

Enabling Interoperability in Space Situational Awareness (SSA)

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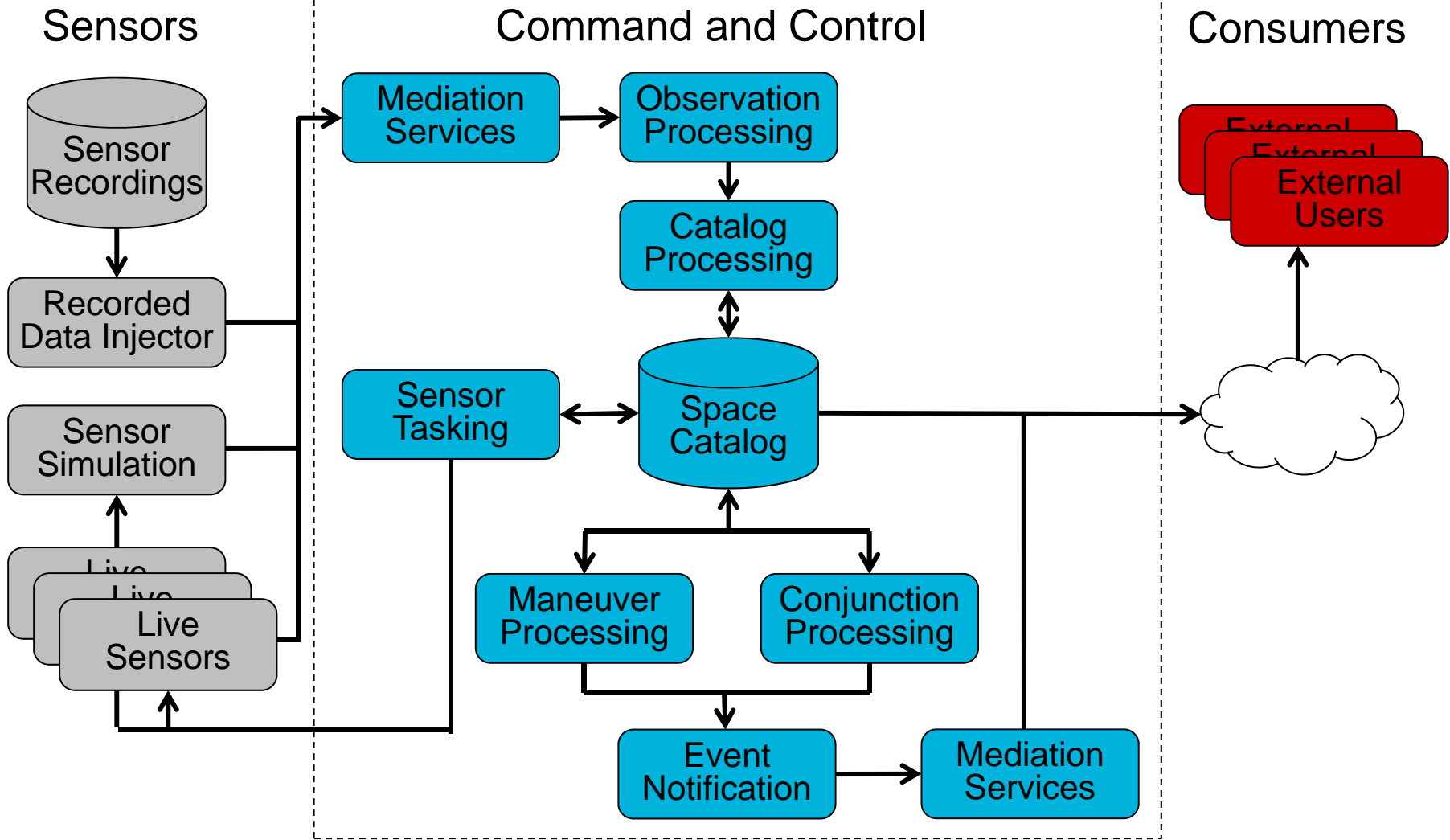
Overview

- **MITRE maintains an SSA modeling, simulation, and analysis (MS&A) environment as part of the *MITRE Enterprise for Space Analysis (MESA)***
 - Supports analysis of portions of the operational Space Situational Awareness (SSA) Enterprise for numerous customers
 - Includes components representing the Space Surveillance Network (SSN) sensors and Command and Control (C2) systems
 - Standards-based, net-centric infrastructure leverages flexible, adaptable, and scalable technologies common throughout industry and the DoD
 - Common interfaces and mediation services enable interoperability across the SSA enterprise

**Net-Centric Interoperability and Standardized Data
are Key to Evolving the SSA Enterprise**

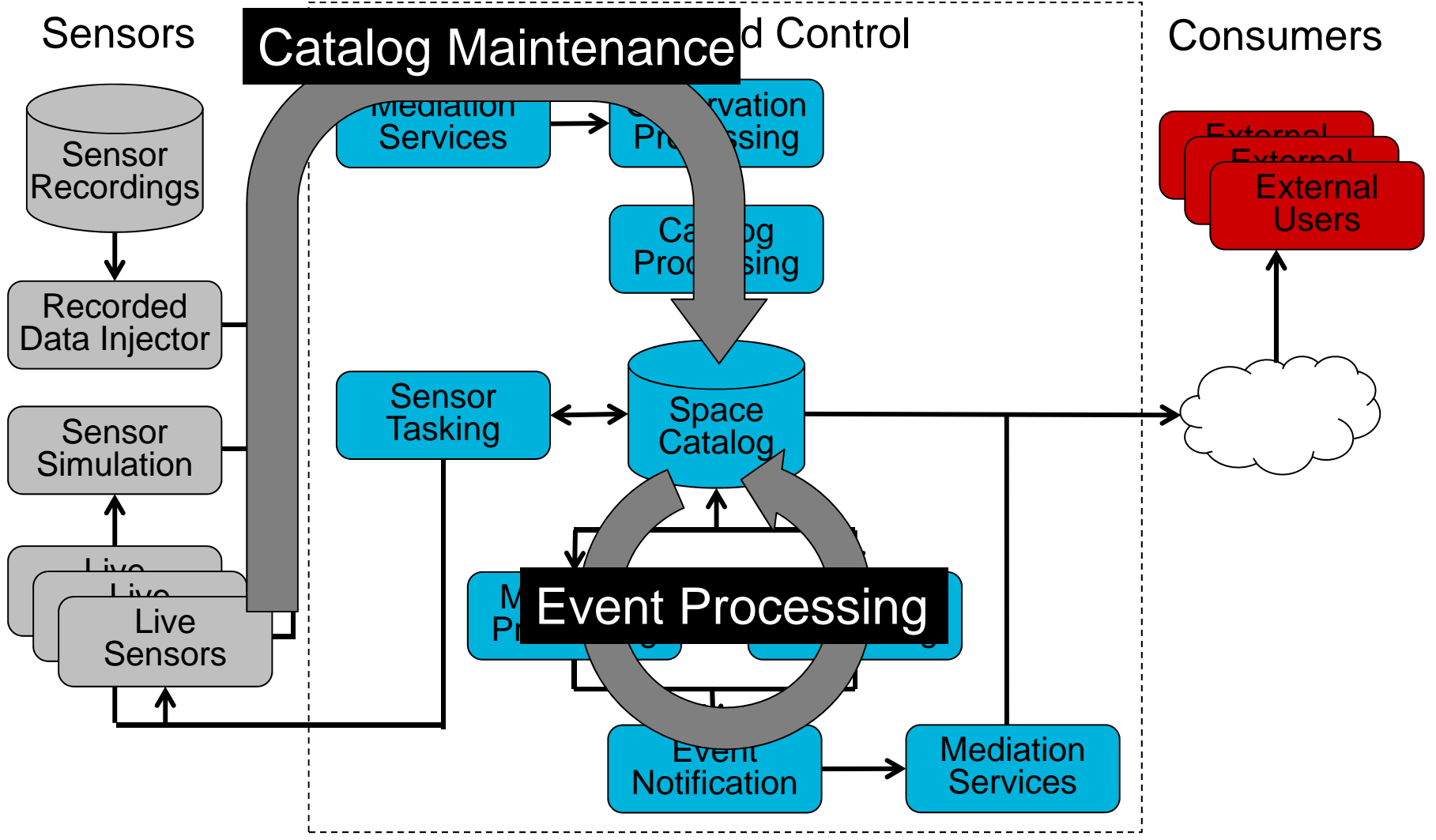
Space Catalog Processing

Overall Data Flow

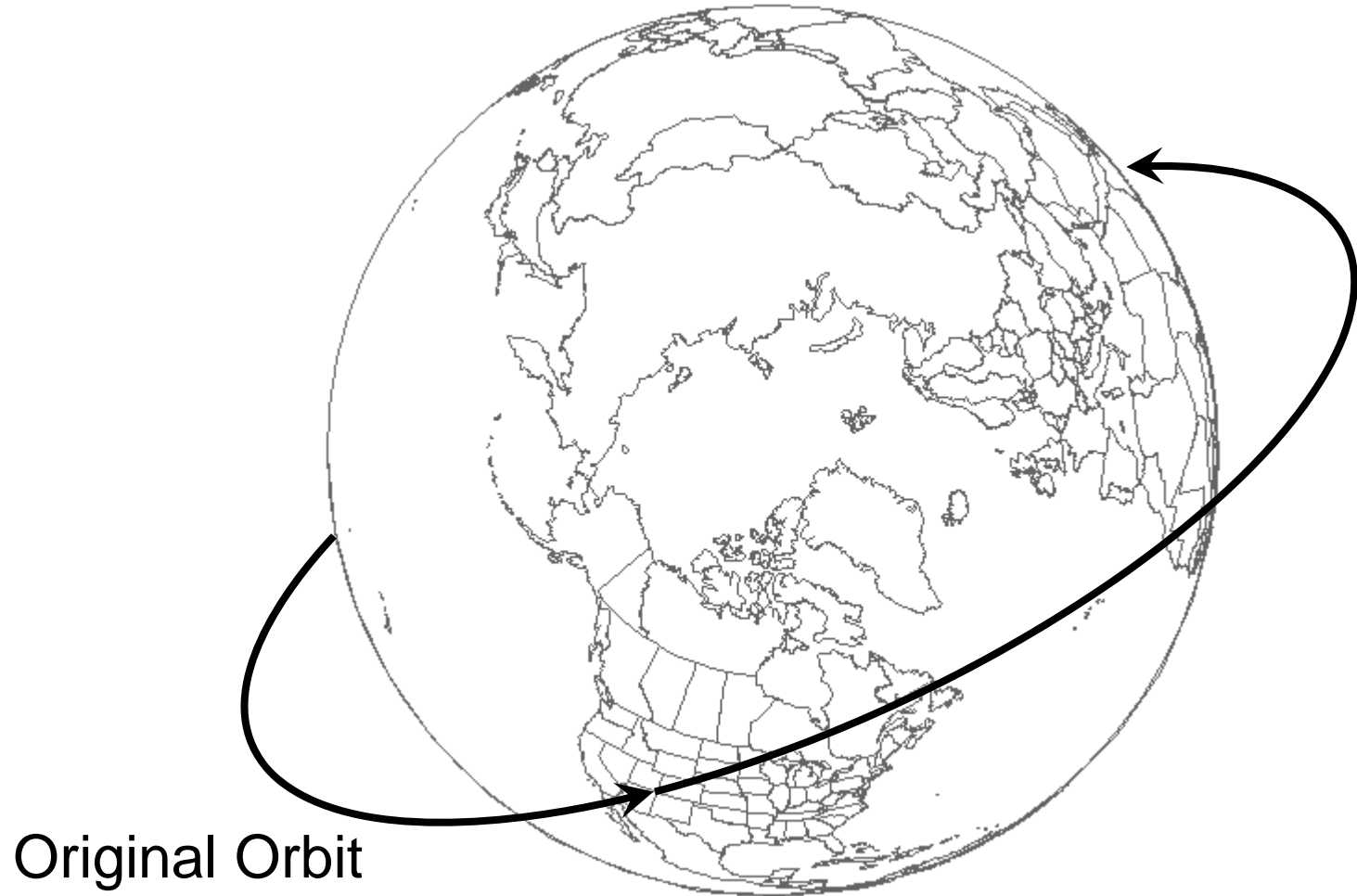


Space Catalog Processing

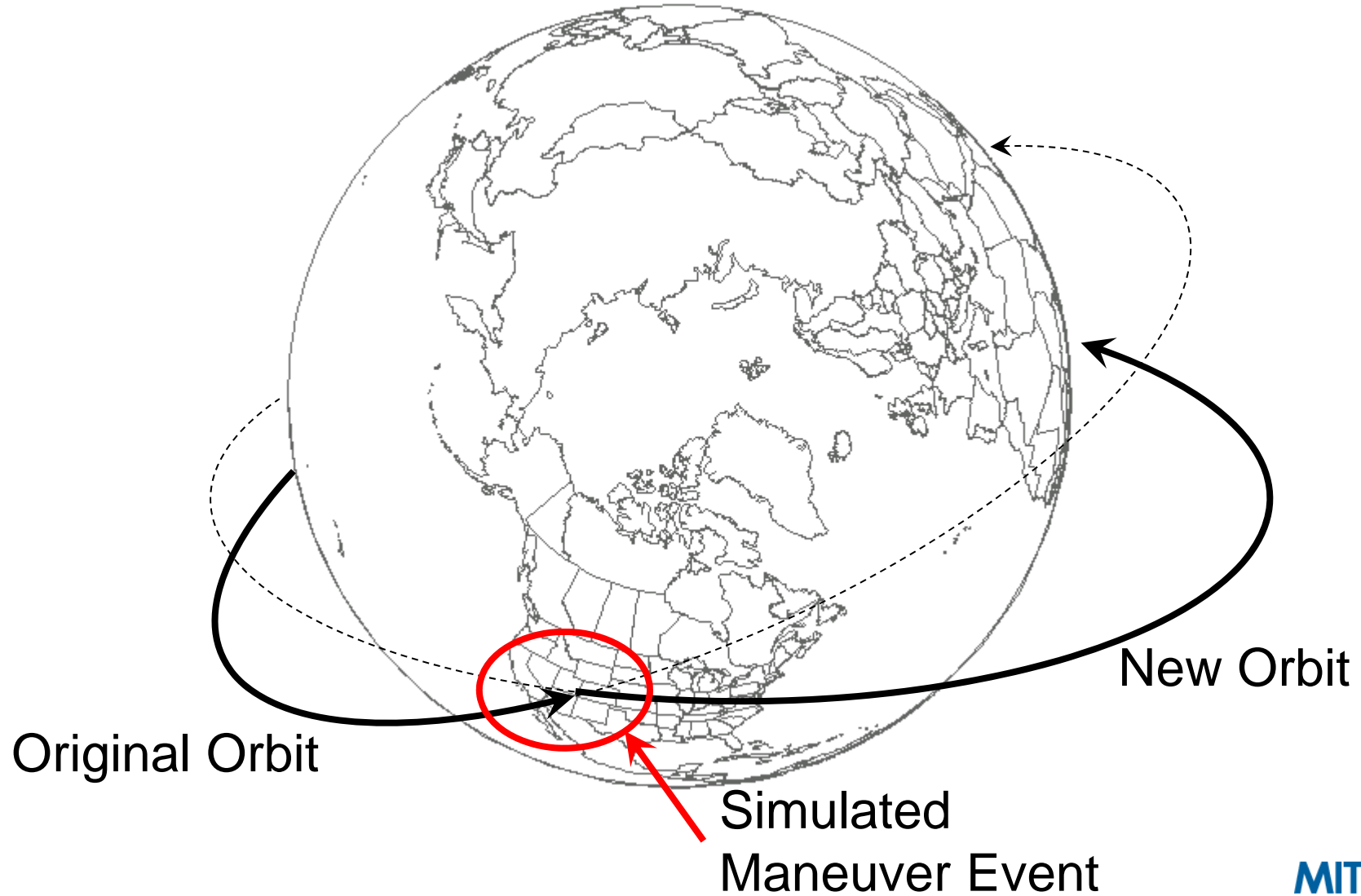
Overall Data Flow



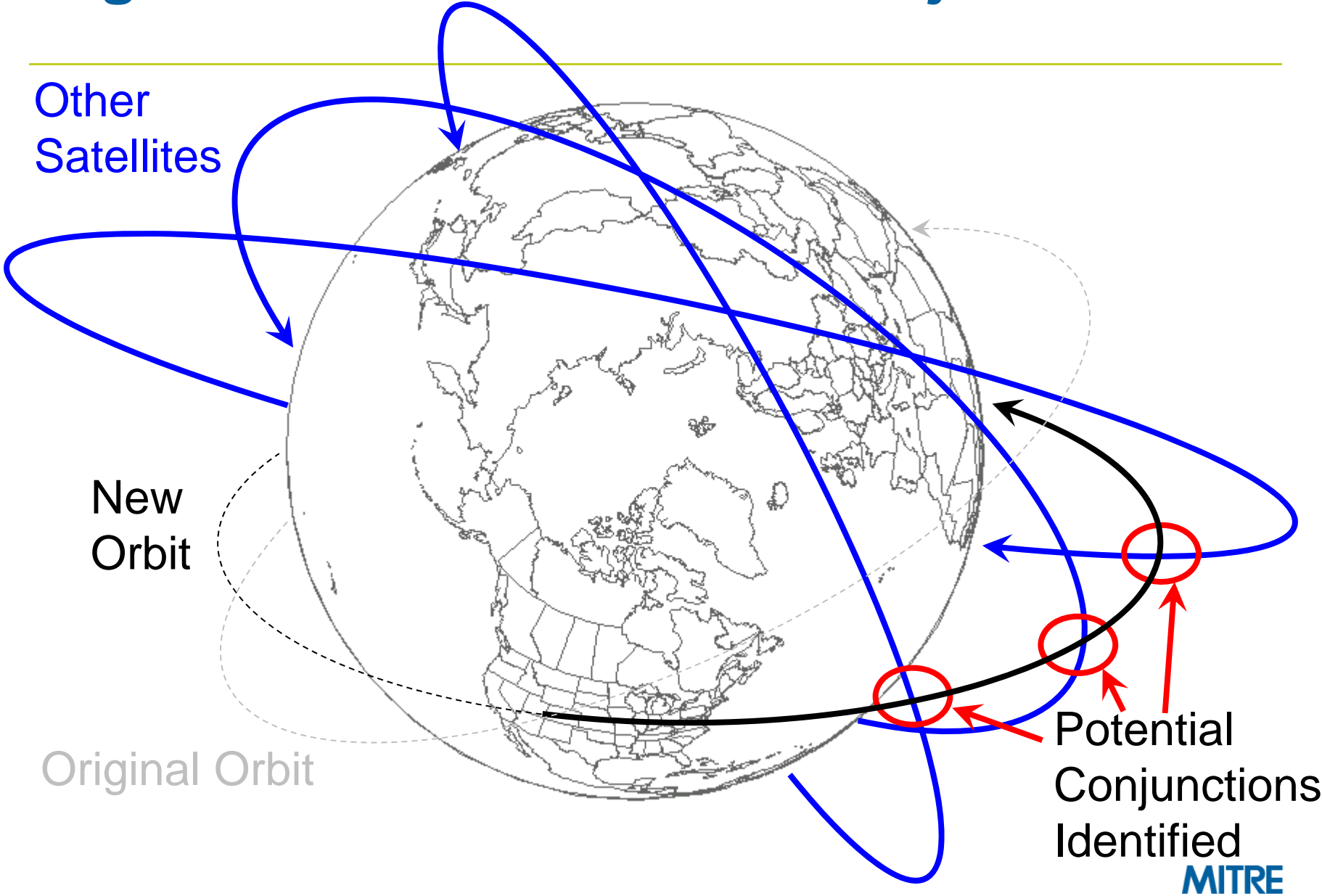
Vignette: Maneuvers and Conjunctions



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Other Satellites

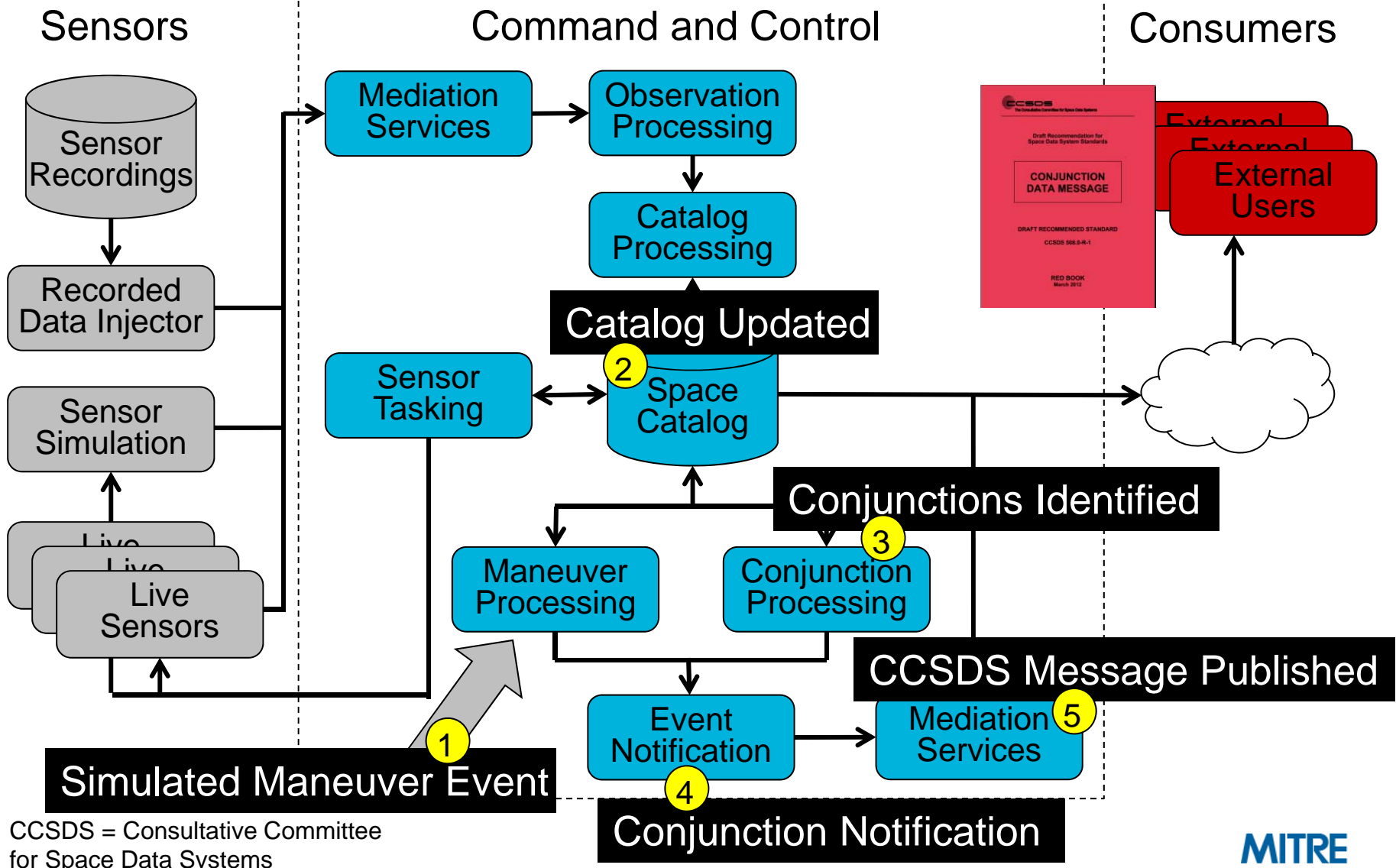
New Orbit

Original Orbit

Potential Conjunctions Identified

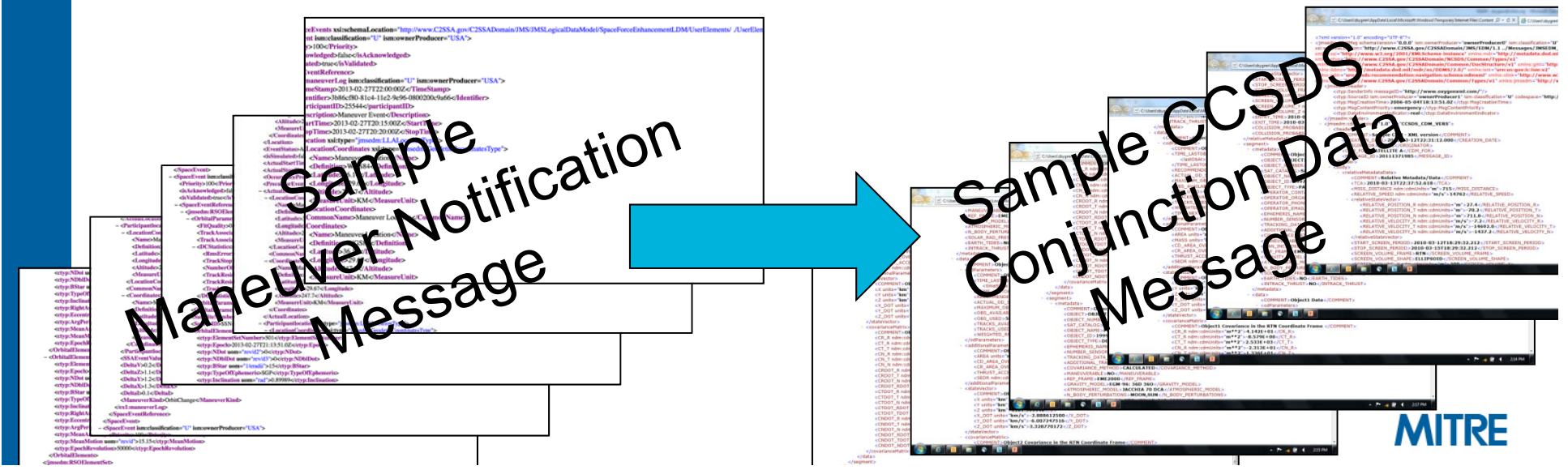
Space Catalog Processing

GSAW Vignette



Consultative Committee for Space Data Systems Sample Conjunction Data Message

- Maneuver Events, whether internally generated or externally provided, whether observed or based on future planning, can initiate Conjunction Analysis
- Our MS&A environment required only simple mediation services to expose conjunction data to external users using common data models, i.e. CCSDS Conjunction Data Message



Summary and Lessons Learned

- **Net-Centric interoperability and standardized data (syntax and semantics) are critical to evolving the SSA Enterprise**
- **Enables a broad range of capabilities**
 - Rapid integration of new data sources and systems
 - Experimentation with new CONOPS
 - Analysis of new technologies
 - Integration of capabilities across the community

Early Investments in Net-Centricity are Paying Dividends for the SSA Enterprise

Consultative Committee for Space Data Systems

- **The Consultative Committee for Space Data Systems (CCSDS) is a multi-national forum for the development of communications and data systems standards for spaceflight (www.ccsds.org)**
- **Goal is to enhance governmental and commercial interoperability and cross-support, while reducing risk, development time and project costs**
- **Membership consists of the major space agencies of the world, including 11 member agencies, 28 observer agencies, and over 140 industrial associates**
 - Agenzia Spaziale Italiana (ASI) - Italy
 - Canadian Space Agency (CSA) - Canada
 - Centre Nationale d'Etudes Spatiales (CNES) - France
 - China National Space Administration - China
 - Deutsches Zentrum für Luft- und Raumfahrt (DLR) - Germany
 - European Space Agency (ESA) - Europe
 - Instituto Nacional de Pesquisas Espaciais (INPE) – Brazil
 - Japan Aerospace Exploration Agency (JAXA) – Japan
 - National Aeronautics and Space Administration (NASA) – USA
 - Russian Federal Space Agency (RFSA) – Russia
 - UK Space Agency – United Kingdom

