Office of Naval Research BAA 08-018

Persistent Networked Intelligence, Surveillance and Reconnaissance

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Agenda

- Welcome

- Today's Meeting 09:00-11:00

  – Process Timeline

  – Part A-B overview: Dr Michael Pollock   (20 Min.)

  – Part C overview: Dr Jim Waterman   (10 Min.)

  – Break (UNCLASSIFIED from this point further   (5 min.)

  – Questions already received   (20 Min.)

  – Q&A   (60 Min.)

  – Wrap Up   (10 Min.)

- Official responses will be posted to ONR BAA web site.

- There will be no individual meetings between potential offerors and ONR personnel.

- Desire 4 page white papers addressing broad range of technology for persistent sensing and surveillance.

| EVENT	DATE (MM/DD/YEAR)	TIME (EASTERN DAYLIGHT TIME)
✓Pre-Proposal Conference/Industry Day	07/24/2008	9:00 AM – 3:00 PM
☐White Papers Due Date	08/14/2008	3:00 PM
☐Notification of Initial Navy Evaluations of White Papers	08/27/2008*	-
☐Oral Presentation of White Papers	09/10/2008	8:30-4:00 PM
☐Notification of Navy Evaluations of Oral Presentations	9/15/2008*	-
☐Full Proposal Due Date	10/30/2008	3:00 PM
☐Notification of Selection for Award	11/10/2008*	-
☐Issued Awards	02/1/2009*	-
☐Kickoff Meeting	TBD	-

*These dates are best current estimates.

Persistent Surveillance
# Technologies of Interest

- Real-time and non-real time automated sensing and understanding of the battle space using multiple distributed unmanned platforms.

- Broad Area Awareness across Domains:
  - At-sea battleforce area awareness.
  - Littoral region of interest.
  - Inland convoy/area force protection.

- Autonomously
  - Formulate platform and surveillance tasking.
  - Focus down to areas of interest.
  - Recognize and identify threats.
  - Persistently hold threats at risk.

- Integration of disparate capabilities including autonomous:
  - Advanced surveillance.
  - Tracking.
  - Tagging.
  - Identification.
  - Platform control.
  - Sensor control.
  - Communications.
  - Understanding and display of information.

- Supportable, extensible, open architecture framework.

Notional Maritime Missions

- Detect, track, and image surface and air contacts
- Optimized control of multiple autonomous UAVs
- Continuous 24/7 operations
- Ad-hoc networking with backup
- Minimized personnel requirements

40 nm

80 nm

CV Operating Area
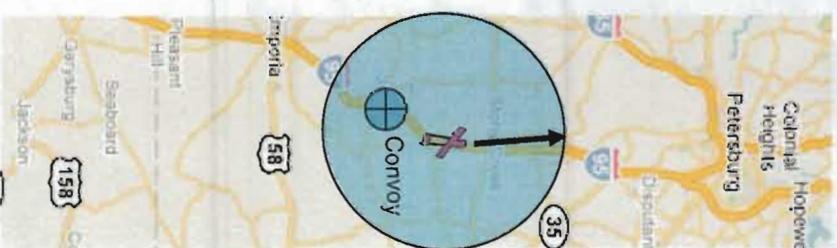
Threat Axis
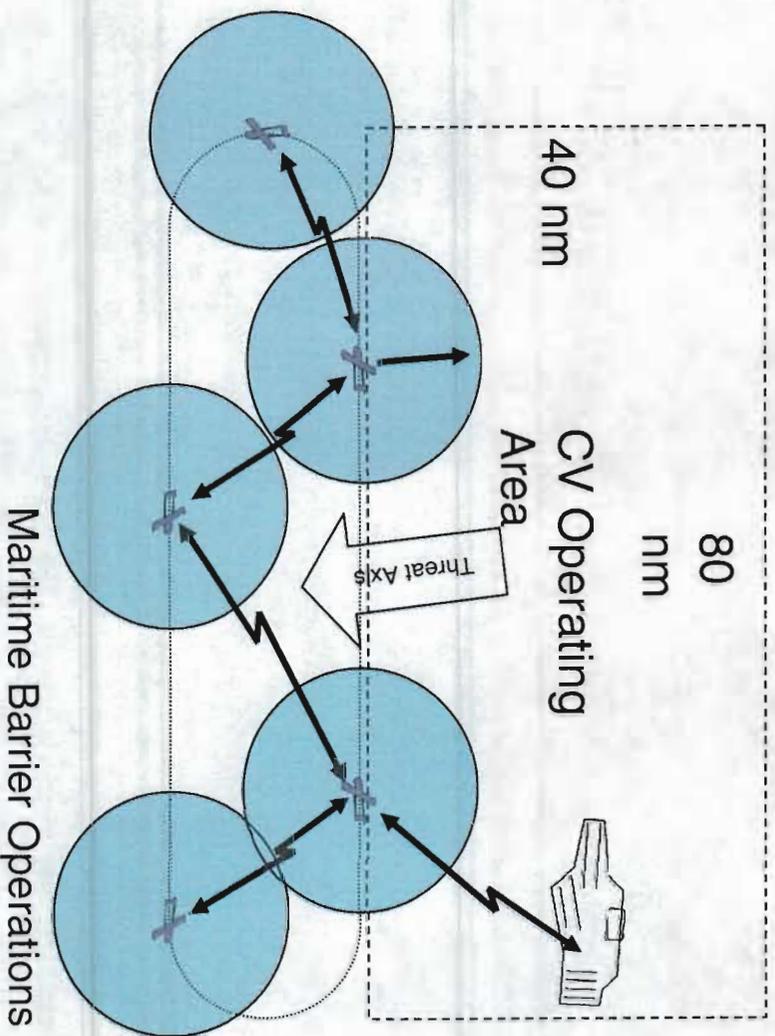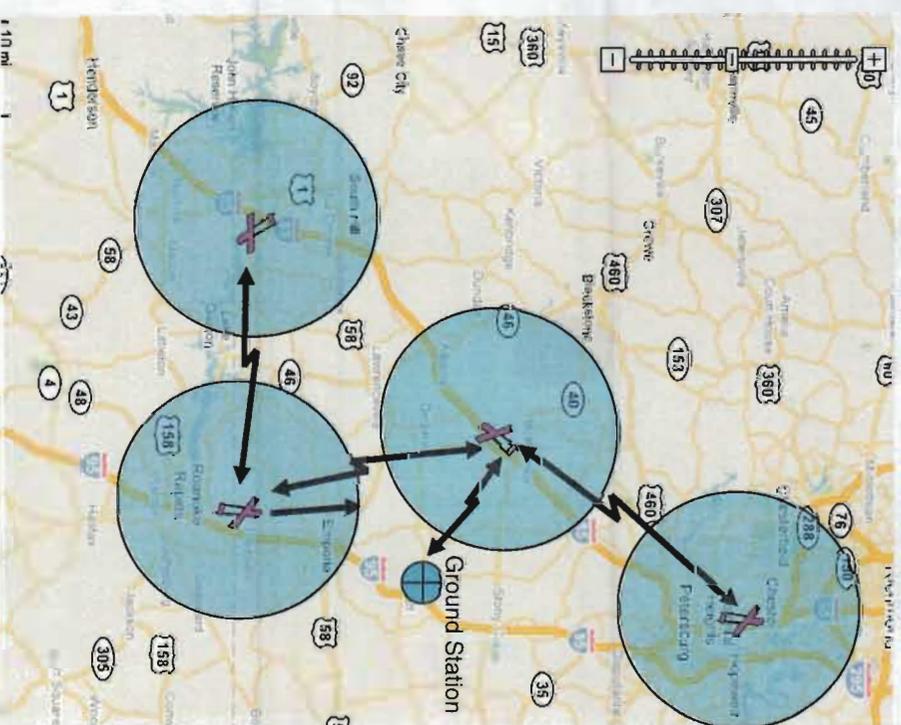
Maritime Barrier Operations

Rover
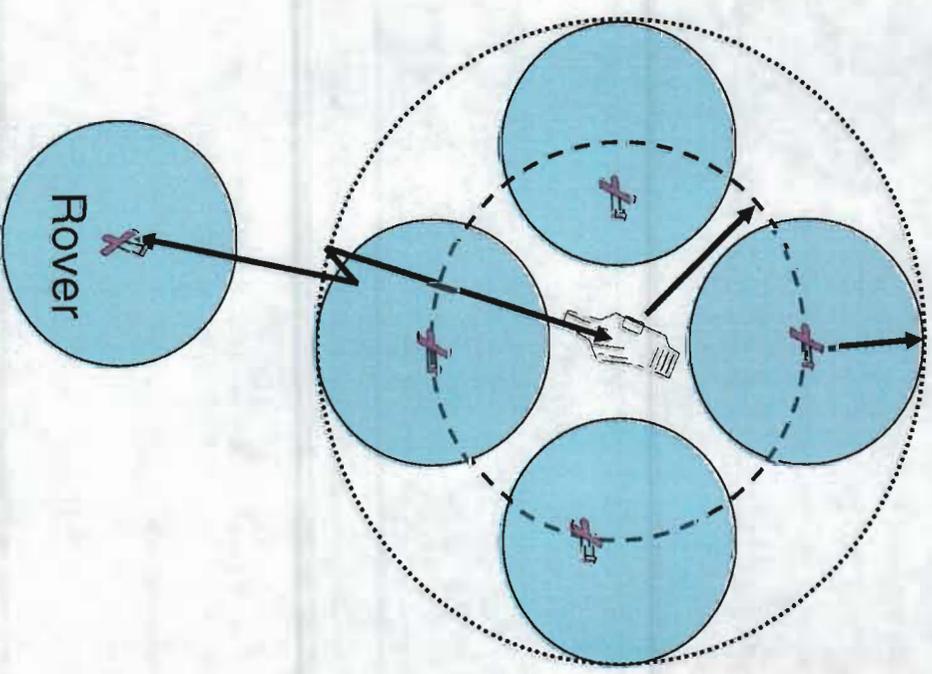
CV Surveillance

Notional Overland Missions

- Surveillance, detection, track, and video of ground and air targets
- Optimized control of multiple autonomous UAVs
- Continuous 24/7 operations
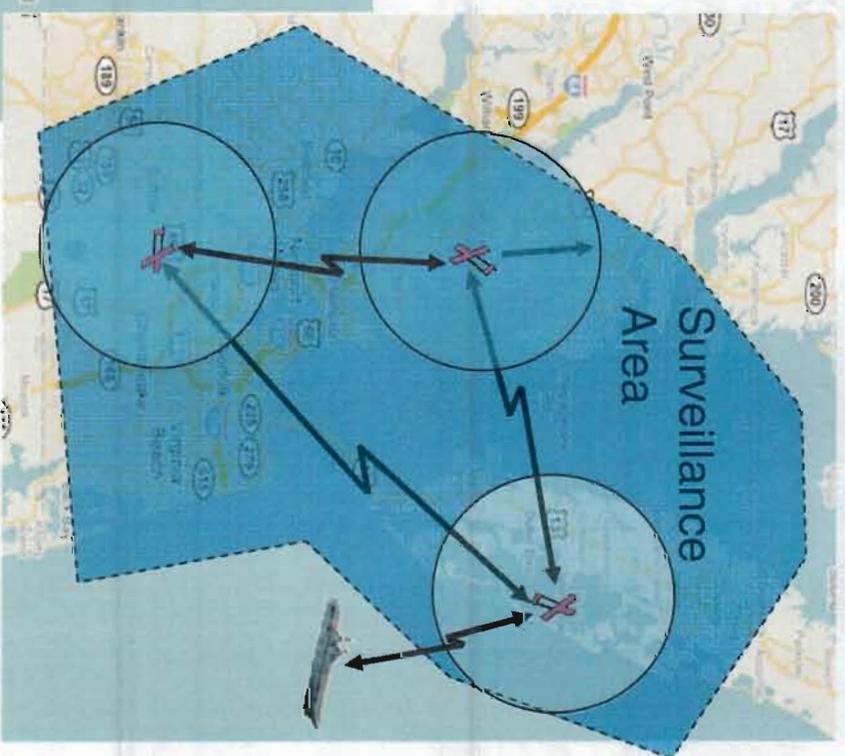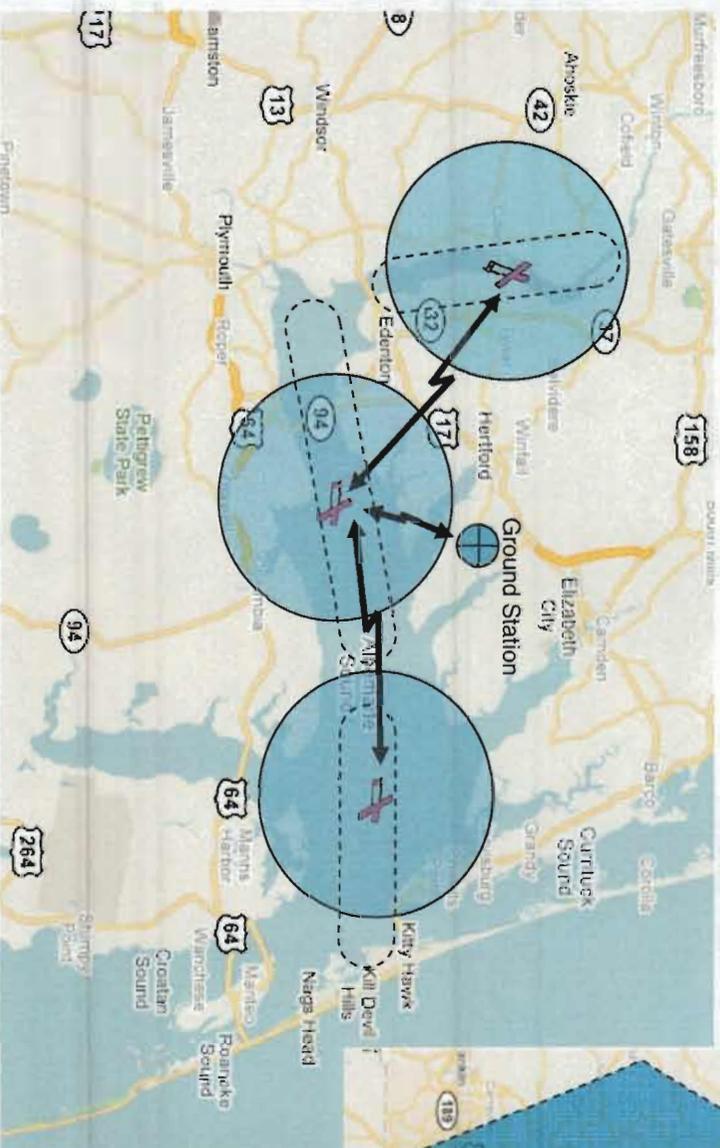- Ad-hoc networking with backup

Convoy Escort

Overland Infrastructure Protection

Notional Littoral Missions

- Surveillance, detection, track, and video of ground and air contacts
- Optimized control of multiple autonomous UAVs
- Continuous 24/7 operations
- Ad-hoc networking with backup

Riverine

Expeditionary

Surveillance Area

Multi-Platform Surveillance Technologies of Interest

- Applicable to
  - A network of persistent RF coherent airborne sensors.
  - A distributed network of shipboard radars.
    - Assume access to host platform's networks, timing and navigation.

- Automated surface and air contact:
  - Detection
  - Tracking
  - Imaging
  - Classification
  - Identification

- Architectures, algorithms, and techniques

- Clearly show the benefit of the distributed network approach over a loose federation of stand-alone platforms.

Multi-Platform Surveillance
Net-Sentric Operation

- Detect, track, classify and identify
- Adaptable distributed sensing
- Continuous 24/7 operations
- Ad-hoc networking and sensor adaptation
- Minimum personnel requirements (automation)
- Open Architecture time coherent RF (Active and Passive)
- Networked time/frequency/angle of arrival

Ground Station

Hypothetical Active Contact
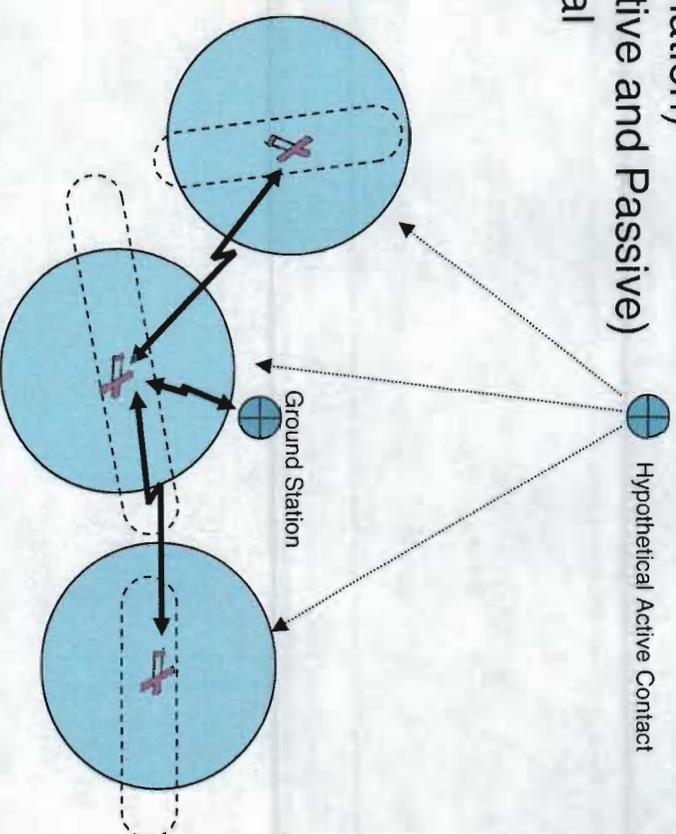
What benefits can be derived from a distributed network of RF coherent sensors verses a federation of stand-alone platforms.
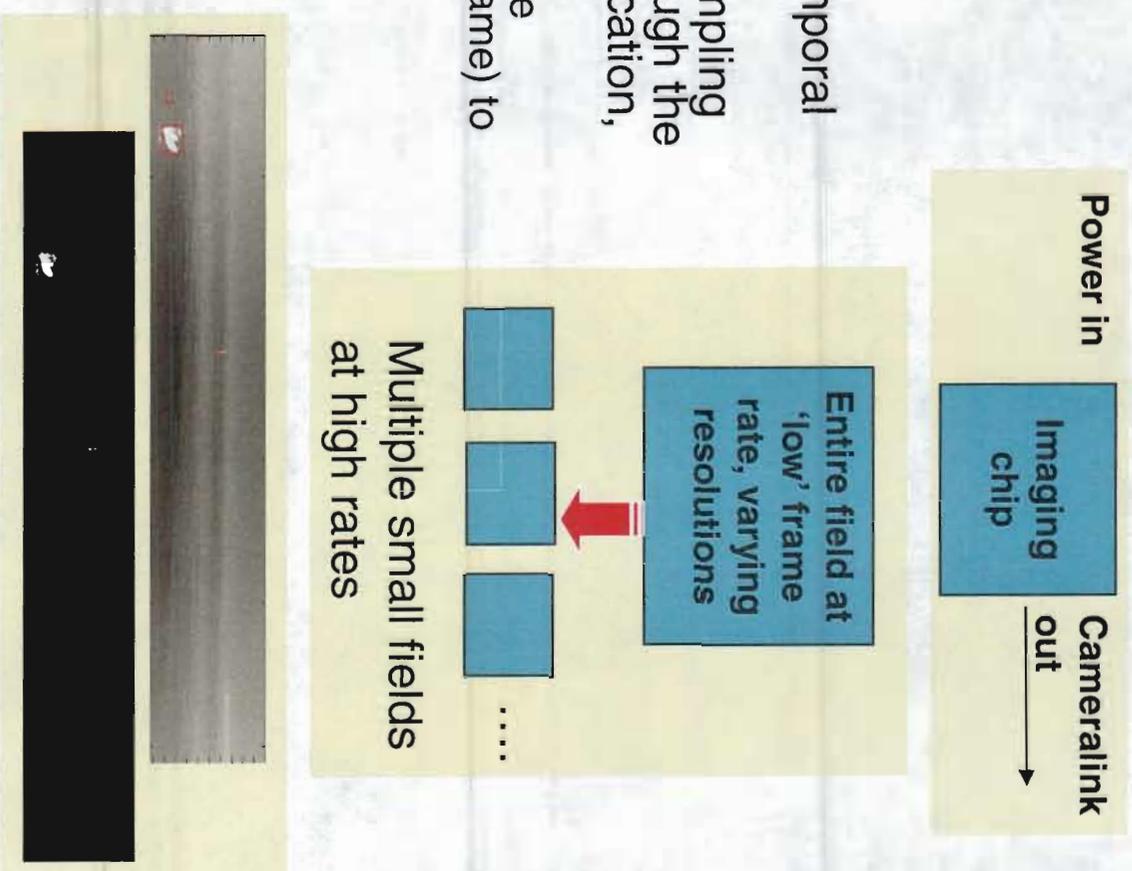
Adaptable Sensor Electronics

- Primary application focus
  - EO/IR sensors for small UAVs, ~ 25 lb payload
- Primary motivation
  - Small UAVs place severe size, weight, and power constraints on sensor packages
    - Can't support multiple sensors with each dedicated to a specific task, e.g. search, track, ID, target
    - *Need to dynamically adapt a single sensor to meet multiple mission functions*
  - Bandwidth constraints limit information flow from platform to user
    - Matching sensor output to bandwidth capability while maintaining critical information flow demands dynamically configurable on platform processing
- Long term objective:
  - Combine sensor electronic developments with adaptable optics for wide area surveillance and targeting.
    - Eliminate mechanically gimbaled turrets, pods or balls.
    - Initial acquisition and life cycle cost savings.
    - Size Weight and Power (SWaP) reductions.

Adaptable Sensor Electronics
Focal Plane Technology

Objectives:

- 'Camera-on-a chip' systems

- Dynamically adaptable spatial and temporal sampling of the image.
  - Required spatial and temporal sampling rates vary as one progresses through the search-detection, tracking, identification, and targeting functional modes.
    - Need EO/IR imaging chips that are reconfigurable in real-time (one frame) to address multiple functions

- On-focal plane processing
  - Change detection, local area kernel operators, image segmentation
  - Tracking

Power in

Imaging chip → **Cameralink out**

Entire field at 'low' frame rate, varying resolutions

Multiple small fields at high rates

...

Adaptable Sensor Electronics
Compact Electronics

- **Low power, compact, dynamically reconfigurable, common interface electronics for applications where 'camera-on-a chip' isn't a viable approach**
  - **Clock & bias generation, A/D, serial control**
  - **Different camera 'personalities': variable frame rates, readout modes, etc.**

- **Compact variable quality image compression hardware for non-standard 10's of megapixel format imagers**
  - **JPEG2000(?), NITF compliant**

Evaluation Criteria

- Technical and scientific considerations are more important than cost

- Overall scientific and technical merits of the proposal

  - The degree of innovation

  - The soundness of technical concept

  - The Offeror's awareness of the state of the art and understanding of the scope of the problem and the technical effort needed to address it

- Naval relevance, transition potential and anticipated contributions of the proposed technology to surveillance operations.

- Offeror's capabilities, related experience, and past performance, including the qualifications, capabilities and experience of the proposed principal personnel

  - The quality of technical personnel proposed

  - The Offeror's experience in relevant efforts with similar resources

  - The ability to manage the proposed effort

- Cost is of less importance than all of the technical factors combined; however, cost will not be ignored.

  - The realism of the proposed cost

  - Total cost relative to benefit

  - Realism of cost levels for facilities and staffing

Evaluation Criteria

- Large Businesses-- the socio-economic merits of each proposal will be evaluated based on the extent of the Offeror's commitment in providing meaningful subcontracting opportunities for small businesses, small disadvantaged businesses, woman-owned small businesses, HUBZone small businesses, veteran-owned small businesses, service disabled veteran-owned small businesses, historically black colleges and universities, and minority institutions.

- Industry-Academia Partnering – ONR highly encourages partnering among industry and academia with a view toward speeding the incorporation of new science and technology into fielded systems. Proposals that utilize industry-academic partnering which enhances the development of novel S&T advances will be given favorable consideration.

- Evaluation of Options: The Government will evaluate options for award purposes by adding the total costs for all options to the total price for the basic requirement.

- The evaluation of options will not obligate the Government to exercise the option(s).

Question and Answer

- Questions regarding white papers must be submitted by 3:00 p.m. Eastern Time on Monday, 28 July 2008.

- Questions from this industry day will be published via the BAA web site. **The official answers are those posted to the web site.**

- All questions that are answered, and their answers, will be posted to the web site for all offerors to review.

- Questions that reveal your approach or technology will not be answered.

- There will be no individual meetings between potential offerors and ONR personnel.

Questions & Answer Session

Will be recorded and posted to the

ONR BAA Website

Wrap Up

- Official Q&A responses, as well as this presentation, will be posted to ONR BAA web site.

- ONR is seeking 4 page white papers addressing broad range of technology for persistent sensing and surveillance.

- There will be no individual meetings between potential offerors and ONR personnel, until you are selected for oral presentations.