

NDIA

AT THE HEART
OF THE MISSION



2021 JADC2 & ALL DOMAIN WARFARE SYMPOSIUM

Putting the Joint in JADC2, Are We There Yet?

July 12 — 14, 2021 | [NDIA.org/JADC2](https://ndia.org/JADC2) | College Station, TX

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NDIA

WHO WE ARE

The National Defense Industrial Association is the trusted leader in defense and national security associations. As a 501(c)(3) corporate and individual membership association, NDIA engages thoughtful and innovative leaders to exchange ideas, information, and capabilities that lead to the development of the best policies, practices, products, and technologies to ensure the safety and security of our nation. NDIA's membership embodies the full spectrum of corporate, government, academic, and individual stakeholders who form a vigorous, responsive, and collaborative community in support of defense and national security. For more than 100 years, NDIA and its predecessor organizations have been at the heart of the mission by dedicating their time, expertise, and energy to ensuring our warfighters have the best training, equipment, and support. For more information, visit NDIA.org

THE TEXAS A&M UNIVERSITY SYSTEM

WHO WE ARE

The Texas A&M University System is one of the largest systems of higher education in the nation with a budget of \$6.3 billion. The System is a statewide network of 11 universities; a comprehensive health science center; eight state agencies, including the Texas Division of Emergency Management; and the RELLIS Campus. The Texas A&M System educates more than 151,000 students and makes more than 22 million additional educational contacts through service and outreach programs each year. System-wide research and development expenditures exceeded \$1 billion in FY 2019 and helped drive the state's economy.

SCHEDULE AT A GLANCE

MONDAY, JULY 12

General Session

Century Ballroom
12:00 - 5:25 pm

Opening Reception

Brazos - Proper Texas Kitchen
5:30 - 6:30 pm

TUESDAY, JULY 13

General Session

Annenberg Presidential Conference Center
8:00 am - 5:15 pm

Reception

Century Ballroom
5:15 - 6:30 pm

WEDNESDAY, JULY 14

General Session

Annenberg Presidential Conference Center
9:00 am - 1:05 pm

WELCOME TO JADC2 & ALL DOMAIN WARFARE SYMPOSIUM

On behalf of the NDIA Cyber-Augmented Operations Division and the Texas A&M University System, we welcome you to our second annual symposium exploring the development and future evolution of the Joint All Domain Command and Control (JADC2) capability. Over the course of the symposium, visionary commanders, innovators and decision makers from across the Services and the Joint community, along with industry's dynamic thought leaders, will review the progress being made to operationalize the JADC2 concept, design, architecture and technology.

The 2021 JADC2 event builds on the results of last year's inaugural symposium, the legacy of NDIA's concentration on Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) as well as joint operations and the evolution of the technologies enabling both concepts.

The hybrid model of the symposium enables us to broadcast the first day's events at an unclassified level to expand its reach to our government and industry partners. The second and third days will be conducted in person and at a classified level. Keynote addresses and panel presentations will include industry leaders and our senior Service leaders who will address progress toward achieving the joint vision for JADC2, experimentation associated with JADC2, core enabling technologies, and potential applications for JADC2 in the joint force.

We are pleased that you are joining us to advance the JADC2 dialogue. We—along with the passionate group of NDIA professionals, volunteers from the Texas-Oklahoma Lone Star Chapter as well as the leadership, faculty, and staff of the Texas A&M University System—hope you will both contribute to and learn from this symposium today, tomorrow, and into the future!

Guy Walsh

*Chair, Cyber-Augmented Operations Division, NDIA
Executive Director, National Security Collaboration Center*

Stephen Cambone

*Associate Vice Chancellor for Cybersecurity Initiatives and
Professor of Practice, Texas A&M University System*

GET INVOLVED

Learn more about NDIA's Divisions and how to join one at [NDIA.org/Divisions](https://www.ndia.org/Divisions)

LEADERSHIP AND COMMITTEES

Guy Walsh

Division Chair

Jim Keffer

Subcommittee Chair

CYBER-AUGMENTED OPERATIONS

WHO WE ARE

The Cyber-Augmented Operations (CAO) Division harnesses the power of cyber-related technologies to deliver speed and automation to create both tactical and operational advantages in military operations. The Division brings industry and government executives together to address pressing policy, technology, and budgetary matters to ensure the incorporation of CAO capabilities into the military and national security enterprises. In periodically sponsoring symposia, seminars, workshops, and executive breakfast meetings, the Division identifies and mitigates challenges confronting combatant commands and military services. Interested in joining or volunteering with the NDIA Cyber-Augmented Operations Division? Click [here](#) for more information.

ENABLING CJADC2 FROM CONCEPT TO REALITY



Connect, collaborate and rapidly innovate for any mission

As the battlespace becomes increasingly connected, we're driving breakthroughs and advancing solutions that keep warfighters ahead of the fight. Collins Aerospace delivers secure communications, assured PNT and intelligent manned and unmanned systems for increased collaboration and situational awareness. Through our resilient networks, open systems architecture and sophisticated sensors, we can quickly accommodate Combined Joint All-Domain Command & Control (CJADC2), keeping forces safer, more secure and more informed.

CONNECTING THE
BATTLESPACE

AEROSPACE REDEFINED

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EVENT INFORMATION

LOCATION

Unclassified Venue

Texas A&M Hotel and Conference Center
177 Joe Routh Blvd
College Station, TX 77840

Classified Venue

Annenberg Presidential Conference Center
1002 George Bush Drive West
College Station, TX 77843

WIFI

Hotel WiFi Password: GigemTime2021

ATTIRE

Civilian: Business
Military: Uniform of the Day

SURVEY AND PARTICIPANT LIST

You will receive via email a survey and list of participants (name and organization) after the conference. Please complete the survey to make our event even more successful in the future.

EVENT CONTACT

Andrew Peters, Meeting Manager
(703) 247-2572 | apeters@NDIA.org

Carizza Gutierrez, Manager, Divisions
(703) 247-2599 | cgutierrez@NDIA.org

HARASSMENT STATEMENT

NDIA is committed to providing a professional environment free from physical, psychological and verbal harassment. NDIA will not tolerate harassment of any kind, including but not limited to harassment based on ethnicity, religion, disability, physical appearance, gender, or sexual orientation. This policy applies to all participants and attendees at NDIA conferences, meetings and events. Harassment includes offensive gestures and verbal comments, deliberate intimidation, stalking, following, inappropriate photography and recording, sustained disruption of talks or other events, inappropriate physical contact, and unwelcome attention. Participants requested to cease harassing behavior are expected to comply immediately, and failure will serve as grounds for revoking access to the NDIA event.

EVENT CODE OF CONDUCT

NDIA's Event Code of Conduct applies to all National Defense Industrial Association (NDIA), National Training & Simulation Association (NTSA), and Women In Defense (WID) meeting-related events, whether in person at public or private facilities, online, or during virtual events. NDIA, NTSA, and WID are committed to providing a productive and welcoming environment for all participants. All participants are expected to abide by this code as well as NDIA's ethical principles and practices. Visit [NDIA.org/CodeOfConduct](https://www.ndia.org/CodeOfConduct) to review the full policy.

REAL-TIME CROWD-SOURCED Q&A



Sli.do is an audience engagement platform that allows users to crowd-source top questions to drive meaningful conversations and increase crowd participation. Participants can up-vote the questions they would most like to hear discussed. Simply tap the thumbs-up button to up-vote a question. Top questions are displayed for the moderator and speaker to answer. Ask your question in sessions by going to Sli.do.com!

Event code: #JADC2

MOBILE APP



Make the most of your attendance at JADC2 2021 with the NDIA Events mobile app, available on the App Store for Apple devices and Google Play for Android devices. Simply search, "NDIA Meetings" to find and download the NDIA Events app for free. With it, you will have 24/7 access to an activity feed, speaker listings, sponsor information, Slido, and venue maps. Be sure to accept push notifications so that you can receive the most up-to-date information regarding any changes to the conference agenda.

AGENDA

SUNDAY, JULY 11

4:00 – 6:00 pm

All times are in CDT

REGISTRATION

CENTURY BALLROOM PREFUNCTION

Sponsored by 

MONDAY, JULY 12 – UNCLASSIFIED SESSIONS

8:00 am – 6:00 pm

REGISTRATION

CENTURY BALLROOM PREFUNCTION

Sponsored by 

8:00 – 11:00 am

TEXAS A&M TOURS & PRESENTATIONS

VARIOUS CAMPUS LOCATIONS

12:00 – 12:10 pm

WELCOME REMARKS

CENTURY BALLROOM

Dr. John Hurtado

Interim Vice Chancellor of Engineering, Texas A&M University System, Interim Dean of Engineering, Texas A&M University

12:15 – 1:00 pm

OPENING KEYNOTE

CENTURY BALLROOM

Gen Hawk Carlisle, USAF (Ret)

President & CEO, National Defense Industrial Association

Moderator

Lt Gen S. Clinton Hinote, USAF

Deputy Chief of Staff for Strategy, Integration and Requirements, U.S. Air Force

Virtual

1:05 – 2:05 pm

USINDOPACOM: CONCEPT OF OPERATIONS

CENTURY BALLROOM

Gen Hawk Carlisle, USAF (Ret)

President & CEO, National Defense Industrial Association

Moderator

Lt Gen Michael Minihan, USAF

Deputy Commander, US Indo-Pacific Command

Virtual

2:05 – 2:25 pm

NETWORKING COFFEE BREAK

CENTURY BALLROOM PREFUNCTION

2:25 – 3:25 pm

HOW INDUSTRY CAN ACCELERATE MULTI-DOMAIN OPERATIONS

CENTURY BALLROOM

Gen Hawk Carlisle, USAF (Ret)

President & CEO, National Defense Industrial Association

Moderator

Frank St. John

Chief Operating Officer, Lockheed Martin

3:30 – 4:30 pm

CONGRESSIONAL PERSPECTIVE

CENTURY BALLROOM

Jim Keffer

Director, Cyber, Lockheed Martin

Moderator

Representative Seth Moulton (D-MA)

U.S. Representative for Massachusetts, 6th District

Virtual

4:35 – 5:20 pm

CLOSING KEYNOTE

CENTURY BALLROOM

Patricia Baumhart

Director, NDIA Lone Star Chapter & VP Business Development, National Security Corporation

Moderator

Lt Gen Dennis Crall, USMC

Director, Command, Control, Communications and Computers/Cyber, Chief Information Officer (CIO), J6

Virtual

5:20 – 5:25 pm

CLOSING REMARKS

CENTURY BALLROOM

Gen Hawk Carlisle, USAF (Ret)

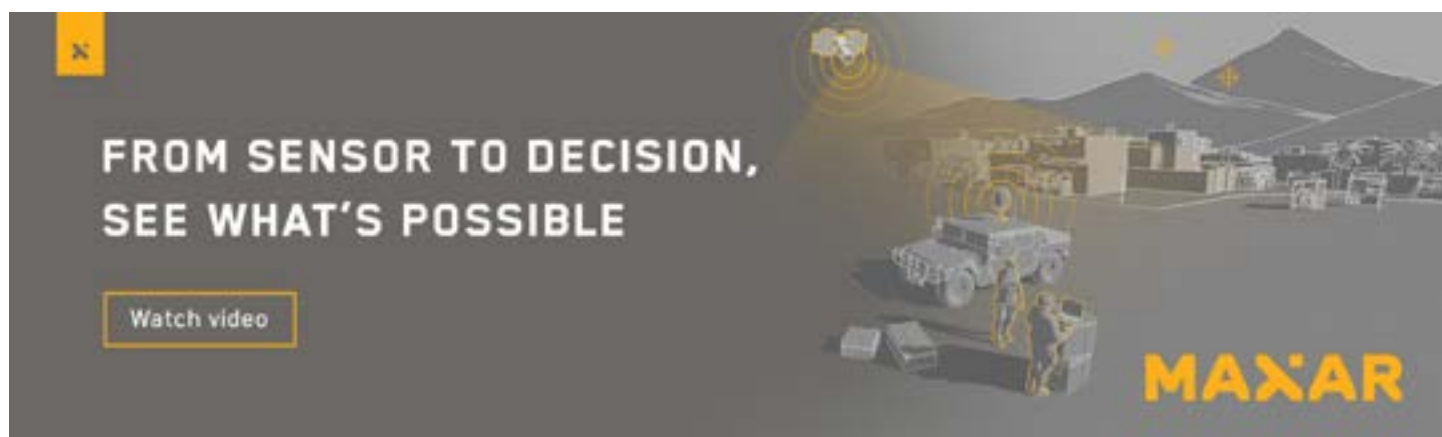
President and CEO, National Defense Industrial Association

5:30 – 6:30 pm

OPENING RECEPTION

BRAZOS - PROPER TEXAS KITCHEN

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FROM SENSOR TO DECISION,
SEE WHAT'S POSSIBLE

[Watch video](#)

MAXAR

The advertisement features a dark background with a 3D rendering of a military vehicle and a person in a futuristic, high-tech environment. The text is in white and yellow, with the MAXAR logo in yellow at the bottom right.



GETTING VITAL INFORMATION TO THE MISSION PLANNER IN A TIMELY MANNER!

Decision-makers and Analysts need answers to critical questions in order to quickly find Actionable Intelligence. AAC's MOHO Knowledge Discovery/Alert Platform takes an exponential leap forward in Digital Discovery and accelerates Decision-making and Digital Awareness in real-time to keep you on top of the situation.

KEY FUNCTIONALITY & ELEMENTS

- ***Fully secure with cross-organization/domain multilevel security.***
- ***Easy to use with extensive natural language & batch query capabilities, plug-and-play integration, all-source data fusion and real-time data viewing.***
- ***Timely & perpetual accuracy with real-time monitoring & reporting, search filtering, adhoc analysis, and virtual consolidation of data.***
- ***Real-time Distributed Alert capability.***
- ***Highly scalable due to its modular architecture.***
- ***High capacity with high query volumes.***
- ***Highly compatible with simultaneous cross-platform capability.***



POC: David Tyler
Mobile: 315-254-0379
Email: DTyler@aac-usa.com



TUESDAY, JULY 13 – CLASSIFIED

6:30 – 8:00 am

DISS PRE-CHECK AND BUS TRANSPORTATION

CENTURY BALLROOM PREFUNCTION

7:00 – 8:00 am

CONTINENTAL BREAKFAST

ANNENBERG PRESIDENTIAL CONFERENCE CENTER BANQUET ROOM 1011BC

7:00 am – 4:45pm

REGISTRATION

ANNENBERG PRESIDENTIAL CONFERENCE CENTER LOBBY

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8:00 – 8:10 am

OPENING REMARKS

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Mark Welsh

Dean, Texas A&M University Bush School of Government & Public Service

8:15 – 9:15 am

KEYNOTE ADDRESS

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Mike Dietz

President, NDIA Lone Star Chapter

*Moderator***Brig Gen Jason Cothorn, USAF**

Vice Commander, Space and Missile Systems Center

9:15 – 9:45 am

NETWORKING COFFEE BREAK

ANNENBERG PRESIDENTIAL CONFERENCE CENTER LOBBY

9:45 – 10:45 am

DIA INTEL BRIEF

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Ross Guieb

Executive Director, George H.W. Bush Combat Development Complex, The Texas A&M University System

*Moderator***Dr. Trent Maul**

Director for Analysis, Defense Intelligence Agency

10:50 – 11:50 am

FEATURED SPEAKER

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Mike Dietz

President, NDIA Lone Star Chapter

*Moderator***Scott Lee**

NSEC FFDC Cross-Cutting Priority Lead for JADC2, MITRE

11:50 am – 1:05 pm

NETWORKING LUNCH

ANNENBERG PRESIDENTIAL CONFERENCE CENTER BANQUET ROOM 1011BC

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1:05 – 2:05 pm

SPACE, ENABLING JADC2 PANEL

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Steven Butow

Director, Space Portfolio, Defense Innovation Unit
Moderator

Maj Gen Thomas Ayres, USA (Ret)

Chief Legal Officer, Voyager, Former General Counsel, U.S. Air Force

Dr. Didi Kuo

Geospatial Intelligence Chief Architect, National Reconnaissance Office

2:10 – 3:10 pm

FEATURED SPEAKER: JADC2 – DATA AS THE KEY ENABLER

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Jim Keffer

Director, Cyber, Lockheed Martin
Moderator

David Spirk

Chief Data Officer, Department of Defense

3:10 – 3:35 pm

NETWORKING COFFEE BREAK

ANNENBERG PRESIDENTIAL CONFERENCE CENTER BANQUET ROOM 1011BC

3:35 – 4:35 pm

PANEL: INNOVATION FROM INDUSTRY

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Dr. Mark Lewis

Executive Director, Emerging Technologies Institute, National Defense Industrial Association
Moderator

Joshua Marcuse

Head, Strategy & Innovation, Global Public Sector, Google Cloud National Security Alliance Executive, Federal Transformation Team, Amazon Web Services

Dr. Reggie Brothers

CEO, Big Bear AI and Former S&T Director

Margaret Calomino

Senior Director of Strategy, L3 Harris

4:40 – 5:10 pm

CLOSING KEYNOTE

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Gen Hawk Carlisle, USAF (Ret)

President & CEO, National Defense Industrial Association
Moderator

Wendell Foster, Jr.

Executive Director, Joint Force Headquarters, Department of Defense Information Network, U.S. Cyber Command

5:10 – 5:15 pm

CLOSING REMARKS

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Gen Hawk Carlisle, USAF (Ret)

President and CEO, NDIA

5:15 – 6:15 pm

BUS TRANSPORTATION

ANNENBERG PRESIDENTIAL CONFERENCE CENTER LOT 41

5:30 – 6:30 pm

NETWORKING RECEPTION

CENTURY BALLROOM

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**WEDNESDAY, JULY 14 – CLASSIFIED**

6:30 - 8 :00am

DISS PRE-CHECK AND BUS TRANSPORTATION

CENTURY BALLROOM PREFUNCTION

7:00 - 8:00 am

CONTINENTAL BREAKFAST

ANNENBERG PRESIDENTIAL CONFERENCE CENTER BANQUET ROOM 1011BC

7:00 am - 12:00 pm

REGISTRATION

ANNENBERG PRESIDENTIAL CONFERENCE CENTER

Sponsored by



8:00 - 8:10 am

OPENING REMARKS

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Stephen Cambone

Associate Vice Chancellor for Cybersecurity Initiatives and Professor of Practice, Texas A&M University System

8:15 - 9:15 am

KEYNOTE REMARKS

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Gen Hawk Carlisle, USAF (Ret)

President and CEO, National Defense Industrial Association

*Moderator***Lt Gen Timothy 'Tim' Haugh, USAF**

Commander, Sixteenth U.S Air Force, Commander, Air Forces Cyber, Commander, Joint Force Headquarters - Cyber

9:20 - 10:20 am

FIRESIDE CHAT

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Gen Hawk Carlisle, USAF (Ret)

President and CEO, NDIA

*Moderator***VADM David Johnson, USN (Ret)**

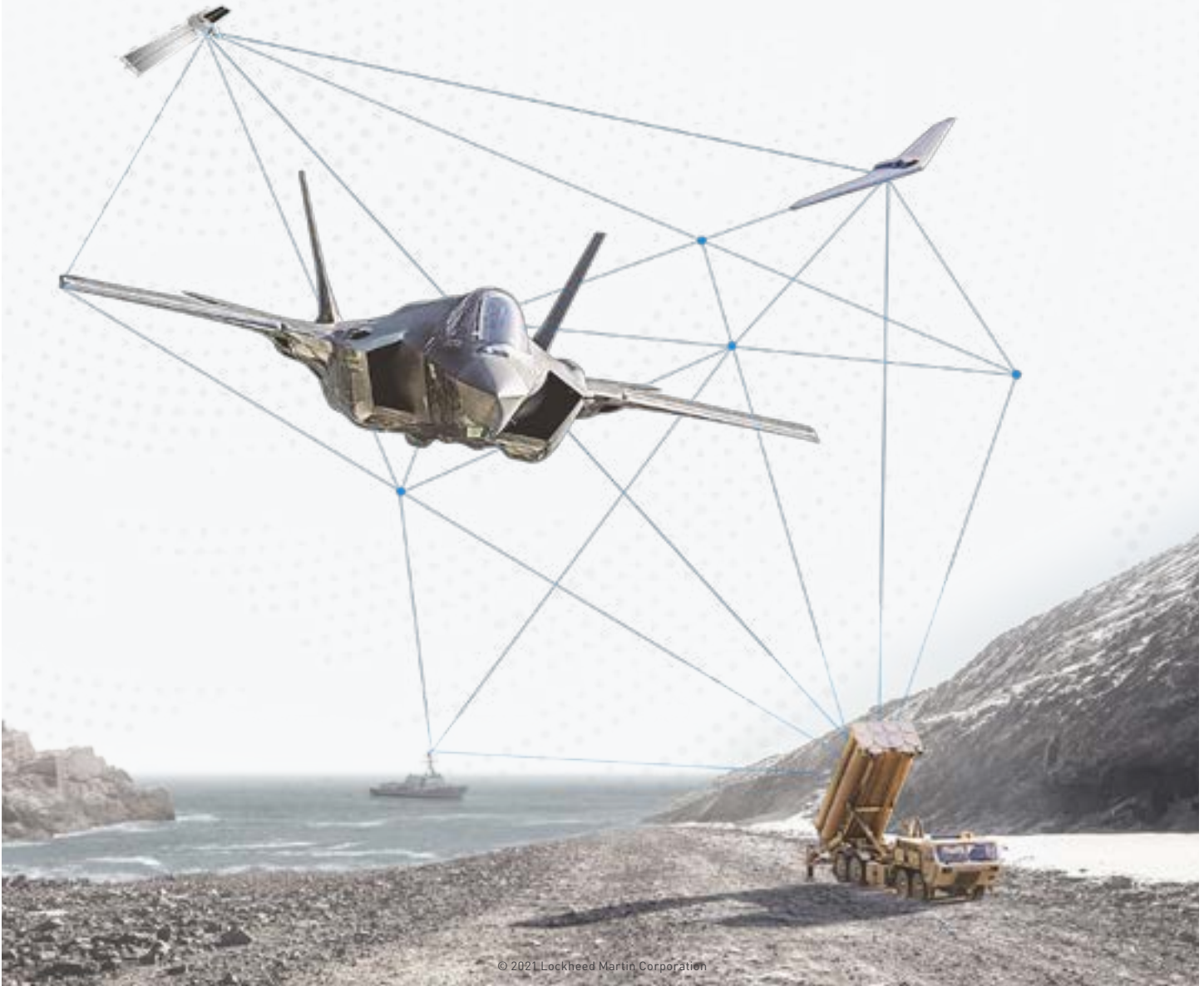
Vice President, Strategy Integrated Mission Systems Segment, L3 Harris

Lockheed Martin is demonstrating JADC2 capability today.

The future battlespace calls for future-forward solutions. That's why Lockheed Martin aims to connect every system across every domain. With integrated advanced sensors, network connectivity and data analysis, you can gain insights to make critical decisions in a split second. So while the enemy is outpaced and outmaneuvered, you win in every domain.

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10:20 – 10:50 am

NETWORKING COFFEE BREAK

ANNENBERG PRESIDENTIAL CONFERENCE CENTER BANQUET ROOM 1011BC

10:50 – 11:50 am

**MODERNIZING THE AOC WHILE CREATING THE FUTURE OF
COMMAND AND CONTROL**

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Col Brian Beachkofski, USAF

Commander, AFLCMC Detachment 12 (Kessel Run)

*Moderator***Brig Gen Jeffrey Valenzia, USAF**

Director, Joint Force Integration, Deputy Chief of Staff for Strategy, Integration and Requirements, U.S. Air Force

11:55 am – 12:55 pm

CLOSING KEYNOTE

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Gen Hawk Carlisle, USAF (Ret)

President & CEO, National Defense Industrial Association

*Moderator***Gen John Murray, USA**

Commanding General, U.S. Army Futures Command

12:55 – 1:05 pm

CLOSING REMARKS

ANNENBERG PRESIDENTIAL CONFERENCE CENTER FRYMIRE AUDITORIUM

Stephen Cambone

Associate Vice Chancellor for Cybersecurity Initiatives and Professor of Practice, Texas A&M University System

12:45 – 4:00 pm

BUS TRANSPORTATION

ANNENBERG PRESIDENTIAL CONFERENCE CENTER LOT 41

1:05 – 3:30 pm

WORKING GROUP MEETING (INVITE ONLY)

The NDIA has a policy of strict compliance with federal and state antitrust laws. The antitrust laws prohibit competitors from engaging in actions that could result in an unreasonable restraint of trade. Consequently, NDIA members must avoid discussing certain topics when they are together at formal association membership, board, committee, and other meetings and in informal contacts with other industry members: prices, fees, rates, profit margins, or other terms or conditions of sale (including allowances, credit terms, and warranties); allocation of markets or customers or division of territories; or refusals to deal with or boycotts of suppliers, customers or other third parties, or topics that may lead participants not to deal with a particular supplier, customer or third party.

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BIOGRAPHIES



LT GEN S. CLINTON HINOTE, USAF

Deputy Chief of Staff for Strategy, Integration and Requirements
U. S. Air Force

Lt. Gen. S. Clinton Hinote is the Deputy Chief of Staff for Strategy, Integration and Requirements, Headquarters U.S. Air Force, the Pentagon, Arlington, Virginia. In this position, Lt. Gen. Hinote is responsible for developing the Air Force strategy and multi-domain operating concepts, integrating through centralized design, and validating (and prioritizing) operational capabilities-based requirements to achieve national defense objectives and deliver timely and effective capability to the warfighter.

Lt. Gen. Hinote was commissioned in 1992 upon graduation from the U.S. Air Force Academy. After completing a master's degree in public policy from Harvard's Kennedy School of Government, he accomplished pilot training at Columbus Air Force Base, Mississippi, and F-16 training at Luke AFB, Arizona. His operational assignments include instructor duty at the USAF Weapons School, leader of the Air Forces Central Strategy Division, Squadron Commander, Wing Vice Commander and Wing Commander. Lt. Gen. Hinote is a graduate of the U.S. Air Force Weapons School, Air Command and Staff College, and the School of Advanced Air and Space Studies.

In his previous assignment, Lt. Gen. Hinote was the Deputy Director, Air Force Warfighting Integration Capability, Deputy Chief of Staff for Strategy, Integration, and Requirements, Headquarters U.S. Air Force, the Pentagon, Arlington, Virginia. In this position, Lt. Gen. Hinote led advanced efforts for design, integration and capability development across the Total Force for multi-domain concepts.

Lt. Gen. Hinote is a command pilot with more than 2,000 flight hours and 240 combat hours in operations Northern and Southern Watch.



LT GEN DENNIS CRALL, USMC

Director for Command, Control, Communications and Computers/Cyber, Chief Information Officer (CIO)

J6

Lieutenant General Crall currently serves as the Director for Command, Control, Communications, and Computers / Cyber and Chief Information Officer, Joint Staff J6.

Recent assignments include Deputy Principal Cyber Advisor / Senior Military Advisor for Cyber Policy; and Director – Command, Control, Communications, Computers (C4), Headquarters Marine Corps / Chief Information Officer (CIO) of the Marine Corps.

Lieutenant General Crall is a native of South Carolina where he graduated from the University of South Carolina. He is a career Aviation Command and Control Officer who has commanded at the Squadron and Group levels. He deployed as the Direct Air

Support Center – Airborne, Officer-In-Charge in support of Operation Iraqi Freedom, conducting thirty-four combat missions spanning over three hundred fifty flight hours.

Joint assignments include: Deputy Principal Cyber Advisor / Senior Military Advisor for Cyber Policy; Chief, Joint Cyberspace Center, US Central Command (CENTCOM); Executive Officer to the Deputy Commander, CENTCOM; Division Chief, Information Operations, CENTCOM; Division Chief, Developments and Concepts, CENTCOM; Branch Chief, Strategic Plans, Information Operations, US Special Operations Command (SOCOM); Joint Liaison Officer to the 7th Air Force, 607th Air Support Operations Group in Osan, Korea.

Supporting assignments include: Director – Command, Control, Communications, Computers (C4), Headquarters Marine Corps / Chief Information Officer (CIO) of the Marine Corps; Marine Corps Recruiting Command, Operations Officer, Recruiting Station Albuquerque, NM; and Contact Team Officer, 6th Marine Corps District, Parris Island, SC.

Lieutenant General Crall is a graduate of the Marine Corps Command and Control Systems Course; a distinguished graduate of the US Air Force Air Command and Staff College where he earned a M.S. in Military Operational Art and Science; a distinguished graduate of the National War College where he earned a M.S. in National Security Strategy. He has also completed the Harvard Kennedy School Cybersecurity Executive Program

ENABLING ALL-DOMAIN OPERATIONS ACROSS THE JOINT FORCE

L3Harris' state-of-the-art strategic and tactical all-domain sensors, with data fused at the tactical edge, provide a foundational element to JADC2. Our system-of-systems architecture is platform agnostic, data-centric, software defined and capable of hosting third party applications and retrieving open source data.

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BRIG GEN JASON COTHERN, USAF

Vice Commander
Space and Missile Systems Center

Brig. Gen. D. Jason Cothern serves as the Vice Commander, Space and Missile

Systems Center, Los Angeles Air Force Base, California. He is responsible for assisting the Commander in managing the research, design, development, acquisition, and sustainment of space and missile systems, command and control, launch and operational satellite systems. The Space and Missile Systems Center is the nation's center of technical expertise for military space acquisition with approximately 6,000 employees nationwide and an annual budget of \$9 billion.

Brig. Gen. Cothern was commissioned in 1993 as an ROTC graduate of the University of Central Florida. His career has spanned a

range of assignments primarily acquiring or planning for a variety of space systems, running the gamut from communications, signals intelligence, missile warning and force application. His space systems experience includes all major segments: ground, space vehicle, payloads and launch vehicles. He commanded the Space Based Infrared Systems Ground Squadron, Space and Missile Systems Center at Los Angeles Air Force Base, California, where he led his unit during development, test and fielding of the ground control system for the first SBIRS geosynchronous satellite. Brig. Gen. Cothern's joint assignment was in the U.S. Strategic Command's Center for Combating Weapons of Mass Destruction Chief of Requirements Integration Department.

Prior to his current assignment, the general served as the Assistant Program Director for Development at the F-35 Lighting II Joint Program Office, Arlington, Virginia. He led all aspects of fifth generation fighter modernization activities focused on delivering three F-35 variants to the Air Force, Navy, Marine Corps, eight international partners and three foreign military sales nations, ultimately producing 3,170 aircraft and supporting air system elements utilizing over \$250 billion in U.S. funds. He directed a 1,194-person joint and multinational team, building and executing acquisition strategies for continued modernization and delivery of the F-35.



LT GEN TIMOTHY 'TIM' HAUGH, USAF

Commander, Sixteenth Air Force and Air Forces Cyber
U.S. Air Force

Lt. Gen. Timothy D. Haugh is the Commander, Sixteenth Air

Force; Commander, Air Forces Cyber, and Commander, Joint Force Headquarters-Cyber, Joint Base San Antonio-Lackland, Texas. Lt. Gen. Haugh is responsible for more than 44,000 personnel conducting worldwide operations. Sixteenth Air Force Airmen deliver multi source intelligence, surveillance and reconnaissance products, applications, capabilities and resources. In addition, they build, extend, operate, secure and defend the Air Force portion of the Department of Defense global network. Further more, Joint Forces Headquarters-Cyber personnel perform

operational planning as part of coordinated efforts to support Air Force component and combatant commanders and, upon approval of the President and/or Secretary of Defense, the execution of offensive cyberspace operations. In his position as Sixteenth Air Force Commander, Lt. Gen. Haugh also serves as the Commander of the Service Cryptologic Component. In this capacity, he is responsible to the Director, National Security Agency, and Chief, Central Security Service, as the Air Force's sole authority formatters involving the conduct of cryptologic activities, including the spectrum of missions related to tactical warfighting and national-level operations. The general leads the global information warfare activities spanning cyberspace operations,

intelligence, targeting and weather for nine wings, one technical center and an operations center.

Lt. Gen. Haugh received his commission in 1991 as a distinguished graduate of the ROTC program at Lehigh University. He has served in a variety of intelligence and cyber command and staff assignments. The general has commanded at the squadron, group and wing levels and served on staffs at a numbered Air Force, major command headquarters and combatant command headquarters. Prior to his current position, Lt. Gen. Haugh was the Commander, Cyber National Mission Force.



GEN JOHN MURRAY, USA

Commanding General
U.S. Army Futures Command

General Murray was commissioned as an Infantry officer in the U.S. Army upon

graduation from the Ohio State University in 1982. Throughout his career, General Murray has served in leadership positions and commanded from Company through Division, with various staff assignments at the highest levels of the Army.

General Murray has held numerous command positions. His command assignments include: Commanding General Joint Task Force-3; Deputy Commanding General – Support for U.S. Forces Afghanistan; Commander Bagram Airfield; Commanding General 3rd Infantry Division at Fort Stewart, Georgia; Commander, 3rd Brigade, 1st Cavalry Division, at Fort Hood, Texas while serving in Operation IRAQI FREEDOM; Commander, 1st Battalion, 18th Infantry, 1st Infantry Division, United States Army Europe and Seventh Army, Germany;

Commander, C Company, 1-12th Infantry Battalion, 4th Infantry Division (Mechanized), Fort Carson, Colorado.

Previously, he was the Deputy Chief of Staff, G-8, in the Pentagon; Director, Force Management, the Pentagon; Assistant Deputy Director for Joint Training, J-7, Joint Staff, Suffolk, Virginia; Director, Joint Center for Operational Analysis, United States Joint Forces Command, Suffolk, Virginia; Deputy Commanding General (Maneuver), 1st Cavalry Division, Fort Hood, Texas; Deputy Commanding General (Maneuver), Multi-National Division-Baghdad OPERATION IRAQI FREEDOM, Iraq; G-3 (Operations), III Corps, Fort Hood, Texas; Chief of Staff, III Corps and Fort Hood, Fort Hood, Texas; C-3, Multi-National Corps-Iraq, OPERATION IRAQI FREEDOM, Iraq; G-3 (Operations), 1st Infantry Division, United States Army Europe and Seventh Army, Germany; Chief, Space Control Protection Section, J-33, United States Space Command, Peterson Air Force Base, Colorado; S-3 (Operations), later Executive Officer, 1st Battalion, 5th Cavalry,

1st Cavalry Division, Fort Hood, Texas; Chief, Plans, G-1, III Corps and Fort Hood, Fort Hood, Texas.

General Murray's awards and decorations include: the Distinguished Service Medal with Oak Leaf Cluster, the Defense Superior Service Medal with Oak Leaf Cluster, the Legion of Merit with two Oak Leaf Clusters, the Bronze Star Medal with three Oak Leaf Clusters, the Defense Meritorious Service Medal, the Meritorious Service Medal with two Oak Leaf Clusters, the Army Commendation Medal with Oak Leaf Cluster, the Joint Service Achievement Medal, the Army Achievement Medal with Oak Leaf Cluster, the Ranger Tab, the Combat Infantryman Badge, the Expert Infantryman Badge, the Parachutist Badge, the Air Assault Badge, the Joint Chiefs of Staff Identification Badge and the Army Staff Identification Badge.

General Murray hails from Kenton, Ohio. He and his wife, Jane, have three lovely daughters and seven grandchildren.



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ETI NDIA EMERGING TECHNOLOGIES INSTITUTE

A National Security Podcast with Dr. Mark Lewis

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Maxar is a trusted mission partner that enables the U.S. government and its allies to monitor, understand and respond to change, deter threats and ensure global security. Our Earth observation satellites offer the highest resolution imagery commercially available and have provided strategic and tactical advantages to the USG for two decades.

Space-based sensing is increasingly important as the DOD pivots to JADC2 with the goal of accelerated decision-making. Maxar offers all of the leading-edge capabilities necessary to rapidly identify objects from broad area surveillance. Our proven workflow significantly reduces the sensor-to-decision timeline—from hours to minutes—by combining our industry-leading imagery with remote ground station support, 3D foundation data and precision georegistration, AI/ML tools and more.



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MITRE

**SOLVING PROBLEMS
FOR A SAFER WORLD**

JOINT ALL DOMAIN COMMAND & CONTROL (JADC2)

Scott Lee

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13 July 2021

Approved for Public Release; Distribution Unlimited
Public Release Case Number # 21-1954

Command & Control Needs Attention

FROM WORLD WAR II

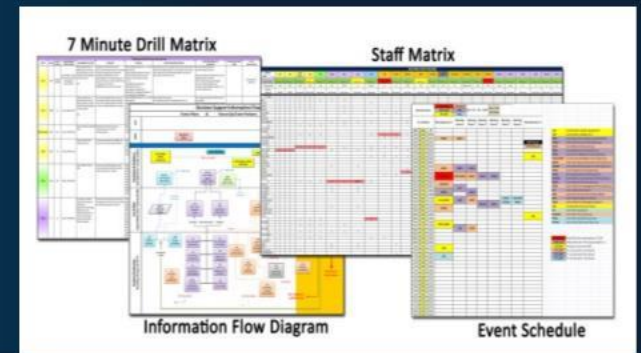
TO TODAY

COMPLICATED BY THIS

US PLATFORM
CAPABILITIES



US COMMAND
AND CONTROL
CAPABILITIES



WITHOUT BETTER COMMAND & CONTROL, WE CANNOT COUNTER ADVERSARY ALL DOMAIN OPERATIONS.

Why is JADC2 needed?

We need to understand and decide faster and better across a range of missions.

- Our way of war is predictable. Our adversaries watched and learned.
- We are reliant on individual domain supremacy, but we are contested in every domain.
- Our adversaries can control tempo and maneuver across competition and conflict.

We need to persistently target and engage our adversaries in competition and conflict.

We must be able to counter A2AD strategies to be successful.

- Execute operations using distributed and/or disaggregated forces when disrupted.
- Regain advantage of time and space.

WE CANNOT CONTINUE TO OPERATE WITH SERVICE-CENTRIC, HUMAN POWERED, STOVE-PIPED C2.

What do we need from JADC2?

A set of C2 capabilities that can be **brought together to support** a variety of mission areas in their own unique ways.

Focused on **mission-driven, context-based** understanding and decision-making.

Employs loosely **coupled interoperability** to enable data sharing.

Enables **integration** of existing platforms and **capabilities** with minimal retrofit.

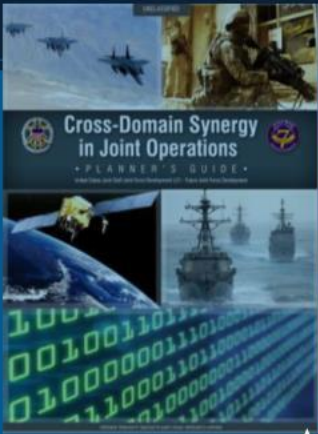
Incorporates **better data, better decision-making,** and **new capabilities** as available.

Degrades gracefully as C2 and communications are challenged – **Dynamic PACE.**

WITHOUT BETTER COMMAND & CONTROL, WE CANNOT COUNTER ADVERSARY ALL DOMAIN OPERATIONS.

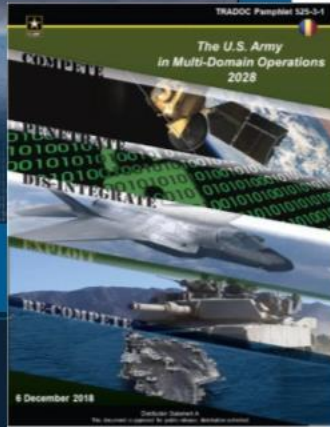
Evolution of JADC2 – A Snapshot

Jan 2016
JSJ7 Cross-Domain
Planner's Guide



Nov 2017
CSAF
MDC2 ECCT
Campaign Plan

Dec 2018
USN
DMO



Dec 2018
US Army in
MDO (RNGW Study
in 2017)

Jun 2019
USAF MDC2
Implementation Plan



Jul 2019
JADC2 JROCM

Jan 2020
DEPSECDEF
JADC2 CFT

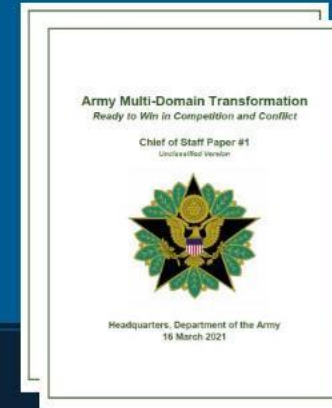


Oct 2020
CNO
Project Overmatch



Dec 2020
Navy, USMC, USCG
Advantage at Sea

Feb 2021
DEPSECDEF
JADC2 CFT Revised



Mar 2021
CSA
Papers



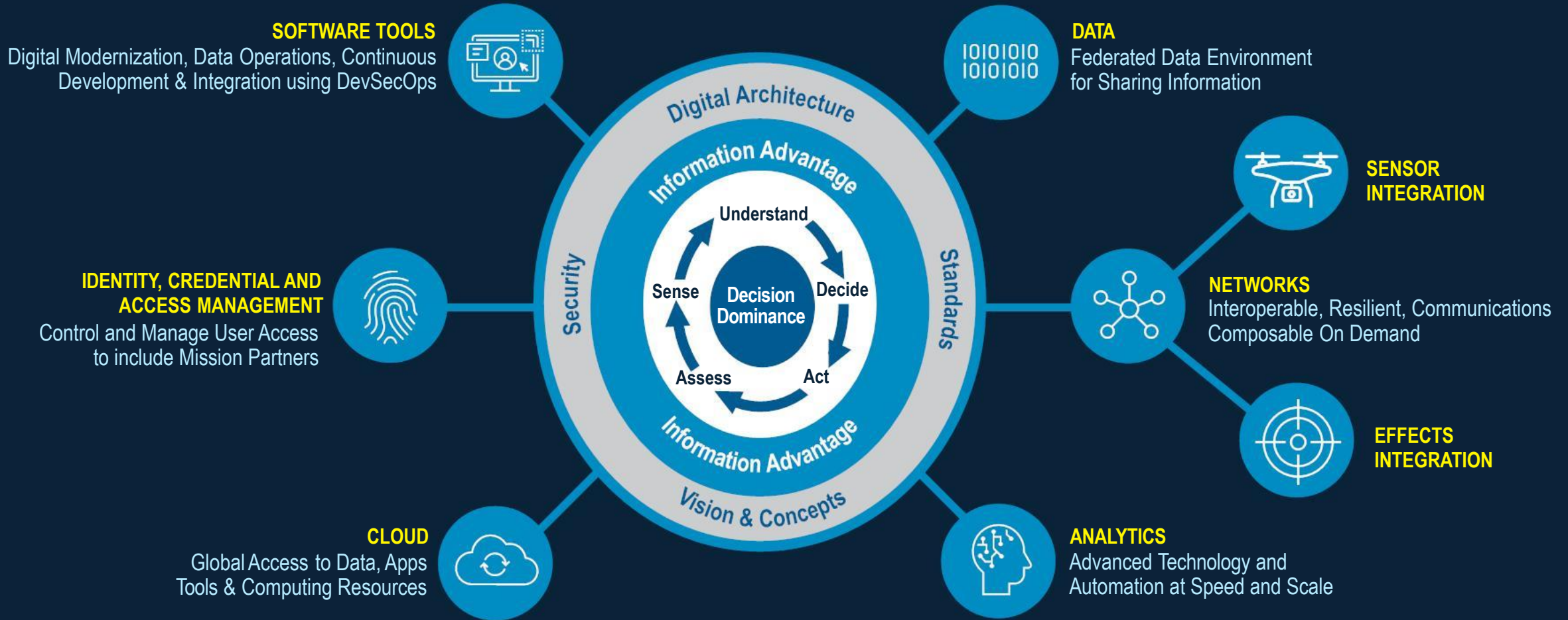
May 2021
CSAF
ABMS
Campaign Plan

JADC2 Framework – The DoD Perspective

- 2019 ● All Domain Convergence, Any Sensor to C2 to Best Shooter.
 - 2020 ● Improve decision-making at point of need, leveraging capabilities across domains, with partners, to achieve convergence at speed required.
 - 2021 ● Sense, make sense, and act at all levels and phases of war, across domains, with partners, to deliver information advantage at speed of relevance.
 - 2021 ● SECDEF Signed Strategy on 13 May with Implementation Plan in Draft.
- JADC2 is not a formal program or concept. A framework requiring C/S/A contributions that work together to improve Joint C2.

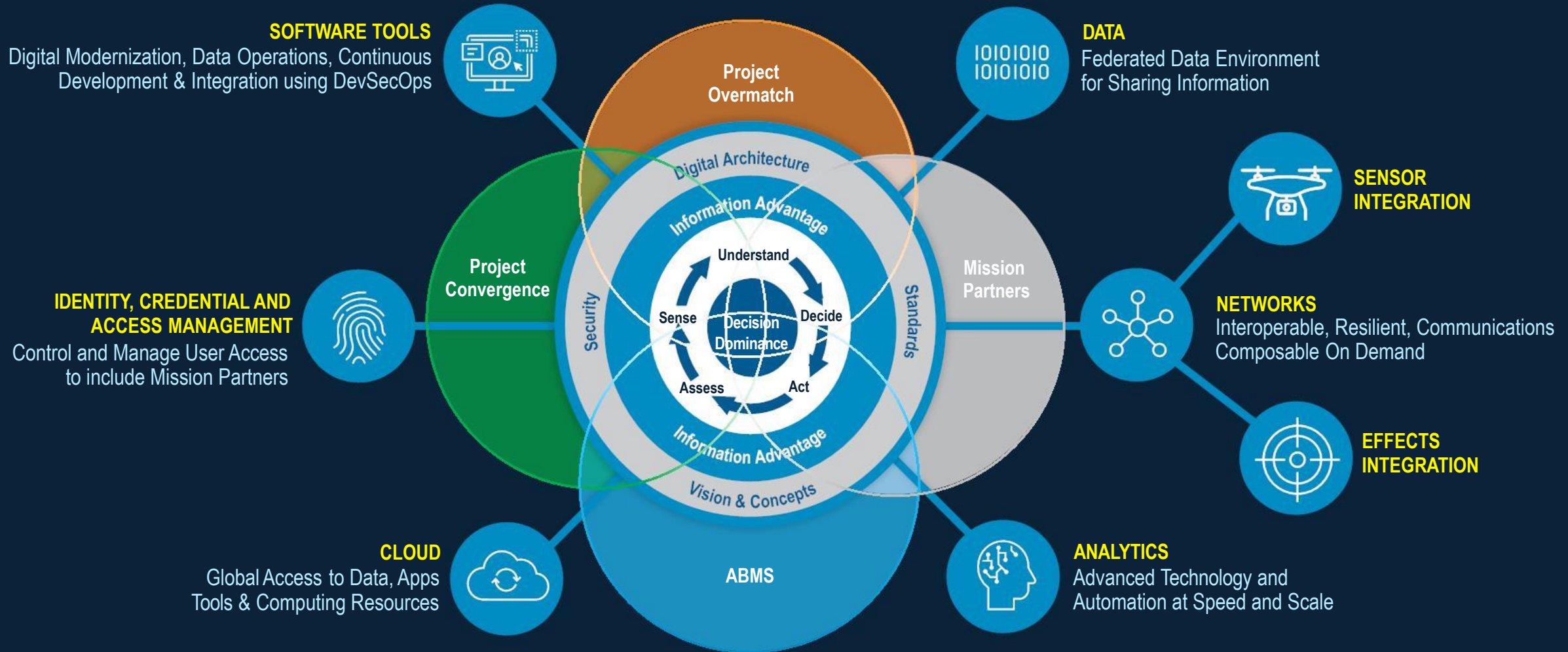


Enabling JADC2 – Envisioning the Future



Next Generation C2 & Warfighting Platform to Realize Distributed All Domain Operations

Enabling JADC2 – Cohere Service & Partner Contributions

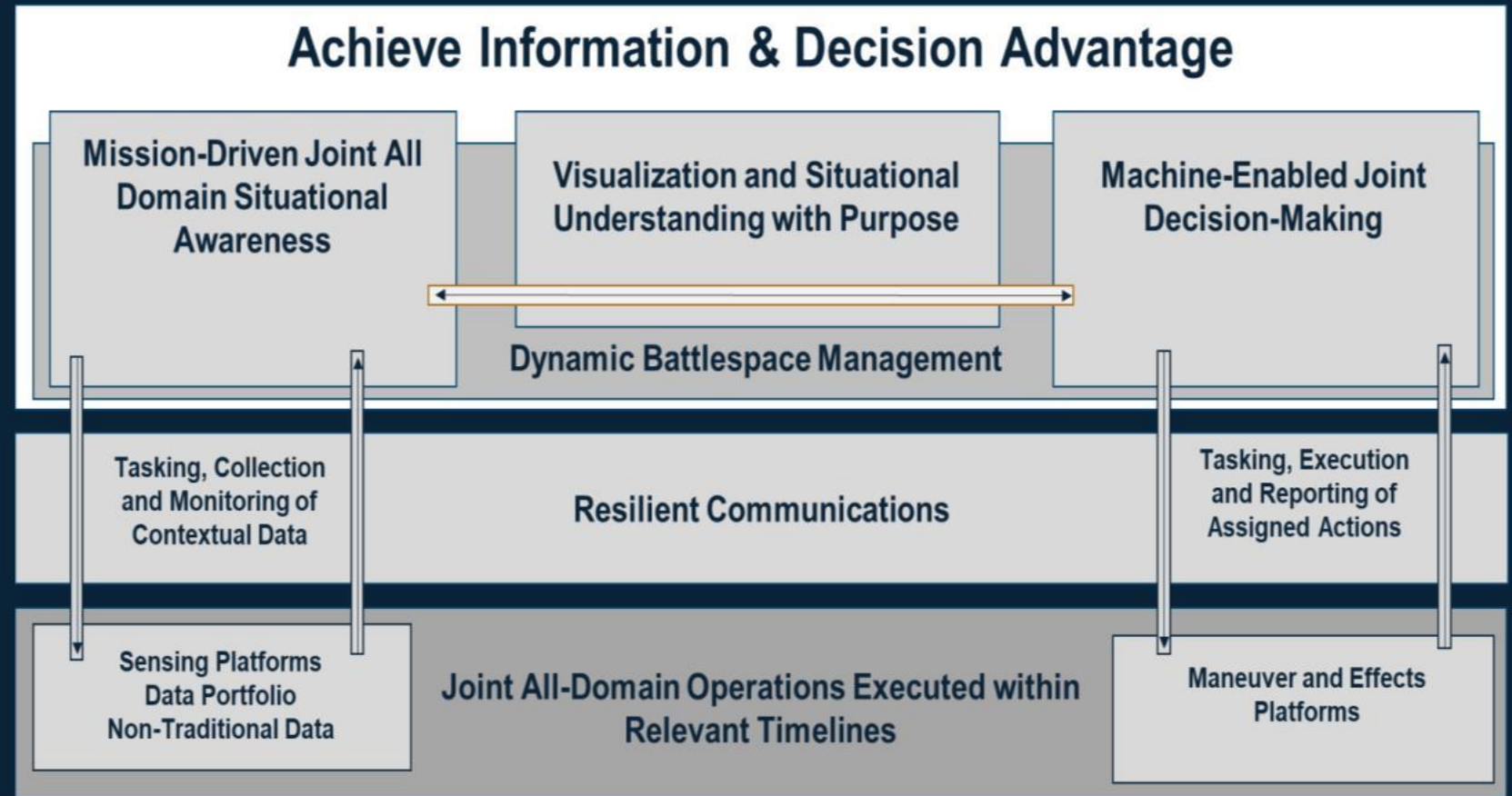


Next Generation C2 & Warfighting Platform to Realize Distributed All Domain Operations

Realizing the Future – Enable JADC2

Decision Dominance:

- Exploit all available data based on contextual need & automation.
- Enable decentralized C2 & distributed operations.
- Employ agile C2 design based on mission & composability.
- Optimize resource use through human-machine teaming.



Enable All Domain Convergence with Near-Term Emphasis on Massed, Simultaneous Engagements to Defeat A2/AD and Fleeting Targets

BE FASTER, WITH GREATER PRECISION, AND WITH A HIGHER PROBABILITY OF SUCCESS!

Realizing the Future – Start with a North Star

Effects

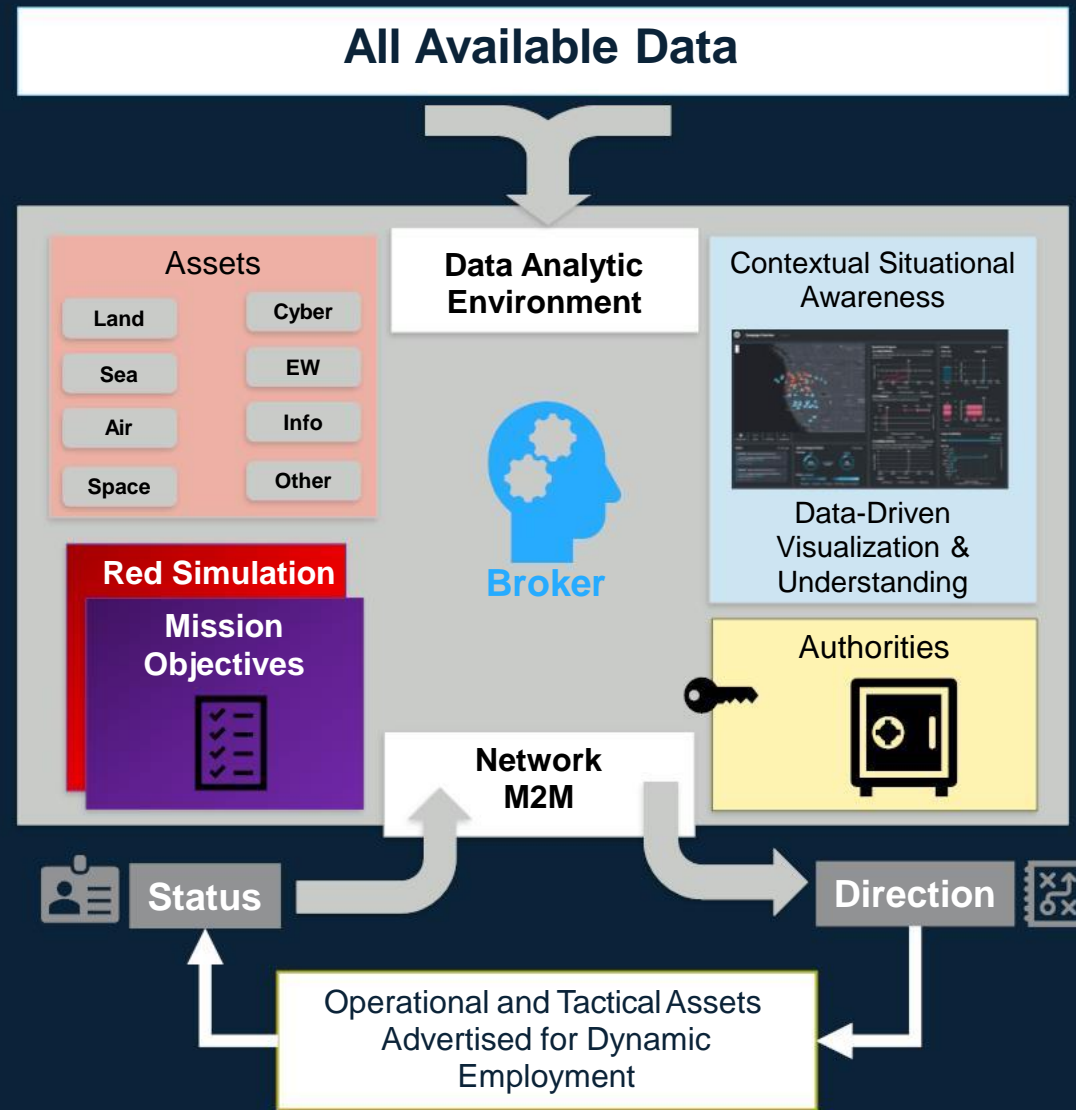
Actions or capabilities applied to adversaries to modify their behavior, posture, or abilities.

Can be applied by **effectors** at all levels of conflict.

- Lethal
- Kinetic
- Non-lethal
- Non-kinetic

Broker

A human/machine construct that acts as an agent to optimally fulfill all requests for and upon decision authorizes delivery of **optimized solutions** to Asset requests.



Asset Market

Ingests situational **awareness** information.

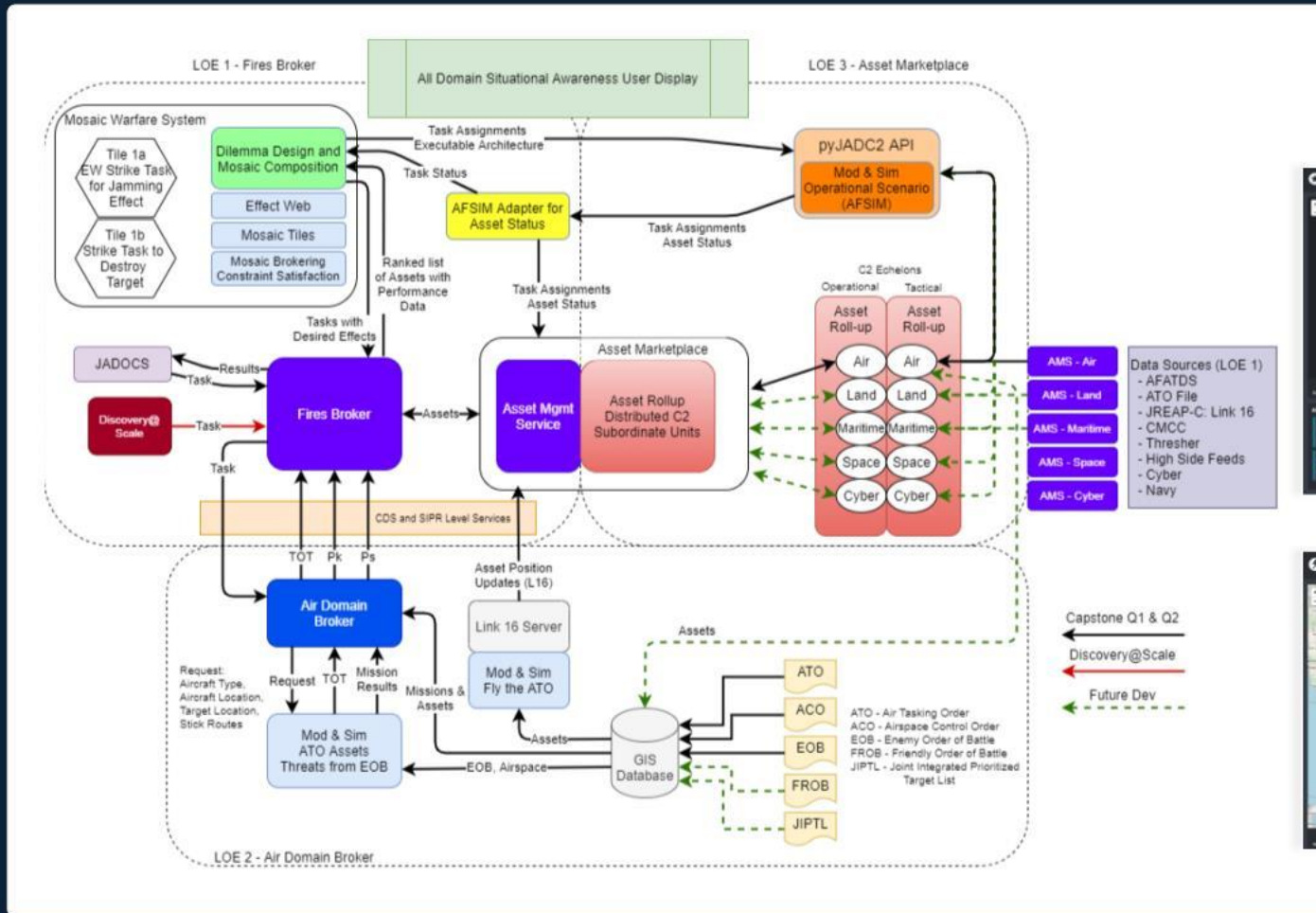
Contains dynamically updated inventory of **effectors and sensors with operational status**.

Includes **domain and warfighting functional brokers** to accelerate kill chains and operational workflows and decisions.

Brokers work in concert with visualization of the situation, mission, intent, asset status, and attack guidance to develop **optimized options** to address effects requests.

Enables access to **authorities necessary for employment of effects** – build towards conditions-based authorities construct.

JADC2 Functional Architecture – Making it Real

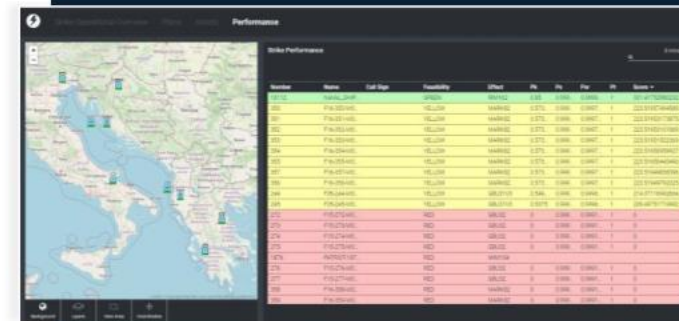


*Starting Point for Next Gen C2.
Technical Reference Architecture.*



Context-Based Awareness via Data and Workflow Automation

User-Focused Customizable Displays



Model Enabled Decision-Making with Brokers and Mosaics

Creating Decision Space and Speed across Domains

WE ARE OPERATIONALIZING OUR JADC2 VISION AND DEMONSTRATING A PATH TOWARDS ACHIEVING INFORMATION AND DECISION ADVANTAGE.

JADC2 is a MITRE Internal Priority – Investments ~\$5M

INTERNAL RESEARCH & DEVELOPMENT PROJECT

JADC2 Functional Architecture Research and Prototyping

JADC2-NC3 Integration Study

Joint Electromagnetic Spectrum Operations and Data Sharing

JADC2 Experimentation Environment

Mosaic Warfare Research and Prototyping

Option Awareness for Agile Combat Employment

AI Enabled Courses of Action (COAs)

Logistics Models for Joint Agile Combat Employment

Universal Awareness for IoT-based Decision Support

- Advancing critical JADC2 concepts and capabilities.
- Addressing key operational & technical risks.
- Partnering with direct funded projects to maximize impact.
- Seeking industry partners for development and transition.

**COMPLIMENTARY WORK EXECUTED WITH A COMMITMENT TO COLLABORATION
AND A COMMON GOAL OF ADVANCING JADC2!**

Applying DoD guidance to Joint All Domain Operations

DoD Data Decrees*

1. Maximize data sharing and rights for data use: all DoD data is an enterprise resource.
2. Publish data assets in the DoD federated data catalog along with common interface specifications.
3. Use automated data interfaces that are externally accessible and machine-readable; ensure interfaces use industry-standard, non-proprietary, preferably open-source, technologies, protocols, and payloads.
4. Store data in a manner that is platform and environment-agnostic, uncoupled from hardware or software dependencies.
5. Implement industry best practices for secure authentication, access management, encryption, monitoring, and protection of data at rest, in transit, and in use.

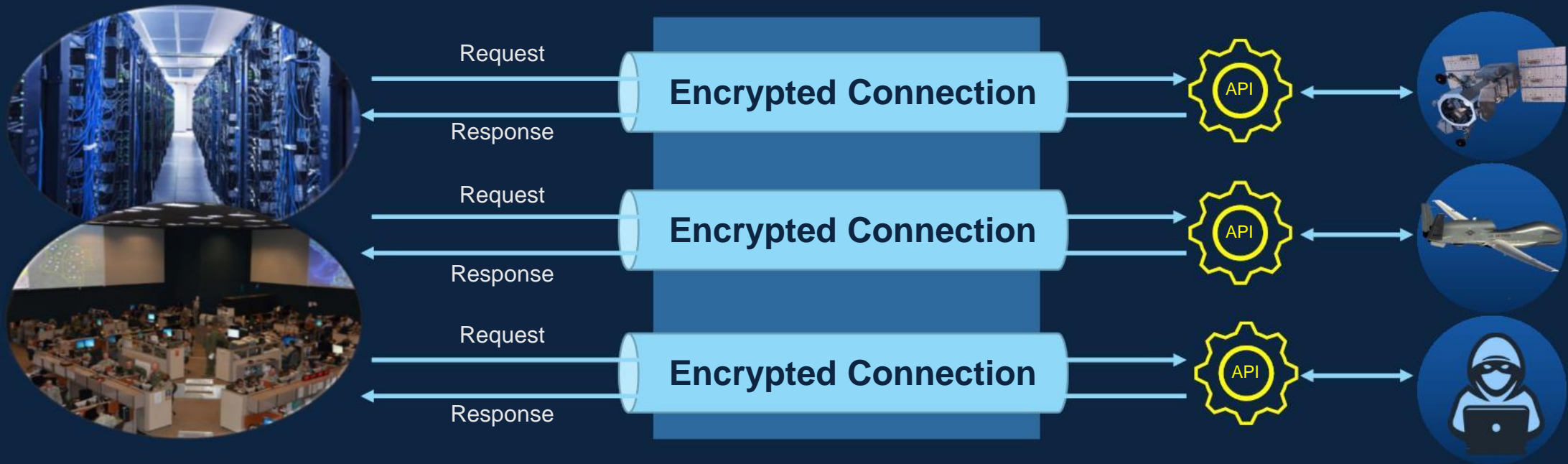
MITRE's JADC2 Data Approach

- Expose data and services via open interfaces to enable access and discovery (1, 2, 3, 5).
- Convert data into meaningful information – move attributes not raw data when possible (4).
- Push compute infrastructure to edge for processing data close to source (4).
- Align data and automation to functional areas solve operational problems.

*DoD Data Strategy 21 MAY 2021

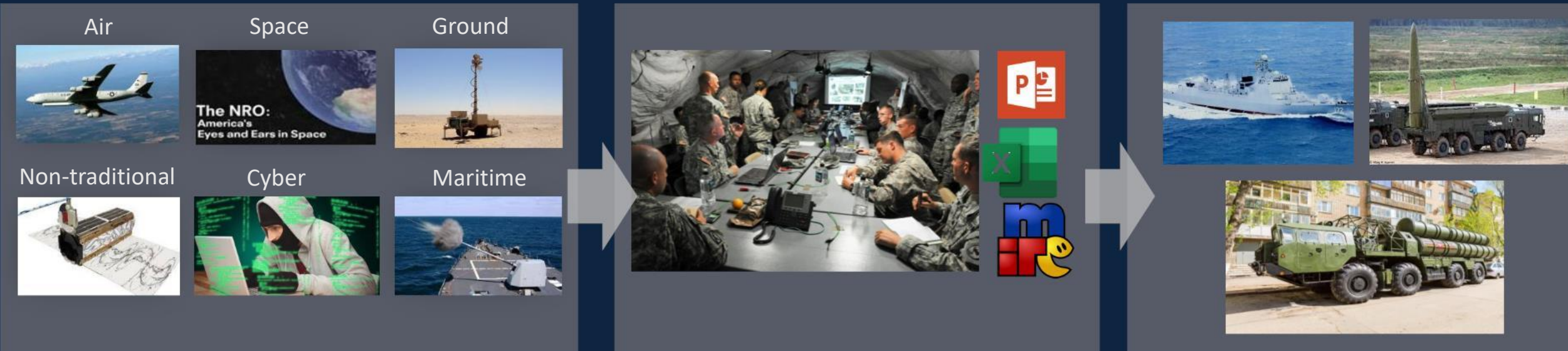
Securely Exposing Data – Application Programming Interface

- Require new systems expose data with documented interfaces.
- Prioritize building APIs to legacy systems driven by specific mission needs – unlock underutilized data.
- Approach is agnostic of centralized vs. decentralized data strategy.



LOOSE COUPLING OF DATA SOURCES TO DATA CONSUMERS

JADC2 Collaboration on Digital Engineering



Advanced Capabilities

Antiquated C2 Processes

Highly Relocatable Targets

- There is a *significant* amount of work to be done in order to operationalize JADC2.
- Making tangible progress will only happen through a collective and collaborative effort and approach.
 - Technology developments taking place within industry could help the DoD get there quicker.
- Potential touchpoints and collaboration.
 - Common Mission Engineering products (scenarios, mission threads, process models, data analytics).
 - Shared experimentation and decision-aiding infrastructure (models, AI/optimization/learning algorithms).

MITRE JADC2 Experimentation Environment

- Originally developed through MITRE IR&D.
- Utilizes fast, extensible GOTS software.
- Informs evolution of JADC2 concepts and capabilities including non-materiel aspects.



Generate mission effectiveness metrics through experimentation with:

Current (live) and future (virtual) C2 services, platforms, and effects

Interfaces with APIs for C2 supporting functions

Human in the loop interaction

Novel course of action generation

MITRE research

MITRE JADC2 Experimentation Environment Partners

Partners

- **MITRE IR&D**
 - FFRDC Collaboration
 - Industry Partnerships
-
- Air Force Futures
 - ABMS
 - Army Futures Command
 - Project Convergence
 - OSD, OUSD R&E
 - NRO/AS&T (Planned)

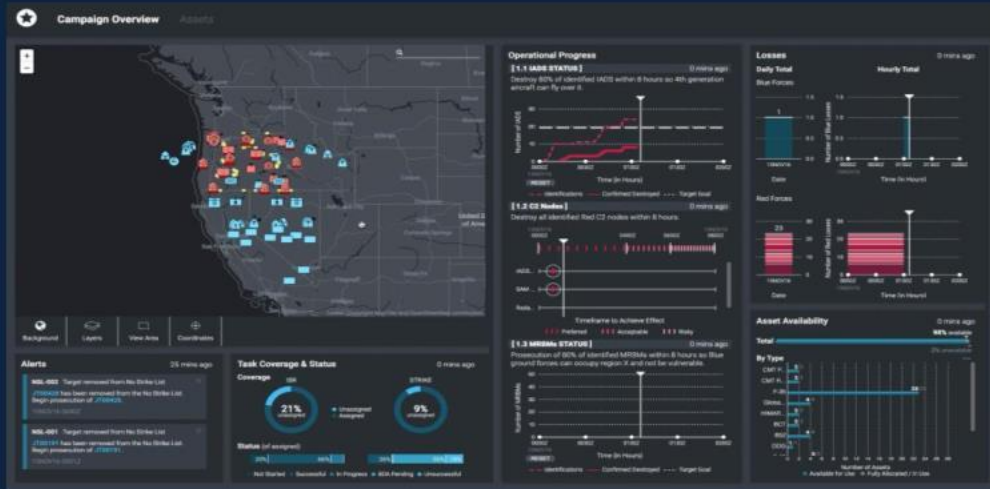
Problems Addressed

- Where can we automate and optimize to reduce timelines?
- How do next generation C2 prototypes perform relative to legacy C2 systems?
 - Centralized vs. decentralized C2, federated decision-making via asset markets and brokers
 - Proposed all domain C2 structures and organizations
- **How feasible is machine-aided all-domain task brokering?**
 - ISR, Strike, IAMD, Space, Contested Logistics
- How can we develop situational awareness from rapidly updated data?
 - API research
 - Data Automation with Integrated Analytics
- How can we test performance of C2 prototypes?

COLLABORATION MOVES CAPABILITIES FORWARD.....FASTER!

Thoughts for the Future

We Need a New COP Paradigm



See, understand, and act first via mission-driven, contextual awareness, temporal/spatial visualization, machine-aided understanding.

- Integration via data operations and automation with purpose.
- Focus on data gaps not data on hand.
- Machine-to-machine sharing of core data.
- AI and automated planning capabilities to rapidly assess and convey COAs.

Enable All Domain Convergence

Deliver Integrated, Layered Non-Kinetic/Kinetic Effects in Competition and Conflict.

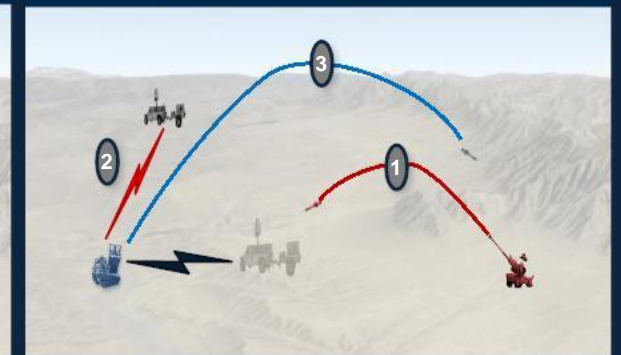
- Brokered Assets using Advanced Algorithms (Dynamic Asset and Options Awareness, mission relevant AI/ML).
- Enable Resiliency via Composable Effects Chains, Decouple Data, Networks and Systems.
- Build Interoperability on Demand – Network Diversity.

Efficient Asset Utilization in Complex Battlespace



ISR tip-and-cue, synchronized effects, optimal effect-target pairings

Rapid Re-planning in Response to Changing Battlespace



Generate, modify, and execute Fires at operationally-relevant time scales

JADC2 is a Wicked Problem.....

Each Service has modernization efforts underway addressing Service-specific challenges and requirements.

JADC2 CFT is establishing a strategy, implementation plan, architecture.



Services are collaborating. Pursuing opportunities for “Combined” JADC2.



Defense-Industry-
FFRDC-UARC
Partnership



SYSTEMS ENGINEER & INTEGRATE HORIZONTALLY & VERTICALLY TO MAKE JADC2 SUCCESSFUL!

Approved for Public Release; Distribution Unlimited
Public Release Case Number # 21-1954

Scott Lee

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July 2021

MITRE | SOLVING PROBLEMS
FOR A SAFER WORLD



JOINT FORCE HEADQUARTERS – DEPARTMENT OF DEFENSE INFORMATION NETWORK

JFHQ DODIN
The Shield of DoD Cyberspace Warfighting

**Enabling DOD Mission Assurance
Unity of Command, Velocity of Action
& Operational Outcomes in a
Multi-Domain Environment**

The overall classification of this briefing is
UNCLASSIFIED

Mr. Wendell E. Foster
Executive Director
13 July 2021



Mission Alignment for Operational Outcomes



U.S. Cyber Command

Subordinate Command Roles & Mission Areas for Full Spectrum Cyberspace Operations

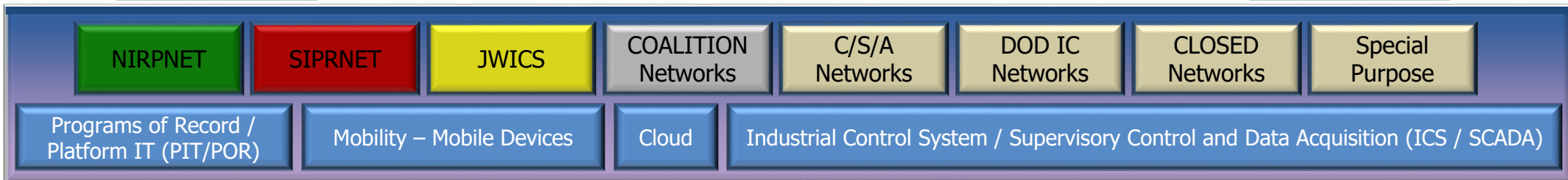
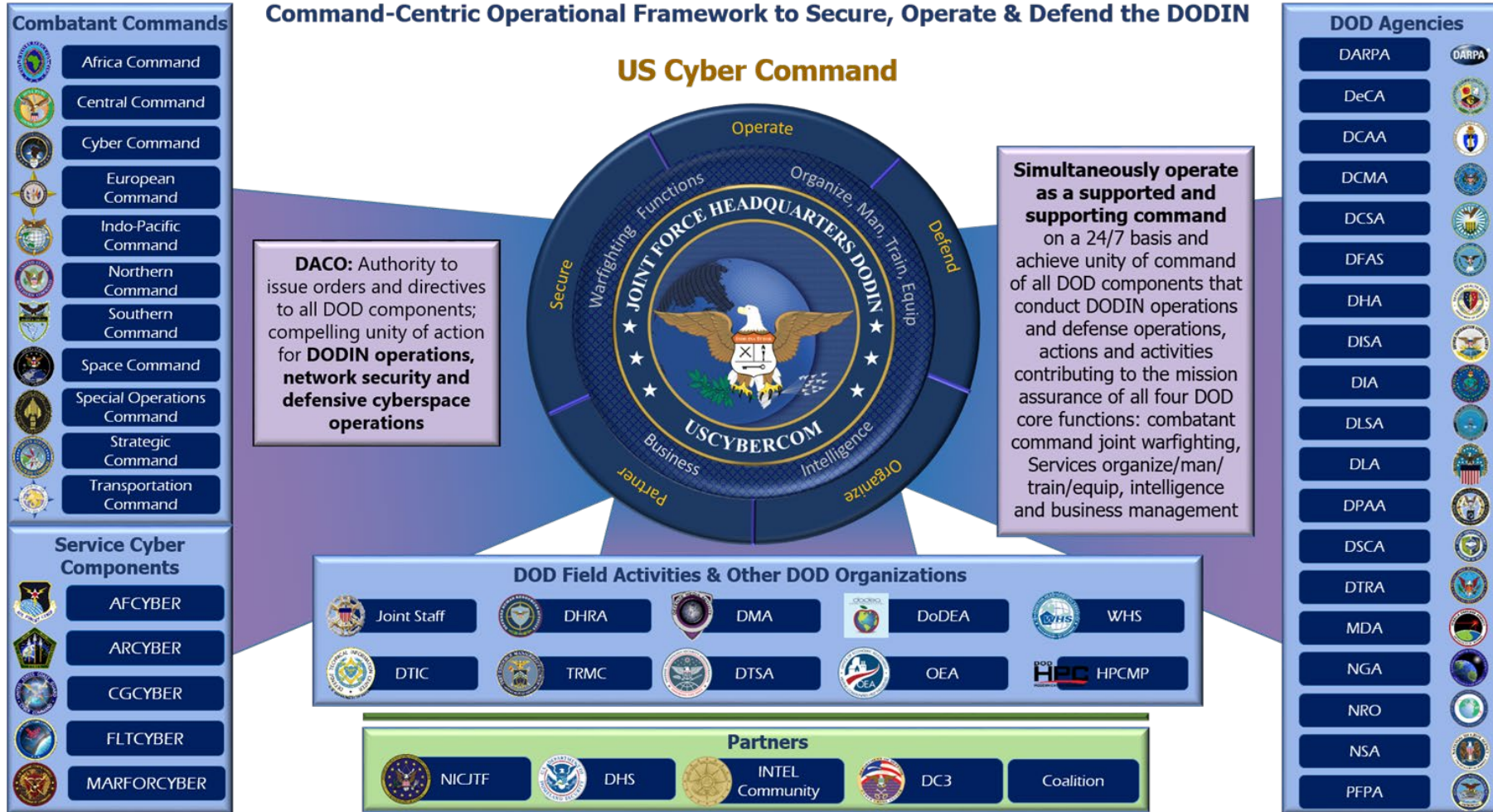


Command and control of DODIN Operations and Defensive Cyberspace Operations-Internal Defensive Measures (DCO-IDM) globally in order to synchronize the protection of DOD component capabilities to enable power projection and freedom of action across all warfighting domains



JFHQ-DODIN Global Responsibility

Command-Centric Operational Framework to Secure, Operate & Defend the DODIN





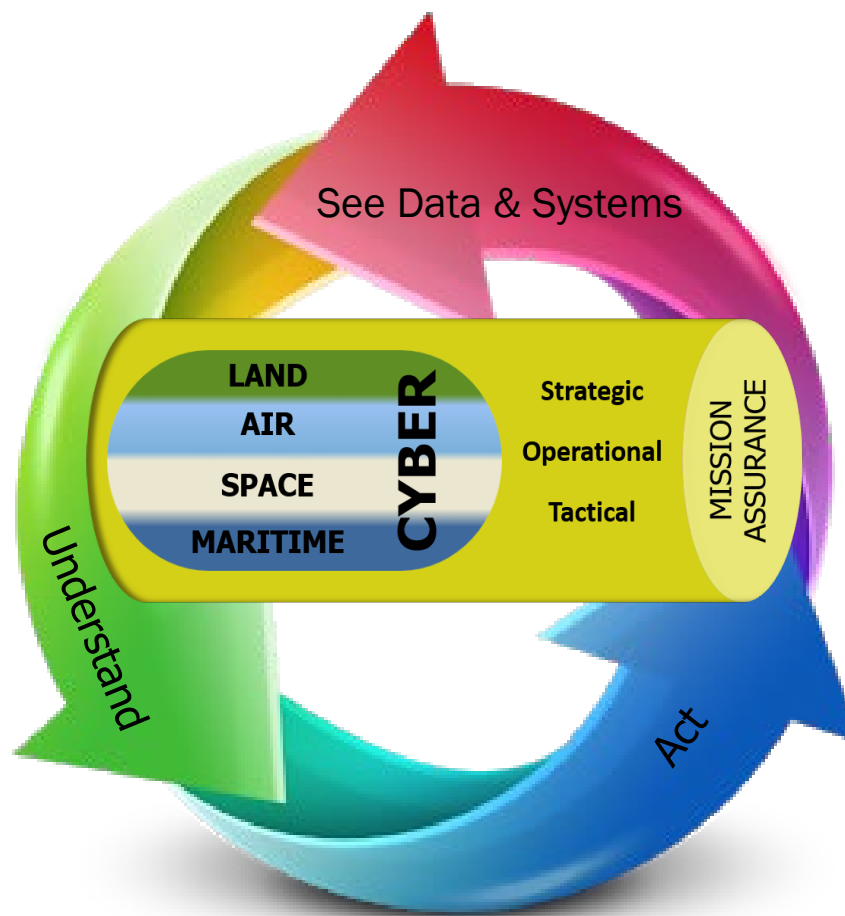
JFHQ-DODIN Role in Multi-Domain Environments

JFHQ-DODIN Mission Area: Unity of Action for DODIN Operations, Network Security & On-DODIN Defense

**Organize
Terrain & Forces**



Continuous Mitigation



**Understanding Relation
of Terrain to Mission
Essential Tasks & Functions**



**Threat-Informed
Priorities & Decisions**



The DODIN Underpins Combatant Command Warfighting & All Other DOD Core Functions



Take Aways for DODIN Secure, Operate & Defend

- Purpose of a command and control effort for an all-domain approach is to improve the lethality of the Joint force
 - Pre-requisite: network operations, security and defense must operate as a unified force
 - Must optimize for crisis as the steady-state condition for the DODIN
- Network operations, network security and network defense must be addressed across full capability development processes (planning through deployment/assessment)

