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NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

Know the Earth... Show the way... Understand the world

STATEMENT OF WORK Technology Innovation Outreach NGA/Analysis Technology Executive (NGA/A TX) June, 19 2014

1. PURPOSE

- I. Summary: NGA/Analysis seeks to employ services to hold Technology Innovation Outreach Event in order to connect innovators with NGA to address our hard problems.
- II. Background: Taking advantage of technology innovation is imperative to maintain NGA's relevance within the Intelligence Community (IC) both as indispensable geospatial intelligence (GEOINT) provider and an enabler of multi-INT integration for the IC. Analysts are and will continue to be increasingly dependent on advances in new technology and exploitation tools to aid them in their analysis.

The Analysis Directorate is working towards a GEOINT Exploitation and Analysis future state vision that allows analysts to spend less time exploiting GEOINT primary sources and more time analyzing and understanding the activities, relationships, and patterns discovered from these sources. This paradigm shift must also include more efficient and dynamic ways of publishing data, knowledge, and intelligence gleaned from the exploitation and analysis of these sources. Technology must enable these transformations.

Specifically, the one-day Technology Innovation Event will focus on four challenge areas:

1. Automated Data Integration and Enhanced Visualization for GEOINT
2. Geospatial Business Analytics
3. Spatial Big Data Environment
4. Modeling Complex Network Interdependencies

In order to take advantage of evolving technology, the Analysis Directorate must first be aware of the current state of the art and also be in lock-step with evolving technological developments. Technology Innovation Events serve as a mechanism to do just that. They use a transparent process to bring emerging technologies and disruptive innovations to the attention of government leaders, program managers, and technologists.

III. Details – Analysis Hard Problems

1. Automated Data Integration and Enhanced Visualization for GEOINT

Analysts continue to rely on manual methods for visualizing and integrating disparate datasets (with unique sources, sensors, storage and PED pipelines) in a common (i.e., layered) environment. In a future where the sources and volumes of location-based data will grow exponentially, traditional GIS layers will be insufficient for visualizing and interpreting voluminous spatial data. Automation of the integration/fusion process and new visualization methods that are intuitive and user-

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friendly will be necessary to merge traditional and non-traditional spatial data, in multiple data formats, to elicit understanding rather than confusion. Please address the following questions:

- What are the optimal points in data pipelines for traditional GEOINT data and non-traditional location-based data to be integrated, prior to getting to the analyst’s exploitation environment?
- What might a hybrid visualization environment, which combines the traditional cartographic visualization capabilities of geo-space with various dimensions of data-space, look like?
- What are examples of “GEOINT products” that can be developed from your vision of a hybrid visualization environment?
- How might a hybrid visualization environment serve as a research tool and facilitate data exploration across multiple datasets simultaneously, such as drilling through data layers to develop enhanced understanding of spatial and temporal relationships?

2. Spatial Business Analytics

Expanding the concept of business analytics to the spatial domain will enhance NGA’s ability to understand our intelligence production process and metrics. In addition to the traditional user metrics of business analytics, NGA would like to understand the spatial context of the analyst’s exploitation environment: where in the world is the analyst viewing and for how long; which coincident data is being leveraged and for how long; what key intelligence questions are they seeking to answer; what assessments and products are derived relative to the amount of time spent interpreting sources; etc. Please address the following questions:

- How feasible is the ability to record and store the spatial extents and content leveraged by analysts, along with other pertinent metadata, in traditional geospatial software platforms (GIS and ELTs)?
- What additional capabilities are feasible with the transition to a web-based exploitation/analytic environment?
- How might spatial user metrics be leveraged by recommendation engines, akin to internet advertising or streaming media suggestion algorithms, to suggest new data/sources, collaboration partners, or alternative workflows to both analysts and mission managers?
- How might automated data value and accuracy assessments be derived from analyst usage metrics, and how might this be shown/summarized/visualized to analysts, mission managers, and production teams?

3. Spatial Big Data Environment

Current Hadoop-based implementations of big data analytics workflows generally lack a user interface that translates to intelligence domain experts. Instead, data scientists with coding proficiency compile map reduce jobs and provide the outputs/findings to

the domain experts. Additionally, there is limited ability to leverage the analytic algorithms of geospatial and imagery analysis platforms. Please address the following questions:

- What are the commercial and open source trajectories for building/integrating a geospatial user interface that can apply traditional raster and vector processing algorithms in a distributed, NoSQL, Hadoop-based parallel processing environment?
- What might this user interface look like, what spatial/imagery operations are optimized for this environment, and what operations are optimized for traditional SQL storage and serial processing?

4. Modeling Complex Network Interdependencies

The world is composed of a number of complex networks that are highly interdependent. Stresses on water, food, energy, transportation, economic, and societal networks all create ripple effects among the others which cascade and reverberate across the globe. Modeling the complexities of these networks individually has only recently become possible with increasing global data and compute resources; modeling the interdependencies and effects of each of these networks on the others, to include the impacts of and on the policy-making environment, remains a vast challenge. Please address the following questions:

- With the data and compute resources we have available today, is it possible to build an integrated ‘model of the world’ that could be leveraged to anticipate critical world events?
- What current models could serve as a base/template that could be extrapolated into such a global model?
- How might GEOINT analysts interact with, test hypotheses against, and assess the validity of the individual and integrated network models?

2. REQUIREMENTS

This requirement is to engage innovators – both in the private sector and within the Federal Government - in order to bring emerging technologies and disruptive innovations to the attention of NGA leaders, program managers, and technologists. For this we require access to multiple networks of innovators and innovation beyond the typical government scope. We require:

- Access to discovery software tool – specifically a discovery process software engine to gather, filter, vet, and select innovation targeted towards our needs
- Online Portal – specifically an SSL secured online portal to host an event, coordinate participants and retain briefings, documents, white papers, and any other attachments in perpetuity for Government use and easy access
- Access to broad company database of innovative companies nation-wide
- Access to broad government-wide database of innovative elements within the federal government

- Technical advisory team to support the vetting of innovation process
- Event hosting services to include all aspects of setting up and executing an innovation event. A complete turn-key solution to event planning and hosting.
- Mechanism to provide in person connection to dozens of innovative company senior executives selected by the Government to fit their technology needs
- Event formatted to include fast pitches by each company CEO
- Event formatted to include breakout sessions with all the companies for deeper technology dives
- Event follow-up to include hot wash session

3. DELIVERABLES

- Deliverable: Fully Coordinated Technology Innovation Event
- 15-30 technology companies brief NGA audience
- Each CEO given short time to pitch (~7 minutes)
- Break-out sessions in the afternoon for NGA audience to engage in technical discussions with companies that interest them
- Deliverable: Video of Event
- Deliverable: Presentations from each company
- Deliverable: White Papers from each company

4. GOVERNMENT FURNISHED EQUIPMENT & INFORMATION (GFE)

- Government furnishing use of NCE Conference Center.
- Government furnishing detailed list of hard challenges (see section 1 sub-section 3) for vendor to focus on

5. TRAVEL

No travel

6. SECURITY REQUIREMENTS

All briefings / discussion held at Unclassified level

7. PERIOD OF PERFORMANCE

The period of performance will be for one year (1 August 2014 through 30 July 2015).