

Finding Engineering-Linked Indicators (FELIX) Proposers' Day Conference



Office of the Director of National Intelligence

I A R P A

BE THE FUTURE

Amanda Dion-Schultz, PhD

Program Manger

July 27, 2017



Agenda

Time	Topic	Speaker
9:00am – 9:15am	Welcome Remarks	Dr. Amanda Dion-Schultz Program Manager, IARPA
9:15am – 9:45am	IARPA Overview and Remarks	Dr. Jason Matheny Director, IARPA
9:45am – 10:30am	FELIX Program Overview	Dr. Amanda Dion-Schultz Program Manager, IARPA
10:30am – 11:00am	Break	
11:00am – 11:30am	Doing Business with IARPA	Acquisition Team
11:30am – 12:00pm	FELIX Program Questions & Answers	Dr. Amanda Dion-Schultz Program Manager, IARPA
12:00pm – 1:30pm	No-Host Lunch	
1:30pm – 4:00pm	Poster Session, Networking, and Teaming Discussions	Attendees (No Government)



Disclaimers

- This presentation is provided solely for information and planning purposes
- The Proposers' Day does not constitute a formal solicitation for proposals or proposal abstracts
- A BAA supersedes anything presented or said by IARPA at the Proposers' Day



Goals

- Familiarize participants with IARPA's interest in the FELIX program
- Familiarize participants with IARPA's mission and how to do business with IARPA
- Provide answers to participants' questions
- Provide you a chance to alter the course of events
- Foster discussion of synergistic capabilities among potential program participants, i.e., facilitate teaming
 - Take a chance - someone might have a missing piece of your puzzle



Additional Information

- Proposers' Day slides will be posted on iarpa.gov
- Please save questions for the end, write on notecards
- Posters are available for browsing during break/lunch
- Government will not be present during the poster/teaming session
- Discussions with PM allowed until BAA release
 - Once BAA is published, questions can only be submitted and answered in writing via the BAA guidance
- Name/email list of Proposers' Day participants provided to the group **with permission**



IARPA Introduction

Dr. Jason Matheny



IARPA Mission and Method

IARPA's mission is to envision and lead high-risk, high-payoff research that delivers innovative technology for future overwhelming intelligence advantage

- **Bring the best minds to bear on our problems**
 - Full and open competition to the greatest possible extent, funding scientists and engineers in academia and industry, through contracts, grants, OTs, and prize challenges
 - World-class, rotational Program Managers
- **Define and execute research programs that:**
 - Have goals that are clear, measureable, ambitious and credible
 - Employ independent and rigorous Test & Evaluation
 - Involve IC partners from start to finish
 - Run from three to five years
 - Publish peer-reviewed results and data, to the greatest possible extent



IARPA's Customers





IARPA Highlights

“One of the government’s most creative agencies.”

– David Brooks, NYT

- Best known for quantum computing, superconducting computing, forecasting tournaments; but our portfolio is diverse -- math, CS, physics, chemistry, biology, neuroscience, linguistics, political science, cognitive psychology. “Everything from AI to Zika.”
- Research highlights include:
 - White House BRAIN Initiative, National Strategic Computing Initiative
 - Nobel Prize for Physics
 - Science “Breakthrough of the Year”
 - MacArthur “Genius”
 - 2,000+ journal articles
- >70% of completed research transitioned to USG partners





Current IARPA Research

Collection

- Amon-Hen (space SA)
- FELIX (syn bio)
- FunGCAT (syn bio)
- Ithildin (chem detection)
- HFGeo (HF geolocation)
- MAEGLIN (CBRN)
- MOSAIC (pattern of life)
- Odin (biometrics)
- Proteos (human ID)
- SILMARILS (chem)
- SLICE (RF tracking)
- UnderWatch (undersea)
- Seedlings and Studies

Analysis

- Aladdin (video search)
- Babel (speech recognition)
- CORE3D (3D modeling)
- DIVA (surveillance video)
- Finder (geolocate images)
- Janus (facial recog)
- KRNS (neuroimaging)
- MATERIAL (translation)
- SHARP (training)
- Seedlings and Studies

Computing

- C3 (cryogenic computing)
- HECTOR (encryption)
- LogiQ (quantum)
- MICrONS (neuromorphic)
- QEO (quantum)
- RAVEN (chip analysis)
- SuperTools (cryogenic)
- TIC (chip security)
- VirtUE (cloud security)
- Seedlings and Studies

Anticipatory Intel

- CAUSE (cyber I&W)
- CREATE (crowdsourcing)
- FUSE (S&T intel)
- Hybrid Forecasting (I&W)
- Mercury (SIGINT I&W)
- SCITE (insider threats)
- Seedlings and Studies

Prize Challenges

- Nail-to-Nail Fingerprinting
- Unconstrained Face Recognition
- Functional Map of the World
- MORGOTH'S CROWN



How to engage with IARPA

■ **Website: www.IARPA.gov**

- Reach out to us, especially the IARPA PMs. Contact information on the website.
- Schedule a visit if you are in the DC area or invite us to visit you.

■ **Opportunities to Engage:**

□ **Research Programs**

- Multi-year research funding opportunities on specific topics
- Proposers' Days provide opportunities to learn what is coming, and to influence programs

□ **IARPA-Wide BAA "Seedlings"**

- Typically a 9-12 month study; you can submit your research proposal at any time
- Strongly encouraged: informal discussion with a PM before proposal submission

□ **Prize Challenges**

- No proposals required
- Submit solutions to our problems; if your solutions are the best, you receive a cash prize and bragging rights

□ **Requests for Information (RFIs) and Workshops**

- Provide input while IARPA is planning new programs



FELIX

Program Overview



Platform Technologies for Detecting Engineered Biology

Problem: Capability to detect engineered biological system is limited

- Current methods are costly, slow, technically demanding and only able to detect a subset of engineering modifications

Solution: Develop platform technologies to detect a wide variety of engineered biological systems across multiple applications

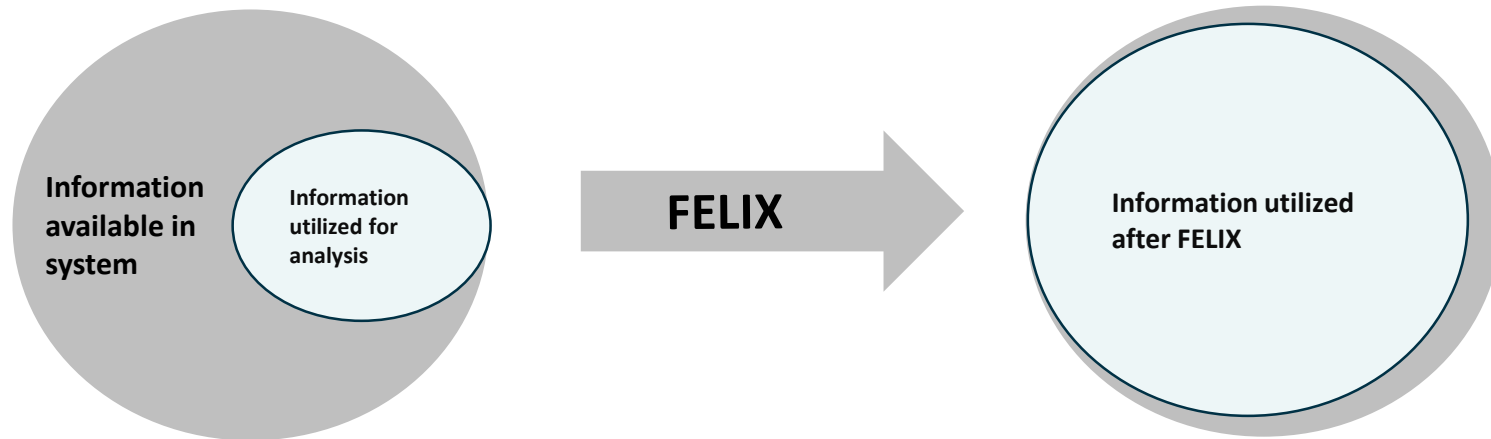
- Leverage advances in genomics, systems biology, bioinformatics, evolutionary biology and high throughput technologies
- Develop analysis tools for complex samples, higher-order signatures, and evolutionary analysis



New Tools to Detect Engineered Systems

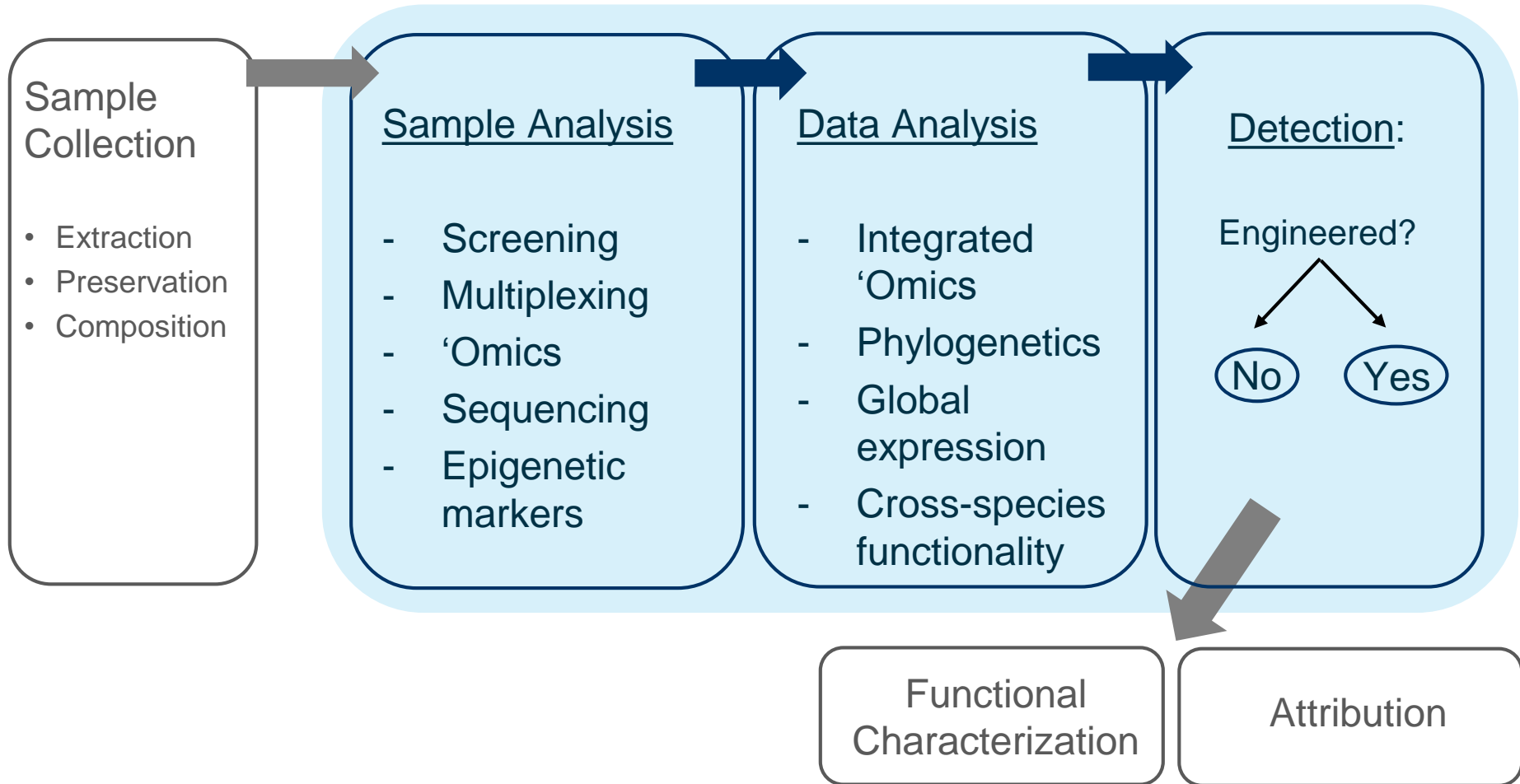
Overall Aim: Increase the *amount* and *quality* of information available to determine if a system has been engineered

- Improve confidence in assessment of engineering
- Capture signatures that were previously hidden



Engineered systems can span from single DNA sequences to ecosystems

Program Scope





Current Approaches for Detecting Engineering

Capabilities are roughly delineated by non-targeted vs. targeted approaches

High Value Samples

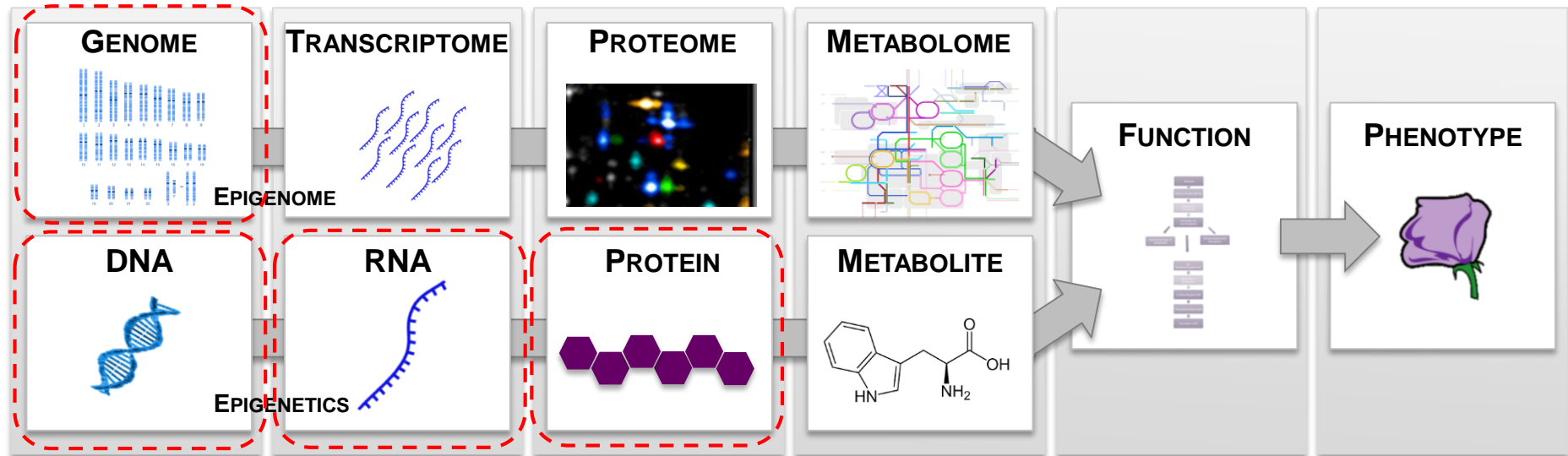
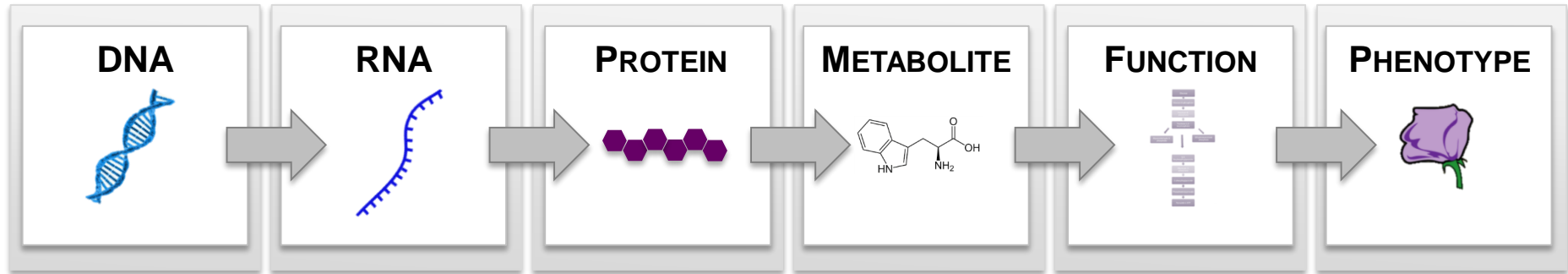
- Clinical isolates, site exploitation, etc.
- Focus on sample identification and characterization
 - In-depth characterization
 - DNA sequencing
 - Protein expression
- Pre-defined, baseline markers of genetic engineering

Continuous Monitoring

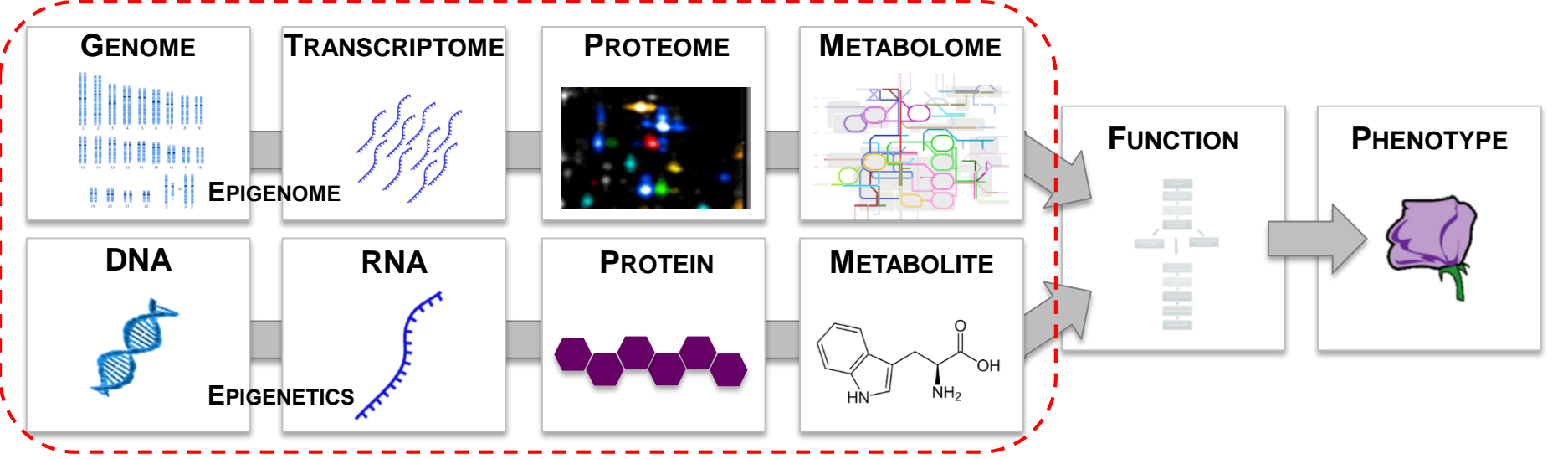
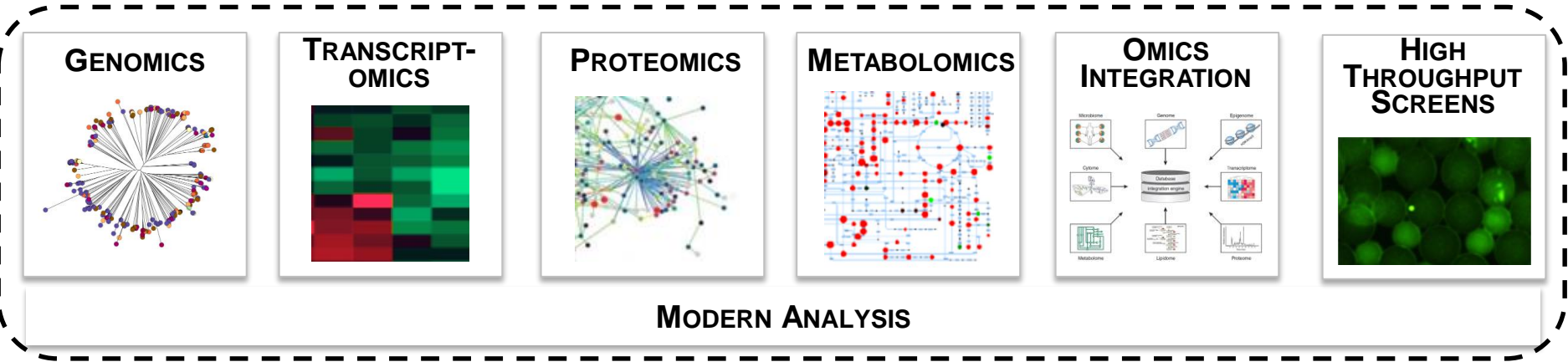
- Screening
- Targeted to specific signatures of engineering
- High(er) throughput
- DNA amplification
- Protein detection



Multiple Points to Analyze Biological Systems

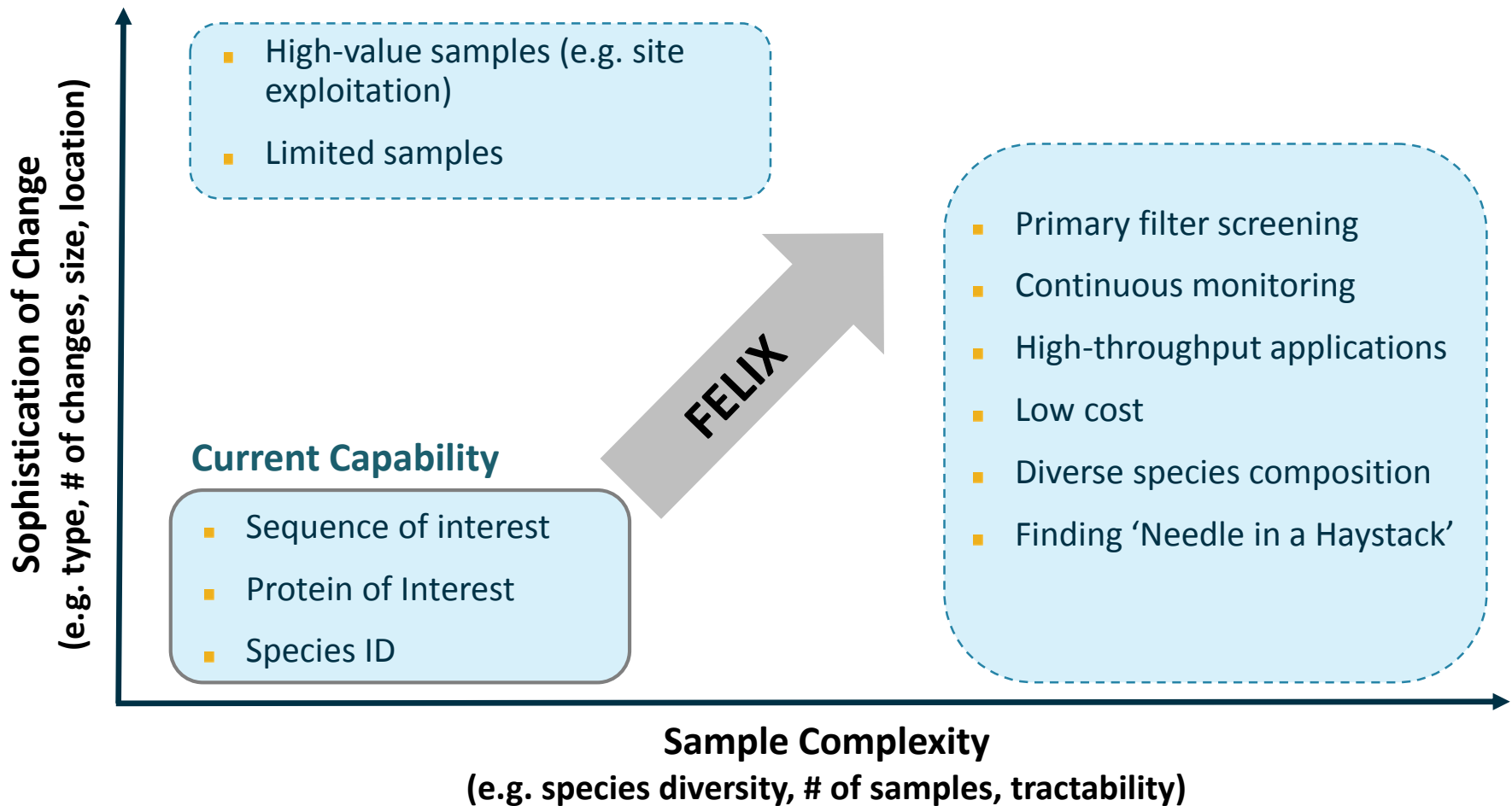


Broadening the Information Used to Detect Engineering





New platform technologies for broad-based detection of complex biological engineering





FELIX

BAA Overview



Program Overview

Single BAA with 2 Focus Areas

- Focus Area 1: Transition-ready experimental platforms and tools for detecting signatures of biological engineering
- Focus Area 2: Transition-ready computational tools and approaches for detecting signatures of biological engineering
- Use of existing model systems and/or data sets
- May bid on one or both focus areas

Two Program Phases

- Phase 1: 18 months
 - 2 Performer-specific Evaluation Tests
- Phase 2: 24 months
 - 2 Performer-specific Evaluation Tests



Focus Area 1

Develop transition-ready experimental platforms and tools for detecting signatures of biological engineering

Increased Data Sources: Develop improved tools for examining biological systems across a broad range of analysis points

- DNA: Sequencing, genomics, metagenomics, epigenetics
- RNA: RNAseq, transcriptomics, ncRNAs, structure
- Protein: Immunoassays, proteomics, quantitation, structure
- Systems: Metabolomics, lipidomics, cytomics, network dynamics

Improved Data Quality: Develop tools for analyzing biological systems across species with increased utility

- Sample: Viruses, bacteria, archaea, eukaryotes, communities
- Throughput: Microfluidics, multiplexing, screening, continuous monitoring
- Sensitivity: Global expression, off-target effects, single cell
- Specificity: Labeling, barcoding, sorting, affinity/avidity



Focus Area 2

Develop transition-ready computational tools and approaches for detecting signatures of biological engineering

Improved Data Analysis: Develop tools for facile examination of complex data sets collected across analysis points and sample types

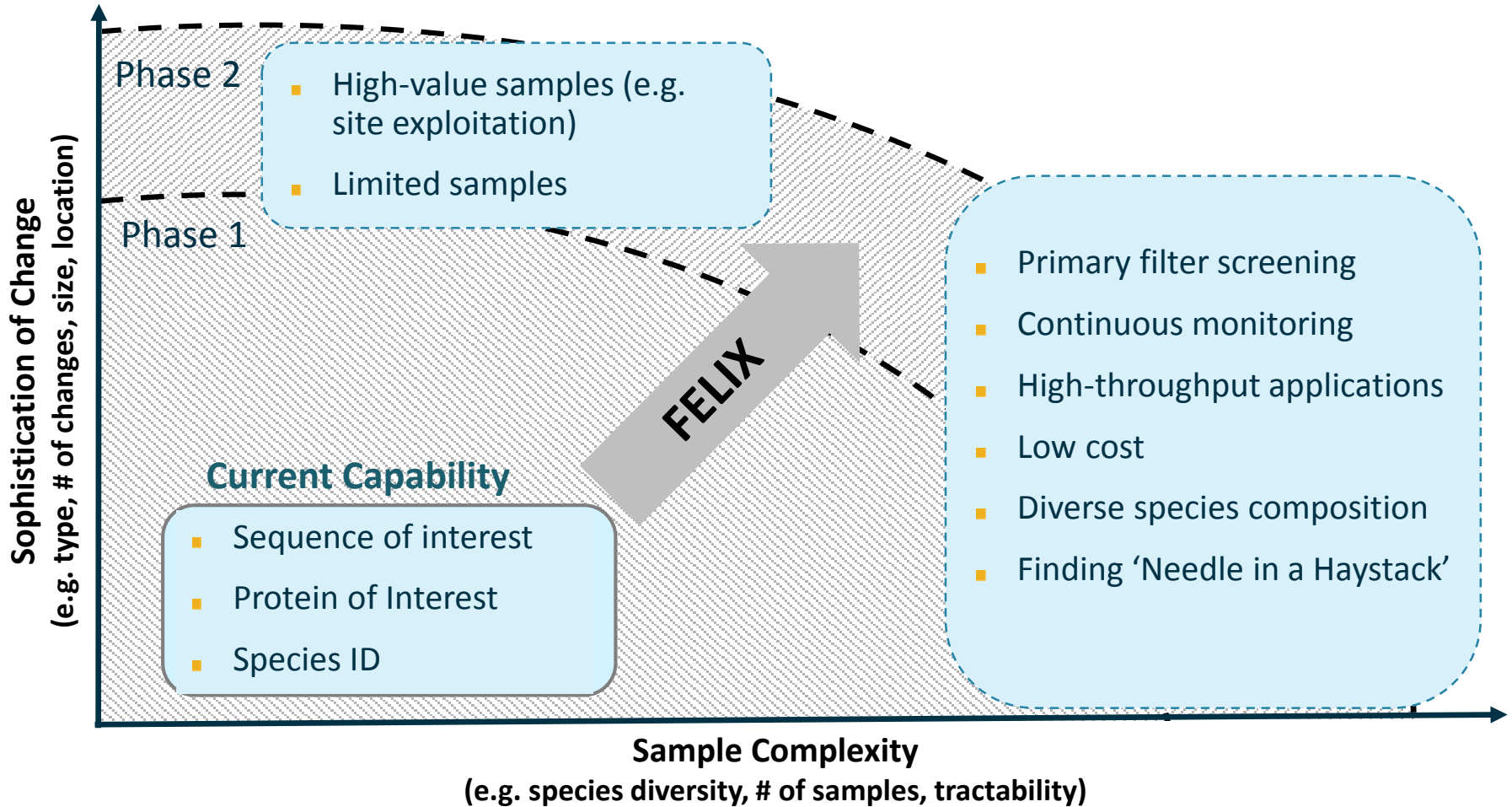
- Scope: Cross-species functionality, multiplex deconvolution, barcode tracking
- Sequence analysis: Next-gen DNA/RNA, metagenomics, epigenetics
- Systems-level analysis: Integrated 'omics, genome wide, global expression, pathway/flux dynamics

Improved Signature Detection: Develop tools for detecting signature of engineering of varying type and complexity

- Sequence-based: Foreign elements, indels, non-natural junctions, cloning footprints, structural alteration
- Systems-level: Off-target effects, global expression changes, 'omics variation, whole-cell modelling
- Population level: Phylogenetics, community dynamics, evolutionary fitness



New platform Technologies for Broad-based Detection of Complex Biological Engineering





Milestones and Metrics

Phase 1: Provide proof-of-concept demonstration for individual technical approaches and demonstrate improvements beyond SOA

Phase 2: Demonstrate optimized platform tools and sophisticated, transition-ready technical capabilities significantly beyond SOA

- Offerors' will develop and meet milestones specific to the technical approach being proposed
- Milestones proposed should include, but are not limited to:
 - Type of engineered change to be detected
 - Specificity
 - Sensitivity
 - Extensibility
 - Throughput and/or scalability
 - Computational resources required (FA 2 only)



Test and Evaluation

T&E partners will develop performer-specific Evaluation Tests with a range of engineered changes and complex backgrounds

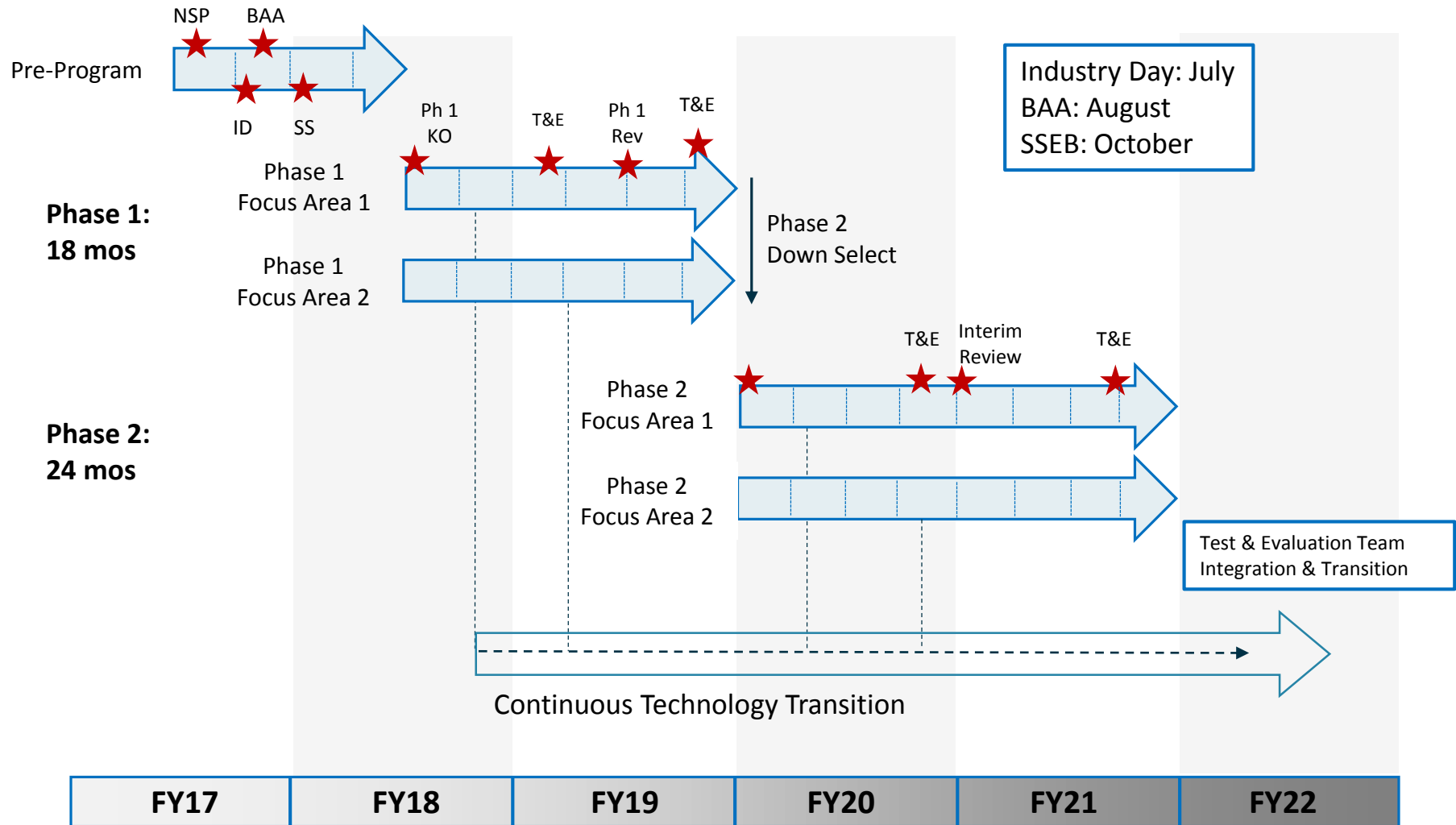
- Samples will vary in sophistication of modification, species, sample purity, and/or signature frequency
- Performers will establish baseline for performance improvements
- Independent evaluation against challenge sets
 - 25 -100 samples for each test
 - 30 days for analysis
- Phase 1: month 8 and month 16
 - Establish capability over baseline
 - Inform down-select and transition decisions
- Phase 2: month 28 and 40
 - Establish capability over baseline
 - Inform final performance capability



Milestones and Waypoints

- **Milestones** are defined progress metrics that must be met by the end of each phase
- **Waypoints** are offeror-defined, task-driven intermediate steps towards a milestone
 - Depending on an offeror's specific approach, progress towards a milestone is not expected to be linear in all areas
 - Waypoints are how the offeror clearly explains to the Government the quantitative and timely progress that must be made for their overall concept to meet the end-of-phase Milestones – performance against these waypoints is reviewed throughout program
- **Technical reviews held throughout the program** will quantify progress against the waypoints & assess whether course corrections are needed for success

Notional Program Schedule





Deliverables

- Improved capability to detect engineered biological systems
 - Platform tools and methods used for detection of engineered biology
 - Approaches for sample analysis for a range of biological systems, including plants, animals, insects, microbes and viruses
 - Computational tools and models that distinguish natural variation from intentional engineering

Doing Business with IARPA

Mr. Tarek Abboushi, Chief Acquisitions Officer
Intelligence Advanced Research Projects Activity



Office of the Director of National Intelligence

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INTELLIGENCE ADVANCED RESEARCH PROJECTS ACTIVITY (IARPA)



Doing Business with IARPA - Recurring Questions

- Questions and Answers (<http://www.iarpa.gov/index.php/faqs>)
- Eligibility Info
- Intellectual Property
- Pre-Publication Review
- Preparing the Proposal (Broad Agency Announcement (BAA) Section 4)
 - Electronic Proposal Delivery (<https://iarpa-ideas.gov>)
- Organizational Conflicts of Interest
(<http://www.iarpa.gov/index.php/working-with-iarpa/iarpas-approach-to-oci>)
- Streamlining the Award Process
 - Accounting system
 - Key Personnel
- IARPA Funds Applied Research
- RECOMMENDATION: Please read the entire BAA



Responding to Q&As

- Please read entire BAA before submitting questions
- Pay attention to Section 4 (Proposal & Submission Information)
- Read Frequently Asked Questions on the IARPA @ <http://www.iarpa.gov/index.php/faqs>
- Send your questions as soon as possible
 - FELIX BAA: **dni-iarpa-baa-17-07@iarpa.gov**
 - Write questions as clearly as possible
 - Do NOT include proprietary information



Eligible Applicants

- Collaborative efforts/teaming strongly encouraged
 - Content, communications, networking, and team formation are the responsibility of Proposers
- Foreign organizations and/or individuals may participate
 - Must comply with Non-Disclosure Agreements, Security Regulations, Export Control Laws, etc., as appropriate, as identified in the BAA



Ineligible Organizations

Other Government Agencies, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and any organizations that have a special relationship with the Government, including access to privileged and/or proprietary information, or access to Government equipment or real property, are not eligible to submit proposals under this BAA or participate as team members under proposals submitted by eligible entities.



Intellectual Property (IP)

- Unless otherwise requested, Government rights for data first produced under IARPA contracts will be UNLIMITED
- At a minimum, IARPA requires Government Purpose Rights (GPR) for data developed with mixed funding
- Exception to GPR
 - State in the proposal any restrictions on deliverables relating to existing materials (data, software, tools, etc.)



Pre-Publication Review

- Funded Applied Research efforts, IARPA encourages:
 - Publication for Peer Review of UNCLASSIFIED research

- Prior to public release of any work submitted for publication, the Performer will:
 - Provide copies to the IARPA PM and Contracting Officer Representative (COR/COTR)
 - Ensure shared understanding of applied research implications between IARPA and Performers
 - IARPA PM decides on approval for release or receiving courtesy copy



Preparing the Proposal

- Note restrictions in BAA Section 4 on proposal submissions
 - Interested Offerors must register electronically IAW instructions on: <https://iarpa-ideas.gov>
 - Interested Offerors are strongly encouraged to register in IDEAS at least 1 week prior to proposal “Due Date”
 - Offerors must ensure the version submitted to IDEAS is the “Final Version”
 - Classified proposals – Contact IARPA Chief of Security
- BAA format is established to answer most questions
- Check FBO for amendments & IARPA website for Q&As
- BAA Section 5 – Read Evaluation Criteria carefully
 - e.g. “The technical approach is credible and includes a clear assessment of primary risks and a means to address them”



Preparing the Proposal (BAA Sect 4)

- Read IARPA's Organizational Conflict of Interest (OCI) policy:
<http://www.iarpa.gov/index.php/working-with-iarpa/iarpas-approach-to-oci>
- See also eligibility restrictions on use of Federally Funded Research and Development Centers, University Affiliated Research Centers, and other similar organizations that have a special relationship with the Government
 - Focus on possible OCIs of your institution as well as the personnel and subcontractors on your team
 - See Section 4: It specifies the non-Government (e.g., SETA, FFRDC, UARC, etc.) support we will be using. If you have a potential or *perceived* conflict, request a waiver as soon as possible



Organizational Conflict of Interest (OCI)

- If a prospective offeror, or any of its proposed subcontractor teammates, believes that a potential conflict of interest exists or may exist (whether organizational or otherwise), the offeror should promptly raise the issue with IARPA and submit a waiver request by e-mail to the mailbox address for this BAA at **dni-iarpa-baa-17-07@iarpa.gov**.
- A potential conflict of interest includes but is not limited to any instance where an offeror, or any of its proposed subcontractor teammates, is providing either scientific, engineering and technical assistance (SETA) or technical consultation to IARPA. In all cases, the offeror shall identify the contract under which the SETA or consultant support is being provided.
- Without a waiver from the IARPA Director, neither an offeror, nor its proposed subcontractor teammates, can simultaneously provide SETA support or technical consultation to IARPA and compete or perform as a Performer under this solicitation.



Streamlining the Award Process

- Cost Proposal – we only need what we ask for in BAA
- Approved accounting system needed for Cost Reimbursable contracts
 - Must be able to accumulate costs on job-order basis
 - DCAA (or cognizant auditor) must approve system
 - See <http://www.dcaa.mil>, “Audit Process Overview - Information for Contractors” under the “Guidance” tab
- Statements of Work (format) may need to be revised
- Key Personnel
 - Expectations of time, note the Evaluation Criteria requiring relevant experience and expertise
- Following selection, Contracting Officer may request your review of subcontractor proposals



IARPA Funding

- IARPA funds Applied Research for the Intelligence Community (IC)
 - IARPA cannot waive the requirements of Export Administrative Regulation (EAR) or International Traffic in Arms Regulation (ITAR)
 - Not subject to DoD funding restrictions for R&D related to overhead rates

- IARPA is not DoD



Disclaimer

- This is Applied Research for the Intelligence Community
- Content of the Final BAA will be specific to this program
 - The Final BAA is being developed
 - Following issuance, look for Amendments and Q&As
 - There will likely be changes
- The information conveyed in this brief and discussion is for planning purposes and is subject to change prior to the release of the Final BAA.



Point of Contact

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(include **IARPA-BAA-17-07** in the Subject Line)

Website: www.iarpa.gov

Questions? Please fill out cards.