National Aeronautics and Space Administration

TDRS-K Guest Ops Panel

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Human Exploration and Operations Mission Directorate
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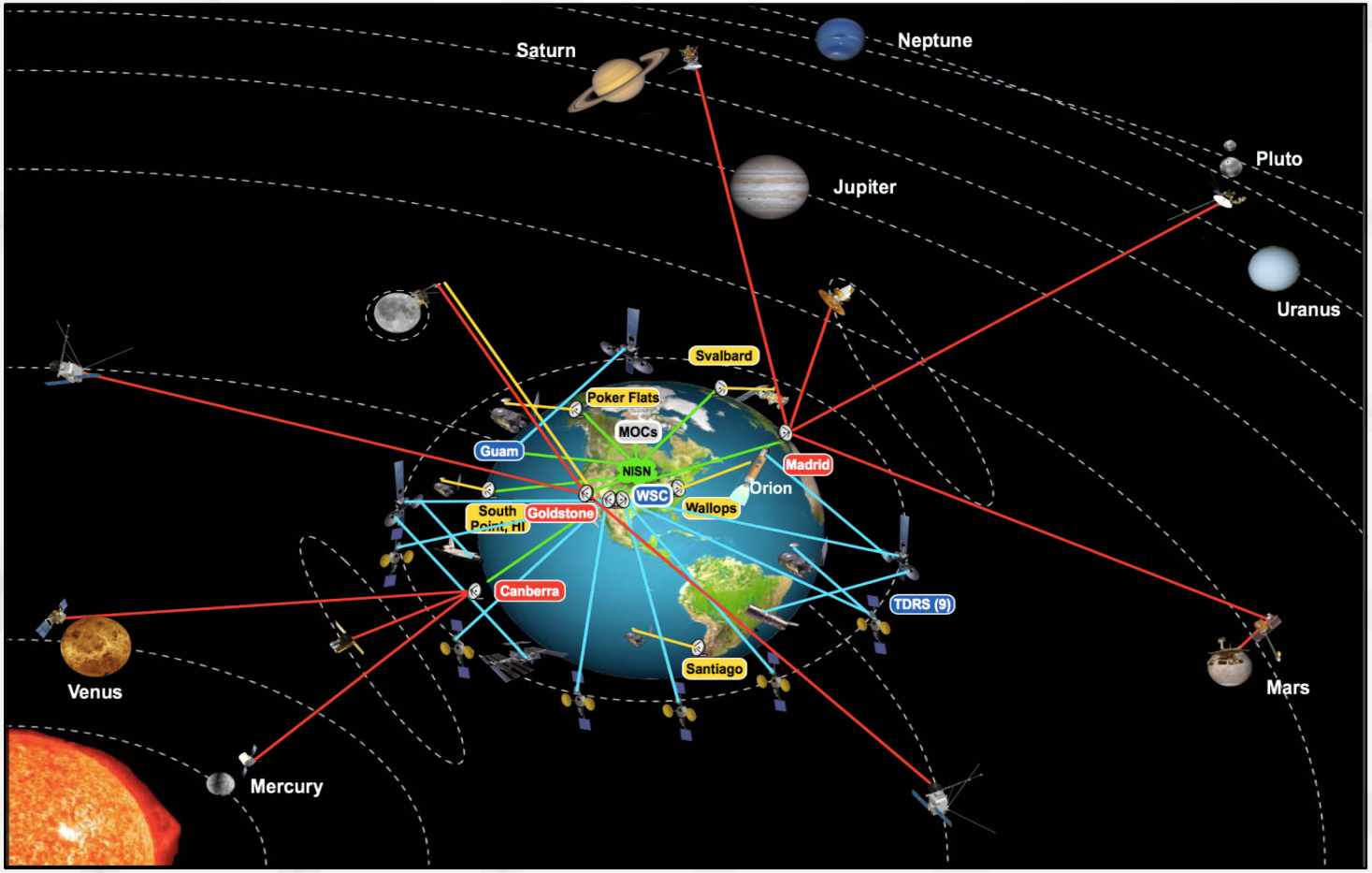
SCaN is a Program Office at NASA HQ

- Responsible for Agency-wide operations, management, and development of all NASA space communications capabilities and enabling technology.
- Integrate all NASA's Communications and Navigation assets into a single fully integrated and unified network.
- Expand SCaN capabilities to further enable robotic and human explorations.
- Manage Spectrum and represent NASA on national and international Spectrum management programs.
- Develop space communication standards as well as Positioning, Navigation, and Timing (PNT) policy.
- Represent and negotiate on behalf of NASA on all matters related to Space Telecommunications in coordination with the appropriate offices and flight mission directorates.

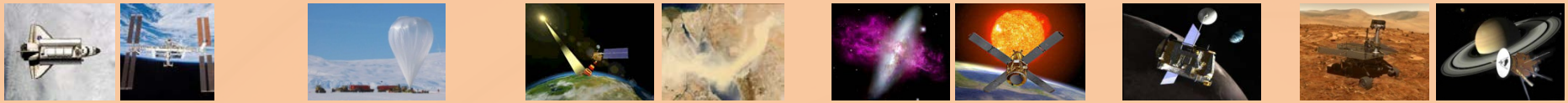
What Do We Do?

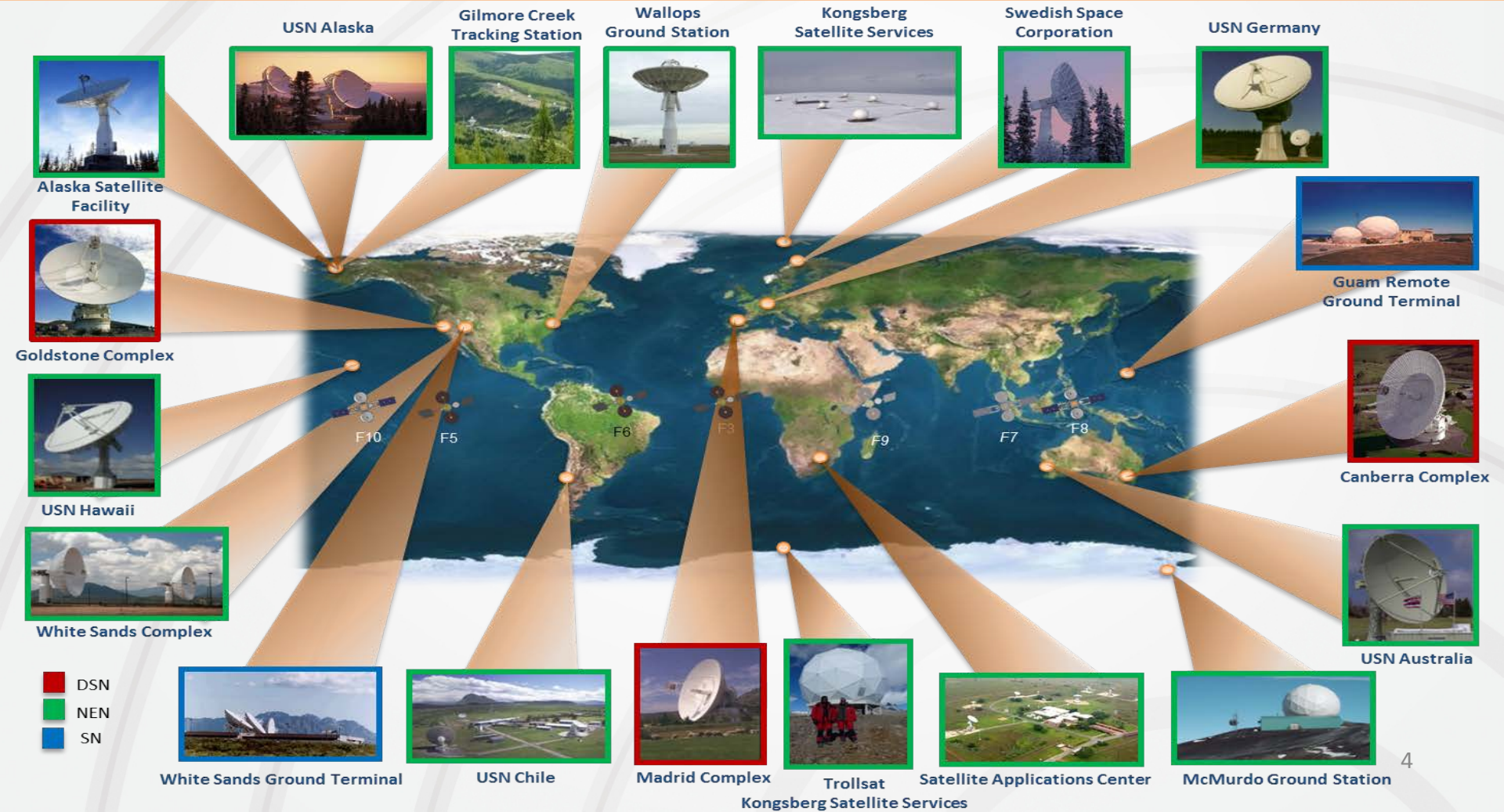
We connect spacecraft with Earth through world-class communication and navigation capabilities.



SCaN's Networks Span the Globe

Human Spaceflight Missions | Sub-Orbital Missions | Earth Science Missions | Space Science Missions | Lunar Missions | Solar System Exploration





Space Network (SN)

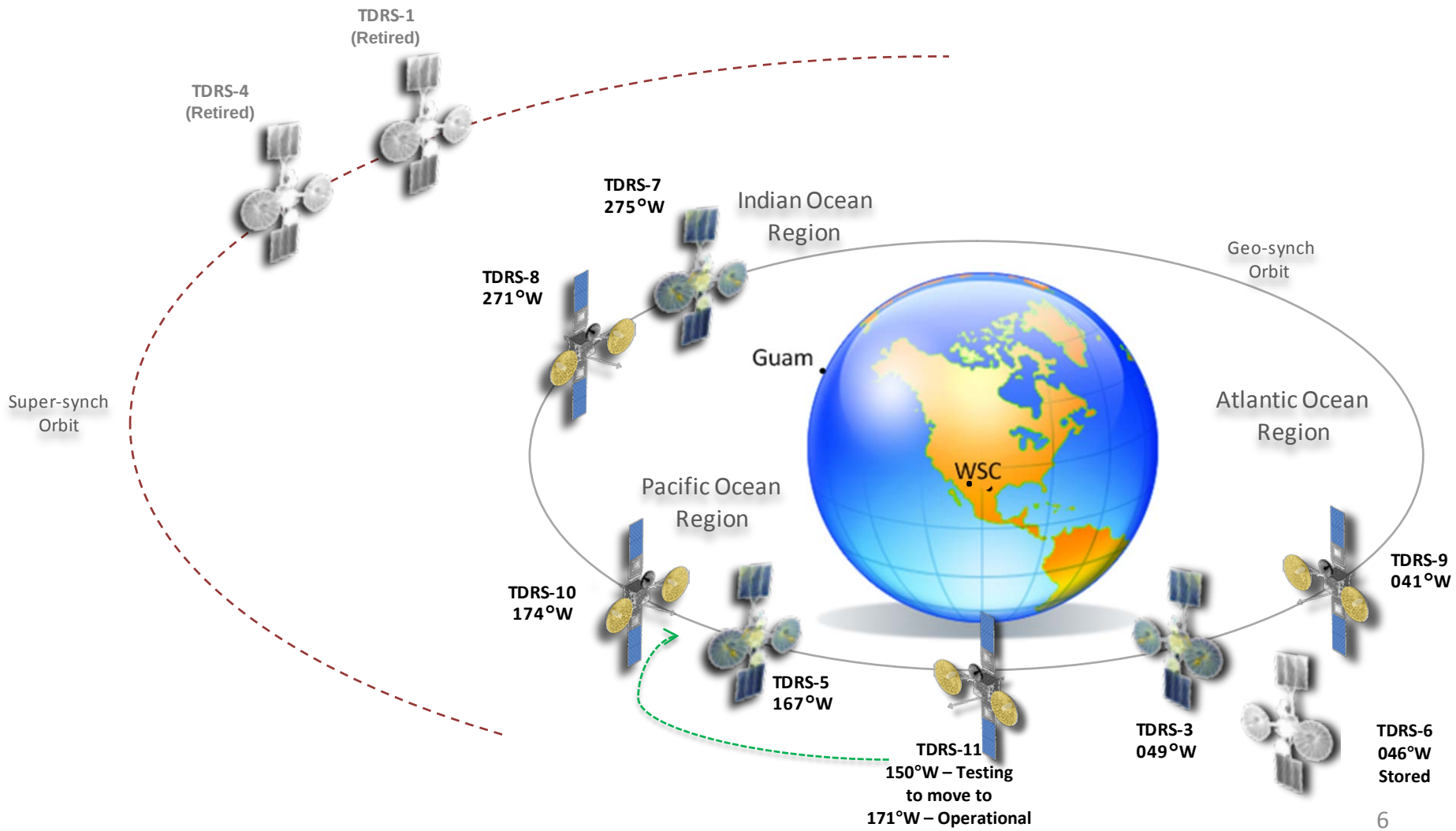
Tracking and Data Relay Satellite (TDRS)
Generation 1 by TRW;
Generation 2 and 3 by Boeing

White Sands Ground Terminal (WSGT)

Second TDRS Ground Terminal (STGT)

Guam Remote Ground Terminal (GRGT)

Space Network:
Tracking and Data Relay Satellite Fleet



TDRS
Launch History and Plans

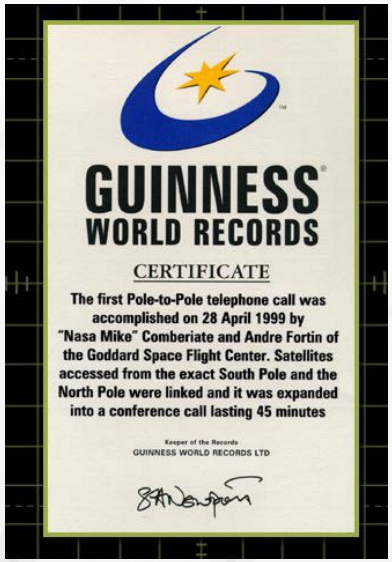
TDRS	Launch Date
TDRS-A (TDRS-1)	April 15,1983 *(Retired Fall 2009, Disposal June 2010)*
TDRS-B	Destroyed January 28, 1986 in Challenger explosion
TDRS-C (TDRS-3)	September 29, 1988
TDRS-D (TDRS-4)	March 13, 1989 *(Retired December 2011, Disposal April 2012)*
TDRS-E (TDRS-5)	August 2, 1991
TDRS-F (TDRS-6)	January 13, 1993
TDRS-G (TDRS-7)	July 13, 1995 (replacement for TDRS-B)
TDRS-H (TDRS-8)	June 30, 2000
TDRS-I (TDRS-9)	March 8, 2002
TDRS-J (TDRS-10)	December 4, 2002
TDRS-K (TDRS-11)	Scheduled to launch in January 30, 2013
TDRS-L (TDRS-12)	Scheduled to launch in CY 2014
TDRS-M (TDRS-13)	Ready to be launched in CY 2015

TDRS 1 – 7 were delivered via Space Shuttle

TDRS 8 – 13 were/will be launched by EELVs

TDRS Contributions to Society

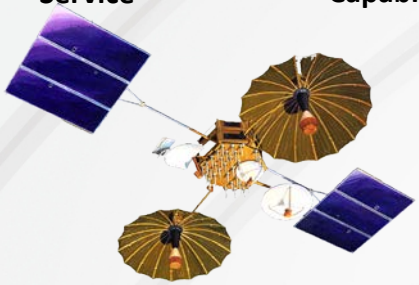
- TDRS-1 recovered lost data from the Compton Gamma Ray Observatory after its recorders failed in 1992.
- On April 28, 1999 the first pole-to-pole phone call took place thanks to TDRS-1's orbit. The phone call lasted 45 minutes and is in the Guinness Book of World Records.
- In 1999, TDRS-1's high-speed Internet connectivity allowed doctors in the US help Dr. Jerri Nielsen, who had breast cancer, perform a self-biopsy and administer chemotherapy. She was stationed at the National Science Foundation's Antarctic Amundsen-Scott South Pole Station.
- In July 2002, TDRS-1 helped again at NSF's Antarctic station to assist in knee surgery for the meteorologist, Dar Gibson.
- TDRS-1 was the first satellite to connect to the Internet with the first live Webcast from the North Pole (on Ripley's Believe it Not)
- The gamma ray bursts that SWIFT notices go through TDRS and then through the Internet for the whole world to observe – this is done at an instantaneous pace.



Space Network of the 2020's

Schedule Free Service

Sensor Web Capability



Current

- Backward Compatible
  - Ku-Band (300 Mbps)
  - Ka-Band (550 Mbps)
  - SSA (6 Mbps)
  - MA (300 Kbps)
  - DAS
  - IP/SLE/CCSDS
  - Beacon
  - SNAS
- Full 2-way Demand Access
- Ka-Band (1.2 to 1.5 Gbps)
- Multiple Access Enhancements
  - Beacon
  - Frequency and polarization flexibility
- Optical
  - Low Earth Orbit Including Optical Multi Access
  - L1/L2 (Lagrangian Points)
  - Deep Space
- Government/Commercial Partnerships
- Reduction of size, weight, power, and cost
- Increased efficiency and capacity
- Increased service flexibility
- Ideas that leverage new technology
- Next Generation Relay Satellites

Formation Flyers

Software Radios

Next Generation

Summary

- SCaN provides the vital connection between spacecraft and Earth
- SCaN is looking forward to adding TDRS-K to the fleet
- SCaN is an example of efficiency within the Agency – doing more with a lot less.
- For more information visit NASA:
  - www.nasa.gov
  - www.nasa.gov/scan
  - www.facebook.com/NASASCaN
  - www.twitter.com/NASASCaN

Acronyms

CCSDS – Consultative Committee for Space Data System
CY – Calendar Year
DAS – Demand Access Service
EELV – Evolved Expendable Launch Vehicle
GRGT – Guam Remote Ground Terminal
IP – Internet Protocol
MA – Multiple Access
SLE – Space Link Extension
SN – Space Network
SNAS – Space Network Access System
SSA – S-band Single Access
STGT – Second TDRS Ground Terminal
TDRS – Tracking and Data Relay Satellite