CROSS ORGANIZATION SEMANTIC SERVICE AND MORE …

Semantic Web for Air Transportation (SWAT) Interest Group

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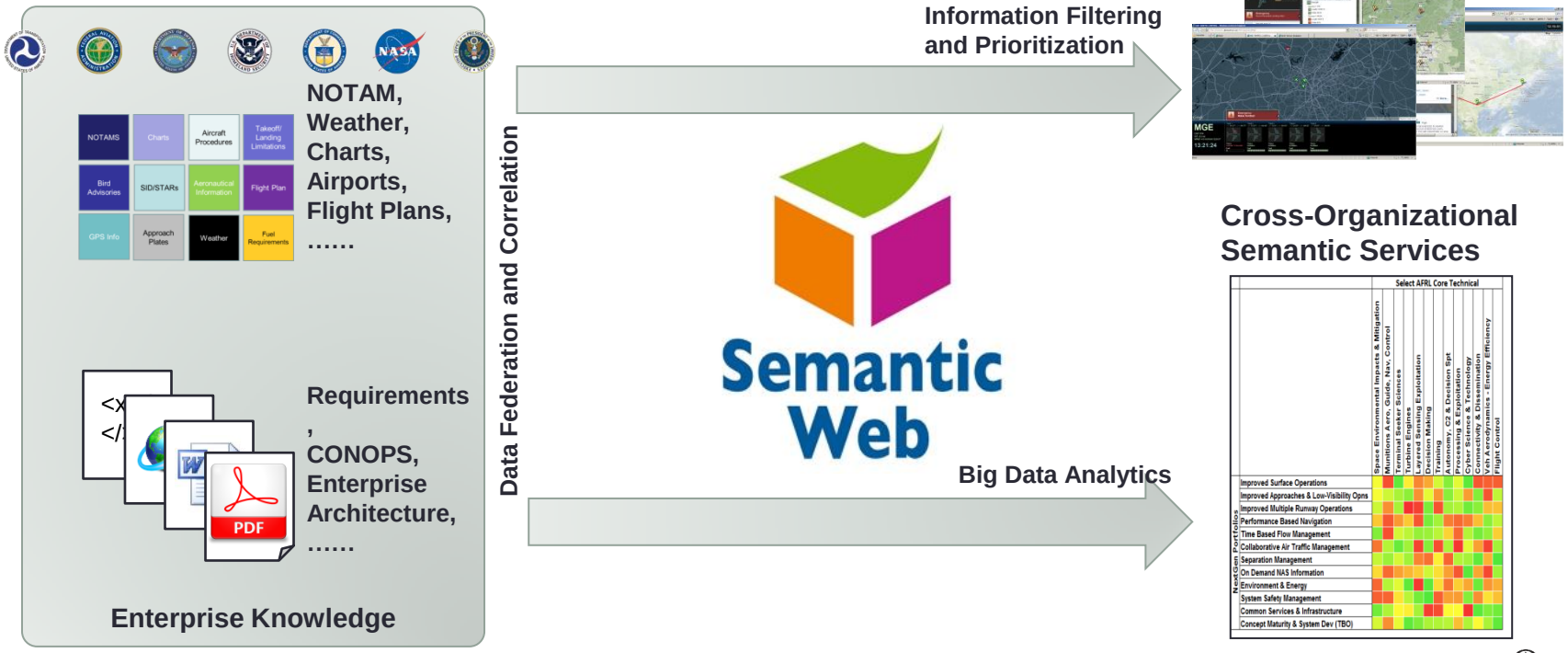
Washington DC

Agenda

- Overview
- Cross-Organizational Semantic Services (CrOSS)
- Semantic Decision Support Tool (SDST)
- Summary

Overview

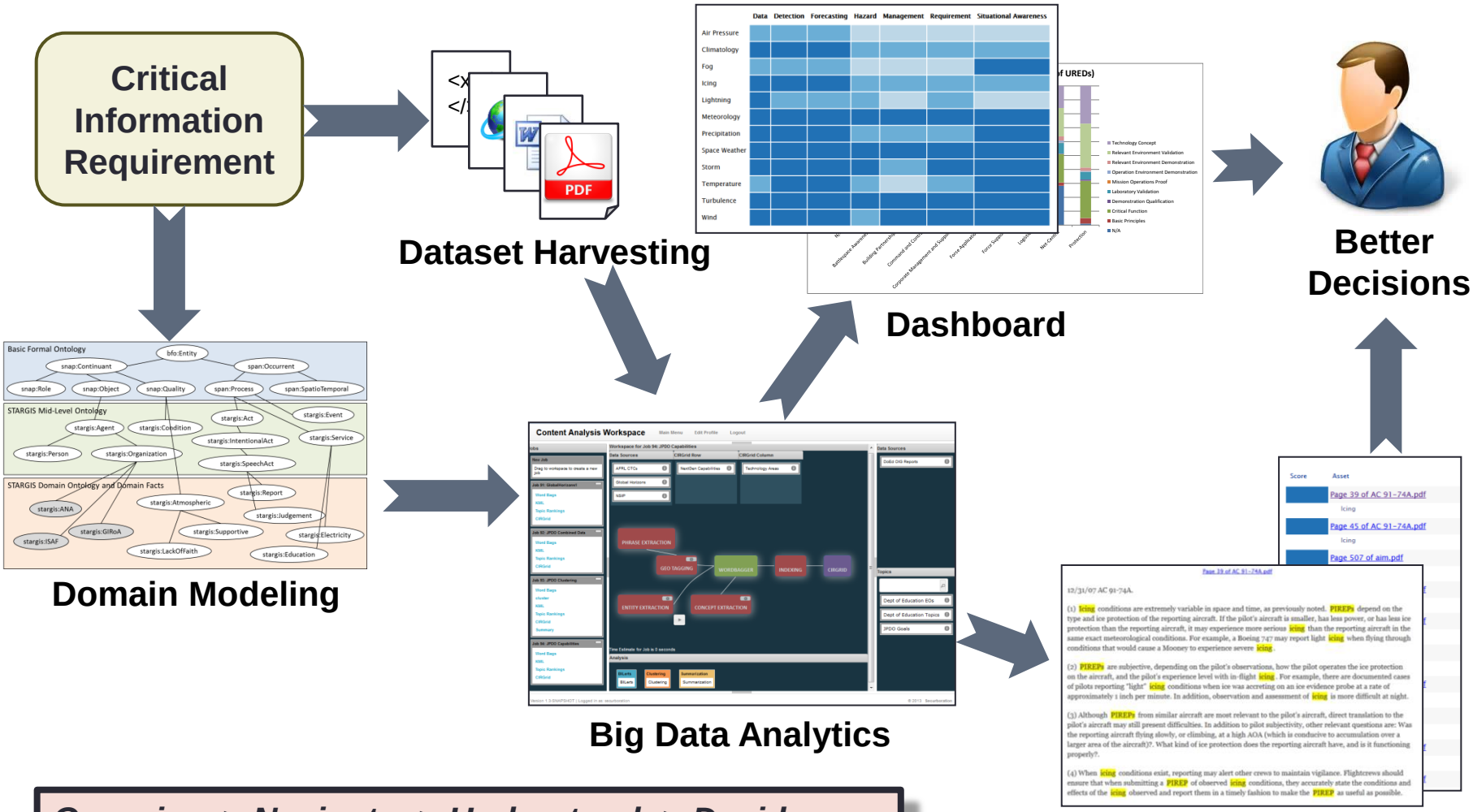
- Leverage Semantic Web Technologies
  - Provide actionable intelligence
  - Enable information discovery across organizational boundaries
  - Reuse existing data sources and services
- Address Operational Problems
  - Context-driven Decision Support for Pilot (Semantic Decision Support Tool)
  - Collaboration and Alignment of NextGen Activities (CrOSS)



SECURBORATION

ALION SCIENCE AND TECHNOLOGY
Aligned with your needs.

CrOSS : Informs Decision Making

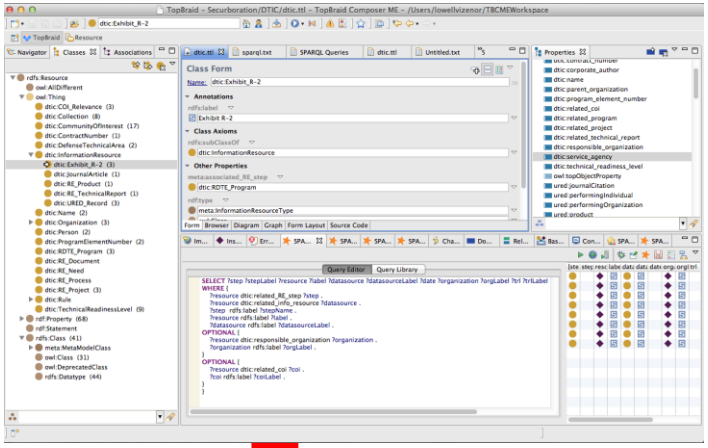


Use Case: UAS Regulations

- Critical Information Requirement:
  - What guidance involving pilot actions in hazard conditions needs to be reviewed for integration of UAS into the NAS?
- Datasets:
  - Federal Aviation Regulations (FAR) ~16 MBs
  - 2013 Aeronautical Information Manual (AIM) ~ 8 MBs
  - FAA Advisory Circulars (AC) ~34 MBs
- Scale:
  - ~12,000 pages of regulatory guidance
- Domain Modeling
  - 3 Aviation Hazards: Icing, Lost Comms, Turbulence
  - 3 Pilot Functions: Avoid or Mitigate, Pilot Aviation, Pilot Communication

CrOSS Topic Authoring

Ontology Editor



Topic File

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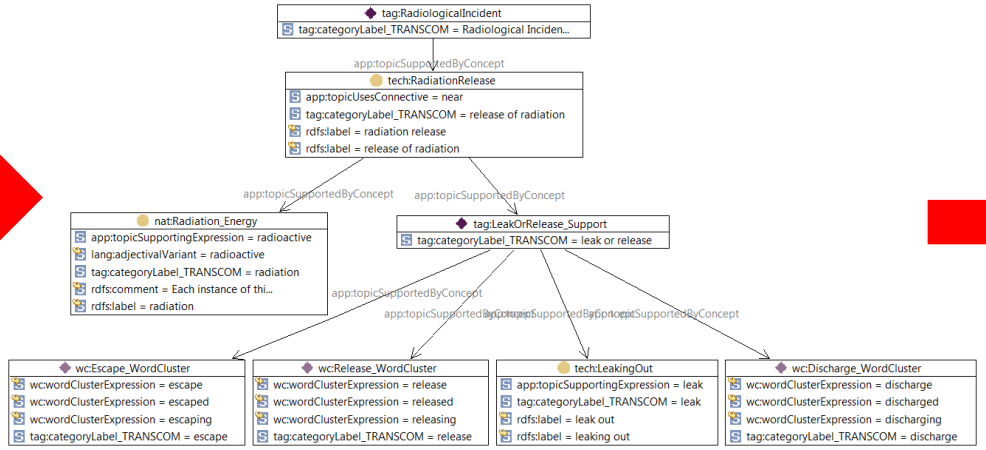
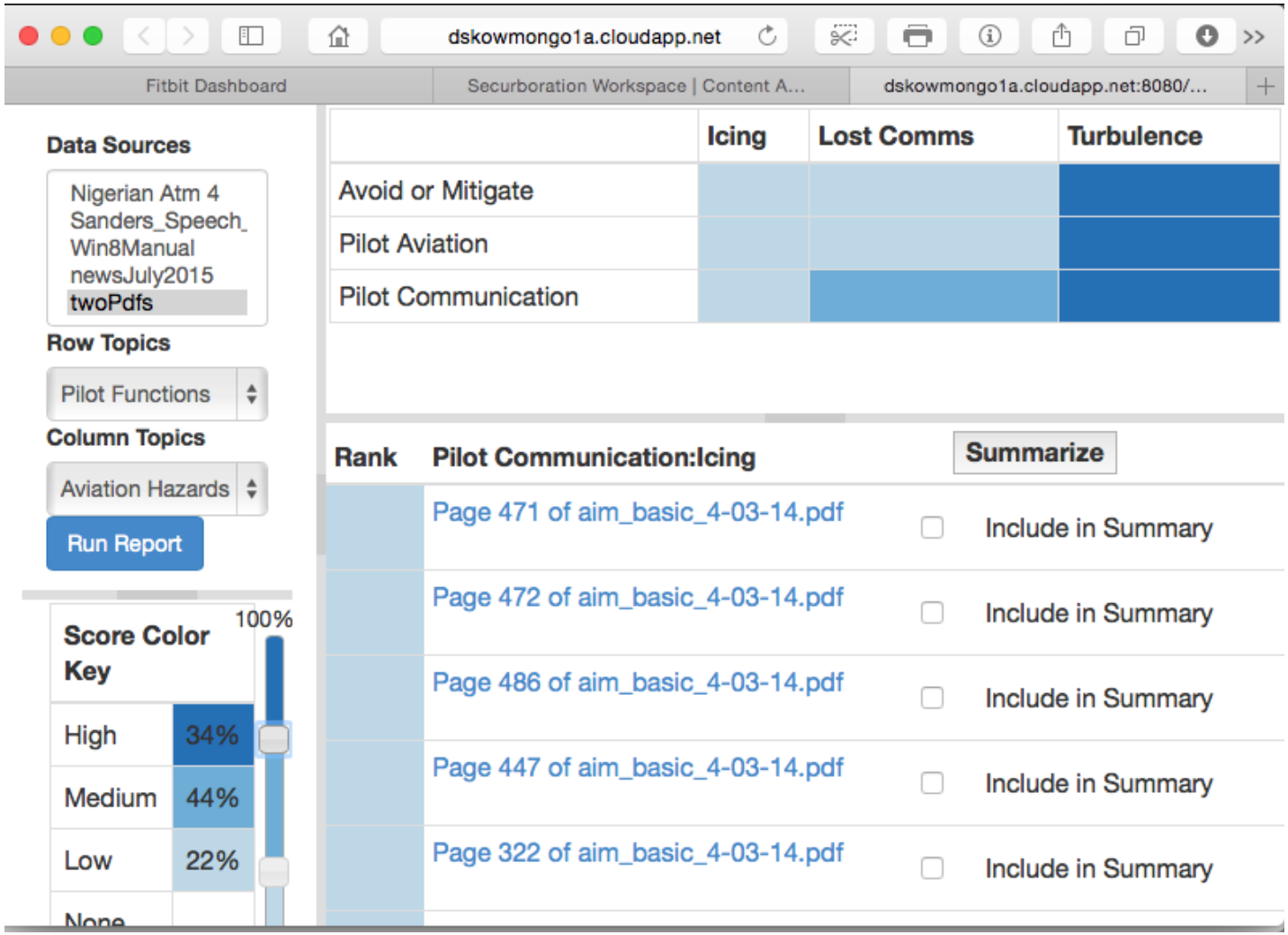


Topics defined in the ontology

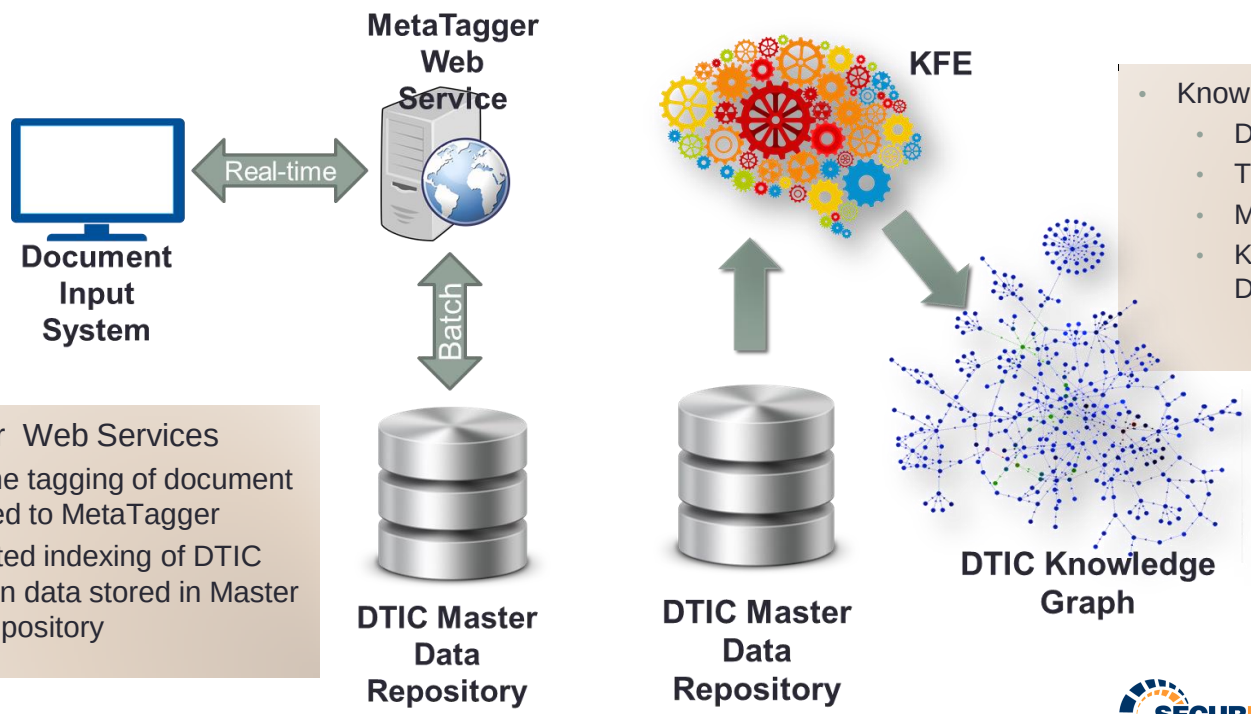
Topic file generated from ontology

CrOSS Content Analysis Results



CrOSS Today

- Content Analysis Workspace hosted on Defense Technical Information Center's (DTIC) Production Environment

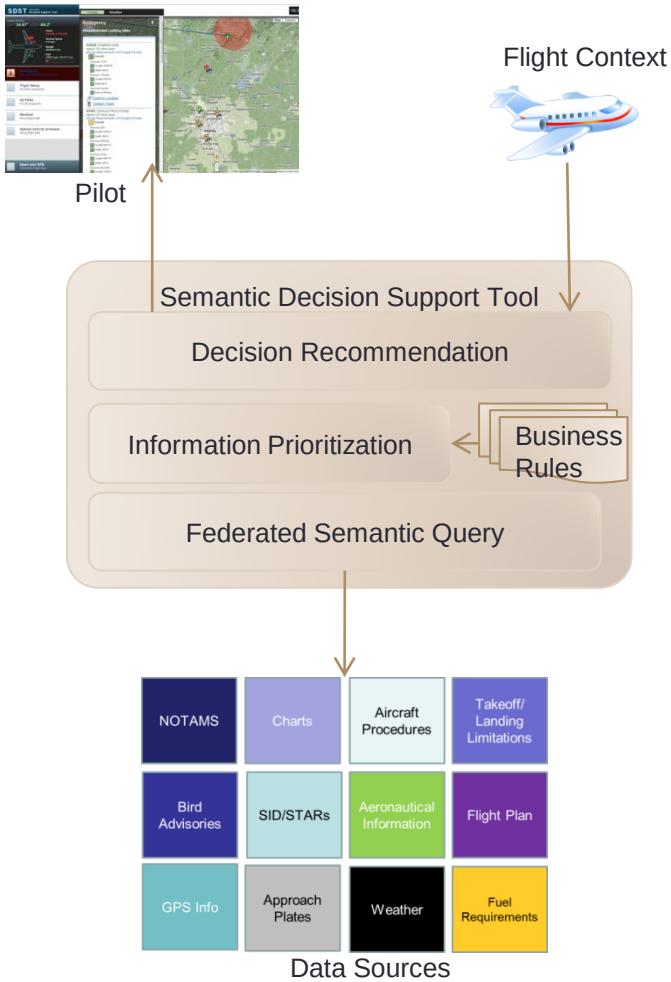


- Knowledge Fusion Engine
  - DTIC Collections
  - Thesaurus
  - Metadata
  - Knowledge Graph (Linked Data)

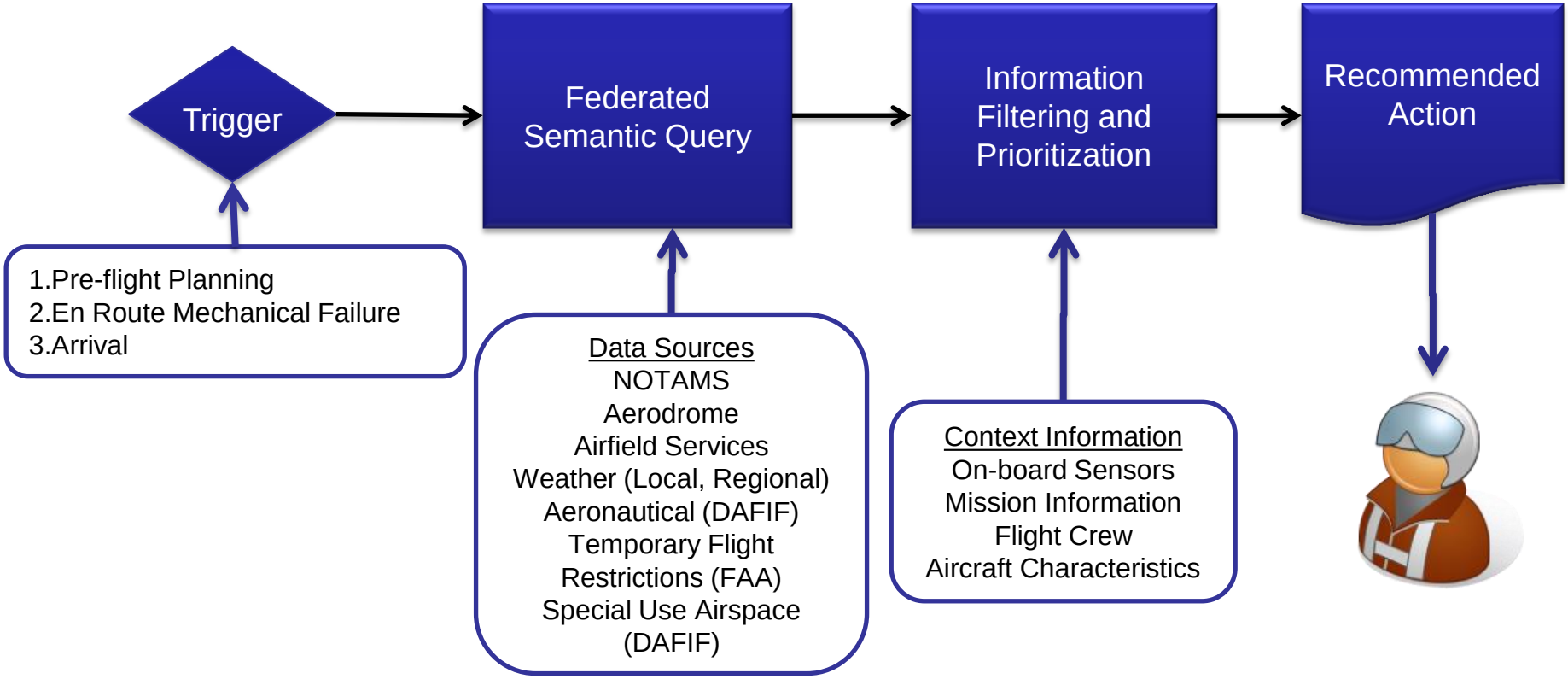
- MetaTagger Web Services
  - Real-time tagging of document submitted to MetaTagger
  - Automated indexing of DTIC collection data stored in Master Data Repository

Semantic Decision Support Tool (SDST)

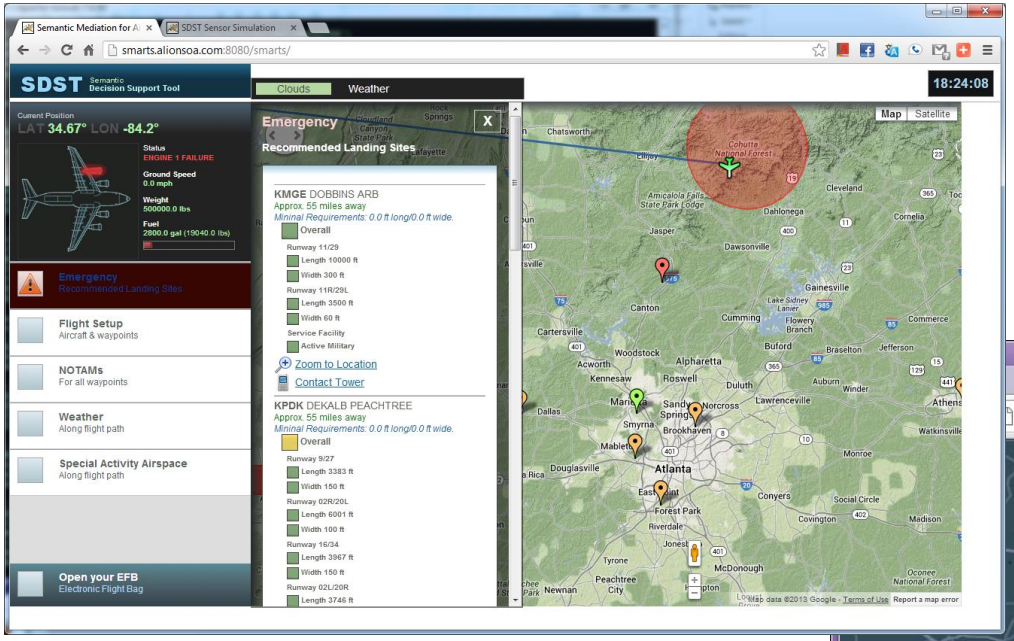
- Sponsored by Air Force NOTAMS office and NextGen Joint Planning and Development Office (JPDO)
  - Currently Deployed in the NextGen Prototyping Network (NPN)
- Addressing Information Overload Challenges Pilots
  - Information to the right people at the right time
  - Improve safety and efficiency
- Context-based Information Prioritization and Decision Support
  - Federated semantic query across multiple data sources
  - Flexible business rules based on SPARQL
  - Context-based decision support

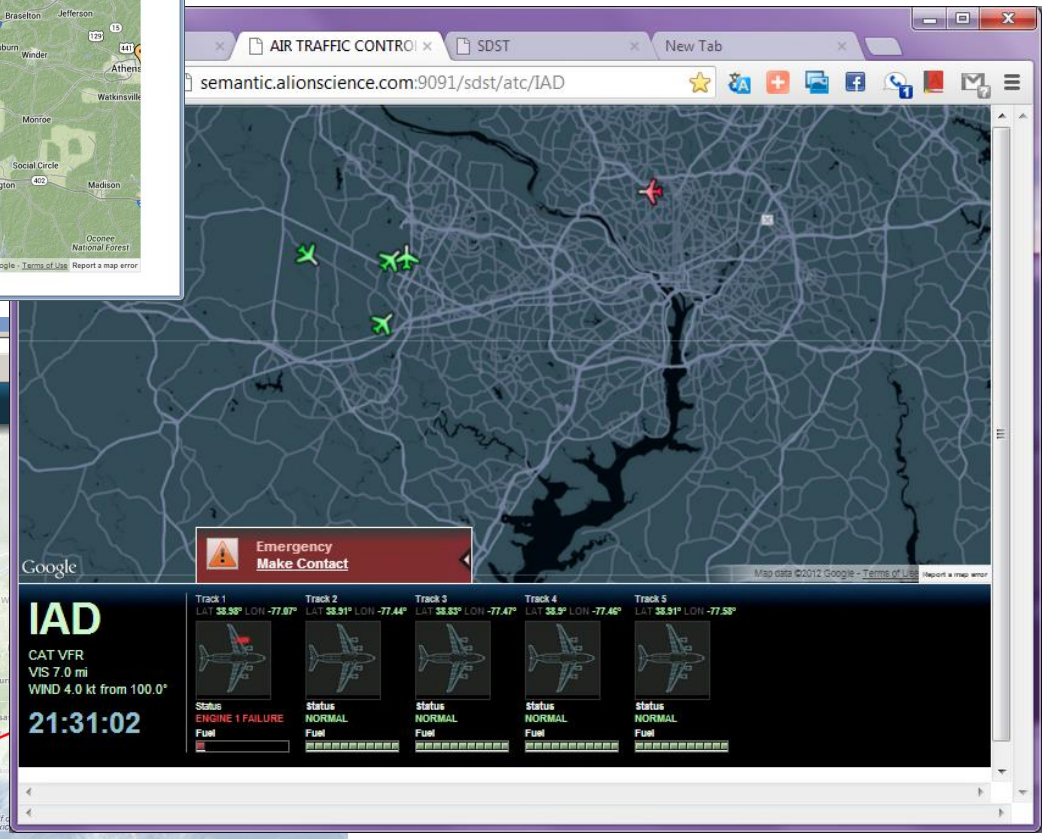


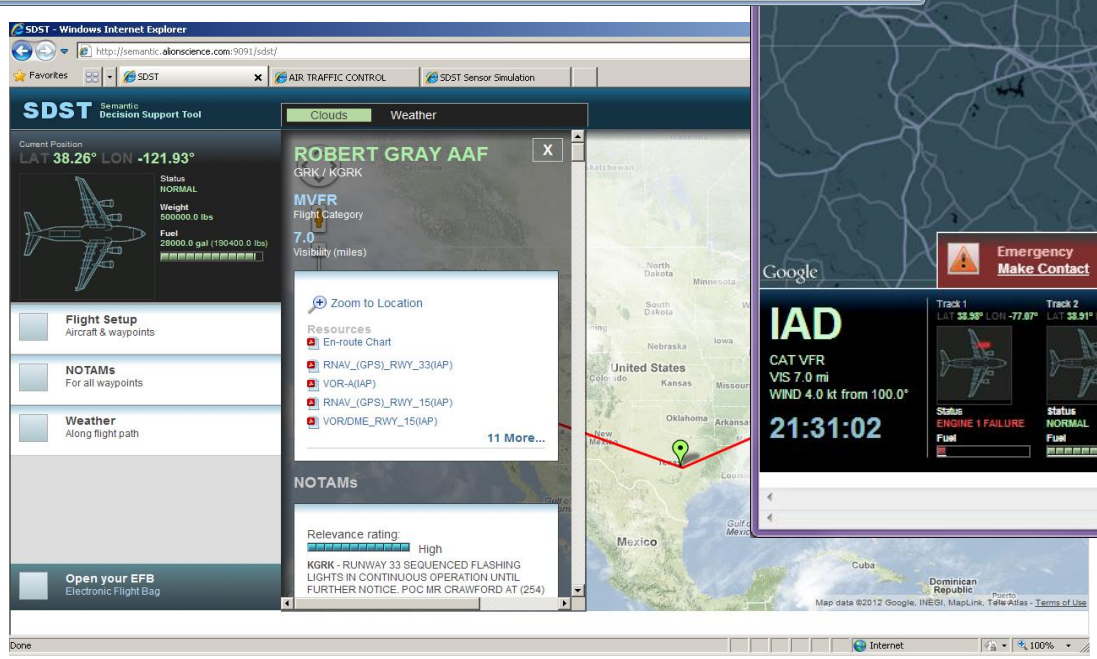
SDST Scenario



SDST Demonstration







SDST Next Steps

- Work Started on Context-based Aeronautical Information Delivery (CAID) Service for Air Traffic Control
  - Focusing on Air Traffic Control
  - Sponsored by FAA and Air Force

Summary

- Leverage Semantic Technologies to Capture Enterprise Knowledge
  - Ontology Development
  - Business Rules
- Establish Scalable Infrastructure for Knowledge Processing
  - Text Analytics
  - Big Data
- Develop Solutions to Address Operational Challenges
  - Mine information across document collections
  - Context-driven information delivery