NDIA
AT THE HEART OF THE MISSION

NDIA NATIONAL SECURITY AI CONFERENCE & EXHIBITION

Strength through Innovation

March 23 – 25, 2021 | NDIA.org/NSAICE

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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**

WELCOME TO NDIA NATIONAL SECURITY AI CONFERENCE AND EXHIBITION

On behalf of the National Defense Industrial Association (NDIA), I welcome you to the National Security AI Conference and Exhibition (NSAICE). This first-time event will focus on strength through innovation in AI across government, industry, and academia to develop AI solutions, discover federal AI initiatives, and explore real-world AI technology. Join us in leveraging AI to strengthen the safety and security of the United States and our allies.

While this year's conference is being conducted in a virtual format, I urge you all to actively participate in session discussions and Q&As as well as join our various networking opportunities. I also invite you all to share your experiences via social media. That way, we can further grow our networks and expand the dialogue, even after our virtual event ends.

In addition to NSAICE, we are pleased to welcome the National Security Commission on AI's public co-located conference focused on public-private partnerships for AI and national security.

We are pleased that you are joining us over the next three days for this inaugural event and wish you all a very productive and beneficial conference!

Gen Hawk Carlisle, USAF (Ret
President and Chief Executive Officer
National Defense Industrial Association

EVENT INFORMATION

WEBSITE

NDIA.org/NSAICE

EVENT THEME

Strength through Innovation

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 CONTACTS

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PLANNING COMMITTEE

Kevin McGinnis
National Security Commission on AI

Shane Shaneman
Carnegie Mellon University

SPEAKER GIFTS

In lieu of speaker gifts, a donation is being made to the Fisher House Foundation.

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.

ANTI-TRUST STATEMENT

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.

AGENDA

TUESDAY, MARCH 23

10:00 – 10:10 am EDT

WELCOME REMARKS
Gen Hawk Carlisle, USAF (Ret)
President and Chief Executive Officer, National Defense Industrial Association (NDIA)

10:10 – 11:00 am EDT

OPENING KEYNOTE
LtGen Michael Groen, USMC
Director, Joint Artificial Intelligence Center (JAIC), U.S. Department of Defense

11:00 – 11:20 am EDT

EXHIBIT/NETWORKING BREAK

11:20 am – 12:20 pm EDT

MORNING KEYNOTE
Joan Johnson
Deputy Assistant Secretary, Research, Development, Test, & Engineering, U.S. Navy

12:20 – 12:45 pm EDT

EXHIBIT/NETWORKING BREAK

12:45 – 1:45 pm EDT

CONGRESSIONAL PERSPECTIVE PANEL
Gen Hawk Carlisle, USAF (Ret)
President and Chief Executive Officer, NDIA
Moderator

Rep Jim Langevin (D-RI)
Chairman, Subcommittee on Cyber, Innovative Technologies, & Information Systems

Rep Elise Stefanik (R-NY)
Ranking Member, Subcommittee on Cyber, Innovative Technologies, & Information Systems

1:45 – 2:05 pm EDT

EXHIBIT/NETWORKING BREAK

JOIN THE CONVERSATION

@NDIAToday | @NDIAMembership | NDIA.org/LinkedIn | @NDIAToday | @NDIAToday

2:05 – 2:45 pm EDT

AFTERNOON KEYNOTE

Mike Brown
Director, Defense Innovation Unit (DIU)

2:45 – 3:45 pm EDT

AI for Manufacturing and Supply Chain: AI for Manufacturing and Industrial Applications

Mike Molnar, PE SES
Founding Director,
Advanced Manufacturing Office,
National Institute of Standards
and Technology
Moderator

Brad Keywell
Founder and Chief Executive Officer,
Uptake

Adam Fry
Lead Product Manager, Covariant.ai

AI for Energy and Infrastructure: AI at DOE

Dr. Frederick Streitz
Chief Science Advisor, Artificial
Intelligence and Technology Office,
Department of Energy (DOE)
Moderator

Irene Qualters
Associate Laboratory Director,
Simulation & Computation,
Los Alamos National Laboratory

AI for Transportation and Logistics: AI for Flight Simulation and Training

Col Dan Javorsek, USAF
Program Manager, Gamebreaker,
Strategic Technology Office (STO),
Defense Advanced Research Projects
Agency (DARPA)
Moderator

Dr. Timothy Grayson
Director, STO, DARPA

Lt Col Eric Frahm, USAF
Lead, Science & Technology, Pilot
Training Transformation, 19th Air Force;
Liaison Officer to DIU

3:45 – 4:05 pm EDT

EXHIBIT/NETWORKING BREAK

4:05 – 5:05 pm EDT

AI for Defense Intelligence and Homeland Security: DoD Disrupted: The New AI Companies for Defense

Lindsey Sheppard
Fellow, International Security Program
Moderator

Brandon Tseng
Chief Operating Officer, Shield AI

Chris Brose
Chief Strategy Officer,
Anduril Industries

Using AI to Understand Relationships Between People, Places, and Things: What Are Knowledge Graphs and Why Should DoD Use Them Now?

Carol Smith
Senior Research Scientist,
Human Machine Interaction,
Software Engineering Institute,
Carnegie Mellon University
Moderator

Jared Dunnmon
Technical Director, Artificial
Intelligence & Machine Learning, DIU

Jaime Fitzgibbon
Program Manager, Artificial
Intelligence & Machine Learning, DIU;
Founder, Ren.ai.ssance Insights

Brian Drake
S&T Director, Artificial Intelligence,
Future Capabilities and Innovation
Office, Defense Intelligence Agency

William Sears
Senior Intelligence Officer,
Innovation & Information Division
(J22i2), U.S. Africa Command

Harnessing the Pace of Innovation in AI: University Research Perspectives Panel

Dr. J. Michael McQuade
Vice President, Research,
Carnegie Mellon University
Moderator

Dr. Sethuraman Panchanathan
Director, National Science
Foundation

Daniela Rus
Director, Computer Science and
Artificial Intelligence Laboratory,
Massachusetts Institute of
Technology (MIT)

5:05 – 5:25 pm EDT

EXHIBIT/NETWORKING BREAK

5:25 – 5:55 pm EDT

AI Priorities, Requirements, and Funding Opportunities: JADC2/ABMS Requirements

Preston Dunlap
Chief Architect, Deparment of the Air and Space Forces

AI for Manufacturing and Supply Chain: AI & Microelectronics

James Chew
Senior Global Group Director, Aerospace & Defense, Cadence Design Systems

AI Priorities, Requirements, and On-Ramps for Industry-Military Teaming

CAPT George Galdorisi, USN (Ret)
Director, Strategic Assessments & Technical Futures, Naval Information Warfare Center Pacific

5:55 – 6:00 pm EDT

CLOSING REMARKS

Gen Hawk Carlisle, USAF (Ret)
President and Chief Executive Officer, NDIA

WEDNESDAY, MARCH 24

10:00 – 10:05 am EDT

OPENING REMARKS

Gen Hawk Carlisle, USAF (Ret)
President and Chief Executive Officer, NDIA

10:05 – 11:00 am EDT

MORNING KEYNOTE

Dr. Peter Highnam
Acting Director, DARPA

11:00 – 11:20 am EDT

EXHIBIT/NETWORKING BREAK

11:20 am – 12:20 pm EDT

AI Capabilities Center Presentations

CrowdAI
Robert Miller, Head, Federal Sales

NCI
Allen Badeau, Senior Vice President and Chief Technology Officer

Modzy
Gage Rindt, Vice President, Business Development

Emerging Technologies and the Future of Defense

Dr. Mark Lewis
Executive Director, Emerging Technologies Institute, NDIA

12:20 – 12:35 pm EDT

EXHIBIT/NETWORKING BREAK

12:35 – 1:35 pm EDT

AFTERNOON KEYNOTE

Bob Work
Vice Chairman, National Security Commission on Artificial Intelligence (NSCAI)
Former Deputy Secretary of Defense, U.S. Department of Defense

1:35 – 1:55 pm EDT

EXHIBIT/NETWORKING BREAK

1:55 – 2:55 pm EDT

AI Capabilities Center Presentations

Tectus Corporation
Sean Singleton, Vice President, Business Development

Cougaar Software, Inc.
Todd Carrico, Founder and Chief Executive Officer

Cignal
Eric Fiterman, Chief Technology Officer

From Prize Challenge to Operations: Lessons from the xVIEW Challenge

Carol Smith
Senior Research Scientist, Human Machine Interaction, Software Engineering Institute, Carnegie Mellon University
Moderator

Bryce Goodman
Chief Strategist, Artificial Intelligence & Machine Learning, DIU

Aaron Reite
Senior Staff Scientist, National Geospatial-Intelligence Agency

Richard Marcum
R&D Scientist, National Geospatial-Intelligence Agency

2:55 – 3:10 pm EDT

EXHIBIT/NETWORKING BREAK

3:10 – 4:10 pm EDT

AI Capabilities Center Presentations

ENSCO
Wil Myrick, Chief Engineer, Positioning, Navigation, & Timing

Skydio
Chuck McGraw, Director, Federal Sales

Trans-Providentia
Ashraf Gaffar, Technology Director

AI for Public Health, Biosecurity, and Humanity: AI for Health, Homeland Defense, and Disaster Relief

Dr. Josh Broadwater
Group Supervisor, Applied Physics Laboratory, Johns Hopkins University
Moderator

CAPT Hassan Tetteh, USN
Lead, Health Mission, JAIC, U.S. Department of Defense

Dr. William Streilein
Principal Staff, Biotechnology & Human Systems Division, Lincoln Laboratory, MIT

AI for Defense Intelligence, and Homeland Security: DoD AI

Bryan Lane
Mission Director, Business Process Transformation, JAIC, U.S. Department of Defense; Co-Founder, AI Center of Excellence, General Services Administration

4:10 – 4:30 pm EDT

EXHIBIT/NETWORKING BREAK

4:30 – 5:30 pm EDT

AI Capabilities Center Presentations

Siemens Digital Industries Software
Glenn Rosen, Business Developer, Digital Solutions

Orion Labs, Inc.
Greg Albrecht, Chief Technology Officer and Co-Founder

Gantz-Mountain Intelligence Automation Systems, Inc.
Greg Wilson, Co-Founder and Vice President

National Security Commission on AI Report: Industry Response

4:30 – 5:00 PM EDT

Graham Gilmer
Vice President, AI Services, Booz Allen Hamilton

AI for Manufacturing and Supply Chain: AI and the Defense Supply Chain after COVID-19

Eric Chewning
Partner, McKinsey
Moderator

Jennifer Bisceglie
Chief Executive Officer, Interos

Jeffrey Dodson
Global Chief Information Security Officer, BAE Systems, Inc.

5:30 – 5:35 pm EDT

CLOSING REMARKS

Gen Hawk Carlisle, USAF (Ret)
President and Chief Executive Officer, NDIA

THURSDAY, MARCH 25

National Security Commission on Artificial Intelligence Public Day

10:00 – 10:05 am EDT

OPENING REMARKS

YII Bajraktari
Executive Director, NSCAI

10:05 – 11:05 am EDT

NSCAI COMMISSIONER PANEL

Hon. Katharina McFarland
Commissioner, NSCAI

Dr. Steven Walker
Chief Technology Officer, Lockheed Martin

Dr. Christopher Kirchhoff
Senior Fellow, Schmidt Futures

11:05 – 11:25 am EDT

EXHIBIT/NETWORKING BREAK

11:25 am – 12:25 pm EDT

MORNING KEYNOTE

Dr. Eric Schmidt
Chairman, NSCAI

12:25 – 12:30 pm EDT

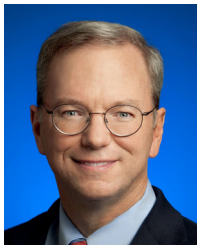
CLOSING REMARKS

Kevin McGinnis
Director, Research & Analysis, NSCAI

NATIONAL SECURITY COMMISSION ON ARTIFICIAL INTELLIGENCE

The Fiscal Year 2019 John S. McCain National Defense Authorization Act (P.L. 115-232) established the National Security Commission on Artificial Intelligence (NSCAI) as an independent Commission "to consider the methods and means necessary to advance the development of artificial intelligence, machine learning, and associated technologies to comprehensively address the national security and defense needs of the United States." To Learn more about the Commission, please visit www.nscai.gov.

COMMISSION BIOGRAPHY



DR. ERIC SCHMIDT

Chairman, National Security Commission on Artificial Intelligence

Eric Schmidt is Founder of Schmidt Futures.

Eric is also Technical Advisor to Alphabet Inc., holding company of Google Inc, where he advises its leaders on technology, business and policy issues.

Eric was Executive Chairman of Alphabet from 2015 – 2018, and of Google from 2011 – 2015. From 2001 – 2011, Eric served as Google's Chief Executive Officer, overseeing the company's technical and business strategy alongside founders Sergey Brin and Larry Page. Under his leadership, Google dramatically scaled its infrastructure and diversified its product offerings while maintaining a strong culture of innovation, growing from a Silicon Valley startup to a global leader in technology.

Prior to joining Google, Eric was the chairman and CEO of Novell and chief technology officer at Sun Microsystems, Inc. Previously, he served on the research staff at Xerox Palo Alto Research Center (PARC), Bell Laboratories and Zilog. He holds a bachelor's degree in electrical engineering from Princeton University as well as a master's degree and PhD in computer science from the University of California, Berkeley.

Eric was elected to the National Academy of Engineering in 2006 and inducted into the American Academy of Arts and Sciences as a fellow in 2007. Since 2008, he has been a trustee of the Institute for Advanced Study in Princeton, New Jersey. Since 2012, Eric has been on the board of the Broad Institute and the Mayo Clinic. Eric was a member of the President's Council of Advisors on Science 2009 – 2017. In 2013, Eric and Jared Cohen co-authored the *New York Times* bestselling book, *The New Digital Age: Transforming Nations, Businesses, and Our Lives*. In September 2014, Eric published his second *New York Times* bestseller, *How Google Works*, which he and Jonathan Rosenberg co-authored with Alan Eagle. In April 2019, Eric published his third *New York Times* bestseller, *Trillion Dollar Coach: The Leadership Playbook of Silicon Valley's Bill Campbell*, which he co-authored with Jonathan Rosenberg and Alan Eagle.

Eric became the Chairman of the Department of Defense's Innovation Board in 2016 and was awarded the Department of Defense Medal for Distinguished Public Service in January of 2017 by Secretary of Defense Ashton Carter. He is Chairman of the U.S. National Security Commission for Artificial Intelligence. He is a member of NASA's National Space Council User Advisory Group, which is chaired by the Vice President. Eric is an MIT Visiting Innovation Fellow, member of the Advisory Board for MIT IQ, member of the MIT Commission on the Work of the Future, member of the MIT CEO Advisory Board, and member of the MIT Schwarzman College of Computing Advisory Council. Eric is founder of Schmidt Futures, which helps exceptional people do more for others by applying science and technology thoughtfully and working together across fields.

NDIA Connect

AN ONLINE COMMUNITY FOR DEFENSE PROFESSIONALS

Various specialized communities are available for you to join and use, all while enhancing your Division and Chapter participation and growing your network.

As the National Defense Industrial Association's members-only online community, NDIA Connect offers 24/7 exclusive access to content, contacts, and collaboration capabilities. Each day, defense professionals from around the world post their thoughts, questions, and answers related to topics ranging from cybersecurity and the space domain to international trade regulations and human systems. Log in today to join these conversations and take advantage of all that NDIA Connect enables:

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- Stay up to date on NDIA upcoming events, whitepapers, policies, and much more
- Network with colleagues in your field and any other
- Collaborate on projects and documents of all kinds
- Plan meetings, seminars, webinars, conferences, or any NDIA-related event
- Foster discussion, promote innovation, and grow your network

Log in today at Connect.NDIA.org

BIOGRAPHIES

MIKE BROWN

Director, Defense Innovation Unit

Michael Brown is the Director of the Defense Innovation Unit (DIU) at the U.S. Department of Defense. DIU, established in 2015, fields leading-edge commercial capabilities to the military faster and more cost-effectively than traditional defense acquisition methods. With offices in Silicon Valley, Boston, Austin, and at the Pentagon, DIU is embedded in key innovation ecosystems across the country and builds direct relationships with organizations that strengthen our national security innovation base.

Previously, Michael served from 2016 – 2018 as a White House Presidential Innovation Fellow at DoD. He is the co-author of a Pentagon study on China's participation in the U.S. venture ecosystem, a catalyst for the Foreign Investment Risk Review Modernization Act (FIRRMA). FIRRMA was signed into law in August 2018 and provided expanded jurisdiction to the Committee on Foreign Investment in the United States (CFIUS).

Additionally, he led the initiative for a new DoD-sponsored investment vehicle, National Security Innovation Capital (NSIC) to fund dual-use hardware technology companies. Through August 2016, Michael was the CEO of Symantec Corporation, the global leader in cybersecurity and the world's 10th largest software company with revenues of $4 billion and more than 10,000 employees worldwide. Michael served as a member of Symantec's Board since its merger with Veritas in 2005. During his tenure as CEO (2014 – 2016), Michael led a turnaround developing a strategy focusing on its security business, sold its Veritas storage software business, hired a new executive leadership team and improved operating margins 300 basis points. Additionally, he led the articulation of a new company culture fostering innovation.

Michael is the former Chairman & CEO of Quantum Corporation (1995 – 2003), a leader in the computer storage industry. As CEO of Quantum, the company achieved record revenues of $6 billion as the world's leader in disk drives for personal computers and the world's largest tape drive business. He joined Quantum in 1984 and served on its Board from 1995 until 2014.

After leaving Quantum, Michael served as Chairman of EqualLogic, a storage array company. Dell acquired EqualLogic in 2008 for $1.4 billion, the largest all-cash deal for a venture-backed company up to that time.

He has been a member of the Board of Trustees of the Berklee College of Music in Boston since 2013 and previously served on the President's Advisory Council.

Michael received his BA in Economics from Harvard University in 1980 and his MBA from Stanford University in 1984.

LTGEN MICHAEL GROEN, USMC

Director, Joint Artificial Intelligence Center, U.S. Department of Defense

LtGen Michael S. Groen assumed his current position as the Director, Joint Artificial Intelligence Center, on 1 October 2020. As a member of the JAIC team, he leads the transformation of U.S. Joint warfighting and departmental processes through the integration of Artificial Intelligence.

Previously, General Groen was assigned to the National Security Agency and served as the Deputy Chief of Computer Network Operations, leading this premier Computer Network Exploitation organization. In 2018/2019, he was the Director for Intelligence, Joint Staff (J2), in direct support of the Chairman of the Joint Chiefs and the Joint Staff. He also served as the Vice J2. Prior to these assignments, General Groen was the Director of Marine Corps Intelligence (DIRINT), championing the redesign of intelligence capabilities into a Marine Corps Intelligence, Surveillance, and Reconnaissance Enterprise (MCISRE).

General Groen has served in operational, ground, air, and naval units with service in Central America, the Western Pacific, the Philippines, the Balkans, and Iraq. He served afloat with the 31st Marine Expeditionary Unit and supported aviation units in the United States and Okinawa. In 2003, he was assigned to the 1st Marine Division, initially as the Deputy Intelligence officer and then as the Intelligence Officer (G-2) in 2004. He has supported conventional combat and counter-insurgency operations. General Groen was a principal in the redesign of Marine Intelligence to meet the emerging demands of the Global War on Terror. Later, he served with the U.S. European Command as the Chief of Intelligence Planning for Europe and Africa. He was instrumental in transitioning intelligence processes into the Joint Intelligence Operations Center.

General Groen has commanded intelligence and operational units, including the 3d Radio Battalion and the Headquarters Battalion, 1st Marine Division, in Camp Pendleton, CA. He was also given additional duties as the Division's Chief of Staff. As a perpetual change-agent, he has served as a Combat Development, Requirements, and Acquisition officer. He served as the initial Director of the Commandant's Amphibious Capabilities Working Group (Capabilities), the Ellis Group (Expeditionary Futures), and as the Director of the Commandant of the Marine Corps Strategic Initiatives Group (SIG).

General Groen is a graduate of Calvin College in Grand Rapids, MI, with a Bachelor's Degree in Engineering. He has received multiple Master's Degrees from the University of Southern California (Systems Management) and from the Naval Postgraduate School (Electrical Engineering, Applied Physics.) He is a graduate of the Marine Corps Command and Staff College and the Naval War College. His personal decorations include the Defense Superior Service Medal, the Legion of Merit, the Bronze Star, and the Combat Action Ribbon.

DR. PETER HIGHNAM

Acting Director, Defense Advanced Research Projects Agency

Dr. Peter Highnam is the deputy director of the Defense Advanced Research Projects Agency (DARPA). From January 2020 – September 2020, he served as the acting director for an interim period, and then resumed his duties as the deputy director. He initially joined DARPA as the deputy director in February 2018.

Before coming to DARPA, Highnam was the director of research at the National Geospatial-Intelligence Agency (NGA), on assignment for two and a half years from the Office of the Director of National Intelligence (ODNI). Prior to that assignment, he served six years at the ODNI's Intelligence Advanced Research Projects Activity (IARPA), initially as an office director, and then as director.

Highnam worked from 2003 until 2009 in the U.S. Department of Health and Human Services (HHS). Initially, he served as a senior advisor in the National Institutes of Health (NIH), with responsibilities in areas where high-performance computing intersects with biomedicine and public health, including computational epidemiology. Subsequently, he served as senior advisor to the director of the Biomedical Advanced Research and Development Authority (BARDA), where he produced analyses in support of public health decision-making related to chemical, biological, radiological, and nuclear events, as well as naturally occurring disease.

From 1999 to 2003, Highnam was a DARPA program manager working in electronic warfare and airborne communications. His research in electronic warfare (the Advanced Tactical Targeting Technology (AT3) program) focused on inexpensive approaches to rapidly and accurately target enemy air defense radars from greater standoff distances. Highnam also investigated technology for high-performance, flexible, and secure networked communication between tactical aircraft (the Tactical Targeting Networking Technologies (TTNT) program), enabling plans to move away from systems such as Link 16.

Highnam worked for more than a decade in applied research at Schlumberger Limited, where he implemented industry-changing seismic data analytics on massively parallel computers. He also served as a director of a successful biomedical imaging startup company.

Highnam holds a PhD in Computer Science from Carnegie Mellon University, an MS in Mathematical Logic and the Foundations of Mathematics from the University of Bristol (United Kingdom), and a BS in Computer Science from the University of Manchester (United Kingdom).

Highnam has received the Department of Health and Human Services Secretary's Distinguished Service Award, the Office of the Secretary of Defense Medal for Exceptional Public Service, and the NGA Distinguished Civilian Service Award. He is a co-inventor on three patents related to commercial seismic exploration.

BOB WORK

Vice Chairman, National Security Commission on Artificial Intelligence

Secretary Robert O. Work is the Distinguished Senior Fellow for Defense and National Security at the Center for a New American Security and the owner of TeamWork, LLC, which specializes in national security affairs and the future of warfare. Secretary Work previously served as the Deputy Secretary of Defense, where he was responsible for overseeing the day-to-day business of the Pentagon and developing the Department's $600 billion defense program. He is widely credited for his work with leaders in the Department and the intelligence community on the "Third Offset Strategy," which aimed to restore U.S. conventional overmatch over its strategic rivals and adversaries. He was awarded

DoD's Distinguished Public Service Award (twice), the National Intelligence Distinguished Public Service Award, and the Chairman of the Joint Chiefs of Staff Joint Distinguished Civilian Service Award.

Prior to serving as Deputy Secretary, Secretary Work spent one year as CEO of the CNAS, after serving as Undersecretary of the Navy from 2009 – 2013 in the first Obama administration. As the principal civilian deputy to the Secretary of the Navy, he was responsible for the smooth running of the U.S. naval global business enterprise, with over 500,000 active duty personnel and 200,000 government civilians, and a budget of $160 billion. He was twice awarded the Department of the Navy's Distinguished Civilian Service Award.

Secretary Robert O. Work is the Distinguished Senior Fellow for Defense and National Security at the Center for a New American Security and the owner of TeamWork, LLC, which specializes in national security affairs and the future of warfare. Secretary Work previously served as the Deputy Secretary of Defense, where he was responsible for overseeing the day-to-day business of the Pentagon and developing the Department's $600 billion

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SPONSORS AND EXHIBITORS

PREMIER SPONSOR AND EXHIBITOR

Skydio is the leading U.S. drone manufacturer and world leader in autonomous flight. Skydio leverages breakthrough AI to create the world's most intelligent flying machines for use by consumers, enterprises, and government customers. Founded in 2014, Skydio is made up of leading experts in AI, robotics, cameras, and electric vehicles from top companies, research labs, and universities from around the world. Skydio designs, assembles, and supports its products in the U.S. from its headquarters in Redwood City, CA, to offer the highest standards of supply chain and manufacturing security. Skydio is trusted by leading enterprises across a wide range of industry sectors and is backed by top investors and strategic partners including Andreesen Horowitz, Levitate Capital, Next47, IVP, Playground, and NVIDIA.

EXHIBITOR

Areté is an advanced science and engineering company that provides innovative solutions — from scientific discovery through production. Areté's smart systems include active and passive sensors, real-time processing, software, and complex algorithms that operate from seafloor to space.

Areté provides multi-domain, multi-discipline expertise and applications supporting the U.S. Navy, the U.S. Army, the U.S. Air Force, the U.S. Marine Corps, the Missile Defense Agency, the intelligence community, the U.S. Department of Energy, and commercial energy exploration companies.

EXHIBIT HALL HOURS

TUESDAY, MARCH 23
10:00 am – 6:00 pm EDT

WEDNESDAY, MARCH 24
10:00 am – 6:00 pm EDT

THURSDAY, MARCH 25
10:00 am – 1:00 pm EDT

EXHIBITOR

Elbit Systems of America, headquartered in Fort Worth, Texas, is a leading provider of high-performance products, system solutions, and support services focusing on the defense, homeland security, law enforcement, commercial aviation, and medical instrumentation markets. With facilities throughout the U.S., Elbit America is dedicated to supporting those who contribute daily to the safety and security of the United States. Elbit Systems of America, LLC is wholly owned by Elbit Systems Ltd. (NASDAQ: ESLT and TASE: ESLT), a global high technology company engaged in a wide range of programs for innovative defense and commercial applications. For additional information, visit: www.ElbitAmerica.com or follow us on Twitter, LinkedIn or Instagram.

EXHIBITOR

ENSCO has expertise in Machine Learning (ML) applications for detection and classification of signatures from various sensor modalities including RF, seismic, and acoustic. These ML algorithms have been implemented on low-SWAP platforms and integrated with state-of-the-art Software Defined Radios (SDRs) and advanced sensing methodologies, allowing ENSCO to rapidly deploy this capability to customers who need accurate and autonomous threat detection or surveillance capabilities.

ENSCO, Inc., and its wholly owned subsidiaries represent a $140 million international technology enterprise, headquartered in the Washington, D.C., area. For more than 50 years, the ENSCO group of companies has been providing engineering, science and advanced technology solutions that guarantee mission success, safety and security to governments and private industries worldwide. ENSCO operates in the defense, transportation, aerospace, and intelligence sectors.

INTRUSION
Protect everything. Trust nothing.

VIRTUAL BRIEFCASE (eBAG) SPONSOR AND EXHIBITOR

In war, your strategy is only as good as your intelligence. That's why we've applied almost 40 years of Consulting & Threat Analysis experience with the DoD to the creation of cybersecurity solutions that actually work.

INTRUSION TraceCop™, a Big Data Cloud that contains more than 25 years of data about the entire Internet, has the history needed to understand hidden ownership and associations today. This unmatched set of data makes TraceCop the premier forensic cybersecurity tool.

INTRUSION Savant™ is a network monitoring tool that leverages the rich data available in TraceCop to identify suspicious traffic in real-time. As a multi-protocol network decoder and analyzer utilizing several original patents to uniquely capture, analyze and store all bidirectional traffic, Savant asserts a strong forward defense position for network security teams.

INTRUSION Shield™ is a managed security platform that leverages Savant technology to inspect every packet of data on a network, making it impossible for malicious entities to hide on a network. It then uses real-time AI to actively kill dangerous connections before they can damage your organization. With nearly zero false positives (.001%), Shield's protection is unmatched. Our plug-n-play technology means Shield is surprisingly easy to implement, protecting your network right out of the box.

Until now, the cybersecurity industry has failed by underestimating the enemy. It's time for a real defense. Shield your network today.

LMI

VIDEO SPONSOR AND EXHIBITOR

LMI is a consultancy dedicated to powering a future-ready, high-performing government, drawing from expertise in digital and analytic solutions, logistics, and management advisory services. We deliver integrated capabilities that incorporate emerging technologies and are tailored to customers' unique mission needs, backed by objective research and data analysis. Founded in 1961 to help the Department of Defense resolve complex logistics management challenges, LMI continues to enable growth and transformation, enhance operational readiness and resiliency, and ensure mission success for federal civilian and defense agencies.

scale

EXHIBITOR

Scale AI is a technology company that builds infrastructure for the most ambitious artificial intelligence projects in the world. Scale addresses the challenges of developing AI systems by focusing on the data - the foundation of all AI applications. Scale provides a single platform to manage the entire ML lifecycle from dataset selection, data management, and data annotation, to model development. Starting with the foundation of data labeling, our platform combines machine learning and human insight to generate high-quality, ground truth data. With intelligent data, our customers are able to accurately train machine learning models, enabling safer and smarter operations across industries focused in Computer Vision, Speech, and Content and Language applications. Founded in 2016, Scale AI closed its Series D round of funding in December 2020 with a valuation of $3.5B.

SHIELD AI

EXHIBITOR

Shield AI develops artificial intelligence products to protect the lives of military personnel and civilians in conflict zones. Its AI software enables self-driving capabilities for unmanned systems to intelligently and autonomously operate without reliance on a pilot, communications, or GPS.

UNISYS | Securing Your Tomorrow®

EXHIBITOR

Unisys is a global IT services company that delivers successful outcomes for the most demanding businesses and governments. Unisys offerings include digital workplace services, cloud and infrastructure services and software operating environments for high-intensity enterprise computing. Unisys integrates security into all of its solutions. Unisys has a rich history of empowering government agencies and defense professionals to achieve their mission-critical needs and push technological boundaries. Visit the Unisys booth for more information on all that we're doing to enable the defense industry to achieve national security prominence. For more information on how Unisys delivers for its clients across the government, financial services and commercial markets, visit www.unisys.com.

EXHIBITOR

Deep Investigation Platforms for Your Most Complex Challenges

Voyager Labs, a world leader in the AI space, enables teams to acquire actionable, previously unattainable insights by analyzing and understanding massive amounts of open, deep, and dark web data. Leading government, law enforcement agencies and corporations around the world use our award-winning, cutting-edge technology, coupled with superior domain expertise, to exponentially increase productivity of their investigative teams and ultimately mitigate and prevent risks to make a safer world.

To learn more about our suite of investigative solutions, visit www.voyagerlabs.co or email us at team@voyagerlabs.co

Air Combat Simulation and Training:
Challenges and Opportunities for AI in the Cockpit

Col Dan “Animal” Javorsek, PhD, USAF

Program Manager, DARPA/STO

Trusted, scaleable, human-level, AI-driven autonomy for air combat simulation and training

NDIA National Security AI Conference and Exhibition

AI for Flight Simulation and Training

March 23, 2021

Source: U.S. Navy

JALOPNIK

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HOME LATEST NEWS JALOPNIK REVIEWS CAR BUYING NICE PRICE OR NO DICE TECH THE INVENTORY

Navy Makes History With Integrated Unmanned-Manned Carrier Ops

Tyler Rogoway
8/17/14 1:56PM

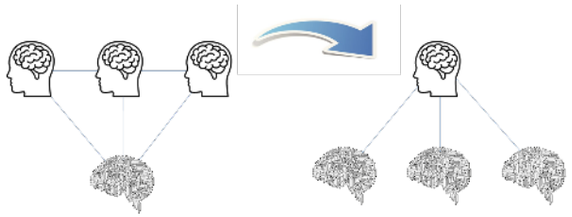
61.0K 45 8

The US Navy just announced that it has successfully integrated unmanned and manned carrier operations for the first time. This is huge, as it's pretty much the first step in how the Navy will work not for the next few years, but probably for

Source: U.S. Navy

Source: Scaled Composites

Future U.S. combat success requires AI-capable aircraft



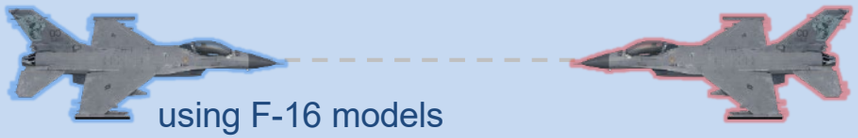
“In the future, it is desirable to have each operator control multiple unmanned systems, thus shifting the human’s role from operator towards mission manager.”

Unmanned Systems Roadmap, 2018

Use existing methods designed for humans to mature autonomy and build trust

AlphaDogfight Virtual Finals

1v1 within visual range air-to-air combat (aka dogfighting) in Sim



using F-16 models

game				
AI	IBM DEEP BLUE	AlphaGo	AlphaStar	AlphaDogfight
year	☑ 1997	☑ 2016	☑ 2019	☐ 2020+

Aurora Flight Sciences, A Boeing Company · EpiSci · Georgia Tech Research Institute · Heron Systems Inc. · Lockheed Martin · perspecta · physicsAI · SOARTECH

8 teams developing & competing combat autonomy against:

gov't provided AI

each other

human pilots

August 18th

Performer AI
vs
Government AI

August 19th

Performer AI
vs
Performer AI

	Aurora	EpiSci	GTRI	Heron	Lockheed	Perspecta	PhysicsAI	SoarTech
Aurora		5	6	7	1	4	3	2
EpiSci	5		7	6	2	1	4	3
GTRI	6	7		5	3	2	1	4
Heron	7	6	5		4	3	2	1
Lockheed	1	2	3	4		5	6	7
Perspecta	4	1	2	3	5		7	6
PhysicsAI	3	4	1	2	6	7		5
SoarTech	2	3	4	1	7	6	5	

August 20th

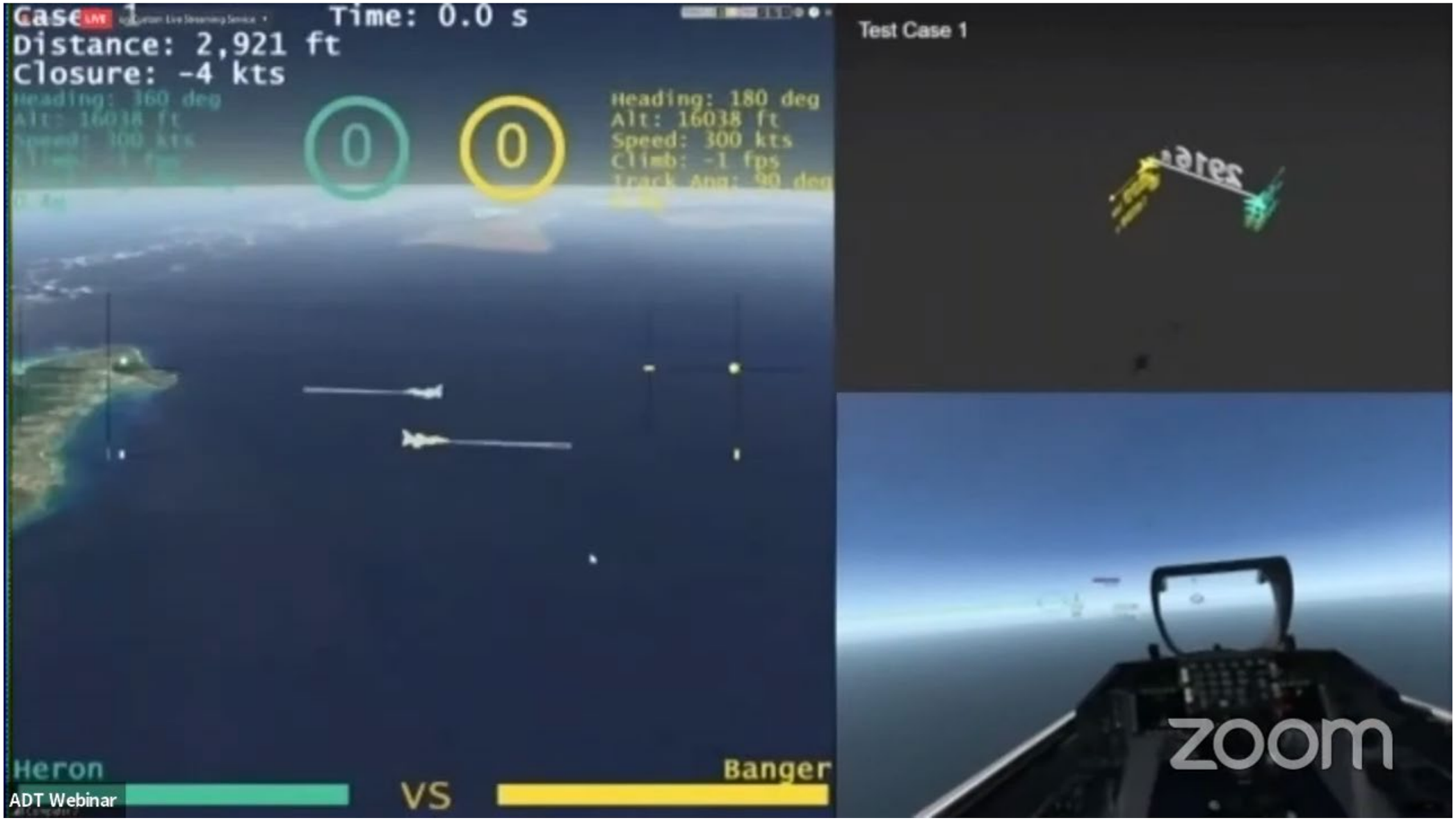
Top Performer AI
vs
Human Pilot

https://youtu.be/NzdhIA2S35w?t=10932

AlphaDogfight Virtual Finals on YouTube

https://youtu.be/NzdhIA2S35w?t=10927

Heron vs Banger, Engagement #1



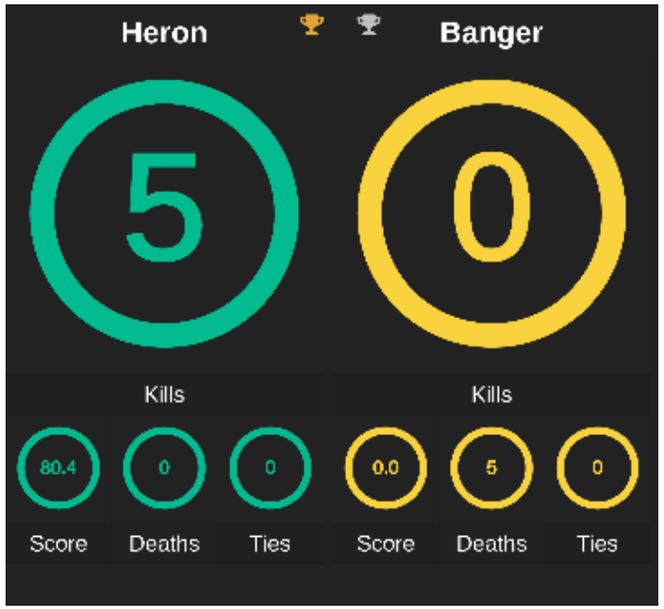
https://youtu.be/NzdhIA2S35w?t=16808

AI is coming to the cockpit

AlphaDogfight competition proves AI outperforms human in aspects of air combat

AlphaDogfight combat autonomy beat human pilot 5-0 in simulated air combat in August 2020

*"The demonstrated success of AlphaGo, and more recently, AlphaStar, in defeating all competitors in one of the world's most complex real-time strategy video games suggests that **in any structured contest between offense and defense, AI will dominate humans**." – Allison/Schmidt*



- Able to develop Top Gun pilot beating AI in months
- Without commercial titans of AI
- Without break through technical advances (mostly applied)
- Debatable: where the human sits on the loop
- Not debatable: without AI assistance human pilots will lose to AI assisted adversary

"The AI agent's resounding victory demonstrated the ability of advanced algorithms to outperform humans in virtual dogfights. These simulations will culminate in a real-world competition involving full-scale tactical aircraft in 2024." -- SecDef Esper Sept2020

Build and maintain the custody of trust through increasingly realistic experimentation

AlphaMosaic

global

Heterogeneous Multi-aircraft Strategic Behaviors

Multi-aircraft Operational Behaviors

AlphaDogfight

local

Team Tactical Behaviors (2v1, 2v2)

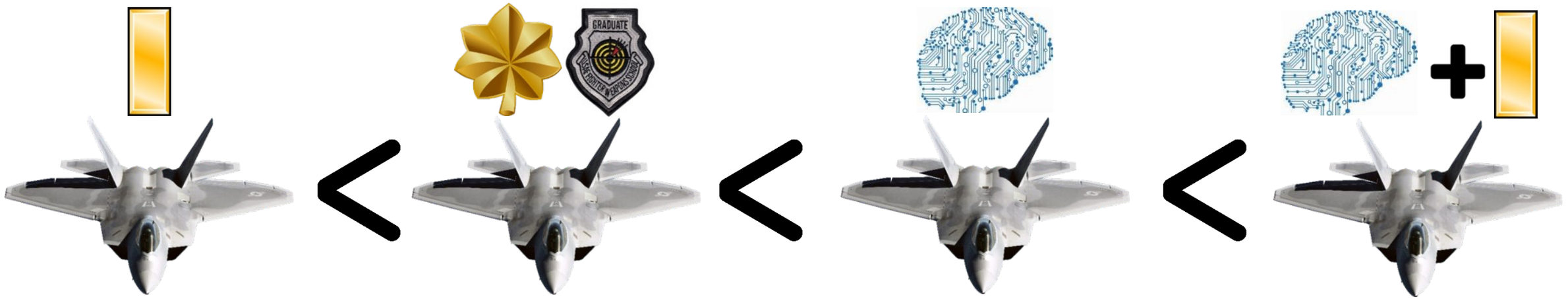
Individual Tactical Behaviors (1v1)

Maneuver

Modeling & Simulation → **Commercial UAVs** → **Combat Aircraft**

AI for Simulation & Training

- Challenges
  - Performance
  - Interfaces
  - Infrastructure
  - Validation & Verification
  - Safety/Novelty
- Opportunities
  - Reframe the current emphasis on routine procedures
  - Modeling & Simulation will continue to lead
  - Constructive, Virtual, Live simulation & training



Revolutionary Trends in Military Training

23 March 2021

Lt Col Eric Frahm
19th AF Liaison to DIU
Mountain View, CA
efrahm@diu.mil

Foundational Principles of Next-Generation Training

- Competency based, not time based -- Progress with student understanding
- On-Demand, On-Command Availability -- Learning available any time and place
- Self-directed learning should be encouraged -- Learners learn best when they are in charge of their own journey
- Self-directed learners should rise to the top -- Our systems should identify and reward "aggressive learners"

Source: Roberson & Stafford, "Redesigned Air Force Continuum of Learning," AU Press, 2017

3 Meta Trends Revolutionizing Training

- XR Technologies and Commercial Gaming Engines:
  - Collapse the cost of meaningful simulation
- Scalable Computing (cloud):
  - Data easily shared and accessible
  - Computational limitations largely a thing of the past
- Machine Learning and Artificial Intelligence:
  - Surface key insights
  - Reduce instructor burden
  - Analyze student, instructor and systemic performance

Goal

Architecture is documented and accessible with extensive data rights to all APIs and I/O data

Components of the platform can be replaced or used elsewhere with ease

Meaningful, effective simulation available at the time and place of the student's choosing

Expandable across many users and devices

Platform is accessible to many applications

Internet of Things: Spectrum of devices contributing data

Deploy ubiquitous simulation through an Open, Modular, Scalable, and extensible IOT network.

Establish a robust data analysis architecture throughout the aerospace environment.

Problem Overview

Challenge:

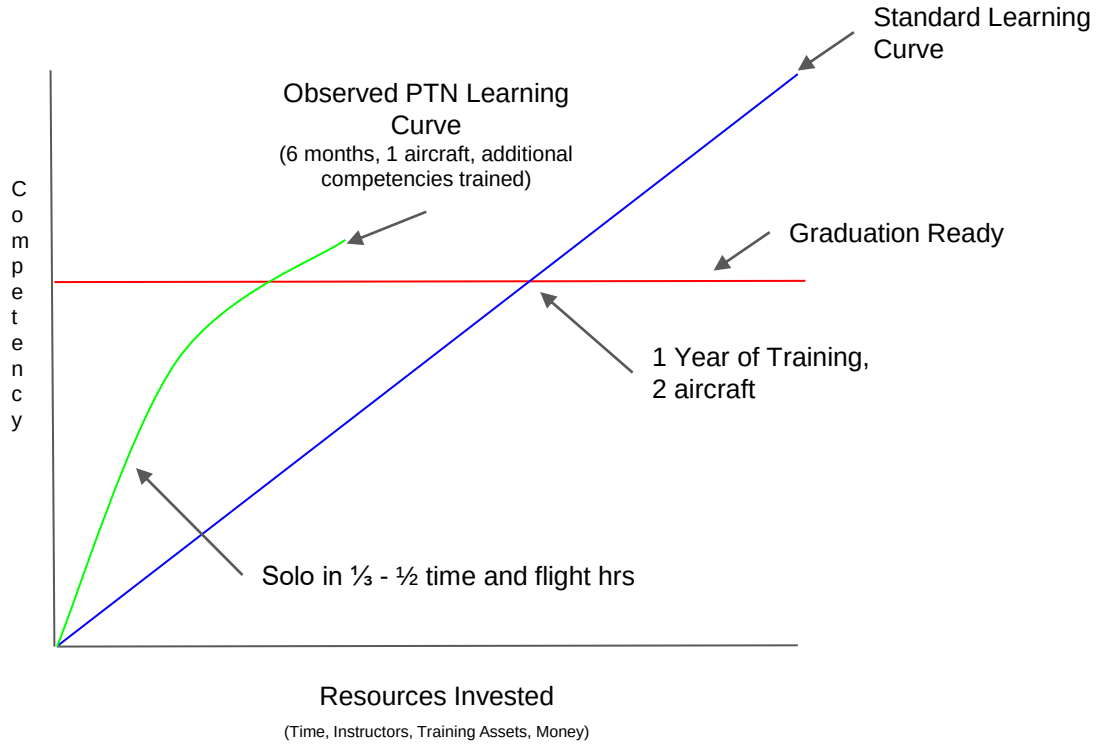
- USAF pilot production is 80% of requirement and unscalable
- Chronic retention issues have eroded experience of the force
- Pilot training remains set on industrial, time-based model (hrs flown=quality)

Opportunity:

- Leverage proven adult learning techniques
- Modernize training tools

Future Growth:

- Open, extensible system
- Detailed tracking of student, instructor performance
- Data architecture to advance learning science



Joint Immersive Training System

An Immersive Environment for Military Aviation Training

Program Objectives

- **Scalable, production-ready solution for UPT 2.5**
- **Establish common architecture for future efforts**

Industry Partners:

- **Vertex Solutions** -- Hardware, software, logistics
- **Google** -- Scalable computing infrastructure, ATO
- **CAE** -- LMS, competency mapping, adaptive syllabus
- **Discovery Machine** -- Autonomous Flight Instructo

STAY UP TO DATE

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DEFENSE
INNOVATION UNIT

Using AI to Understand Relationships Between People, Places, and Things

March 2021

PANELISTS

- Jaime Fitzgibbon
  Program Manager, AI/ML Portfolio
  Defense Innovation Unit

- Jared Dunnmon
  Technical Director, AI/ML
  Defense Innovation Unit

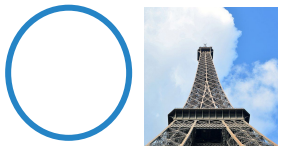
- Carol Smith
  Sr. Research Scientist in HMI
  Software Engineering Institute,
  Carnegie Mellon University

- William “Russ” Sears
  Sr. Intelligence Officer, Innovation & Information Division
  United States Africa Command

- Brian Drake
  Branch Chief, Executive Support
  Operation
  Defense Intelligence Agency

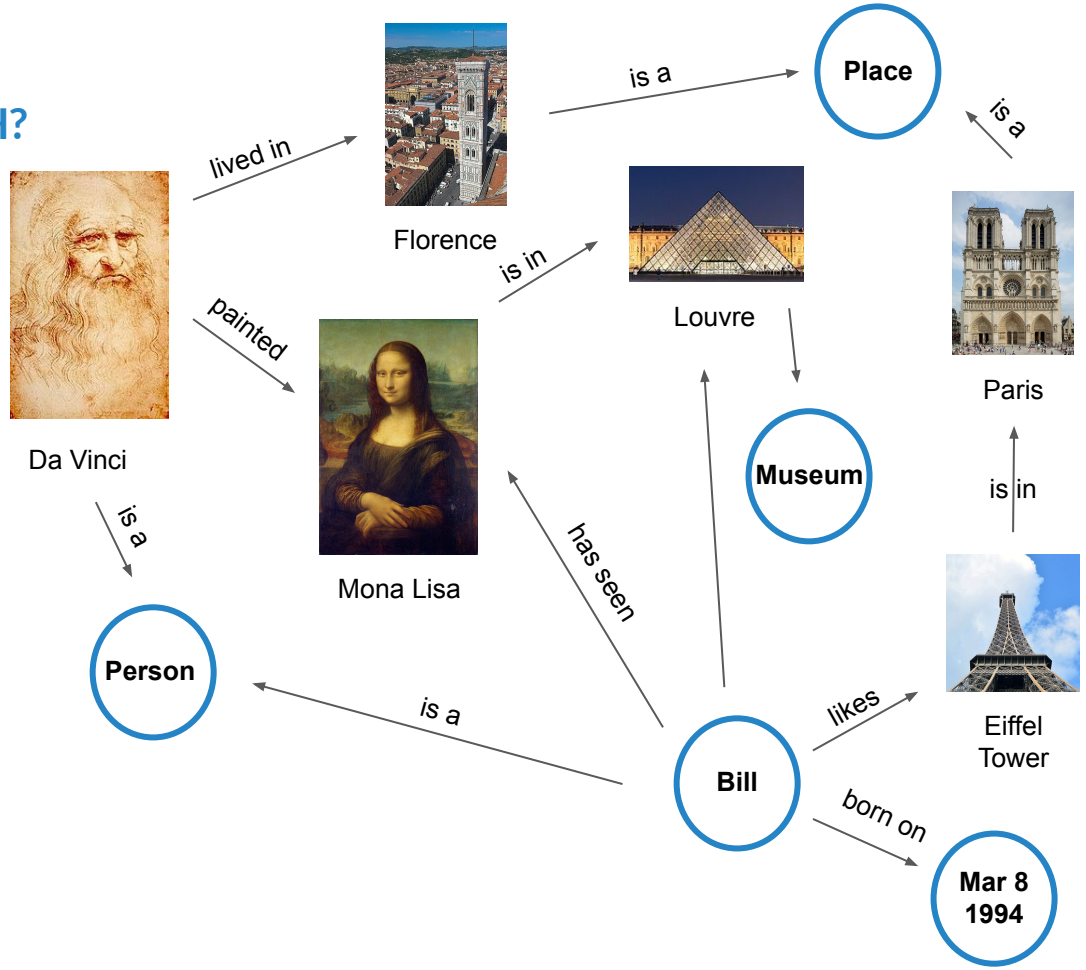
WHAT IS A KNOWLEDGE GRAPH?

A collection of *nodes* -- usually people, places, or things -- connected by a set of *edges* defining the relationships between them

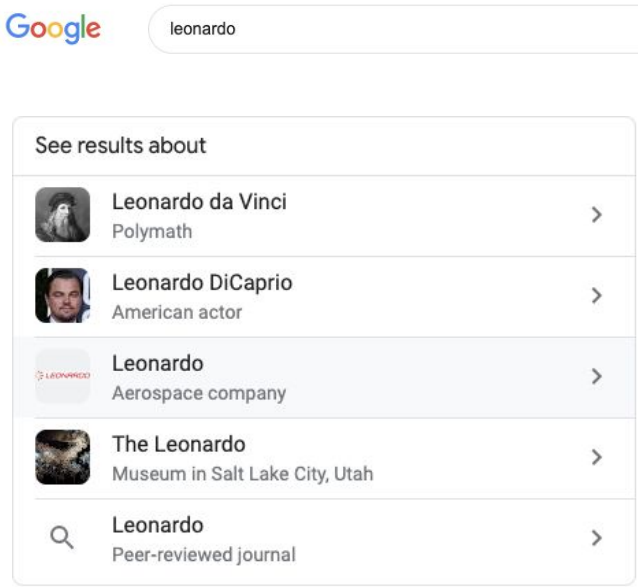


Nodes

Edges



WHAT ARE KNOWLEDGE GRAPHS USED FOR?

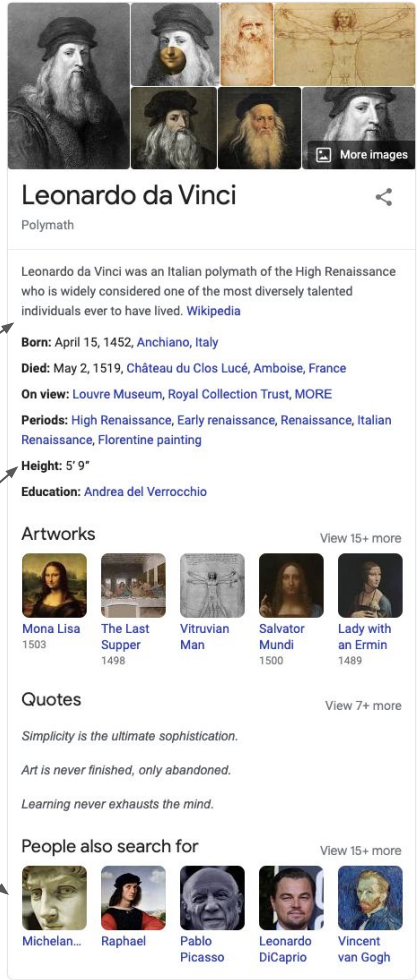


Disambiguation:
Leonardo

Summarization:
Leonardo da Vinci

Question Answering:
How tall was Leonardo da Vinci?

Discovery:
Other Artists and Leonardos



HOW ARE KNOWLEDGE GRAPHS BUILT, STORED AND COMPUTED ON?

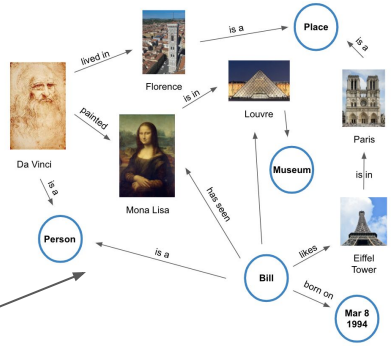
Step 1: Gather Unlabeled Data

Mona Lisa, also called **Portrait of Lisa Gherardini, wife of Francesco del Giocondo**, Italian **La Gioconda**, or French **La Joconde**, oil painting on a poplar wood panel by Leonardo da Vinci, probably the world's most famous painting. It was painted sometime between 1503 and 1519, when Leonardo was living in Florence, and it now hangs in the Louvre Museum, Paris, where it remained an object of pilgrimage in the 21st century. The sitter's mysterious smile and her unproven identity have made the painting a source of ongoing investigation and fascination.

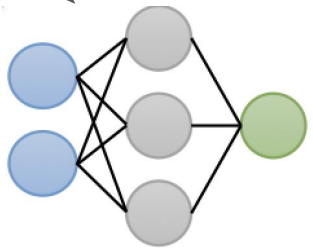
Entity 1	Entity 2	Painted By?	Lives In?
Mona Lisa	Leonardo	1	0
Leonardo	Florence	0	1
Mona Lisa	Florence	0	0

Step 2: Extract Entities and Relations

Step 3: Iterate, Refine, and Scale



Graph Database



Step 4: Graph Analysis

Quote: "Mona Lisa." *Encyclopedia Britannica*. https://www.britannica.com/topic/Mona-Lisa-painting

Real Life Applications

HOW DIU LEVERAGES THE POWER OF KNOWLEDGE GRAPHS

ADDRESSING CAPABILITY GAPS

- Efficient Data Aggregation for Augmented Intelligence
- Entity Linking at Scale
- Extracting Risk Patterns from Noisy Signals
- Analyst Upskilling

TO SOLVE REAL WORLD MISSION CHALLENGES

- Evaluating unofficial influencers' global activity toward advancing an adversary's priorities.
- Identifying anomalous activities in an area of interest (AOR) by organizations/persons tied to adversaries.
- Assessing an adversary's strategic plans via supply chain analysis.

PANELISTS

- Jaime Fitzgibbon
  AI/ML Portfolio
  Defense Innovation Unit

- Jared Dunnmon
  Technical Director, AI/ML
  Defense Innovation Unit

- Carol Smith
  Sr. Research Scientist in HMI
  Software Engineering Institute,
  Carnegie Mellon University

- William “Russ” Sears
  Analyst
  United States Africa Command

- Brian Drake
  Leadership Team Chief
  Defense Intelligence Agency

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DEFENSE INNOVATION UNIT

CELEBRATING 5 YEARS

Preparing the U.S. for a Superpower Marathon with China

Michael Brown
Director

TECH DOMINANCE IS THE NEW GLOBAL BATTLEGROUND

> **Success no longer goes to the country that develops a new technology first, but rather to the one that better integrates it and adapts its way of fighting.**
>
> 2018 National Defense Strategy

Game Changing Technologies

- AI
- Quantum
- Hypersonics
- Cyber
- Biotechnology
- 5G
- Space
- Autonomy

Image Source: Center for a New American Security

CHINA - THE PACING THREAT

Competing with the U.S. today—economically, geopolitically, ideologically, and militarily

Transforming its economy through advanced technology

- Leading in key strategic industries (MiC 2025)
- Acquiring foreign technology and know-how
- Fostering indigenous innovation
- State-sponsored projects
- National champions
- Using tech for political & societal control
- Civil-military fusion

DIMENSIONS OF THE CHINA THREAT

ECONOMIC

- Techno-nationalism
- Industrial policies
- WTO rules abuses

GEOPOLITICAL ALIGNMENT

- Belt and Road Initiative
- Economic coercion
- Asia by Asians

MILITARY

- Increased spending
- Overmatch neutralized
- Military-civil fusion

IDEOLOGICAL

- Authoritarianism
- Opposition to Western ideas
- Propaganda | Soft Power

U.S. AND CHINA: NOT A NEW COLD WAR

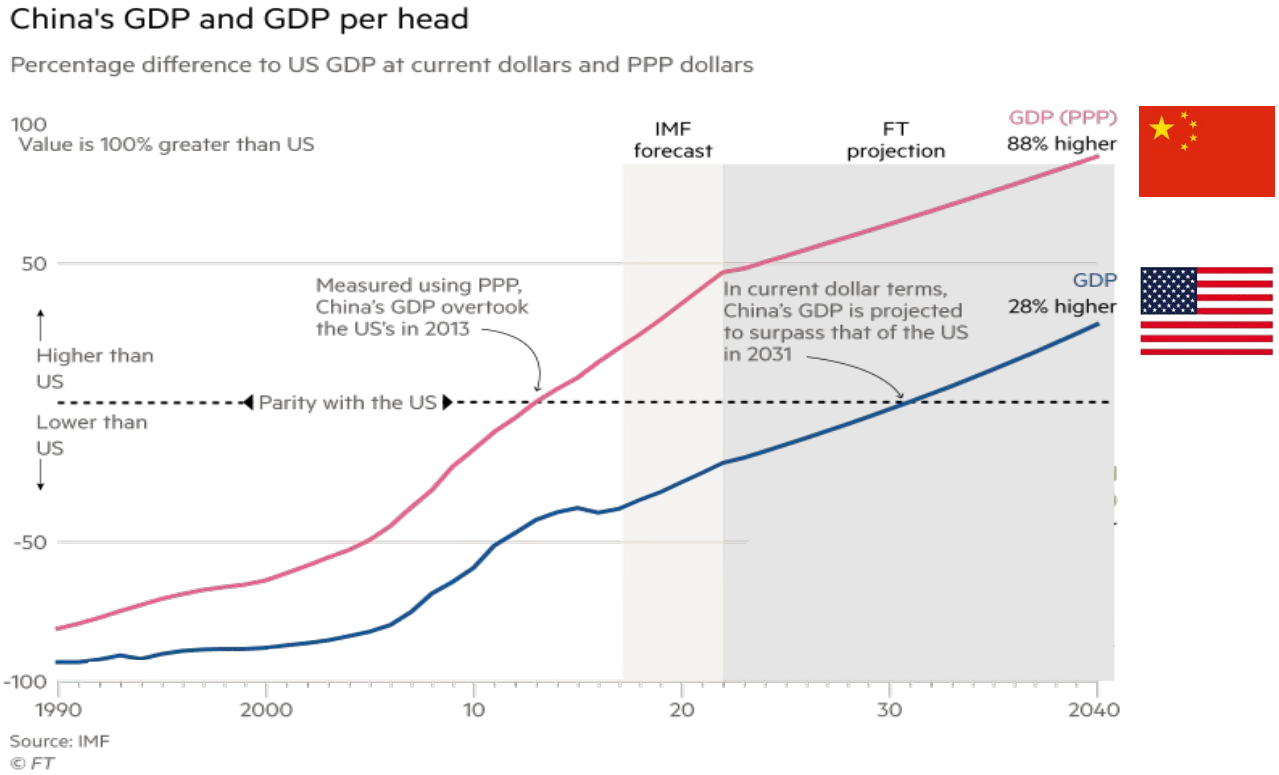
Compete where we Must, Cooperate where we Can

What is different from the Cold War?

1. China's economic scale
2. U.S. - China - Global economic integration
3. China's utilization of global institutions (i.e. WTO, IMF, World Bank, etc.)
4. China's pursuit of civil-military fusion

ECONOMIC CAPACITY

Primary Determinant of National Security



RELATIVE NATIONAL SECURITY STRENGTH

- Relative technology advantage —multiplier to economic capacity —indicates future economic growth
- Relative national security strength can change faster than economic capacity

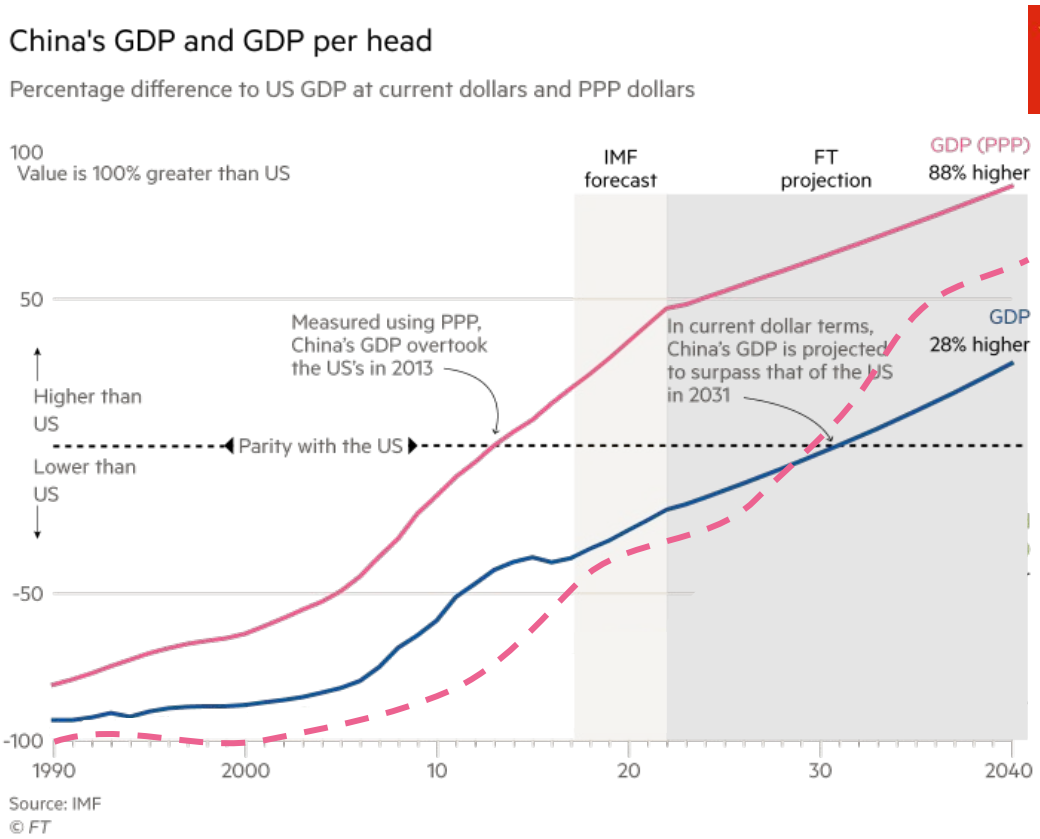
Relative National Security Strength =

Relative Economic Capacity **x** Relative Technology Advantage

↓ Relative GDP ($)

↓ $\sum_{1}^{n}$ T ratios

Technology advantages summed over all technologies (weighted by economic impact)



TECHNOLOGIES CURRENTLY AT RISK

Technologies Where China Leads the U.S. Today

Cryptocurrency
Small Drones
E-Commerce (700 million users)
Electric (Li-ion) batteries
Electric vehicles
Facial recognition software
Genetic data: genomics & medical histories
High-speed rail
Hypersonics
Mobile device manufacturing
Quantum communications (Micius)
Solar energy
Telecommunications — 5G Deployments
Ultra high-voltage electricity transmission
Wind energy

Technologies Where China is Challenging the U.S. Lead

Artificial intelligence
Biotechnology
Pharmaceuticals
Rocket launches into space
Quantum computing
Quantum sensors
Supercomputing

Commercial Implications

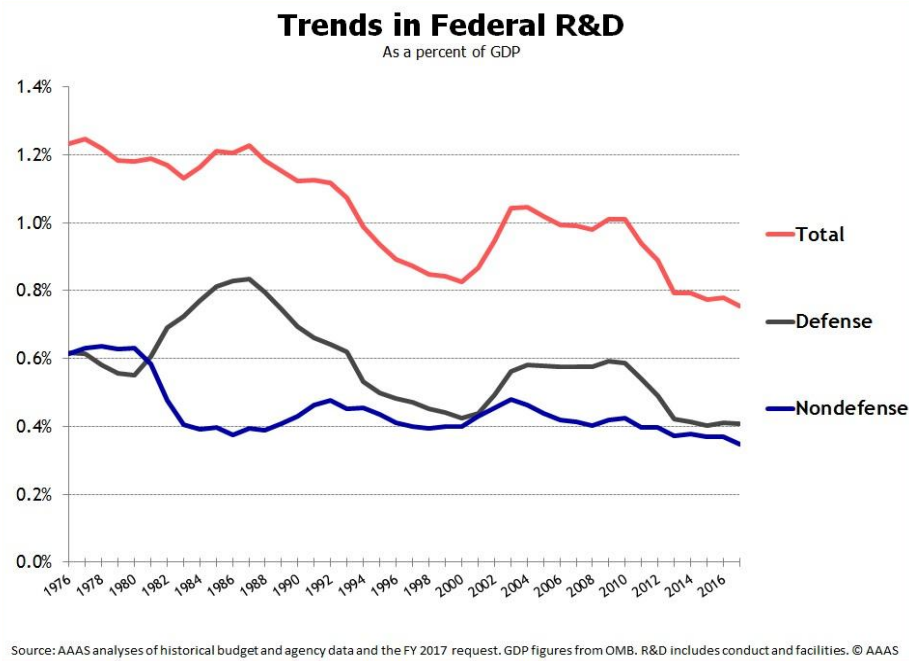
BGI华大

HUAWEI

dji

Disclaimer: The views, opinions, and assumptions expressed in this presentation are those of the author and do not reflect the official policy or position of any agency of the U.S. government.

U.S. FEDERAL R&D IS DECLINING



Source: AAAS analyses of historical budget and agency data and the FY 2017 request. GDP figures from OMB. R&D includes conduct and facilities. © AAAS

Implying:

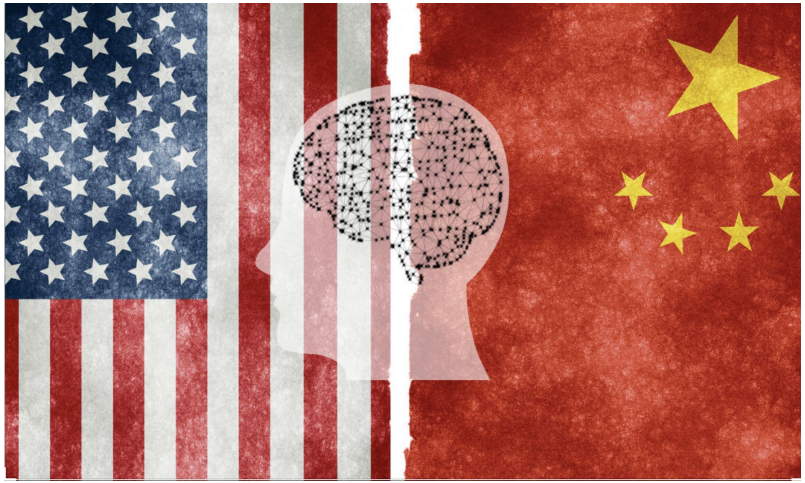
- **Fewer Breakthrough Innovations**
- **Fewer Economic Spillover Effects**

- Google Search Engine (NSF)
- GPS (DARPA, Navy, DoD)
- Supercomputing (DoD, National Labs)
- Internet (DARPA, NSF, UCLA)
- Smartphones – semiconductors, touch screens (NASA, USAF, DARPA-SEMATECH, NSF, SBIC)
- Shale Gas Hydraulic Fracturing (DOE, National Labs)
- 3D and 4D seismic imaging (DOE; MIT)
- LED Technology (DOE, USAF)
- MRI (NIH, NSF)
- Prosthetics (DARPA, VA)
- Human Genome Project (NIH, DOE)

At 0.7% of GDP, U.S. is behind China, Japan, Korea, Finland, Sweden, Denmark, and Germany

PREPARING THE UNITED STATES FOR THE SUPERPOWER MARATHON WITH CHINA

1. Bolster investment in basic R&D
2. Attract and develop human capital in STEM fields
3. Develop integrated U.S. economic statecraft
4. Increase long-term focus in U.S. capital markets and businesses



ACCELERATING COMMERCIAL TECHNOLOGY FOR U.S. NATIONAL SECURITY

U.S. SHARE OF GLOBAL R&D FUNDING IS DECREASING

1960s

Technologies funded or sponsored by USG and then transitioned to commercial sector:

- Microelectronics
- Touch screen
- GPS
- Space launch
- Satellite imagery

U.S. Defense Related (36%)

Other U.S. & USG (33%)

Rest of the World (31%)

2010s-Now

Technologies developing in the commercial sector rather than by USG:

- Biotechnology
- AI
- Mobile payments
- 5G
- Quantum computing
- Batteries & Power Systems

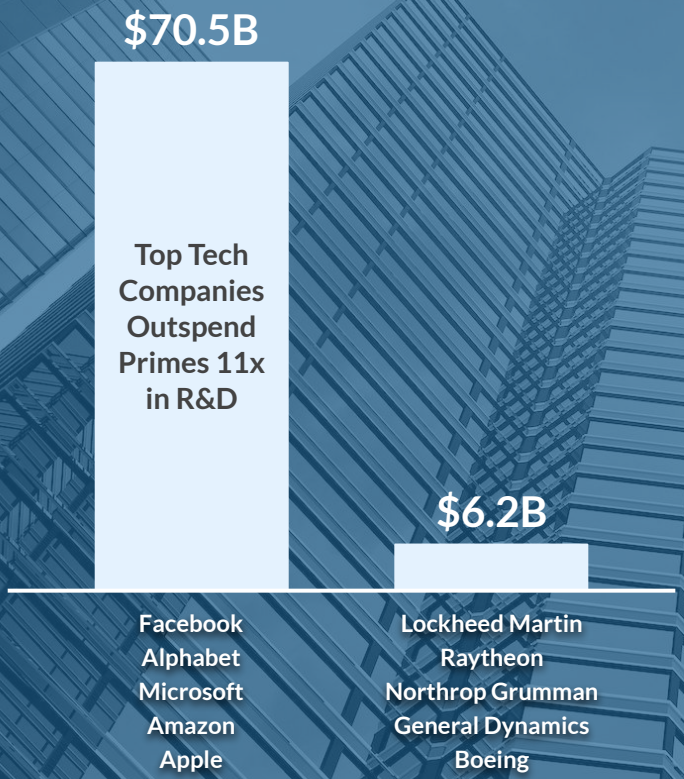
U.S. Defense Related (4%)

Other U.S. & USG (24%)

Rest of the World (72%)

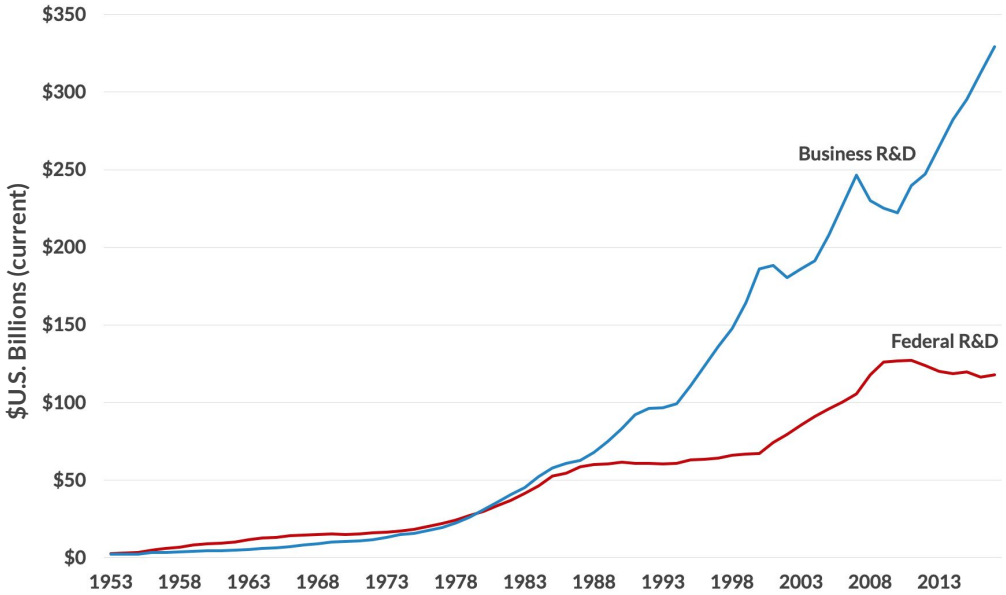
Data Source: Congressional Research Service

WHY COMMERCIAL



Data Sources: National Science Foundation, Defense News, Strategy&

U.S. R&D Expenditures by Source: 1953 - 2017



Source: National Science Foundation, National Patterns of R&D Resources: 2016–17 Data Update.

ALIGNED DEFENSE INNOVATION EFFORTS: Core DIU, NSIN, and NSIC

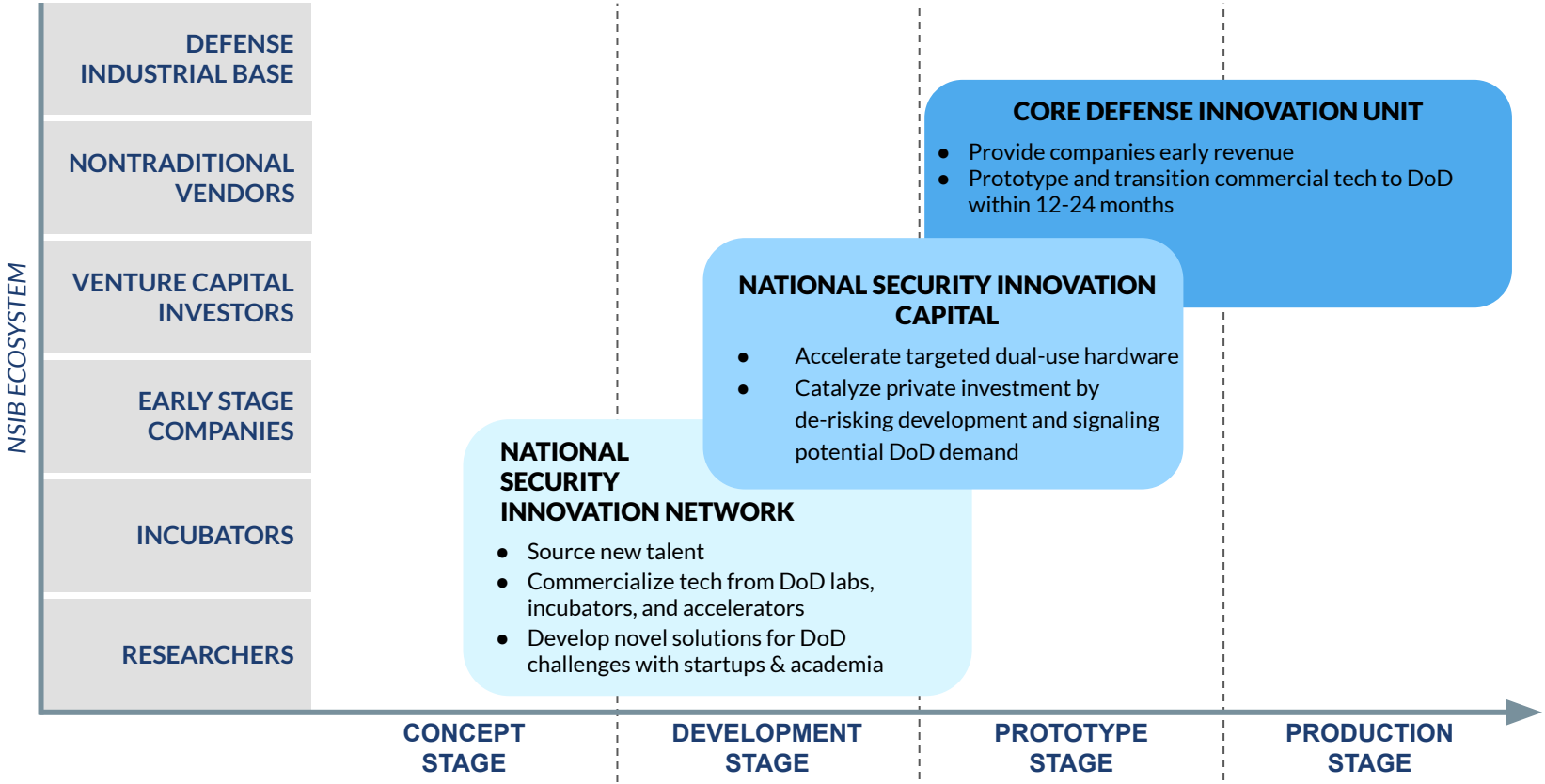
DIU is a fast-moving, cross-DoD organization focused exclusively on commercial companies to solve national security problems.

- **ACCELERATE**
  DoD adoption of commercial technology
- **TRANSFORM**
  Military capacity and capabilities
- **STRENGTHEN**
  The national security innovation base

National Security Innovation Network: Builds networks of innovators that generate new solutions to national security problems

National Security Innovation Capital: Accelerates development of dual-use tech and stimulates private investment

THREE ORGANIZATIONS COMPRISE DIU: ALL GROWING THE NATIONAL SECURITY INNOVATION BASE



WE FOCUS ON CRITICAL TECHNOLOGY AREAS

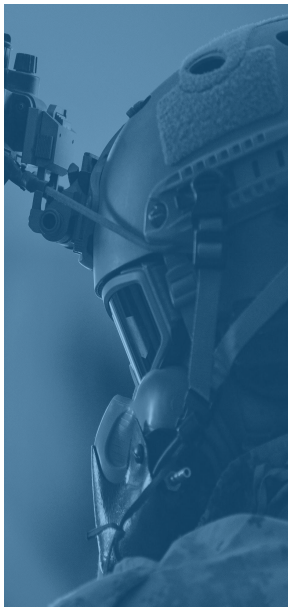
Where the Commercial Sector is in the Lead

Advanced Energy & Materials

AI/ML

Autonomy

Cyber



Human Systems

Space

BEST COMMERCIAL TECH TO DOD

DIU, with DoD partners, competitively selects the best technology to prototype, transition, and scale solutions.

Department of Defense

- Knowledge of and access to leading technologies
- Competitive prototype process-->proven solutions
- Delivery of capabilities in 12-24 months
- Solutions at commercial cost to save taxpayer $

Commercial Technology

- Simple process and fast time to award
- Access to large volume defense contracts
- Opportunity to solve high-impact national security problems

STRENGTHEN THE NSIB

Broad & Deep Integration Into Tech Ecosystems

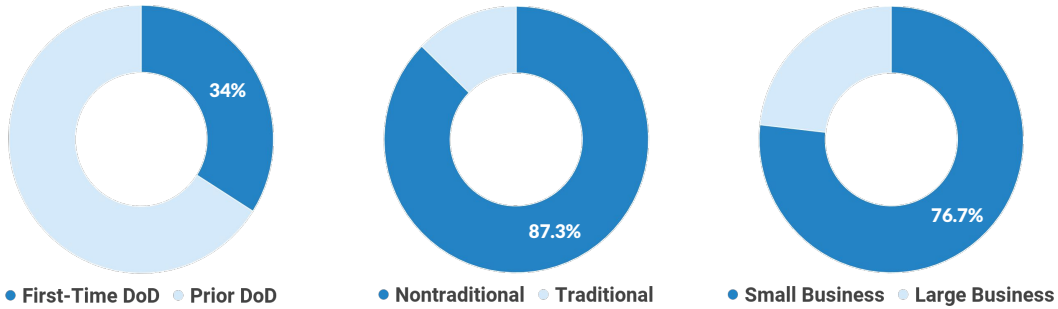
2,300+ Companies Have Responded to DIU Solicitations

41 COMPANY PROPOSALS RECEIVED PER SOLICITATION IN 2020

- 50% increase compared to 2019
- 60-90 days-to-award goal

35% INCREASE IN NEW PROJECTS STARTED COMPARED TO 2019

189 Unique Companies Have Received DIU Awards



Predictive Maintenance

E-3 Sentry

Joint Light Tactical Vehicle

Data shown here represents DIU awards from June 2016 - December 2020

DIU TRANSFORMATIVE PROJECT: BLUE sUAS INITIATIVE

Creating Viable Alternatives to Chinese Drones

Solution

- Standardize product: Enables units throughout the joint force to field large numbers of sUAS (refreshing tech frequently).
- Aggregate USG buying power: Create viable U.S. and friendly-nation industrial base to produce best in class capabilities and achieve scale economies for vendors.

DoD Partners

- Army PEO Aviation
- Navy/USMC PMA-263
- USAF SAF/CN
- GSA
- DHS/CBP

Commercial Vendors

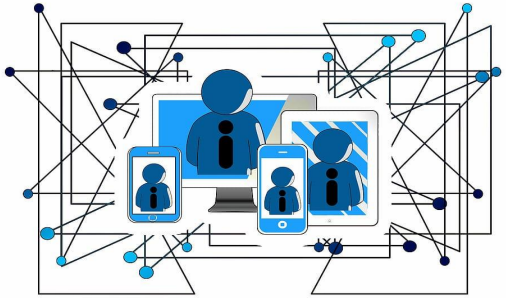
- Altavian
- Parrot
- Skydio
- Teal
- Vintage Robotics

Blue sUAS leverages the Army's Short Range Reconnaissance (SRR) Program of Record

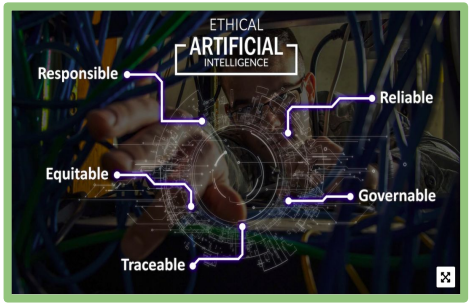
- Use the same drones, but integrate open architecture with a ground control system that fits the needs for each particular user base while ensuring iterative upgrades.
- Align requirements, resources, development, testing, and user experimentation across DoD from the start.
  - NDAA/TAA compliant with DoD cyber validation
  - Configurations available in ISM/DoD frequency bands
- Make systems available through production OTs and on the GSA schedule for DoD and other federal agencies to purchase, sending a strong demand signal to the U.S. industrial base.

DIU AND AI: SUPPORTING DOD EFFORTS

Providing access to new capabilities



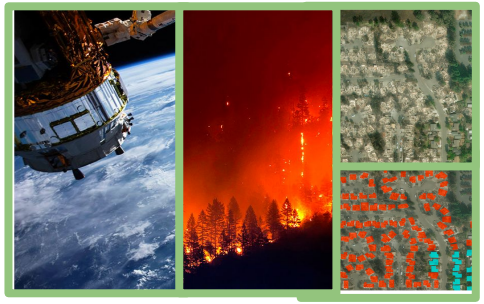
Cutting-Edge Commercial Capabilities
(e.g. Knowledge Graphs)



DoD's AI Ethical Principles

DIU NDIA Panel #1

Using AI to Understand Relationships Between People, Places, and Things



World-wide AI Prize Competitions
(e.g. xView)

Coordination With DoD Partners

DIU NDIA Panel #2

From Prize Challenges to Operations: Lessons from the xView Challenge

DIU MISSION AND KEY AREAS OF EFFORT

BE A FAST FOLLOWER

- Utilize commercial solutions to address DoD challenges today in key technology areas:
  - AI & Autonomy
  - Human Systems & Advanced Energy and Materials
  - Space & Cyber

DoD STRATEGIC EFFORTS

- Climate
- Supply Chain
- COVID-19
- Whole-of-Government AI

ATTRACT BEST TALENT

- Lower barriers of entry to DoD as a solution provider, civilian or SME
  - Cyber Information Technology Exchange Program/Challenges
- Leverage Reserve and National Guard personnel
- Outreach to universities/graduate programs for new National Security talent

WORK WITH US

www.diu.mil

CONTACT US

www.diu.mil/contact-DIU

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www.cadence.com/go/national-security

Enabling the delivery and sustainment of secure and resilient capabilities to the warfighter and international partners quickly and cost-effectively

Better, Faster, Cheaper DoD Systems Through Commercial Electronics Design Best Practices

Leveraging the DoD Agile Electronic Hardware Emulation and Design Center and Tensilica To Realize The DoD AI Vision

J.S.B.Chew ***Senior Global Group Director***

Chair, NDIA S&ET Division

23 Mar 21

cadence®

Who Is Cadence

3,600+
R&D ENGINEERS

R&D INVESTMENT
$936M
(~40% of revenue)

1750+
FIELD ENGINEERING EXPERTS

PATENTS WORLDWIDE
1600+

US-based Company
HQ, San Jose
NASQ:CDNS
www.cadence.com
www.cadence.com/go/national-security

~$2.34B Revenue in 2019
~8100 Employees

26 GLOBAL DEVELOPMENT CENTERS

ONLY EDA Company Certified by DoD As A Trusted Supplier
https://www.dmea.osd.mil/otherdocs/AccreditedSuppliers.pdf

Making the World a Better Place Through Intelligent System Design
By Enabling First pass Success, Future Proofed Electronic Systems

Bottom Line Up Front

- **Cadence Design Systems (NASQ: CDNS) is an acknowledged leader in the Electronic Systems Design Enablement market**
  - Emulate Before You Fabricate
  - Intelligent Systems Design
  - We enable the Army's IVAS *(AI on the Edge)*

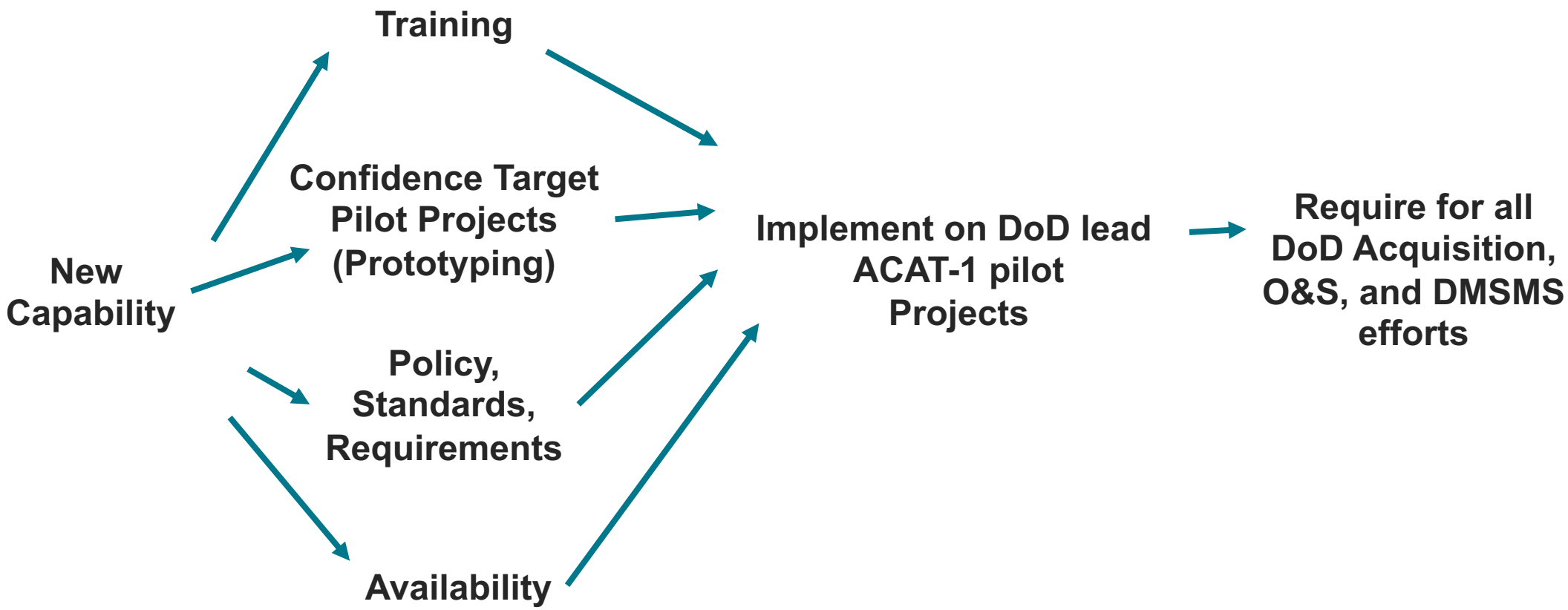
- **Since 2016, Cadence have been working to transition the Commercial Electronics Design Best practices to the DoD and Defense Industrial Base**
  - FY 17, FY 18 NDAA
  - National Defense Strategy
  - DoD funded pilot projects

- **DoD funded pilot projects has resulted in many "lessons learned"**
  - Identified deficiencies, challenges, and leverage points
  - Developed material to overcome and implement

- **If these "lessons learned" are leveraged, the DoD AI initiative can be accelerated and the quality of the finished product improved**
  - We want to help, in the appropriate fashion

Cadence brings a unique and exclusive insight in to this challenge

Process To Implement New Capability to DoD Acquisition



Anecdotal Observations on US AI Activity

- **Belief that AI/ML is a *Software* Solution Only**
  - AI/ML systems are a combination of customized HW and SW systems depending on application
    - How many DevSecOp Guys Does it take to change a lightbulb?
    - They don't – that's a hardware problem

- ***Most* US Electronic Manufacturers focus/core competency is in the communications aspect of the SOC/System; not in the AI/ML architectures**
  - Do not see an R&D Investment trend in AI for DoD

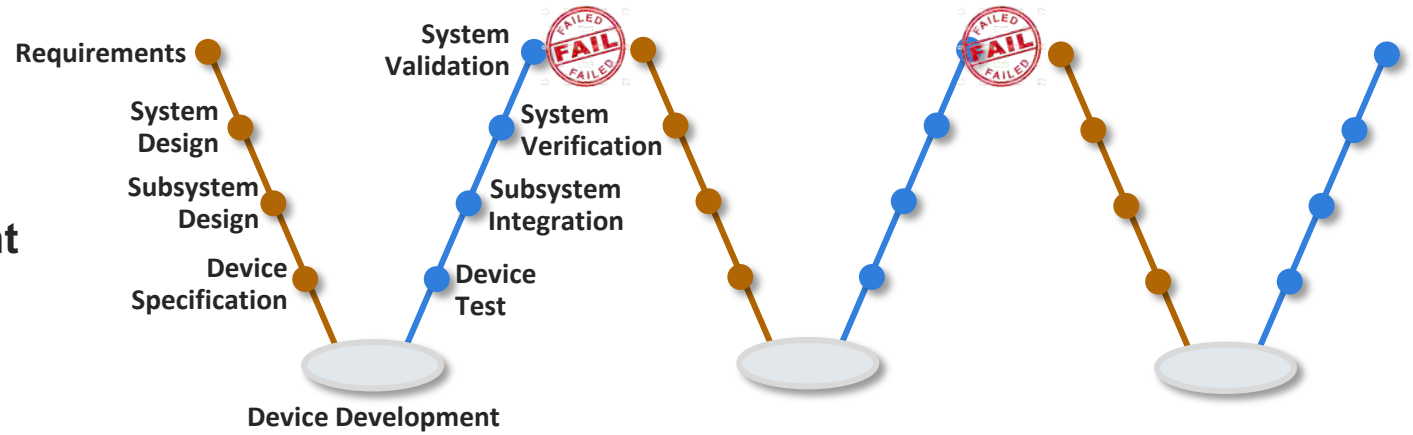
- **Lots of "R" funding, Not a lot of "D"**

- **Current *known* investment stems around Large/ Cloud based analytics/training applications**
  - Assuming huge platforms and data links

- ***Slim US focus on Edge based AI applications***
  - Will you have those data links during conflict?

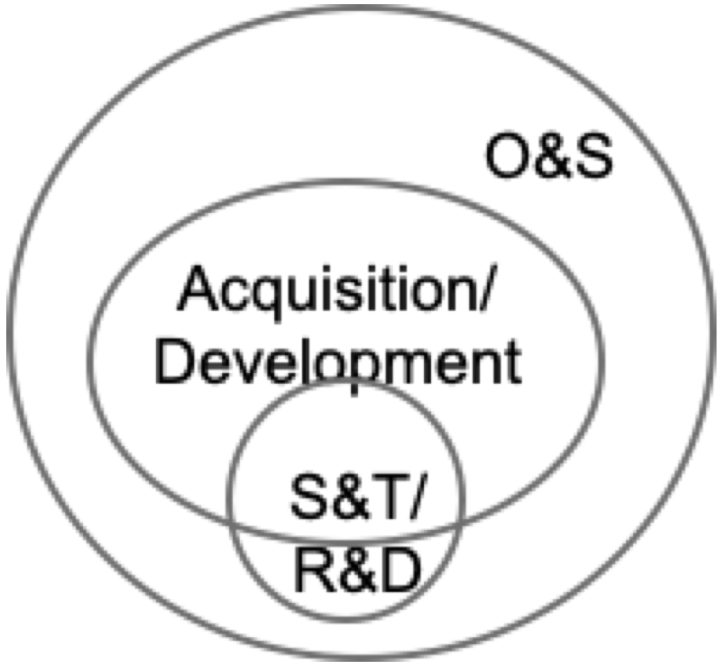
The DoD Acquisition/Development Culture
Cost Plus Fixed Fee

- **Build – Test – Rebuild - Test ...**
- **This process develops HARDWARE first , THEN SOFTWARE development starts**
- **Trainers developed after Prime Mission Equipment is built**
- **T&E performed AFTER Prototype Hardware/Prime Mission Equipment are Built**
- **Results in schedule slips and cost overruns**
- **Promotes performer culture of "Not Enough Time and Money To Do It Right, But Plenty Of Time and Money To Do It Over"**



Sustainment and Modernization NOT priority

The Commercial Electronic System Product Development Culture



- **Funded Internally**
- **Can’t Miss Christmas**
- **Emulate Before You Fabricate**
- **First Pass Success**
- **Sustainable and Modernizable at Launch**

“People who are really serious about software should make their own hardware”

- Alan Kay

How the Innovation Hub Can Advance the use of Edge Based AI To Ensure US Leadership

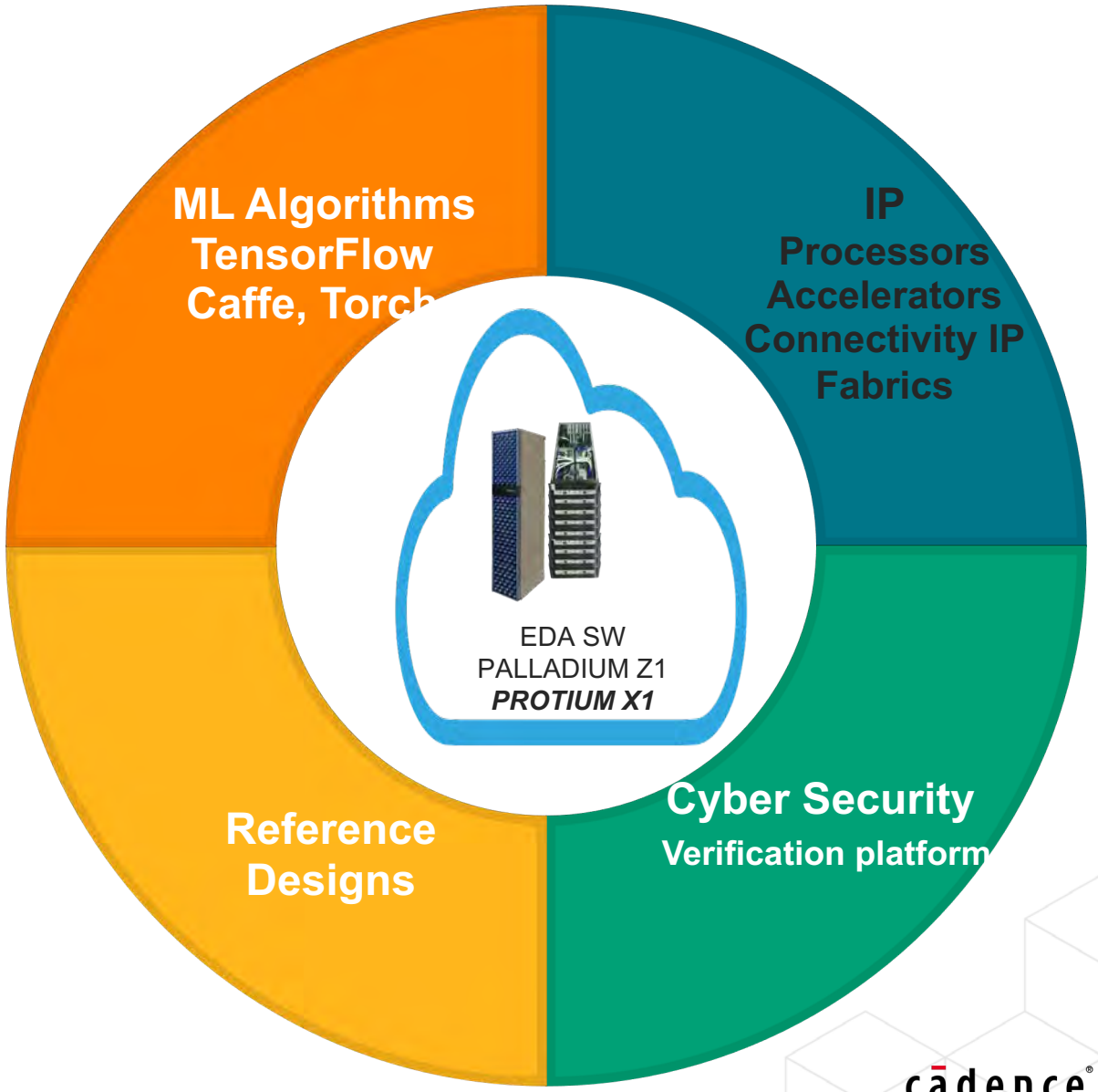
- **Provide an environment for both research and DEVELOPMENT of AI electronic systems and which address the needs of those Applications**
  - University (Research)
  - Start-ups (Development)
  - Govt Primes (Development)

- **Define key programs which can take advantage of AI Applications**
  - Target acquisition systems
  - Surveillance
  - Autonomous vehicles

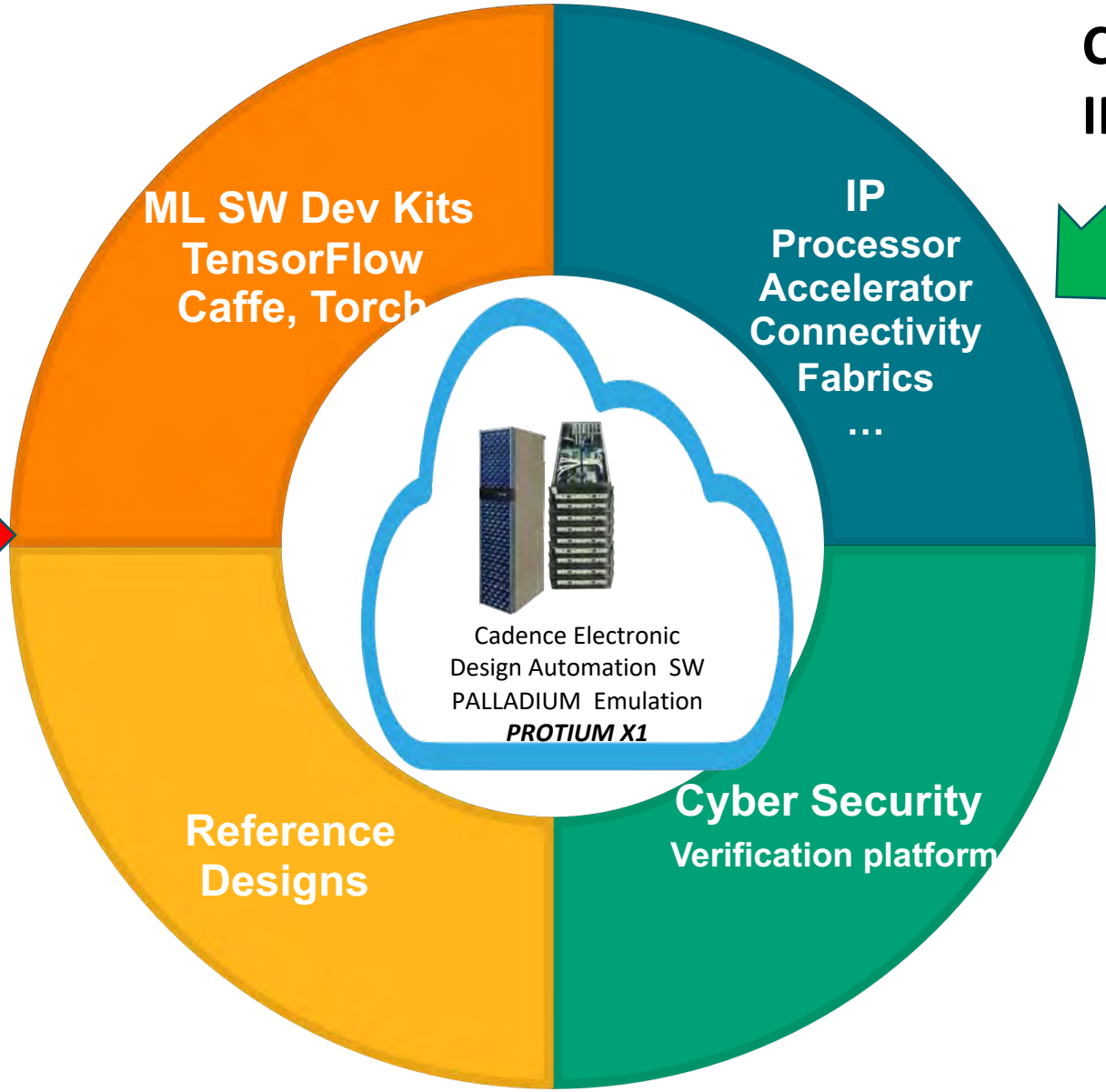
- **Provide Initial Funding to Seed the Development**

AI Innovation Hub for US AI Edge System Development (HW/SW)

- Cadence capabilities provide the Enabling technology blocks/methodologies for both Core and Edge Based Systems
  - EDA SW-Develop/Verify hardware
  - IP/Reference designs
  - HW/ SW Development and Co-verification environment
    - VALIDATE SYSTEM (HW and SW) WORKS BEFORE YOU BUILD IT.
    - Emulation and Configurable Prototyping
  - Cyber Security Verification Platform
- SW/Training algorithm development and test



NSCAI Innovation Hub for AI Cloud HW/SW R&D



Commercial IP

US Electronics Developers

- Current contractors
- US gov't funded Startups

Universities

What is Tensilica: Benchmark Edge-based computing

- **It is a RISC-based processor technology**
- **It is a Configurable and Extensible processor technology**
- **It is a design methodology**
- **It is an architecture design/analysis tool**
- **It is a set of software tools**
- **It is the "ARM of Audio"**
  - De facto standard for audio DSP

How Does it Work?

Electronic Specification

Configuration selection and custom-instruction description

Xtensa Processor Generator ("XPG")

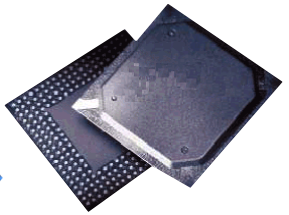
Complete Hardware Design

Source RTL, EDA scripts, test suite

Processor Extensions

Customized Software Tools

C/C++ compiler
Debuggers, Simulators
RTOSes



Use standard ASIC/COT design techniques and libraries for *any* IC fabrication process

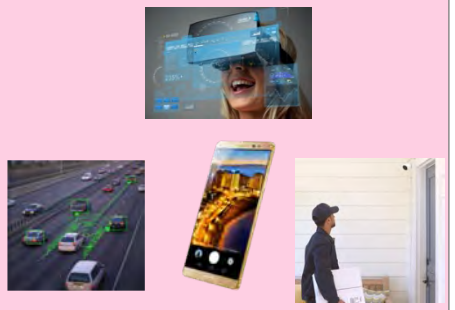
Tensilica® Products

DNA
Standalone AI processor for AI at the Edge inference
CNN, RNN, regression

HiFi

- Audio pre- and post-processing
- Voice trigger
- Noise reduction, Audio encode and decode

Vision



- Image and vision pre-/post-processing
- AI at the Edge
- SLAM, SGM

Fusion

- Auto radar
- Consumer radar
- Always-alert sensor processing

ConnX

- Narrow to wide band wireless
- LTE/LTE-A/5G
- Infrastructure and terminals

Controllers/ Custom ISAs

- High performance DSPs, NPUs, CPUs
- Application specific data types
- Custom ISA, Special functions

Broad Range of Application Specific DSPs | Custom

Automated User-Defined Customization (TIE)

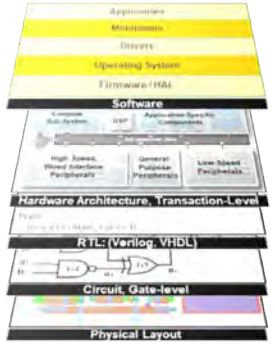
Xtensa® Processor

DoD Federated Emulation and Design Center (WPAFB, OH)

Located At Wright-Patterson AFB

Systems

Board & Package



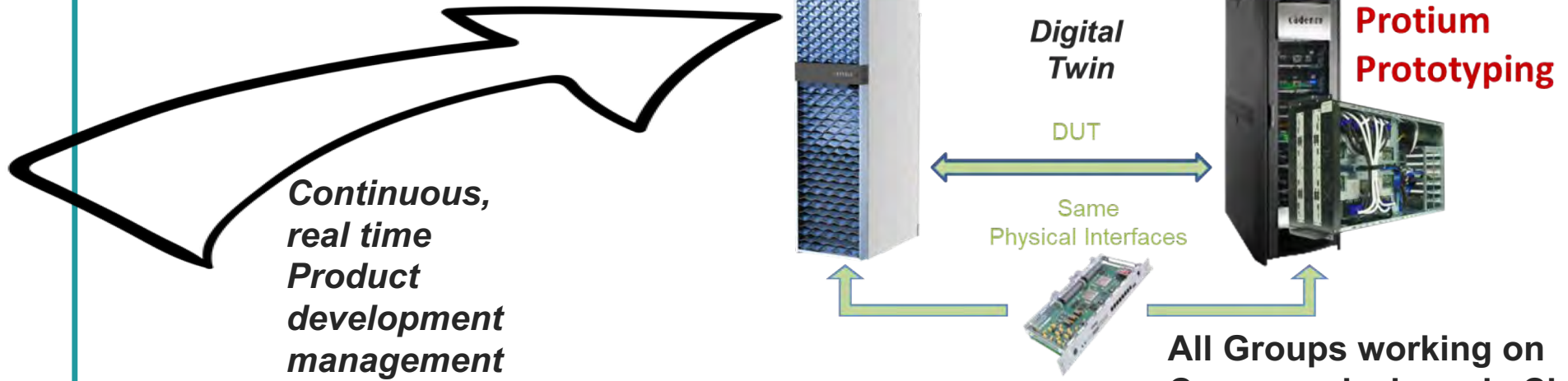
Hardware/Software Co-Design

IP & Subsystems

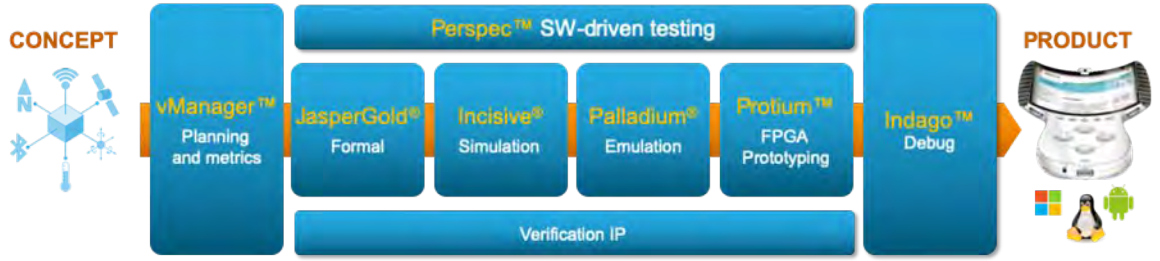
Emulate Before You Fabricate

- Hardware Development
- Systems Integration
- System/subsystem, Performance Analysis
- Thermal, EMI, Power systems analysis

- Software development
- *Digital Twin* for DevSecOps Development
- *Digital Twin* for system, subsystem developers
- *Digital Twin* for trainers, operators, maintainers



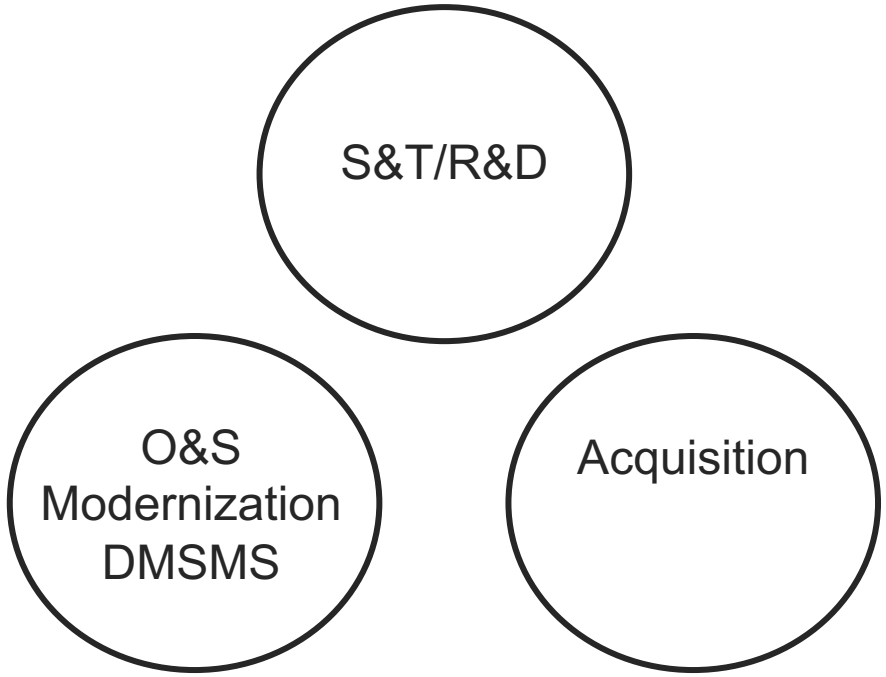
Continuous, real time Product development management



All Groups working on Common design, via Cloud, resulting in Trainers Developed and In Use Well Before Capability Is Fielded

Impact/Payoff To DoD
Continuous, Agile Improvement; No More Block Upgrades

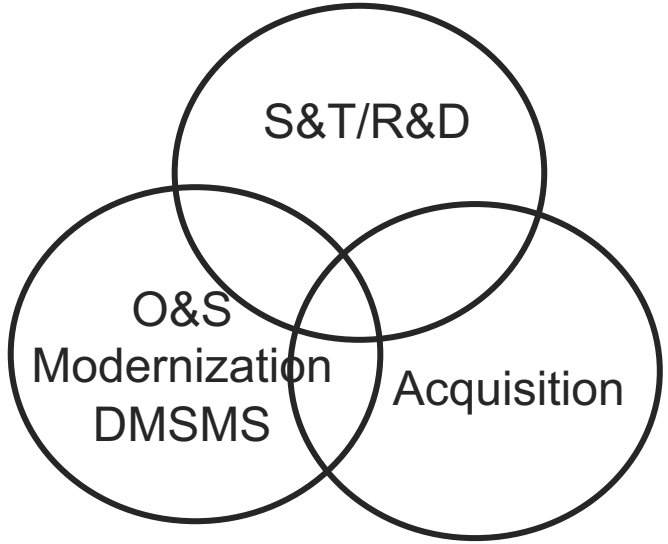
Current



Three separate activities

(Illustration Idea by CDR Jon Connelly)

Future



Continuous Improvement

All Groups working on Common design, via Cloud, resulting in Rapid Agile Fielding of New Capabilities on an "As Needed" Basis

NDIA EMERGING TECHNOLOGIES INSTITUTE

Emerging Technologies and the Future of Defense

Dr. Mark Lewis

Executive Director

NDIA Emerging Technologies Institute

Presented at the NDIA National Security AI Conference and Exhibition

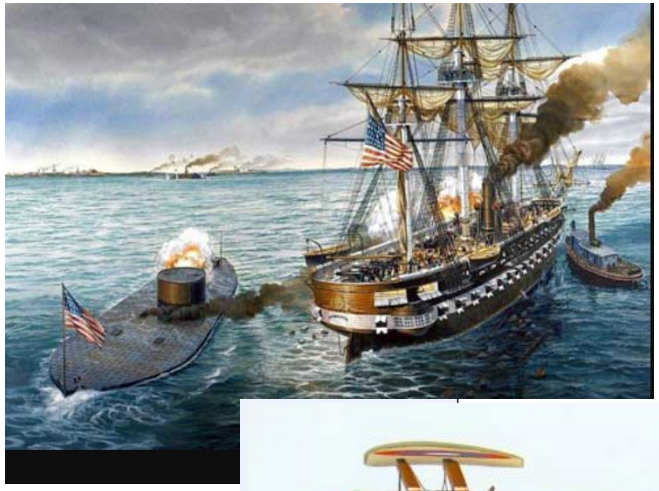
March 23-25, 2021

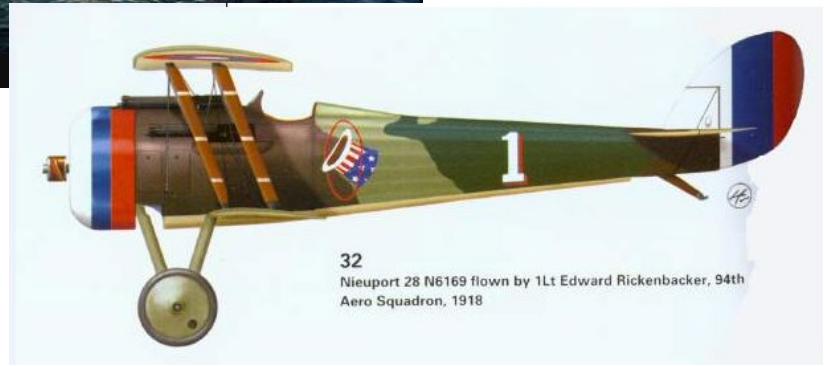
Lessons from History

- ***The American way of war relies on technological superiority***
  - ***Early Navy frigates***
  - ***Ironclads***
  - ***Stealth***
  - ***Precision munitions***
  - ***Space***

- ***We have missed technological advances***
  - ***Pre WWI aviation***
  - ***Radar***
  - ***Gas turbines***
  - ***Rockets***

- ***Defense technology is always advancing; today's advantage may be obsolete by tomorrow***





"The gas turbine could hardly be considered a feasible application to airplanes mainly because of the difficulty in complying with the stringent weight requirements imposed by aeronautics."
- National Academy of Sciences (1940)

Context: The National Defense Strategy 2018

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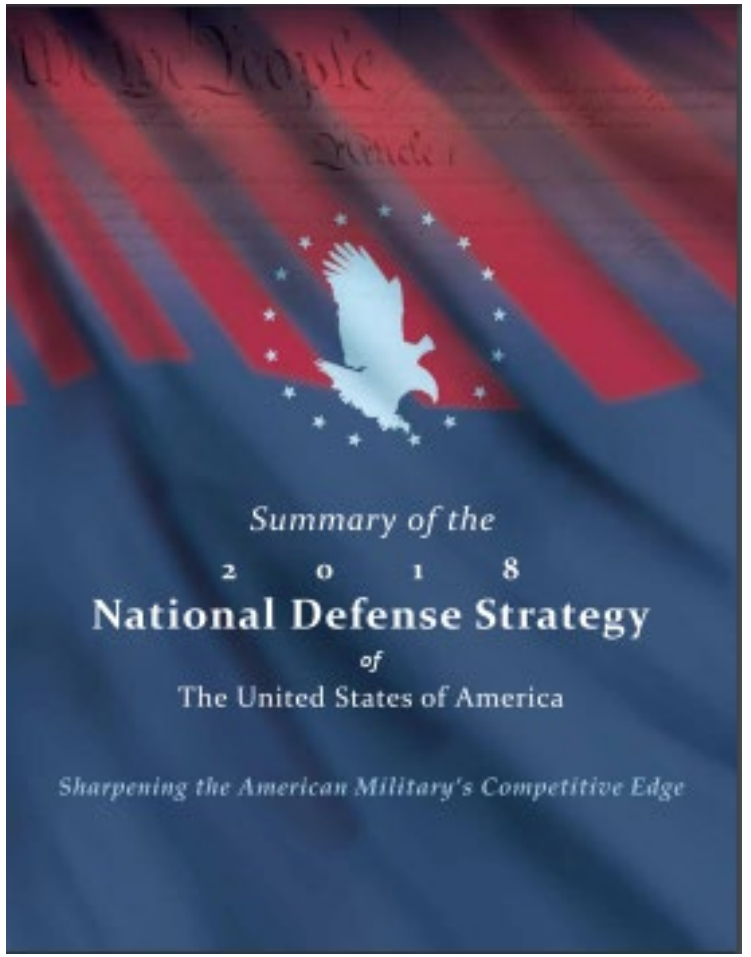
- *"Today, we are emerging from a period of strategic atrophy, aware that our competitive military advantage has been eroding…Inter-state strategic competition, not terrorism, is now the primary concern in U.S. national security."*
- *"China is a strategic competitor using predatory economics to intimidate its neighbors while militarizing features in the South China Sea. Russia has violated the borders of nearby nations and pursues veto power over the economic, diplomatic, and security decisions of its neighbors."*
- *"It is now undeniable that the homeland is no longer a sanctuary…terrorists…malicious cyber activity … political and information subversion."*
- *"[We must] Modernize key capabilities. We cannot expect success fighting tomorrow's conflicts with yesterday's weapons or equipment."*
- *"We must anticipate the implications of new technologies on the battlefield, rigorously define the military problems anticipated in future conflict, and foster a culture of experimentation and calculated risk-taking."*



Modernization Priorities Drawn from the NDS

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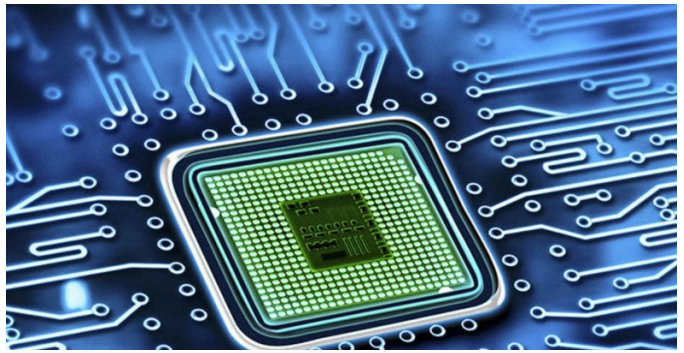
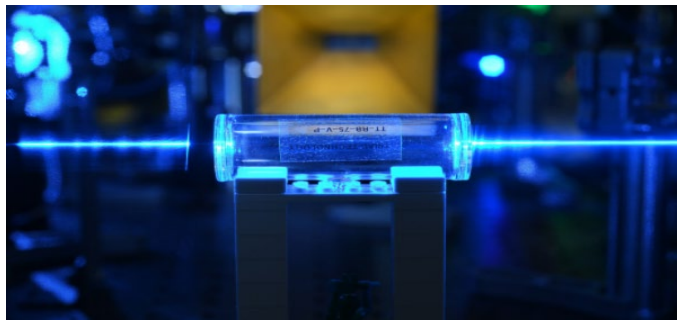
- ***Underlying capabilities***
  - ***AI***
  - ***Cyber***
  - ***Autonomy***
  - ***Microelectronics***
  - ***FNC3***
- ***Delivered Effects***
  - ***Space***
  - ***Directed Energy***
  - ***Hypersonics***
- ***Future Promise***
  - ***Quantum***
  - ***Biotechnology***





Emerging Technology Priorities Key Issues

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- **Hypersonics**
  - Airbreathing vs. boost-glide
  - Delivery at scale
  - Countering recent (bad) utility studies

- **Microelectronics**
  - Onshoring
  - Getting DOD on the commercial curve
  - DOD-unique needs (rad-hard)
  - Legacy buys and split fab

- **AI**
  - Poor understanding of what it is, what it can do
  - Buying its way into real systems
  - Establishing standards, shared platforms
  - Workforce

Emerging Technology: Hypersonics

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- **Utility and foreign threats fully acknowledge**
  - Significant increases in investments starting in 2020 after ~10 year pause
  - Leadership fully engaged
- **Recognition of international investments**
  - Peer competitors: China, Russia
  - Allies: Australia, UK
- **Some well-publicized demonstrations**
  - NASA X-43
  - AFRL X-51
  - Conventional Prompt Strike
- **Organizations**
  - Services: USAF, U.S. Army, U.S. Navy,\
  - OSD: DDR&E(M), JHTO, DARPA, TRMC, OUSD(A&S)
- **Challenges**
  - Until recently, efforts uncoordinated
  - Utility still be questioned, new vs. legacy systems
  - Bad investments still being made
  - Industrial base
  - Workforce

Emerging Technology: Microelectronics

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- **Fundamental to every part of national defense**
- **The U.S. is reliant on foreign sources for state-of-the-art microelectronics**
  - TSMC
  - Samsung
- **Current policy has the DOD well behind the commercial market (45nm vs 7 nm node size)**
  - Trusted foundries
  - Rad hard
- **Organizations**
  - Office of the Under Secretary of Defense (Research and Engineering)
  - Office of the Under Secretary of Defense (Acquisition and Sustainment)
  - Naval Surface Warfare Center Crane
- **Challenges**
  - The DoD is <1.5% of the total market, defense can't drive state-of-the-art alone
  - Leveraging commercial involves avoiding creation of ITAR restrictions, giving up on seamless custody.
  - Existing investment in legacy parts and components and end-of-life buys
  - Trusted vs. Zero Trust approaches

Credit: Shutterstock/Ivan Cholakov

DOD's Top Tech Priorities Shift to Microelectronics and 5G

Emerging Technology: Artificial Intelligence

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- **Near-universal recognition of impact on future defense**
  - Keen interest in bringing commercial capabilities to the DOD
  - Much of the early investment from DOD but commercial incorporated it faster
- **Recognition of international investments**
  - Peer competitors: China, Russia
  - Allies: UK, Canada, Germany, India, France, Sweden, Norway
- **Some well-publicized demonstrations**
  - Project Maven
  - AlphaDogFight
- **Organizations**
  - The Joint Artificial Intelligence Center (JAIC)
  - Office of the Director of Defense Research & Engineering (Modernization)
  - DARPA
- **Challenges**
  - What's AI? What's ML? Is it the same as autonomy?
  - Real (perceived) ethical issues
  - Poor general understanding leads to bad investments
  - Too many programs invoking AI as a catch-all solution, no easy accounting
  - Workforce

Introducing the Emerging Technologies Institute

NDIA EMERGING TECHNOLOGIES INSTITUTE

- **NDIA's ETI is a non-partisan institute focused on technologies that are critical to the future of national defense.**
  - **ETI has been established to provide research and analyses, as well as to convene open discussion and engage with national leaders, to inform the development and integration of emerging technologies into the defense industrial base.**
  - **ETI has been created as an entity within the NDIA governance structure. This allows ETI to conduct independent objective research while leveraging the experience and knowledge of NDIA's chapters, divisions, members, and partners.**
- **NDIA it is uniquely positioned to sponsor ETI. With an unparalleled ability to convene stakeholders and partners, ETI will build on NDIA's infrastructure, translating emerging technologies into concrete capabilities.**

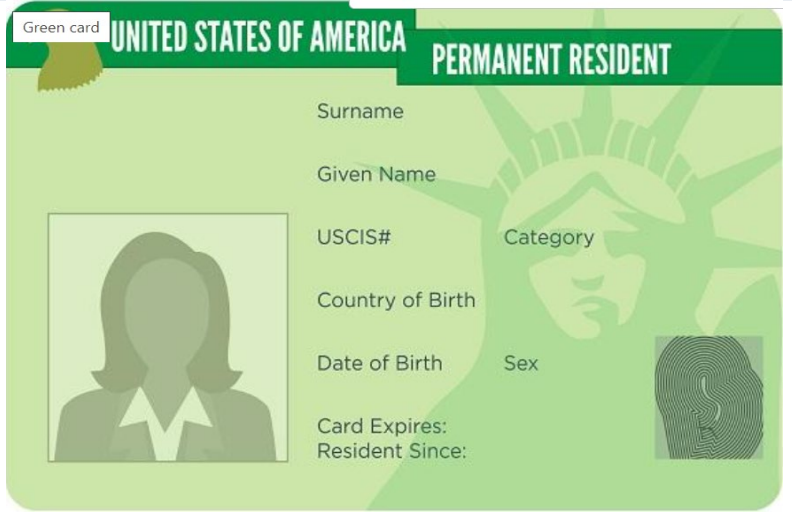
The Intersection of Policy and Technology

NDIA EMERGING TECHNOLOGIES INSTITUTE

- **For government decision makers**
  - Need for objective information on critical defense technologies
  - Connections to the defense industrial base
- **For industry**
  - Need to be heard on key industrial base issues, to influence and set the national agenda
  - Credibility in tackling technology development and acquisition challenges
  - Connections to academic partners working at the cutting edge of critical technology development
- **For the Nation as a whole**
  - Address fundamental threats to the future of national security, focused on outmatching peer competitors and adversaries
  - Highlight the defense industrial base as it relates to innovation and technology investment for the country as a whole

Roadblocks

- *Acquisition timelines*
- *The acquisition valley (actually, mountain) of death*
- *Legacy vs new*
- *Test and Evaluation*
- *Industrial Base vulnerabilities*
- *Workforce*
- *Many bad ideas*
- *Responding to adversaries without more harm than good*



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Questions?

Dr. Mark Lewis
Executive Director
NDIA Emerging Technologies Institute

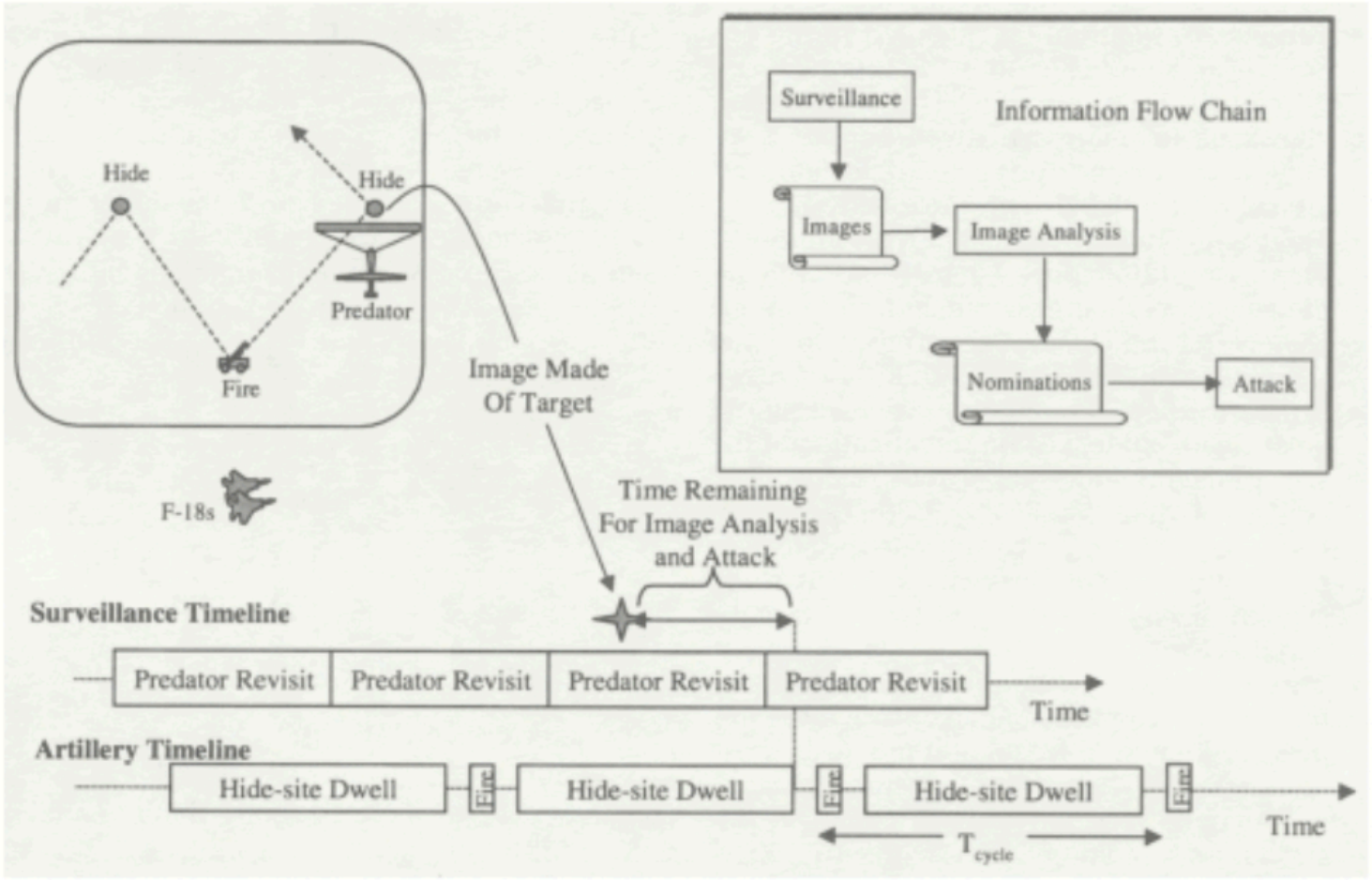
Workflow Warfare:

Business Process Transformation in the DoD

Bryan Lane, BPT Mission Director
March 24, 2021

U.S. DEPT OF DEFENSE

DARPA Sensor-To-Shooter Scenario – Bosnia 1999



Castleberg, Paul A., and William Dunaway. "A Model for Evaluating UAV Sensors with a Bosnia Sensor-To-Shooter Case Study." *Military Operations Research* 4, no. 4 (1999): 53-64. Accessed January 7, 2021. http://www.jstor.org/stable/43940818.

When it comes to transforming the Department of Defense, we are only as fast as our slowest workflow.

Business Process Transformation

Vision: The business of modern Defense is run as a trusted, digital, data-driven operation

BPT Mission Initiative Goal: Transform DOD business processes through AI technologies to improve efficiency, accuracy and overall operations in key service areas.

Business & Law   Finance & Budget

Training & Development   Customer Relations

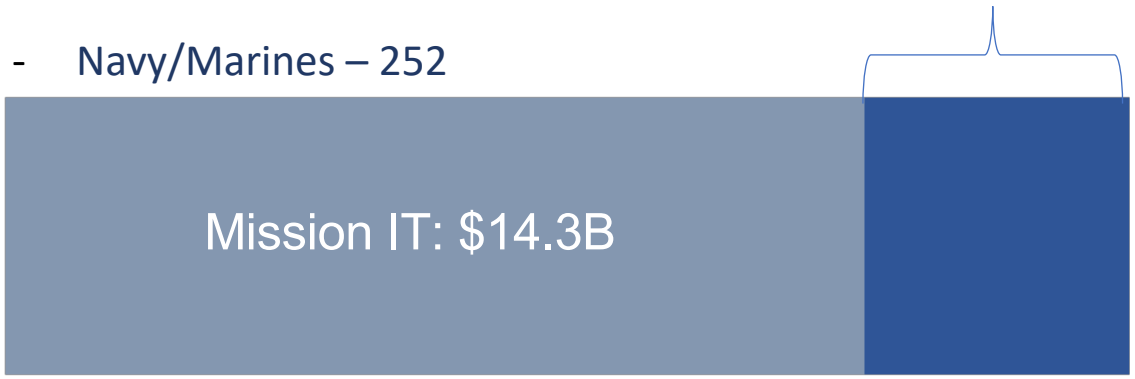
Human Capital Management   Acquisition

BPT Total Addressable Market: Preliminary Assessment

Total Number of "BPT-Ready" Projects: 1009

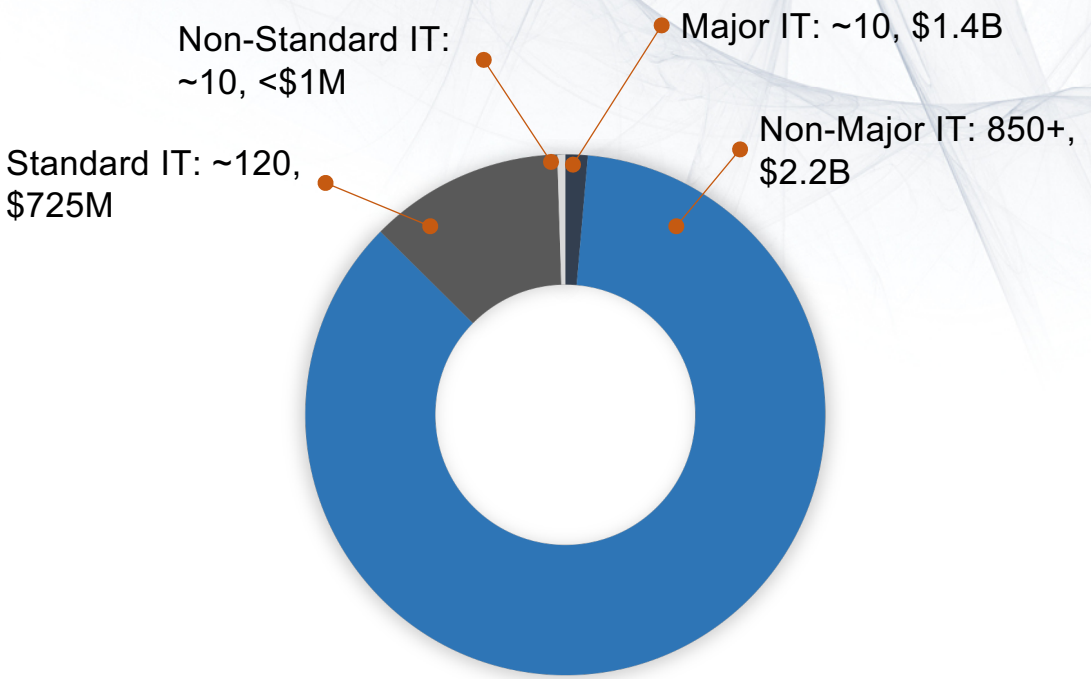
Number of Investments Per Organization:

- Air Force – 198
- Army – 306
- Defense Wide – 253
- Navy/Marines – 252



Total FY 21 IT Spending: $18.7B
Source: DoD CIO IT Dashboard

Number of Projects vs IT Spend



IT spending is fragmented with a small number of major IT programs and many non-major programs spread across DoD.

23% of publicly available DoD IT Spending is in BPT's sweet spot of business, law, policy, HR, training, finance, and acquisition.

BPT Weapons of Choice

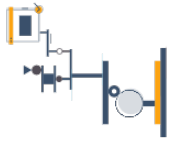
Tools and levers to achieve the BPT vision extend beyond building capabilities.

Community Building: Outreach, development, and evangelism of a BPT related communities of interest

Key Activities: Working groups, consortia, workshops, detail programs, training, strategic communications

Senior Leader Engagement: High level interactions to foster organizational change

Key Activities: Partnerships, official correspondence, top-down support, enterprise change management, goalsetting, performance



Process Definition: Describing user workflows and system interactions to identify transformation efforts

Key Activities: User research, process mapping, business process management, use case development, evaluation, and prioritization

Solution Design: Requirements gathering and architectural design of transformation capabilities

Key Activities: Technical exchanges, requirements mapping, capability matchmaking, solution architecture , tech evaluation

Prototyping: Advancing from ideas to AI-enabled technology solutions

Key Activities: Proofs of concept, MVP development, model building and testing, data analytics, software development

Scaling: Enabling the department through enterprise solutions and shared services

Key Activities: Capability transition, acquisition support, infrastructure enhancements, capacity building

JAIC U.S. DEPT OF DEFENSE

Product Line Highlights

HUnT & HUnTx

In partnership with the JAIC and DIU, HUnT seeks to improve the accuracy and auditability of financial transactions conducted by Assistant Secretary of the Army for Financial Operations and Information (DASA-FOI) and USD (Comptroller).

AI-Enabled Robotic Process Automation: The Army financial management workforce consistently spends millions of manpower hours annually to manually resolve financial errors within the General Funds Enterprise Business System (GFEBS). These errors exceed $2 billion with some errors never resolved, even after five years.

Read more here: [HUnT Article]

KEY INFORMATION

- **Multiple Capabilities Spanning Multiple Platforms.** HUnT users are leveraging automation tools to prove out methods for identifying unmatched transactions across different datasets.
- **Scaling Army Infrastructure.** HUnTx is executed and managed by DIU, which is actively scaling Army backend infrastructure to expand intelligent automation for unmatched transactions.
- **Successful Army Transition.** HUnT activities have been adopted by the Army as a committed transition partner and the Army is scaling to be a Service-wide capability for financial managers.

JAIC U.S. DEPT OF DEFENSE

GAMECHANGER

GAMECHANGER is intended to identify, consolidate, and automate the discovery and analysis of all applicable Statute, Executive Orders and Presidential Directives, Regulations, DoD Issuances, and Military Department Guidance documents for the Department.

AI-Enabled Shared Service Platform: The JAIC, in partnership with OSD components, is developing an artificial intelligence platform that utilizes semantic analysis, natural language processing (NLP), and data analytics to drive human-in-the-loop automated analysis and processes.

Access GAMECHANGER* today @
https://gamechanger.advana.data.mil

GAMECHANGER is fully operational on NIPR with 46k+ queries and over 3k unique users since inception. Anticipated SIPR deployment by April 2021.

*Requires CAC and NIPR access

KEY INFORMATION

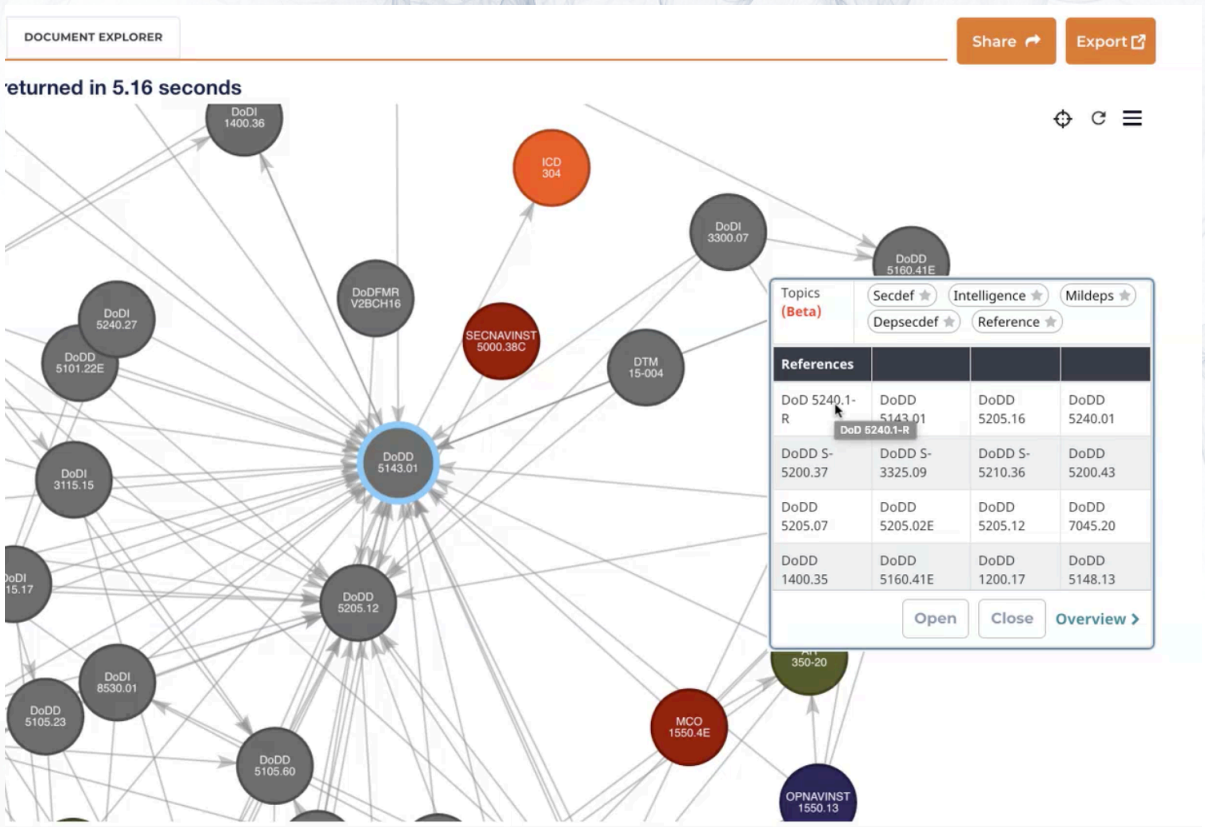
- **Foundational Infrastructure.** Intelligent search and NLP tools exist on Advana platform, which can support enterprise-scale operations.
- **Increasing Demand From Mission Partners.** The Navy, Army, Joint Staff, and other organizations have expressed interest in partnering with GAMECHANGER team. JAIC has a role in shaping these partnerships.
- **JAIC Use Cases On Deck.** BPT has identified other potential use cases GAMECHANGER in areas such as safety operations, program evaluation, health policy, requirements mapping, security classification, and records management.

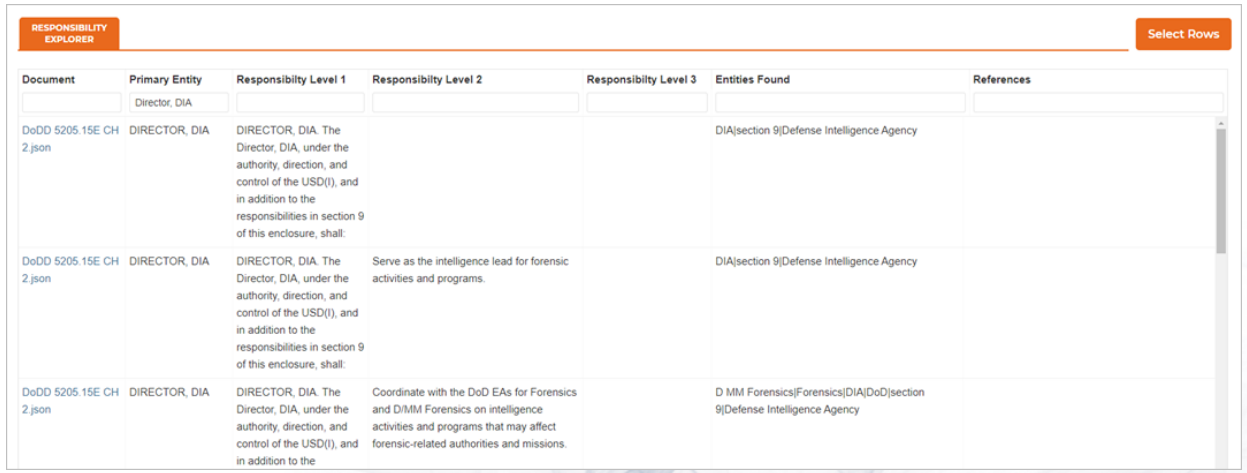
JAIC U.S. DEPT OF DEFENSE

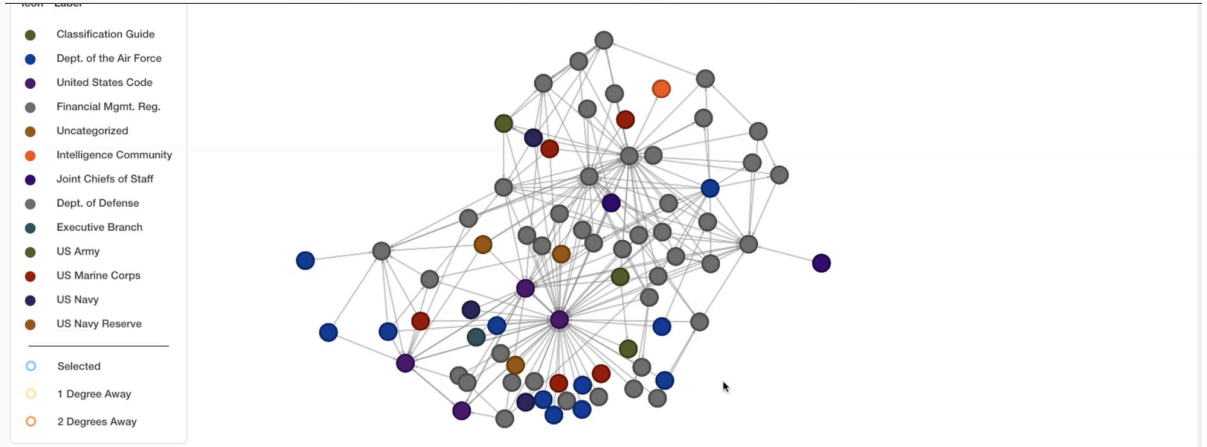
GAMECHANGER

Intelligent Policy Analytics For The DoD

- **Detect Relationships Between Policies.** Identify and extract policy references embedded in documents. Visually understand impact of changing or updating policy documents.
- **Identify Roles & Responsibilities.** As organizations are reconfigured through policy, identify where roles and responsibilities exist, overlap, or complement the mission.



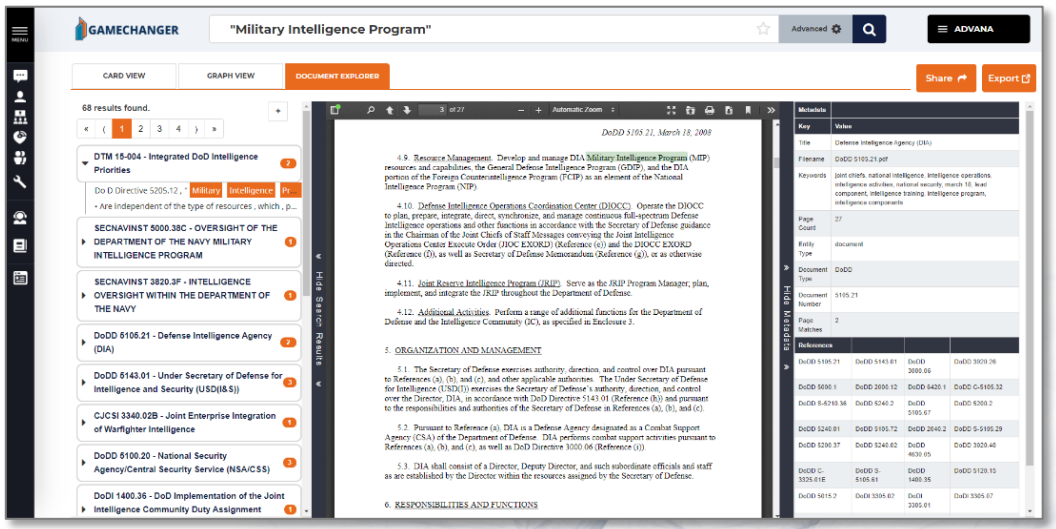


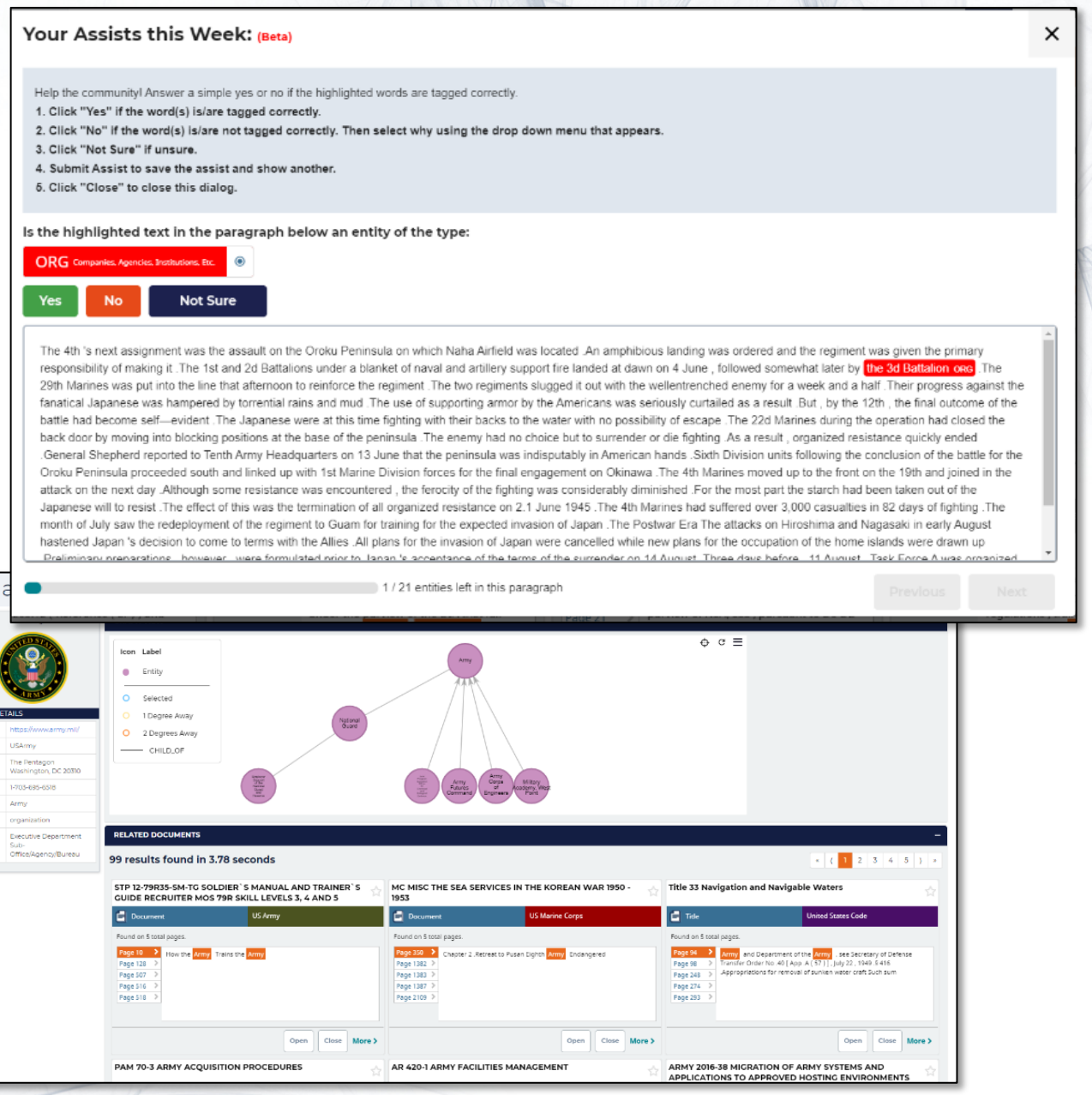


GAMECHANGER

Intelligent Policy Analytics For The DoD

- **Interactive Document Exploration:** Preview, explore, and export documents. Quickly visualize metadata, relevant policy references, topics, and key organizations.
- **Entity Extraction & Crowdsourced Annotation.** Identify organizations, topics, keywords through named entity recognition. Ask users for input to continually update knowledge graphs.





Exciting Prototyping

MyNavy HR

The US Navy PSD offices have the responsibility of processing the Record of Emergency Data/Dependency Application (RED/DA) forms. Due to the amount of time the initial review requires, less time is available for the high-value work of processing the RED/DA forms that affect pay.

Intelligent Automation for HR Data: RPA technology can be used to automate the simple tasks, allowing personnel to focus on more high value work. Each RED/DA form review averages about 10 minutes when processed manually. Approximately 50% of all RED/DA forms submitted affect payroll. The results of the Norfolk PSD automation pilot validated a 48% reduction in workload.

KEY INFORMATION

- **Delivered & Transitioned.** Developers have delivered functioning code to the Navy. Navy has accepted the code and procured tools and capabilities required to assume O&M.
- **Intent To Scale.** The Navy has identified up to 13 deployment sites throughout the Service that perform this activity. The initial scaling strategy will deploy the prototype other stations to include Naval Station Great Lakes, Newport, and Memphis.
- **Need For CIOs To Weigh In.** The Navy team has expressed challenges with communicating risk to CISOs during implementation. This is an opportunity to conduct a Senior Leader Engagement around this successful prototype.

Big Ideas

BPT Big Ideas

100x Ideas That Are Truly Transformational

Policy-as-Code

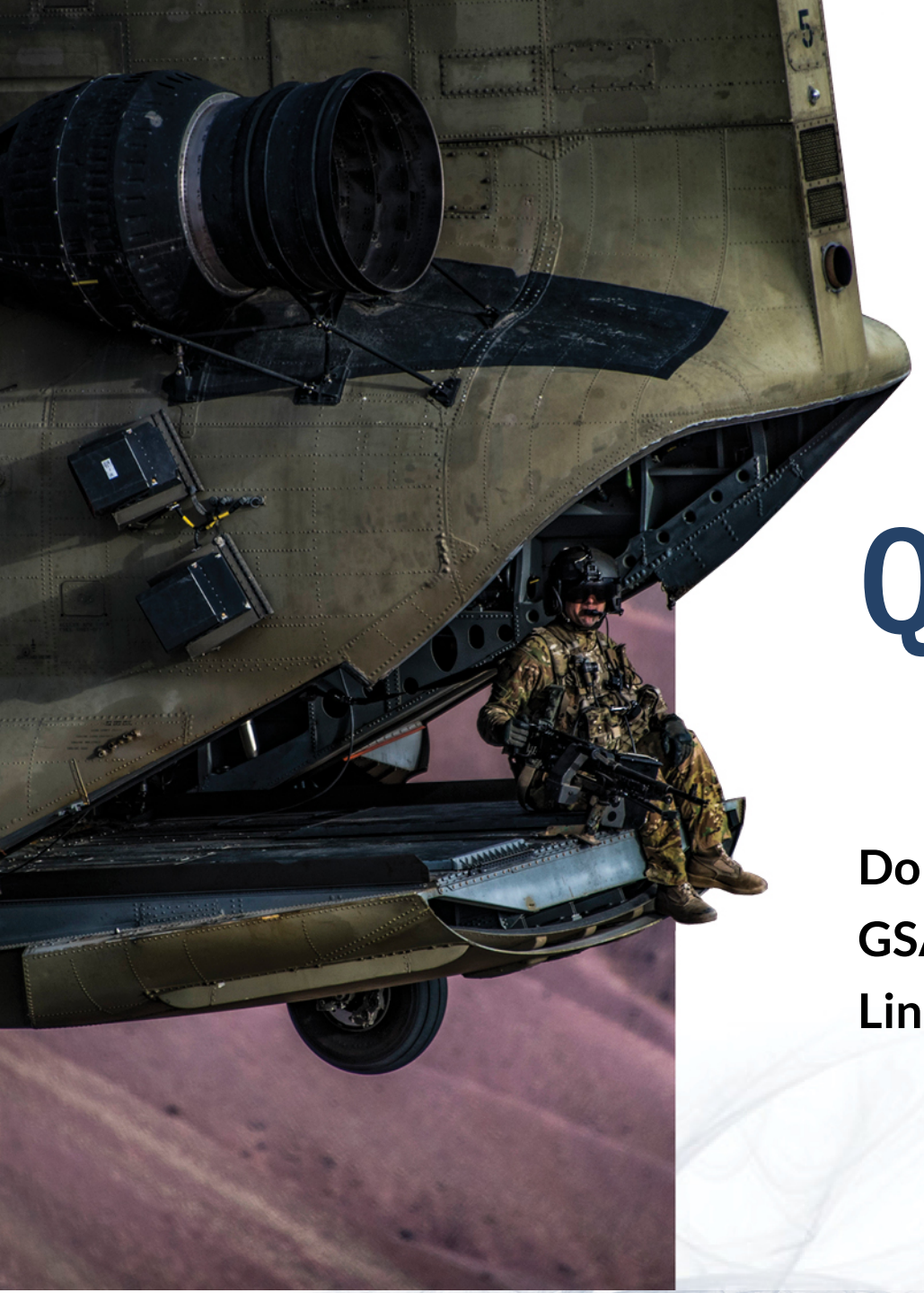
- Update once, propagate everywhere
- Real time impact analysis
- Machine readable roles, responsibilities, and authorities
- Enduring traceability and transparency

Data Driven Acquisition

- Intelligent vendor discovery and requirements matching
- Ensure fair pricing and minimize the risk of fraud
- Automated generation of acquisition packages

AI-Powered DoD & Industrial Base

- Build capacity and skills within industry, academia, and the government to match AI capabilities to mission needs
- Balance innovation and competition with reducing risk to the supply chain for the entire federal government
- Operate the Business of Defense as a truly digital operation
- Illuminate relationships between manufacturers, suppliers, and customers for materiel and non-materiel solutions



Questions?

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JAIC

U.S. DEPT OF DEFENSE

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NSCAI FINAL REPORT: INDUSTRY'S RESPONSE

2021

National Defense Industry Association: National Security AI Conference and Exhibition (NSAICE)

WELCOME, AND THANKS FOR JOINING!

GRAHAM GILMER

Vice President, Artificial Intelligence
Booz Allen Hamilton
ai@bah.com

ABOUT GRAHAM GILMER

Graham Gilmer is a Vice President in Booz Allen's Analytics practice, focused on research and client delivery in the areas of machine learning, deep learning, artificial intelligence, and quantum computing. He leads a team that delivers innovative AI capabilities for defense and intelligence clients, including many of the U.S. Government's AI pathfinder efforts. Graham also manages technical investments in Booz Allen's R&D portfolio across the lifecycle of AI operations. He established the firm's relationship with NVIDIA Corporation, setting the strategy and bilateral engagement to bring next-generation computing technology to the Federal Government. Graham holds a B.S. in Management Science & Engineering from Stanford University.

ABOUT BOOZ ALLEN

For more than 100 years, military, government, and business leaders have turned to Booz Allen Hamilton to solve their most complex problems. As a consulting firm with experts in analytics, digital, engineering, and cyber, we help organizations transform. We are a key partner on some of the most innovative programs for governments worldwide and trusted by their most sensitive agencies. We work shoulder to shoulder with clients, using a mission-first approach to choose the right strategy and technology to help them realize their vision. With global headquarters in McLean, Virginia, and offices worldwide, our firm employs nearly 27,200 people and had revenue of $7.5 billion for the 12 months ending March 31, 2020. To learn more, visit BoozAllen.com.

AI IS NO LONGER A LUXURY GOOD – IT IS A NECESSITY

Historically, the United States has enjoyed technology leadership. We have had the freedom to innovate at our own pace. Our open markets have encouraged fair competition between private companies (industry) that have accelerated AI advancements.

TODAY WE HAVE ENTERED A DIFFERENT ERA

URGENCY

We are on the brink of an AI deficit and we will fall behind if action is not taken immediately to heed the call plainly made in the National Security Commission on Artificial Intelligence (NSCAI) Final Report [1]

CONSEQUENCES

AI will continue to accelerate in every aspect of life, and adversaries are determined to turn AI capabilities against us. The United States must act now to field AI systems and invest substantially in AI innovation. We can either shape the change to come or be swept along by it [2]

SOLUTION

The challenge ahead cannot be solved by one company, government, or industry alone. It is critical that we embrace collaboration and responsibly develop the future of AI together

BOOZ ALLEN HAS DEVELOPED A CALL TO ACTION FOR INDUSTRY

With your help, we can, and we will, maintain U.S. leadership

STARTUP | Newer companies founded by entrepreneurs to develop a unique product

TRADITIONAL DEFENSE | Longstanding technology companies that primarily provide U.S. Government contracting and manufacturing services

BIG TECH | Largest and most influential companies in the technology sector

[1,2] NSCAI Report, Introduction

THE CHALLENGE AHEAD CANNOT BE SOLVED BY ONE COMPANY, GOVERNMENT, OR INDUSTRY ALONE. IT IS CRITICAL THAT WE EMBRACE COLLABORATION AND RESPONSIBLY DEVELOP THE FUTURE OF AI

AI FOR AMERICA

Rapid advancement in AI strategy must be comprehensive and democratized.
The new era of AI will require America to put forward its best people, partners, and technology

RESPONSIBLE AI TODAY

A human-centered approach places ethics at the forefront of AI. America must set the standard to promote accountable AI systems with a commitment to developing ethically sound solutions

AI WORKFORCE REVOLUTION

With high demand for AI talent, organizations must optimize structures to attract, train, scale, and mature the AI workforce. Diversity of AI contributors is a catalyst for innovation and rapid progress

AI TECH ECOSYSTEM

A holistic approach guided by R&D efforts is essential to create an effective and accessible AI environment. Paired with integrated systems, best practices, and adoption, the ecosystem will allow for pockets of innovation to blossom

PARTNERING FOR INNOVATION

The U.S. Government cannot do this alone. Industry must expand and deepen partnerships with the Government and Academia to accelerate innovation

AI FOR AMERICA

ACCELERATED

Rapid advancement in a comprehensive AI strategy in parallel with technology investment is critical for the United States to maintain leadership and provide for the national security of the American people

COMPREHENSIVE

The challenge requires a solution that encompasses infrastructure, technical solutions, policy, workforce, and partnerships regarding AI. It will demand iteration and a feedback-driven approach that is flexible to rapid prototyping

DEMOCRATIZED

Efforts must lower the barrier to entry through investments and partnerships so the benefits of AI can be applied across sectors, and not only by the largest companies

Call to Action

Bring momentum to this critical decade of AI; engage and start a conversation today

Whoever leads in AI by 2030 will rule the world until 2100; it is critical to have a national strategy that sets values for AI[3]

NSCAI REFERENCES | CHAPTERS

1 3 5 9 11

"The United States must elevate AI considerations from the technical to the strategic level. Emerging technologies led by AI now underpin our economic prosperity, security, and welfare. The White House should establish a new Technology Competitiveness Council led by the Vice President to integrate security, economic, and scientific considerations; develop a comprehensive technology strategy; and oversee its implementation." NSCAI Report, Executive Summary

[3] Whoever leads in artificial intelligence in 2030 will rule the world until 2100 (brookings.edu)

RESPONSIBLE AI TODAY

HUMAN-CENTERED

Humans will drive critical decisions; AI will enhance human decisions through data and reduce manual efforts on mundane tasks

ETHICAL AND TRUSTWORTHY

Lead by example through Ethical AI Frameworks to mitigate bias and implement accountable and technically rigorous systems

RESPECTFUL

Promote approaches that maximize insights derived from AI while protecting individual privacy; doing so will promote best practices and standards both domestically and internationally

Call to Action

Normalize AI in your community by increasing transparency and trust, reducing barriers

The DoD Joint Artificial Intelligence Center (JAIC): Operationalizing the DoD ethical principles into the Responsible AI Framework [4]

NSCAI REFERENCES | CHAPTERS

4 7 8

"The fact that AI, from the training data to the output, is not static means you have to be intentional in creating meaningful decision points and processes to ensure that we are building technology in a responsible manner."
Alka Patel, Head of AI Ethics Policy, JAIC [5]

[4], Highlighting the Progress and Future of Responsible AI in DoD – Ai.mil
[5] The AI Ethics Journey Will Hit New Heights in 2021 - AI in Defense

AI WORKFORCE REVOLUTION

OPTIMIZED

Create organizational structures and incentives that allow AI technologists to thrive and apply cutting-edge technologies to the mission; become a destination of choice for practitioners

TRAINED

Establish training programs to increase current workforce capabilities as well as advanced training in AI through public-private partnerships and academia; keep a long-term focus to scale and mature the workforce

INCLUSIVE

Ensuring and fostering diversity in backgrounds, experience, skills, and thought is critical for innovation. Industry must invest in a wide range of talent to transform technology

Call to Action

Deepen academic partnerships, provide training to current staff, and recruit top talent to the National Security field

The Software Engineering Institute (SEI), Carnegie Mellon: ODNI funded the AI Initiative to advance AI engineering [6]

NSCAI REFERENCES | CHAPTERS

2 6 10

The NVIDIA Deep Learning Institute (DLI) offers hands-on training in AI, accelerated computing, and accelerated data science. Developers, data scientists, researchers, and students can get practical experience powered by GPUs in the cloud. And IT professionals can access courses on designing and managing infrastructure to support AI, data science, and HPC workloads across their organizations.[7]

[6] Office of the Director of National Intelligence Sponsors SEI to Lead National AI Engineering Initiative – SEI News

[7] Deep Learning Institute and Training Solutions | NVIDIA

AI TECH ECOSYSTEM

HOLISTIC
To create the right conditions requires addressing technology, infrastructure, talent, tools, and strategy, all of which is underpinned by healthy R&D investments to lead innovation

INTEGRATED
Through accessible, integrated, and automated solutions, AI development can be rapidly advanced to meet evolving threats. Ease of technology is critical for user adoption

BASED ON SHARED BEST PRACTICES
Utilize existing best practices and share technology where possible – avoid duplication of efforts

INNOVATIVE
Create a space for innovation and promote and maintain R&D partnerships

Call to Action
Plug into the integrated AI ecosystem to contribute and scale innovative capabilities

USAF U-2 Dragon Lady Recon aircraft: "Putting AI safely in command of a U.S. military system for the first time ushers in a new age of human-machine teaming" Will Roper, Air Force [8]

NSCAI REFERENCES | CHAPTERS

2 — 5 — 16

"The DoD must set an ambitious goal. By 2025, the foundations for widespread integration of AI across DoD must be in place. Those foundations include a common digital infrastructure that is accessible to internal AI development teams and critical industry partners alike, a digitally literate workforce, and modern AI-enabled business practices that improve efficiency." NSCAI Report, Ch. 2

[8] U-2 Flies with Booz Allen Hamilton Artificial Intelligence Algorithm - Aviation Today

PARTNERING FOR INNOVATION

PARTNERED WITH INDUSTRY

The U.S. Government must work with industry and academic partners to stay attuned with the latest technology, invest to fill gaps as needed, and field prototypes to mature them into trusted systems

COLLABORATIVE

Industry must work together to innovate through integrated partnerships. Larger organizations can sponsor new tech startups

UNITED

Without the commitment of resources, talent, technology, and partnerships from industry the US will not be able to maintain leadership in AI

Call to Action

Industry, academia, and government must collaborate to pave the way forward

Senator Mark Warner introduced bipartisan legislation to create a new interagency office to coordinate technology strategies with allies to counter China's influence [9]

NSCAI REFERENCES | CHAPTERS

9 — 11 — 14 — 15

"DoD must leverage industry's comparative advantage in available R&D capital as part of its investment strategy. To do so effectively, the Department must adopt a consistent and transparent approach to messaging defense technology priorities that enables Defense primes and non-traditionals to plan and invest more to help meet DoD R&D needs, and further supports the Department's efforts to attract venture-backed companies." NSCAI Report Ch. 2

[9] The Technology 202: Bipartisan bill would fund tech partnerships with allies to counter China - The Washington Post

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DEFENSE
INNOVATION UNIT

xView Challenges
March 2021

PANELISTS

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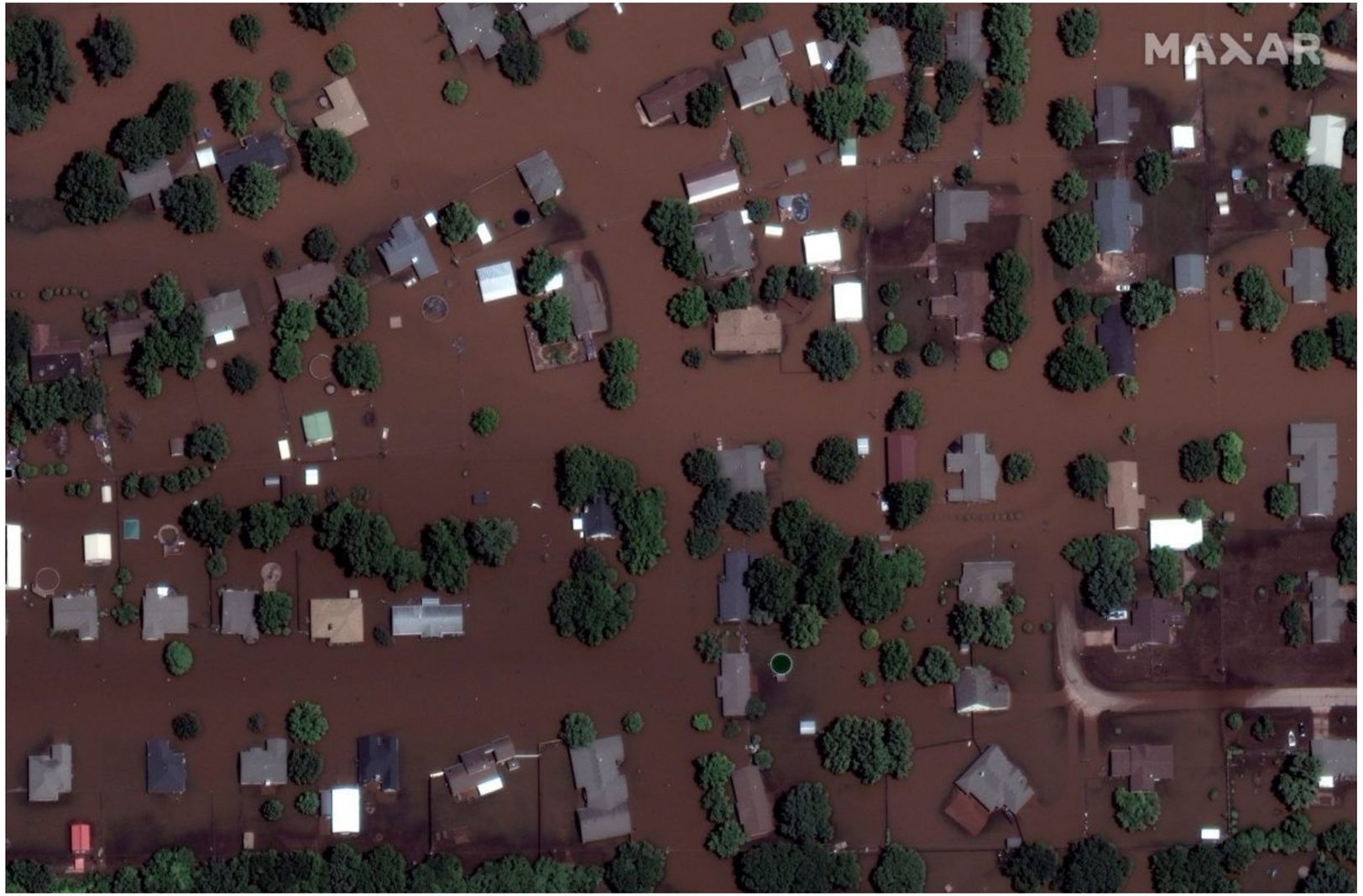
  Consultant, AI/ML Portfolio
  Defense Innovation Unit

- Carol Smith
  Sr. Research Scientist in HMI
  Software Engineering Institute,
  Carnegie Mellon University

- Aaron Reite, Ph.D.
  Senior Staff Scientist
  National Geospatial-Intelligence Agency

- Richard Marcum
  R&D Scientist
  National Geospatial-Intelligence Agency

BACKGROUND

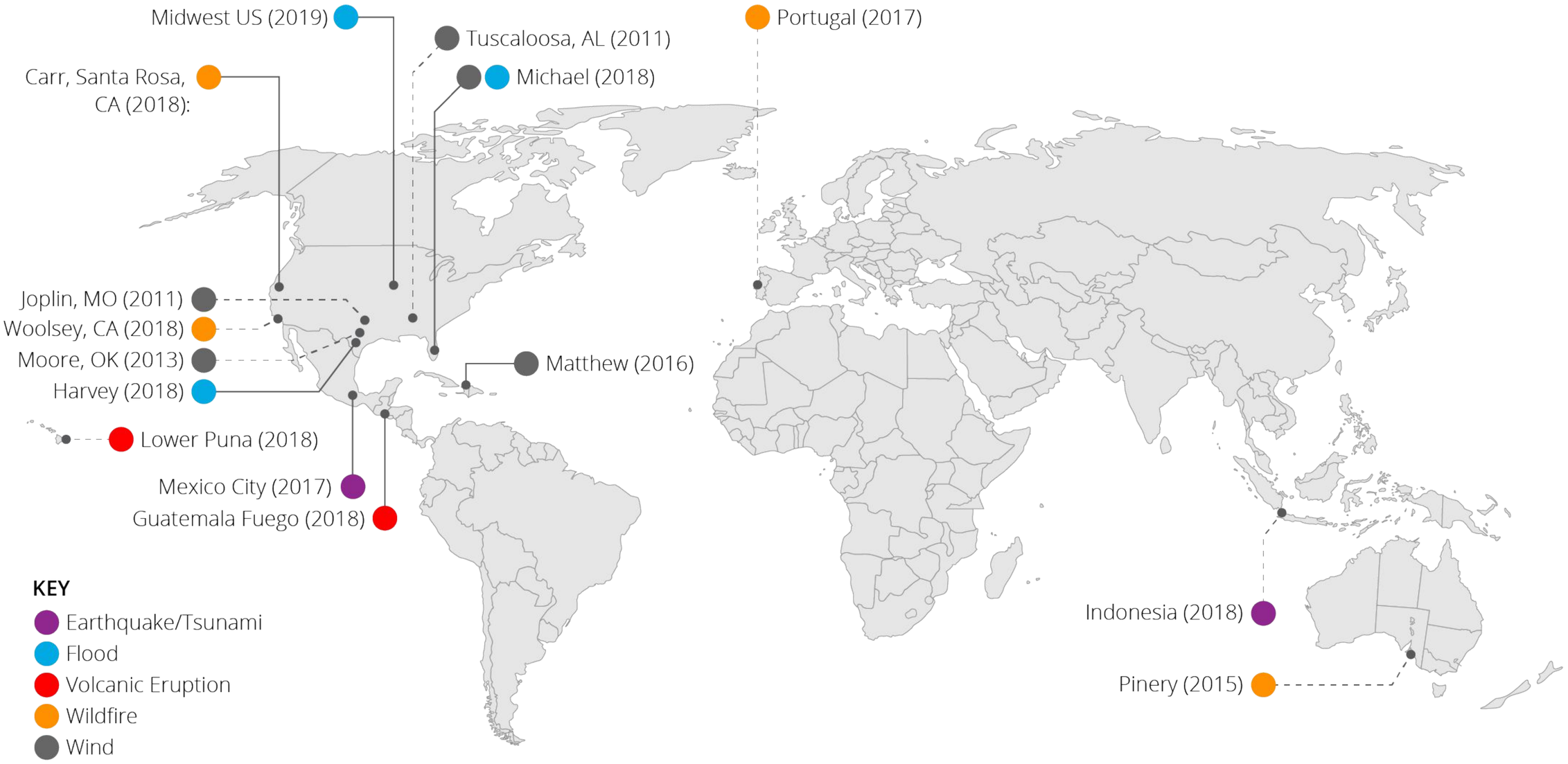


xView 2

Analysis Agencies

FEMA

DIVERSITY OF LOCATIONS

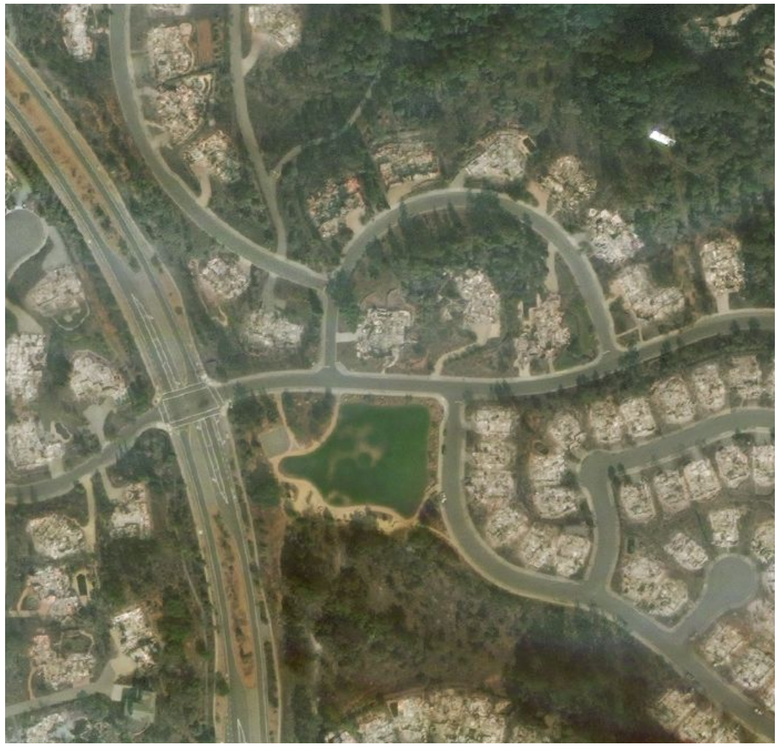


JOINT DAMAGE SCALE

Disaster Level	Structure Description
0 (No Damage)	Undisturbed. No sign of water, structural or shingle damage, or burn marks.
1 (Minor Damage)	Building partially burnt, water surrounding structure, volcanic flow nearby, roof elements missing, or visible cracks.
2 (Major Damage)	Partial wall or roof collapse, encroaching volcanic flow, or surrounded by water/mud.
3 (Destroyed)	Scorched, completely collapsed, partially/ completely covered with water/mud, or otherwise no longer present.

DATA

Pre-event



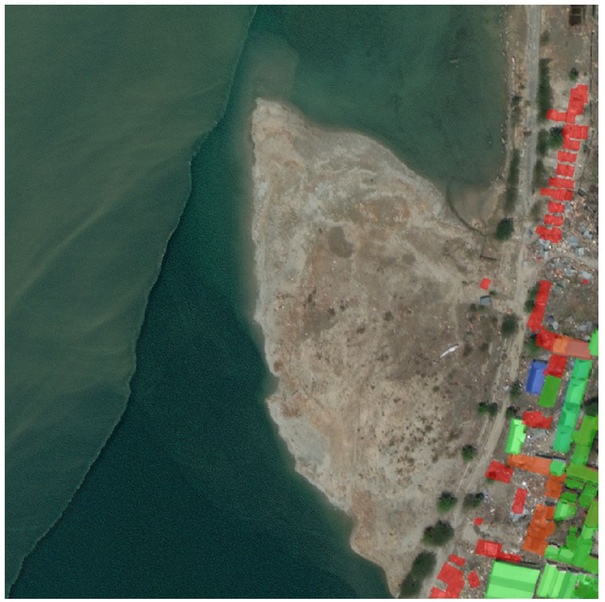
Post-event

Annotations

DATA

Pre-event

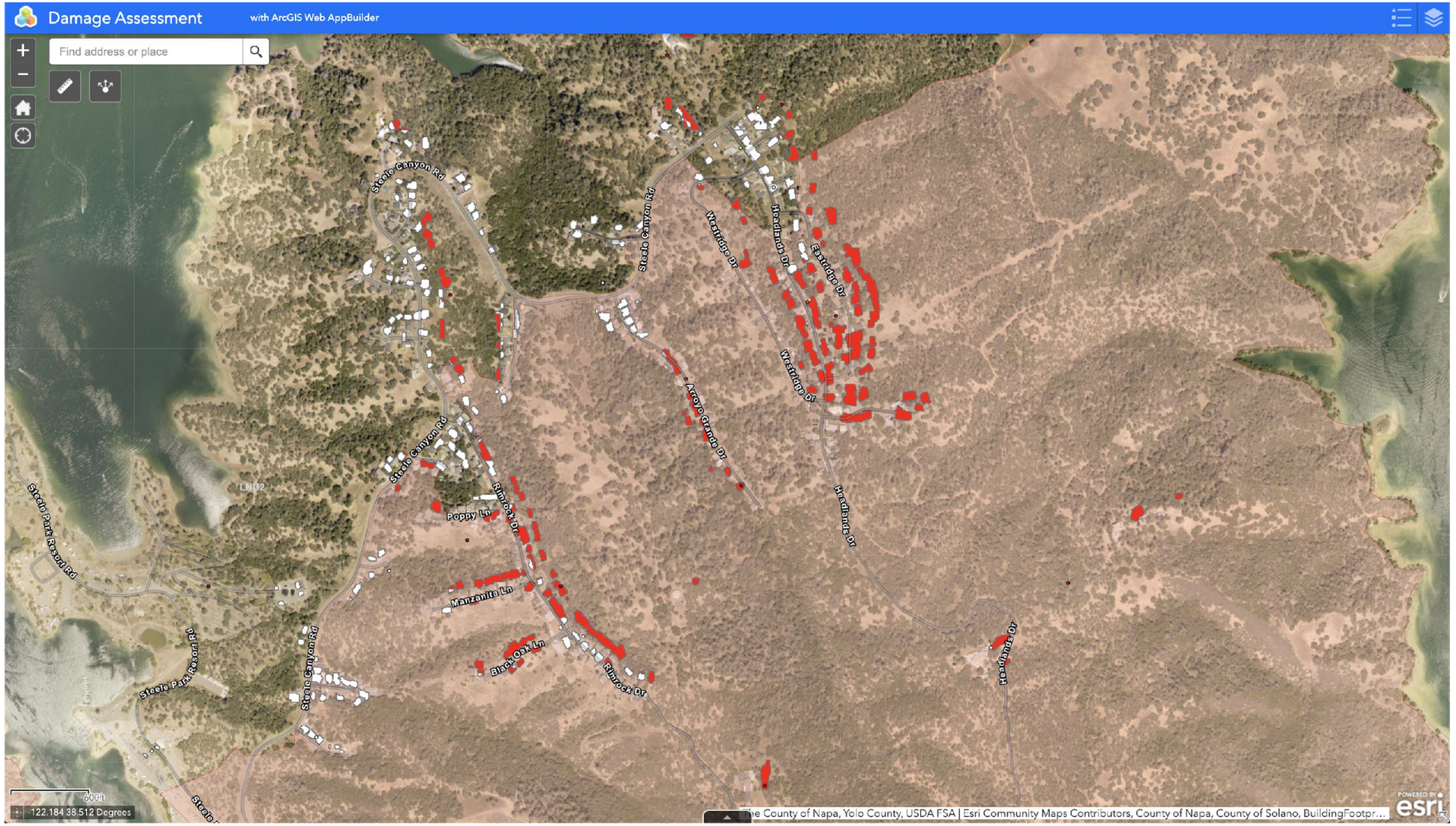
Post-event



Annotations

Inference

DEPLOYMENT


Damage Assessment
with ArcGIS Web AppBuilder
Find address or place
Steele Canyon Rd
Westridge Dr
Hearstands Dr
Eastridge Dr
Arroyo Grande Dr
Poppy Ln
Rimrock Dr
Manzanita Ln
Black Oak Ln
Steele Park Resort Rd
RV Resort Rd
600 ft
122.184 38.512 Degrees
County of Napa, Yolo County, USDA FSA | Esri Community Maps Contributors, County of Napa, County of Solano, BuildingFootpr...
esri

DATA ACCESS

xView 1: http://xviewdataset.org

xView2: https://xview2.org

GitHub: https://github.com/DIUx-xView

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