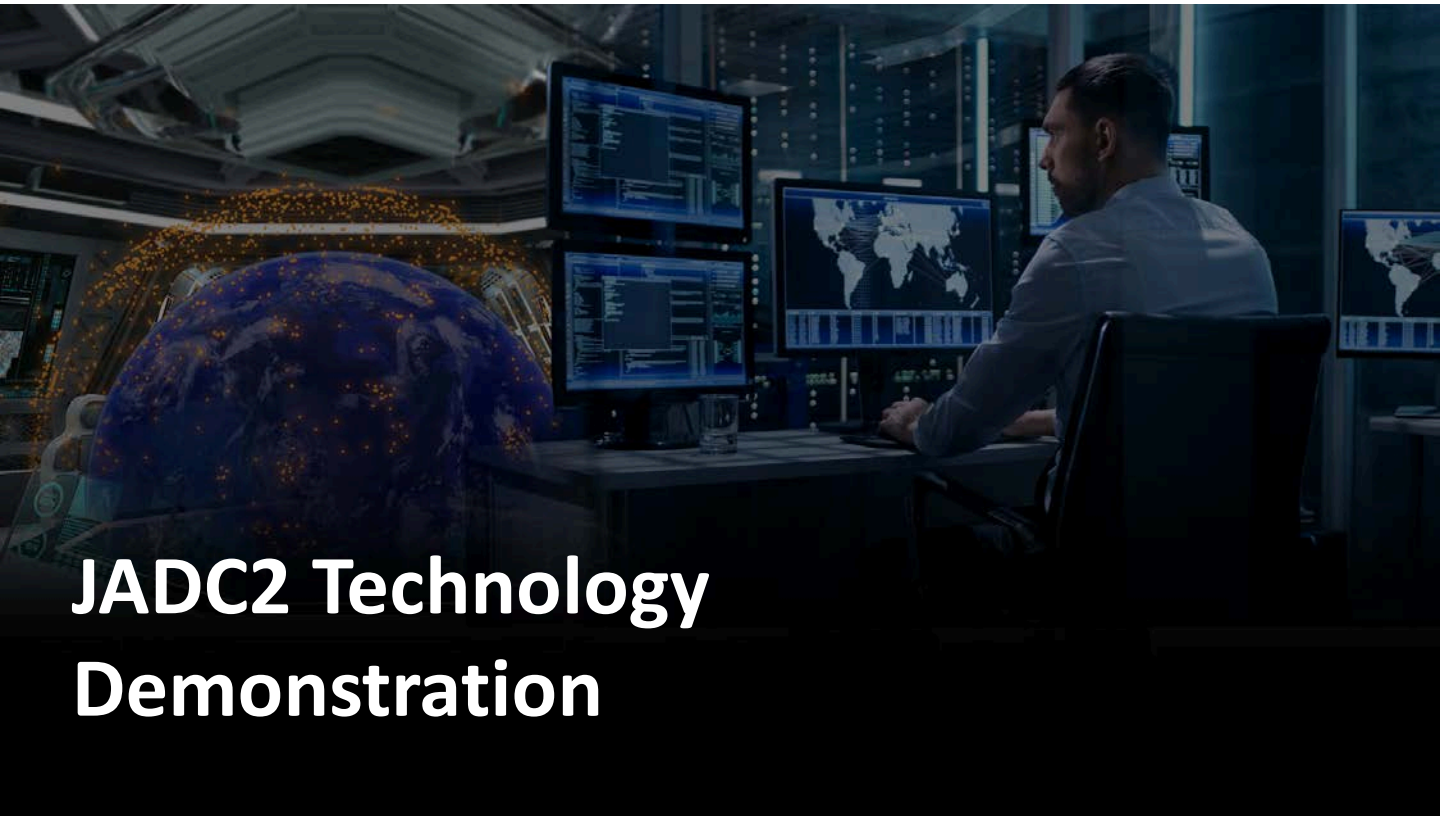

JADC2 Technology Demonstration

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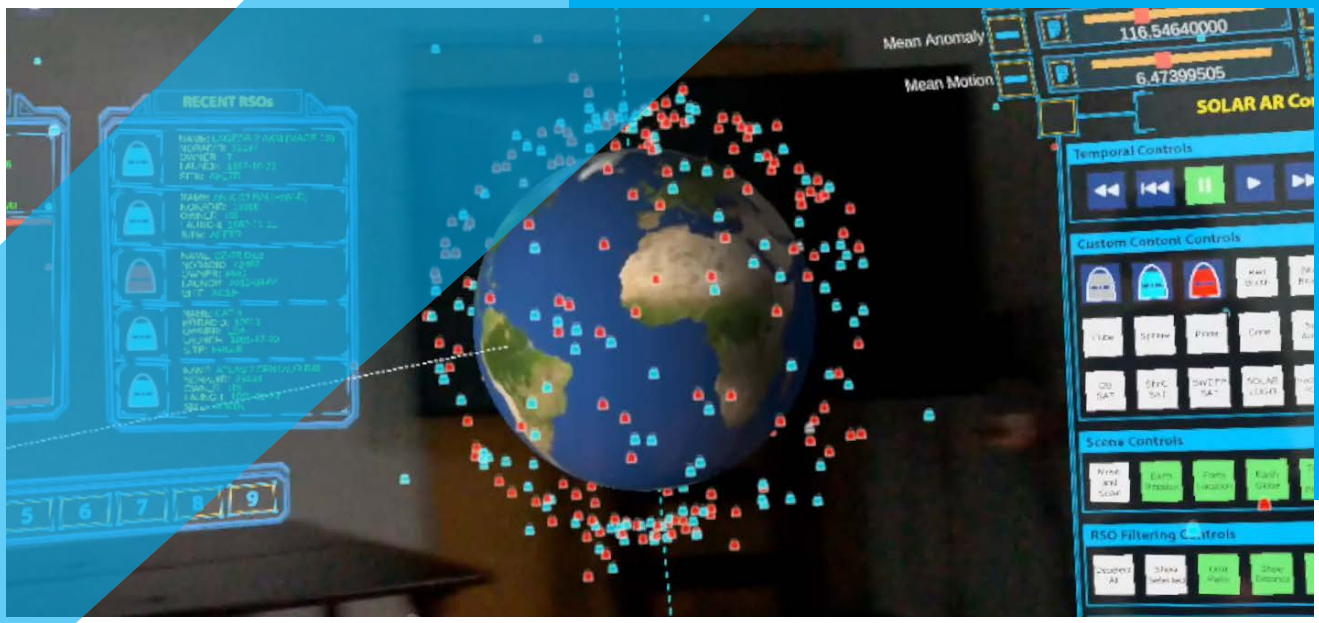
2020 BROCHURE



JADC2 Introduction

Charles River Analytics' 2D and 3D visualization apps support networked, integrated, and dynamic COP visualizations on multiple platforms—web, smartphone, and AR/VR.

Our apps' open data standards mean you can visualize all your data, from LVC-formatted data in training and simulation systems like DIS, to highly specialized and domain-specific data for advanced space and cyber effects.

Our visualization and collaboration apps are flexible and extensible front-end workflow solutions for cross-service, multi-domain command and control, giving JADC2 access to improved ops floor support environment displays for mission monitoring and execution.

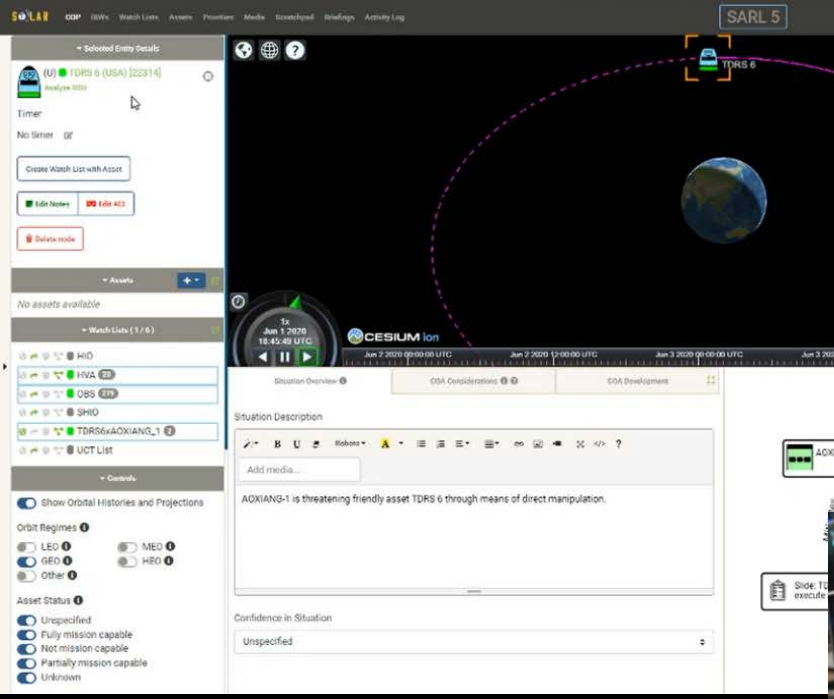
SOLAR Overview

We developed our SOLAR app under DARPA's Hallmark program. SOLAR gives decision makers the integrated support they need for space domain awareness (SDA) and space battle management command and control (BMC2).

SOLAR combines multiple web and augmented reality applications—each with their own unique visualizations and interfaces—to provide a COP with intuitive decision support and workflow guidance.

SOLAR's open data standards allow third-party information sources and tools to easily integrate and visualize their data. Its COP transforms data from dissimilar and disparate sources into actionable intelligence aligned with the operator's needs.

Although centered on space BMC2, SOLAR can seamlessly translate to multi-domain operations.



SOLAR Web

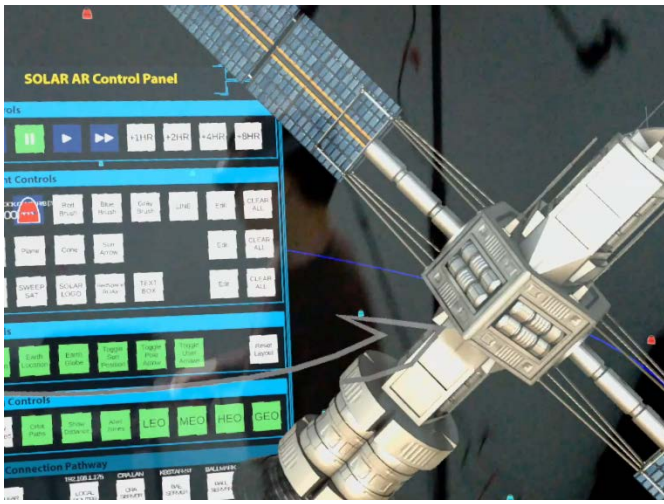
SOLAR's web-based common operating picture (COP) served as the front-end COP for multiple SDA analytics performers on DARPA's Hallmark program – integrating and aggregating data and APIs from multiple providers and data sources. We worked closely with US Air Force space domain experts and operators to refine the SOLAR app based on feedback from quarterly wargaming evaluation events.

SOLAR's workflow-based design provides a common front-end solution for distributed operators. It readily ingests a range of data types and makes it easy for you to integrate third-party machine learning and analytics tools.

SOLAR offers a powerful solution for shared awareness in a collaborative and dynamic mission-centric, high-tempo operations environment.

Networked Mixed Reality

XR tools can integrate with web applications to give operators a collaborative, 4D visualization decision support tool to assess orbit-ology, assets, situations, and threats.



For example, operators can:

- Enhance 3D visualization of 3D entities and spatiotemporal relationships
- Plan and communicate with annotations
- Support co-located and distributed collaboration in shared 3D environments
- Streamline access to controlled information for specific users
- Facilitate the development of 2D and 3D briefings

Operators make faster and more confident decisions with SOLAR because it fuses proven human-computer interaction technologies with next-gen augmented reality displays.

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3D visualizations, filtering, and annotation enhance spatiotemporal understanding and SDA for complex multidimensional data and relationships

Device & web networking offer collaboration, data streaming and configuration, and rapid content sharing in 2D and 3D

Synchronized XR overlays provide user-level information access control (facilitating coalition/combined ops floor control) on top of COPs and shared displays or workstations

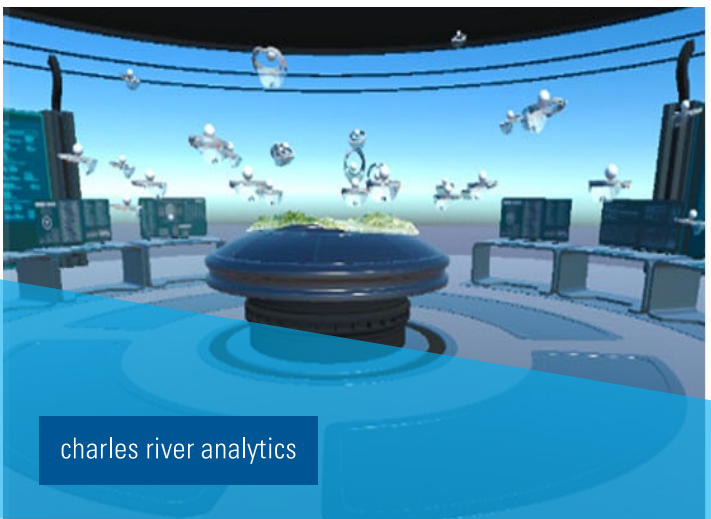
Virtual, augmented, and mixed reality designs based on deep human factors expertise create a custom XR experience tailored to an individual's information needs

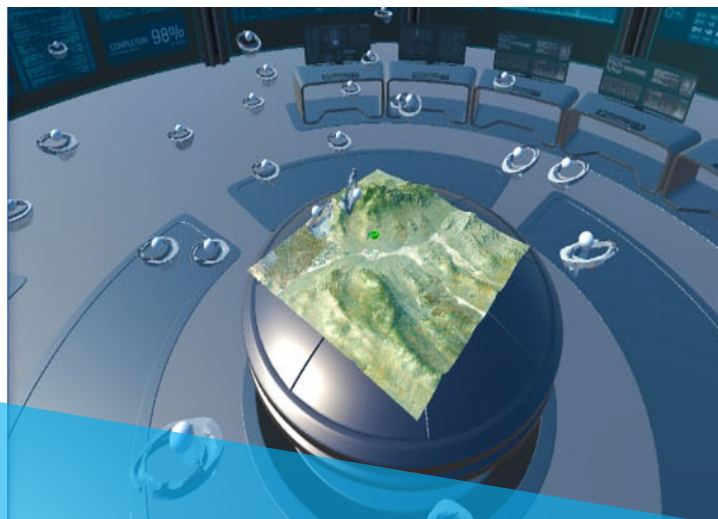
Mixed Reality for multi-domain command and control

Charles River's networked AR/VR apps support ground, air, and space command and control with enhanced 3D visualizations and interactive planning and collaboration tools.

These apps were developed through our work on multiple US Army-funded efforts to promote situational awareness through synchronized virtual collaboration environment. With these environments, distributed and dispersed Mission Command personnel can collaboratively plan, rehearse, and execute missions, even under denied and degraded network conditions.

Users can join the virtual environments using any device—AR/VR head-mounted displays, smartphones, tablets, or desktop and laptop computers. Once connected, they access a 3D geospatial battlefield COP, where they can use a suite of collaboration tools to annotate, explore data, and capture and share media with other users.

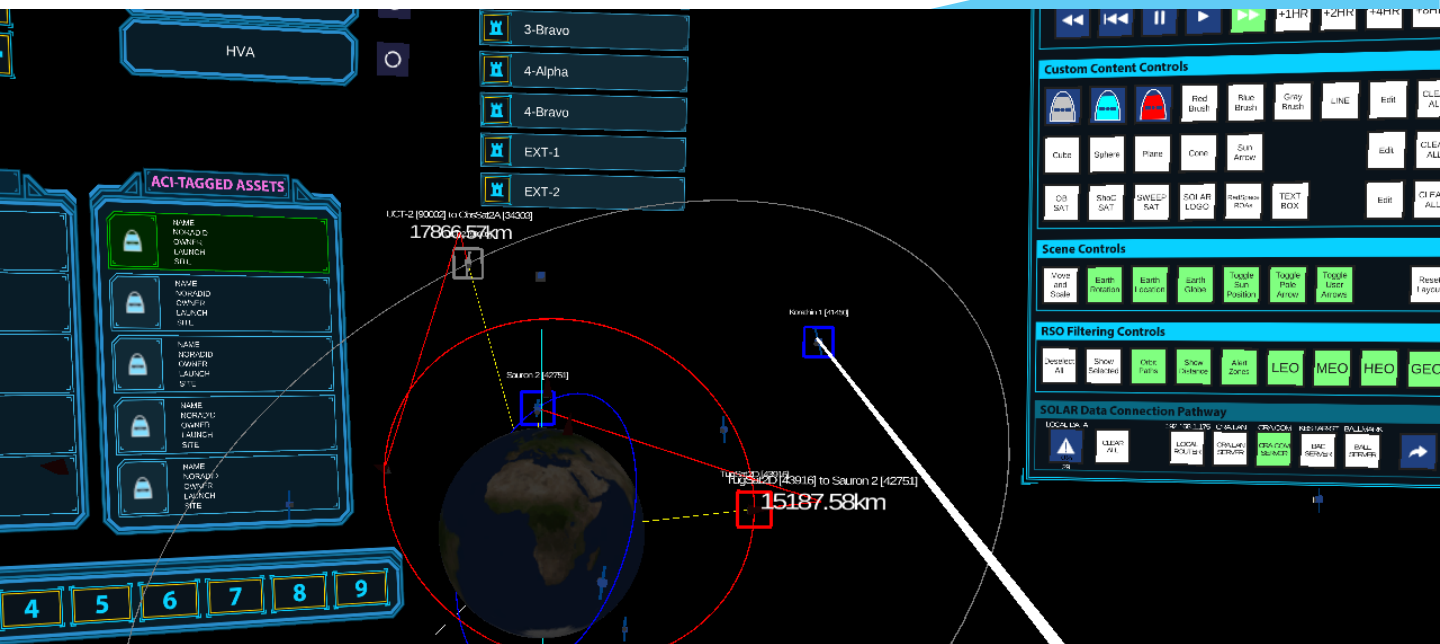


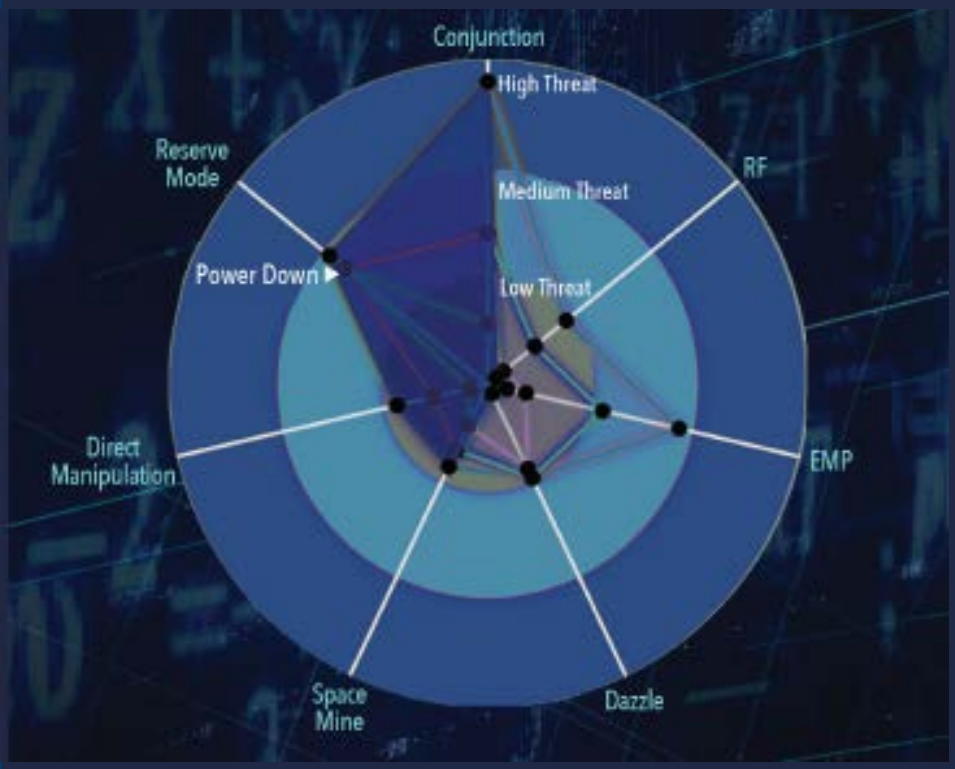


Mixed Reality for multi-level security

AR/VR head-mounted displays can conduct continuous user environmental authentication through biometric iris recognition and spatial mapping. Our apps use this feature to streamline multi-level security protocols; users no longer need to leave the ops floor to access controlled information.

Our proof-of-concept SCIF-on-the-head solution has revolutionary implications for visual information access and display across all tactical and strategic elements of the DoD.





PICASSA

Probabilistic Inference for COA Analysis in Space Situational Awareness (PICASSA)

PICASSA improves threat detection in space using advanced probabilistic reasoning. It was also developed under the Hallmark program. When viewed within SOLAR's interactive visualizations, space operators can easily understand and incorporate outputs from PICASSA's reference models and decision algorithms into their SSA and course-of-action workflow.

PICASSA builds probabilistic models with Figaro™, our free, open-source probabilistic programming language. Figaro makes it possible to express probabilistic models using the power of programming languages and includes built-in reasoning algorithms for application to new models.

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Charles River Analytics conducts cutting-edge AI, robotics, and human-machine interface R&D to create custom solutions for your organization. Our customer-centric focus directs us towards problems that matter, and our passion for science and engineering drives us to create actionable, impactful solutions.

We were founded in 1983 to perform results-focused research for the US government. We became an employee-owned company in 2012, setting the stage for the next generation of innovation, service, and growth. Today, our nearly 200 employees make a difference for a "who's who" in government and industry by delivering results on government programs and working with commercial partners.

We come to work every day because we want to advance technology to solve todays' hardest problems. We have a stellar track record implementing successful solutions that enrich diverse markets—defense, intelligence, medical technology, training, transportation, space, and cyber security. We owe our success to our expertise in advanced algorithms, machine learning, autonomous systems, advanced human-system interfaces, agile software and hardware engineering, and to our enduring base of knowledgeable customers.

At **Charles River Analytics**,
we turn research into results.

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