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
**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
DARPA Role in Science and Technology

Science & Technology $(FY03)$

- **Service S&T**

- **Fundamental Research, Discovery, System Concept Invention**

- NEAR
- MID
- FAR
DARPA Role in Science and Technology

- Fundamental Research, Discovery, System Concept Invention
- Service S&T

Science & Technology $ (FY03)

NEAR   MID   FAR
DARPA Accomplishments

1960
- Saturn
- M-16 Rifle
- Ground Surveillance Radar

1970
- Vela Hotel
- ATACMS
- Stealth Fighter
- Sea Shadow

1980
- Arpanet
- JSTARS

1990
- J-UCAS
- Mobile Robots
- Uncooled IR
- Taurus Launch Vehicle

2000
- J-UCAS
- JSF Engine
- Global Hawk
- Predator
- BAT
- MEMS
Components, tech base

DARPA Transition Paths

Components, small systems

Prototypes

POM submit
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