

GIS as a Foundation for Command & Control

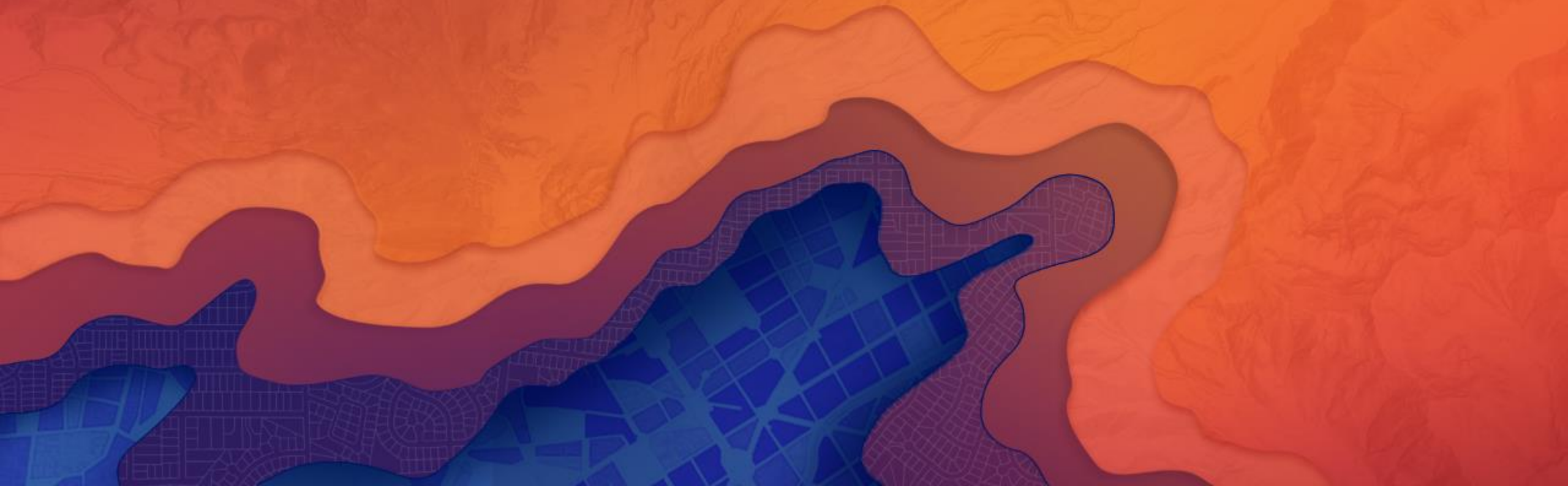
Tom Smedley

Milquiades Walther-Rodriguez

Agenda

- Trends in Command and Control & GIS
- What is Web GIS
- Use Cases
- GIS Platform Approach to Command and Control

Trends in GIS and Command & Control



Characteristics and Trends in C2 Applications

Modernizing Command & Control

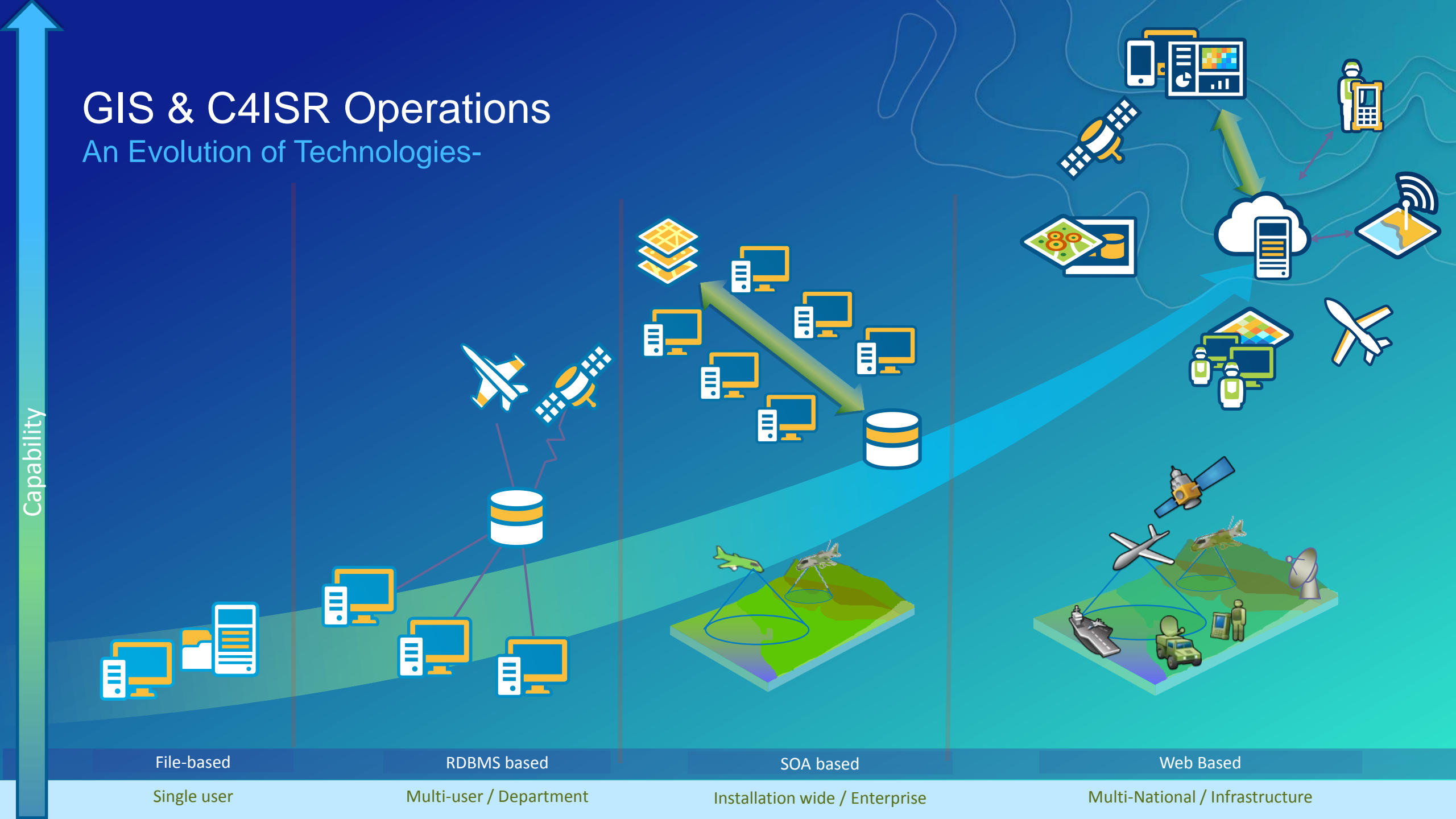
CHARACTERISTICS

Networks
Distributed Services
Identity
Security
Real-Time
Connected/Disconnected
Bandwidth
Time-Sensitive
Multi-National Deployments

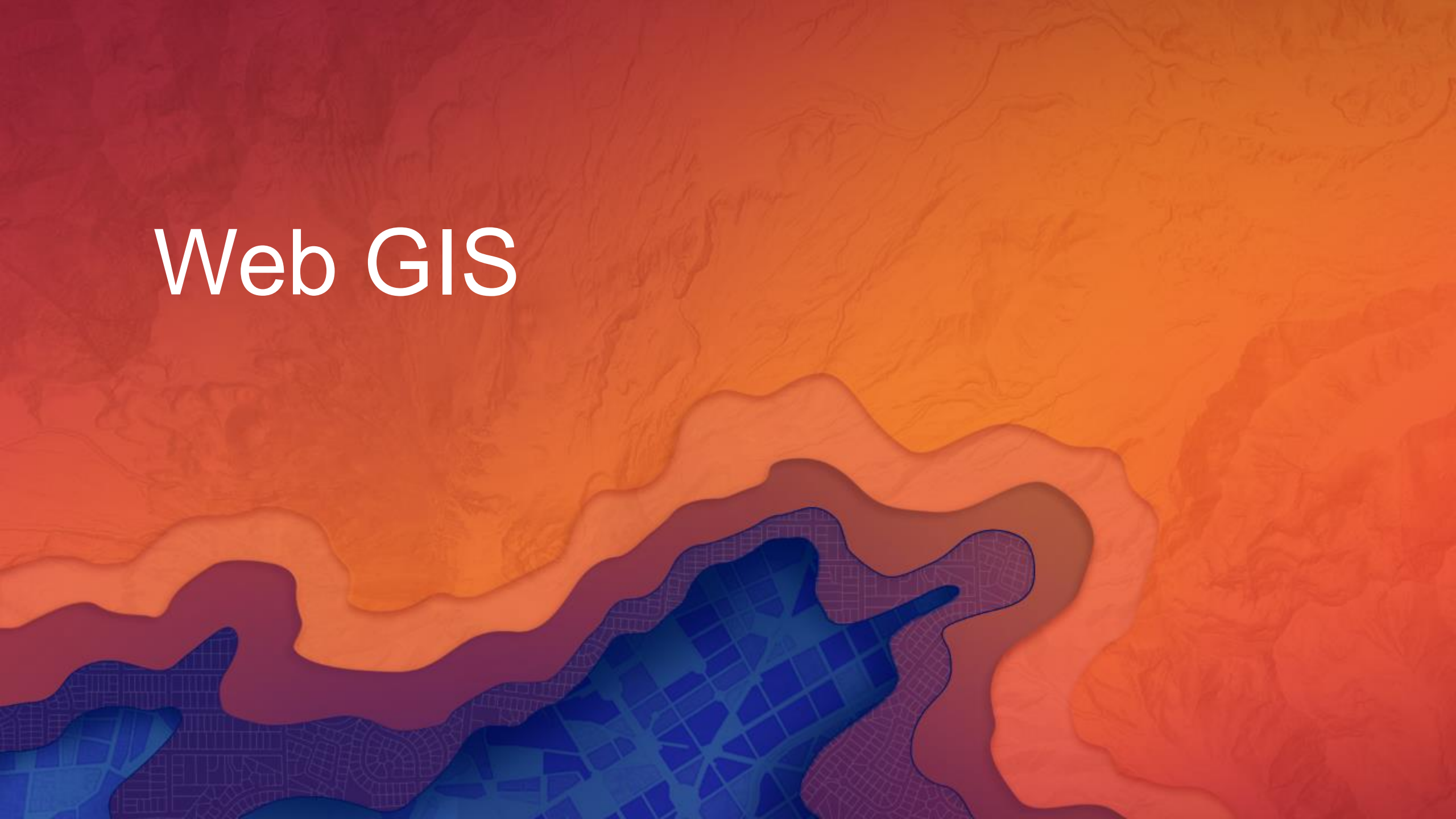
Client / Server	→	Web Services / SOA
Stovepiped Systems	→	Seamlessly Integrated Systems
Unconsolidated Infrastructure	→	Cloud and Elastic Computing
Physical Servers	→	Virtualization and Data Centers
Information Overload	→	Relevant Pictures
Proprietary Data	→	Open Data & Shared Services
Reactive Analysis	→	Predictive Analysis
'One Size Fits All' Applications	→	Lightweight Reusable Apps
Complex User Interfaces	→	Intuitive User Experiences
Long Development Cycles	→	Short Iterations
Risk Averse	→	Risk Aware

GIS & C4ISR Operations

An Evolution of Technologies-



Web GIS



Web GIS is a Transformational Architecture

Opening, Integrating, and Simplifying Everything

Web GIS



**Bringing Together Your Existing Systems . . .
and Creating a System of Engagement**



Web GIS Supports Multiple Missions

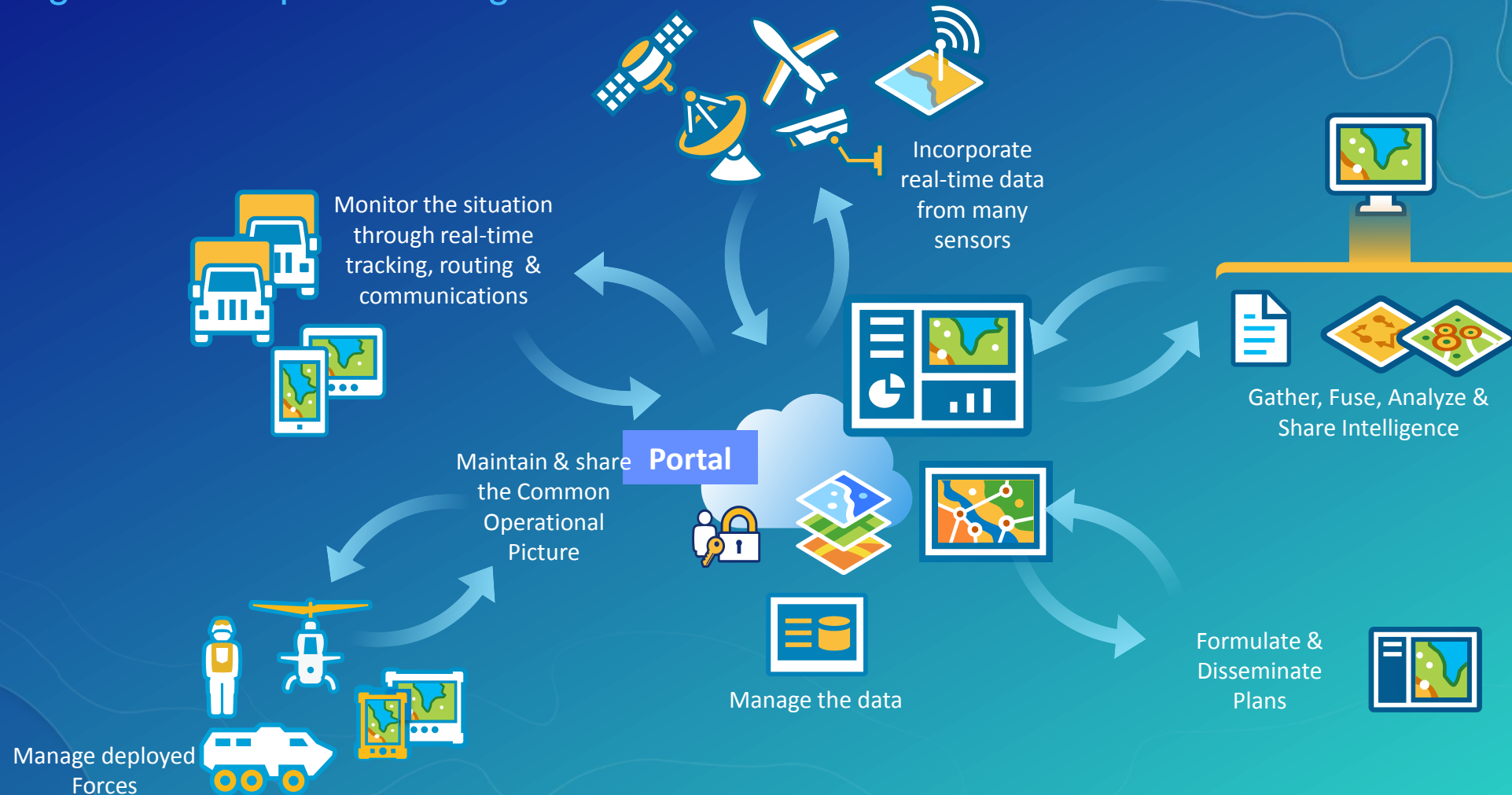
Integrating Organizations and People



Enabling Sharing, Collaboration, and Decisive Action

What Can the ArcGIS Platform bring to Command & Control?

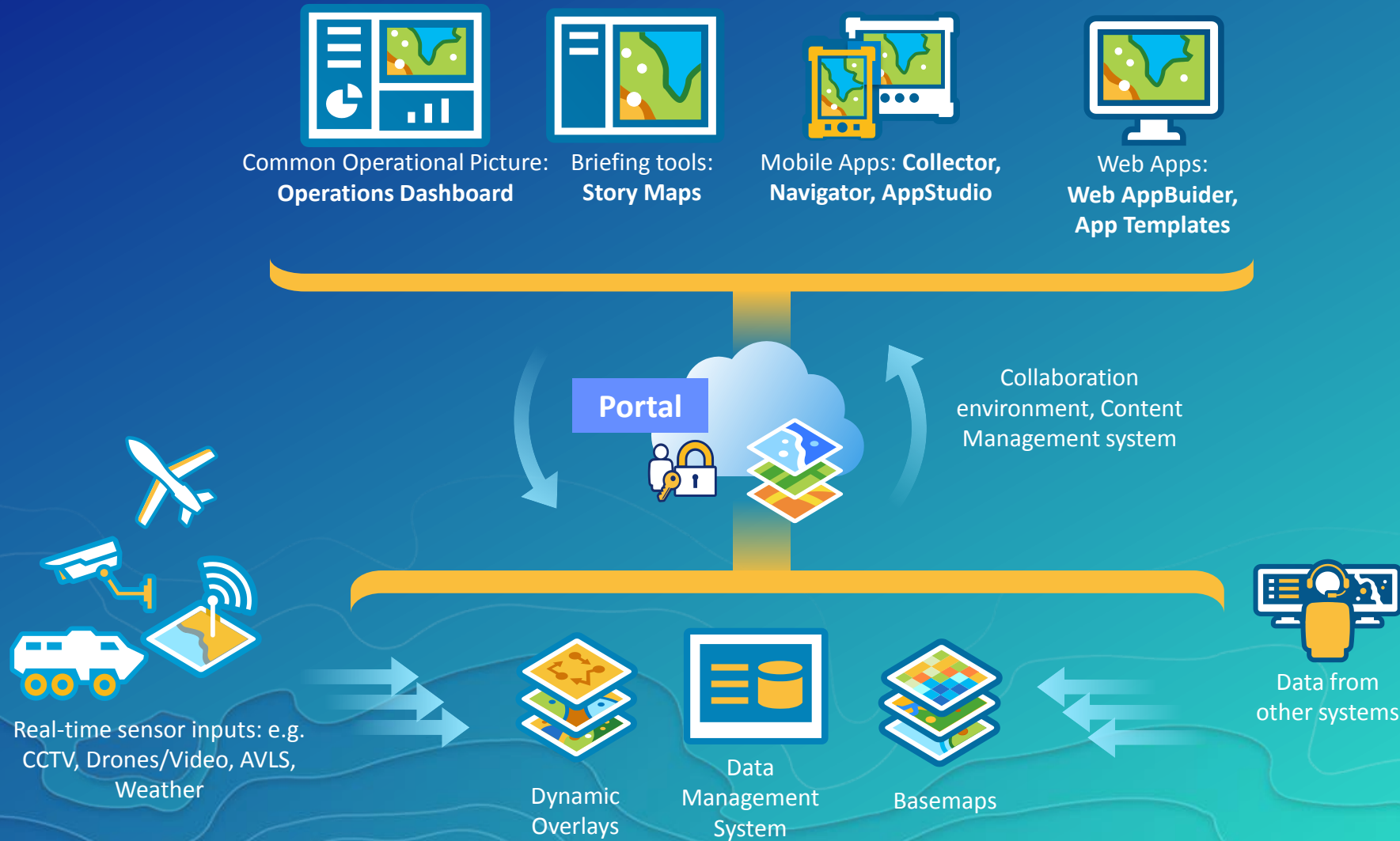
Integrate and exploit existing investments in data and infrastructure



Collect... Analyse... Share... Act...

Initial Operating Capability through Lightweight, Reusable Apps

Delivering essential capabilities right away



Use Cases



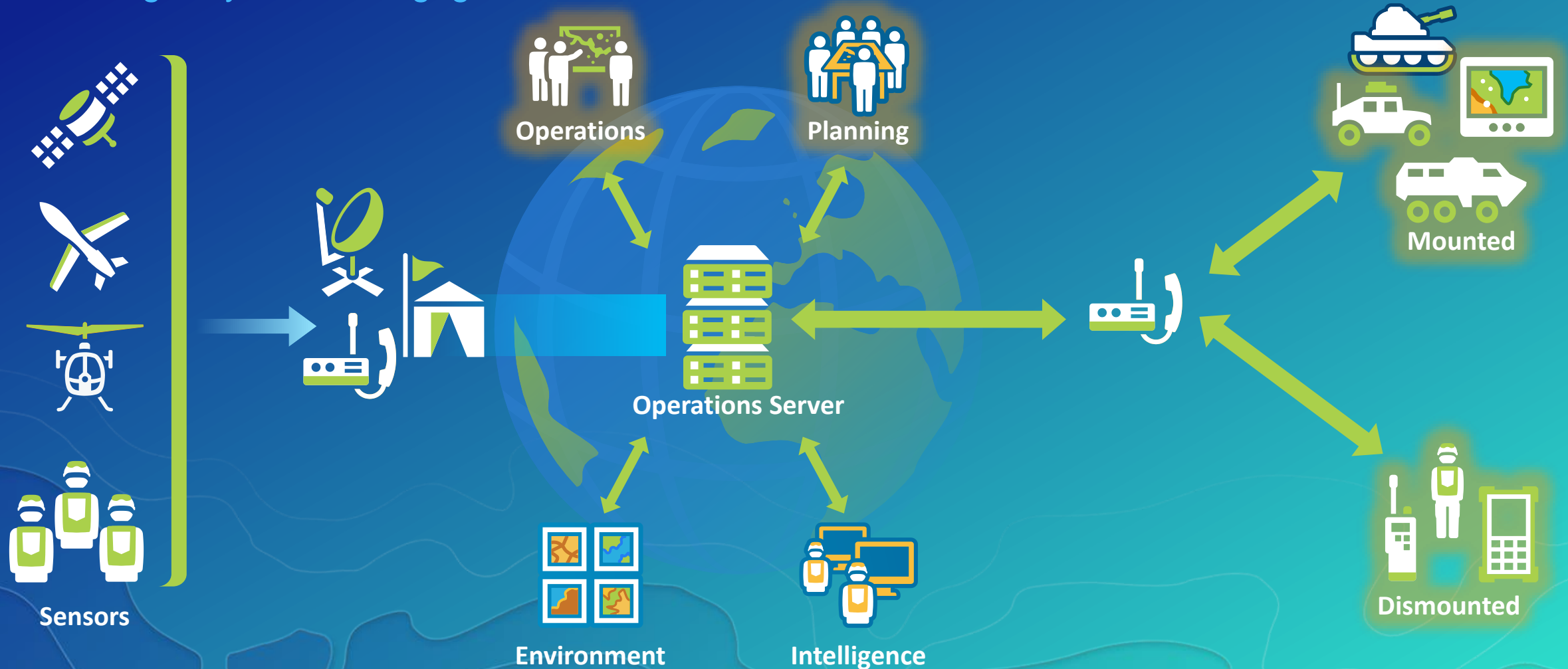
A Platform Approach to Military Operations

Enabling a System of Engagement for Command & Control

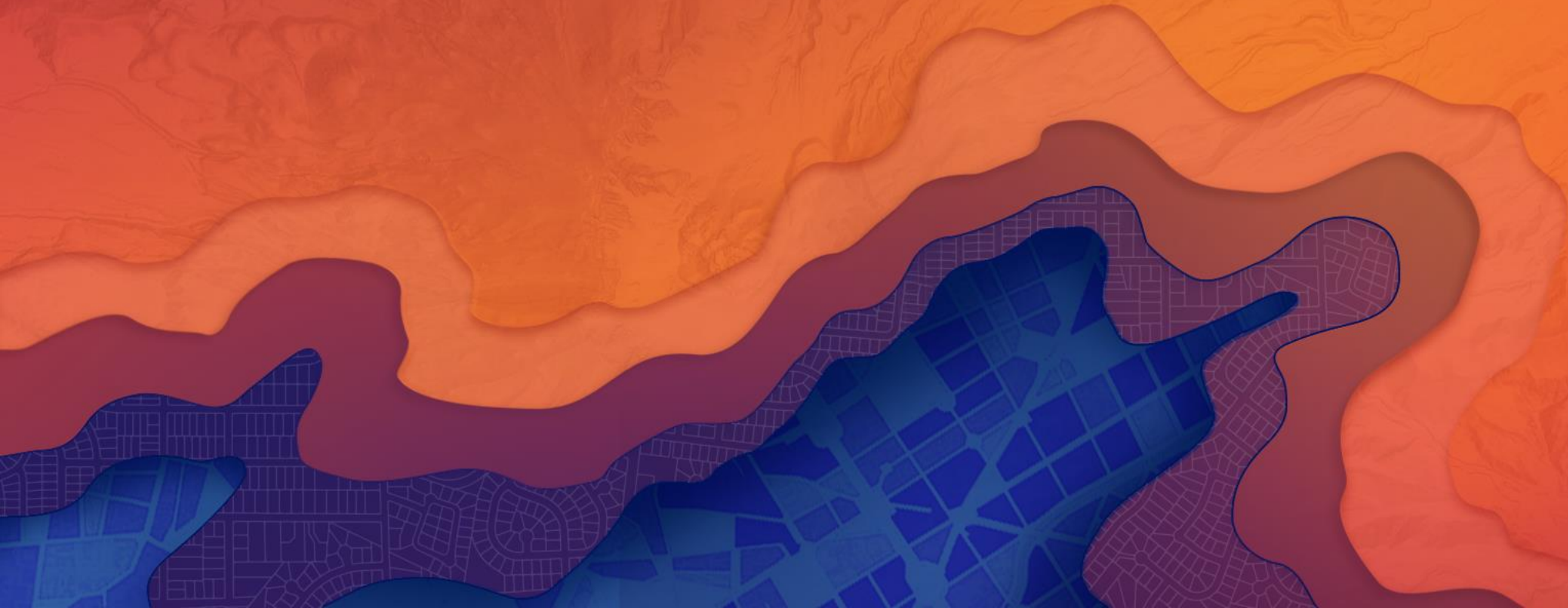


A Platform Approach to Military Operations

Enabling a System of Engagement for Command & Control

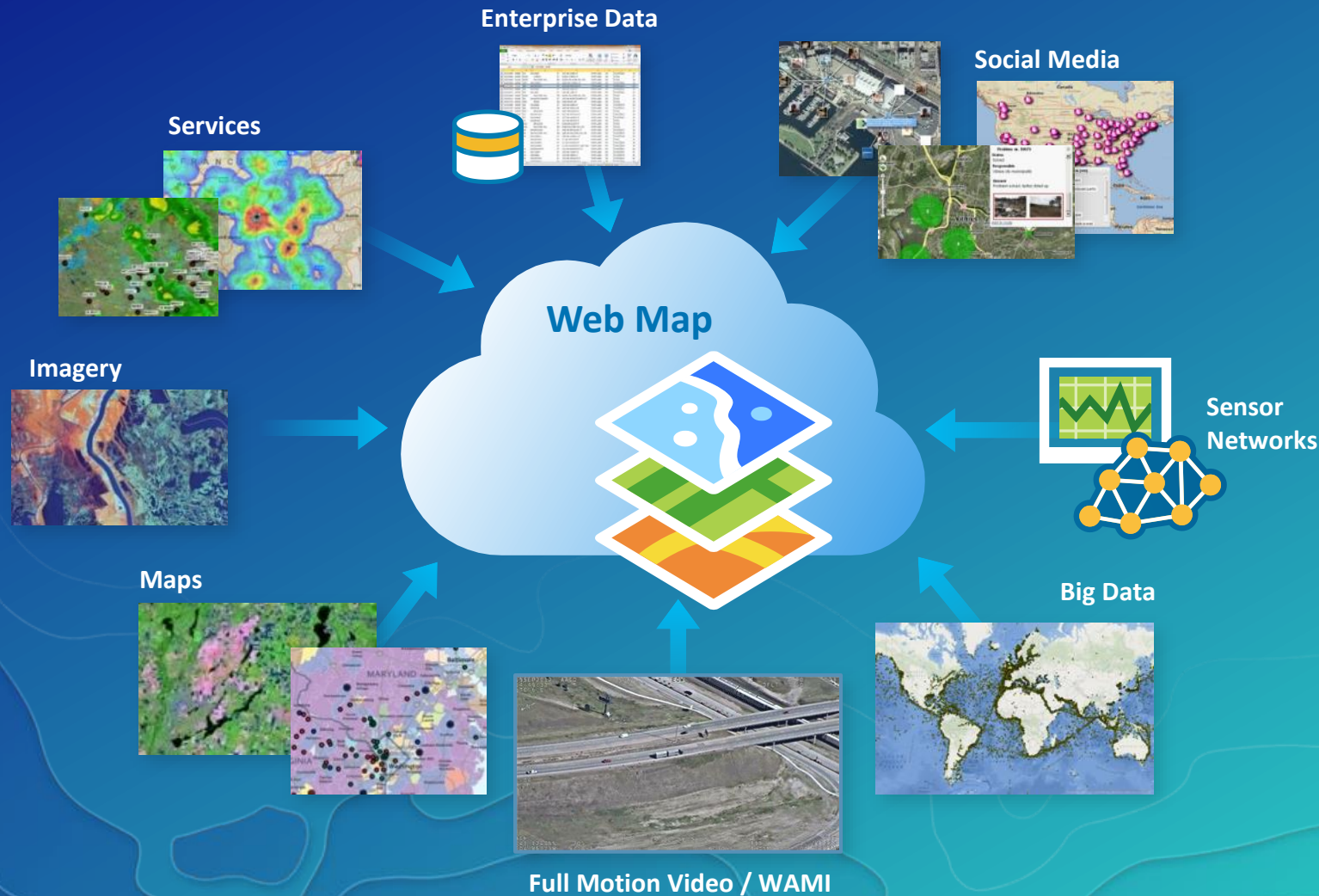


A GIS Platform Approach to Command & Control



Web GIS Can Represent All Data Types

As Web Maps and Services



Foundation Data

Operational Overlays

Providing a New Medium for GIS

Web Maps

Integrate Information / Configure / Share

Source Information



Desktop



Spreadsheet



Databases



CSV



Sensor & Real-Time Data



3D Data



Basemaps



Analytical Services

Web Map



Apps



Dashboards



Mobile Apps



Web Apps

User Needs



Current Operations



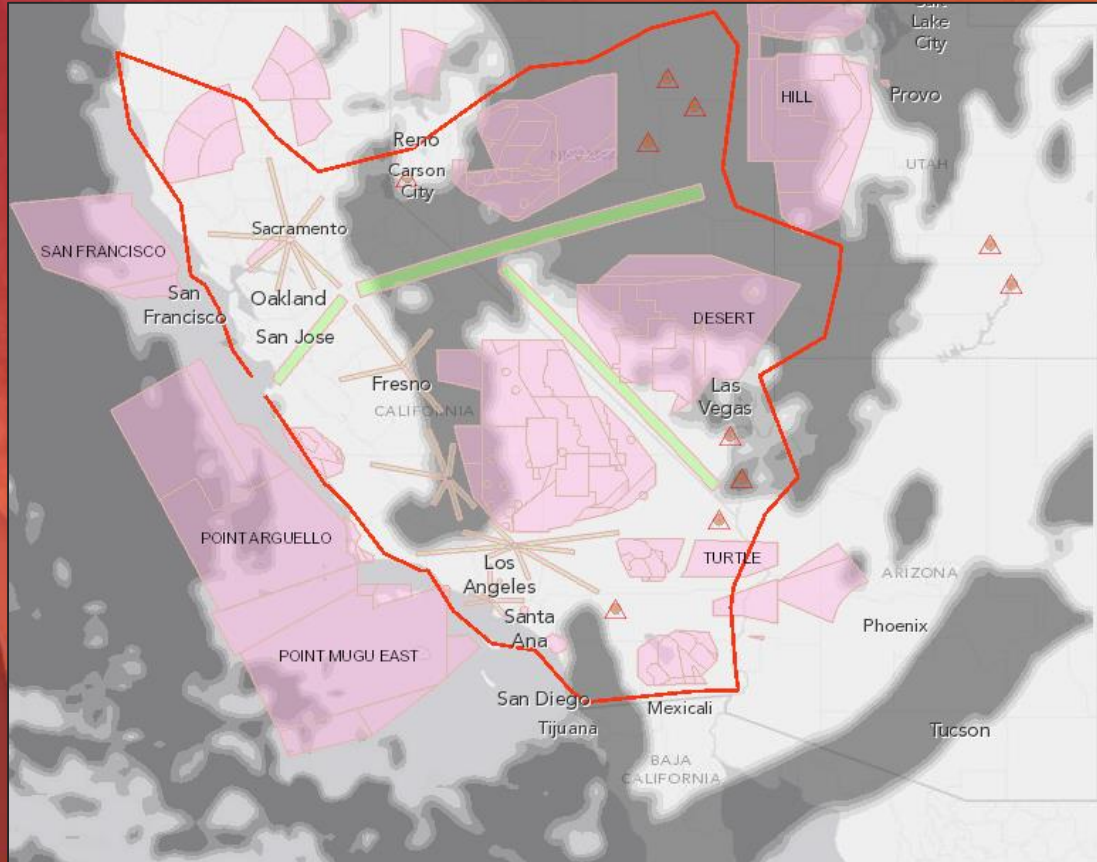
Field Operations



Planning and Analysis



Briefings and Public Information



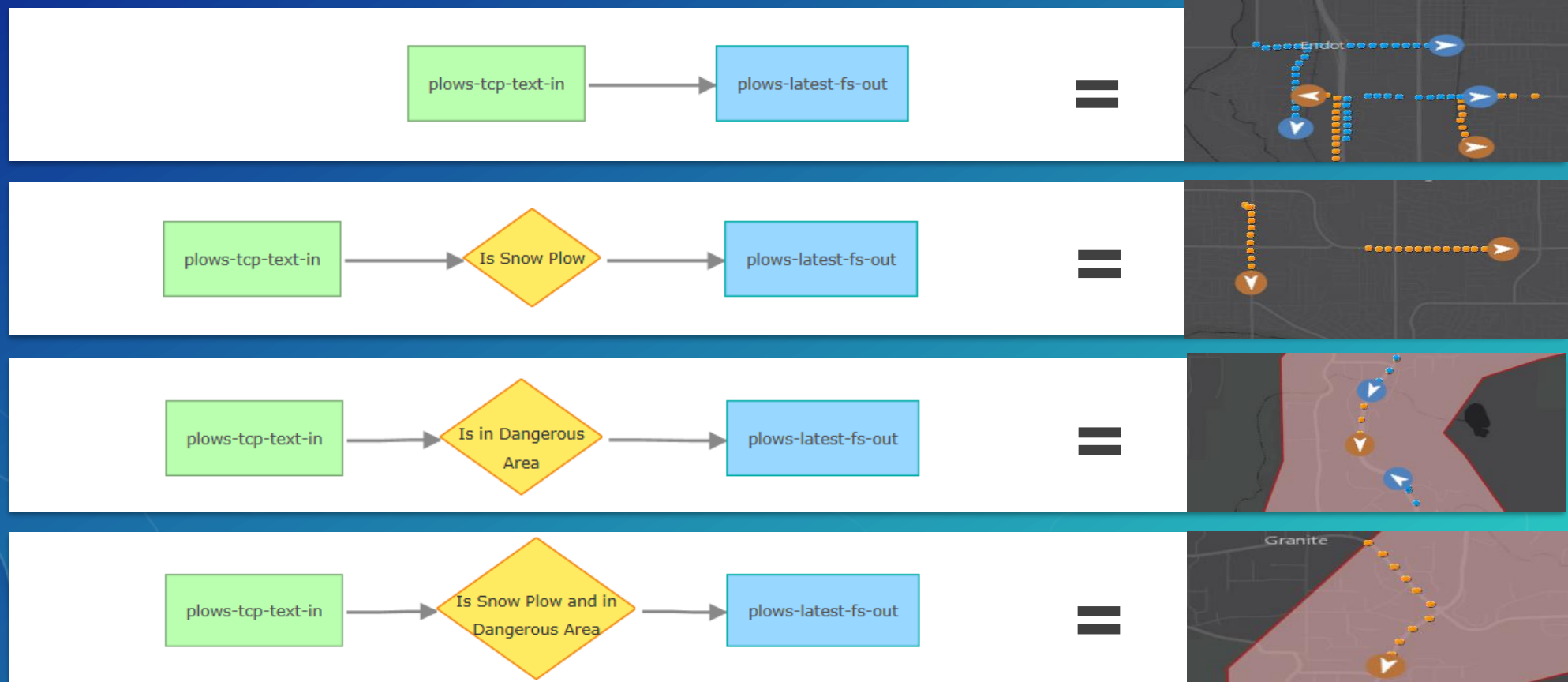
Web Maps

- Air Plan
- Current Operations

Applying Real-Time Analytics

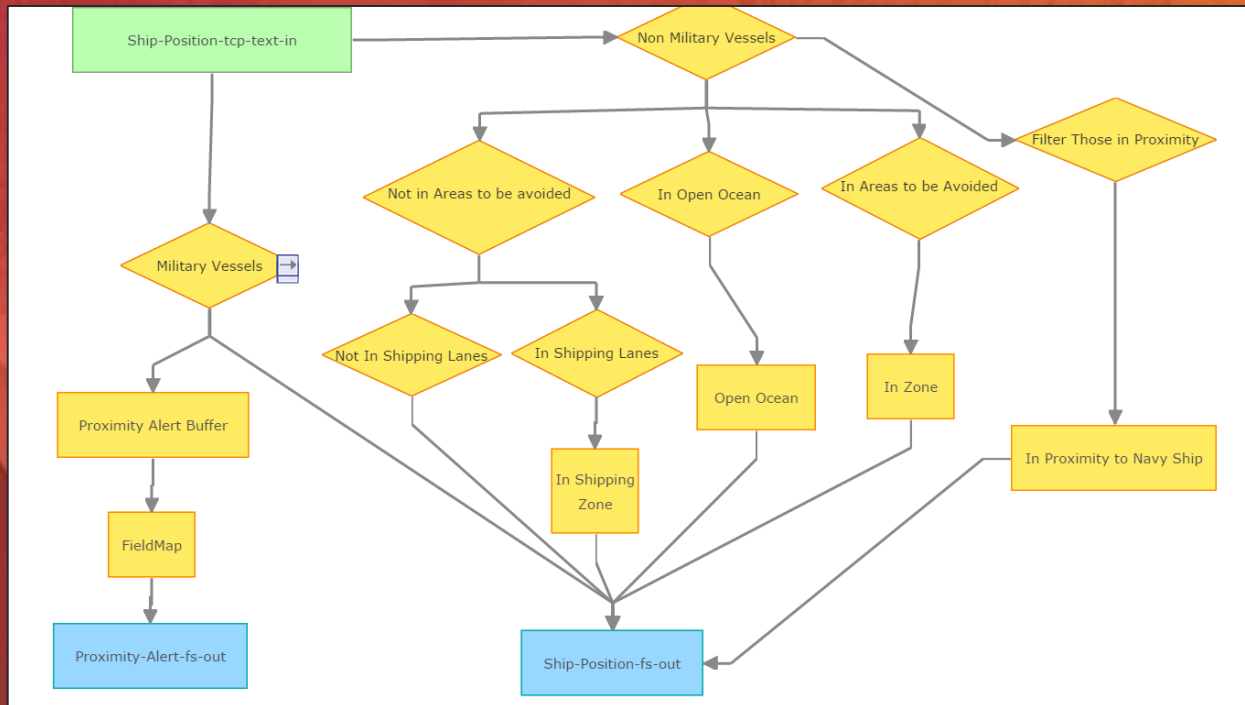
GeoEvent Filtering

- A **Filter** eliminates GeoEvents based on an expression



Real Time Analysis

- Maritime Events (Big Data)
- Air Tracks

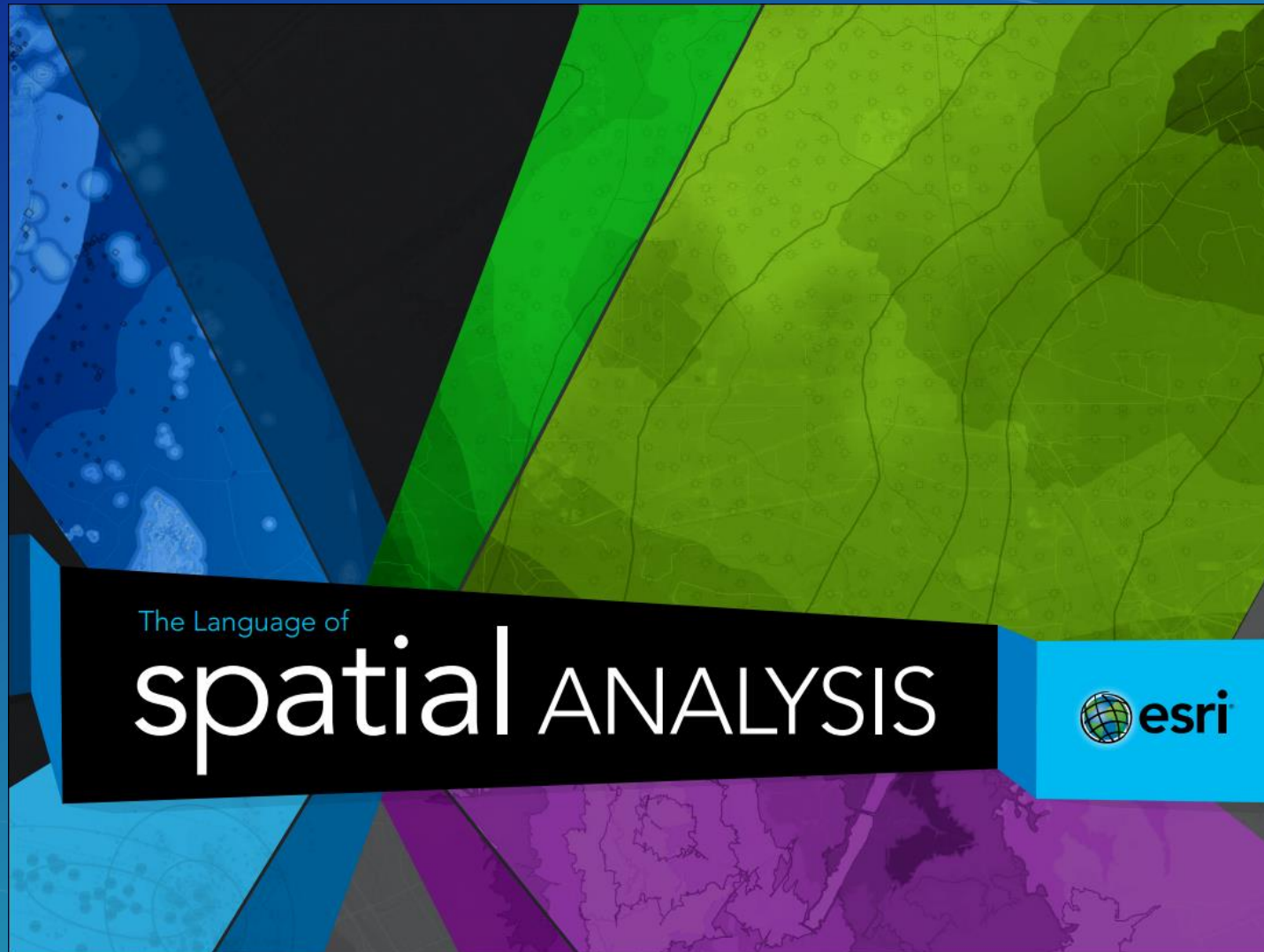


Thinking Geospatially...

The Language of Spatial Analysis

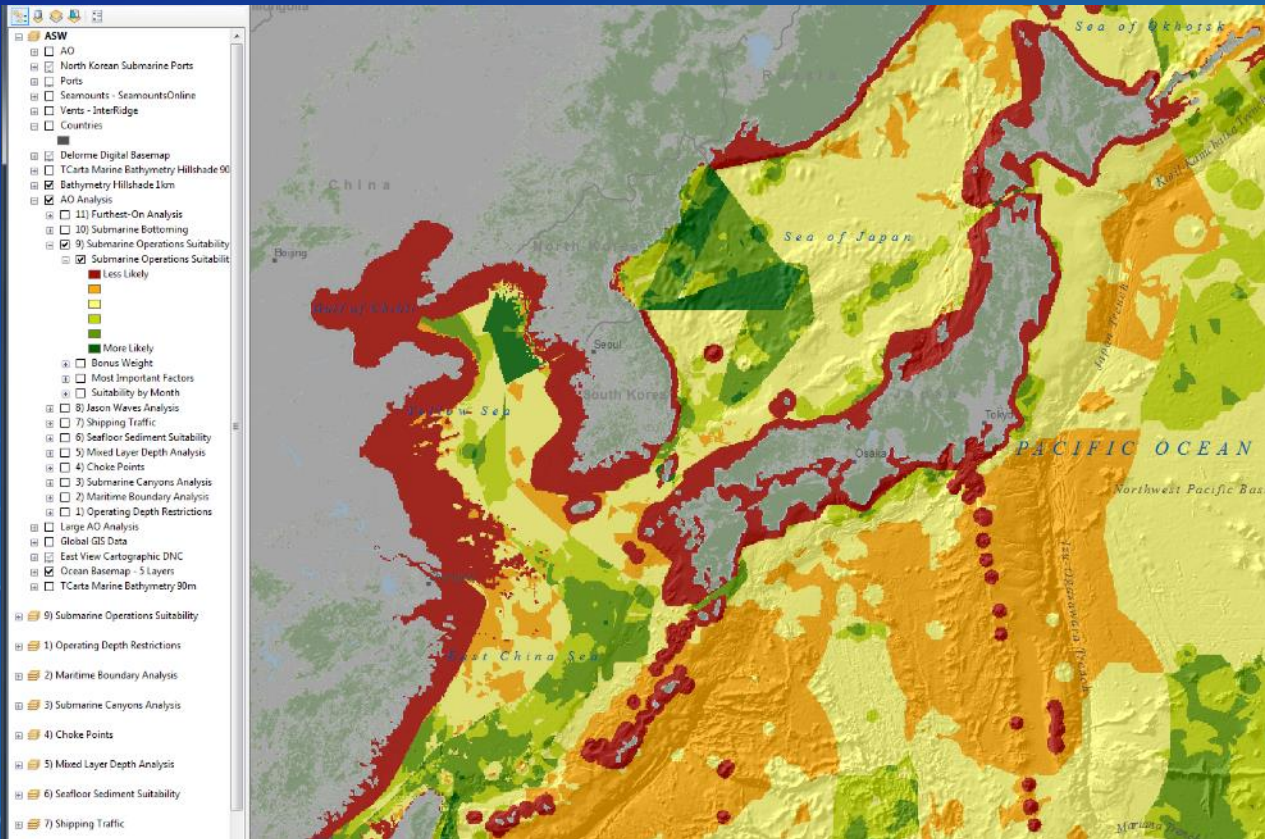
- **Understanding WHERE** are my forces and my SIGACTS?
- **Measuring What** are the main characteristics of my operating environment?
- **Determining What** are the likely enemy egress routes from a given location?
- **Finding How** should I place my sensors allowing for optimal coverage?
- **Detecting What** are the impacts of my operations on the distribution of SIGACTs?
- **Making predictions on Where** are likely choke points that may impact my ability to maneuver?

The Language of Spatial Analysis



Submarine Operations Suitability

Where are the high probability areas for DPRK submarine operations?



Complex queries and speed models

Predictions based on multiple sets of data

Resuable, Configurable Apps

Take advantage of COTS

Story Maps



Templates



Explorer



Dashboard



Collector



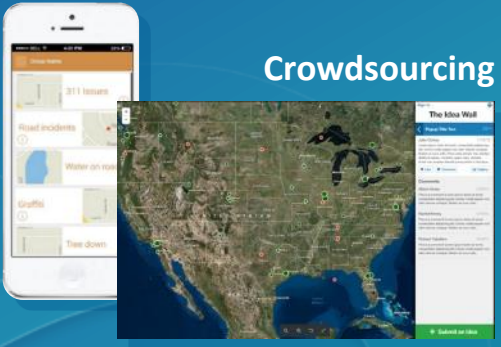
Maps for Office



Web Scene Viewer



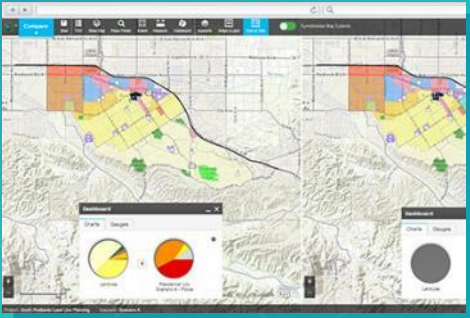
Crowdsourcing



Open Data

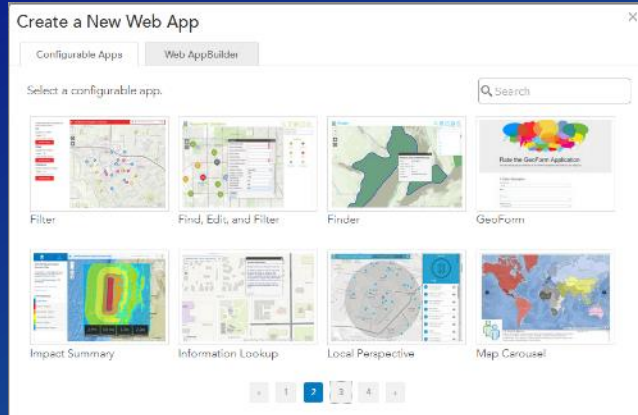


GeoPlanner



App Builders

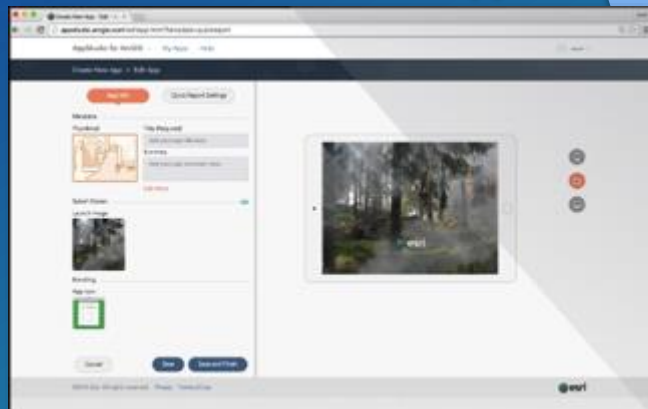
App Templates



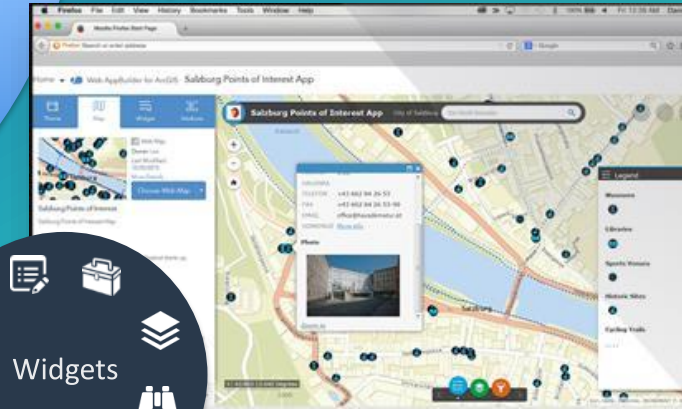
Story Maps



AppStudio



Web AppBuilder



Reusable Apps

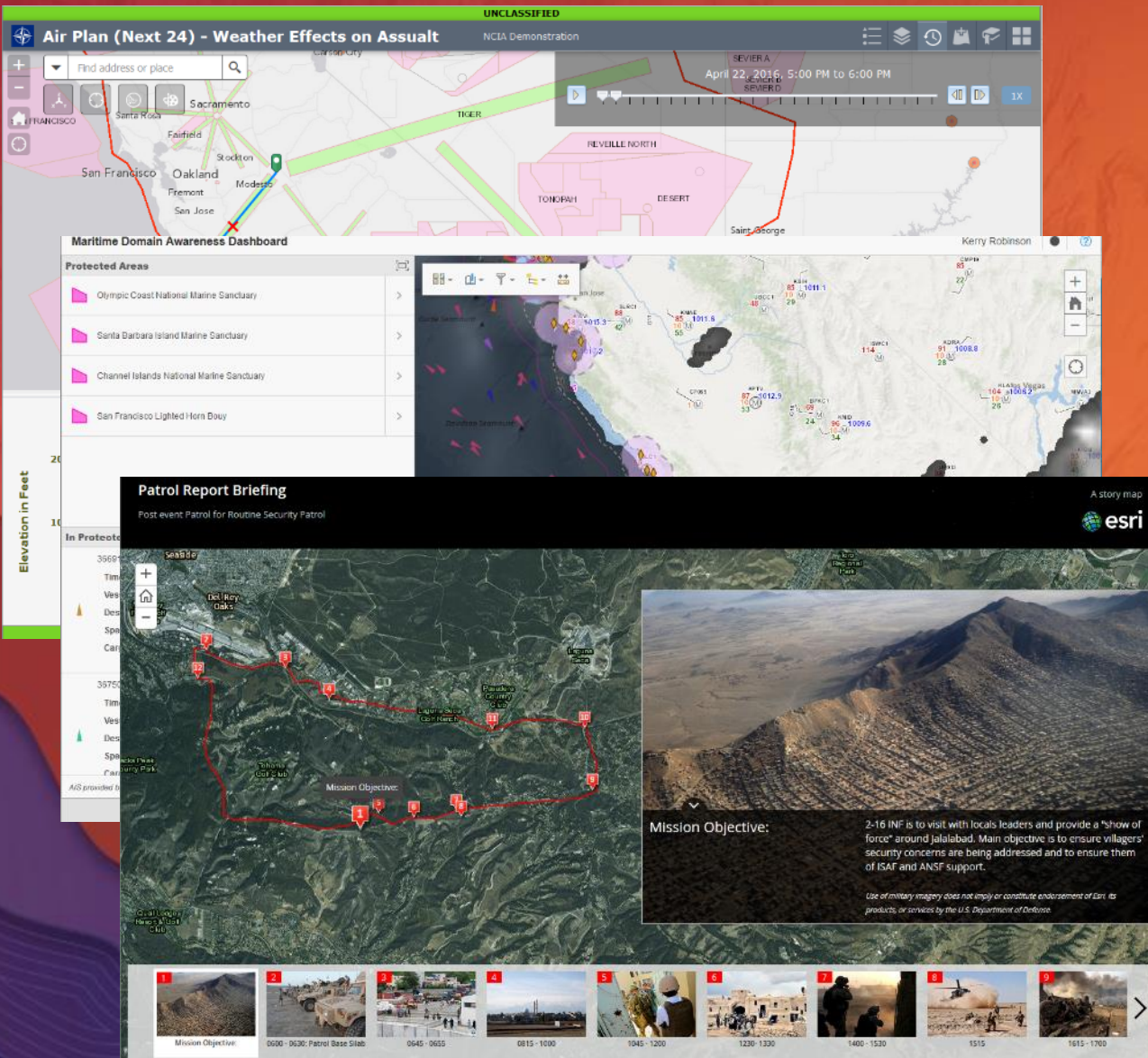
Air Plan Web App Template

Operations Dashboard

Current Air Operations

Briefing

Patrol After Action Report

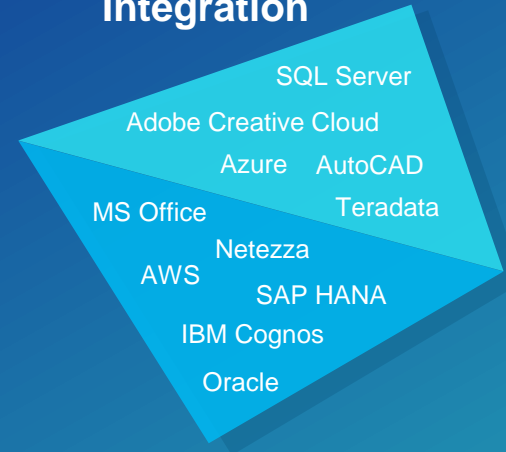


ArcGIS is Open and Interoperable

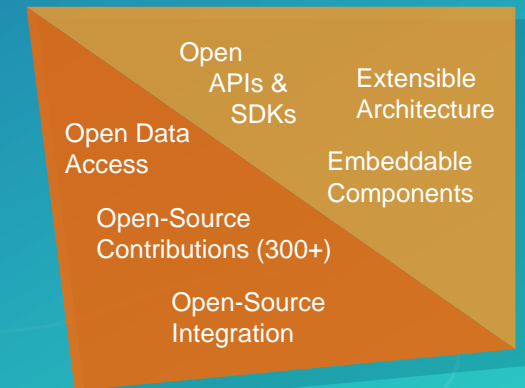
Open Standards and Formats



Product Integration

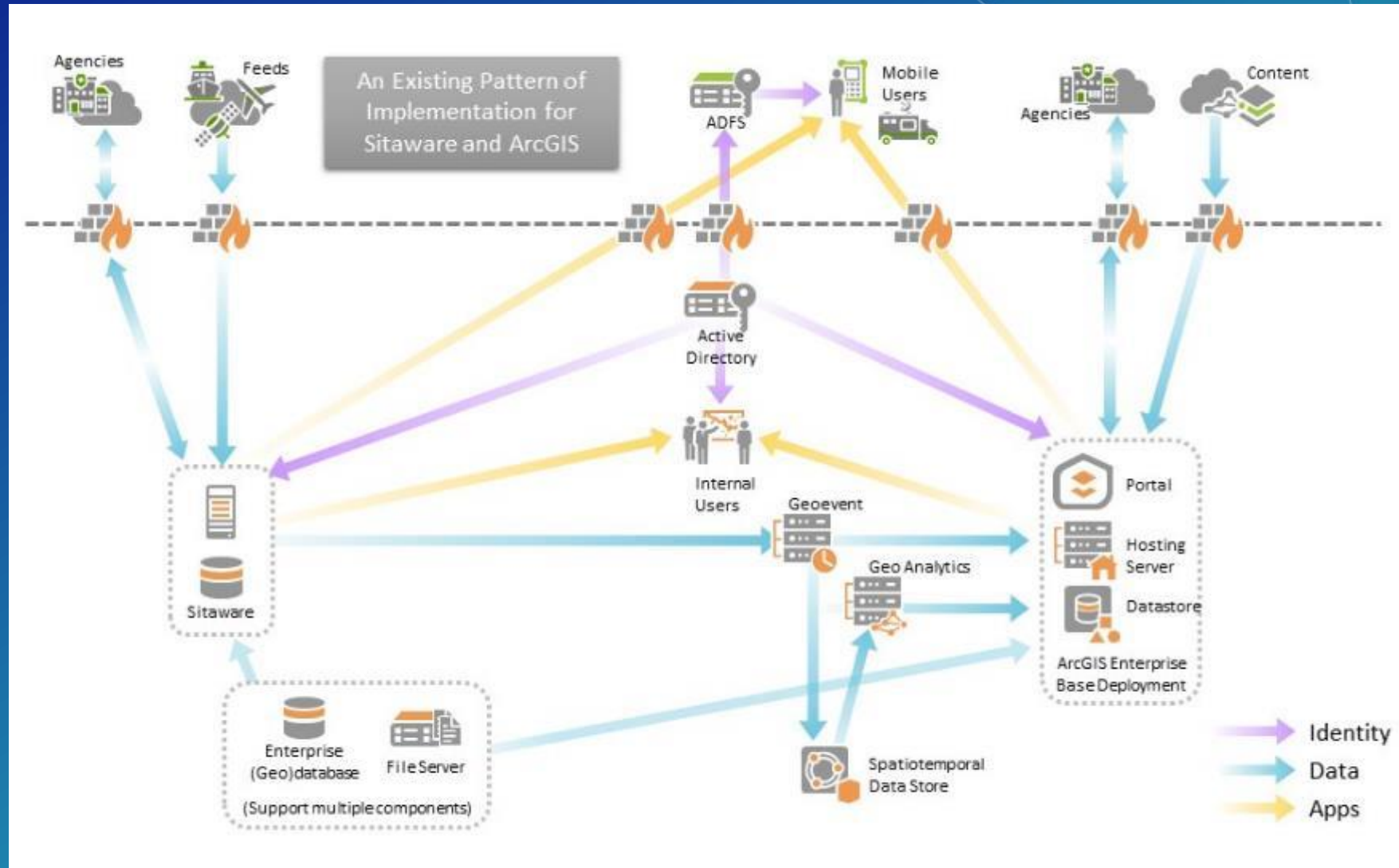


Open Software



... Successfully Integrated into Thousands of Systems

COTS to COTS Integration



COTS to COTS Integration

The screenshot displays a web application interface for a map-based system. The main map area shows a geographical region with a black grid overlay. A search bar at the top left of the map area contains the coordinates "-5.149, 57.422". A search result window is open, displaying the coordinates and a "Zoom to" button. The map includes labels for "SUILEAN SOVEREIGN BASE (STO)", "OUTER HEBRIDES", "GRAMPIAN MOUNTAINS", and "COTLAND". A scale bar at the bottom left indicates 30km. The application is running in a browser window with tabs for "My Content" and "Esri/Converse Chat". The browser address bar shows "umw.ddns.net:8010". The Windows taskbar at the bottom shows the time as 12:21 on 15/08/2016. Several floating windows are visible: a chat window for "um2@roys-mbp.home" showing a conversation from Monday Aug 15th 2016; a "UMW Refine Wkshp" window showing a new room creation message; and a "Rooms" window with fields for "Room name", "Server", and a "Join Room" button.

Take Advantage of Open Source Solution Templates

Ready to use services and applications

Helicopter Landing

CCM

Visibility and Range

Incident Analysis

Compound Mapping

Lines of Communication

Drop Zone

SITEMP

Fields of Fire

Artillery Emplacement

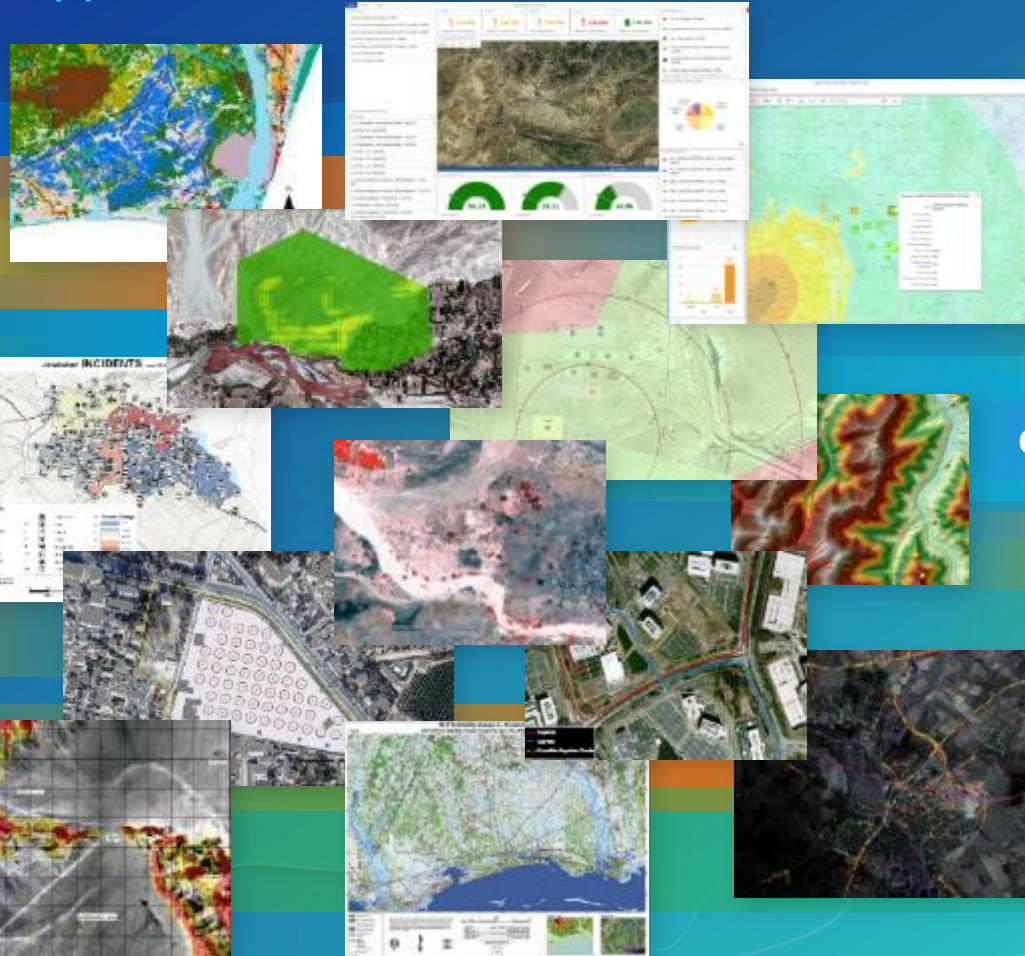
Cover and Concealment

Avenues of Approach

Point of Origin

Key Terrain

Sun Position Analysis



Summary





esri

THE
SCIENCE
OF
WHERE