NGA Disparate Data Challenge Solution

Summary of the Problem Space

Today's intelligence analysts are drowning in data, spending an inordinate amount of time and resources to discern relevant data from disparate sources for subsequent analyses. Analysts are ill equipped to sift through the data, determine what is relevant, and prepare detailed situational analyses.

The challenges of extracting information for intelligence applications include:

- Maintaining access to the source data
- Managing data in multiple formats (JSON, WMS, shapefiles, videos), which complicates data storage, retrieval and correlation
- Ability to retrieve from multiple repositories and sources
- Speed at which results are populated and analyzed
- Ability to distill vast amounts of data into essential elements of information (looking for needles in the haystack)
- Ability to determine relevance

To keep pace with evolving national security threats, analysts need an exquisite capability that enhances their ability to efficiently derive meaningful information from disparate data that is in a wide array of formats, schemas, interfaces and locations.

Solution Overview: Multi-source Analyst Ready Information (MARI™)

MDA Information Systems LLC (MDA) is offering a unique solution to enhance analysts' ability to benefit from a multitude of data sources. MDA's solution, **Multi-source Analyst Ready Information** (**MARI™**), is an information service environment that handles open-source data harvesting, aggregation, and correlation of data and products from multiple sources. MARI™ is offered by MDA as a subscription service. The service distills vast amounts of open source information into critical essential elements of information, qualifies it for relevance to the subscriber's mission priorities, and delivers only the relevant open source-derived data as **analyst-ready information with geospatial content**. The information is delivered as alerts, observations and insights, enabling analysts to focus efforts on performing deeper analysis, rather than on data management.

MARI™ Features and Benefits

The MARI™ subscription solution uses an advanced auto-correlation engine and query interface to seamlessly sift and pull together widely disparate data sources in order to create a robust strategic alerting and information service for analysts (subscribers). The output of MARI™ is an "analyst ready"

information package, meaning that MARI™ has aggregated, correlated and qualified the available open source data (the "haystack") and found potential information of interest ("the needles") for analysts. Effectively, MARI™ uses open-sources to discover what analysts might be missing, and identifies mission-relevant issues before they are apparent through traditional methods and approaches. MARI™ is not designed, nor envisioned, to provide final intelligence.

Figure 1 depicts the end-to-end MARI™ process, from initial subscription to repeated delivery of alerts and reports. From MARI™ alerts, subscribers can prioritize which discoveries require review and detailed analysis, by applying their tradecraft.

Figure 1: Operational overview of MARI™ capabilities

The open source feeds monitored by the MARI™ system include:

- Social Media (approximately 20 U.S. and international feeds, from microblogging, location-based, photo-sharing, video-sharing and profile-based services)
- Open Sources (AP, OpenStreetMap, Wikimapia, GDELT)
- Environmental Sensors (GOES, weather, flow gauges)
- Publically Available Satellite Sensors (Landsat, Sentinel-1 SAR, Sentinel-2 EO)
- MDA specific derived products (Image-based change detection (RPM), NaturalVue)

As new sources become available, MARI™ adds them to the searched sources. Cycle times will accelerate to near constant awareness by MARI™ with situational alerting to intelligence analysts.

MARI™ alerts and reports are tailored to specific subscriber requirements, architectures and preferences. Deliverable formats range from dynamic open standard web access to .kml and shapefiles, to stand alone offline reports viewable through a browser. Alerts/reports are focused on specific issues and targeted AOIs (i.e. known facilities or other objects of interest) and are analyst ready. They can also be set up to monitor vast geographic expanses to enhance broad area search and discovery of unknown/unidentified facilities.

The MARI™ architecture is built on a Service Oriented Architecture (SOA) framework and provides a web-based, cloud-enabled solution, with Open Geospatial Consortium (OGC) compliant interfaces and open API development to integrate machine-to-machine services. The architecture also aligns to industry best practices, focusing on reliability, security, integration, performance, scalability, technical innovation and operational efficiency.

MARI™ supports the ODNI directive of Object Based Production (OBP) through the practice of implementation of open standards. MARI™ organizes and provisions information into OGC supported data formats, in which analysts can use analytical tradecraft and Activity Based Intelligence (ABI), to discover and examine data relationships.

MARI™ is a Mature Capability

MARI™ is an operational subscription service. No funds are required to support additional research and development, provision hardware or accredit software.

MARI™ is currently monitoring five regional problem sets across the globe (including military expansion in the South China Sea, and Syrian Cessation of Hostilities) and generating daily alerts through the correlation of social media, open source data, environmental sensors, and publically available satellite sensors. Additional features of MARI™ are listed below:

- MARI™ uses a multitude of tools and techniques that correlate data by space, time, topic and entity (person, place or thing).
- MARI™ performs queries across disparate data types AND **across any language** in the world, allowing analysts the power to capture those key pieces of data that were once very difficult to correlate without ability to speak the native language in their area of responsibility.
- MARI™ queries both static and dynamic data sets from a user interface and a persistent auto-correlation engine that allows analysts the ability to monitor more topics.
- MARI™ handles the big data challenge upstream from the analyst. This allows analysts more time to conduct analysis by eliminating time spent retrieving, cleaning and organizing their data for analysis. With MARI™, analysts have an enhanced capability to discover key pieces of information left of boom.

Please reference the video enclosed in our submittal to view a demonstration of the MARI™ system.

For additional information please contact one of the individuals listed below.

Al League, Chief Innovation Officer
al.league@mdaus.com
820 West Diamond Ave, Suite 300
Gaithersburg, Maryland 20878
240-833-8329

Kelly Amundsen, MARI™ Product Owner
kelly.amundsen@mdaus.com
820 West Diamond Ave, Suite 300
Gaithersburg, Maryland 20878
240-833-8221