



CROSS-MISSION GROUND &
COMMUNICATIONS ENTERPRISE

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Advanced Tracking and Launch Analysis System (ATLAS)

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ATLAS Overview

Problem Space

Modernizing core space Command and Control (C2) to decommission Space Defense Operations Center (SPADOC)
Providing “Fight Today” capabilities to support growing space traffic

Hypothesis

Leveraging industry best practices for software development in a low-risk eco-system
Utilizing modern software technology to respond to decades long issues
Effectively monitor, track and display space assets with astrometric tools to support Space Domain Awareness (SDA)

Mission Operations Focused

Provide mission centric applications to address current shortfalls and provide automation
Program delivery responsive to short term needs
User Centered Design guided by C2 Ops Centers priorities
Quarterly release planning

The ATLAS team collaborates with mission operators and stakeholders utilizing agile methods, most prevalent are User Centered Design techniques and DevSecOps methods to release to operators quickly.



ATLAS Objectives

- **Minimum Viable Capabilities (MVCs) contain high level requirements**
 - **Changing the way DoD contractors deliver software to operations**
 - **Agile Methodology**
 - Break work down into manageable pieces
 - Minimum Viable Capabilities -> Multiple Initiatives
 - Initiatives -> Features/Epics
 - Features/Epics -> User Stories (<8 hours work)
 - **Features Prioritization**
 - Accomplished by operations representative and product manager
 - Stories are owned by the developers
 - **General understanding of the features; don't plan all work up front**
 - **Identify constraints and dependencies a few cycles ahead of the devs**
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ATLAS Objectives (cont.)

- **Four Objectives of Agile**
 - Individuals and interactions over processes and tools
 - Working software over comprehensive documentation
 - Customer collaboration over contract negotiation
 - Responding to change over following a plan
- **Twelve additional principles**

Agile Manifesto

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

While there is value in the items on the right, we value the items on the left more.

The 12 Principles of Agile

- 1 Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
- 2 Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
- 3 Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
- 4 Business people and developers must work together daily throughout the project.
- 5 Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
- 6 The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
- 7 Working software is the primary measure of progress.
- 8 Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
- 9 Continuous attention to technical excellence and good design enhances agility.
- 10 Simplicity – the art of maximizing the amount of work not done – is essential.
- 11 The best architectures, requirements, and designs emerge from self-organizing teams.
- 12 At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Advancing the principles of Agile



Learn more at AgileAlliance.org

THE MANIFESTO AUTHORS

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ATLAS MVCs

- **Mission Minimum Viable Capabilities**
 - Automated processing and maintenance of astrometric baseline (Space Object Mapping)
 - Manual and Automated Obs Assoc/Orbit Det/GP SP Propagation
 - Event Processing
 - Manual and Automated UCT processing
 - Routine Sensor Tasking and Calibration
 - Processing Satellite Conjunctions

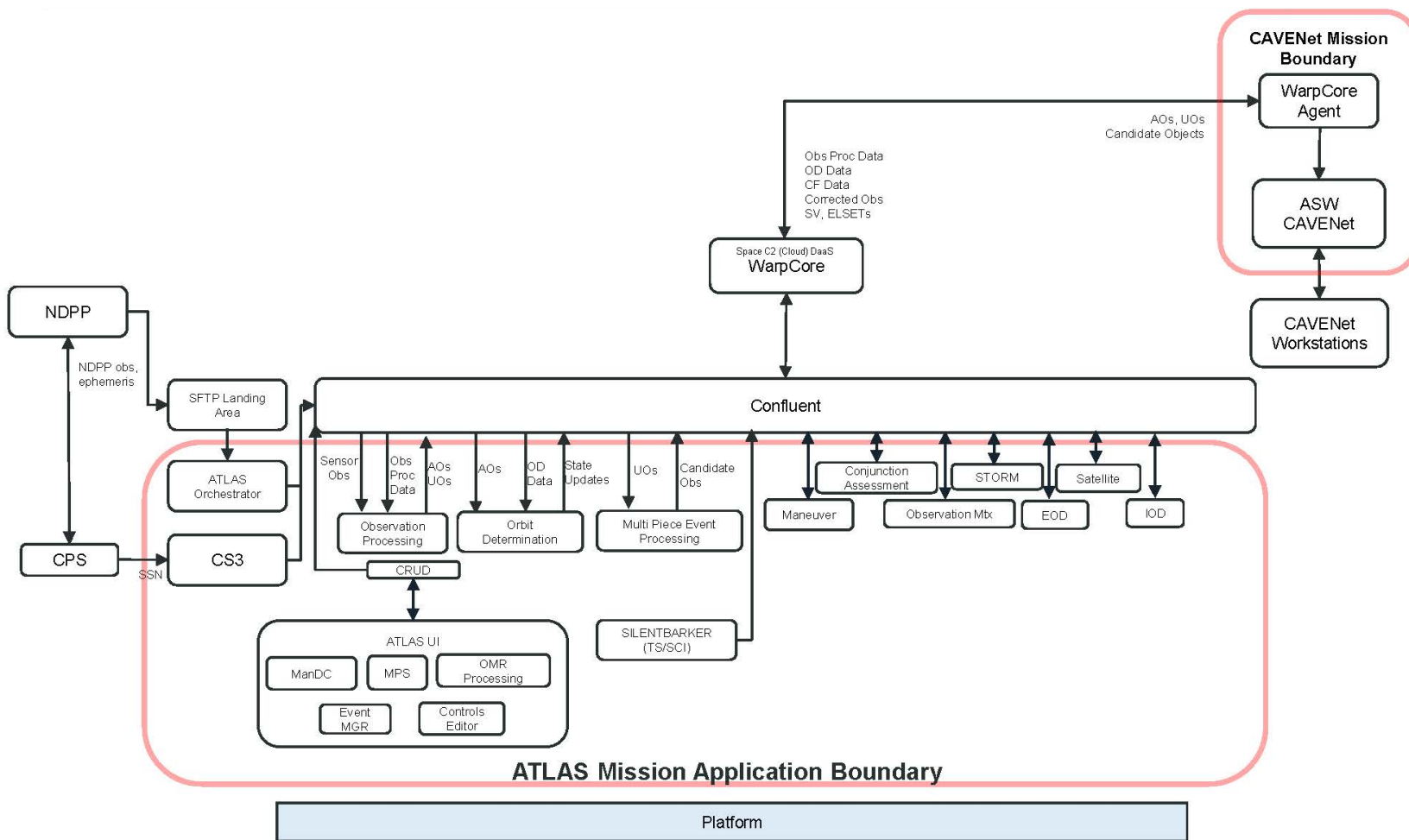


ATLAS MVCs (cont.)

- **Enabling Minimum Viable Capabilities**
 - Queries on SSA Data
 - Create, display, update, delete, send/receive, store data at ID'd classification levels
 - Ops logins to ATLAS for those classification levels
- **System Interoperability Minimum Viable Capabilities**
 - Cheyenne Mountain (Legacy SSN), CAVENet, NDPP connections
 - Generate, send, and receive legacy messages
 - Test, Training and Exercise with real data in partitioned environments
 - Use across multiple ops centers with a backup in hot shadow



ATLAS Architecture





ATLAS Details

- **Requirements** – MVC memo (AFSPC signed 17 Apr 19)
 - **Incremental Delivery** – Delivering a product to users <90 days at a time within a DevSecOps construct
 - **Continuous Development** – Subsequent releases after an application Minimum Viable Product (MVP) will build up to an MVC
 - **User Interface/User Experience** – The developers employ a feedback loop from discovery to implementation
 - **Test and Evaluation** – Developmental Test (DT) is baked into development, Operational Test (OT) follows the incremental deliveries leading to Operational Acceptance (OA)
 - **Training and Tech docs** – Training strategy documented and reviewed with ops and test; docs focused on applications and updated with each release (user checklists/backshop guides)
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ATLAS Current Status

- **ATLAS Release 10.2 Imminent**
 - Includes LEO Proliferation capabilities to introduce automated functions to support managing mega constellation launches and orbits
 - Provides automated observation processing and orbit determination capabilities
 - Early Manual Differential Correction capabilities also included
 - Connections to Non-Traditional Data Pre-Processor (NDPP), Legacy Data Networks, and 18th Space Control Squadron networks



ATLAS Conclusion

- **Continue to reduce the time between releases**
- **Continue to work towards providing capability to support SPADOC decommissioning**
- **Integrating in commercial ready capabilities**
- **Helping to inform how to do software development with DoD contractors**

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