Ones and Zeros

Creating an AI-Driven, Data-centric Approach for All-Domain Operational-Level Simulations

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2. VISTA Overview
3. Generative AI and Operator Modeling
4. Applications to Training and Results

Concept and Value Proposition

- Military Intelligence, Targeting, and Planning still lacks all-domain, automated data-based training
- DCGS-A training done via on-the-job or LFEs using live feeds from operational or range missions
- Intel crews must deploy or go TDY to participate in large force exercises
- IEWTPT expansion to all-domain requires extensive, manual, white force effort result in significant limitations

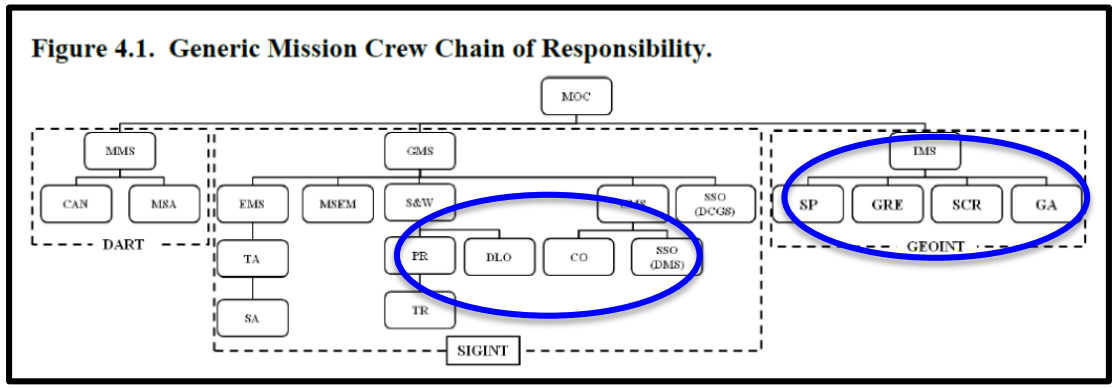
Capability Needed: Dedicated, Enterprise-ready capability to create synthetic ISR data that can *stimulate* training and operational networks enabling training using real-world software tools

Value Proposition:

- Hundreds of Intel, Operational C2 Centers, and exercise hubs around the world—thousands of potential users
- All operational players need data-centric training—intel, JOC/TOC/CAOC, targeting cells, planning cells, etc.
- Emerging JADC2 enterprises need volumes of tailorable data for testing and to develop concepts and TTPs
- Virtualized data-centric training capability can also be used as a planning and decision tool
- Value of synthetic data scales with new JADC2 efforts and AI-based data analysis



Intel Training Audience

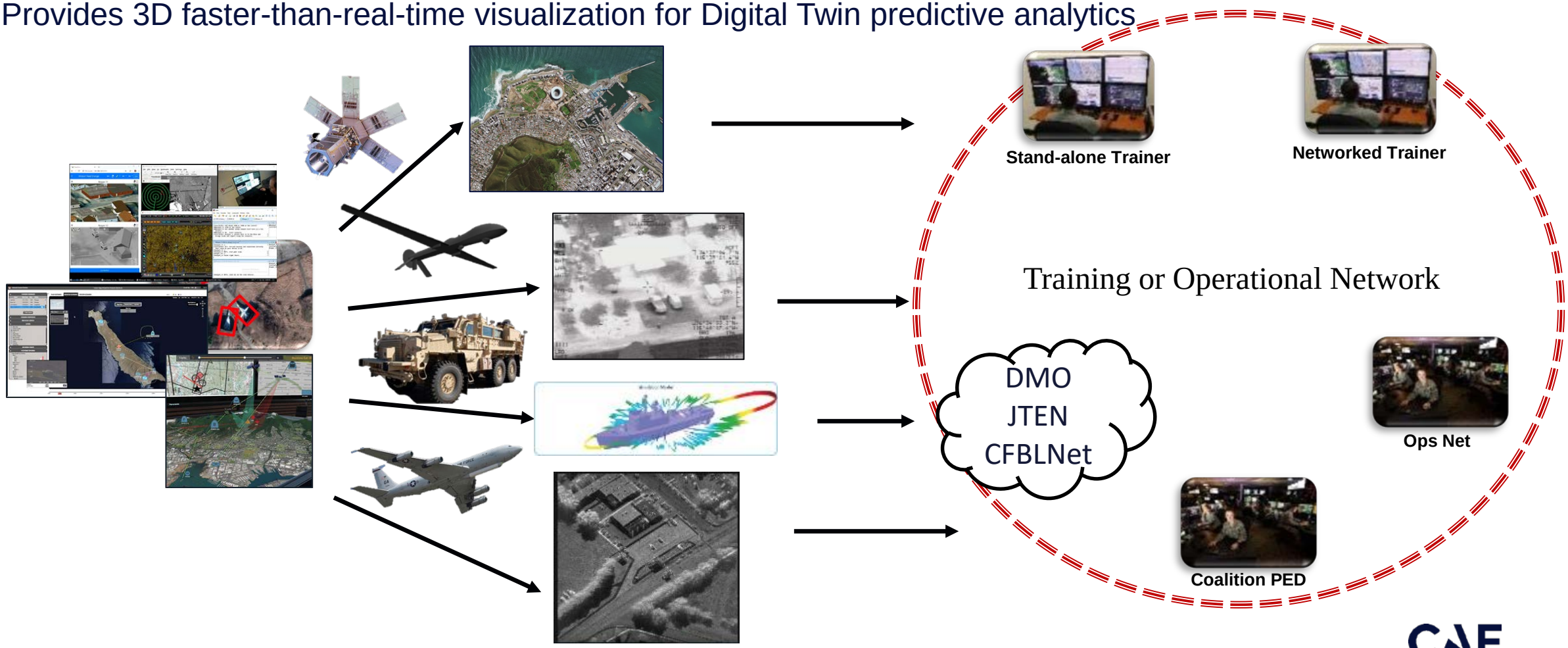


MOC	GEOINT - FMV	GEOINT - HA	SIGINT (EXCLUDING THOSE UNDER CMS)	SIGINT UNDER CMS	DART
SIT DISPLAY (E.G. GE)	FMV INJECT/DISPLAY/EXPLOITATION TOOL (E.G. AIMES, MAAS, FMV TOOLKIT)	HA GEOINT (EO, IR, SAR, MULTISPECTTRAL, AGI) INJECT/DISPLAY/EXPLOITATION TOOL (E.G. SOCET GXP, GEOINT BASELINE 4.1)	SIGINT INJECT/DISPLAY/EXPLOITATION TOOL	SIGINT INJECT/DISPLAY/EXPLOITATION TOOL	SIT DISPLAY (E.G. GE)
MSN MGMT (E.G. UNICORN)	SIT DISPLAY (E.G. GE)	MSN MGMT (E.G. UNICORN)	MSN MGMT/SIGINT APPLICATIONS	MSN MGMT/SIGINT APPLICATIONS	MSN MGMT (E.G. UNICORN)
COMM TOOLS (E.G. MIRC)	MSN MGMT (E.G. UNICORN)	REPORTING TOOL (E.G. EISSOR REPLACEMENT)	REPORTING TOOL	REPORTING TOOL	COMM TOOLS (E.G. MIRC)
OFFICE TOOLS	COMM TOOLS (E.G. MIRC)	SIT DISPLAY (E.G. GE)	SIT DISPLAY (E.G. GE)	SIT DISPLAY (E.G. GE)	OFFICE TOOLS
ABILITY TO ACCESS TEMPLATES/REF MATERIALS	OFFICE TOOLS	OFFICE TOOLS	OFFICE TOOLS	OFFICE TOOLS	ABILITY TO ACCESS TEMPLATES/REF MATERIALS
ACCESS TO VARIOUS INTEL APPLICATIONS	ABILITY TO ACCESS TEMPLATES/REF MATERIALS	ABILITY TO ACCESS TEMPLATES/REF MATERIALS	ABILITY TO ACCESS TEMPLATES/REF MATERIALS	ABILITY TO ACCESS TEMPLATES/REF MATERIALS	ACCESS TO VARIOUS INTEL APPLICATIONS
		COMM TOOLS (E.G. MIRC)	COMM TOOLS (E.G. MIRC)	COMM TOOLS (E.G. MIRC)	

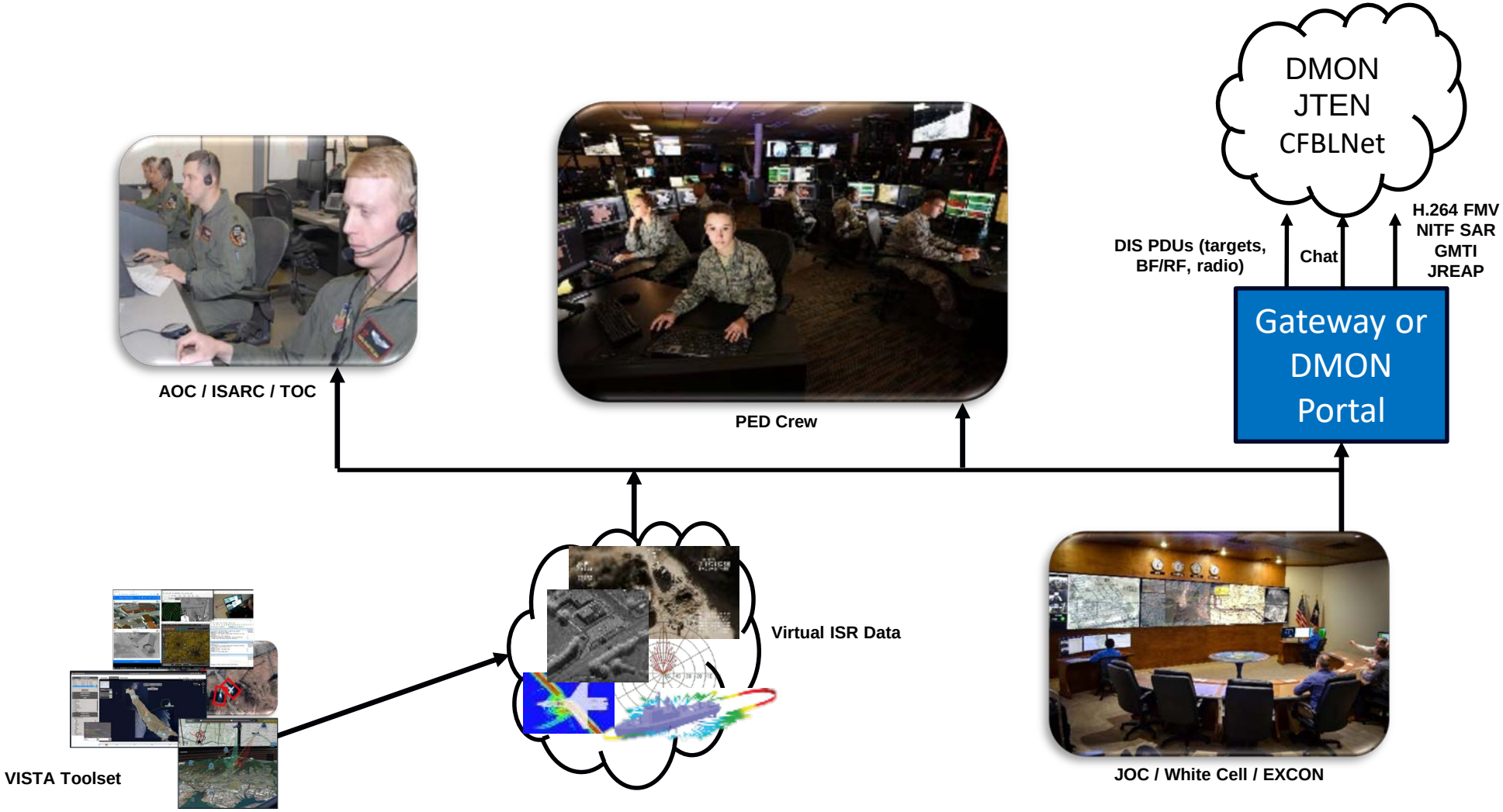
Virtual ISR Training Application (VISTA)

Provides taskable assets to inject all-domain C4ISR sensor/data feed onto training or ops networks

- Creates or shares databases, RF/BF/WF entities, and targets
- Enables man/machine-in-the-loop M&S analysis for training, TTP development, mission rehearsal
- Provides 3D faster-than-real-time visualization for Digital Twin predictive analytics



Operational View of Virtual C2ISR Training Concept



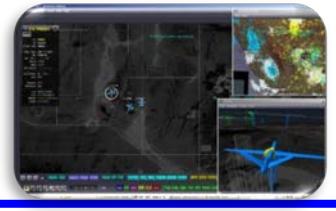
From Off-the-Shelf to C2ISR Mission Training

Strategic and Reach Back

Operational and Strategic C2

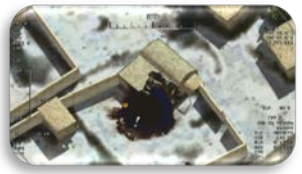
Cyber Approvals and Cloud Deployment for Large-Force Training

Common Operating Picture



Operational

Training and Mission Rehearsal Areas

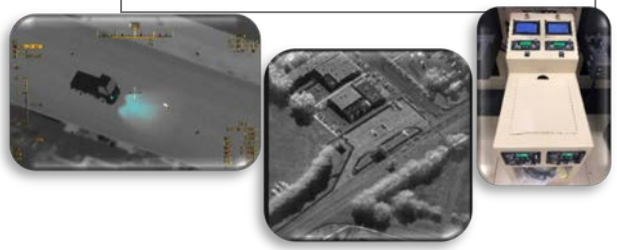


Complex, Realistic Scenarios

Realistic Weather and RF Threats

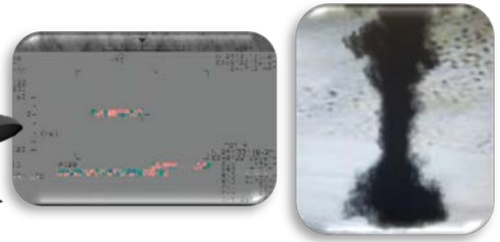
Tactical

Comms, Sensor, and Emitters



Adv Mission Replay and Debrief

Datalinks & Weapons

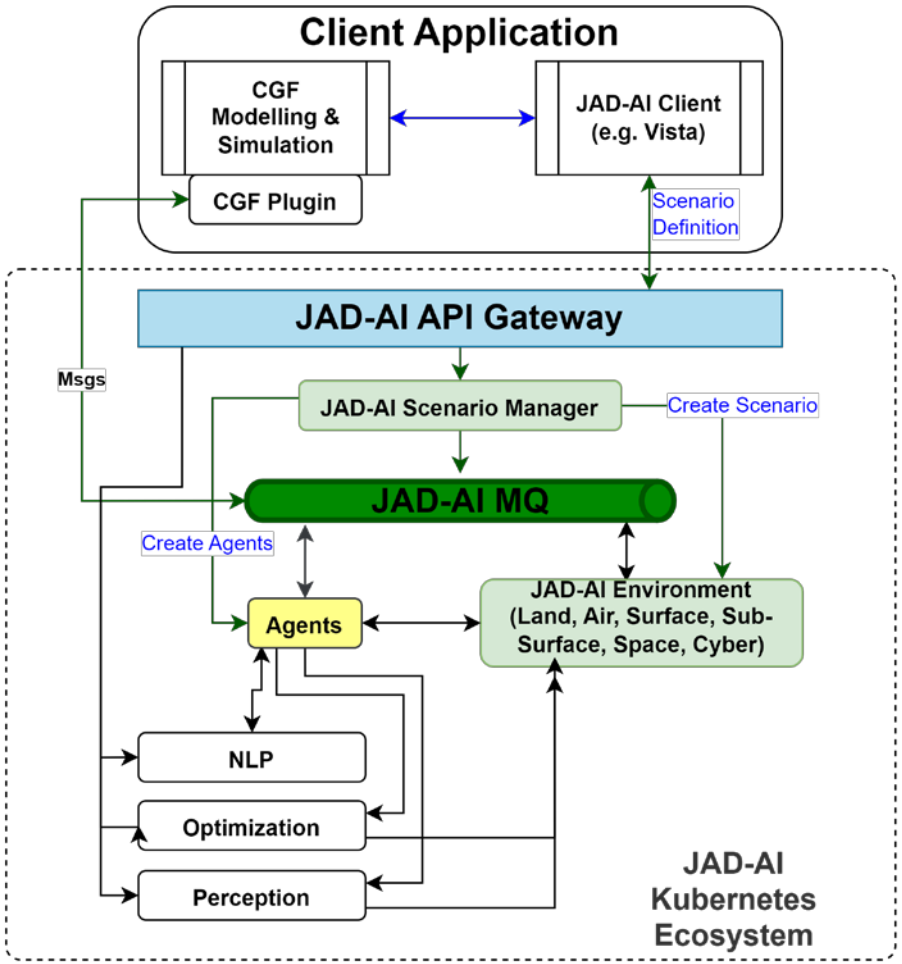


Stand-Alone Hardware/Software Concurrency

Mature Mission Integration Capability Leveraged for the C2ISR Enterprise

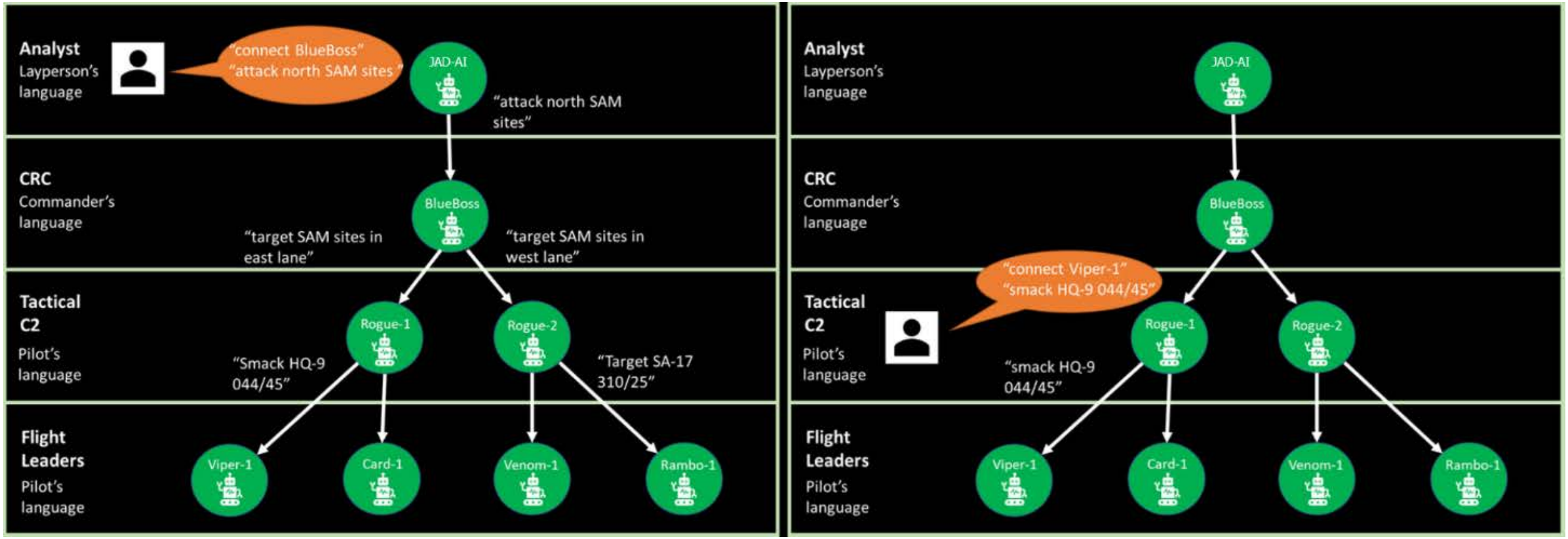
CAE

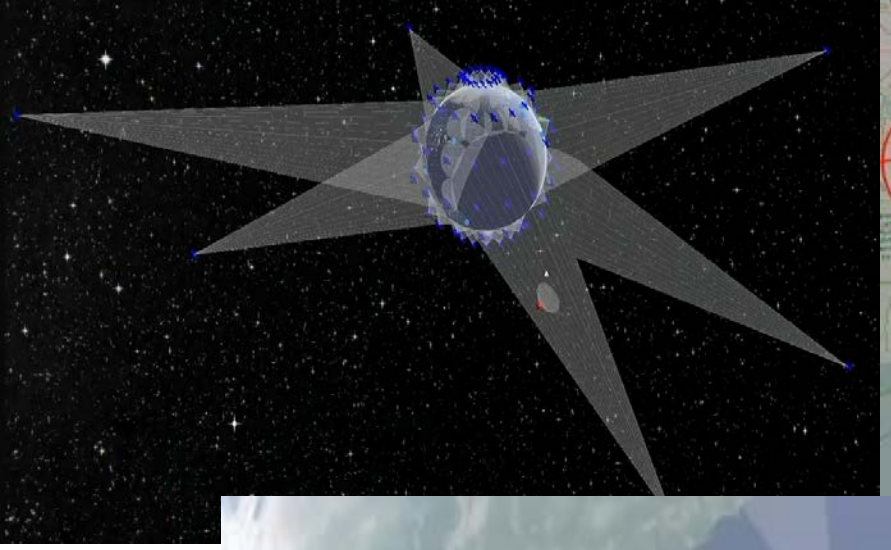
Joint All-Domain AI

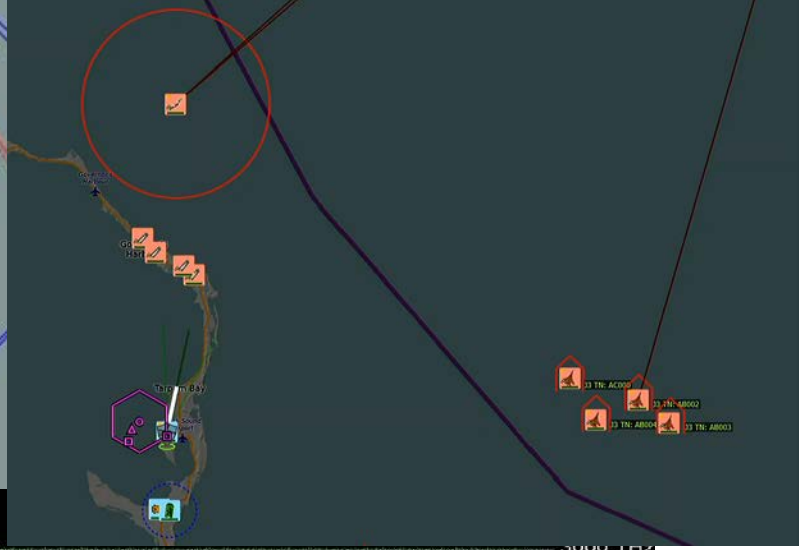


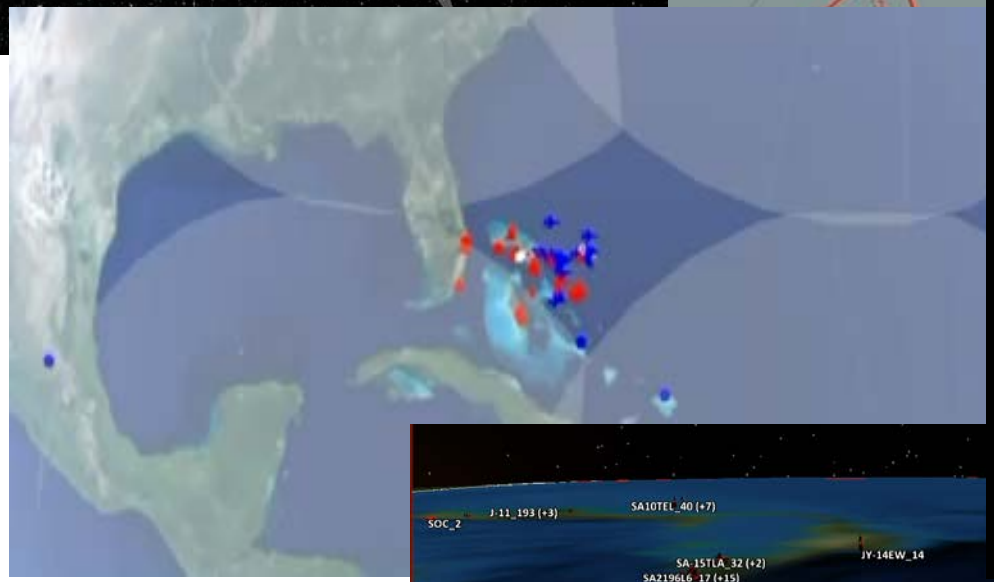
Component	Description
Environment	Provides entity state information from the CGF environment to the agents
CGF Plug-in	Interface between JAD-AI and the CGF environment
Agents	CGF independent agents can communicate with the CGF plugin and environment to send and receive information to and from the CGF environment; they can execute general or specific behaviors using techniques like behavior graphs, reinforcement learning, closed-form continuous-depth networks, rule-based logic, generative adversarial network, and others
Message Que	Asynchronous messages sent through a centralized message queue that enables agents to track only the information relevant to them as it arrives
Natural Language	Speech-to-text, text-to-speech, intent classification, and parameter extraction support for agents
Optimization	Pathfinding, COA generation and analysis, Monte Carlo simulation, probabilistic methods, and other techniques to support agents
Perception	Pattern of life detection, object identification, tracking, and other techniques to support agents

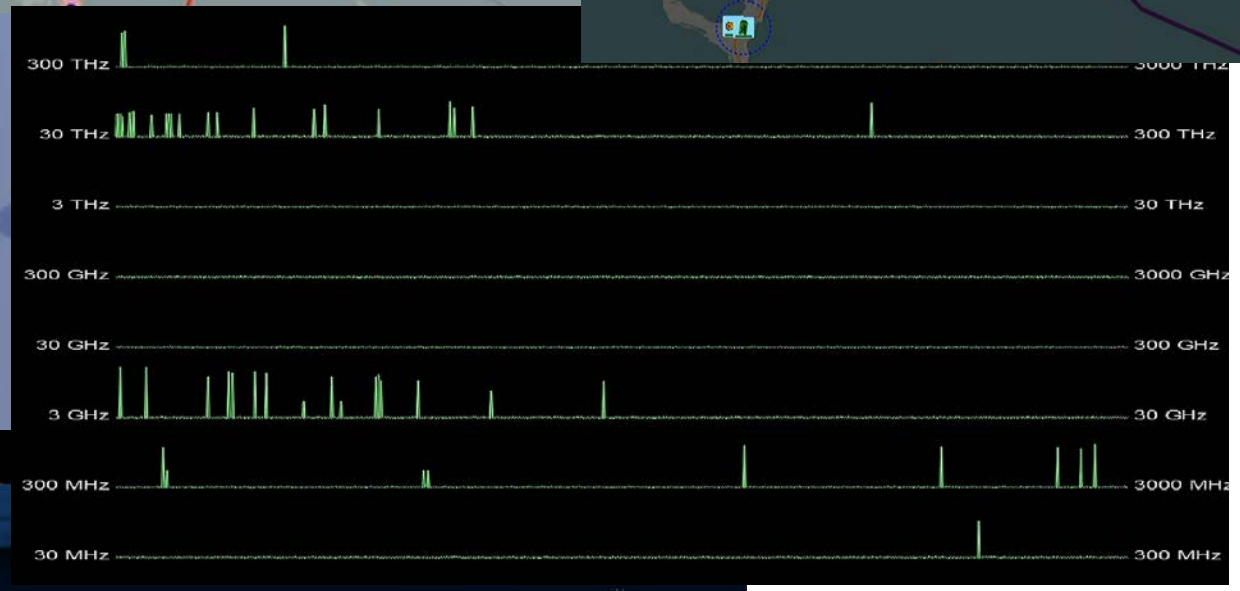
Operator Model Event Flow







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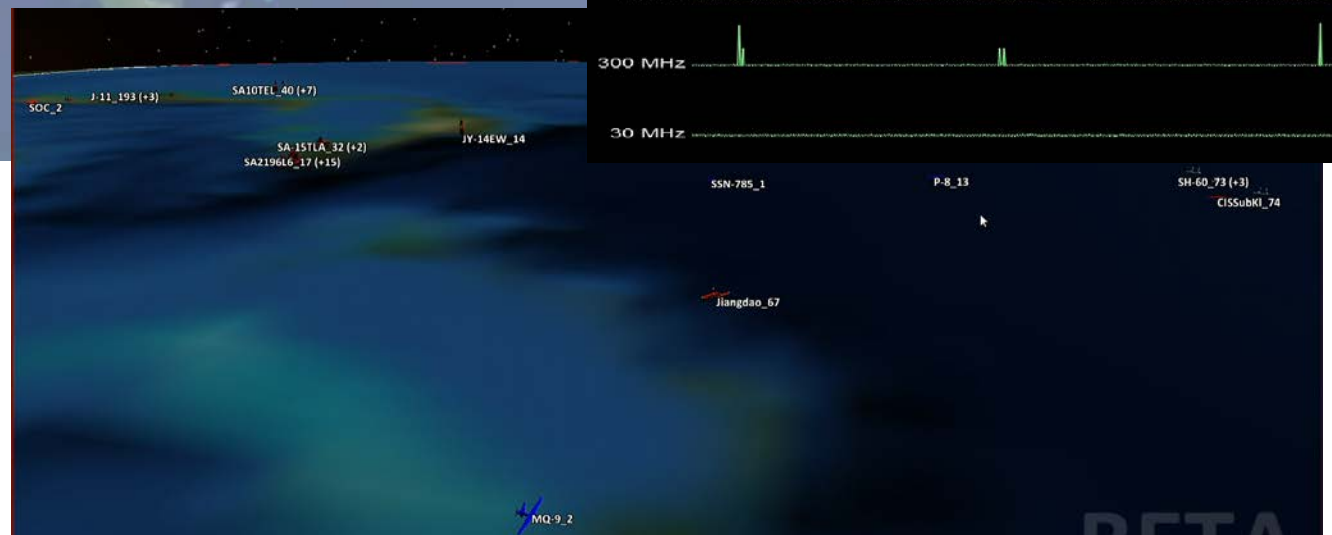
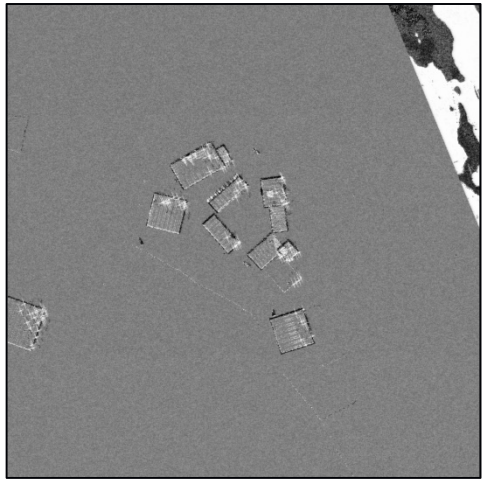

SOC_2
J-11_193 (+3)
SA10TEL_40 (+7)
SA-15TLA_32 (+2)
SA2196L6_17 (+15)
JY-14EW_14
SSN-785_1
P-8_13
SH-60_73 (+3)
CISSubKl_74
Jiangdao_67
MQ-9_2

Virtual ISR Trainer Setup and Data Support Provided

WPC Setup

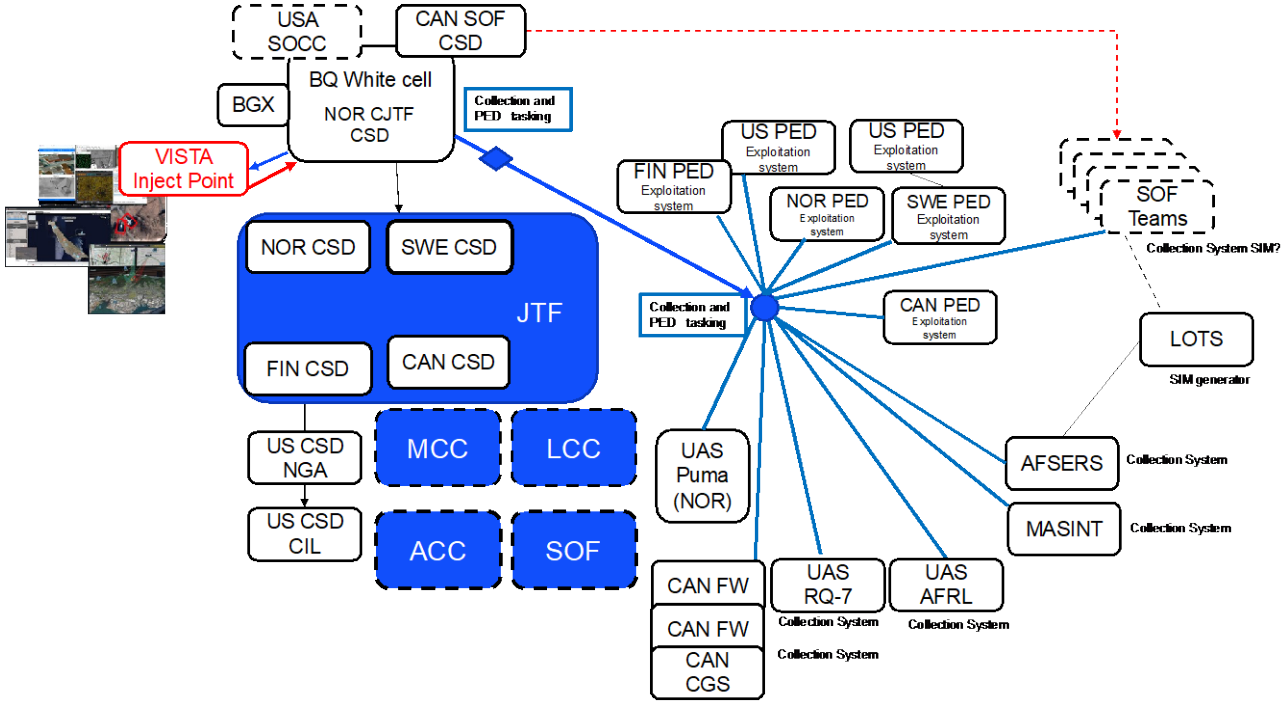
CCTV Images



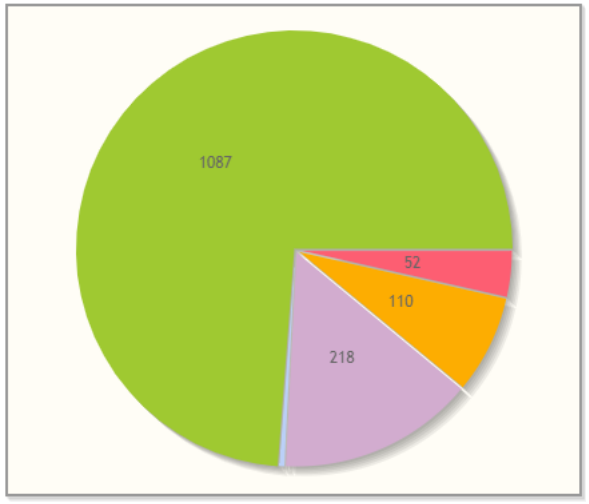
SAR Images with GMTI

Unattended Ground Sensor (MASINT) Images

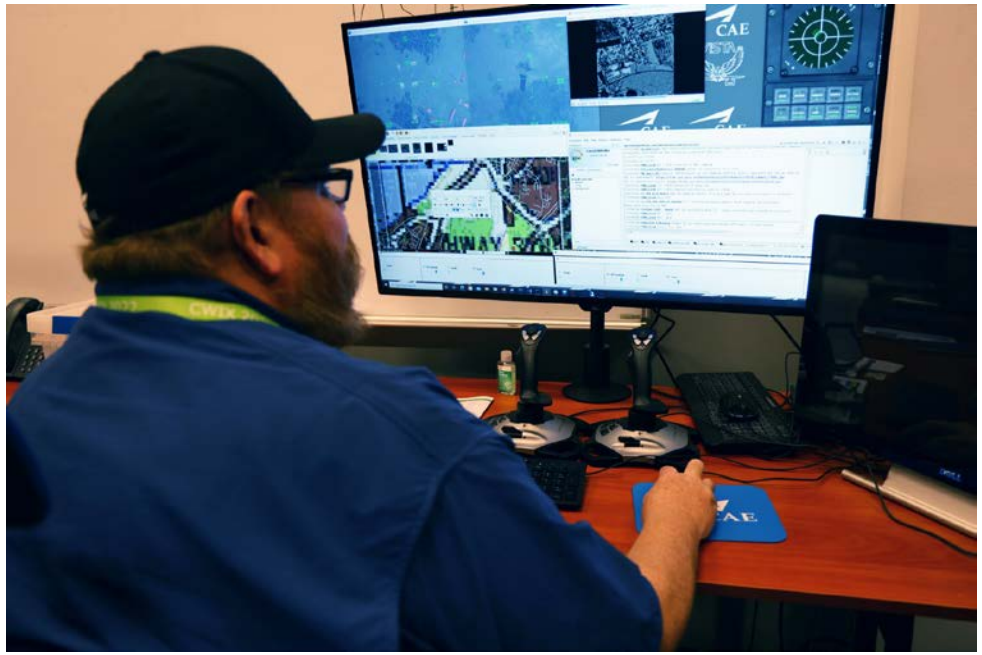
Operational Assessments

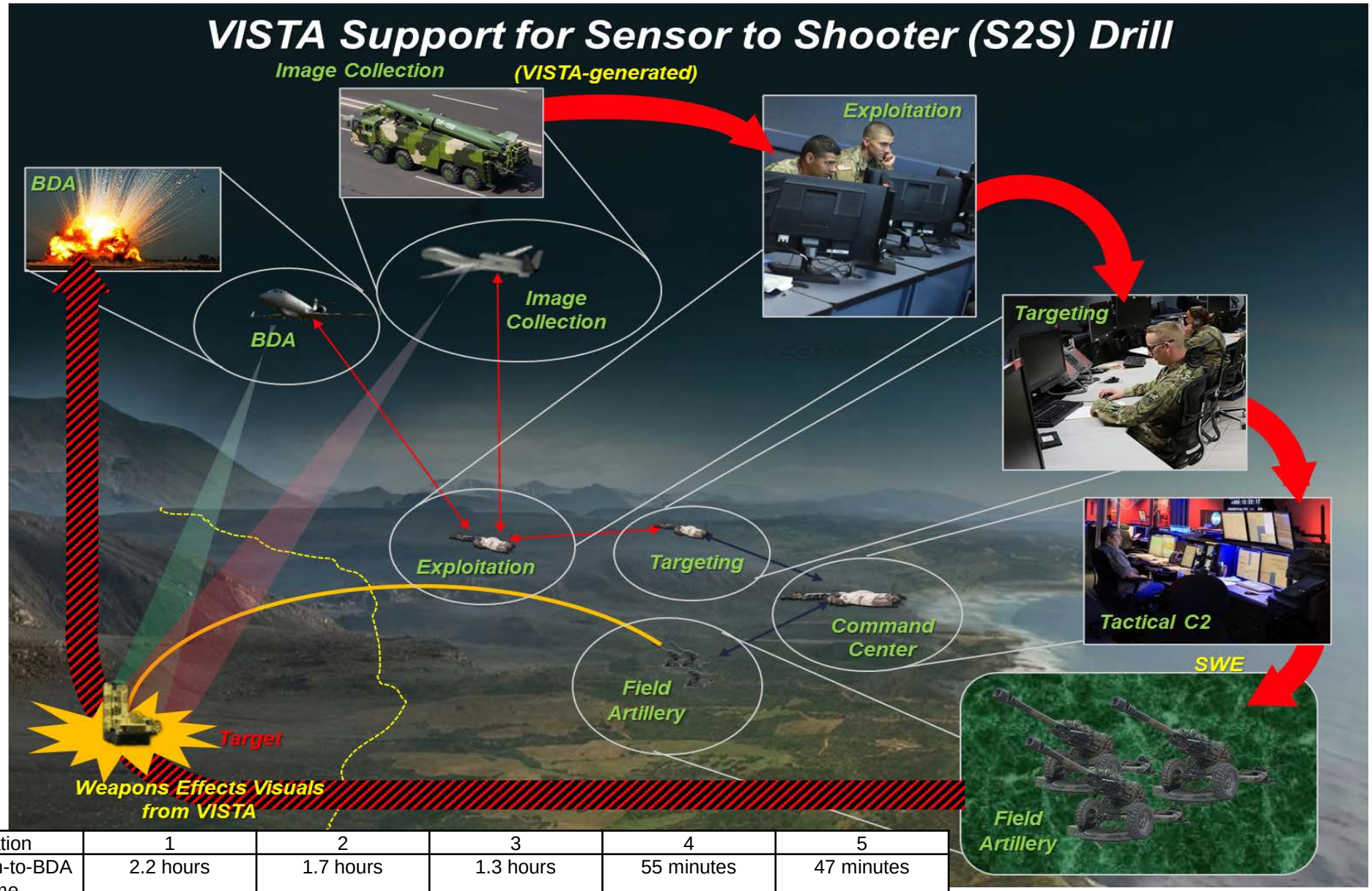


NATO CWIX



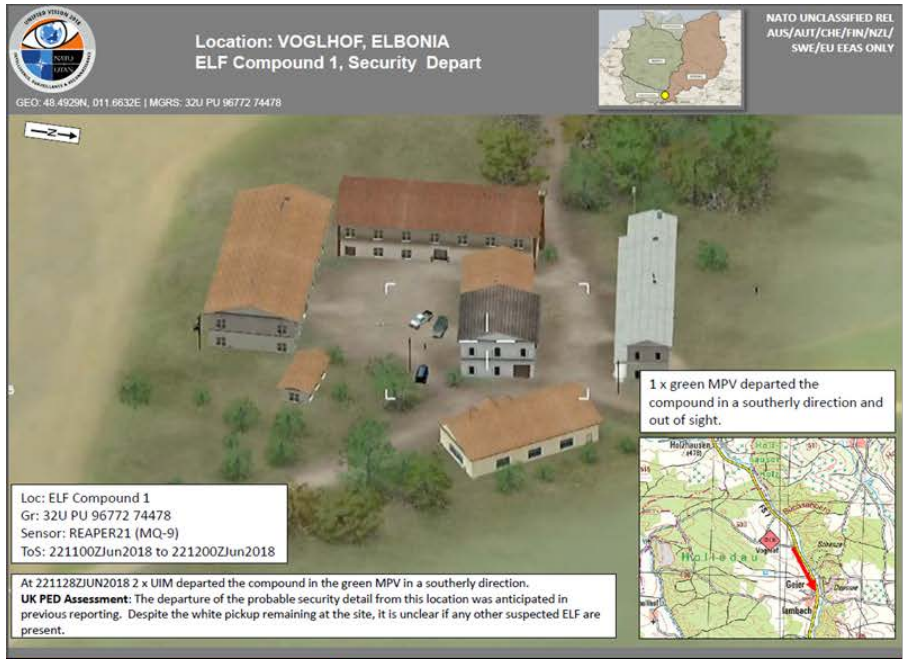
Focus Area	Test Cases
Air Focus Area	0
Comms Focus Area	1058
Cyber Focus Area	93
DCS Focus Area	0
FCS Focus Area	24
FFT Focus Area	12
FMNCS Focus Area	0
FMNEX Focus Area	0
GeoMetOc Focus Area	0
JISR Focus Area	4
LOG Focus Area	132
Land Focus Area	0
MIP Focus Area	3
MandS Focus Area	158
Maritime Focus Area	0
OpCmd Focus Area	9
Space Focus Area	0
TDL Focus Area	0

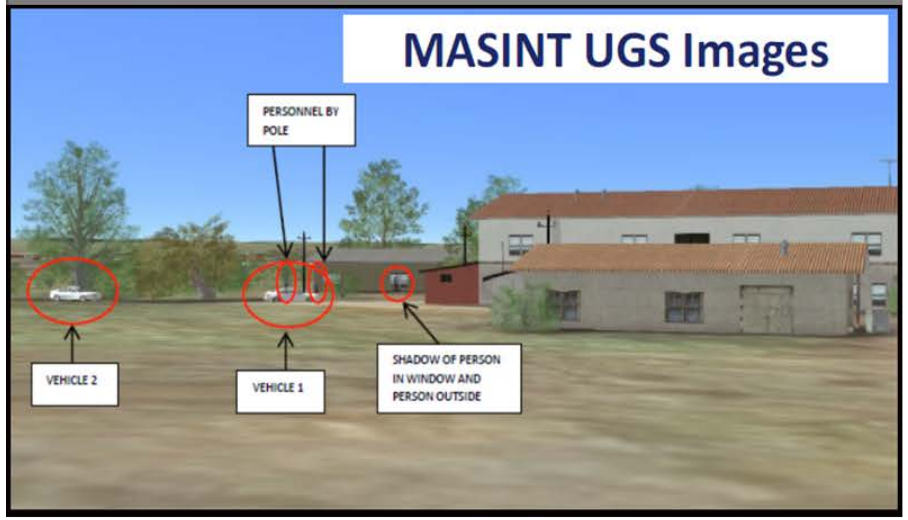




Iteration	1	2	3	4	5
Detection-to-BDA Time	2.2 hours	1.7 hours	1.3 hours	55 minutes	47 minutes
% Time Reduction from 1	0%	23%	41%	59%	64%

Intel Products Produced Using VISTA Data





(For training purposes only)

CJTF

ELBONIA

INTSUM

ORRIGINATOR://	CJTF ELBONIA – V1A – Elbonian Hostage Located
SIC CODE://	
EXER:// or OPER://	EXERCISE UNIFIED VISION 2018
MSGID / /INTSUM / UNIT / SERIAL NUMBER / MONTH //	
REF:// INTSUM / UNIT / DATE+TIME Z / MONTH / YEAR / SERIAL NUMBER//	
EFDT / DATE + TIME Z / MONTH //	
PERIOD / PERIOD OF TIME://	
SUBJREF://	20180622_NU_UV18_V1A_CJTF_ELB_INTSUM 105

1. GENERAL ASSESSMENT:

GENTEXT/Multiple corroborated intelligence sources confirm Elbonian hostage, Ericka Hines held captive at CMP 1 located 48°29'33.33N 11°39'48.35E by ELF terrorists current as of 201806220800. Activity at CMP 1 increased significantly in past 12 hours with multiple vehicles entering and exiting the compound and an increased guard presence on compound grounds.//
GENTEXT/Multiple Intelligence sources with high confidence indicate ELF intend to transfer hostage, Ericka Hines from CMP 1 to a temporary holding cell shortly before transferring Hines from Elbonia to undisclosed location in neighboring Borduria in next 12 hours by way of light aircraft originating from unnamed airfield in Southern Elbonia.//

Assessment:
GENTEXT/Rapid movement of hostage, Ericka Hines appears to indicate increased presence and pressure from both Elbonian and NATO forces in the southern contested area of Elbonia. It is also likely, ELF leader Roblas Mondio fears losing the ELF's current best political and propaganda bargaining chip and the backlash Mondio would face by losing support by Elbonian sympathizers. The closest airfield to ELF CMP 1,2 and 3 is Genoshya Airfield located 48°10'27.95N 11° 7'32.41E. Genoshya ATC reported an UI aircraft took off without permission at 20180621100Z and did not squawk Mode 3. It is highly probable ELF forces will attempt to use this same airfield to move Ericka Hines.//

End of Brief