



AOC EW EUROPE CONFERENCE

“UNIFYING ELECTROMAGNETIC WARFARE IN A COMPLEX WORLD - TOGETHER”

Spectrum: Multi-Domain and Multi-National

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MEET THE SPEAKER



DUSTAN HELLWIG

CEO/CTO, CHESAPEAKE TECHNOLOGY INTERNATIONAL, USA

Dustan has been working in the spectrum, EW, and CEMA environments for over 28 years. As the CEO and CTO for Chesapeake Technology International (CTI) he focuses on strategic planning and forward-leaning technology development and helping CTI fulfill the needs of its users across the department and the force.

After graduating from Virginia Tech in Mathematics, Dustan was also awarded Master's degrees from the University of Maryland and American Military University. Dustan has been a software developer, engineer, architect, and business owner over the past three decades.

When not sitting on United Airlines, Dustan can be found hiking and skiing the Colorado mountains with his wife and dogs.

ABSTRACT

Spectrum: Multi-Domain and Multi-National

“UNIFYING ELECTROMAGNETIC WARFARE IN A COMPLEX WORLD - TOGETHER”

Spectrum is ... by definition ... multi-domain and multi-national. Electrons do not abide by international boundaries nor physical boundaries between air, land, sea, and space. Because of this fact, spectrum-dependent operations must also be multi-domain and multi-national. The Joint Electromagnetic Spectrum Operations (JEMSO) construct identifies functional collaboration between the intelligence, operations, and spectrum communities; and it also identifies the economic and regulatory aspects of multi-national spectrum; and also supports that the “EMS transcends all physical domains”. Finally, it presents procedures and approaches to resolving these challenges but does not address the *technical* aspects of implementing these procedures and approaches.

Chesapeake Technology International (CTI) proposes a technical, open-platform based environment on which JEMSO solutions can be created to facilitate multi-domain and multi-national operations. This includes the sharing of spectrum resources, data, plans, information, analytics, and awareness through visualization. This also includes addressing the various uses of spectrum in support of military operations to include sensing, communicating, attacking, navigating, synchronizing, and other related spectrum-dependent operations.

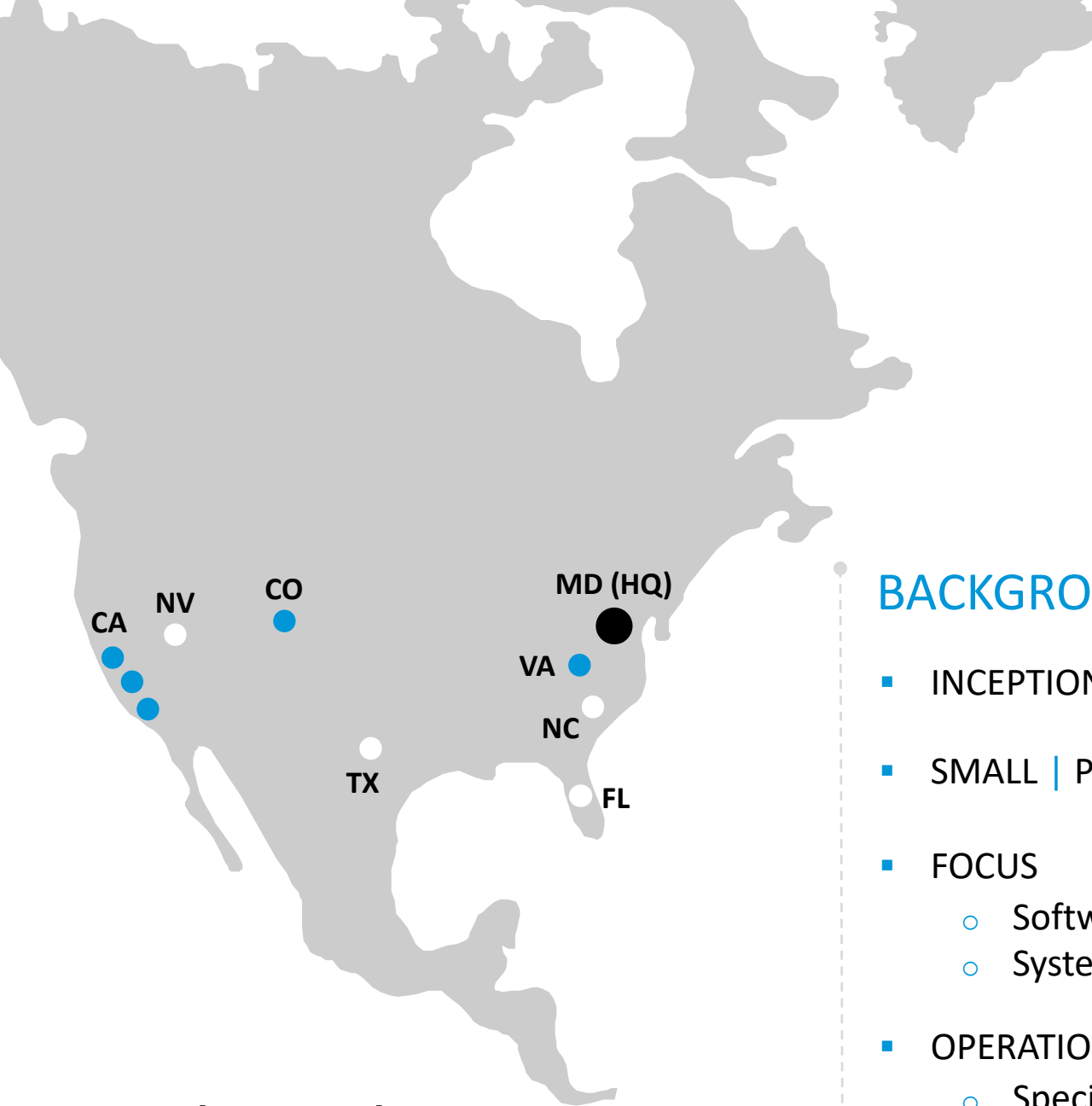
BOTTOM LINE – UP FRONT

- Spectrum is multi-domain and multi-national by definition
- JEMSO does a good job of addressing the functional, political, and procedural aspects of this fact
- A technical framework is required to facilitate successful JEMSO implementation
- CTI is well down the road of creating a government-open, standards-based framework that allows for the effective and efficient implementation of JEMSO across domains and nations

SOLUTIONS ARE AVAILABLE TODAY
For Effective/Efficient Spectrum Dependent Operations

ABOUT US

BRINGING **TECHNOLOGY** TO THE FIGHT



BACKGROUND

- INCEPTION: APRIL 1, 2000
- SMALL | PRIVATE | VETERAN-OWNED
- FOCUS
 - Software Development
 - Systems Integration
- OPERATIONAL EXPERIENCE
 - Special Operations
 - USN | USMC | USA | USAF



Customer Focused



Highly Efficient



Cost Effective



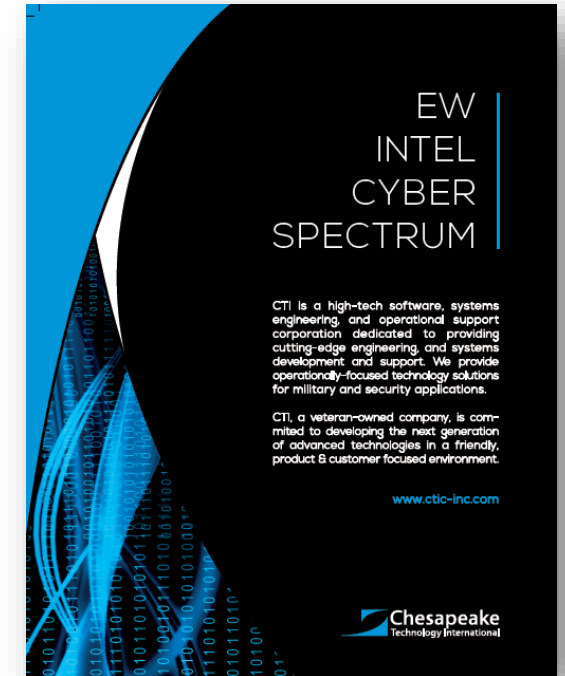
Hire Known Experts



Leverage Technology

CTI BUSINESS AREAS

- **Spectrum-Dependent Operations**
- Collection, Processing, Exploitation, and Dissemination
- Planning, Analysis, and Training
- Open Architecture and Interoperability



Based on **deep experience** in Spectrum and EW
and branching into adjacent markets

Bringing Technology to the Fight



JEMSO

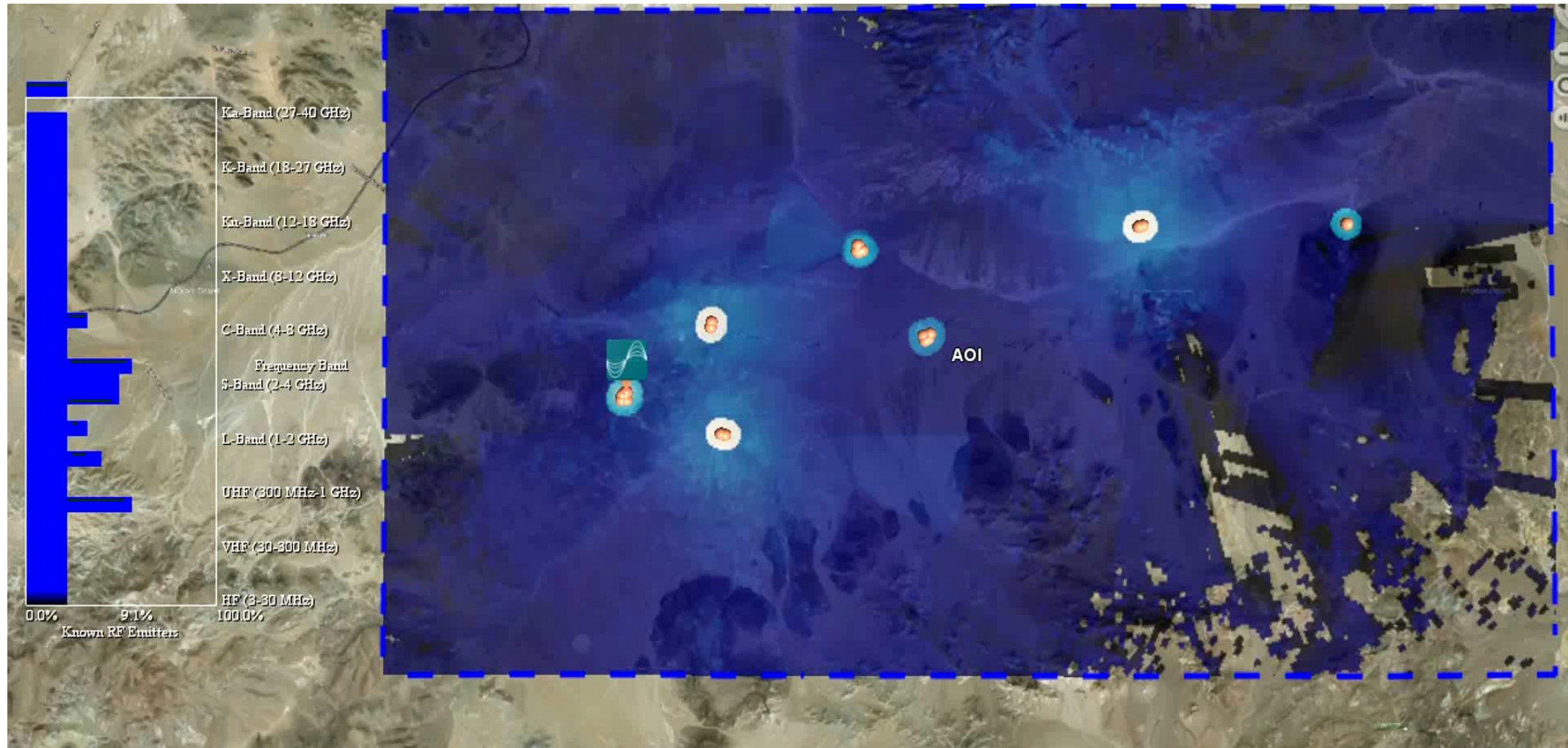
planning

execution

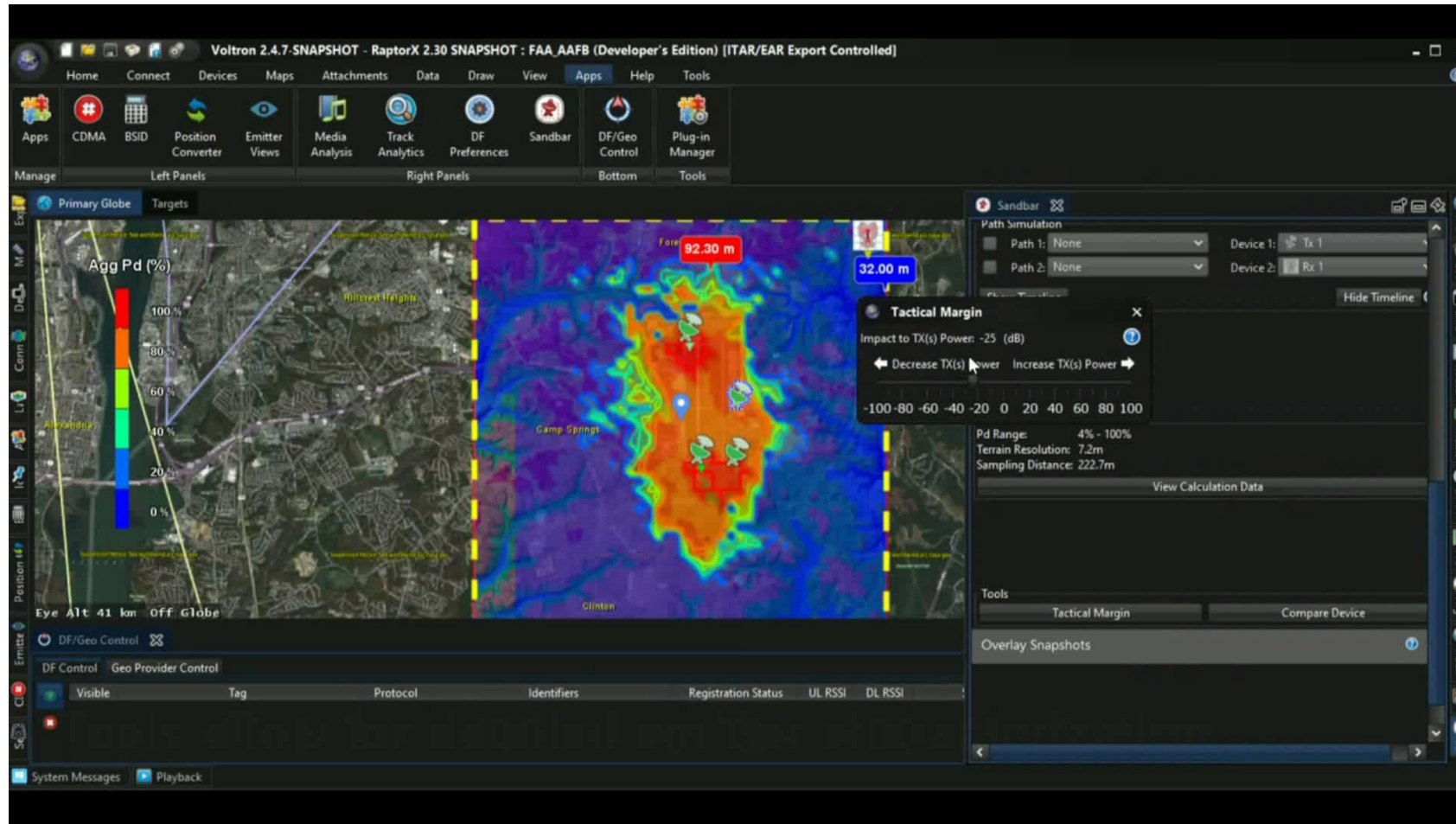
analysis

review

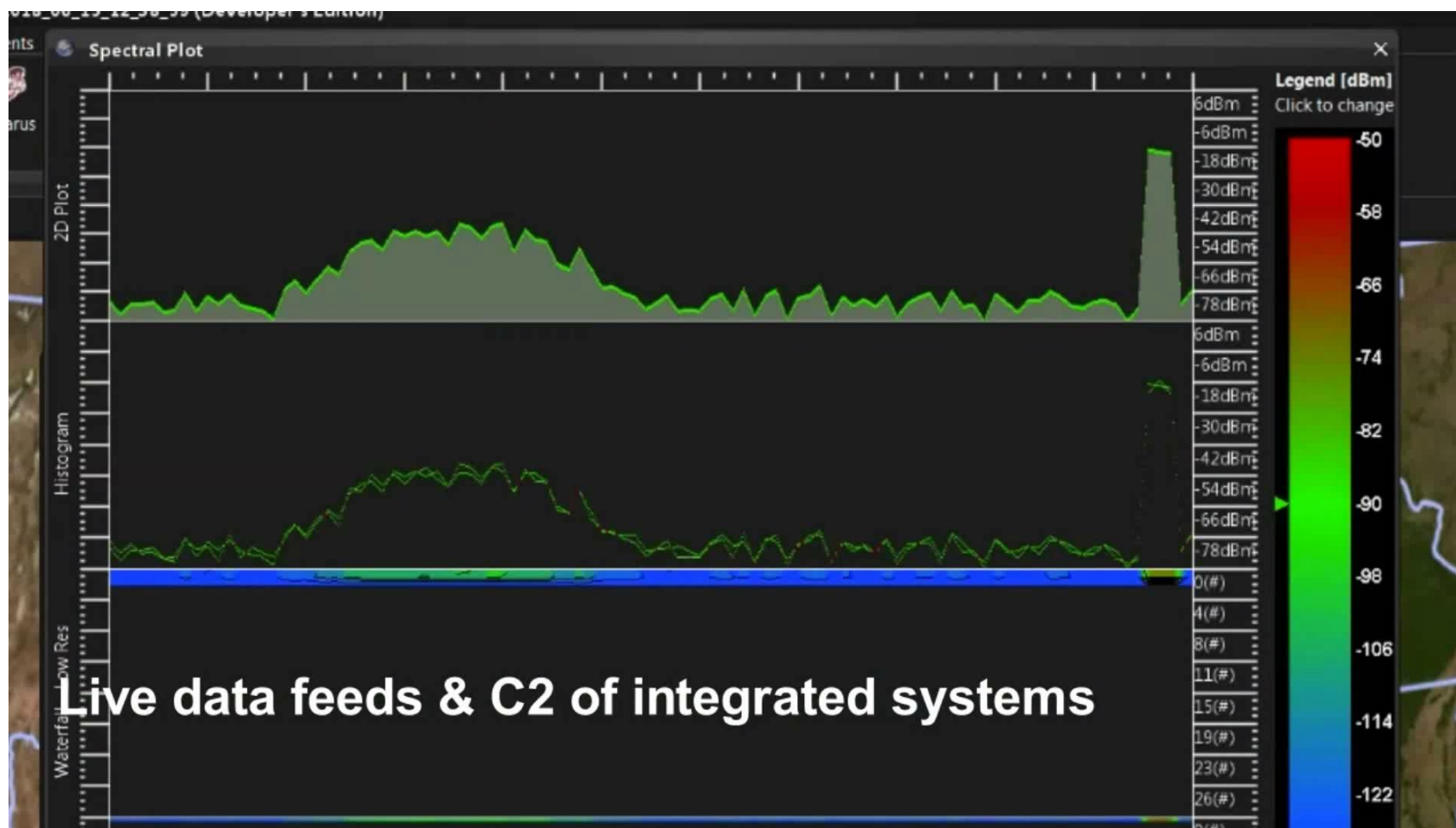
SPECTRUM PLANNING



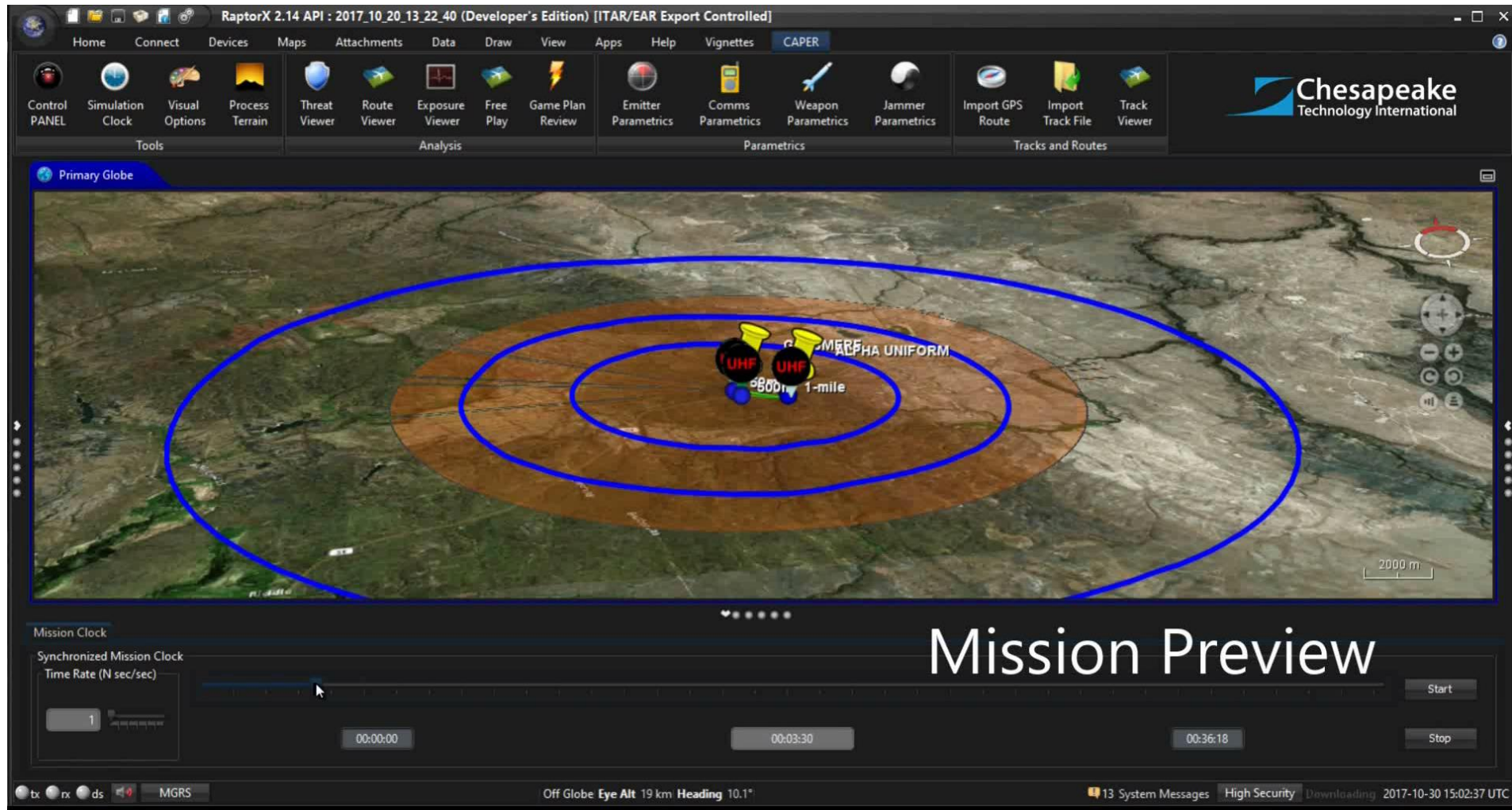
SPECTRUM OPERATIONS DECONFLICTION



SPECTRUM SENSING



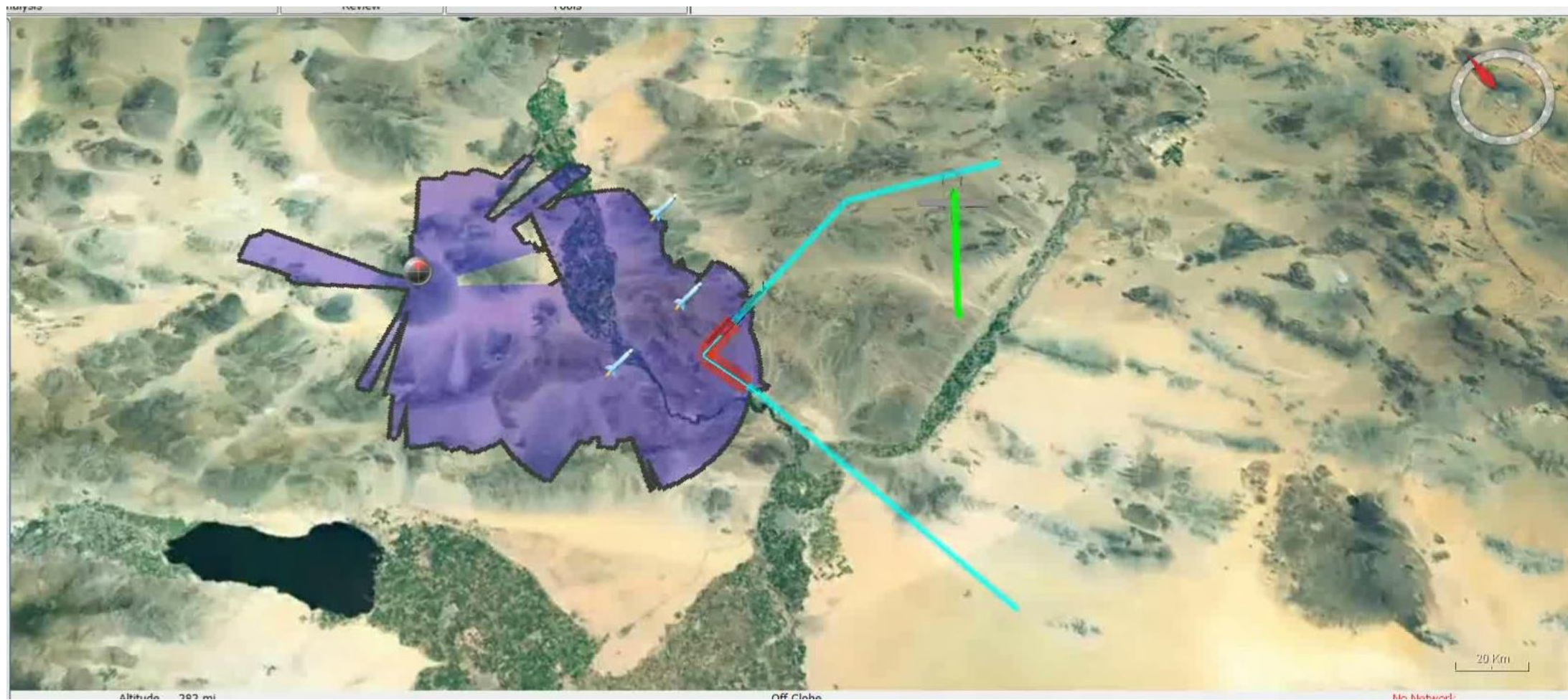
SPECTRUM FORCE PROJECTION



SPECTRUM AWARENESS



SPECTRUM MANEUVER



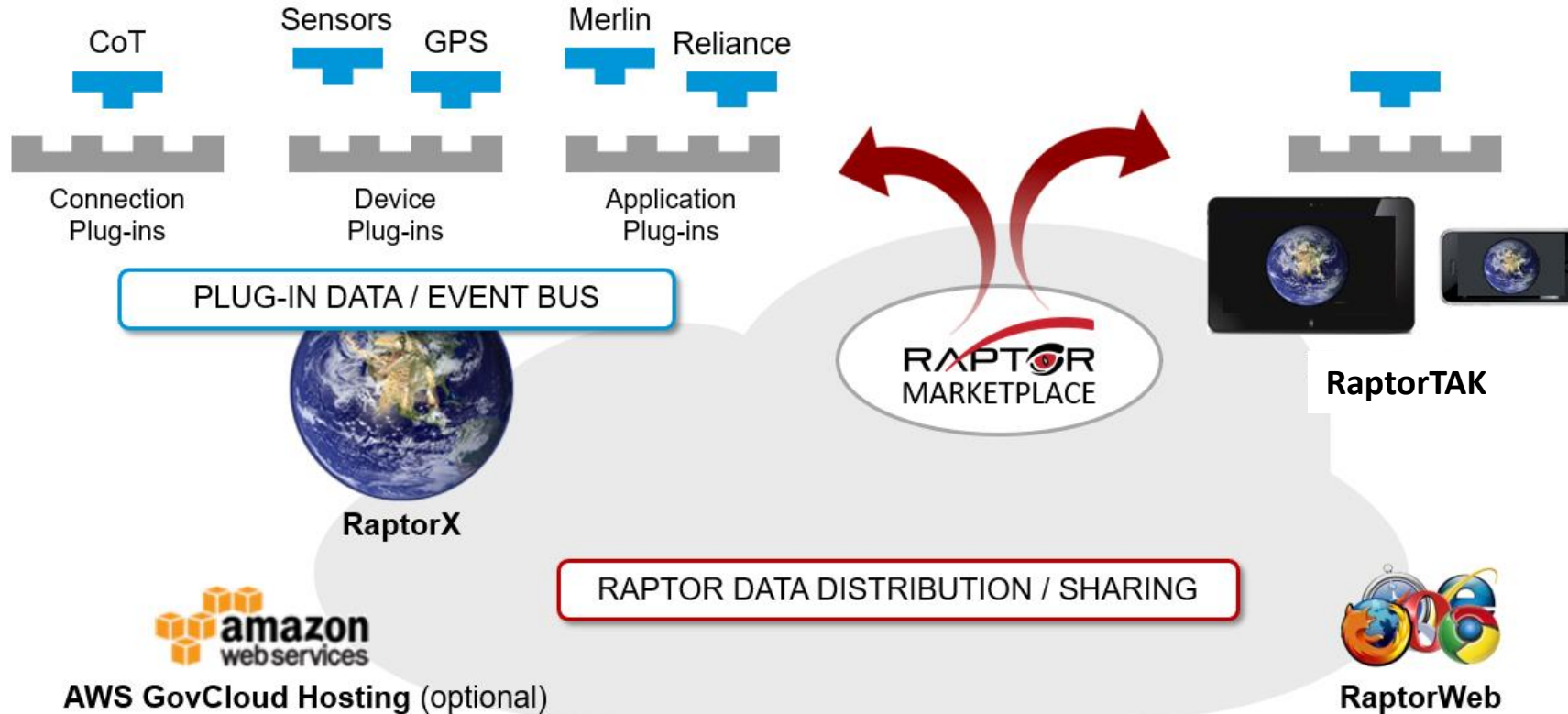
Bringing Technology to the Fight



OPEN PLATFORMS

WHAT IS RAPTOR?

An Open **VISUALIZATION** Platform

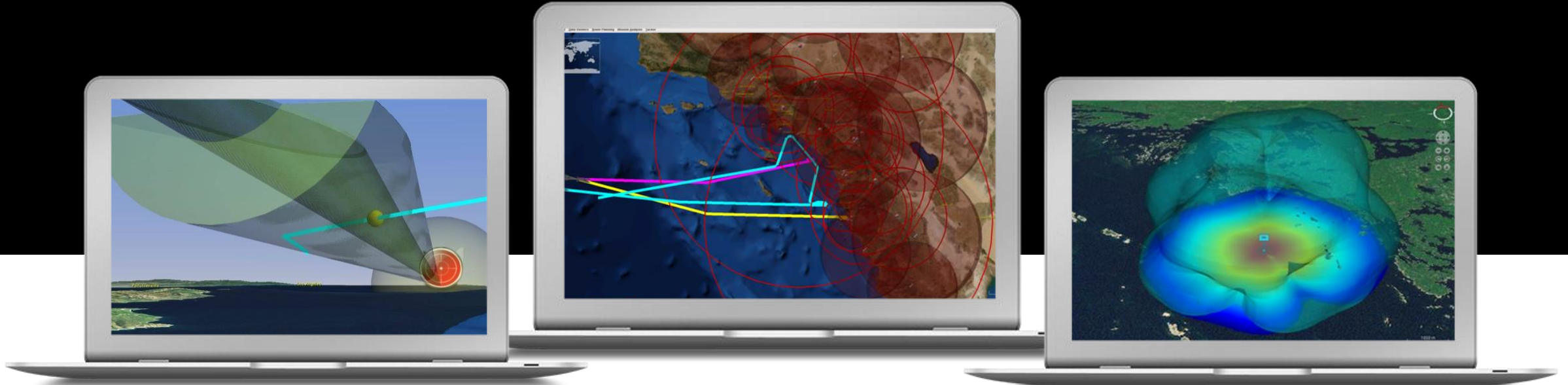


We Are Working To Create An INTERNATIONAL and RELEASABLE Version For Use Across Coalition Partners



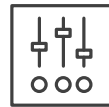
WHAT IS MERLIN?

An Open **SPECTRUM ANALYTIC** Platform



Automation

Route generation, course of action (COA) development, resource allocation, and beyond



Mission Analysis Tool

Capable of analyzing the electromagnetic battle-space



3D Visualization Tool

Leveraging NASA World Wind, can visualize: antenna patterns, electromagnetic effects, propagated signals, and terrain masking



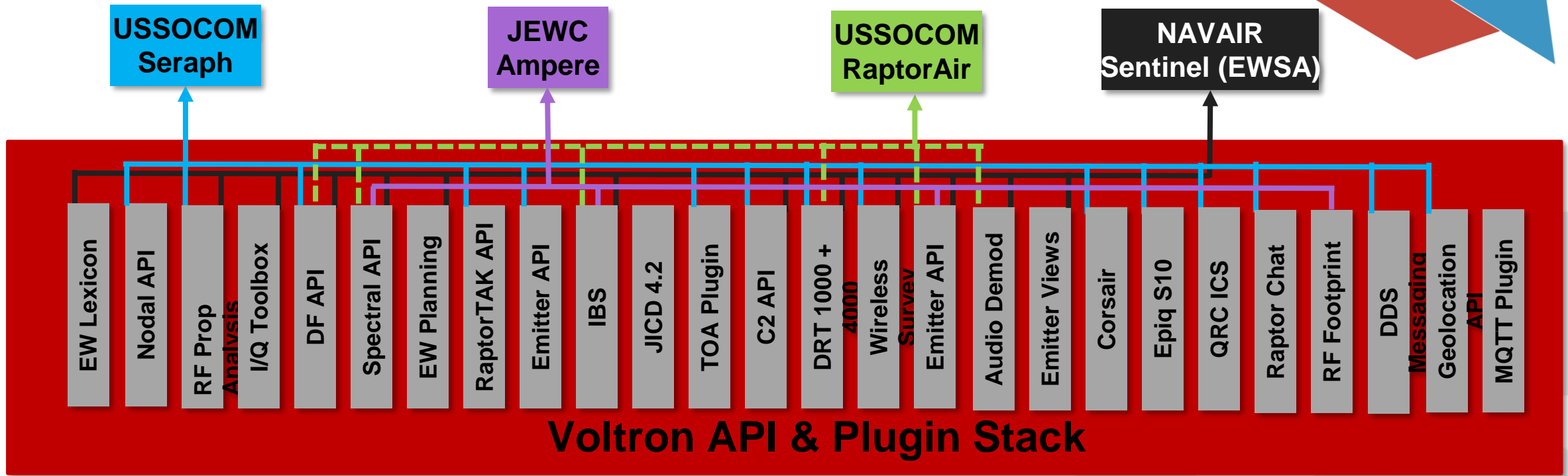
Extensible Mission Planning Environment

For Electronic Warfare Solutions

Voltron

Structure & Flow

Voltron User Suites*



UNCLASSIFIED

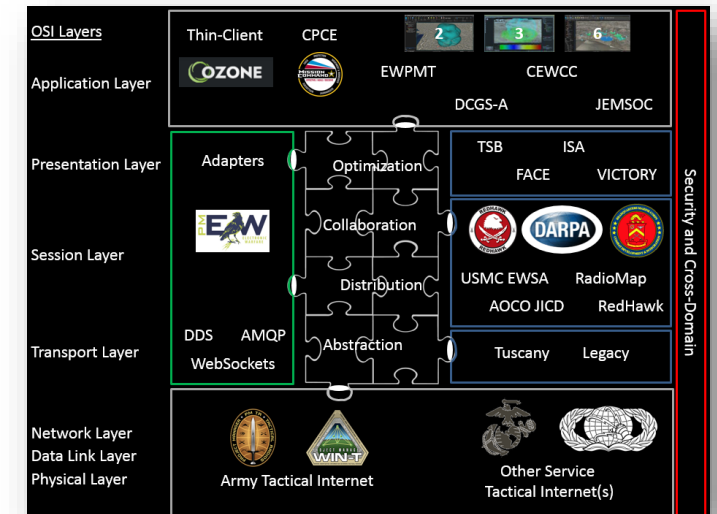
*not all inclusive, contact Voltron POC for further information.



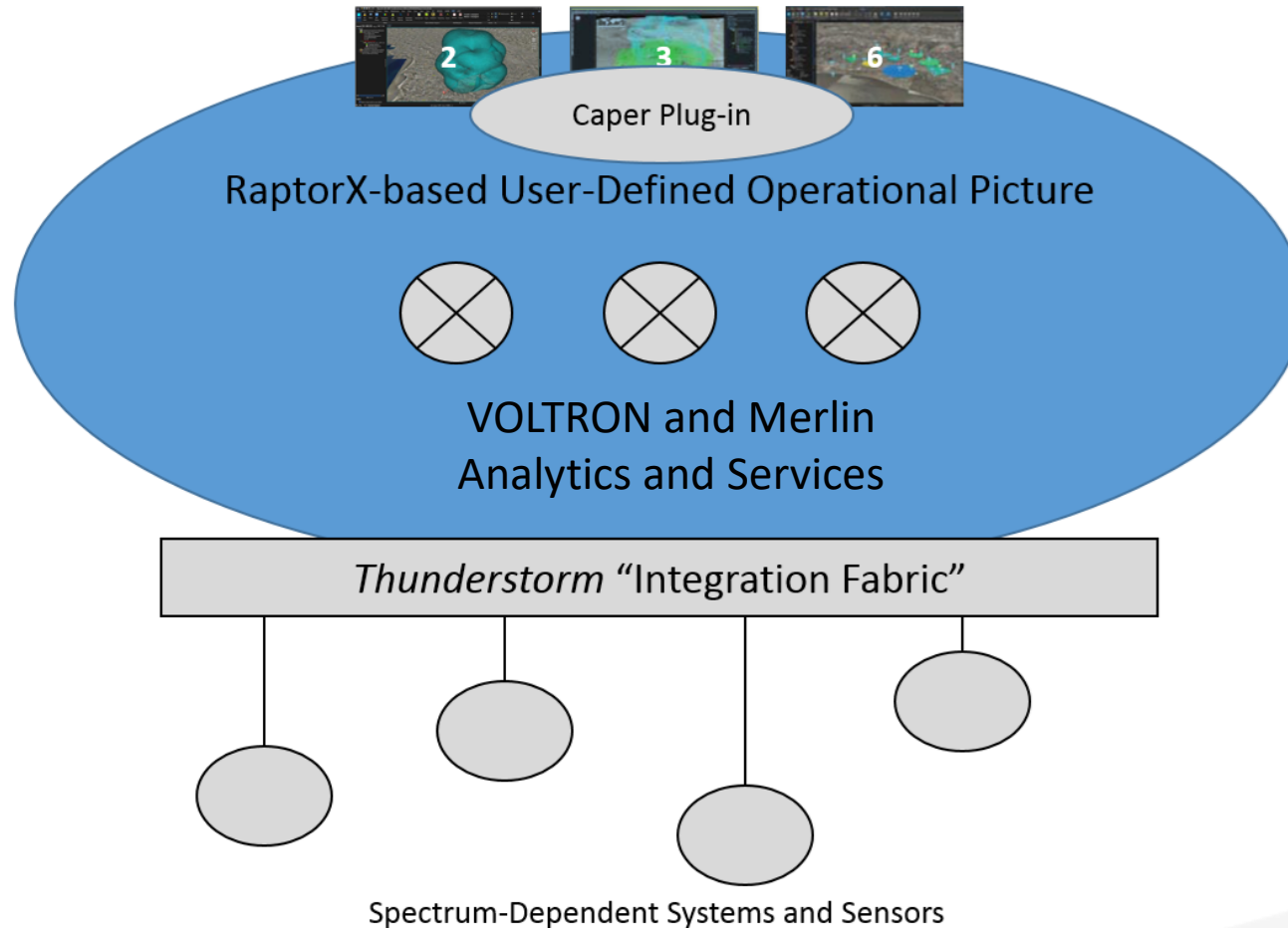
WHAT IS THUNDERSTORM?

An Open **DATA SHARING** Platform

- The “**Integration Fabric**” for networking of tactical cyber and EW sensors and systems
 - Promotes interoperability, scalability, extensibility, and maintainability
 - Allows for incorporation of and integration with multi-service environments
 - Streamlined lifecycle modification, management, and extension
 - Supports coordination, optimization, and de-confliction of resources across the battlefield
- Leverages open-source and GOTS technologies that are accreditable and secure
- Under improvement from additional USG “Innovation” funds



PUT THE PIECES TOGETHER



Government owned,
open, and
AVAILABLE

Distribution Sites & Collaboration



DI2E These government open platforms are hosted on DI2E (www.di2e.net) and leverage the Developer Collaboration Tools (Atlassian) including Confluence, Jira, and Bitbucket:



- Confluence - A content collaboration tool that provides a common space for program documents as well as design and requirement discussions. Contributors post screenshots of current Raptor plugins, identify gaps, and outline future API requirements. Information is consolidated by program teams for prioritization and to inform the development process.



- Jira - A planning and tracking tool for software development. Users create tickets for specific tasks that need to be completed and approach them collaboratively. Contributors report issues and create tickets for related development. Tickets are assigned to program developers or completed by available contributors.



- Bitbucket - A git-based version control system that supplies the code repository space on DI2E. Associated repos are divided and permission-based, ensuring appropriate access to source code segments without risk to core capabilities. Completed code is checked-in and reviewed by the Technical lead before being added to the associated code repository.

VALIDATION OF CONCEPTS

Exercises

Experiments

Efforts

VALIDATION OF CONCEPTS

CTI leverages on-going experimentation to
VALIDATE and IMPROVE these concepts:

| Pacific Sentry | Vigilant Hammer | CyberQuest |
| Pacific Endeavor | Cyber Blitz | ... and more ... |

Build a little... Show a little... Build a little... Show a little...

Bringing Technology to the Fight



AVAILABILITY

WHERE CAN I GET THIS GREAT STUFF?



If you are from the **UNITED STATES**: Contact us directly
Most of these capabilities are available via GOTS channels



If you are from **PARTNER NATIONS**: Contact us through
your Embassy Representative
Most of these capabilities are exportable via FMS or DCS

IN CLOSING...

Joint Electromagnetic Spectrum Operations
on Government Open Platforms is AVAILABLE

CTI Is Proposing A New Technical Path Forward for JEMSO

THE FUTURE IS NOW!

Bringing Technology to the Fight

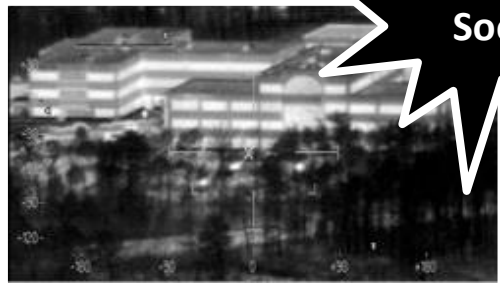


QUESTIONS | ANSWERS

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Moving
Soon!



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