1. General Description.

Over the last decade, Activity Based Intelligence (ABI) has emerged as a powerful method for dealing with some of the intelligence community’s tougher analytic challenges. A need to mature the approach used to conduct ABI and the desire to better coordinate activities within the emerging ABI community prompted the call for this workshop.

Candidates for the application of ABI processes are those analytical questions regarding behaviors and transactions in which the data have both geospatial and temporal components, even when the underlying relationships are not known; i.e., identifying “unknown unknowns.” For example, tracking vehicular and pedestrian traffic over time might lead analysts to uncover suspicious patterns that help shape future collection or operations (see Section 8 below for an example highlighting some of the intricacies of ABI). The workshop focuses on ABI from an Operations Research, or Analytic Methodology, perspective with methods for data mining, natural language processing, network analysis, pattern recognition, and similar fields all being important topics.

The workshop will address five questions:

1. What are the lexicon and best practices currently in place in the ABI community and how can they be enhanced?
2. How can the ABI process be improved from an analytical perspective (ORSA)?
3. What operations research tools are being used to support ABI now and what are the best near term potential improvements to this toolset?
4. How can ABI methods be extended to other applications?
5. How can ABI practitioners better describe/propose products (e.g., software-based analysis tool, common ABI architecture, etc.), and solutions providers better provide those products to the practitioners?

At the conclusion of the workshop, individual participants will have a better appreciation of the character of ABI and of the methods and best practices that support its use. Analysts will have acquired new methods, gained new insights into previously known methods, and made new professional
contacts. This professional growth will better equip them to serve their organizations through insightful analysis. Furthermore, the ABI analytic community and the broader community of predictive analytics will benefit from the insights gained during the workshop and synthesis conducted both during and after the workshop. These insights are expected to include improved processes and tradecraft, new applications of existing methods, and better understanding of requirements for materiel solutions.¹

The workshop will be held over three days, Jan 26-28, 2016, at the MITRE facility in McLean VA. An optional ABI training course will be provided on Jan 25 (see Section 4 below). Some sessions will be at the TS/SCI level. The entire meeting will be limited to US citizens with a Secret or higher clearance. While the greater ABI challenge is larger than a single workshop can solve, taking the first important steps is well within the scope of the three day event.

2. Motivation and Purpose.

At its core, ABI is a multi-INT approach that uses the analysis of activity and transactional data to uncover unknowns, develop intelligence insights and drive collection future collection efforts.² ABI answers five seemingly simple, but often complex, questions:

- Who is the adversary, and who is the friend or neutral party?
- What are they doing?
- When and where are they taking action?
- Why are they taking that action?
- How are they taking that action?

A sophisticated and novel approach is needed to develop faster and better-informed forecasts in a multipolar world, especially when many threats exhibit weak and non-persistent signatures. Operations research tools and methods offer tremendous promise to help. Using data from multiple sources, ABI analysts work to graph out relevant entities and their networks. The analysis goes beyond traditional pattern analysis, and seeks to discover unknown relationships and networks – those elusive “unknown unknowns” we have heard so much about.

Intelligence professionals create knowledge and specialized collection strategies using:

- Problem-focused dynamic workflows
- Access to diverse data
- Rapid data discovery techniques

¹ Under the DoD’s DOTMLPF-P framework, (Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy), the Materiel Solutions are the “things” that government acquires to help get the job done. Most iconic materiel solutions are major end items such as tanks or aircraft, but they also include software, which is the more likely case here.

² This section is adapted from the NGA ABI flier, 13-232.
• Automated upstream processing of targeted, untargeted, and incidentally collected data (allowing the data to surprise the analyst)
• State-of-the-art information collection systems and data processing and analysis technologies
• Specialized analytics

The potential applications of ABI are wide-ranging, but almost always involve difficult conditions (e.g., disparate and sometimes sparse data sets), complex situations (e.g., adversaries that hide among the populace), or both. “In environments where there is no visual difference between friend and enemy, it is by their actions that enemies are visible. Motion is the first indication of activity. Temporal and visual patterns of change provide the context for intent.” Further, “one can extend that concept [ABI] to any adversary’s attempt to conceal any person, place, thing, or activity that it does not want to be found.”

ABI analysts apply new tradecraft (techniques, methods, best practices, etc.) that provides context to apparently ordinary or even hidden activities to generate estimates of “intent by actors to predict consequences from observations.” These new methodologies and tradecraft are often enabled by data and technological advances, such as multi-INT data sources, the explosion of open source (and “big”) data, the availability of cloud computing, and the development of advanced search algorithms.

The ultimate purpose of this workshop then is to better equip analysts to conduct intelligence analysis; and more specifically, to conduct intelligence analysis from a more quantitative and scientific perspective. In accomplishing that purpose, we also aim to achieve a number of objectives:

1) Encourage collaboration and better coordinate the ABI community.
2) Expand the awareness of analytic techniques and best practices used in ABI.
3) Demonstrate the value of quantitative methods to non-technical leadership.
4) Develop suggestions for improving ABI processes and products.

3. Organization.

This special meeting is based on the MORS Workshop framework. It is organized with the goal of maximizing interaction across disciplines, organizations, and agencies, bringing in nontraditional customers and interested agencies, and presenting results to senior leaders from interested organizations.

The workshop chair will establish an i-Space workspace on JWICS before the conference to host up to TS/SCI level collaboration relevant to the conference and to help bring in nontraditional (that is, non ORSA) participation. The workshop will be conducted at the Secret and TS/SCI levels. Following the workshop, our intent is to produce workshop products at both the unclassified and classified levels.

3 This section, including the five questions, is adapted from former NGA Director Letitia Long’s paper, “Activity Based Intelligence - Understanding the Unknown,” in which she quotes NGIS Chief Technologist Edwin Tse.
The opening and closing sessions will be Secret. The closing session will primarily consist of working group chair presentations on the findings of their working groups. A written report will be posted on the i-Space site and made available via SIPRNET and NIPRNET as appropriate.

The opening session will feature the following Keynote Speakers to provide the scope of the ABI problem and help set the stage for our discussions:

- **Mr. Mike Foster**, ABI Portfolio Representative at NGA
- **Dr. Gary Weir**, NGA Historian
- **Mr. Elmo “Mo” Wright**, Analytic Modernization Lead at DIA
- **Mr. John Cole**, ABI Study Lead for ODNI

The opening session on Tuesday morning will also include a Practitioner’s Panel featuring a small group of ABI analysts, each with a decade or more of experience using ABI in counter-terrorism applications in the Middle East or providing systems to those users.

During the closing session on Thursday afternoon, we will be honored to have an additional Keynote Speaker:

- **Mr. Greg Treverton**, NIC Chair, and author of the ABI Primer

In addition to Mr. Treverton’s talk during the closing session, the Working Group Chairs and Synthesis Team lead will brief out the results of their sessions. These outbriefs constitute the major findings of the workshop and form the basis for the workshop report.

We will have two break-out working groups to provide participants with options to learn and contribute:

- **WG-1 ABI Philosophy & Process** – This working group will identify the driving principles and concepts associated with ABI. What are the cornerstone architectural elements? How do we measure success, effectiveness & performance of ABI operations? How can we promote early adoption of new technologies? (Note: Includes material previously described under WG-2.) Held at the TS/SCI level. Chair: Ms. Sara Kerner, Lockheed Martin; Co-Chairs: Mr. Steve Ryan, Northrop Grumman; and Mr. Jim Happel, JHU/APL.

- **WG-3 ABI Tools and Applications** - This working group will review ABI tools and methods currently in use, and then identify and evaluate potential new ways these tools could be applied, both inside and outside of the IC. Specific presentations and examinations at the tactical, operational, and strategic levels will guide the discussion. (Note: Includes material previously described under WG-4.) Held at the Secret level. Chair: Mr. John Cole, NGA; Co-Chairs: Mr. Mike McVicar, USSTRATCOM J5; and Mr. John Van Auken, NGA.

In addition to the two working groups, we will have a Synthesis Team to examine issues holistically. They will do this by participating in each working group as well as meeting separately. This team comprises individuals with substantial experience in one or more of the workshop focus areas and will
play a significant role in providing a response back to our government proponents. Synthesis Chair: Dr. Dan Maxwell, KadDSCI.

All working groups have the mandate to look at issues across the general thematic questions cited above, and in particular to help draft a lexicon.

Workshop participants will select a working group when they register. We will attempt to size the working groups to best encourage active participation – approximately 15-25 participants per group. If working groups grow too small or too large, the workshop chair may aggregate or divide participants into appropriately-sized groups.

4. Tutorial and Further Reading.

We offer an exceptional tutorial on Monday, January 25th, prior to the formal opening of the workshop on Tuesday morning. This is a full-day hands-on course, “Essentials of Activity-Based Intelligence (ABI)” provided by The Learning Tree. The Learning Tree normally offers this course at a rate ranging from $1000 to $1500, but workshop registrants may attend the class at no additional charge, subject to available seating. We expect 25-30 seats available. This excellent training opportunity will be held at the unclassified level. **Note:** As of 20 Jan, the course is full. Please contact the MORS office to see if there are any drops that might create an available seat.

A member of the meeting leadership, Mr. Steve Ryan, has recently co-authored a textbook, “Activity-Based Intelligence: Principles and Applications.” More information about the book is available from the publisher, Artech House, at the address below.

- Mr. Ryan has provided a copy of the book to us to offer as a door prize during the opening session. One lucky name will be drawn from those registered as of January 26th.
- Artech House is providing a 25% discount on the $189 book to workshop registrants. The special cost of $149.75 includes free standard shipping. A promo code will be provided at the on-site registration.
- Both Mr. Ryan and his co-author, Mr. Patrick Biltgen, will be at the workshop to discuss the principles and applications they included in the book.

5. Call for Presentations.

In general, we seek presentations that expand the awareness of analytic methods and tools that have the potential to advance the practice of quantitative analysis within the Intelligence Community, as well as those that address the broader topics of the analytic process and the challenges of supporting practitioners with tools and services. As our focus is on quantitative methods, we are looking primarily
for creative approaches using mathematical, statistical or computational techniques. However, non-quantitative methods will be considered, especially for those topics that have stubbornly resisted quantitative means. Topics and methods presented do not have to have an extended pedigree. Instead, we ask for techniques and tools that show innovative approaches to solving difficult problems, with a preference to those techniques and tools within the context of Activity Based Intelligence.

Individual Working Group Chairs will provide editorial control over the presentations and discussions within the working groups. Their aim is to provide a sequence of presentations and focused discussions that achieve the workshop objectives.

Note: while the schedules for the workshop and working groups are now being finalized, we have some flexibility, especially to provide ad hoc speaking opportunities during the working group discussions.

6. Definitions.

a. Activity Based Intelligence. One definition was presented in the text box on Page 1. A second definition for ABI: a discipline of intelligence where the analysis and subsequent collection is focused on the activities and transactions associated with an entity, a population, or an area of interest. USD(I) Definition, 2010.

The “Pillars of ABI” often accompany the definition:

Pillar 1: Georeference to Discover

All reporting should be captured and referenced geospatially, temporally, and logically, and then made available in a single analytic application; this eliminates the need for multiple applications in the discovery phase; “plot it now, find it later.”

Pillar 2: Integration before Exploitation

Collection is decoupled from exploitation; tasking focus is not exploitation, not collection; ABI inherently relies on large-volume, incidentally collected data; raw data should be integrated spatially as close to the point of collection as possible;

Pillar 3: Data Neutrality

All data sources are equally viable as long as they are adequately geotagged; each data source contains inherent strengths and weaknesses that must be understood by the analyst; the particular sensor or INT that collected the data is irrelevant.

Pillar 4: Sequence Neutrality

Forensic data can be as valuable or more valuable than data collected near-real time; data is collected and georeferenced before its relevance is known; the collection net is very broad; past events (even dating back years) can give context and provide new transactions; data collected for one purpose may inadvertently lead to answer other types of questions; never throw anything away.
b. Other definitions. These definitions are provided to establish a baseline for discussion. Where available, we cite the origin of the definition. As one of the workshop objectives is to improve the ABI lexicon, we encourage all participants to discuss and challenge these, and other, definitions.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Anticipatory</td>
<td>the product of intelligence collection and analysis, focused on trends, events, and changing conditions, to identify and characterize potential or imminent discontinuities, significant events, substantial opportunities, or threats to US national interests. Foresees, forecasts, and warns of emerging conditions, trends, threats, and opportunities that may require a shift in national security posture, priorities of emphasis, in an increasingly complex strategic environment.</td>
</tr>
<tr>
<td>Entity</td>
<td>a person or thing, e.g., a terrorist cell or WMD device; an entity has a unique identifier, although it may not yet be resolved; an entity may be a group of smaller entities, e.g., terrorists within a cell.</td>
</tr>
<tr>
<td>Proxy Entity</td>
<td>a surrogate entity that serves as a placeholder because of the inherent difficulty in tracking the actual entities of interest, e.g., a telephone number as a proxy for an individual.</td>
</tr>
<tr>
<td>Event</td>
<td>a recognizable change conducted by a specific actor that has meaning within a relevant context; events have specific spatial and temporal information, e.g., an individual is present at a particular compound during a particular month; events are used to characterize locations.</td>
</tr>
<tr>
<td>Transaction</td>
<td>a recognizable change conducted between two or more specific actors indicating an exchange of information or materiel; e.g., two phones in communication with each other at a given time, a vehicle driving from point A to point B, transfer of funds from one account to another; transactions are used to associate locations or entities with one another.</td>
</tr>
<tr>
<td>Discreteness</td>
<td>the degree of a location’s public access; locations may be categorized as discrete (private), semi-discrete (semi-private), or non-discrete (public); not to be confused with the mathematical definition of discrete vs. continuous; the spatial precision and temporal context are important, as a location that is non-discrete may become discrete at a later time (e.g., a market in the middle of the night) or with more spatial resolution (e.g., a night club might not be discrete, but a back room in that club might be).</td>
</tr>
<tr>
<td>Durability</td>
<td>the degree to which certain facts or signatures are limited by time, e.g., because the signature degrades or the proxy changes; durability also refers to situations in which the level of discreteness changes or the context changes, such as a market opening to the public or a location changing its function.</td>
</tr>
</tbody>
</table>
7. Organizing Committee.

Chair: Dr. Stephen R. Riese, MORS Past President, Johns Hopkins University Applied Physics Laboratory, stephen.riese@jhuapl.edu

Bulldog: Mr. James N. Bexfield, MORS Fellow and Past President, jim_bexfield@comcast.net.

Bulldog: Ms. Renee Carlucci, U.S. Army Center for Army Analysis (CAA), renee.g.carlucci.civ@mail.mil.

Opening and Closing Session Coordinator: Mr. Mike Etz, Lockheed Martin, michael.r.etz@lmco.com.

Tutorial Coordinator: LTC/Dr. Sam Huddleston, US Army CAA, samuel.huddleston@us.army.mil.

WG-1 Chair: Ms. Sara Kerner, Lockheed Martin, sara.kerner@lmco.com; and Co-Chairs: Mr. Steve Ryan, Northrop Grumman, steve.ryan@ngc.com; and Mr. Jim Happel, JHU/APL, Jim.Happel@jhuapl.edu.

WG-3 Chair: Mr. John Cole, NGA, John.C.Cole@nga.mil. Co-chairs: Mr. Mike McVicar, USSTRATCOM, mcvicarm@stratcom.mil; and Mr. John Van Auken, NGA, John.B.VanAuken@nga.mil.

Synthesis Chair: Dr. Dan Maxwell, KadDSCI, dmaxwell@kadsci.com.

Scribe: Mr. Scott Scherer, Lockheed Martin, scott.d.scherer@lmco.com.

8. Administrative.

- Name: Operations Research Methods for Activity Based Intelligence (ABI)
- Location: MITRE, McLean VA (in the Washington DC Metro Area)
- Hotels: Our hotel block at the Hilton McLean Tysons Corner is now full. Please contact Shelbie Jenkins at 703-933-9072, or shelbie.jenkins@mors.org at the MORS office for assistance.
- Transportation: The McLean Metro station is right across Rt. 123 (Dolly Madison Blvd.) from MITRE. A parking garage is available on-site at MITRE at no cost to participants.
• Attendance: Anticipate 40-60 participants
• Registration: For more information and to register, visit the MORS website at www.mors.org. Alternately, you may contact the MORS office by phone at 703-933-9070, or by e-mail at morsoffice@mors.org.
• Classification: US citizens possessing a Secret or higher clearance only. One break-out working group will be conducted at the TS//SCI level. The balance of the workshop will be held at the Secret level.
**Fee Structure:**

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<tr>
<th></th>
<th>MORS Member</th>
<th>Non-MORS Member</th>
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<tr>
<td>US Government Sponsors*</td>
<td>$500</td>
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<td>US Federal Government</td>
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<tr>
<td>All Others</td>
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*Registrants assigned to one of the MORS Government Sponsor organizations: ODS R&E, USA G3/CAA, USN N81, USAF A9, USMC MCCDC.*
9. ABI Example Problem (Under Development)

This incomplete example provides an unclassified basis for discussion both before and during the workshop. Leaders and participants are free to add to this example scenario as necessary.

**Background.** For the past 6 months, Forward Operating Base (FOB) intelligence analysts have gathered INTEL on a particular gas station suspected to being a front for terrorist activities. Analysts have focused on tracking people and vehicle traffic patterns. They note that a white cargo van regularly visits the gas station. On one particular day the white cargo van pulls up and eight individuals jump out and go into the gas station’s convenience store. However, on this day the van’s operating pattern changed. A differently dressed and smaller group (6 people total) emerges from the gas station, get into the van, and drive down the road...

**Analytic Challenge.** What do the analysts do now? What questions should they ask?

1. Should the analysts conduct an “After-the-fact” data analysis report?  
   a. Has this behavior been observed before?  
   b. Where was the van prior to arriving at the gas station?  
   c. Any potential ID information on any of the individuals leaving the van?  
   d. How do we make sense of the past data once we have them?

2. What does this change in behavior mean?  
   a. Where is the van going now?  
   b. What is it doing?  
   c. What assets do I need to obtain more data?  
   d. Do we have currently have ISR assets to track the van?

3. What preparations do I need to make for potential future events?  
   a. How do I conduct “What-If” hypothesis analysis?  
   b. What models do I have to help predict future event?  
   c. What do I tell the ‘General’ that he or she needs to do?