

Command, Control, and Interoperability

It's All about the Information ...
and the User

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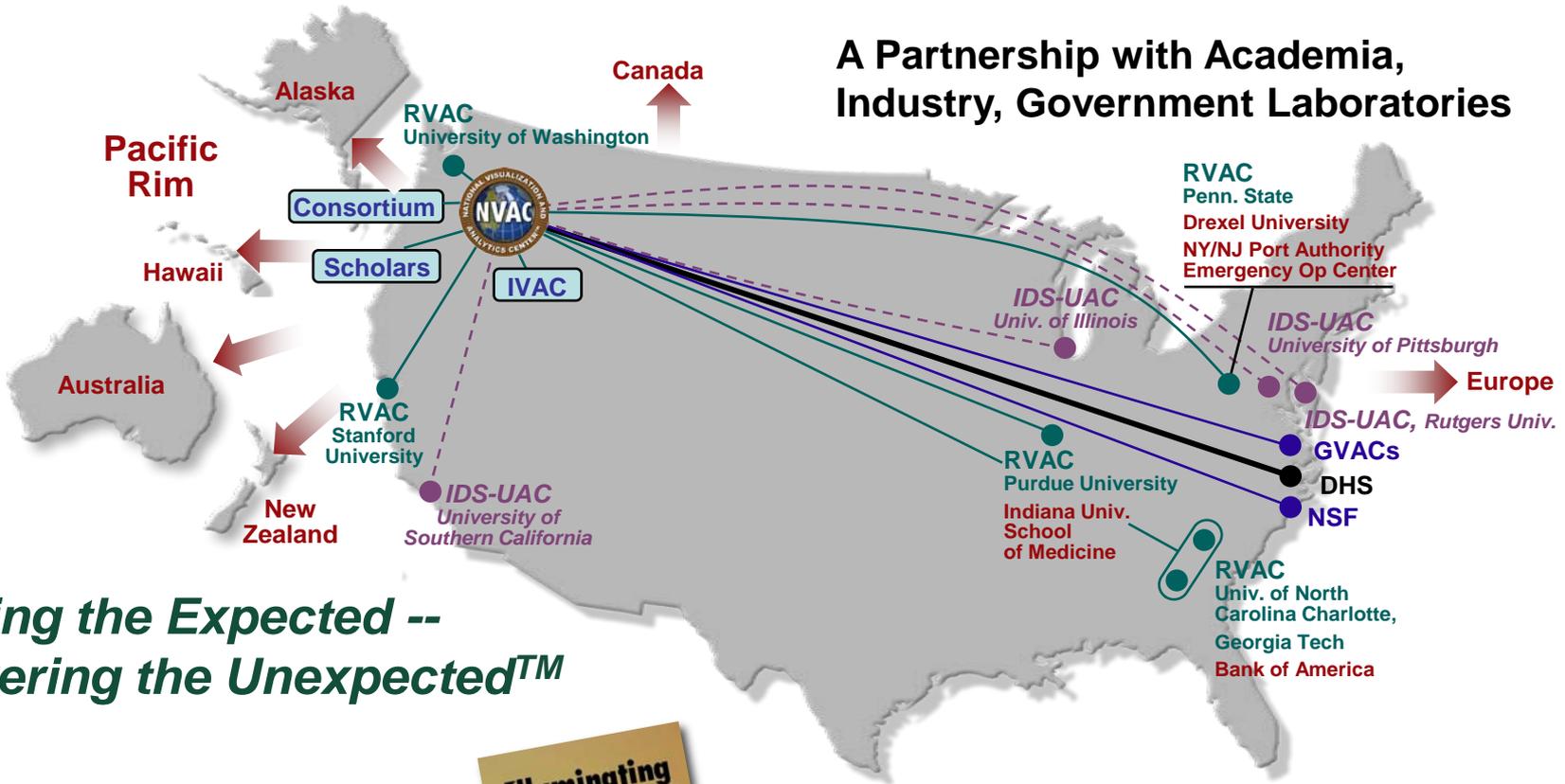
March 19, 2009



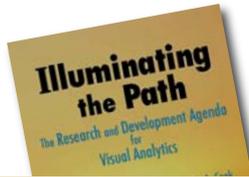
**Homeland
Security**

A Map for Information

A Partnership with Academia, Industry, Government Laboratories



*Detecting the Expected --
Discovering the Unexpected™*



2003 Doug Lemon & Jim Thomas NVAC Concept

2004 NVAC Started

2005 R&D Agenda Published "Illuminating the Path"

2006 RVACs Established

2007 NSF Program Established

2008 Canadian Partnership

The best is yet to come!!!

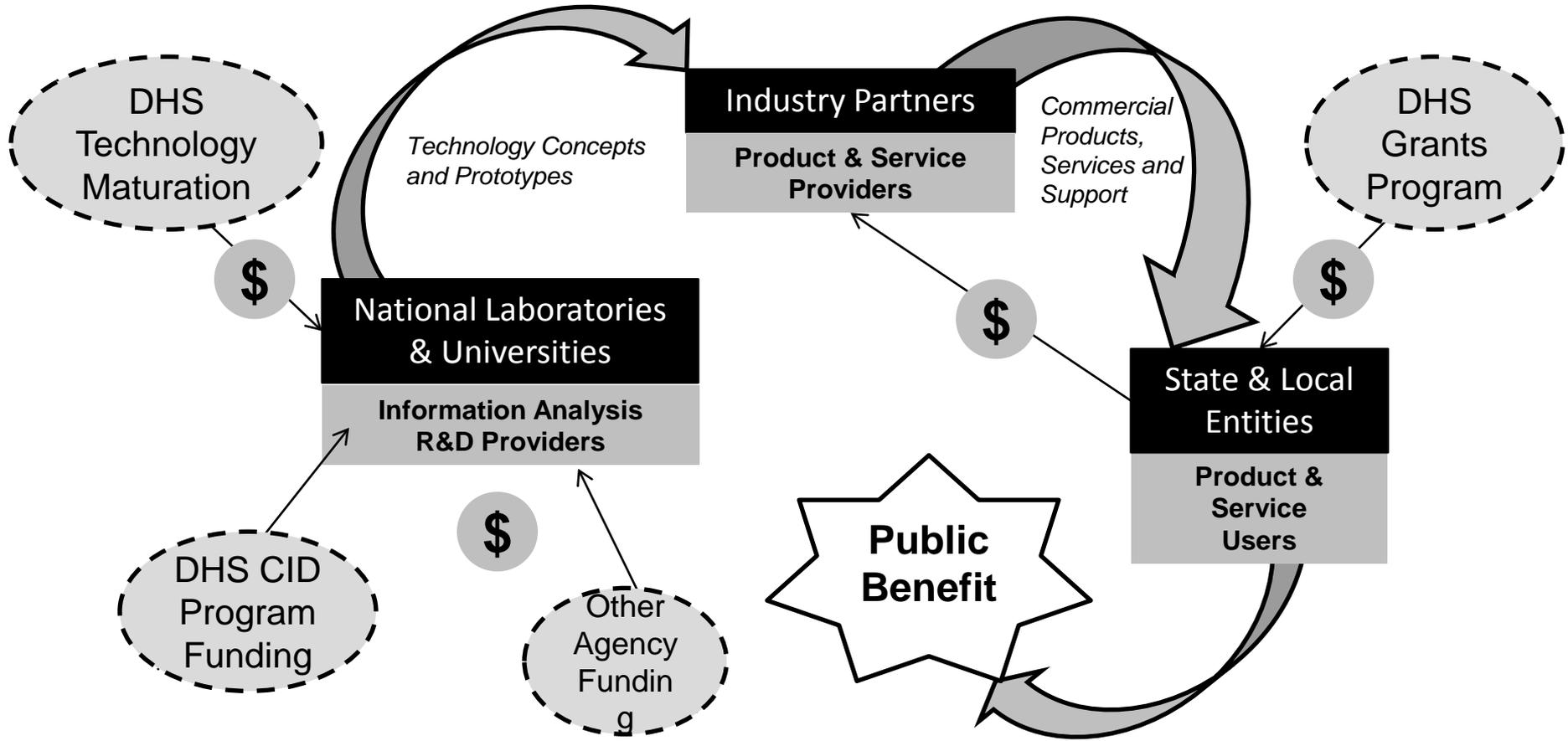
The Homeland Security Environment

- Department of Homeland Security
 - 22 components, 7 operational agencies
 - 215,000 personnel
- Federal Government Partners
 - 15 Intelligence Community agencies
 - 11 Law Enforcement Community agencies
 - 350,000 personnel
- Tribal, Local, and State Partners
 - 80,000 public safety, public health, emergency response, law enforcement agencies
 - 750,000 homeland security practitioners



Homeland Security

Research to Reality (R2R) Technology Transition Model



Law Enforcement and Counter-Terrorism



Desktop to Handheld: Enabling cross-jurisdictional situational awareness for rapid decision making and resource deployment

PURDUE
UNIVERSITY™

PENNSYLVANIA STATE UNIVERSITY



START ▶▶



Intuidex

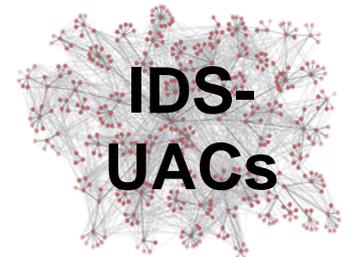


SRS/DCAF

THE PORT AUTHORITY OF NY & NJ



Homeland Security



The Top Ten – Framing the Discussion

- Conditions
 - Untethered to Device/Network/Interaction
 - Tethered to Data/Information
 - Indefinite or Indeterminate Data
 - Minimized Transaction Costs
 - Trust
- Components
 - Challenges
 - Research Foundations
 - Applications



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The Top Ten Challenges

- Dynamic, on-Demand Data Processing and Visualization
- Hypothesis-driven Analysis
- Structured, Unstructured, and Streaming Data
- Mathematics of Discrete and Visual Analysis
- Scalable Filtering and Dissemination
- Common Modes for Models, Simulations, and Real-World Data
- Mobile and Light-Weight Information Analytics and Sharing
- Provenance, Privacy, and Security
- Synthetic Environments and Data
- Purpose-driven Interaction



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The Top Ten Research Foundations

- Cognitive and Perceptual Science
- Data Transformation and Representation
- Dimensionality Reduction
- Smart Query
- Machine Learning
- Architectures
- Games and Synthetic Environments
- Risk
- Evolutionary Biology
- Cultural Anthropology



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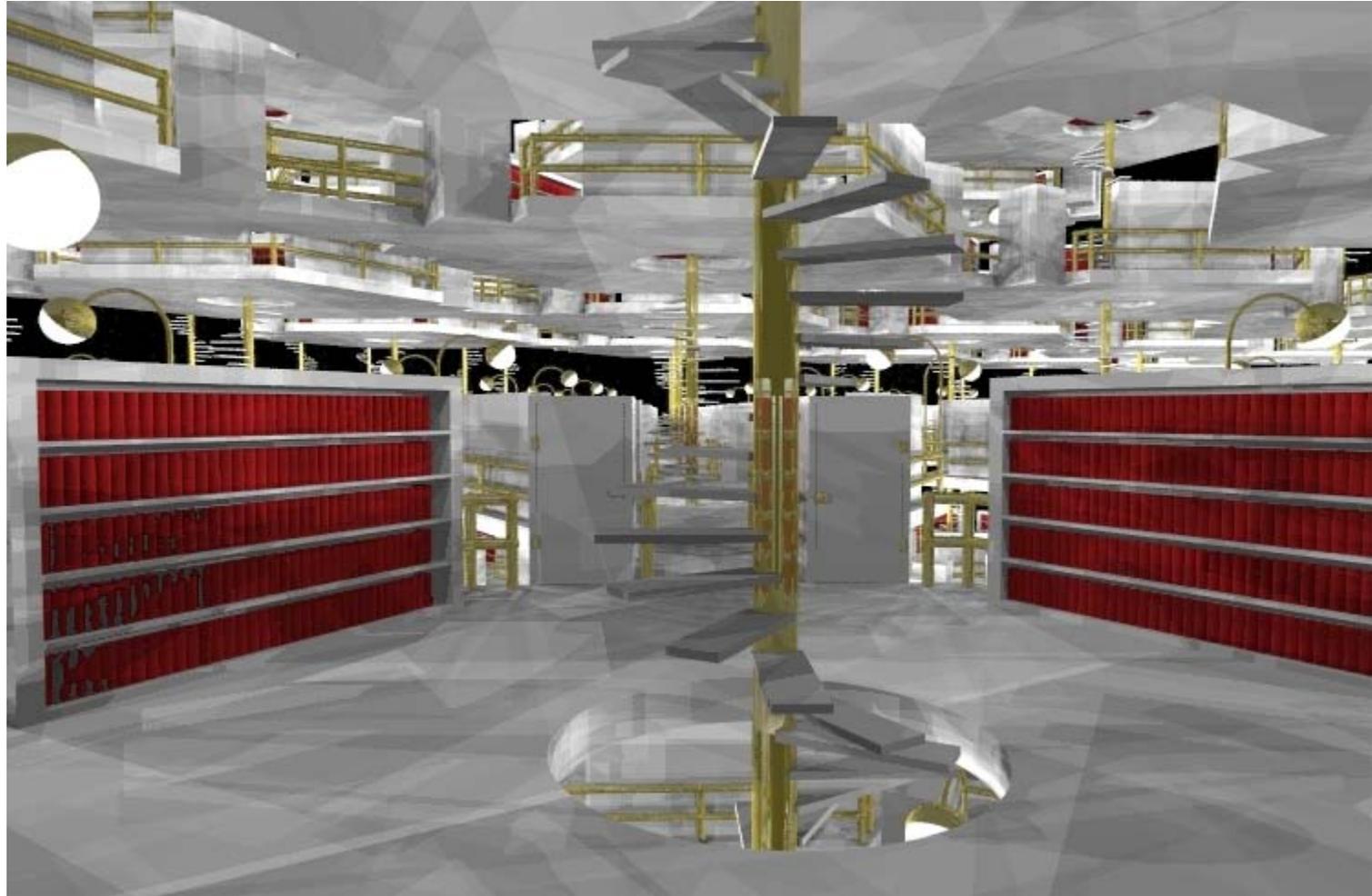
The Top Ten Applications

- Synthetic Materials
- Disease Development
- Economic Stability
- Climate Change
- Environmental Stability
- “Slow” Catastrophes
- Genetics and Epigenetics
- Threat (All-Hazards) Awareness
- Human Learning
- Financial Policy



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The Library of Babel



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Command, Control and Interoperability

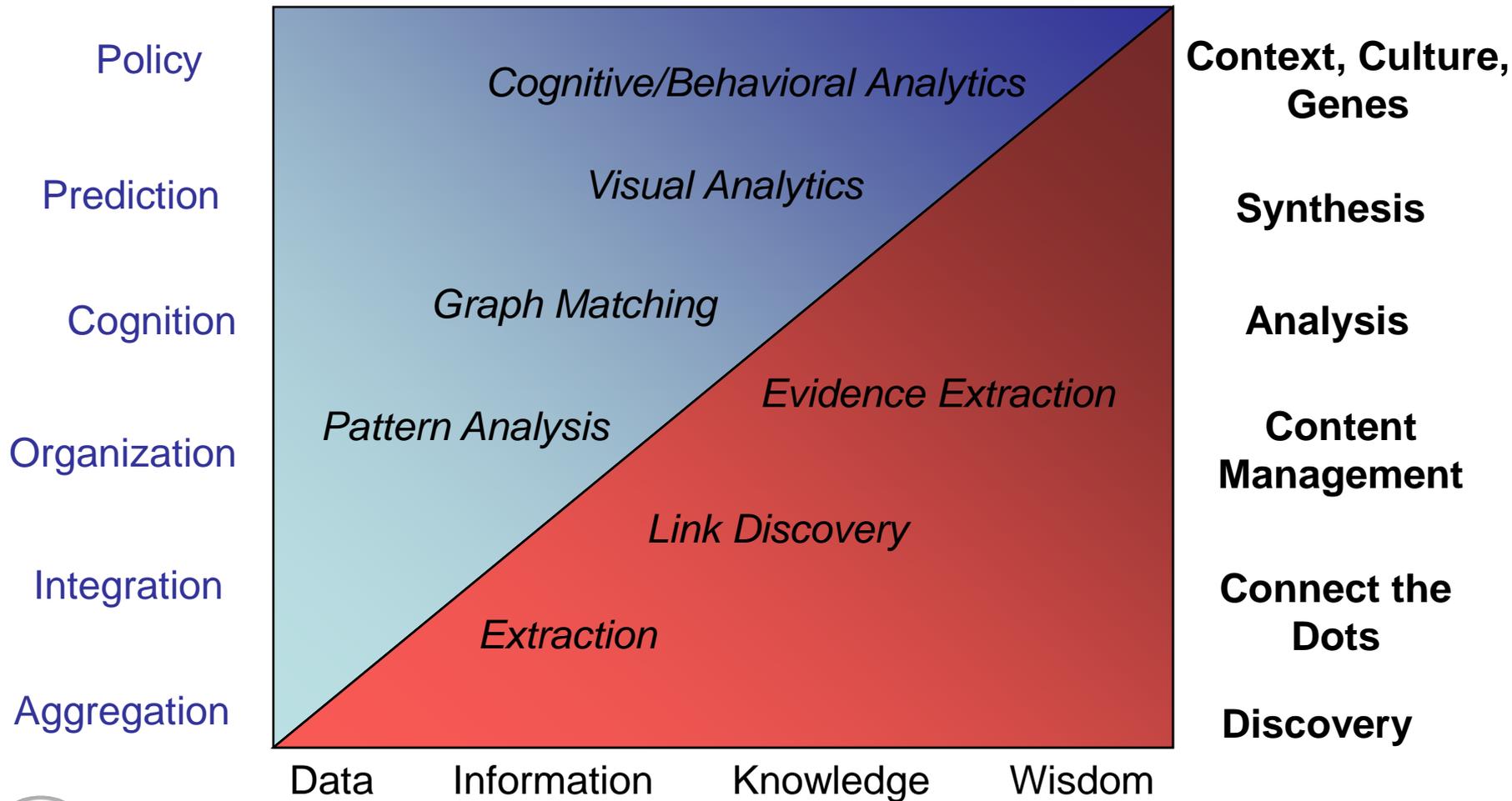
Mission - Transform new and promising concepts into real operational capabilities that strengthen communications interoperability, improve Internet security and integrity, develop sensors and investigative tools, and accelerate the development of automated capabilities to help identify potential national threats.

Customers - Local, tribal, state, and Federal emergency responders that plan for, detect, and respond to all hazards, as well as private-sector partners that own, operate, and maintain the Nation's cyber infrastructure.



U.S. DEPARTMENT OF
Homeland Security

Predictive, Prospective



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What Is Research to Reality?

- Three Essential Elements
 - Technology Suites
 - Commercialization Partners
 - Grants Funding
- Continuing Technology Refresh Process
 - National Laboratory and University Research
 - Standards Based
 - Industry Research, Support, and Training
- Constant On-Site Interactions
 - Local, State, Tribal, Federal Partners
 - PANYNJ, ARJIS, Seattle NWRTC

