Dr. Tony Tether
Director

2004

DARPA's Related Research Efforts

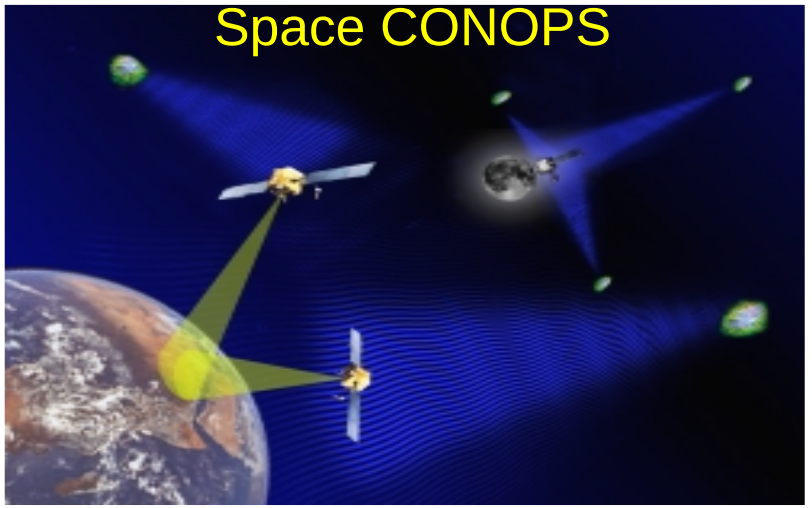
- **Position Location in Space (LEO to ?)**
  - **Pulsar (X-Ray) navigation**
- **Advanced Communication Protocols**
  - **Packet-based systems for communication with widely separated nodes**
- **Extremely Large Deployable Antennas**
  - **Large aperture; large aperture stabilization and control; low-power density, highly integrated RF; large scale dynamic calibration techniques**
    - **Enables large radio telescopes and extremely large deep space communication antennas**
- **Long Endurance Space Flight**
  - **Biomedical Technologies**
  - **Logistics: Power and Water**
  - **Exoskeleton**
  - **Robotics**

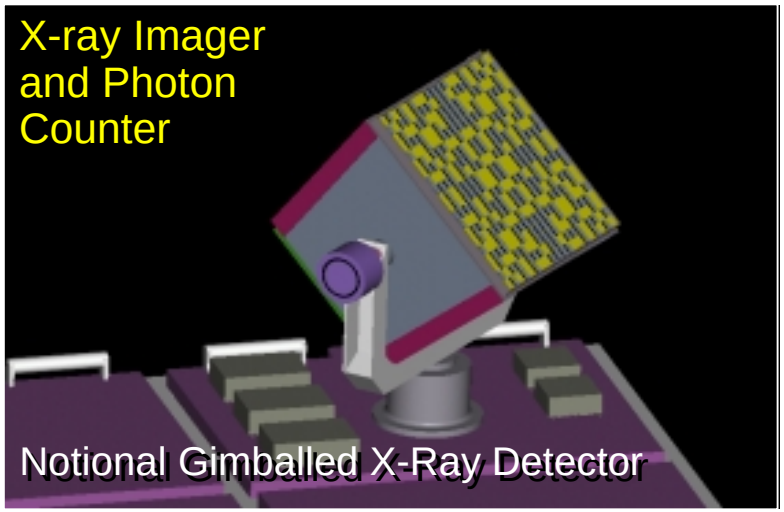
XNAV

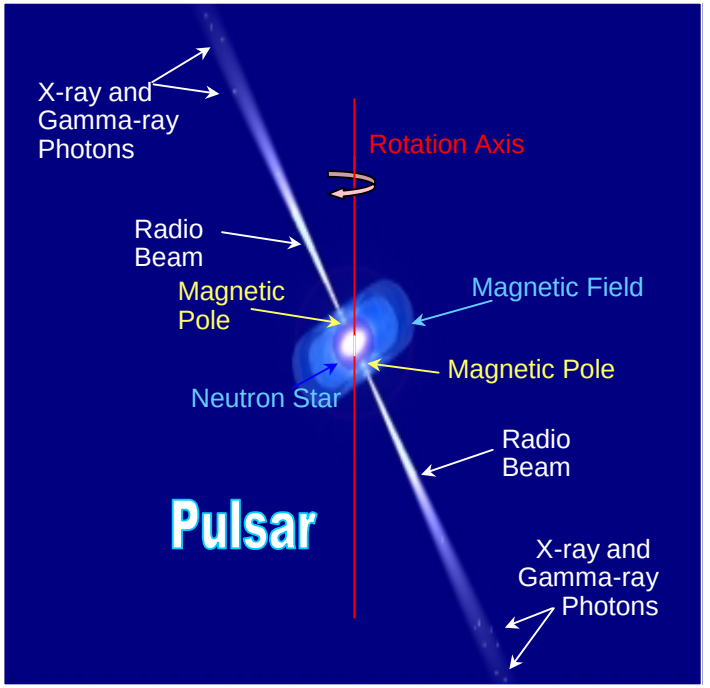
X-Ray Navigation for Autonomous Position Verification

Objective:
Develop a revolutionary attitude and position capability exploiting periodic celestial sources (e.g., pulsar stars)

Payoffs:
- Autonomous navigation capability for DoD satellites: position, attitude & time determination
  - GPS Backup
  - Positions estimates < 3m CEP
  - New Missions: Cislunar, HEO, Deep Space







Dr. Tony Tether
Director

2004

DARPA Organization

Director, Tony Tether
Deputy Director, Bob Leheny

Information Exploitation
Ted Bially
Bob Tenney/Bob Popp

- **Sensors**
- **Exploitation Systems**
- **Command & Control**

Tactical Technology
Art Morrish
Gary Graham/Stephen Welby

- **Air/Space/Land Platforms**
- **Unmanned Systems**
- **Space Operations**
- **Laser Systems**
- **Future Combat Systems**
- **Planning / Logistics**

Special Projects
Amy Alving
Joe Guerci

- **Chem/Bio Def Systems**
- **Counter Underground Facilities**
- **Space Sensors/Structures**
- **Navigation/Sensors/ Signal Processing**

Advanced Technology
Dave Honey
Larry Stotts

- **Assured C3ISR**
- **Maritime**
- **Early Entry/Special Forces**

Joint Unmanned Combat Air Systems
Mike Francis

- **UCAV(AF)**
- **UCAV(N)**
- **Autonomous Operations**

Defense Sciences
Steve Wax
Brett P. Giroir

- **Bio Warfare Defense Technologies**
- **Biology**
- **Materials & Devices**
- **Mathematics**

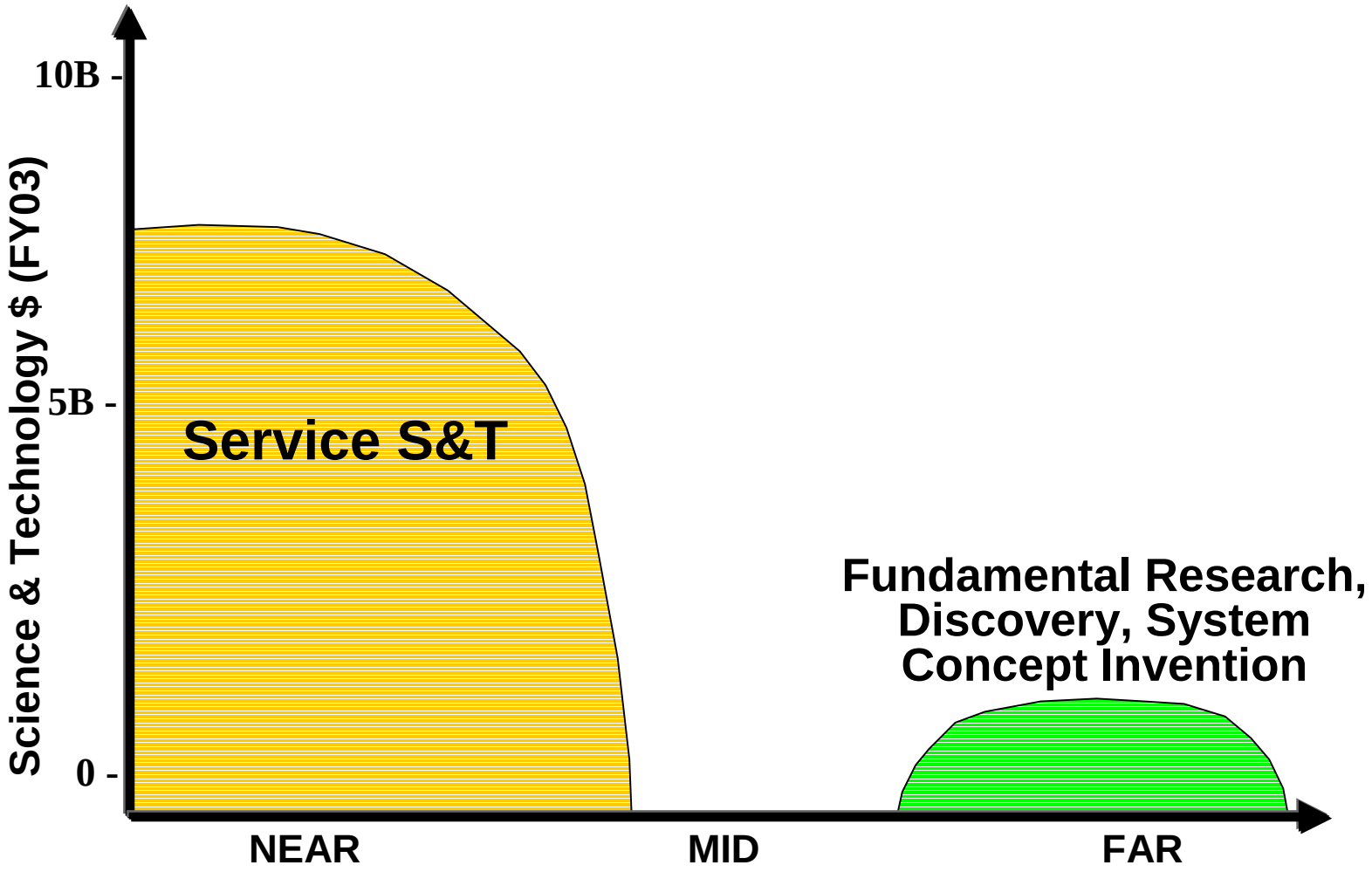
Information Processing Technology
Ron Brachman
Barbara Yoon

- **Cognitive Systems**
- **Computational - Perception**
- **Representation & Reasoning**
- **Learning**
- **Natural Communication**

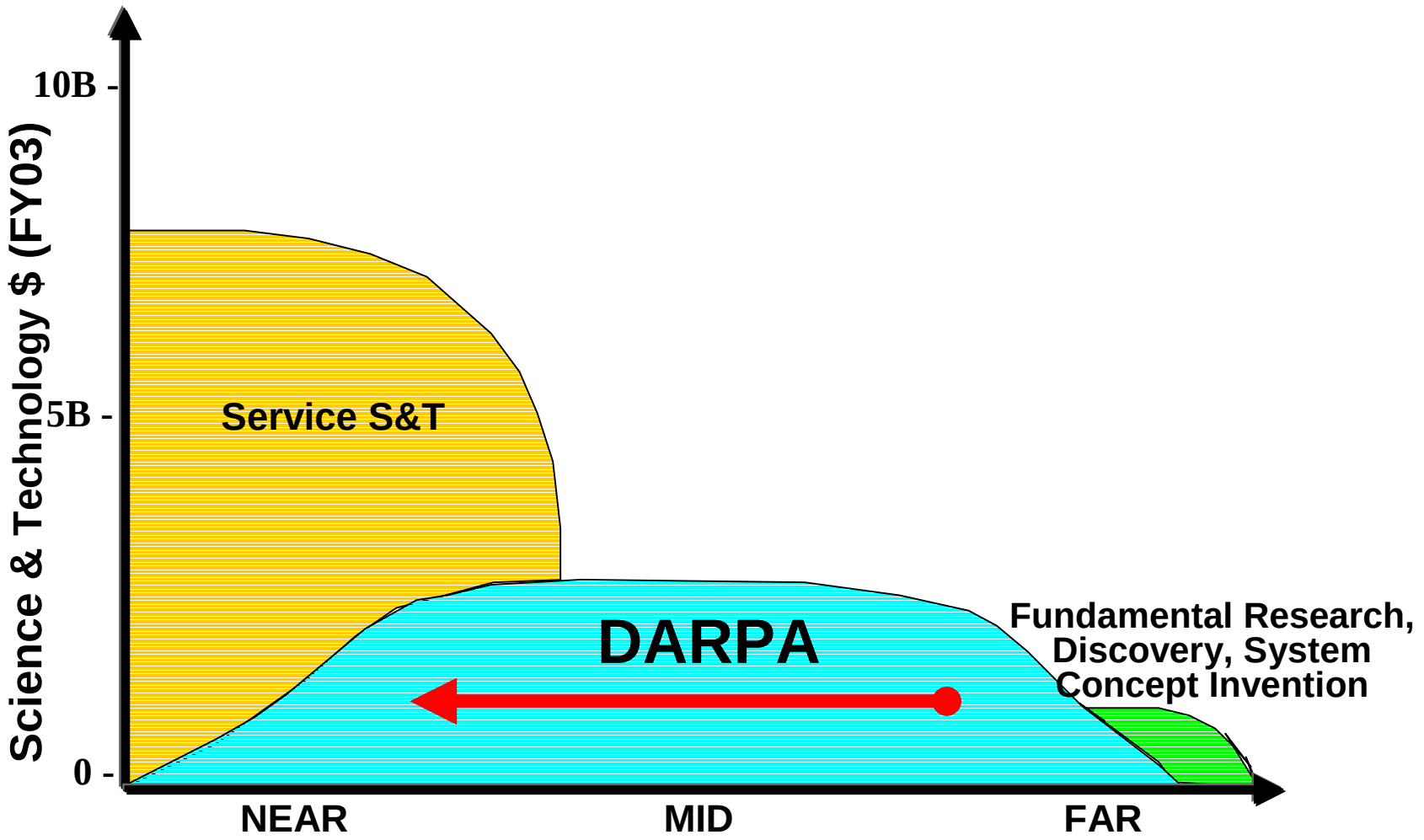
Microsystems Technology
Zach Lemnios
John Zolper

- **Electronics**
- **Optoelectronics**
- **MEMS**
- **Combined Microsystems**

DARPA Role in Science and Technology



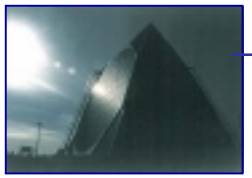
DARPA Role in Science and Technology



DARPA Accomplishments

Saturn

M-16 Rifle



Ground Surveillance Radar

Stealth Fighter

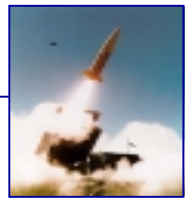
Sea Shadow

1960

1970

1980

Vela Hotel



ATACMS

Arpanet

JSTARS

GPS

J-UCAS

Mobile Robots

JSF Engine

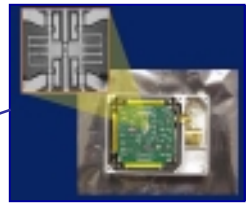
Uncooled IR

Taurus Launch Vehicle

2000

1990

Future Combat System



MEMS

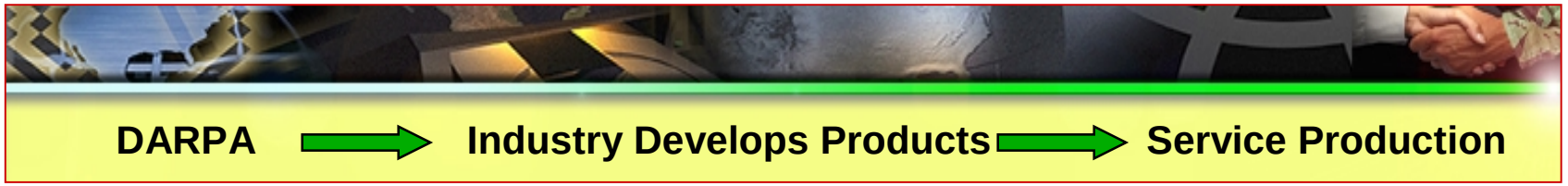
Global Hawk

Predator

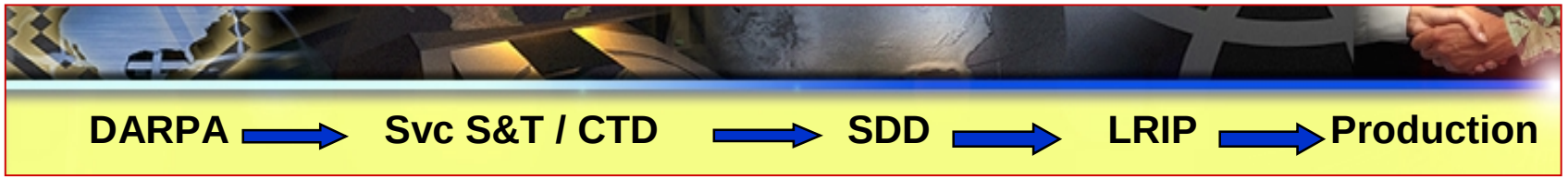
BAT

DARPA Transition Paths

Components, tech base



Components, small systems

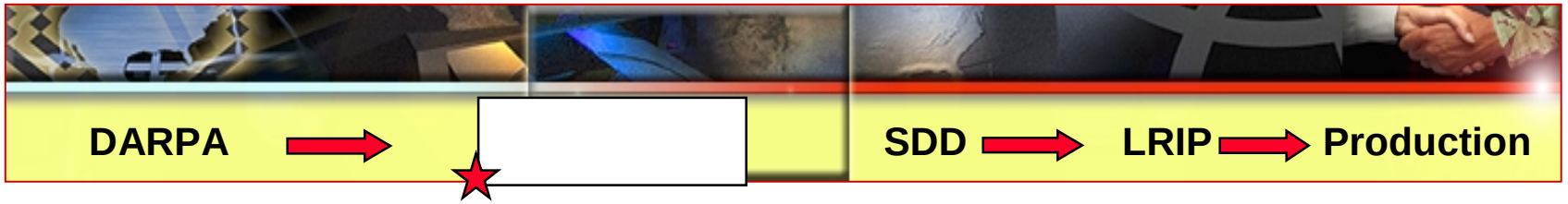


Concept and Technology Development (MS A)

System Development and Demonstration (MS B)

Low Rate of Initial Production (MS C)

Prototypes



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DARPA's Strategic Thrusts

Investments Today for Future Capabilities

- Detection, Precision ID, Tracking, and Destruction of Elusive Surface Targets
- Location and Characterization of Underground Structures
- Force Multipliers for Urban Area Operations
- Networked Manned & Unmanned Systems
- Robust, Secure Self-Forming Tactical Networks
- Cognitive Systems
- Assured Use of Space
- Bio Revolution

Secretary of Defense Priorities

- **Successfully Pursue the Global War on Terrorism**
- **Strengthen Combined/Joint Warfighting Capabilities**
- **Transform the Joint Force**
- **Optimize Intelligence Capabilities**
- **Counter Proliferation of WMD**
- **Improve Force Manning**
- **New Concepts of Global Engagement**
- **Homeland Security**
- **Streamline DoD Processes**
- **Reorganize DoD and the USG to Deal with Pre-War Opportunities and Post-War Responsibilities**