

Multi-Orbit Maritime Operations

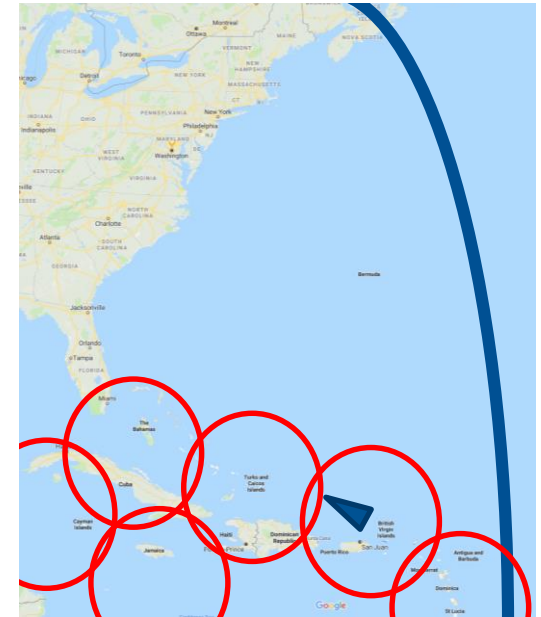
David Burr
VP, Business Development



Are you Prepared for Multi-Orbit Operations?

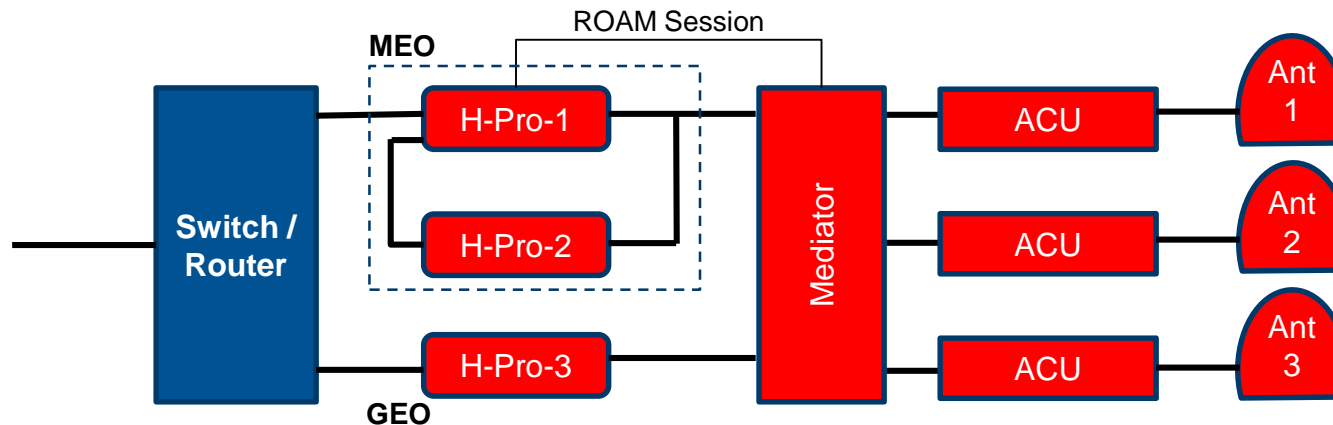
Comtech has 10+ Years of maritime roaming experience
+ 5 Years of NGSO experience with O3b
+ Recent experience with Intellian tri-band antennas
= Global Multi-band Multi-orbit Maritime Networks

- Integrate LEO, MEO and GEO
 - Roaming between fixed LEO, MEO and GEO coverage as a single network
 - Network Resilience
- Single management system with a QoS policy across multiple orbits.



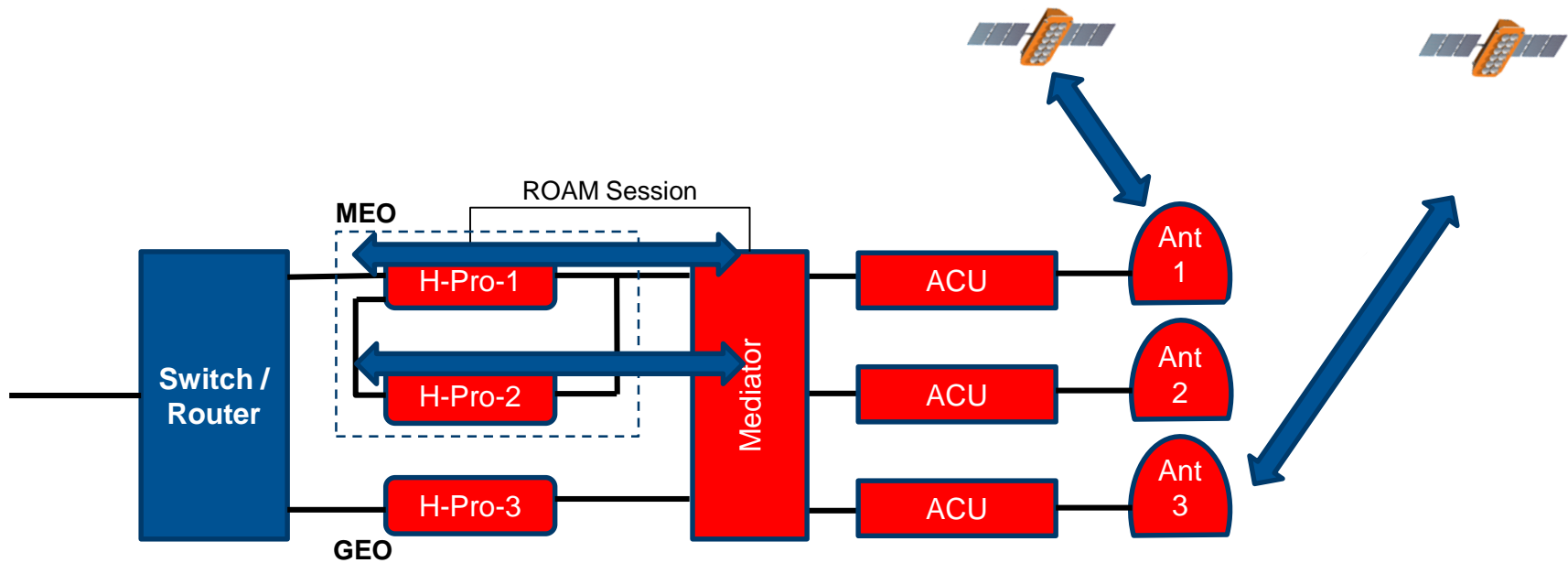
MEO/GEO Shipboard Diagram

- Heights Platform with H-PRO modems supporting 250/197 Mbps.
- Comtech ROAM protocol – communication to ACU for switching between beams, satellites, frequency bands and sub-bands.
- Typical Cruise deployment is a 3 antenna system
 - Intellian 2.4m - 3 x C/Ku/Ka tri-band
 - Orbit 2.2m Dual Band – 2 x Ku/Ka + 1 C/Ka



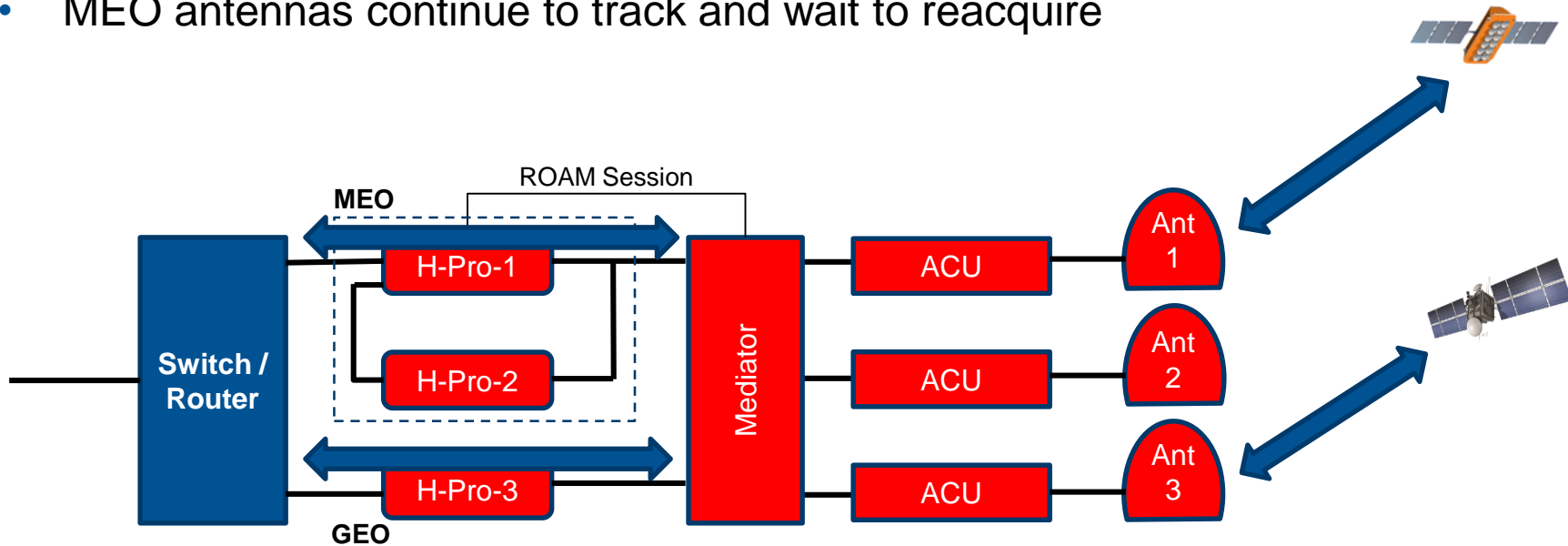
MEO Operation

- Satellite Handover
 - 2 antennas + 2 modems for seamless handover
- Blockage Avoidance



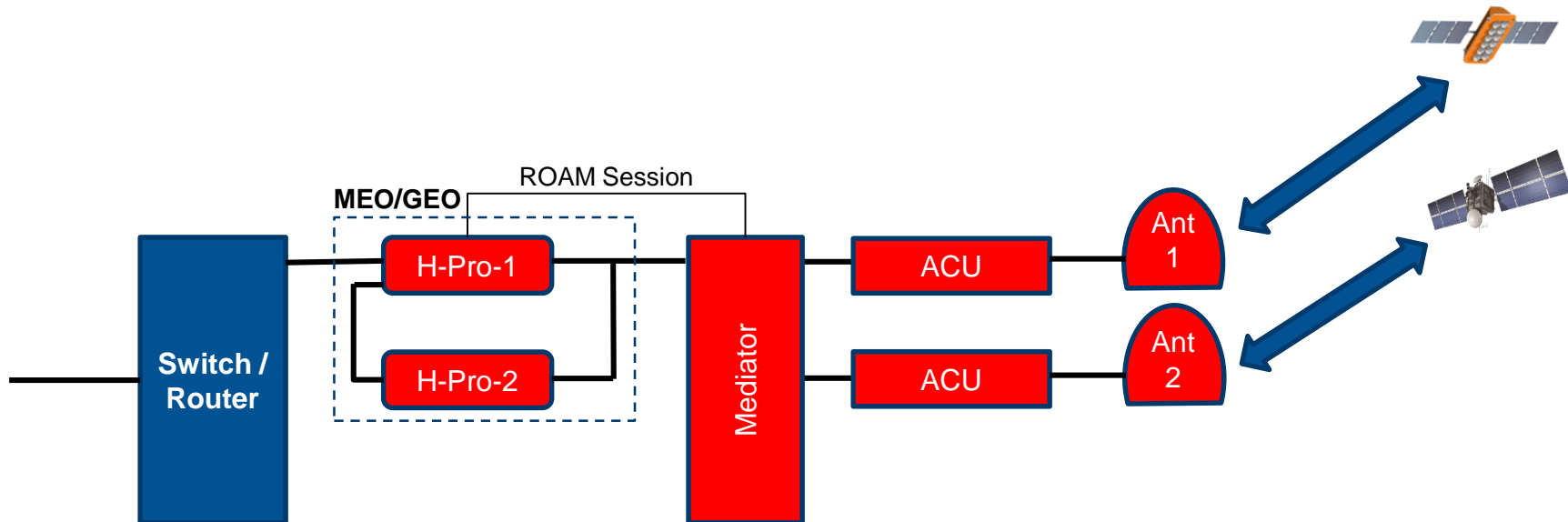
MEO-GEO Mode

- Both MEO Primary and GEO Secondary links active.
- Two Antennas on MEO + One Antenna on GEO
- Higher layer MPLS directs traffic over the preferred MEO Link
- In the event of link outage traffic is rerouted
- MEO antennas continue to track and wait to reacquire



Integrated Multi-Orbit Network

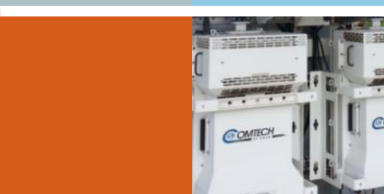
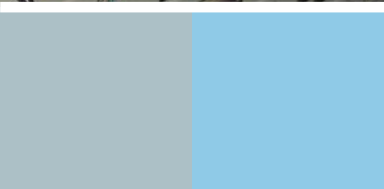
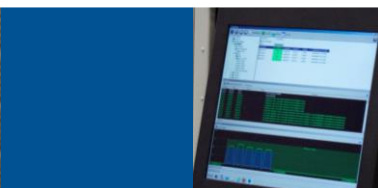
- Today: Separate MEO and GEO networks for historical reasons
- Future: A single pair of modems to switch between orbits
- Enables a cost effective solution for smaller vessels using 2 (or even 1) antenna(s)





Preparing for a Multi-Orbit Future

- Deploying flexible systems today for use on GEO will prepare you for whatever orbits the future holds.
- Comtech has proven experience in GSO and NGSO operation providing a future platform that can deal with whatever orbits come your way.



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