BAA 09-018
High-bandwidth Free-space Lasercomm Industry Day

03 April 2009

Presented by:
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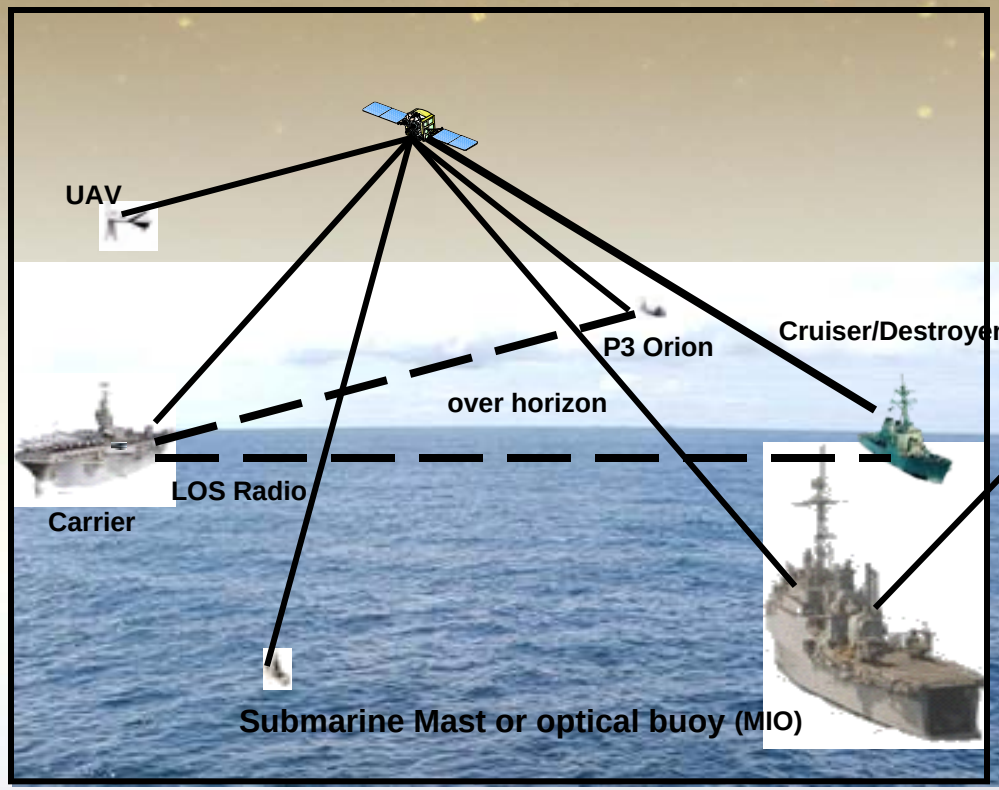
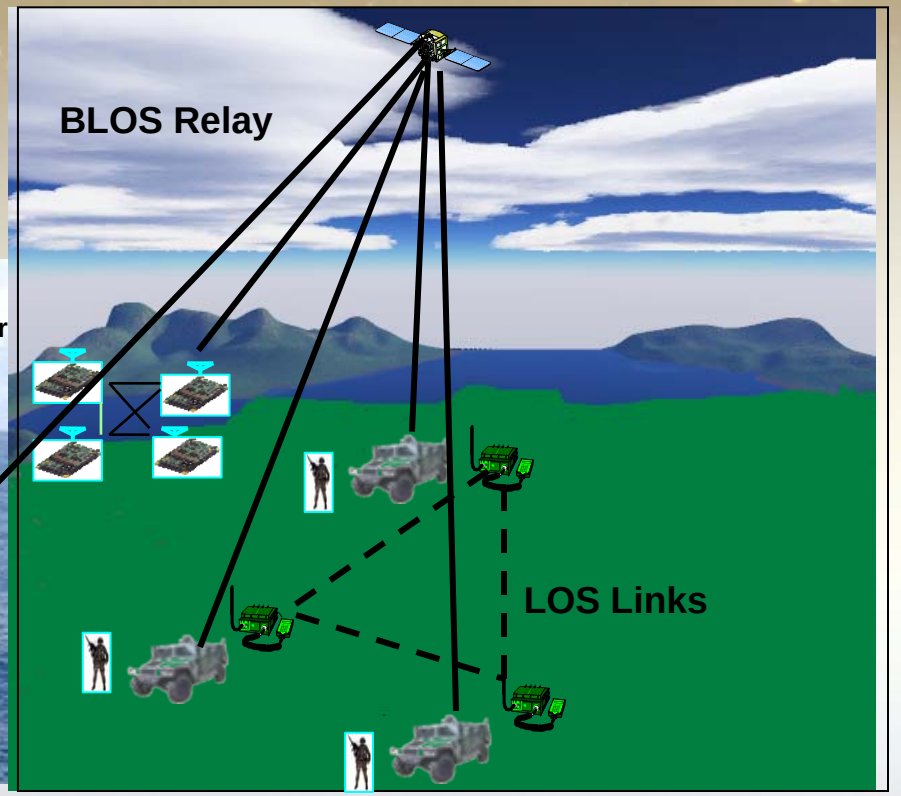
Revolutionary Research . . . Relevant Results

AGENDA

- Overview (Dr. Santanu Das ONR)
- Tactical Edge Navy USMC Discussion (Mr. Ray Cole NRL)
- BAA Technical Briefing (Dr. Christopher Moore NRL)
- BAA In-Depth Modulating Retro Reflector Discussion (Dr. William Rabinovich NRL)
- Discussion/Questions

CURRENT CAPABILITY





SATCOM (kbps to several Mbps)

LOS: CDL and TCDL (10 to 274 Mbps)

HCLOS (8-16 Mbps, up to 20 nm)

DWTS(MRC-142) (576 Kbps, up to 25 nm)

TSSR (GRC 39) (5 Mbps, up to 5-10 nm)

LASERCOMM DRIVERS

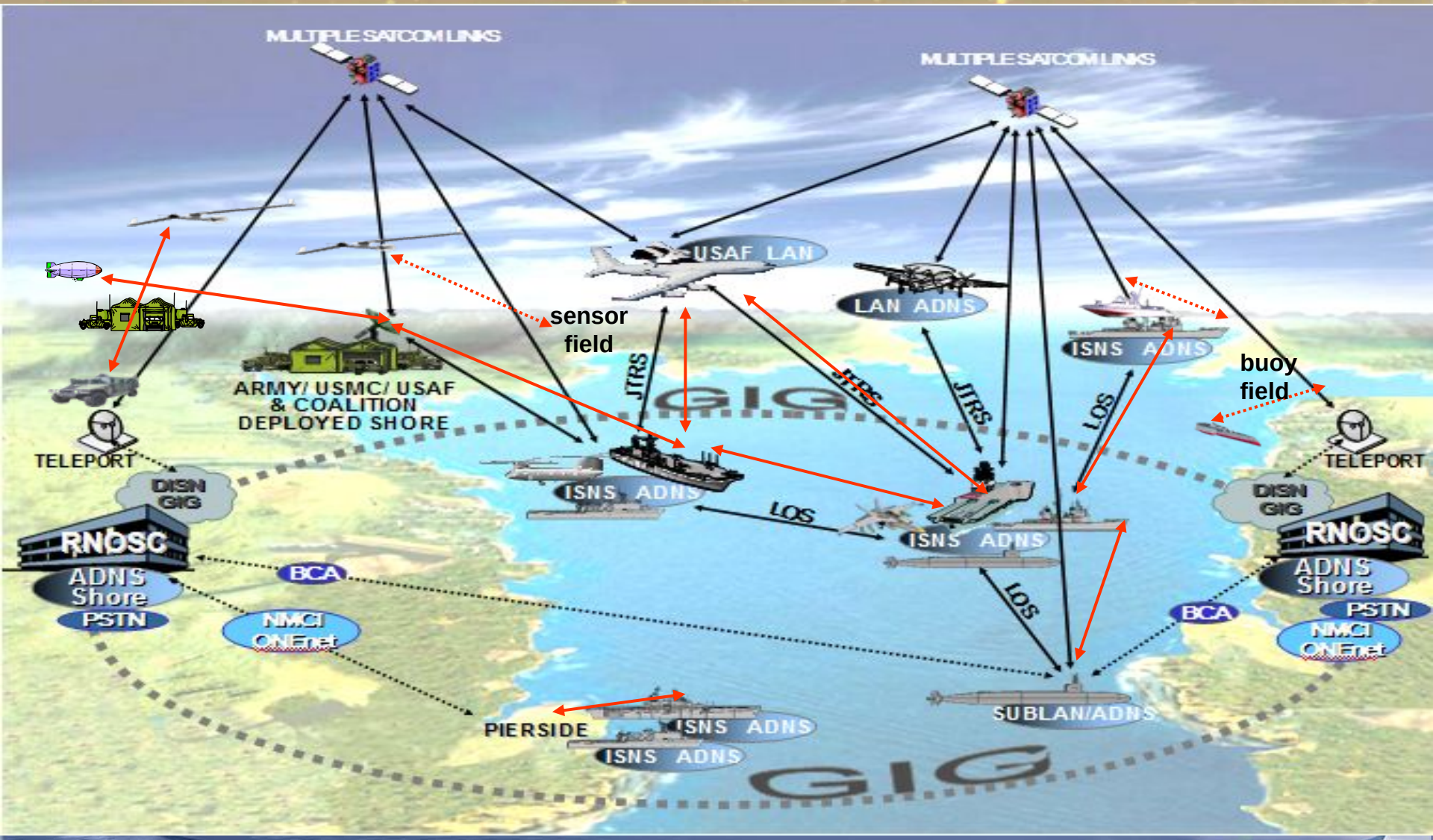
- BANDWIDTH
- SPECTRUM
- EP (LPI/LPD/AJ)
- SWaP and COST

"The number one priority from the Fleet Top Ten is Bandwidth and every ESG/CSG returns from deployment asking for more." (VADM Harris)

"Information dominance is key to our success, spectrum access is indispensable in achieving that dominance" (Defense Science Board)

"…. will continue to mitigate anti-access threats … secure broadband communications into denied or contested areas to support penetrating surveillance and strike systems" (DoD, 2006, pp. 30–31)

LASERCOMM OV-1

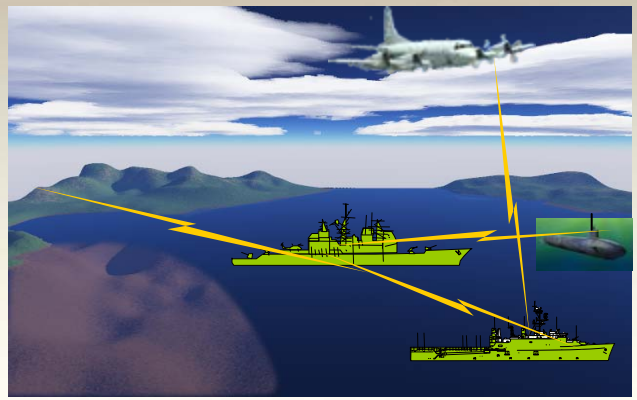


CONOPS

Revolutionary Research . . . Relevant Results

Bidirectional Point-to-Point

Pier-side communications
Ship-to -ship and -submast comms
Ship-to –air (P3,E2C,GH) comms



Bidirectional Point-to-Point

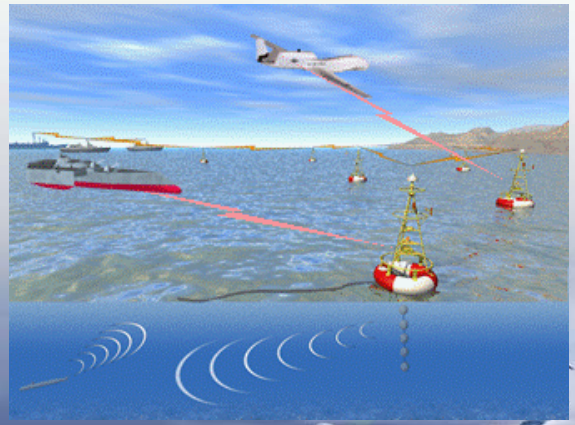
Expeditionary
Forward Operating
Base reachback to
the COC/GIG

Asymmetric (Retro-reflector) Point-to-point

Biometric Comms for MIO boarding parties

Asymmetric (Retro-reflector) Point-to-point

ASW and Mine warfare
C2 & sonar data
exfiltration
(LCS, buoy, UxV)



CHALLENGES

- Scintillation (Long fades)
- Large optical receiver dynamic range
- Background light
- Performance impact from clouds, snow, fog, aerosols
- Aero-optics introduced optical aberrations
- Fast acquisition and tracking (GPS to closed-loop)
- Fine pointing system technologies (fast steering mirrors, optical phased array wave front sensors, etc)
- Stabilized turrets under high acceleration
- (MRU) Overcoming 1/R4 range losses and double atmospheric propagation
- (MRU) Achieving wide field of view, long-range and high speed simultaneously
- Effects of sea spray on optical windows
- MANET operation