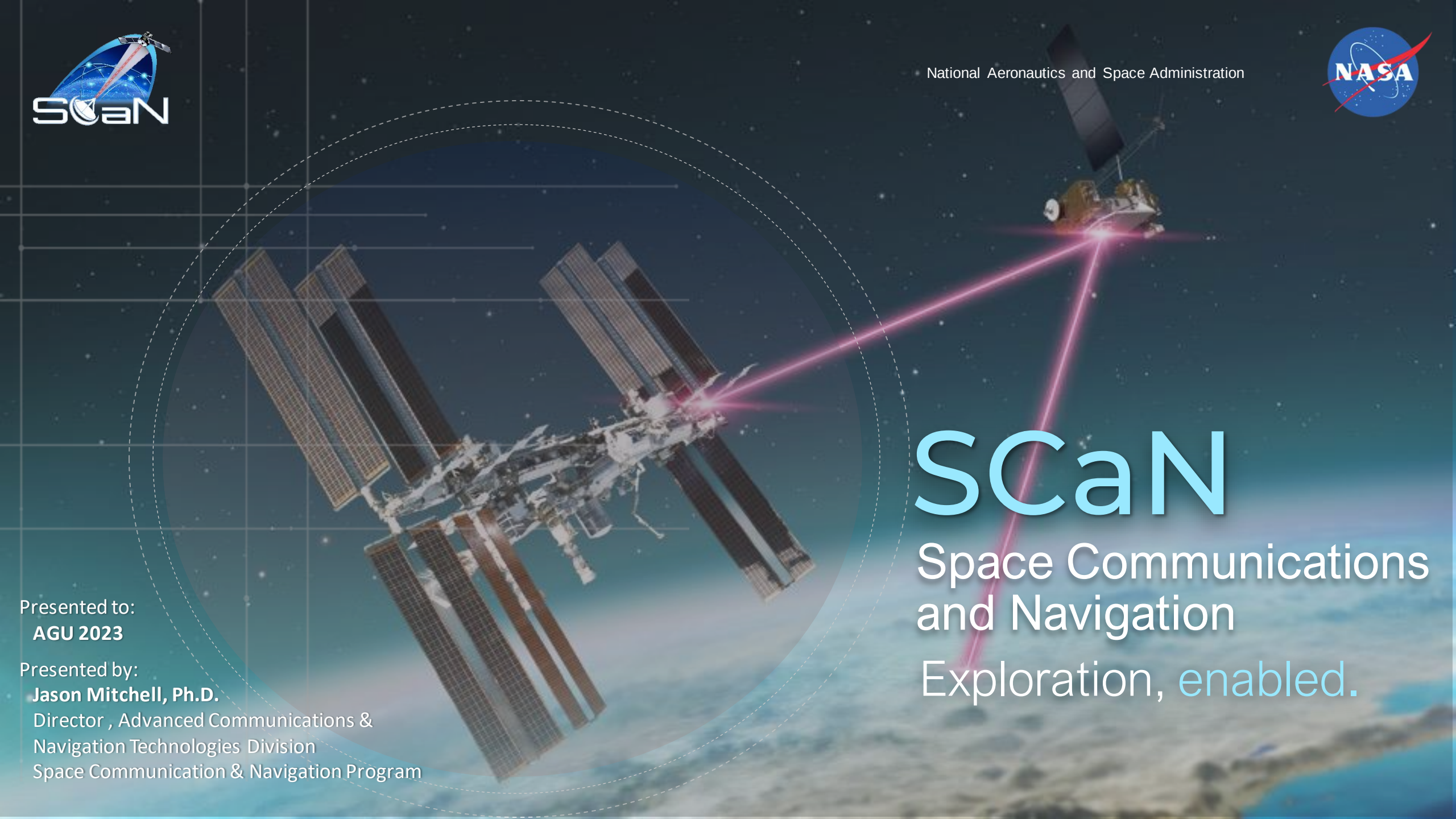




National Aeronautics and Space Administration



SCaN

Space Communications
and Navigation

Exploration, **enabled.**

Presented to:
AGU 2023

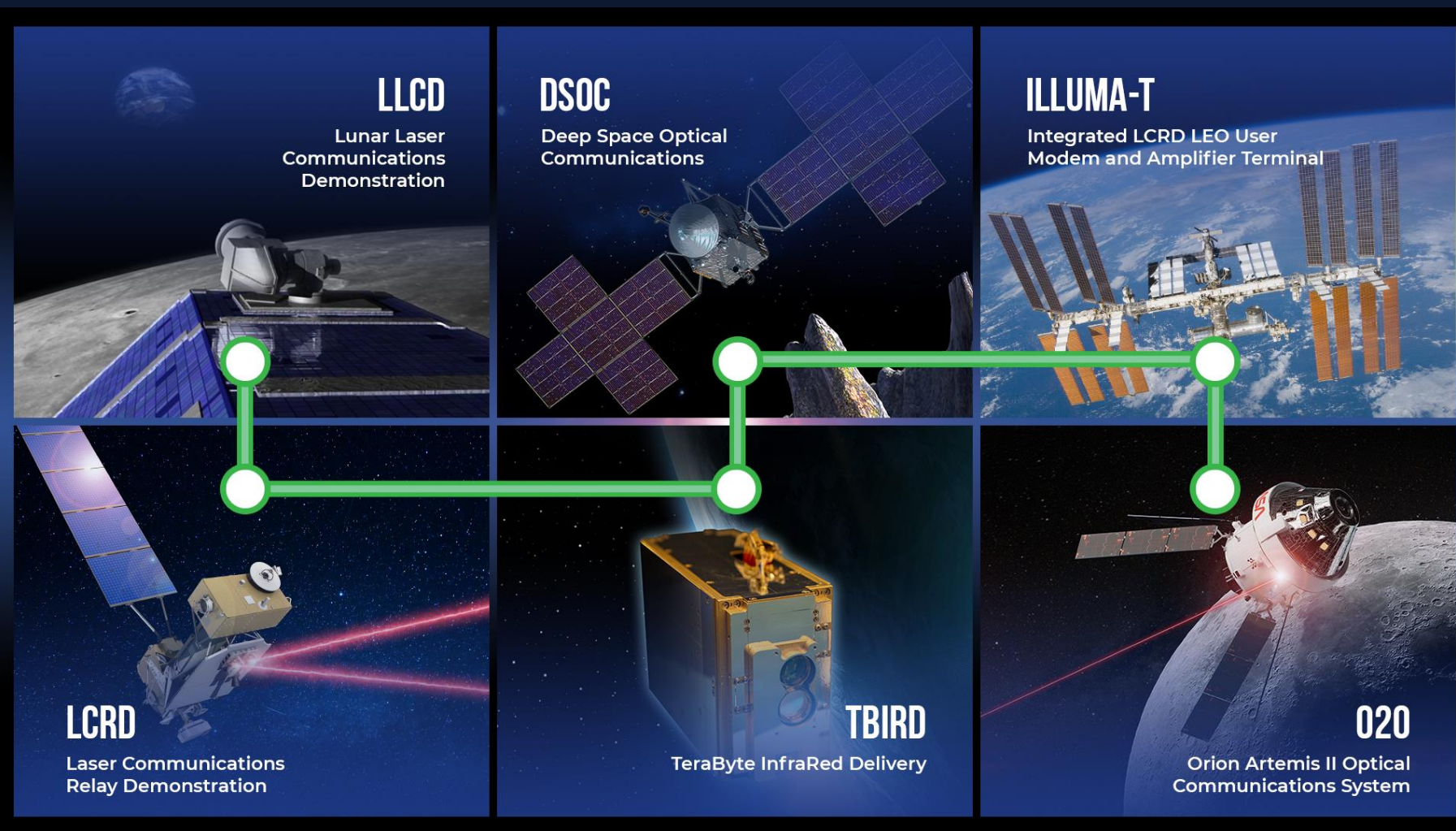
Presented by:
Jason Mitchell, Ph.D.
Director, Advanced Communications &
Navigation Technologies Division
Space Communication & Navigation Program

BENEFITS OF LASER COMMUNICATIONS

- Higher Data Rates
- Lower Size, Weight, and Power Requirements (SWaP) than Radio Frequency systems
- Reduce interference by off-pointing
- Unregulated spectrum
- Multi-mission Ground Stations



LASER COMMUNICATIONS PORTFOLIO

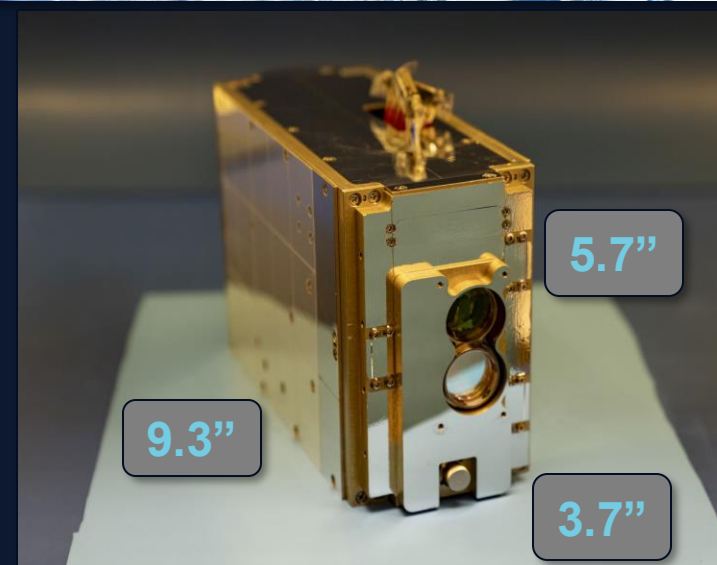


- LLCD: 622 Mbps from the Moon (Sep 2013)
- LCRD: 1.2 Gbps from Geosynchronous Orbit (Dec 2021)
- TBIRD: 200 Gbps from Low-Earth Orbit (May 2022)
- DSOC: Deep Space (Oct 2023) [variable rates]
- ILLUMA-T: 1.2 Gbps to LCRD (Nov 2023)
- O2O: 260 Mbps from the Moon (Artemis II 2024)

TBiRD

TERABYTE INFRARED DELIVERY

- Revolutionary 200 Gbps LEO direct-to-Earth
- Small: 3U (cereal box)
- Single pass (<5 min) records
 - 4.8 TB night-time, 3.3 TB day-time
- Fully body pointed, no gimbal
- Ruggedized commercial telecom transceivers
- Hosted on standard Tyvak 6U smallsat
- Automated Repeat reQuest (ARQ)
 - Provides robust link through atmosphere
 - Via low-rate uplink



TBIRD Flight Payload with dimensions

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More Data = More Discoveries

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