

Briefing to
Request for Information Symposium
14 February 2000

Air Force Research Laboratory

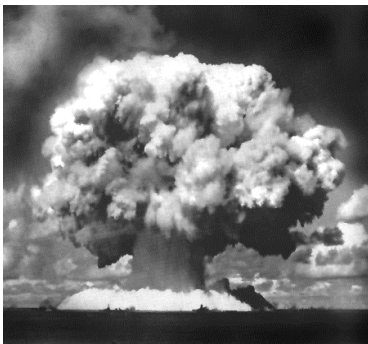
Directed Energy Directorate
AFRL/DE

Kirtland AFB, New Mexico

Colonel Doug Beason
Deputy Director



“VICTORY SMILES UPON THOSE WHO ANTICIPATE THE CHANGES IN THE CHARACTER OF WAR” Giulio Douhet





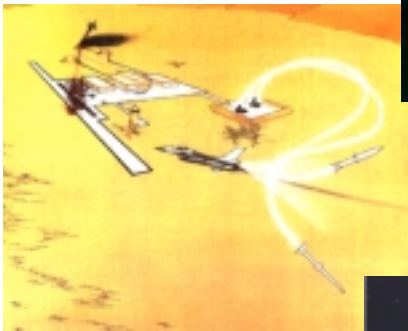
Directed Energy Directorate

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!



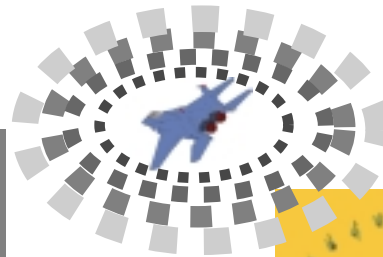
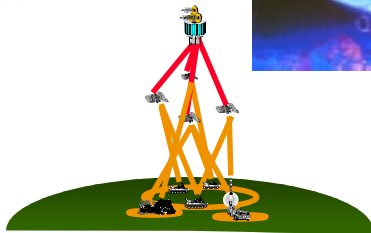
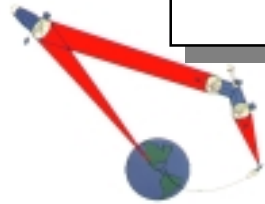


Directed Energy Directorate

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.



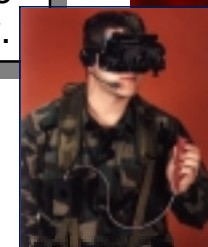
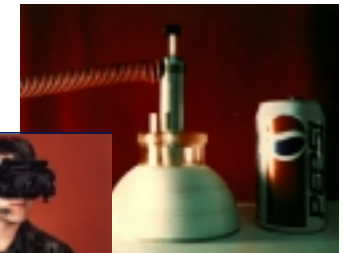
Our high value and limited military assets will be protected by invisible shields of directed energy.

Protect



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





Security & safety in isolated canyons



Access to 50,000 acres for testing



Remote sites



**Ideal weather
“thin” atmosphere**



Kirtland AFB

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

**Dark skies
No light
“pollution”**



Many diverse, high tech tenants

International airport & metro area

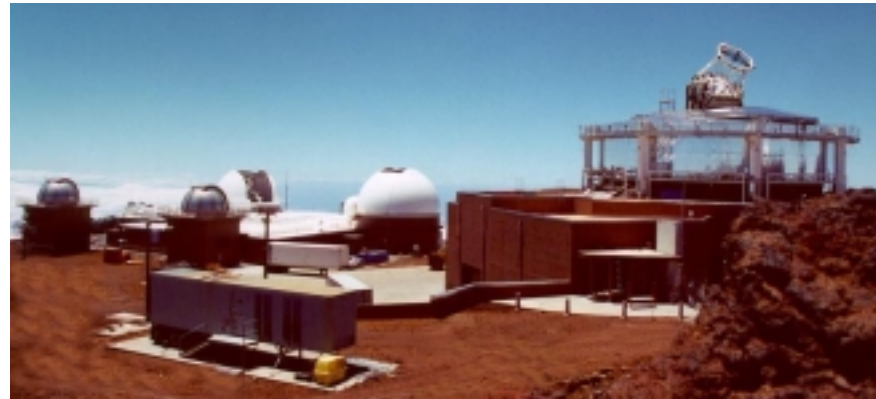




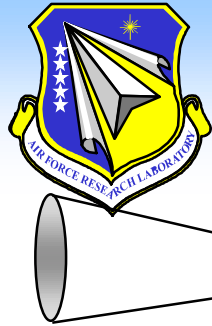
Directed Energy Directorate Remote Sites



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

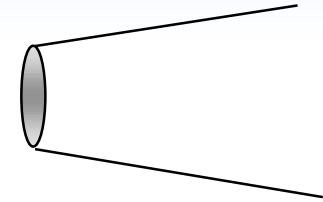
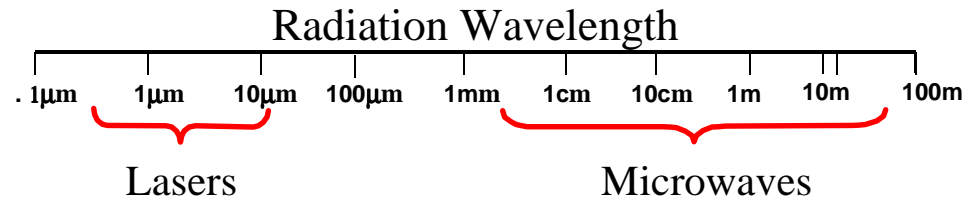


- **North Oscura Peak, NM**
 - **Telescope site at White Sands Missile Range**
 - **Supports Space Imaging R&D (ABL Technology)**



Lasers and Microwaves

Synergistic, Complementary and Capable



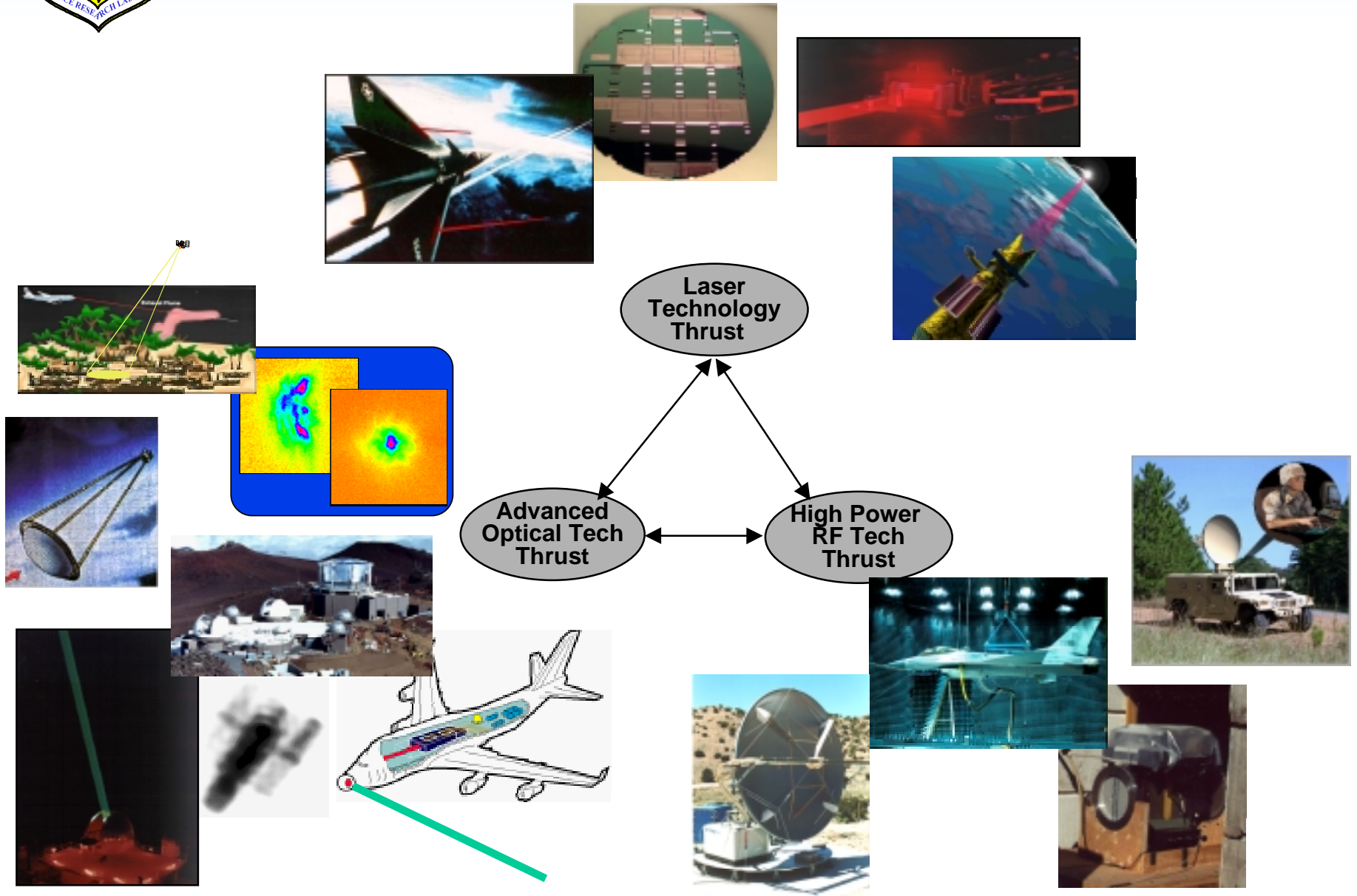
| High Energy Lasers | High Power Microwave s |
|--|---|
| Small spot: surgical attack | Flood target area: multiple simultaneous targets |
| Affects targets from outside: structural destruction | Affects components inside: electronic disruption |
| Weather sensitive: clouds, dust, molecular absorption | Weather insensitive: sees through clouds and dust. |
| Modest apertures: glass mirrors, coatings | Big apertures: metal antennas, ground planes |

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



Ground Based Laser Technology Program

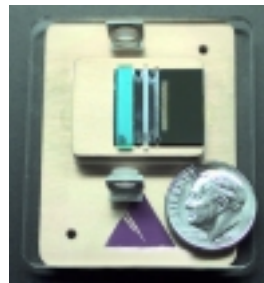


Airborne Laser Technology Program



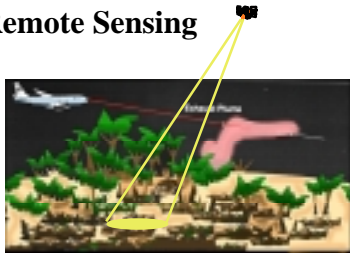
High Power Laser Program

Scalable Multi-Wavelength Laser Program



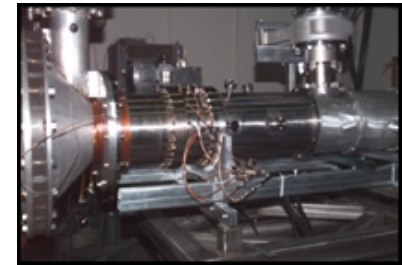
High Efficiency Electric Laser Program

Remote Sensing



Directed Energy Directorate

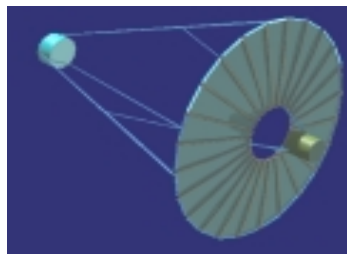
12 Major DE Technology Programs



HPM Sources Program

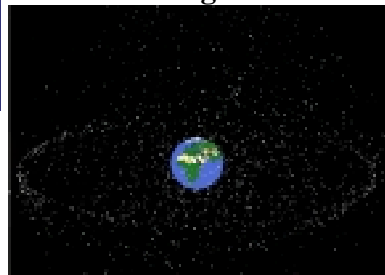


HPM Pulsed Power Program



Large Optics

Space Awareness Program



HPM Applications Program



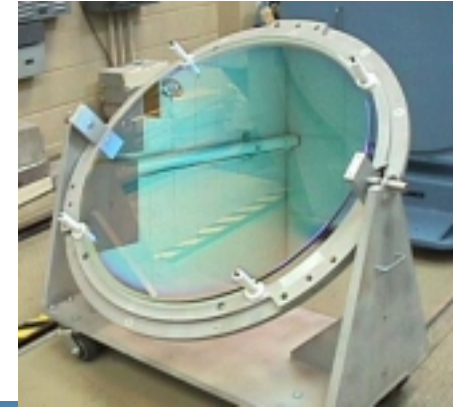
HPM Effects Program



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 | Space Awareness |
| Airborne Laser | HPM Applications |
| High Power Lasers | HPM Effects |
| Multi-Wavelength Laser | HPM Pulsed Power |
| Electric Lasers | HPM Sources |
| Large Optics | 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

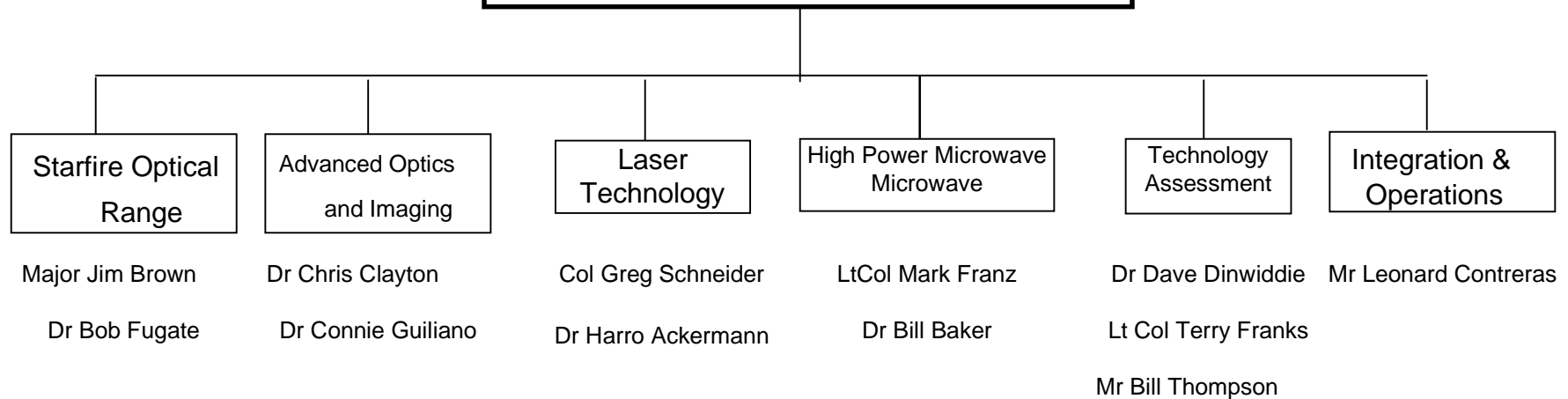


Air Force Research Laboratory

Directed Energy Directorate

Directed Energy Directorate

Director Dr Earl Good
Deputy Col Douglas Beason
Chief Scientist Dr Barry Hogge

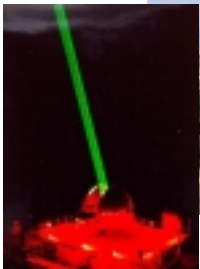




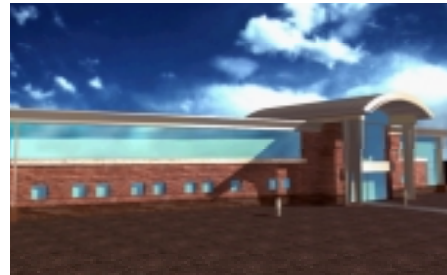
Directed Energy Directorate Major Kirtland Facilities Lasers, Optics, Imaging



Starfire Optical Range



Advanced Laser Facility



Argus Facility



**Optics Development
& Beam Control Laboratory**



**Chemical-Oxygen-Iodine-
Laser Facility**



Laser Effects Test Facility



Optics Coating & Components Evaluation Laboratory





Directed Energy Directorate

Major Facilities - High Power Microwave



Plasma Research Laboratory



High Energy Microwave Laboratory



High Energy Research & Technology Facility



Electric Research Laboratory

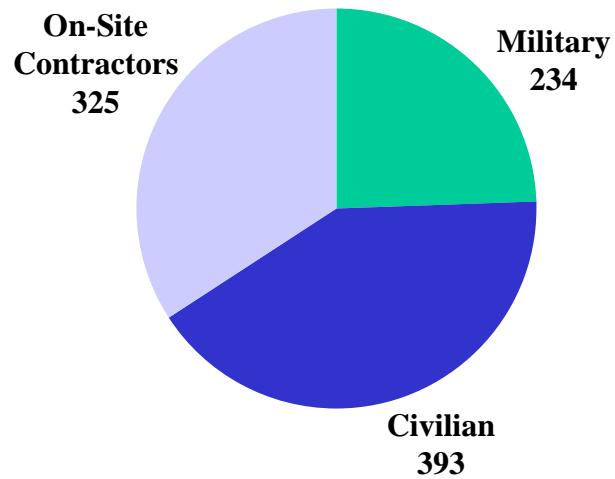


Electromagnetic Energy/RF Effects Laboratory

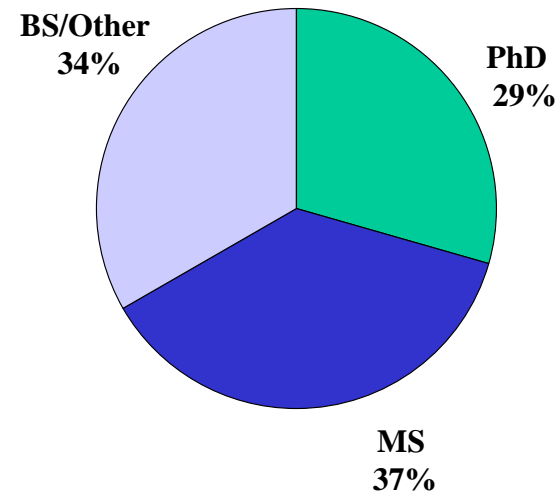


Directed Energy Directorate

Manning



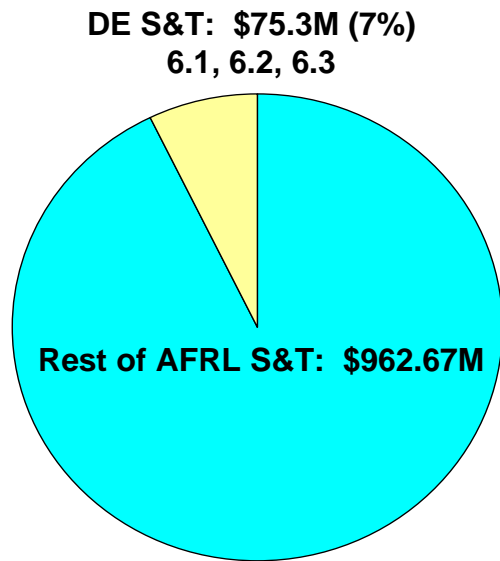
Assigned Personnel
952



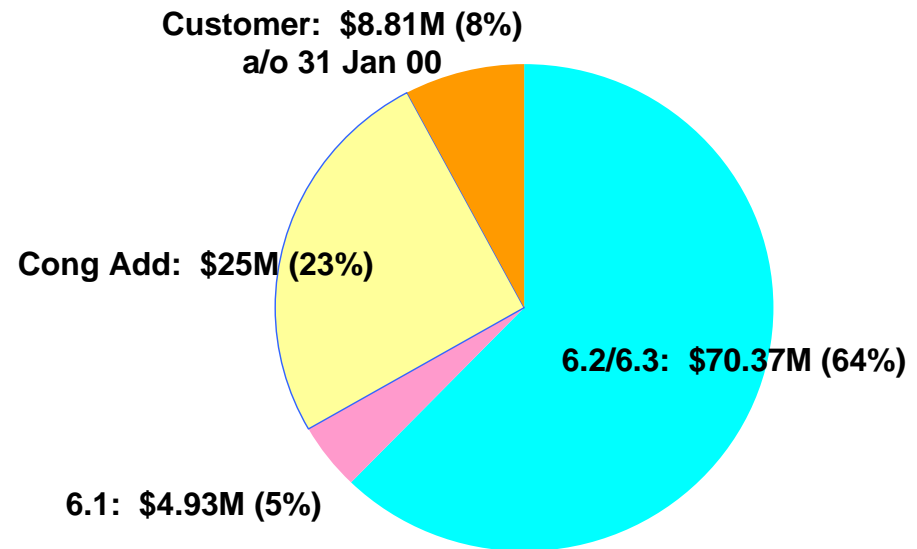
Government S&E Education Levels



Directed Energy Directorate FY00 AFRL PB Resources



AFRL TOTAL S&T: \$1,037.98M



Directed Energy Total: \$109.11M



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

For Information contact Mr Rich Garcia, AFRL/DEOB-PA (505)846-4583