EGS Data Exploitation (DEX) Platform

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DEX Objective

Develop an architecture and prototype for an EGS Data Exploitation service that aligns to the framework of the Space Warfighting Construct
Architecture and Design Tenets

Managing change is central to DEX architecture and design

- **Responsive**
  
  ... to changes in operational needs

- **Evolvable**
  
  ... readily adapt to new technologies

- **Resilient**
  
  ... always available
DEX Design

Data Sources
- Data Processing & Storage
- Sandbox Analysis Environment
- Operational Analytics Environment

Cloud
- Analytics Tool Set

Products

Enterprise Ground Services
- TT&C
- GRM
- Cyber
- DEX
- Etc.

New Analytics
Status

- Cloud-Native
- Container and VM deployment technologies facilitate integration of new/legacy analytics
- Open Sources
- Resilient
- DevOps
  - Planned work: Batch Management Platform (e.g., Hadoop, …)

- Expandable analysis tool set
  - Generic and Domain-specific
  - Real-Time, Micro-Batch, Batch

- Existing Analytics:
  - Neural Network (SAS), Clustering, Event Filter, EWMA, Boolean, Bayesian
  - Planned Analytics:
    - Image recognition
    - Object Conjunction/Collision
    - Network cyber monitoring

- Native formats and schemaless data model for evolvability
- Real-time data streams (with replay)
- Data preprocessing where/when advantageous

- Complete
  - Update as required
  - Planned Work

EWMA = Exponential Weighted Moving Average
SAS = Satellite as Sensor
Status

- Configure and deploy analytics (and analytics packages)
  - UI driven

- EGS & external access
- Situational awareness
- Alerts & cues
- Data

Collaborative environment (operators, analysts, developers) to study, develop and validate new analytic solutions
  - Real-time/stored/synthetic data
  - Data prep/Visualization tools
  - Analysis and validation tools
  - Workflows

- Status
  - Evaluating technologies and products (e.g., Node-Graph patterns)

✓ Complete  • Update as required  ○ Planned Work
Roadmap

- **Iteration 1**
  - Architecture/Design Foundation
  - Cluster and Container Management
  - Web API
  - Data Storage & Retrieval
  - Demo

- **Iteration 2**
  - Analytics Integration: SAS, Cluster, Event Manager
  - Analytic Threads/Workflows
  - Demo: Multi-Sate EMI detection

- **Iteration 3**
  - Data Streams & Streaming API
  - Operational Analytics Environment
  - Analytics Integration: EMA, Boolean, Bayesian
  - DevOps
  - Demo

- **Iteration 4**
  - Sandbox Analysis Environment
  - Analytics Integration: Conjunction/Collision, Network Cyber
  - Demo
  - Plug Fest
  - EGS 1.x Integration

- **Iteration 5**
  - Big Data Batch Management Platform (ex., HADOOP)
  - Demo
  - Update EGS DEX Service
Take Away

• DEX is well on its way to support the Space Warfighting Construct

  – **Responsive**
    ✓ DEX environments enable users to study, develop and deploy analytics solutions to emergent requirements

  – **Evolvable**
    ✓ Containers and VM technologies, open source software, and schemaless data model facilitate integration of new capabilities

  – **Resilient**
    ✓ Cloud computing