

National Organization of Research Development Professionals Conference

Dr. Valerie Browning, DSO Director

April 30, 2019

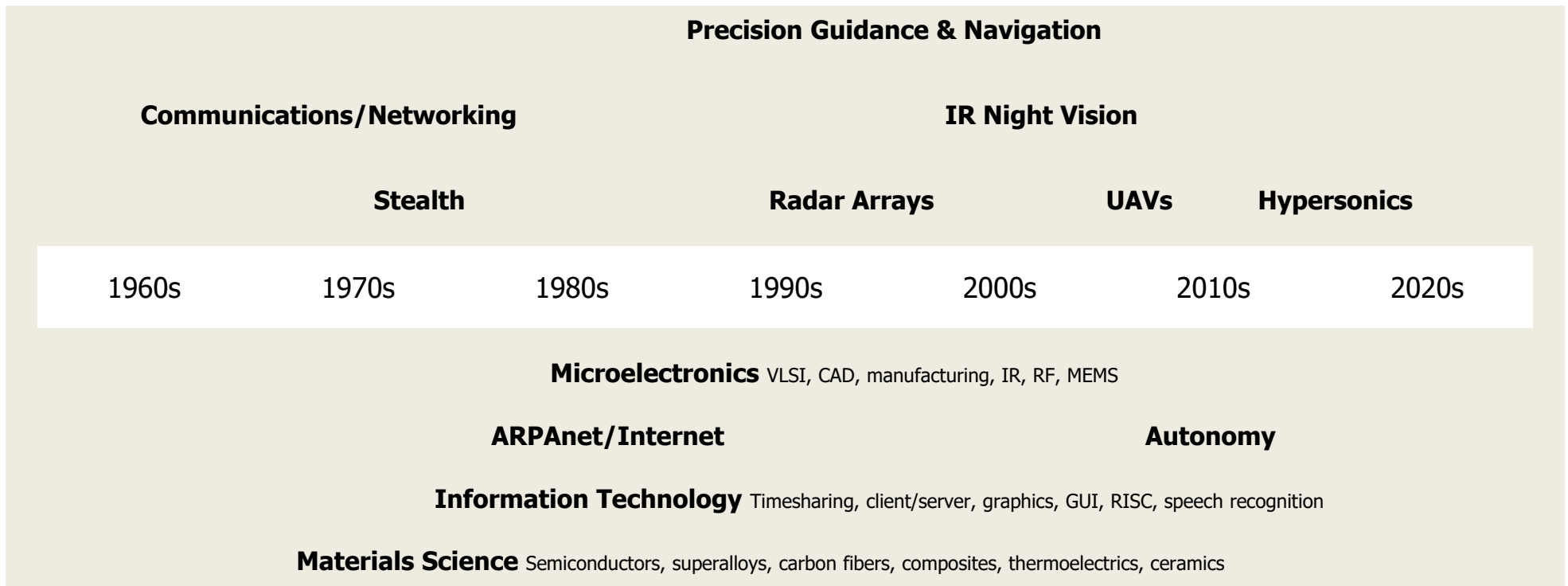


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DARPA's mission

Breakthrough Technologies and Capabilities for National Security



DARPA's role: Pivotal early investments that change what's possible



DARPA technical offices





BREAKTHROUGH TECHNOLOGIES AND CAPABILITIES FOR NATIONAL SECURITY

YEARS
61

GOVT. EMPLOYEES
230

TECH OFFICES
6

PROGRAM MANAGERS
110

PROGRAMS
250+

YEARS OF AIG/PM TENURE
4

DEFEND THE HOMELAND



CYBER DETERRENCE



COUNTERING HYPERSONICS



BIO THREAT DETECTION AND MITIGATION



DEFENSE AGAINST WMT

DETER & PREVAIL AGAINST HIGH-END ADVERSARIES



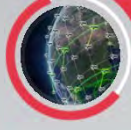
ADAPTIVE LETHALITY FOR AIR, LAND, AND SEA



LONG-RANGE EFFECTS



CONTROL OF THE EM SPECTRUM



ROBUST SPACE

EFFECTIVELY PROSECUTE STABILIZATION EFFORTS



WARRIOR PERFORMANCE



COUNTERING GRAYZONE WARFARE



3D CITY-SCALE OPERATIONS



BEHAVIOR MODELING AND INFLUENCE

FOUNDATIONAL RESEARCH

Understanding complexity, composable systems, advanced materials and electronics, trusted hardware and software, human-machine symbiosis, 3rd wave artificial intelligence, data and social science, new computing, and engineered biology.



ALTERNATIVE COMPUTING



ENGINEERED BIOLOGY



ELECTRONICS RESURGENCE INITIATIVE



ARTIFICIAL INTELLIGENCE NEXT

Increasing the pace of developing technologies and capabilities for the US and allied warfighter

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DARPA: Create and prevent technological surprise

DSO—"DARPA's DARPA"

- Creates opportunities from scientific discovery
- Invests in multiple, often disparate, scientific disciplines--everywhere the rest of DARPA is, and more
- Focuses on mission-informed research

DSO: The Nation's first line of defense against scientific surprise



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Frontiers in Math, Computation & Design

(quantum information processing, alternative computing, foundational AI science, design tools)

Limits of Sensing & Sensors

(quantum sensing, imaging through scattering media, novel light matter interactions, 3D scene reconstruction)



Complex Social Systems

(new social science tools and methodologies, human-machine teaming, wargaming, deterrence)



The Economist, April 2012

Anticipating Surprise

(WMD/WMT detection, materials for harsh environments, advanced manufacturing, autonomy)





Opportunities



DARPA Young Faculty Award (YFA)

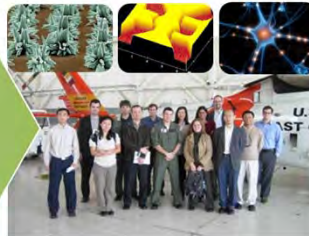
Identify and engage **rising stars** in junior research positions, emphasizing those without prior DARPA funding, and expose them to DoD needs and DARPA's program development process

The YFA program provides:

- Research funding
- DoD contacts
- Military visits/exercises
- PM Mentor

The YFA program yields:

- Insight into DoD problems
- Novel ideas
- Career development
- Future DARPA performers

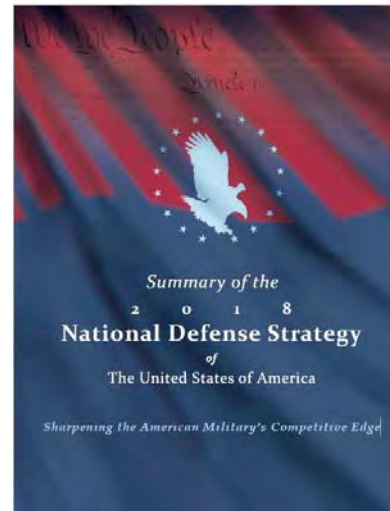


Develop the next generation of academic scientists, engineers, and mathematicians who will focus a significant portion of their career on DoD and National Security issues

Disruptioneering

Disruptioneering is a DSO rapid acquisition approach to increasing the speed of innovation:

- High risk concept exploration
- Acquisition tailored to speed (idea to program in 90 days)



- “Harness and protect the National Security Innovation Base”
 - “Deliver performance at the speed of relevance”
- National Defense Strategy

AI Next

Creating systems capable of reasoning with generative, contextual, and explanatory models

\$2B over 5 years



Programs advancing the state of the art in AI

AIDA • AMD • ALIAS • ASIST • Assured
Autonomy • A-Teams • Big Mechanism • CAML
• CASCADE • Causal Exploration • CHASE •
CODE • Configuration Security • CWC • EQUIPS
• GARD • HIVE • KAIROS • L2M • Lagrange •
LORELEI • LwLL • MCS • SAIL-ON • SD2 •
SIMPLEX • TRACE • World Modelers • XAI

80+ programs applying AI



Artificial Intelligence Exploration (AIE)

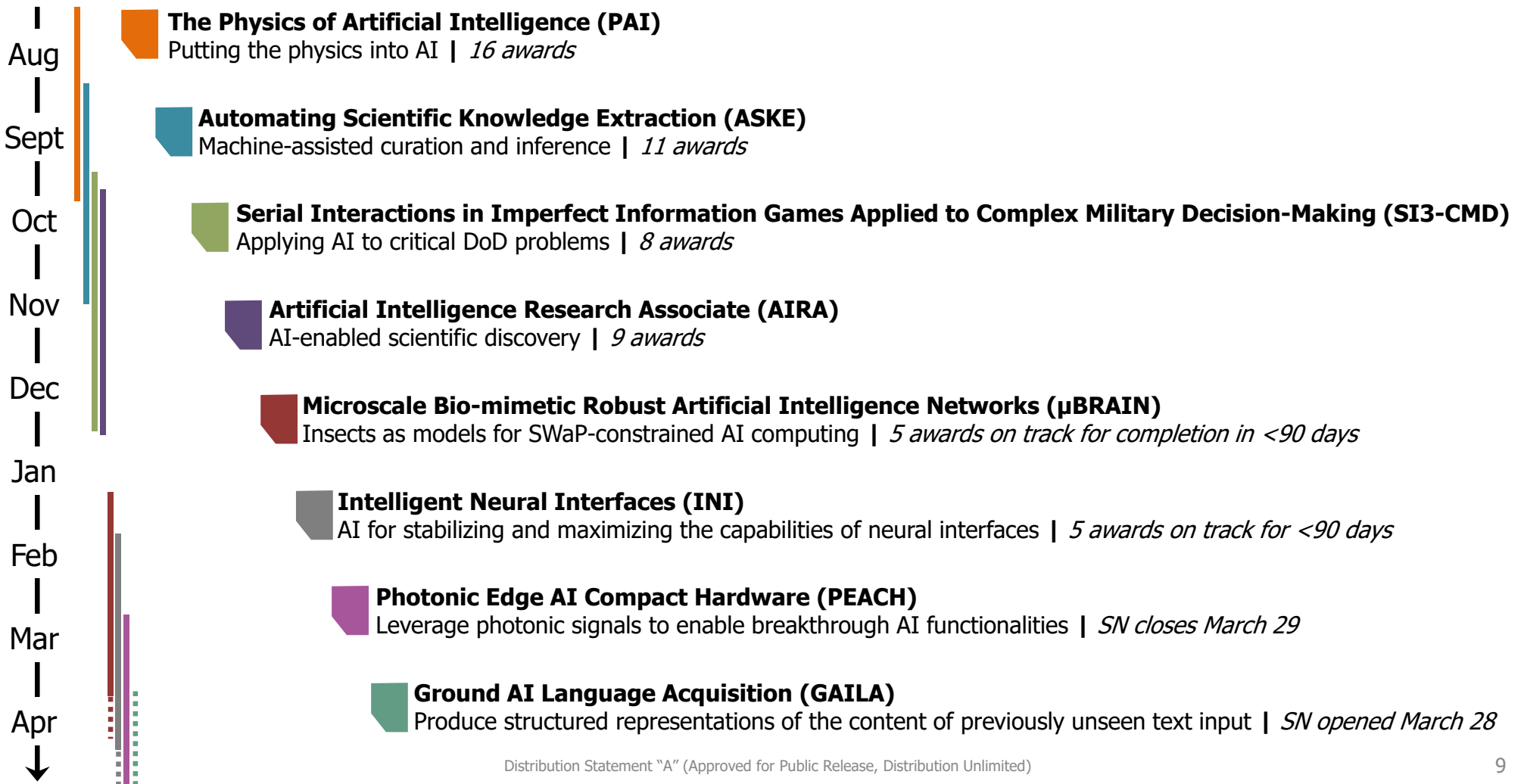
AIRA • ASKE • INI •
μBRAIN • PAI
• SI3-CMD • PEACH •
GAILA

More coming on a regular basis

90 days from inception to exploration



AIE: from special notice to contract awards in <90 days





Evolutionary vs. Revolutionary R&D

“The flying machine which will really fly might be evolved by the combined and continuous efforts of mathematicians and mechanics in from one million to ten million years”

- The New York Times
 - 9 October 1903

“We started assembly today”

- Orville Wright’s Diary
 - 9 October 1903





www.darpa.mil