Army
Science and Technology

NDIA
9th Annual Science & Engineering Technology Conference

15 Apr 2008

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Chief Scientist

Outline

- *Army Science and Technology (S&T) Strategy and Funding*
- *Future Force Technologies*
- *Future Combat Systems*
  - *Spinouts to the Current Force*
- *S&T Insertions to Current Operations*
- *Basic Research Thrusts*


I'VE BEEN ASKED TO GIVE A PRESENTATION AT THE TRADE SHOW.
I'D LIKE YOU TO PUT THAT TOGETHER FOR ME, ALICE.
WHAT'S YOUR TOPIC?
TECHNOLOGY. THEY DIDN'T SAY IF I'M FOR IT OR AGAINST IT.
I'LL LEAVE SOME WIGGLE ROOM.
S. Adams
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Science & Technology for a Campaign Quality Army with Joint & Expeditionary Capabilities

Current Force

~100 lb. load

Limited network

> 70 tons

< 10 mph

Enabling the Future Force

Science and Technology—
develop and mature
technology to enable
transformational capabilities
for the Future Force
while seeking opportunities
to accelerate technology
directly into the
Current Force

Enhancing the Current Force

Future Force

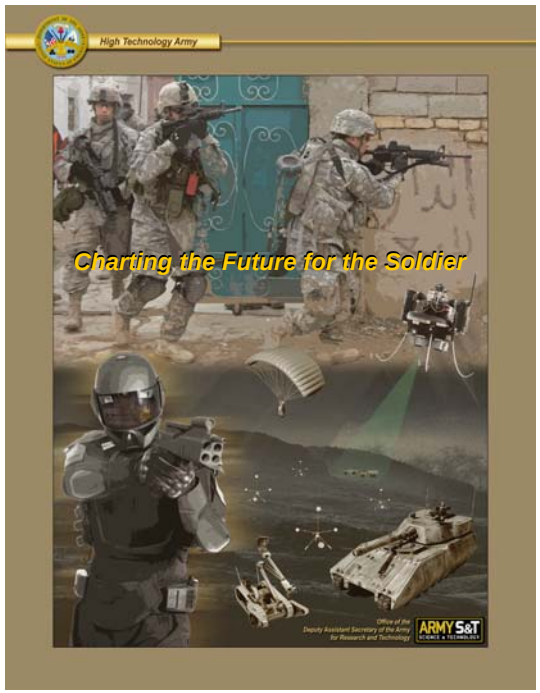
< 40 lb. load

Fully networked

< 30 tons

> 40 mph

Elements of Army S&T Strategy



- *Ensure investments are aligned with Army missions and capability needs*
- *Maintain balanced & responsive portfolio across*
  - *Elements of investment (6.1/6.2/6.3)*
  - *Disciplines and technology areas*
  - *Performers (intramural/extramural)*
  - *Capability pull and technology push*
- *Sustain critical infrastructure—people and physical—responsive to Army needs*
- *Communicate S&T vision and approach to senior decision makers, key stakeholders, partners and customers*
- *Establish and refine processes and metrics to promote innovation, efficiency & effectiveness, and facilitate transition*

FY09 Funding—Research to Systems

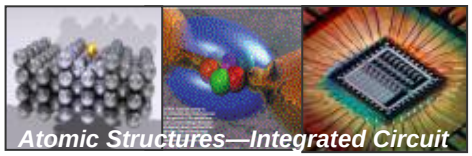
3 Different Types of S&T Investments

S&T $1.8B

Development (RDT&E) $8.7B → **Acquisition** (Procurement) $24.6B

6.1: Basic Research
$379M (21% of S&T)

Nanoscience

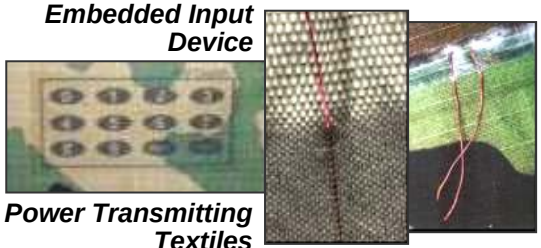


- Understanding to solve Army-unique problems
- Knowledge for an uncertain future

67% Universities/Industry

6.2: Applied Research
$724M (39% of S&T)

Integrated Textile Conductors



- Applications research for specific military problems
- Components, subsystems, models, new concepts

35% Industry

6.3: Advanced Technology Development
$739M (40% of S&T)

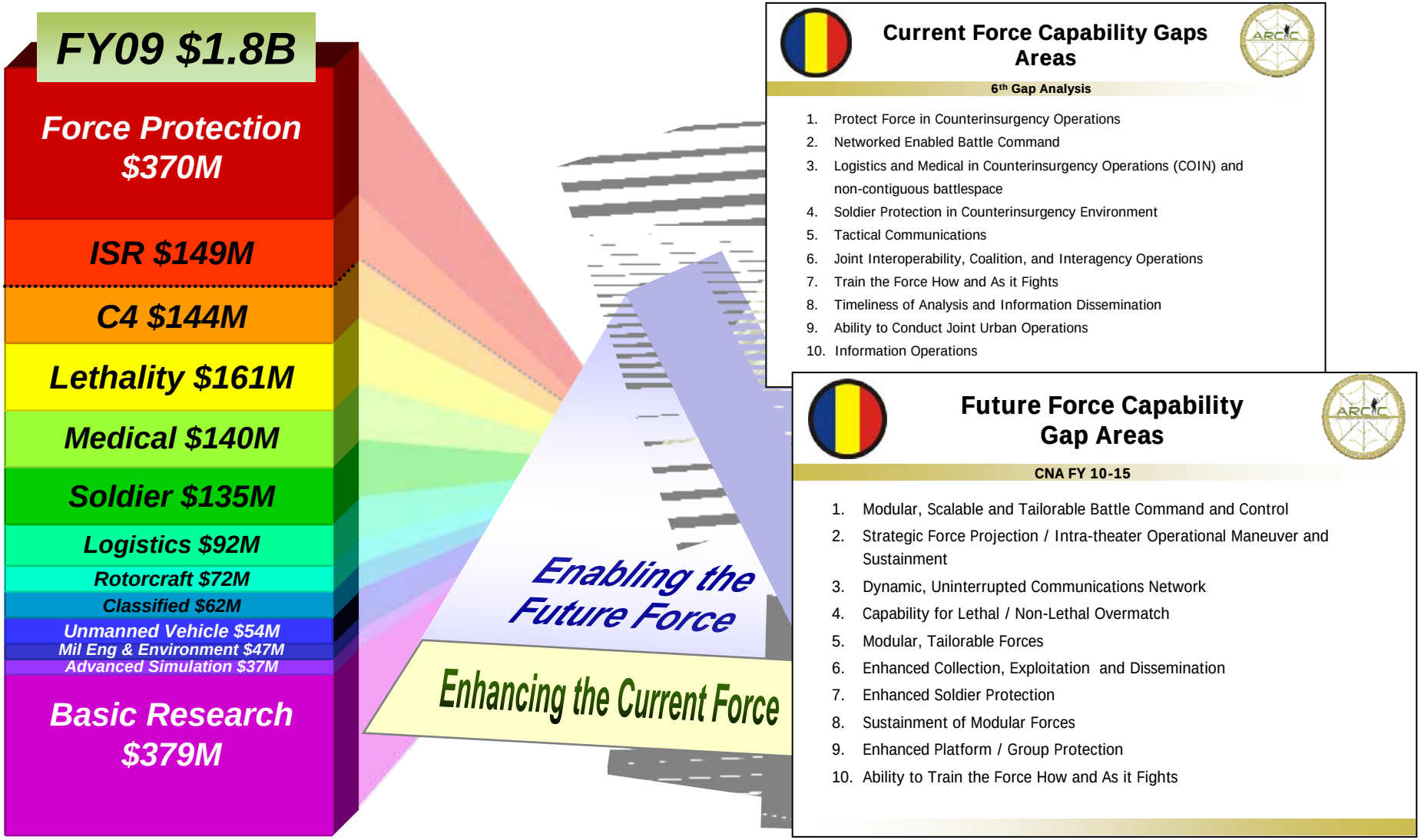
Precision Air Drop—50 meters

- Demonstrate technical feasibility at system and subsystem level
- Assess military utility
- Path for technology spirals to acquisition—rapid insertion of new technology

60% Industry

Far Term → **Mid Term** → **Near Term**

Technology Area Investments to Satisfy Gaps—New Capabilities



Current Force Capability Gaps Areas

6th Gap Analysis

1. Protect Force in Counterinsurgency Operations
2. Networked Enabled Battle Command
3. Logistics and Medical in Counterinsurgency Operations (COIN) and non-contiguous battlespace
4. Soldier Protection in Counterinsurgency Environment
5. Tactical Communications
6. Joint Interoperability, Coalition, and Interagency Operations
7. Train the Force How and As it Fights
8. Timeliness of Analysis and Information Dissemination
9. Ability to Conduct Joint Urban Operations
10. Information Operations

Future Force Capability Gap Areas

CNA FY 10-15

1. Modular, Scalable and Tailorable Battle Command and Control
2. Strategic Force Projection / Intra-theater Operational Maneuver and Sustainment
3. Dynamic, Uninterrupted Communications Network
4. Capability for Lethal / Non-Lethal Overmatch
5. Modular, Tailorable Forces
6. Enhanced Collection, Exploitation and Dissemination
7. Enhanced Soldier Protection
8. Sustainment of Modular Forces
9. Enhanced Platform / Group Protection
10. Ability to Train the Force How and As it Fights

Future Force Technologies

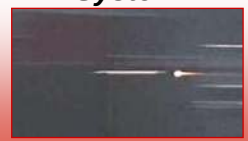
Force Protection

Army component—Joint High Power Solid State Laser Program

Structural Armor

High Energy Laser

KE Active Protection System

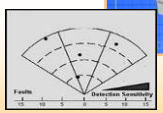


Integrated Rotorcraft Protection

C4/ISR

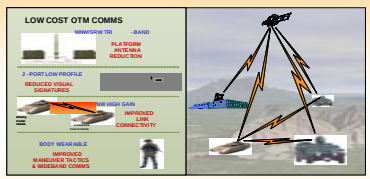
Knowledge Fusion

Flexible Displays



Sense Thru Wall

Advanced Antennas



Tactical Network & Communications Antennas

Directional Antennas

Tactical Mobile Networks

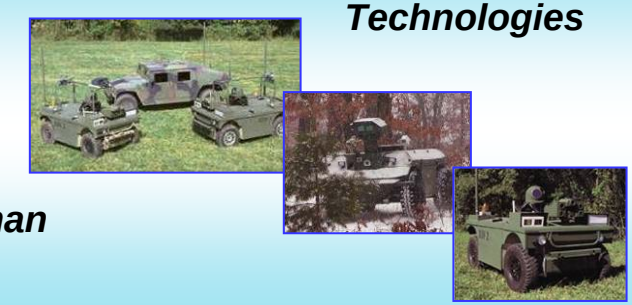
Unmanned Systems

Unmanned Air Vehicles

Unmanned Ground Vehicles

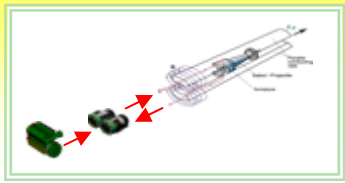
Unmanned System/Human Interface Technology

Unmanned Ground Vehicle Technologies



Future Force Technologies

Lethality



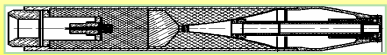
EM Gun

Warhead
Small Arms
Technology

Non Line of Sight - Launch System (NLOS-LS)

Scalable Effects

Urban Assault Munitions



Smaller, Lighter, Cheaper Munitions

Soldier Systems

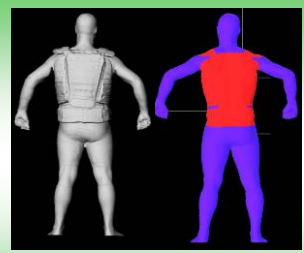
Combat Rations

Soldier Mobility and Advanced Load Carriage

System Flame Test

Current New

LiCFx Half-Size BA-5590 Battery



Armor Coverage

Logistics

Power & Energy

Hybrid Electric Drive

Fuel Cell Development

Sustainment

Advanced Hybrid Engines

Segmented Band track

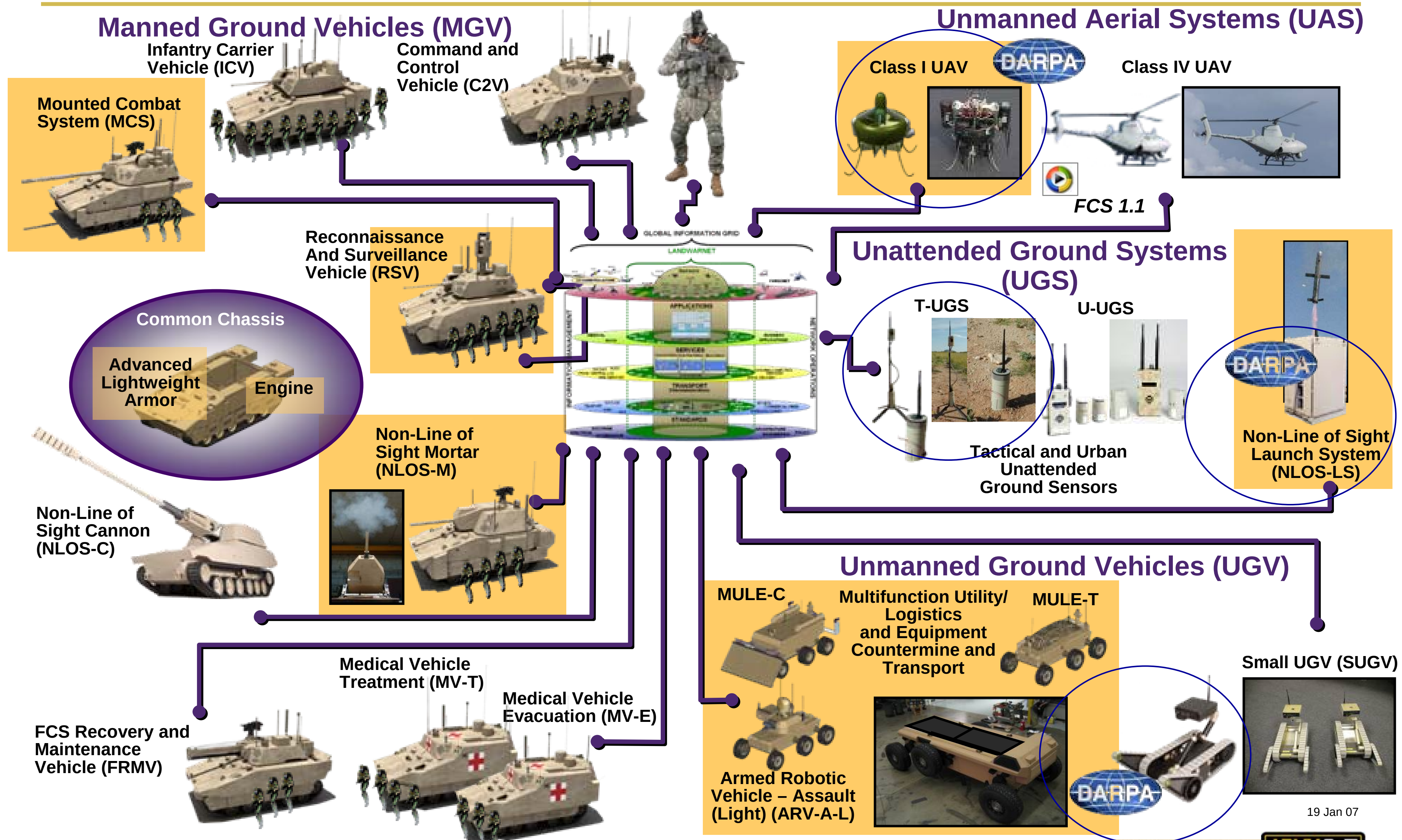
UNITED STATES ARMY NAC NATIONAL AUTOMOTIVE CENTER

Deployability

Precision Air Drop 30k lbs

Future Combat Systems—Spinouts to the Current Force

PROGRAM MANAGER FCS
BRIGADE COMBAT TEAM
One Team-The Army/Defense/Industry



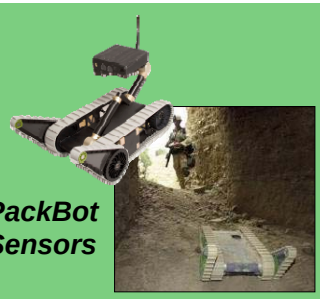
19 Jan 07

High Technology Army
ARMY S&T SCIENCE & TECHNOLOGY

Technology Insertions for Current Operations

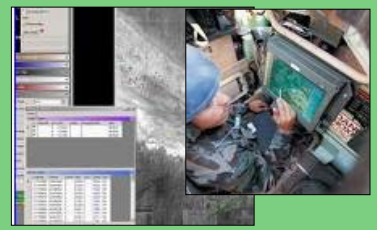
Benefiting from Past Investments

Interceptor Body Armor



PackBot Sensors

Blue Force Tracking



Guided MLRS

Adapting/ Accelerating On-going S&T Programs

Mobile Remote Access & Information Diagnostics

Every Soldier A Sensor Simulation

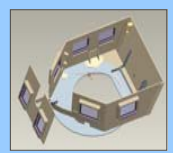
USMC Dragon Fire II with Lightweight Counter Mortar Radar (LCMR)

Mine Detecting Ground Penetration Radar (GPR)

Leveraging Scientist & Engineer Expertise

Enhanced Rocket, Mortar & Sniper Detection

RG-31 Engineer Vehicle Add-on Armor Kit



Hellfire Launch On Predator

HMMWV Expedient Armor

Accomplishments—2007

MCS

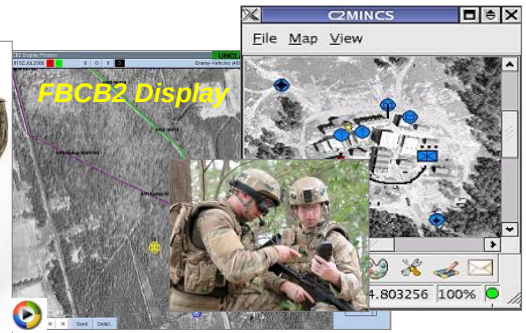
Mid-Range Munition

Line-of-Sight Multi-Purpose

Low Cost Accuracy Improvement for LOS Munitions

Mounted Combat Systems & Abrams Ammunition System Technologies

Future Force Warrior (FFW)



C4ISR—On The Move Experiment

Add On Armor & EW Subsystems

Buffalo

MRAP

HMMWV

Battlemind Training

Basic Research Thrusts

Research in human-engineered and biologically-evolved networks to improve performance, increase reliability and enhance network-centric mission effectiveness

Revolutionize military training and mission rehearsal through the development of technology and art for simulation experiences and the development of virtual human technology

Research to understand biological construction of novel materials, structures and processes to develop biologically-derived materials, sensing systems, information processing and power and energy

Discover, develop and exploit robotic devices and systems with highly sophisticated sense, response and processing systems approaching that of biological systems to dramatically enhance Soldier survivability

Research in understanding the functional brain to improve training techniques, human-machine interface design, the nature of traumatic brain injuries, and to more fully understand the decision-making process

Discover and create new materials with properties that will revolutionize military technology and make Soldiers less vulnerable to the enemy and environmental threats

Generate advances in quantum sciences that will enable revolutionary approaches to information processing, cryptography, information assurance, and communication

Predicting the Future

It's tough to make predictions, especially about the future. Some famous technology predictions include:

- ***"Heavier-than-air flying machines are impossible."***
  - ***Lord Kelvin, 1895***
- ***"Airplanes are ...of no military value."***
  - ***Marshal Ferdinand Foch, 1911***
- ***"Who ... wants to hear actors talk ?"***
  - ***H. M. Warner, 1927***
- ***"... (T)here is world market for maybe five computers."***
  - ***T. Watson, IBM Chairman, 1943***
- ***"640k (RAM) ought to be enough for anybody."***
  - ***Bill Gates, 1981***

Army S&T…

Engine of Transformation