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Special Projects Office

Innovative Space-Based Radar Antenna Technology (ISAT) Program

Dr. Joseph Guerci
Special Projects Office

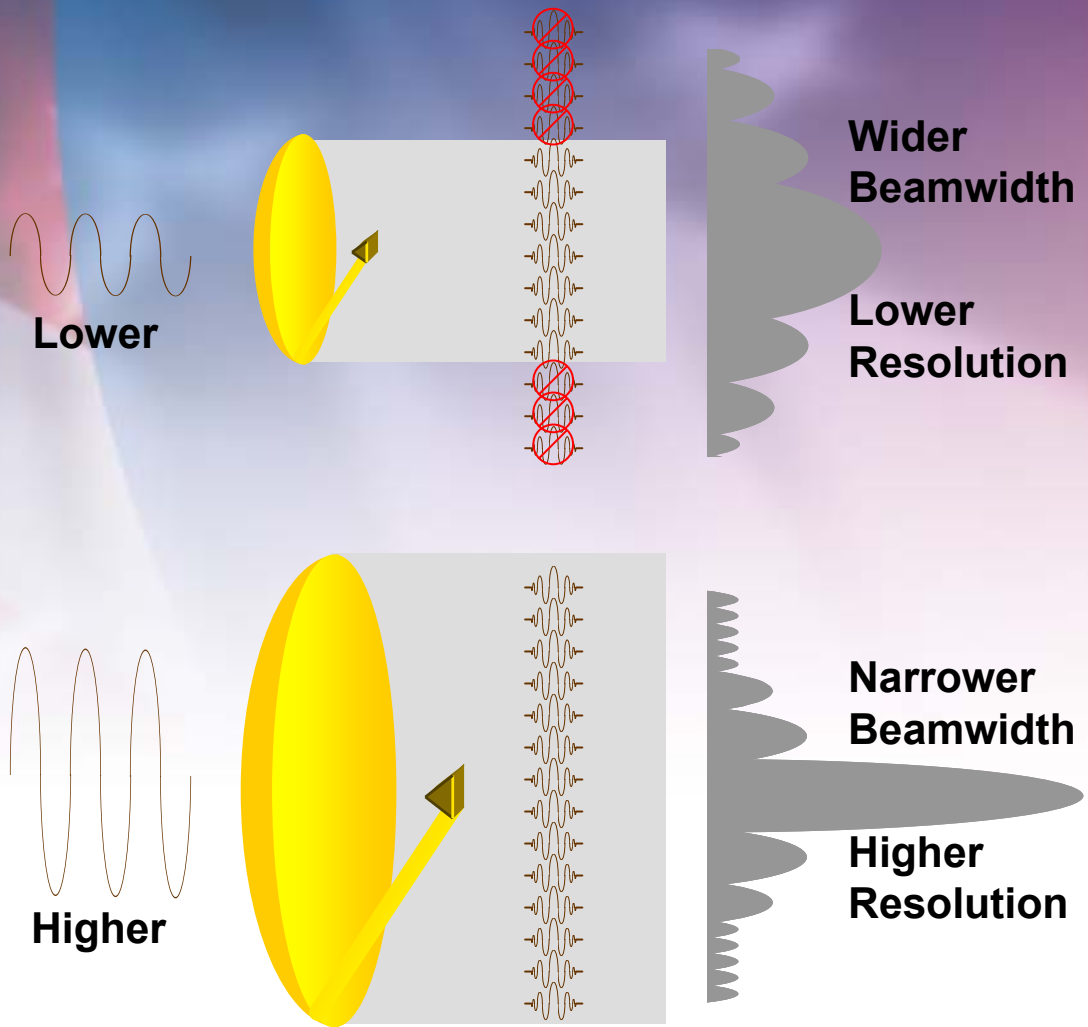
Special Projects Office

Aperture Is Critical to Photon Collection Applications

Signal Gain

Photon Collection Area

Antenna Beam Pattern



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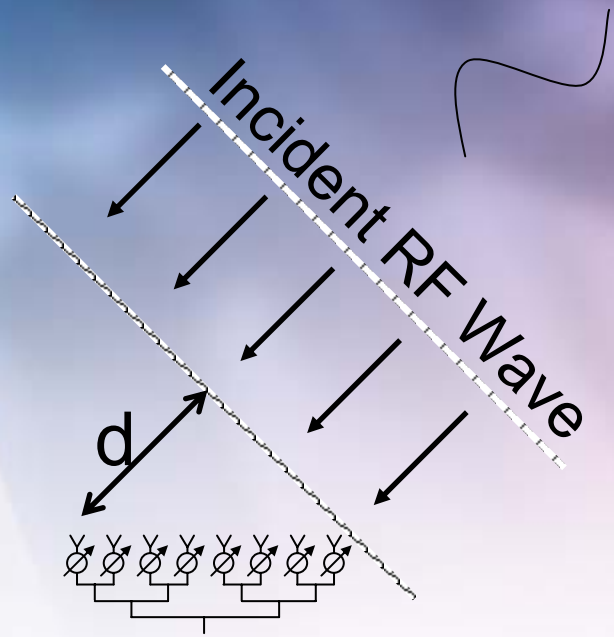
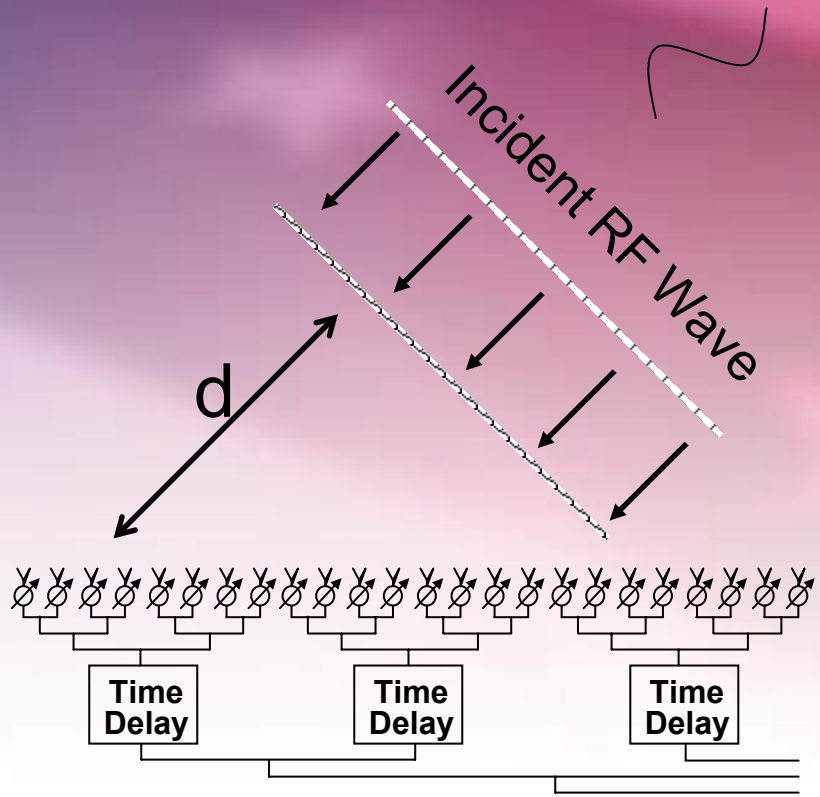
Antenna Architecture Challenges

Phase Shifters ⇒ Narrowband



Extra Phase = 360º x d/λ

True Time Delays ⇒ Wideband



Extra Time = d/c

Time Delay Options
- **Digital**
- **Photonics**

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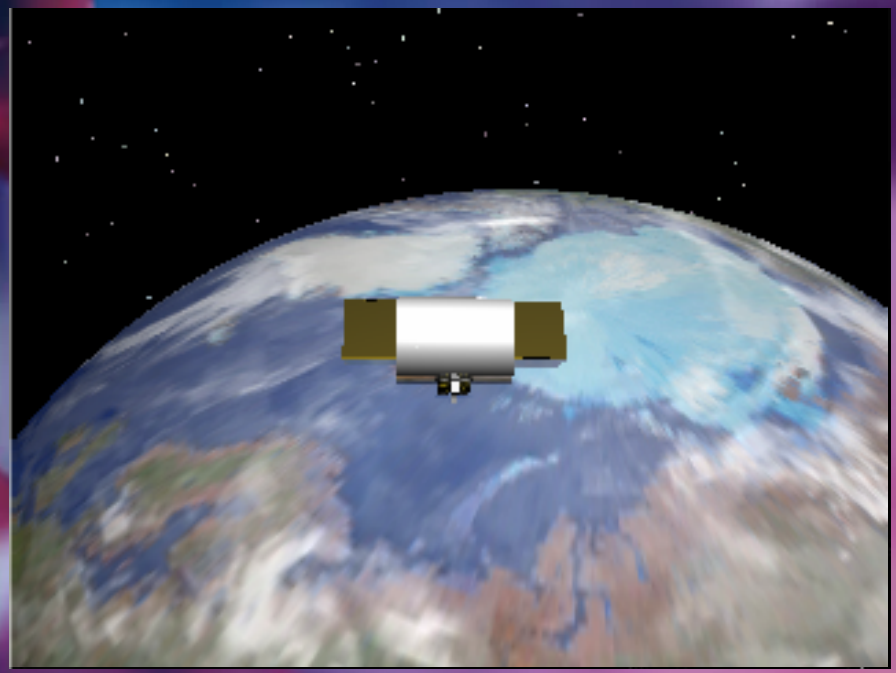
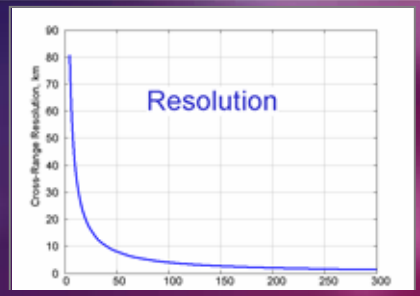
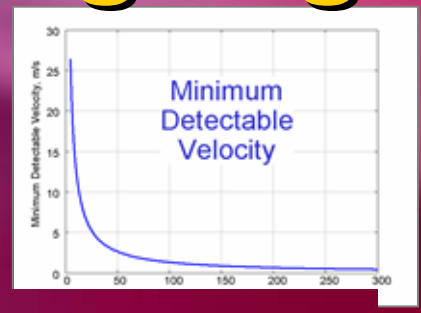
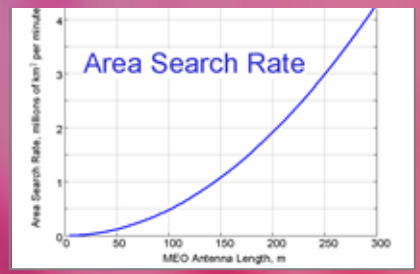
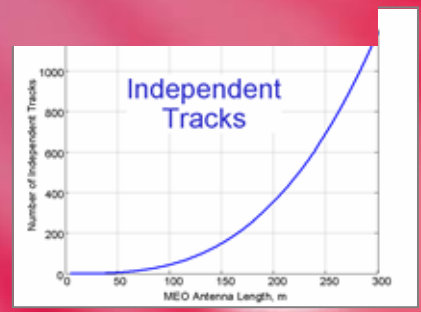
Benefits of Going Big











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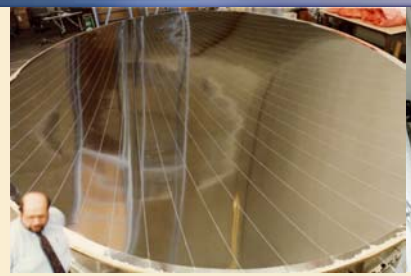
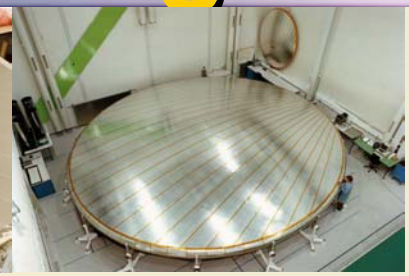
Enabling Technologies

ECHO BALLOONS

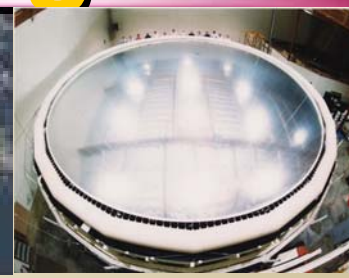
1960





REFLECTOR ANTENNAS

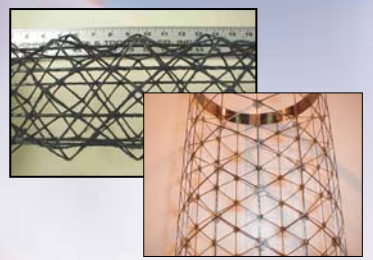
1980



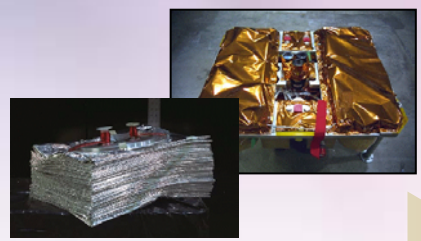
INFLATABLE ANTENNA EXPERIMENT

1996

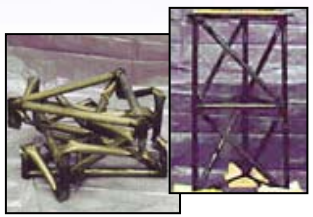
ILC DOVER



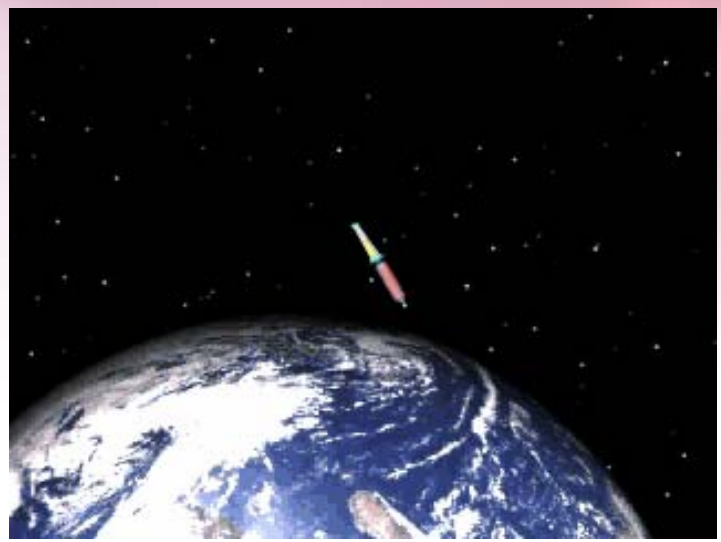
L'Garde



Rigidized inflatables and composite joint materials support large aperture deployments



Foster-Miller



L'Garde deployment concept

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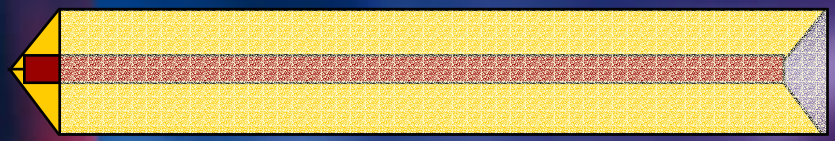
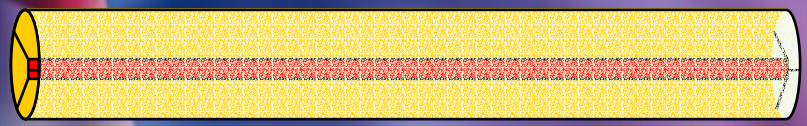
Antenna Design and Calibration

Space-Fed Lens

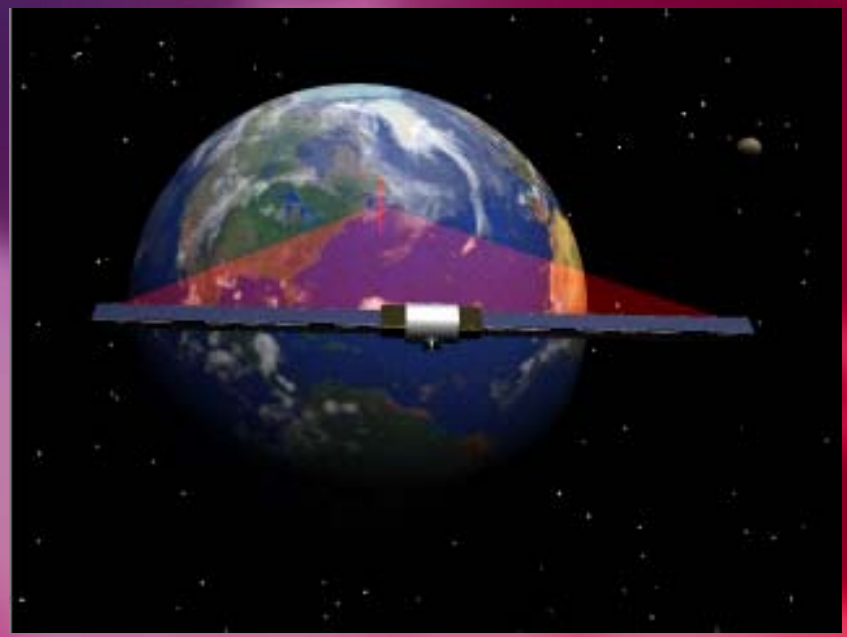


Reflector



Active ESA

Cooperative beacons calibrate aperture within an orbit



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ISAT Technology Needs

- Advanced antenna architectures
- Lightweight radhard materials and electronics
- Reliable deployment technologies
- Compressible materials and components
- Reduced cost-per-kg launch technologies
- Advanced calibration concepts

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