JFC's choosing, what would MTOs cover and who would develop them?

There needs to a common vernacular, understood by forces from all domains.

There was discussion of the current supported/supporting relationship between forces. Is the construct too limiting for forces operating in a degraded communications environment? There was disagreement as to whether the echelons below a commander are too many or whether the "connective tissue" was damaged. It was noted that the Army still operates with multiple command echelons. Army C2 elements understand how to write strategic and operational guidance and translate it to tactical execution. The different tasking mechanisms for the different domains (Air Tasking Order (ATO), Combined Space Tasking Order (CSTO), Cyber Tasking Order (CTO) and others are all the mechanism to articulate strategy to task from commanders to supporting organizations. They all require additional coordination and planning to be fully implemented. All this comes down to who has the authority to task another organization. If you put all those taskings under one commander, you have the makings of an ITO. However, that would require radical change from the current US military command structure.

There was debate in one team as to whether networks should be trusted or not. "Trusted" was defined in the sense the end user must trust the information he is receiving is legitimate. Another suggested that each node in the network must be treated as hostile until validated. It was noted that people fail to understand that only commanders can accept or reject risk. Fielded forces are to do as directed. By the time a tasking or guidance has been provided, risk has already been assessed. Same is true for networks. The commanders decide what level of trust to assign to a particular network.

The creation of an ITO will impact the Advanced Battle Management System (ABMS) currently under development. These two developments cannot be done in isolation from each other.

The ITO will fare best in a centralized control decentralized execution (CCDE) environment. Need to stop tasking tasks. Instead we should task objectives, provide risk, timing and tempo guidance. The orders should identify any left and right boundaries as well. A useful ITO will be "decomposable" into many forms. For example, you should be able to pull an ATO out of an ITO. You should be able to do this in multiple formats. For example, having the ability to generate an ITO in the United States Message Text Format (USMTF) allows it to link to legacy systems. In the future, machine-to-machine communication is probably hampered by Asynchronous Serial Communications Interface (ASCI) text. Other formats to include Extensible Markup Language (XML) are better for this type of operation.

Can artificial intelligence (AI) approach an understanding of the human will in warfare? It was noted that DARPA and BAE are working on a COA development tool to assist planners in the AOC. Developing COAs appears to be one area where AI could assist. Leveraging AI is vital to bridge the gap between the current joint targeting process and the decision speed necessary to execute dynamic all-domain targeting. It was thought that anything new (such as AI) would

have to be backwards compatible. In order to do that, the joint force must develop data standards as doctrine.

For rapid integration into a tasking order, domain subject matter experts (SMEs) have to be inserted into the ITO development and execution cycle. USCYBERCOM and USSPACECOM need other domain SMEs in their operations center as well.

One dilemma the ITO should resolve is the disconnect between fires and maneuver. The ITO can demand an effect against a target, both lethal and nonlethal, but if the capability has not been maneuvered so as to be able to generate the effect, the task is for naught. It was also noted, at least for the Air Force, that a disconnect exists between the logistics community and taskings. The ATO is not currently sent to logistics organizations.

The Army builds a robust primary alternate contingency emergency plan (PACE) to ensure transmission redundancy of orders. If we do go to a joint tasking process, the dissemination of targets across multiple services is problematic.

Understanding command relationships between components, the various functional and geographic commands is problematic. They are usually not clear. Understanding the difference between operational control (OPCON) and tactical control (TACON) is sometimes difficult for fielded forces. Just knowing what authority a C2 operations center such as an AOC has can be unclear. This is especially true for space and cyber capabilities but also for joint fires. A team asked what the role was for supported and supporting relationships in an AOC. Doctrinally, supporting forces must flex to meet the supported forces battle rhythm. Failure damages the integration of effects and may severely set back a campaign.

An ITO would have to successfully navigate organization, classification and multiple commander boundaries to be capable to control operations across all domains. Adding partner nations complicates the tasking order even further. And a lot of functions, especially in space, the logistics community and air mobility are performed by commercial entities. Are there actions controlled via the ITO? In the space AOR there is a Title 10 versus Title 50 divide, which makes control more difficult. USCYBERCOM has a similar dilemma.

Managing scarce capabilities in order to synchronize and integrate effects is extremely challenging. The bigger the ITO gets, the more difficult to sync and integrate capabilities. Being able to set and communicate priorities so that capabilities are matched with the most important effects are vital for an ITO to be successful.

Whatever is developed, relationships, experience and subject matter experts will drive success. Unity of effort will fill the gaps where unity of command breaks down. It also covers for failure to clearly define and communicate command relationships.

STANFORD DESIGN THINKING PROCESS:

IDEATE PHASE

Out of the first two phases of the process, the participants generated nine problem sets and identified possible solutions. In no particular order, they are listed below.

1. **Differences in timelines for planning purposes in the various domains and the electro-magnetic spectrum.**
    1. Possible Solution: Streamline tasking cycle to allow flexibility. Model ATO cycle so that in incorporates all domains.
2. **Lack of education on what cyber, space and IO "can bring to the fight," which has been limited due to classifications and stovepipes.**
    1. Possible Solution: Create Centers of Excellence (based on the Global Strike Command Stand-Off Munitions Application Center (SMAC)).
    2. Possible Solution: Push cyber, space, intelligence, information operations, bomber, fighter, tanker 200 and 300 courses as badge awarding courses.
3. **Identify "sushi menu" for commander to choose from in planning.**
    1. Possible Solution: Use similar approach to Special Technical Operations; create operations plan standardized list of capabilities. Documents should be stored at the correct classification level.
4. **Warfighters at all levels need to be educated and trained to enable JADO.**
    1. Possible Solution: Re-design Squadron Officers School (SOS) to be focused on "how the Air Component Employs Forces" similar to Army, Navy and Marine company-grade officer professional military education (PME). Focus should be on creating basic mission qualified officers ready for positions in the Air Operations Center (AOC). Course focus should be AOC process, pieces and capabilities. Should provide an academic environment for exploring nontraditional tactics, techniques and procedures (TTPs).
    2. Possible Solution: Design a course that is either combined or synchronized with the Noncommissioned Officer (NCO) Academy.

5. **How might we better understand and mitigate the high classification of weapon system capabilities and their limitations for the JADO joint force organization in order to more efficiently employ all available military resources?**
    1. Possible Solution: Lower capability classifications
    2. Possible Solution: Broaden access to information by developing more comprehensive classification guides.
6. **How might we synchronize the planning, execution and assessment activities of the air, space and cyber tasking cycles to ensure an integrated and mutually supported plan for joint operations?**
    1. Possible Solution: Improve data sharing capabilities of existing systems.
    2. Possible Solution: Explore the best way to employ mission-type orders effectively.
    3. Possible Solution: Create an ITO that provides menu-type actions.
    4. Possible Solution: Employ the power of AI
7. **How might we ensure continuity of communications from the strategic, operational and tactical level to ensure continued C2 of JADO forces to effectively operate in a contested or denied environment?**
    1. Possible Solution: Develop and maintain alternate communication paths.
    2. Possible Solution: Develop and distribute interoperable communications equipment across the force.
    3. Possible Solution: Develop and maintain a PACE plan that is standardized across the force.
    4. Possible Solution: Rely on mesh networks when available.
8. **Enable the JFC to effectively conduct C2 across all domains so as to coordinate lethal and nonlethal effects across land, sea, air, space and cyberspace.**
    1. Possible Solution: Propel ABMS development.
    2. Possible Solution: Bolster non-kinetic integration by building a catalog of non-kinetic effects at the SECRET/RELEASABLE or TOP SECRET level.
    3. Possible Solution: Develop disposable non-kinetic capabilities for use in current training and exercises.
9. **The JFC lacks an ability to design a plan that incorporates all-domain options and identifies the optimal combination of effects available in order to achieve strategic and operational objectives at the lowest possible cost in lives and treasure. The JFC lacks the ability to efficiently conceptualize how to employ JADC2 in order to timely inform, integrate and delegate authorities to forces so that all available platforms**

are employed to predict, achieve, synchronize and control cascading effects to support stakeholders while ensuring effective feedback mechanisms.

1. Possible Solution: Synchronized JADO planning.
2. Possible Solution: Stand up a Joint All Domain Planning Center that mirrors how STO planning is done today.
3. Possible Solution: Standardize products across all domains.
4. Possible Solution: Develop an effects-based ITO.
5. Possible Solution: Develop distributed JADO C2.
6. Possible Solution: Insert JADO integration experts at each echelon.
7. Possible Solution: Improve and make resilient situational awareness for resource allocation within the C2 organization.
    1. Sub-Solution: Develop an ITO that directs the employment of existing capabilities efficiently and effectively

After the participants developed the problem sets, they were asked to vote on which ones showed the most potential in achieving integrated effects, regardless of the cost, how disruptive it is to current operations, and difficulty to achieve? 34% choose problem set #9. From that the LeMay Center personnel developed VOLTRON. 32% of the participants chose problem set #7. In response, the ITO Tasking Design was created.

Then the participants were asked to assess which problem sets could be implemented today and provide maximum capability and minimum impact. 50% of the participants chose problem sets #4 and #9. In response an Education prototype was developed to address problem set #4. As noted in the previous paragraph, VOLTRON was the designed prototype to solve or mitigate problem #9. The three prototypes are described in the next sections.

PROTOTYPE #1: EDUCATION

JADO COURSE

Currently the Air Force officer education model, with a few exceptions, allows officers to develop tactical proficiency in their weapon system before applying education to broaden their level of knowledge and understanding beyond the tactical level. Exceptions are company-grade officers who are assigned to weapon instructor courses, AOCs or a staff. The prototype designers envision a tiered education, offering JADO courses at the company-grade, field-grade and senior leader level.

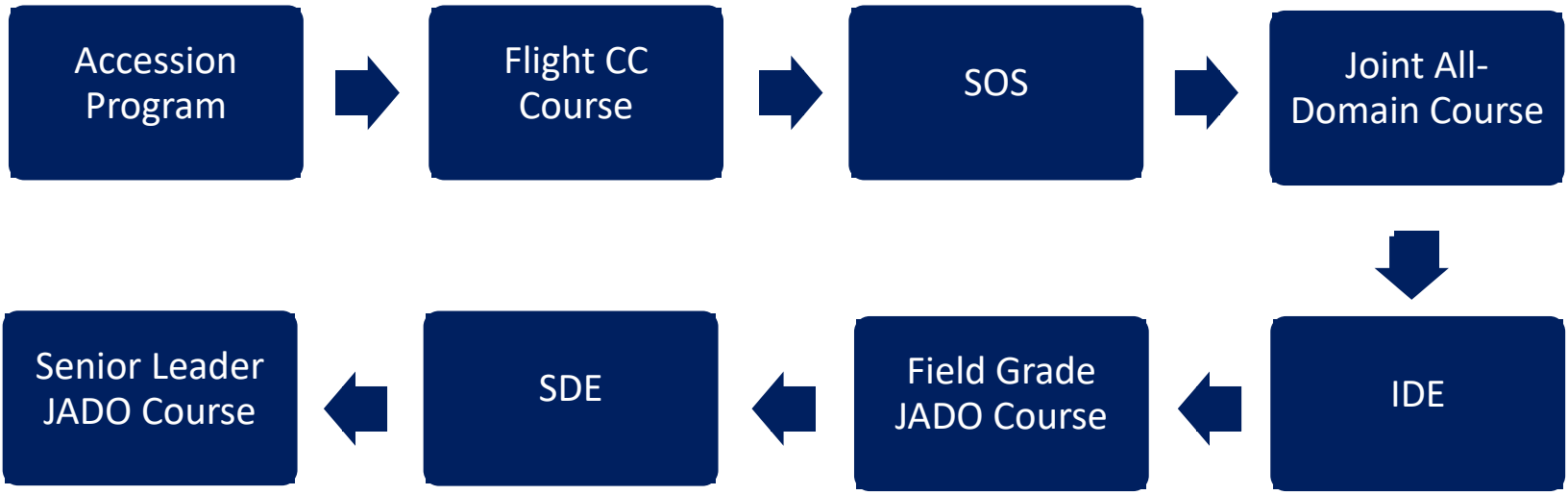


Figure 2: Proposed Air Force Officer Education Model

The prototype designers envisioned the Joint All-Domain Course to be a 100% attendance course on how the Air Force and Space Force contributes to the Joint fight across all domains, and includes highlights on mission-type capabilities (CAS, Cyber, Reconnaissance, Space, etc.) with additional JADO education expanding to other PME, such as the NCOA. It would be a 4-5 week course that is open to the sister services. Students would study Air Force and Space Force doctrine, joint doctrine and the tools necessary to perform a near-peer adversary threat assessment. The course would terminate with a practical warfighting exercise. Additional

courses would be added at the field-grade and senior leader level as shown in Figure 2. The designers have not yet identified the objectives for the upper-level courses.

This prototype attempts to mitigate the concerns addressed in problem set #2, **lack of education on what cyber, space and IO "can bring to the fight," which has been limited due to classifications and stovepipes**. Under the Stanford Design Thinking Process, this prototype now resides in the testing phase. It will possibly require modifications. If not feasible or it's determined during testing that it does not sufficiently mitigate the problem, the designers will develop a new prototype based on the lessons observed during the testing of this prototype.

PROTOTYPE #2:

ITO TASKING DESIGN

The prototype designers had to start from scratch. What does an effective ITO process look like? No one has ever developed a tasking order that incorporated all domains and all the commanders, geographic and functional. The designers envisioned an inverted hurricane model process that provided mission-type guidance across an eight-day cycle.

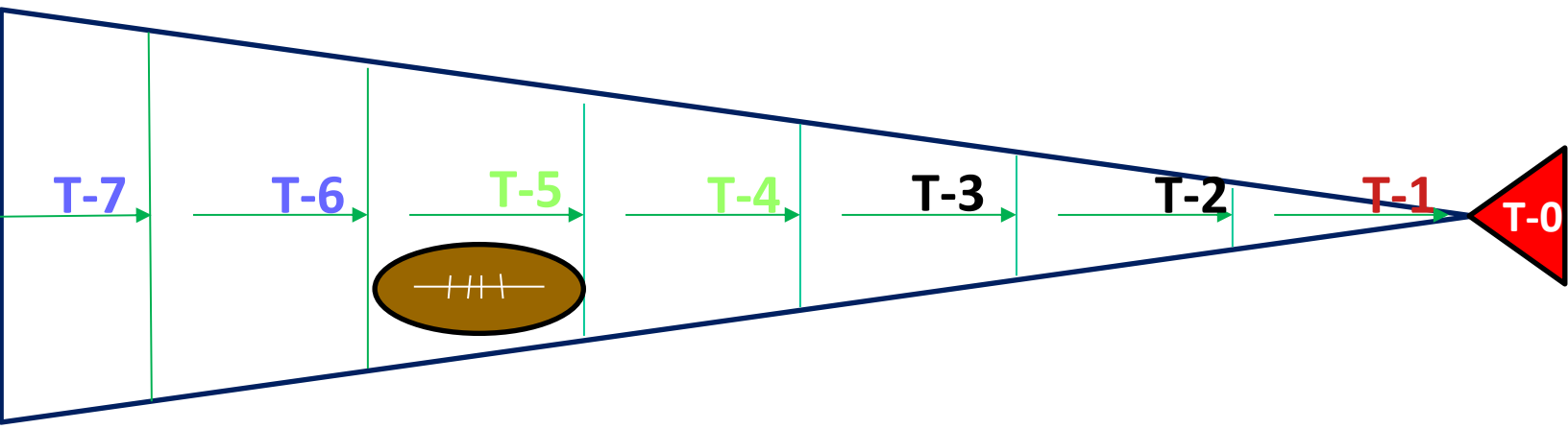


Figure 3: Eight-day ITO process model (with football)

The ITO would be published daily with tasking and purpose to direct the actions of the joint task force (JTF), geographic combatant commanders and functional combatant commanders. All eight days would be published to provide the joint force guidance in the event communications are degraded. As the days moved from T-7 to T-0, the mission type orders became more specific, more detailed and more focused. If something broke communications, the daily ITO would provide guidance for the out days that forces would be able to act upon. In the out days, forces would assess their ability to provide the combat capability at the time and place desired, would begin to maneuver capabilities so as to be in place for the tasking, or if not able, provide feedback to the C2 organization. There would be a request for forces (RFF) function that the

lower echelons can deliver to the All Domain Coordination Cell to enable whatever task is being presented. Within the C2 function (All Domain Operations Center or ADOC), there would be at least three joint service O-6s who stayed with the ITO around the clock as it moved from T-7 to T-0.[6] This design is similar to the football concept that has been discussed in earlier Chennault Events for the AOC. The purpose is to ensure continuity along the process so that the original strategic intent of the planners is not lost.

As the tasking moves forward, each day the C2 becomes more finely tuned. At the same time, the delegation of authority broadens the earlier the tasking sits in the process. When the taskings are at T-1, most of those authorities are returned to the ADOC, where the command will be executed. The point is to ensure that authorities and guidance are aligned to allow for the fog of war and degraded communications.

In parallel, the ADOC planners are continuously analyzing battle-damage assessments, battle hit assessments, intelligence and adversary's actions in order to fine-tune the ITO to reflect the latest situation.

The designers envision the ITO being published as mission type orders, providing who, what, when, where and why for the taskings. Tasking execution would reside at the lowest possible level. That level would be identified in the ITO. The designers envisioned the execution level would be a joint mission commander.

One requirement the ITO will need is a current database of frequencies and other communication methods that enable the ADOC to contact echelon forces and supporting organizations. This may require a system that can automatically identify open communication networks.

The ITO Tasking Design prototype was designed in response to problem set #7, **how might we ensure continuity of communications from the strategic, operational and tactical level to ensure continued C2 of JADO forces to effectively operate in a contested or denied environment.** As prescribed by the Stanford Design Thinking Process, this prototype now resides in the testing phase for further testing and modifications.

[6]This would likely require at least 21 joint O-6s assigned to the football, since the process is ongoing 24 hours per day and seven days per week.

PROTOTYPE #3:

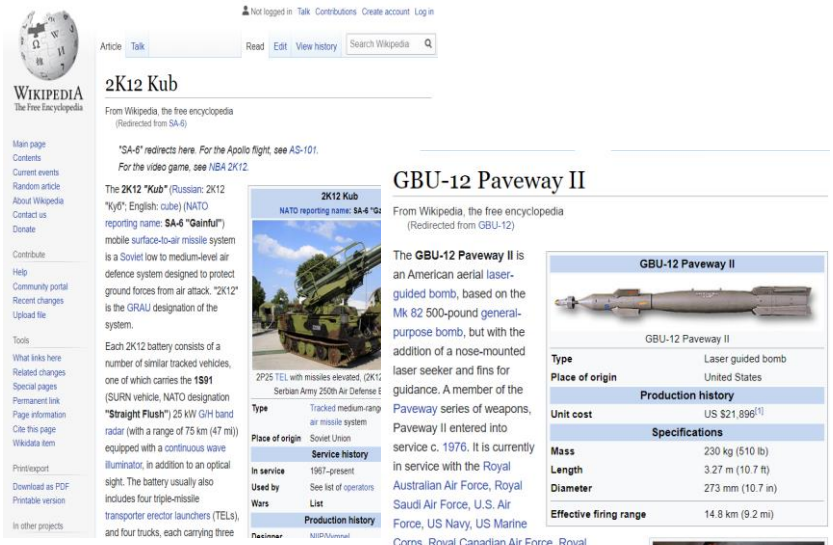
VOLTRON

The Variable Output Labeled and Tagged Rational Ontological Network (VOLTRON) is a concept for a centrally located, distributively supported knowledge management network. The objective is to have a database managed as a wiki. VOLTRON would reside on TOP SECRET, SECRET (or SECRET RELEASABLE), and UNCLASSIFIED networks. Employing the concept of tearlining, the same entry resides on every network, just at a different classification level. Anyone on the networks could build or edit a wiki entry, however the designers envision a process where specific units and organizations are tasked with keeping the wiki entry up to date.

The purpose is to develop knowledge management sites that everyone has access to. VOLTRON would maintain capability entries from the Air Force and Space Force, but equally important from the other services and USCYBERCOM. Coalition partners would be encouraged to provide and maintain their capabilities in VOLTRON. Threats would be identified as well as supporting functions such as airlift, tanker, medical and logistics. The entries would include capabilities of specific system as well as its vulnerabilities. Because VOLTRON is one system, it will be easy to do searches. For example, which systems are vulnerable to an SA-6? Or which platforms can deliver a GBU-12? The systems and vulnerabilities should identify both kinetic and non-kinetic capabilities, vulnerabilities and support. Each entry should describe how the capability is delivered, how it maneuvers and how it is usually packaged with other capabilities,

The purposes are multiple. One is education. If we want our Air Force and Space Force officers and NCOs to be informed about joint and coalition capabilities, it is not enough to send them to a class. There must be a central reference product that they can refer to after the course. That is the role VOLTRON performs. Secondly, there needs to be central reference point that joint planners can go to that provides them with planner level information. See figure 4 as an example. VOLTRON could automatically fill in information in an ITO about capabilities, targets and vulnerabilities. If allowed, it could identify that there are SAP and STO capabilities (use a lock and key symbol, for example). In addition, VOLTRON could be linked to COPs and mission planning software. The goal can be the creation of user-defined operational pictures that are customized to the knowledge and purpose of the user.

If done properly and on an enterprise level, VOLTRON could serve as the basis for AI to enable planners and speed up the planning cycle, thus shortening the joint force planners observe, orient, decide and act cycle and providing a significant operational advantage over a peer adversary. VOLTRON would improve COA development, support decision making, assist in the management of emerging threats and enable the ability to identify and act on opportunities in real-time.



<u>Vulnerabilities:</u>

Kinetic:

GBU-12

JAASM

Non-Kinetic:

See SIPR

############

See JWICS

<u>Delivery Platforms:</u>

F-15E

B-1B

B-52

<u>Vulnerabilities:</u>

Kinetic:

SA-6

Figure 3: VOLTRON examples

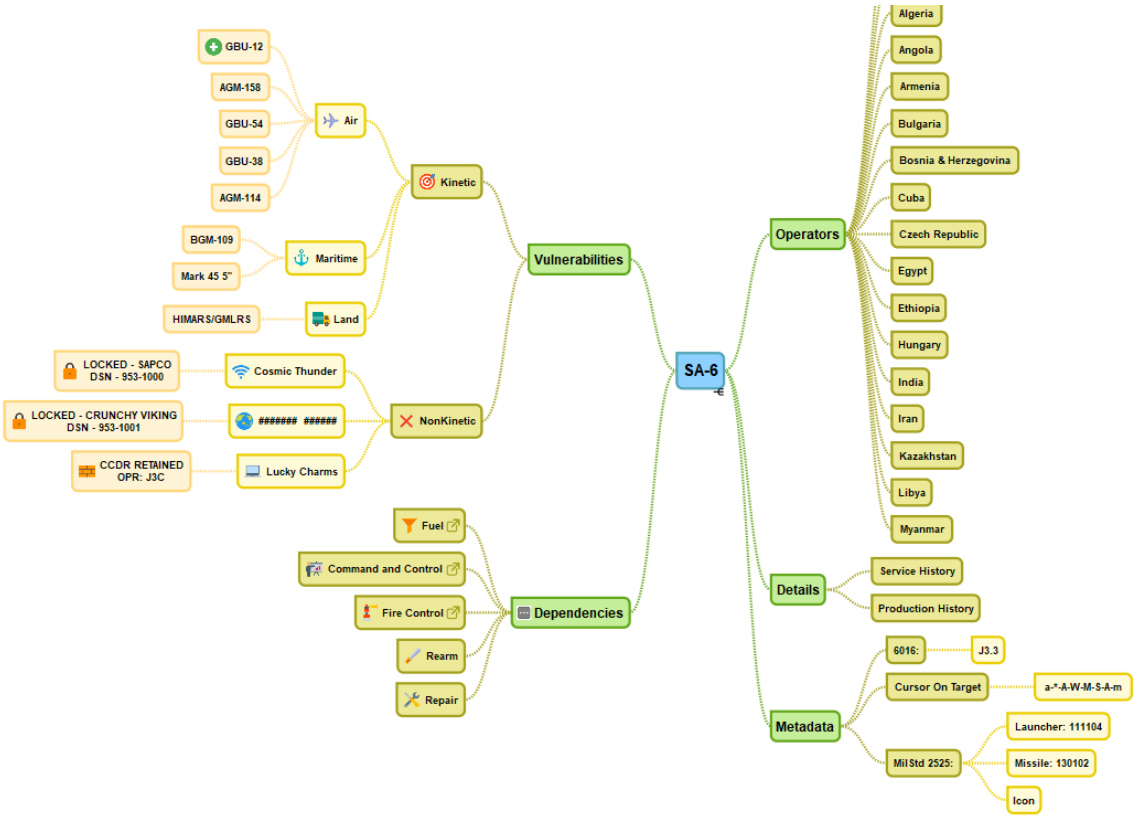


Figure 4: Example of VOLTRON as a planning tool

Way Ahead

Chennault 4 was the fourth in a series of events intended to inform future JADO doctrine. This event stepped away from the AOC and the specific domains to pursue the development of tools to enable JADO. The three prototypes created will require further testing and modification. They will have to be handed off to an organization better able to further development and convert the concept from prototype to a real system. All lessons will culminate in a major wargame during the summer of 2021.