Colonel Doug Beason
Deputy Director

Briefing to
Request for Information Symposium
14 February 2000

Air Force Research Laboratory
Directed Energy Directorate
AFRL/DE
Kirtland AFB, New Mexico

Colonel Doug Beason
Deputy Director
“VICTORY SMILES UPON THOSE WHO ANTICIPATE THE CHANGES IN THE CHARACTER OF WAR” Guilio Douhet
Directed Energy Directorate
A paradigm shift in weapon system technology for the 21st Century.

Our Mission

• *To support* user needs for DEW applications and to address mission area deficiencies

• *To exploit* the relevance of Directed Energy technology to Air Force and DoD needs

• *To foster* user awareness of the potential of Directed Energy for Air Force and DoD applications

• *To avoid* technological surprise

• *To explore* DE technology avenues that offer high payoff to directed energy capabilities and applications

To do what has never been done before!
Directed Energy Directorate
Our Vision of the Future:
Directed Energy will Dominate the Battlespace of the 21st Century

**Strike**
We will strike deep in the enemy’s territory at the speed of light, with little or no collateral damage or loss of life, crippling his ability to wage aggression.

**Protect**
Our high value and limited military assets will be protected by invisible shields of directed energy.

**Graduated Deterrence**
We will provide our warfighters with weapons that provide a wide range of graduated force for every military contingency.

**Awareness**
Our battlefield awareness will be greatly enhanced with directed energy tools capable of detection and identification.
Kirtland AFB

Unique & ideally suited for the nation’s directed energy technology development

Security & safety in isolated canyons
Access to 50,000 acres for testing

Ideal weather
“thin” atmosphere

Remote sites

Kirtland AFB

International airport & metro area

Many diverse, high tech tenants

Dark skies
No light “pollution”
Directed Energy Directorate
Remote Sites

• Maui, HI (leased land)
  • Relay Mirror Experiment Facility
  • Maui High Performance Computer Center
  • Maui Space Surveillance Complex

• North Oscura Peak, NM
  • Telescope site at White Sands Missile Range
  • Supports Space Imaging R&D (ABL Technology)
Lasers and Microwaves
Synergistic, Complementary and Capable

Radiation Wavelength

<table>
<thead>
<tr>
<th>High Energy Lasers</th>
<th>High Power Microwaves</th>
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<tbody>
<tr>
<td>Small spot: surgical attack</td>
<td>Flood target area: multiple simultaneous targets</td>
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<tr>
<td>Affects targets from outside: structural destruction</td>
<td>Affects components inside: electronic disruption</td>
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<tr>
<td>Modest apertures: glass mirrors, coatings</td>
<td>Big apertures: metal antennas, ground planes</td>
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But on the other hand,... they both

- Travel at the **speed of light** to the target
- Capable of graduated effects from **deny, disrupt, degrade, and destroy.**
- Minimum collateral damage
Directed Energy Directorate
Broad Technology Investments

Laser Technology Thrust

Advanced Optical Tech Thrust

High Power RF Tech Thrust
Directed Energy Directorate

12 Major DE Technology Programs
AFRL
Directed Energy Directorate

Mission
Develop, integrate and transition science & technology for Directed Energy to include high power microwaves, lasers, adaptive optics, imaging and its effects to assure the preeminence of US in air & space

Major Technology Programs
- Ground Based Laser
- Airborne Laser
- High Power Lasers
- Multi-Wavelength Laser
- Electric Lasers
- Large Optics
- Space Awareness
- HPM Applications
- HPM Effects
- HPM Pulsed Power
- HPM Sources
- Remote Sensing

AFRL/DE - factoids
- 952 people (Civ, Mil, Contr)
- $109M FY00 budget
- 4,325 acres
- 757,000 sf of space
- Located throughout Kirtland
- Sites at Maui & WSMR
Directed Energy Directorate
Major Kirtland Facilities
Lasers, Optics, Imaging

Starfire Optical Range

Advanced Laser Facility

Optics Development & Beam Control Laboratory

Chemical-Oxygen-Iodine-Laser Facility

Laser Effects Test Facility

Optics Coating & Components Evaluation Laboratory

Argus Facility
Directed Energy Directorate
Major Facilities - High Power Microwave

High Energy Microwave Laboratory

High Energy Research & Technology Facility

Plasma Research Laboratory

Electromagnetic Energy/RF Effects Laboratory

Electric Research Laboratory
Directed Energy Directorate

Manning

Assigned Personnel
952

Government S&E Education Levels

- On-Site Contractors: 325
- Military: 234
- Civilian: 393

- BS/Other: 34%
- PhD: 29%
- MS: 37%
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FY00 AFRL PB Resources

AFRL TOTAL S&T: $1,037.98M

Directed Energy Total: $109.11M

DE S&T: $75.3M (7%)
6.1, 6.2, 6.3

Rest of AFRL S&T: $962.67M

Customer: $8.81M (8%)
a/o 31 Jan 00

Cong Add: $25M (23%)

6.2/6.3: $70.37M (64%)

6.1: $4.93M (5%)
Directed Energy Directorate
Potential Areas for Collaboration

- Electric Lasers
- Beam Control
- Large, Lightweight Optics
- Optical Coatings

- High Power RF Sources
- High Power RF Antennae
- Atmospheric Compensation
- Remote Sensing

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