Photonics Overview

LtCol David A. Honey

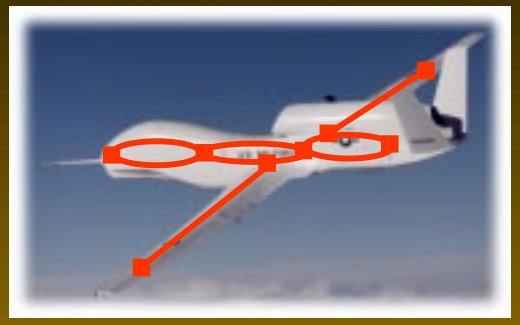
DARPA/MTO

DARPATECH 1999

Photonics

- A Technology for...
  - –Sensing
  - –Communicating
  - –Information Processing

Warfighter Benefits



- Comprehensive Awareness
- Precision Engagement

Photonics Overview

MTO

- MTO Applications Areas
- Technical Strategy: *Business Plan*
- S&T Acquisition Strategy
- Future Opportunities

Photonics Overview

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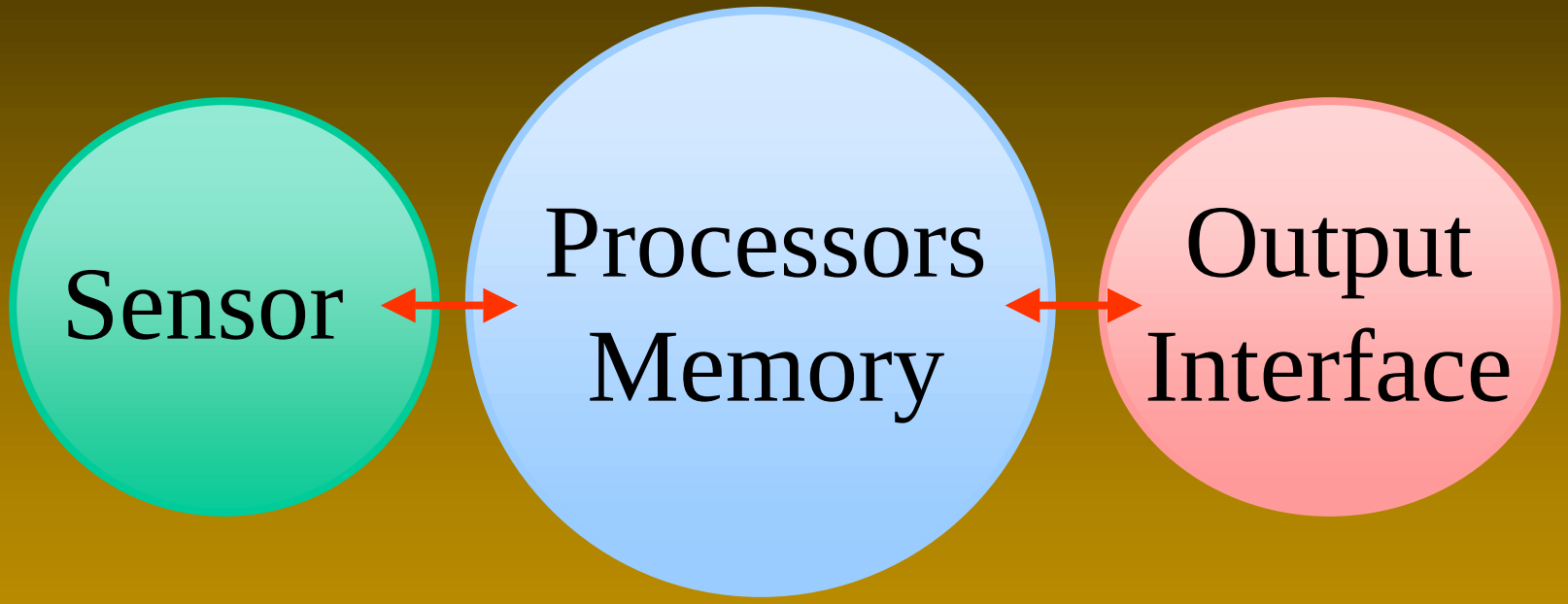
Sensor System



Platform Scale
Information System

Programs

- Sensing
  - –IR Sensitive Materials; Sensor Integration; GaN Sensors
- Communicating
  - –RF Photonics; Optical Micro Networks; Steered Beams
- Processing
  - –VLSI Photonics; Photonic A/D Converter

Program Managers

- Sensing
  - –R. Balcerak; E. Towe; R. Leheny
- Communicating
  - –R. Leheny; D. Honey
- Processing
  - –E. Towe; R. Leheny

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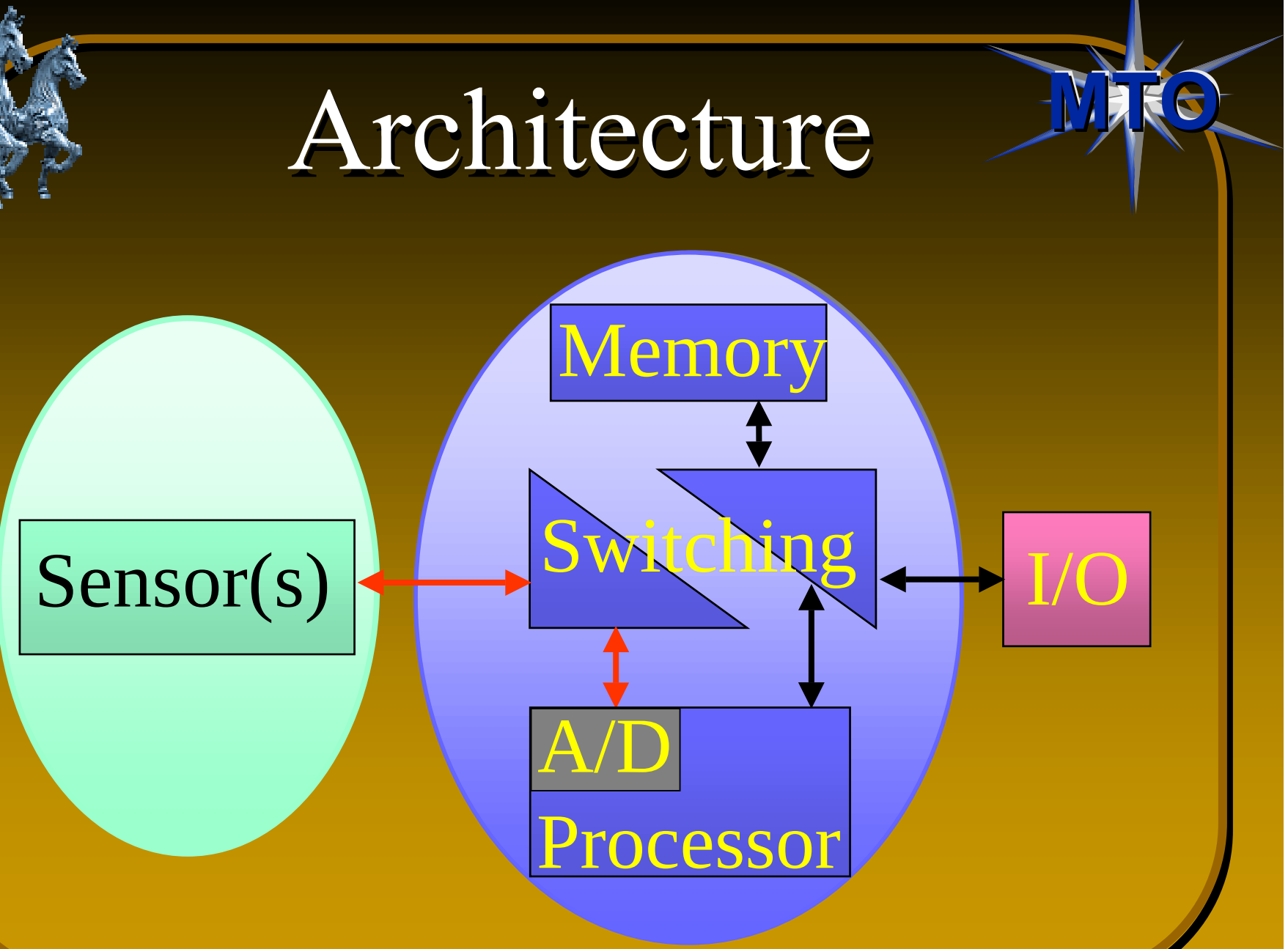
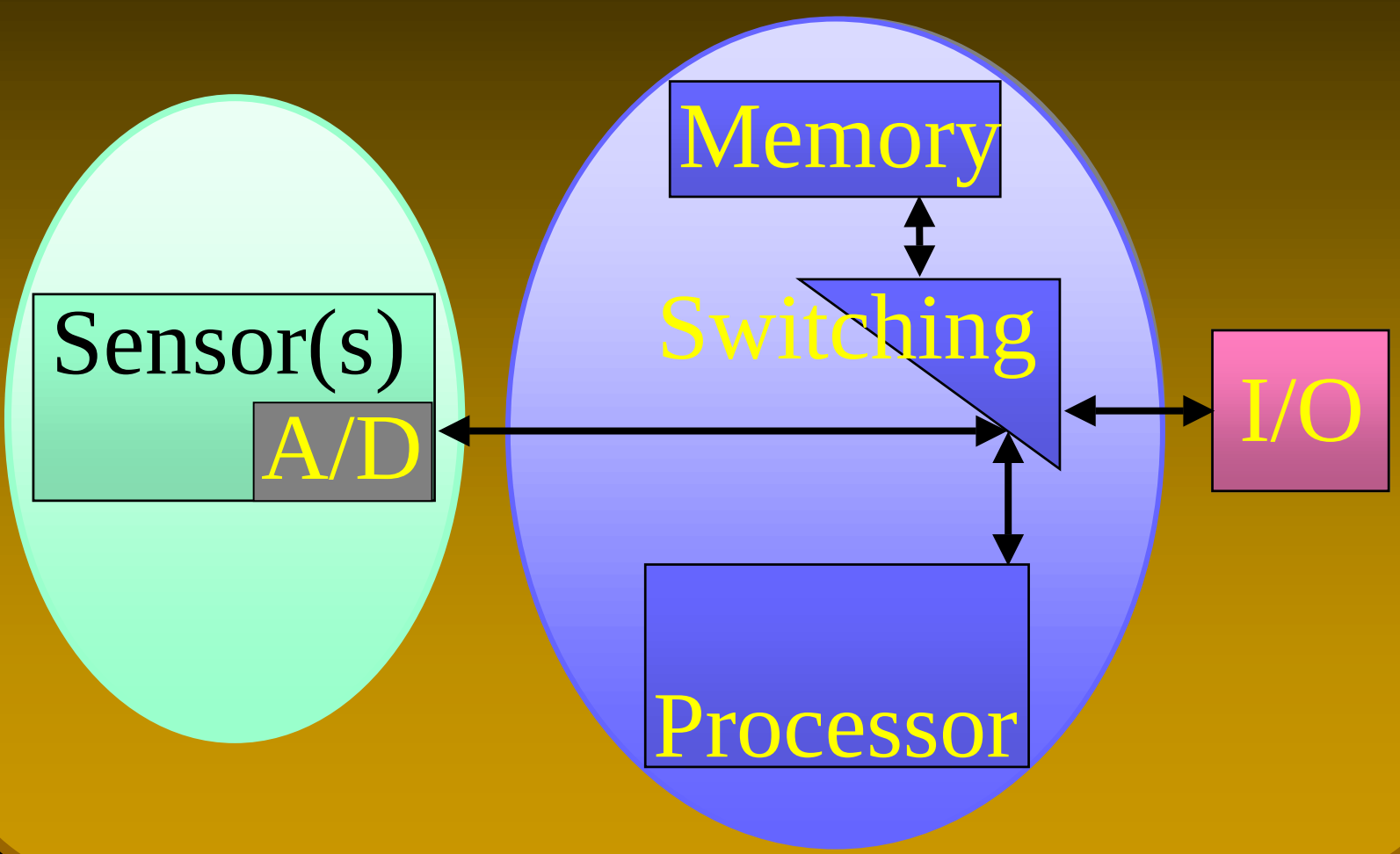
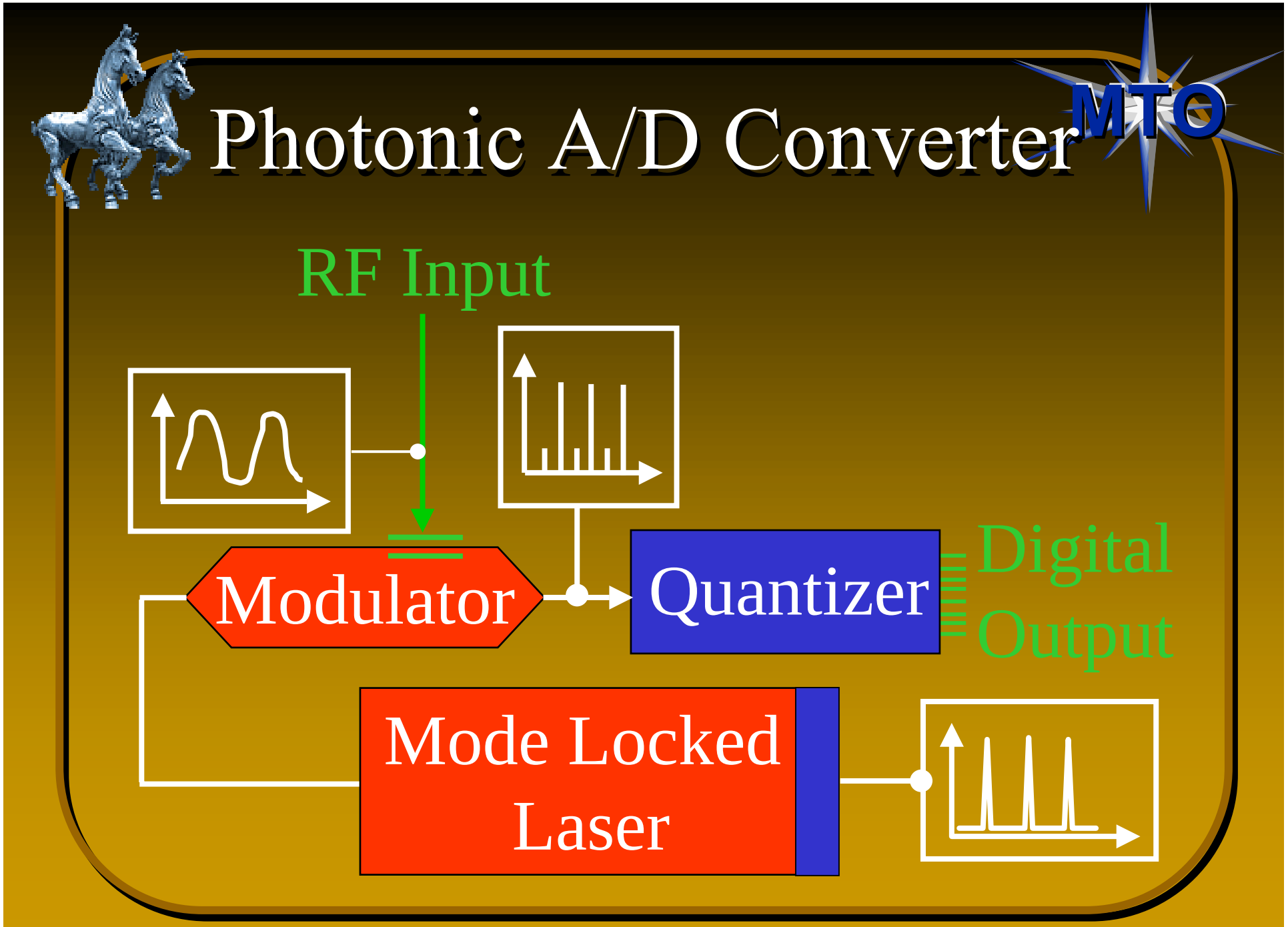
Architecture



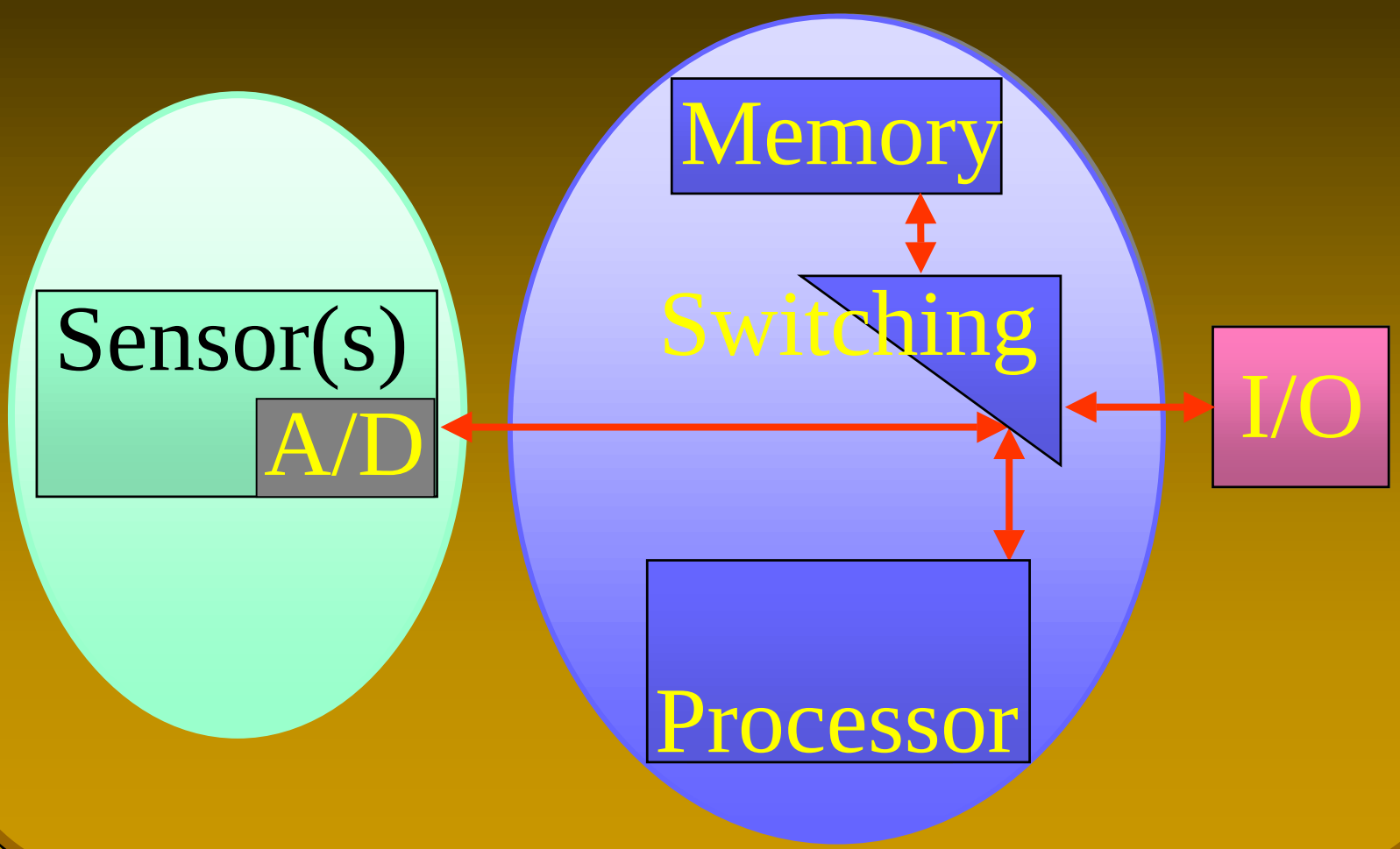
Photonic A/D Converter



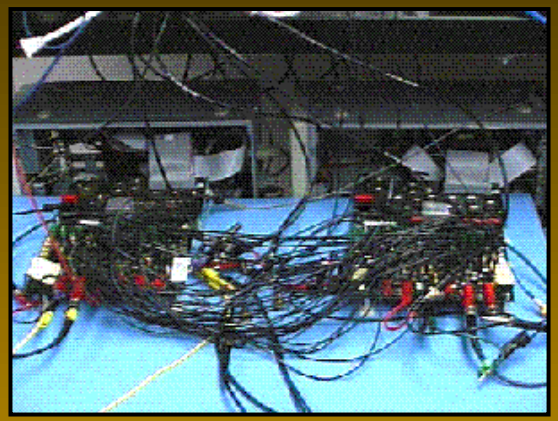
Photonic A/D Converter



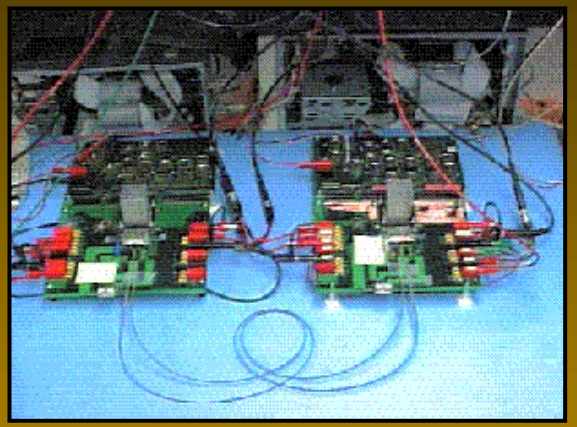
Optical Micro Networks

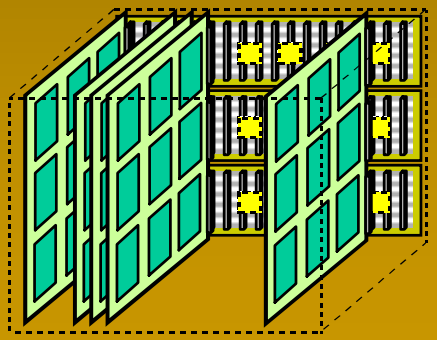


Optical Micro Networks

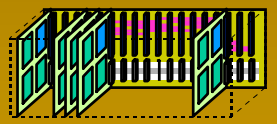


Reduced Cabling





9U chassis

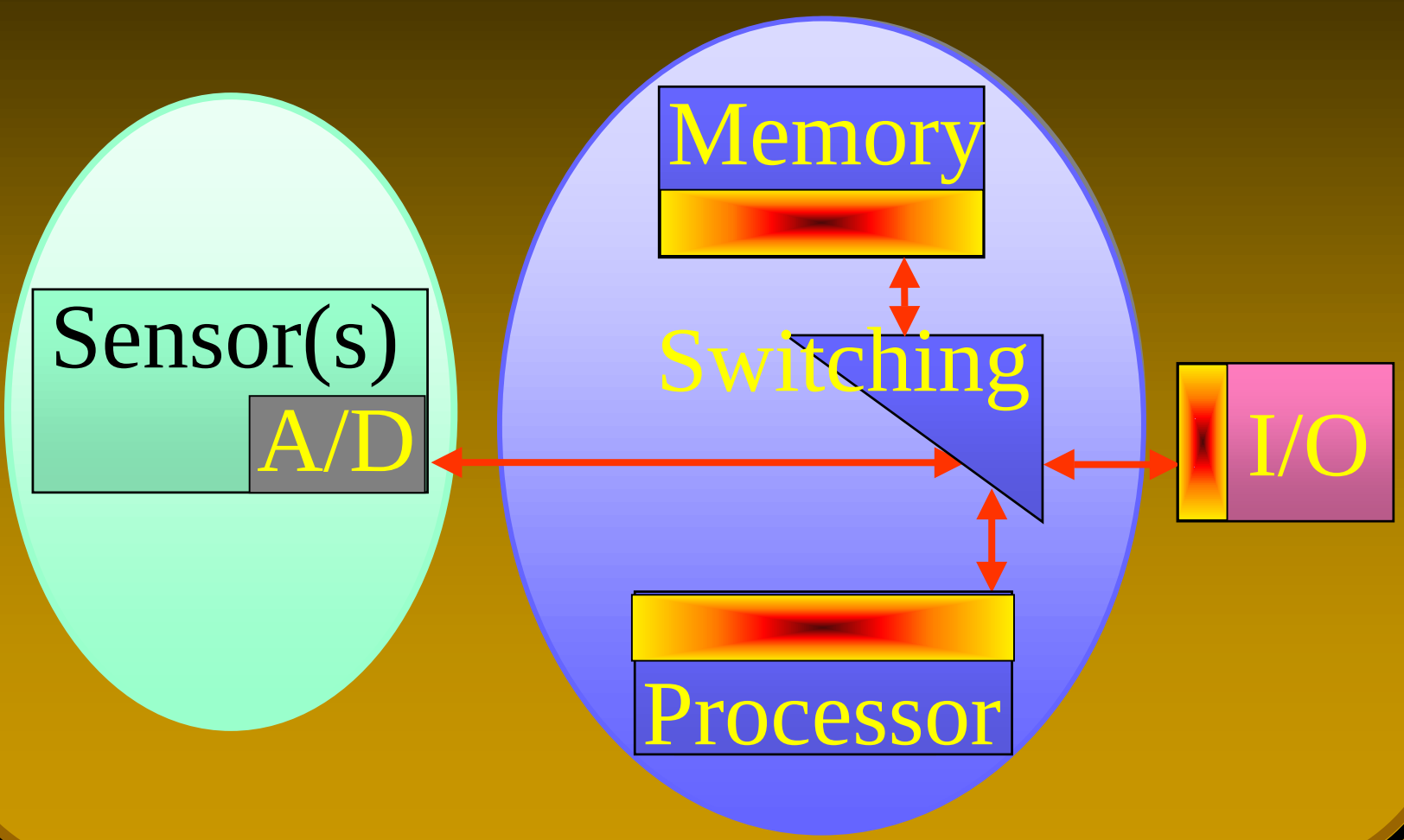


6U chassis

AV-8 Flying Testbed

China Lake NAS

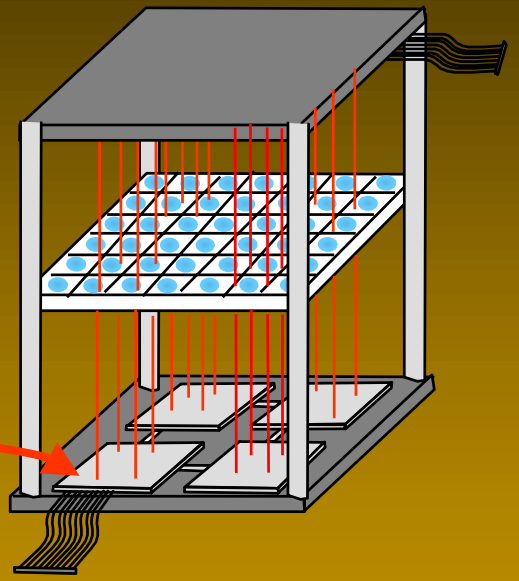
VLSI Photonics

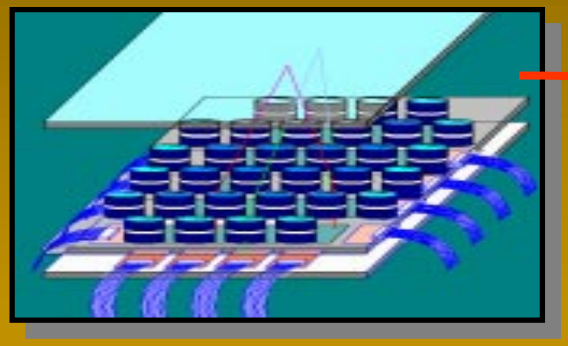


VLSI Photonics

MTO

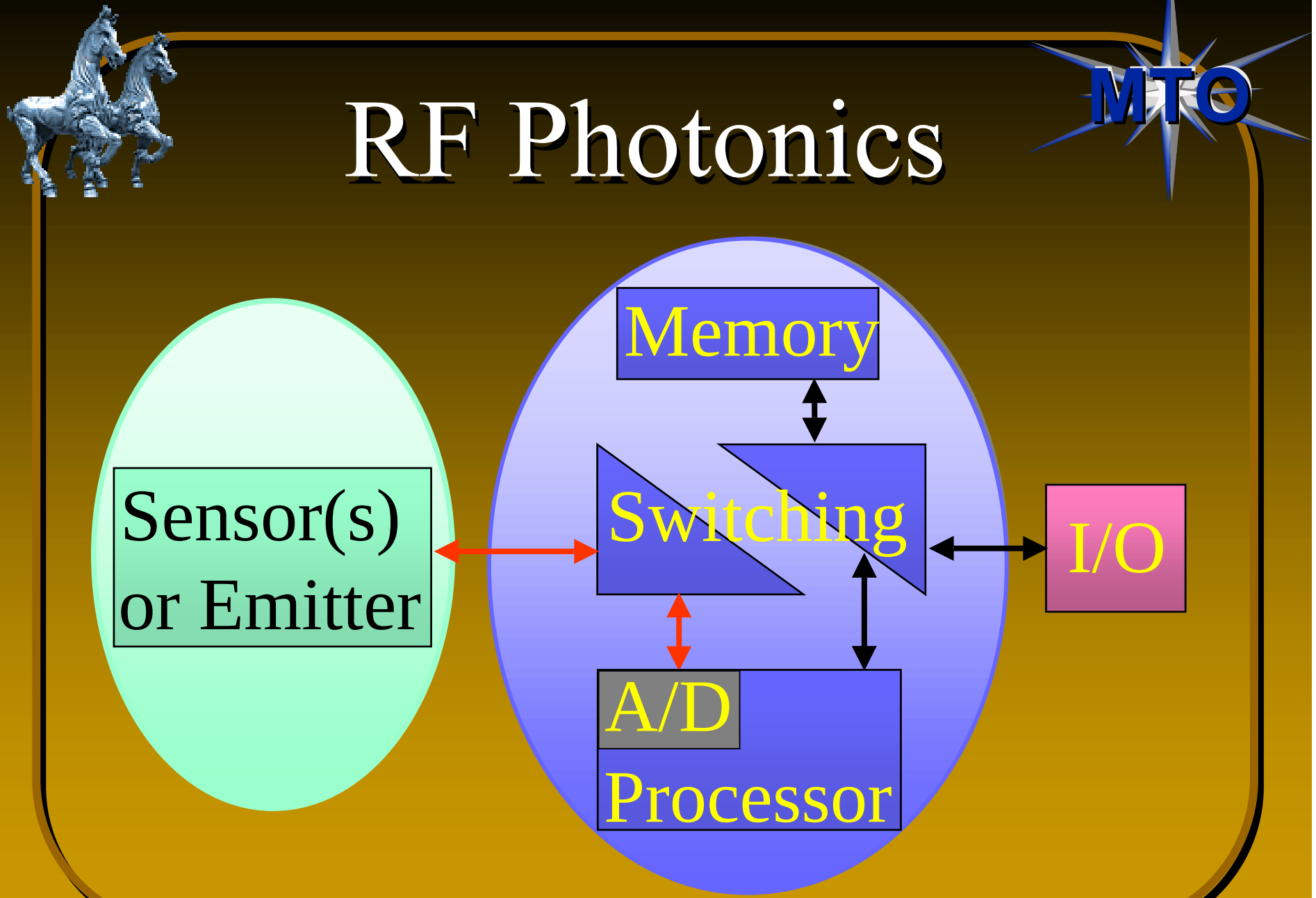
TBytes
of
Information



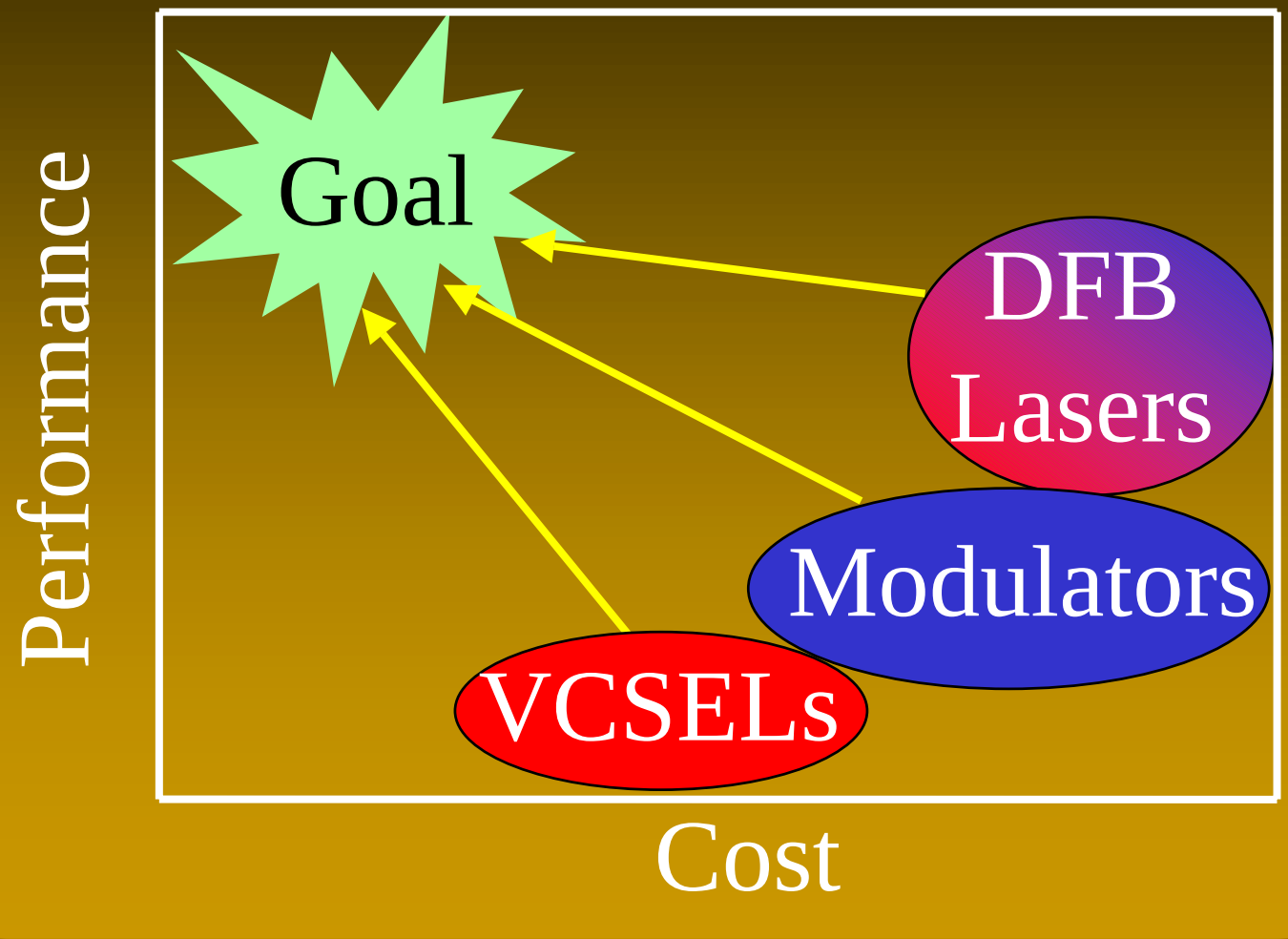


Chip-to-Chip Optical Interconnect

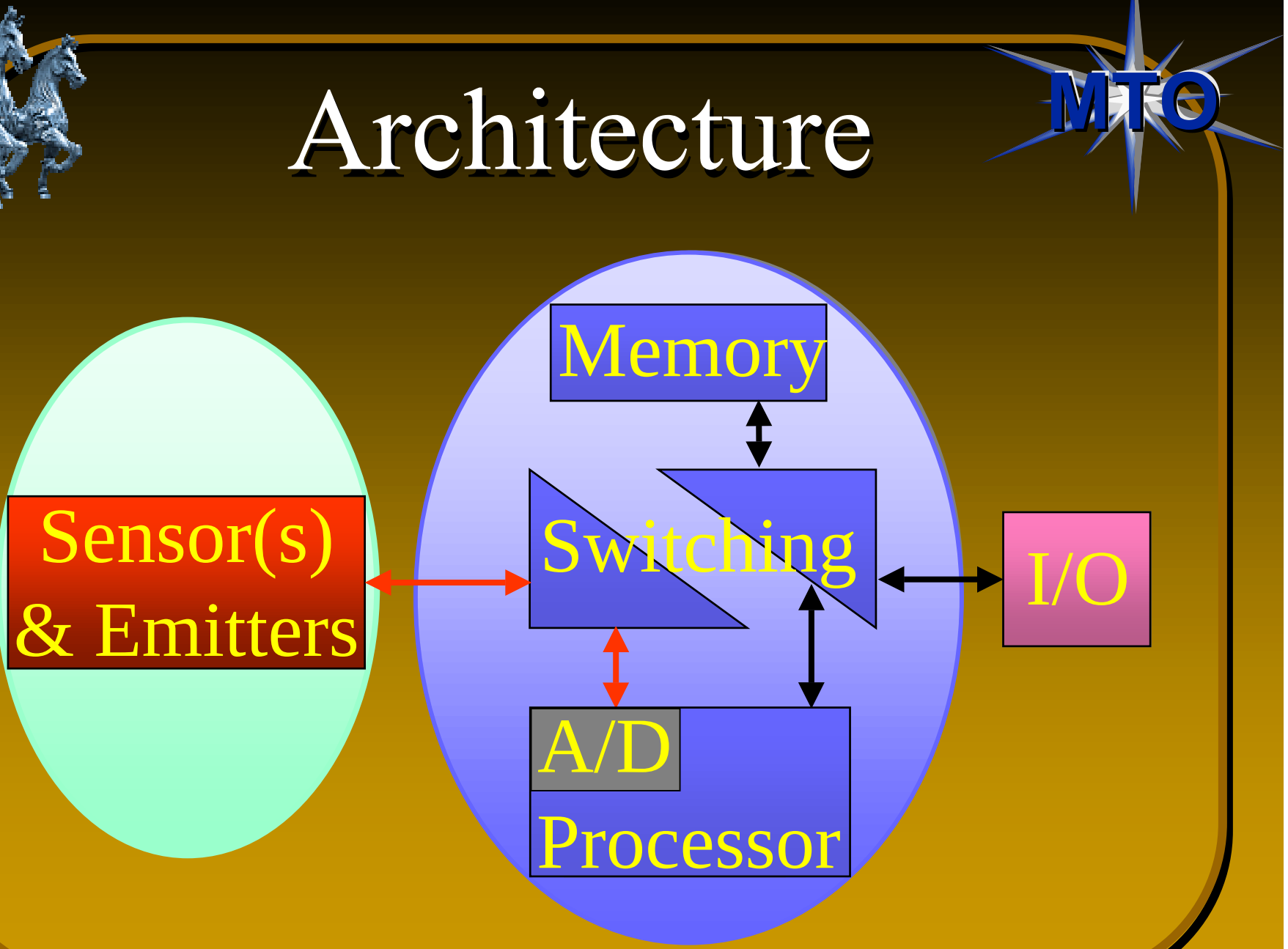
RF Photonics



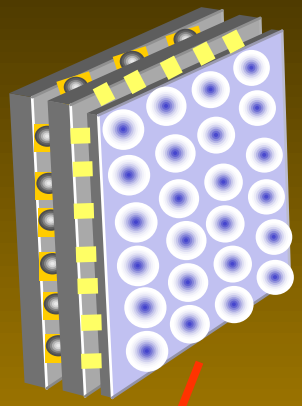
RF Photonics

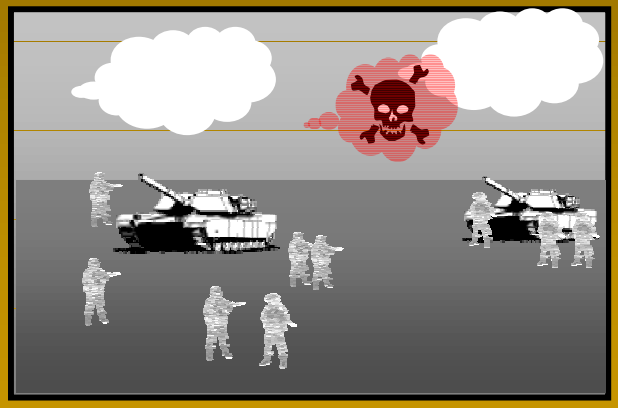


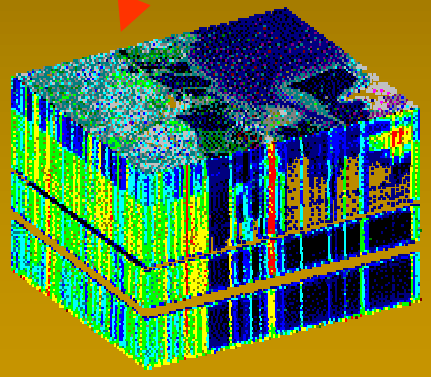
Architecture

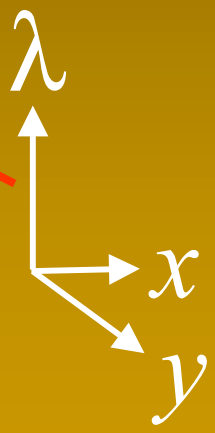


Integrated Sensors





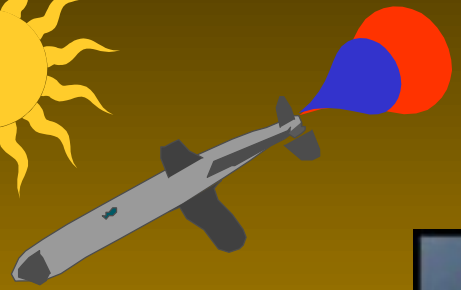


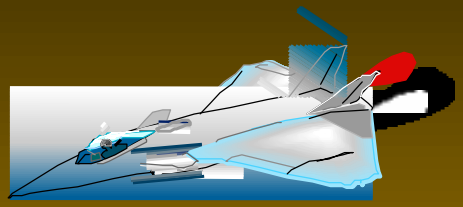


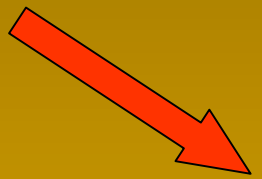
IR Sensitive Materials

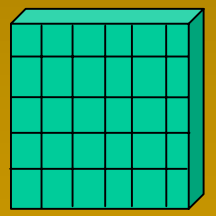
IR Sensitive Cantilever

Vehicle Self Protection

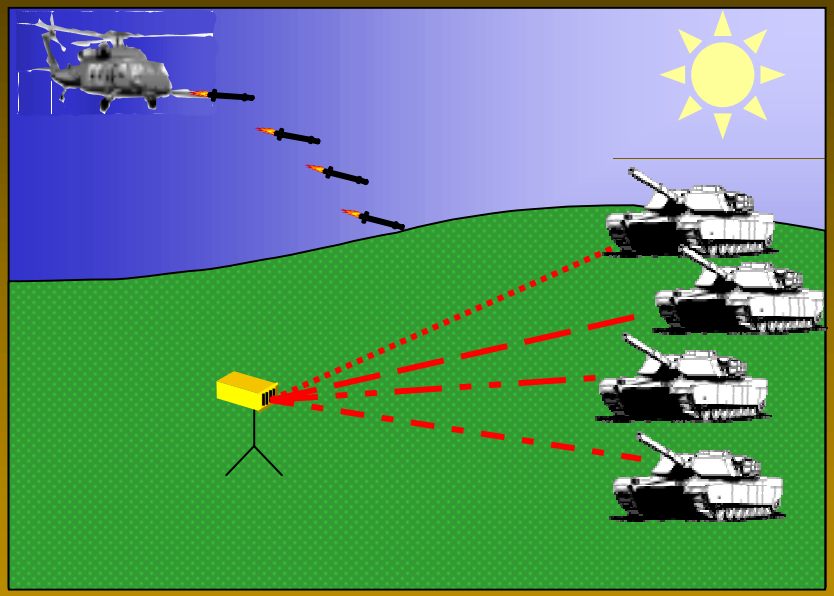


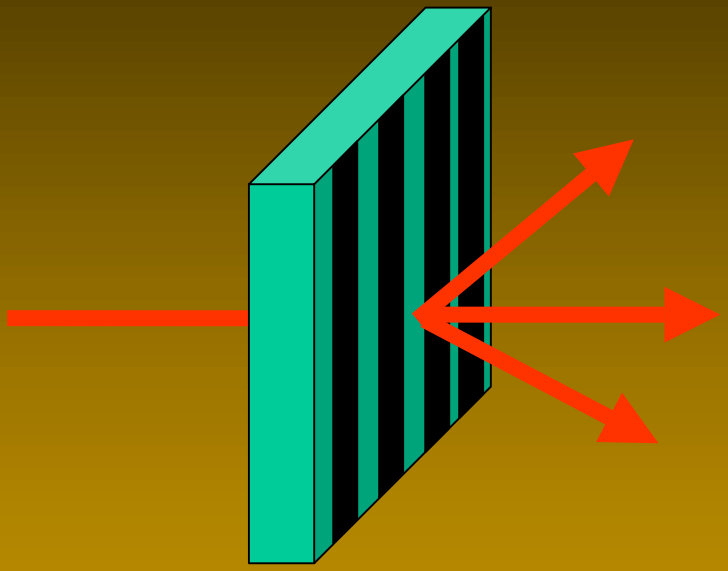






Steered Agile Beams





Multiple Target Engagements

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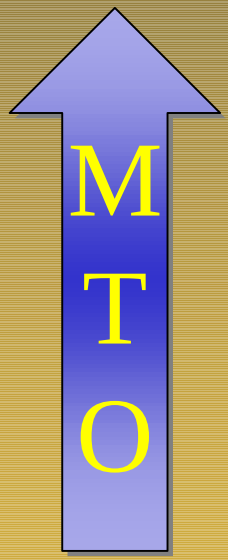
- Future Opportunities

Development Food Chain

Applications
Systems
Subsystem
Module
Device
Fabrication
Materials
Science

Application Pull



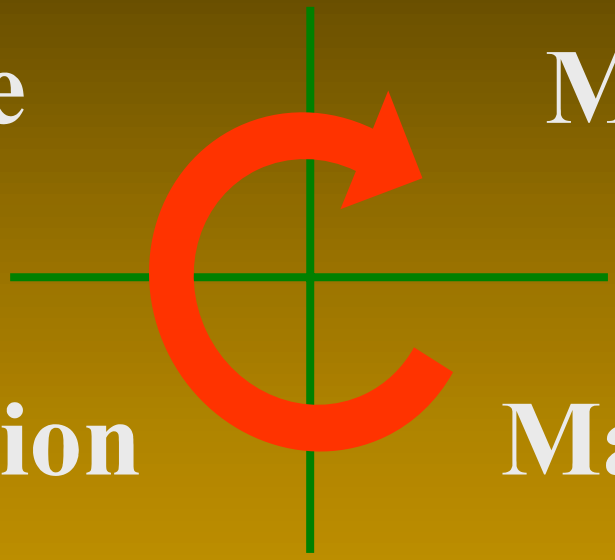
Technology Push

Development Cycle

MTO

Device

Module



Fabrication

Materials

Com.-Def. Teaming

COTS Product

Mil Product

Mfg

Mfg

Marketing

Requirements

Lab

Lab

Commercial

Defense

Funding Profile

Relative Investment

Applications

System Builders

Box Builders

Component Builders

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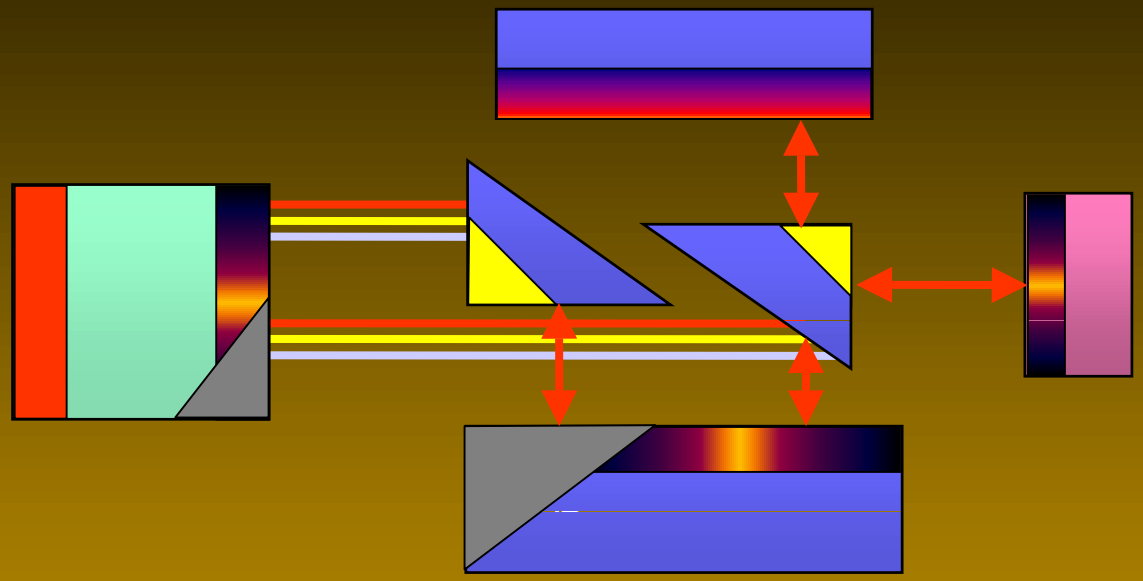
Next Generation



Optical
- RAM
- Switching
- Processing

Multi-Spectral
Sensors
WDM Links