

Science Fiction Made Real

Introduction to Directed Energy



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Commander (CC)
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Executive Director (CA)
Mr. Joe Sciabica



Vice Commander (CV)
Col. Daniel Morin



Chief Technology Officer (CZ)
Dr. Brian Kent



AF Office of
Scientific Research
(AFOSR)



Propulsion
(RZ)



Directed Energy
(RD)



Information
(RI)



711 Human
Performance Wing



Munitions
(RW)



Sensors
(RY)



Space Vehicles
(RV)



Materials &
Manufacturing (RX)

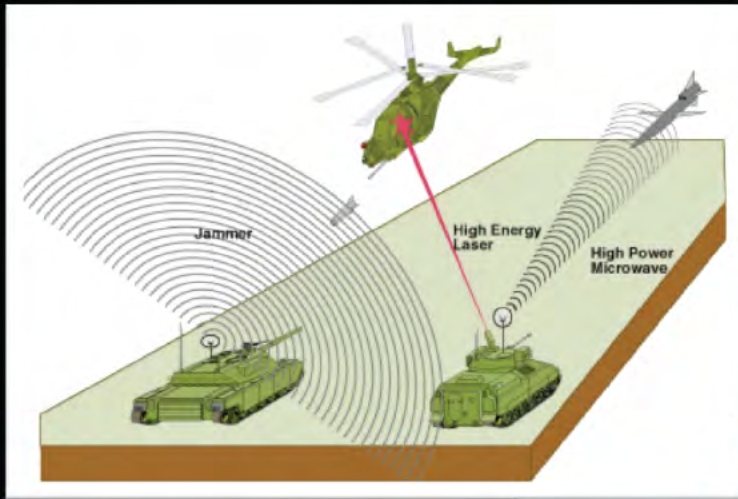


Air Vehicles
(RB)



Human
Effectiveness
(RH)

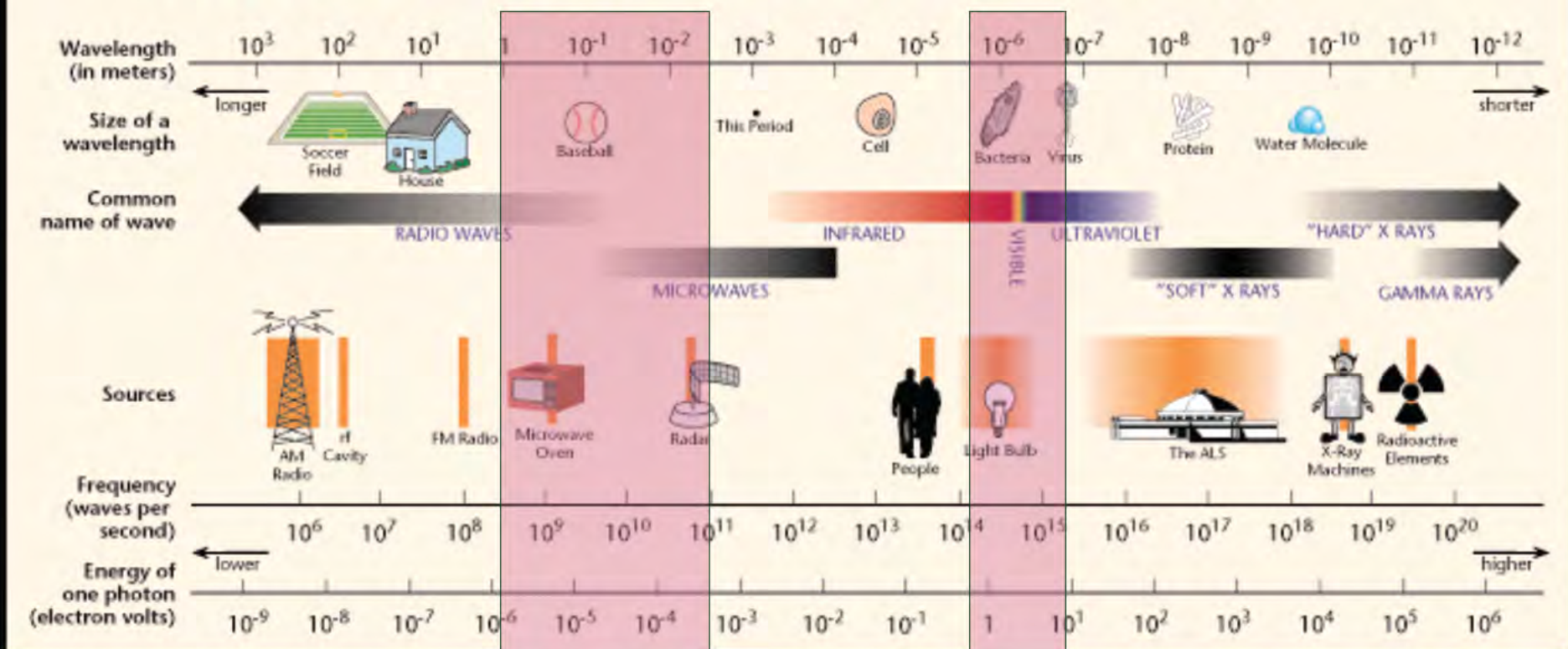
Directed Energy Lasers and Radio Frequency



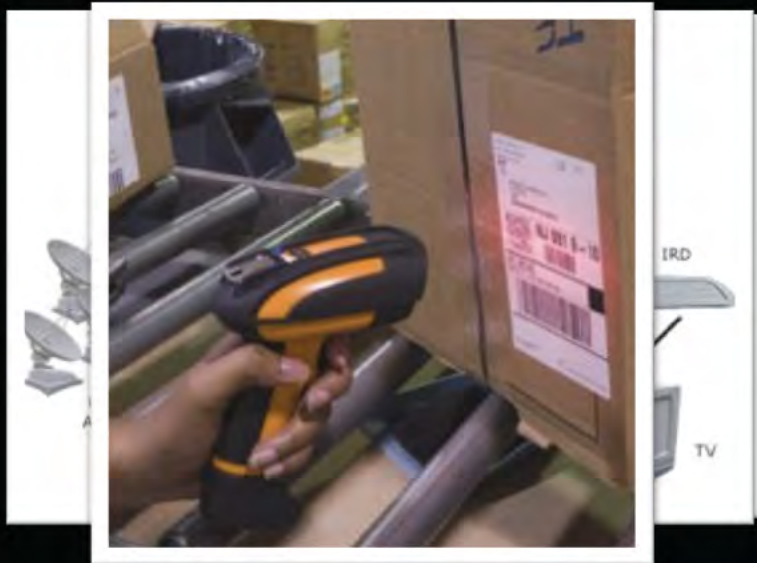
A concentrated beam of electromagnetic energy

Directed Energy

THE ELECTROMAGNETIC SPECTRUM

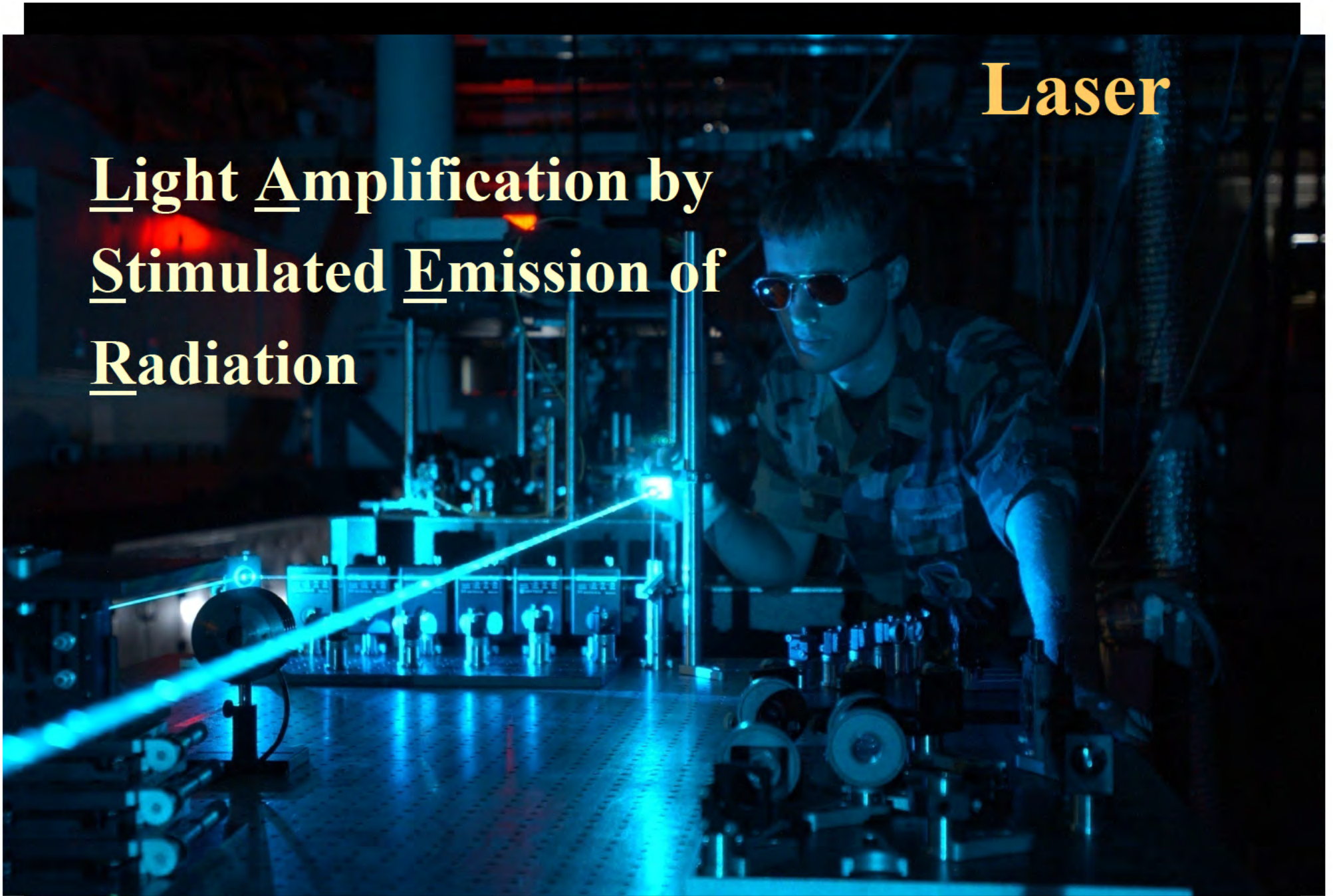


The Spectrum is All Around You

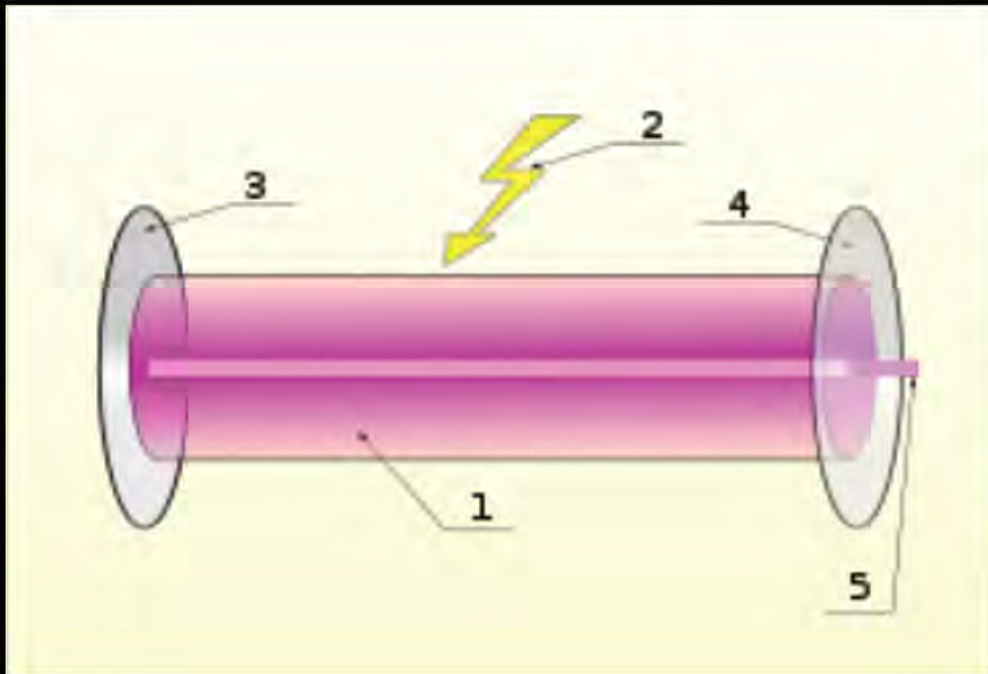


Laser

Light Amplification by
Stimulated Emission of
Radiation



Laser



Principal Components:

1. Gain medium
2. Laser pumping energy
3. High reflector
4. Output Coupler
5. Laser beam

Radio Frequency (RF)

Electricity



Radio Frequency Source



Radio Frequency waves



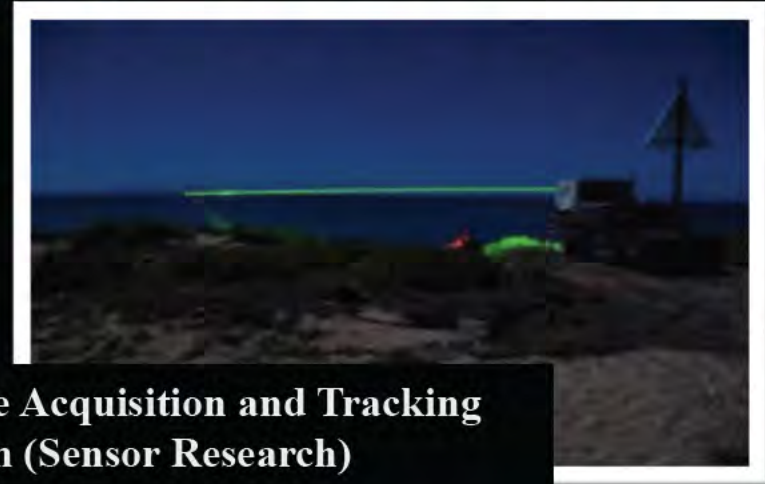
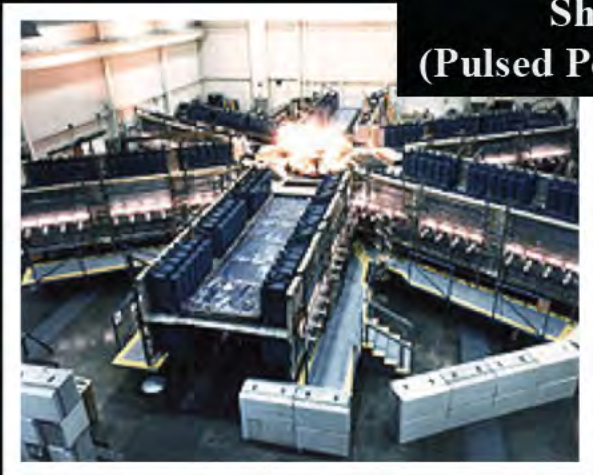
Heat

Radio Frequency (RF)



Air Force Research Laboratory Directed Energy Directorate

**Shiva Star
(Pulsed Power Research)**



**Mobile Acquisition and Tracking
System (Sensor Research)**



**Anechoic Chamber for
Indoor electronics testing**



**Starfire Optical Range
(Adaptive Optics Telescope)**

Videos

Space
Situational
Awareness &
Ground-based
Lasers

Videos

Defending
against
Unmanned
Aerial Systems

Videos

Confusing
the Enemy
with Electronic
Disruptions

Videos

Active Denial
Through
Radio Waves

Discussions

Short range, different effects on different people



Pepper Spray



Rubber Bullets



Water Cannon

Which do you Want?

Long range, minimal uniform effects



Active Denial System



Timeline Shortened

Centuries!



Decades!



3 Years!



We Still Have a Ways to Go

Early Armored Vehicle
(armored steam engine towing armored
6" howitzers and rifle port cars)



If no one bought these,
we would not have these!



Current Armored Vehicle
(MaxxPro XL)



Behind Foreign Borders

- China Laser hit sat (2007)
- Russian Club K Missile System
- German Diehl RF system

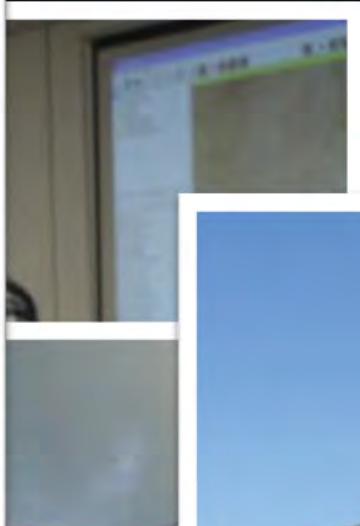
Chinese Anti-Satellite Test



Russian Club K Missile System



Directed Energy



Thank you