



**SCaN Commercialization of Near-Earth
Communications Services – Strategic Overview
Presentation to the NASA Advisory Council**

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NASA's Road to Commercialization

2005

Today

Beyond

Commercial Cargo Program

“What I would like to do is to be able to buy [crew and cargo] services from industry...and utilize the market that is offered by the International Space Station’s requirements”

- *NASA Administrator Mike Griffin, June 2005*

Commercial Crew Program

“Embrace the commercial space industry...by contracting with American companies to provide astronaut transportation to the Space Station.”

- *NASA’s 2011 President’s Budget Request*

Low Earth Orbit (LEO) Commercialization (International Space Station)

“Transition in a step-wise approach from the current regime that relies heavily on NASA sponsorship to a regime where NASA could be one of many customers of a low-Earth orbit non-governmental human space flight enterprise.”

- *NASA Transition Authorization Act of 2017*

SCaN Near Earth Commercialization

“NASA will define the acquisition strategy for transitioning near-Earth NASA users to suitable commercially provided services.”

- *NASA’s 2020 Budget*

The Space Communication and Navigation (SCaN) Program Plan is a Natural Next Step in Commercialization of the LEO Space Environment

Extending Commercial Capabilities to Space Users

Commercial Space Relay



Science Missions

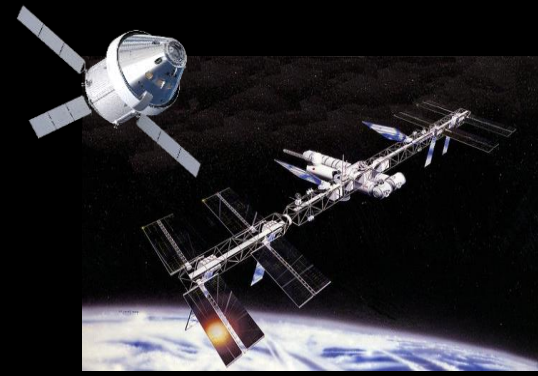


————> Existing Market
- - - -> New Market

Small Sats



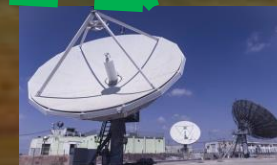
Human Space Flight



Land, Sea and Air User Terminals



Launch



Commercial Ground Stations

Plan for Commercial Communications Services

“Divide and Conquer” approach is tailored to market capabilities and risks...



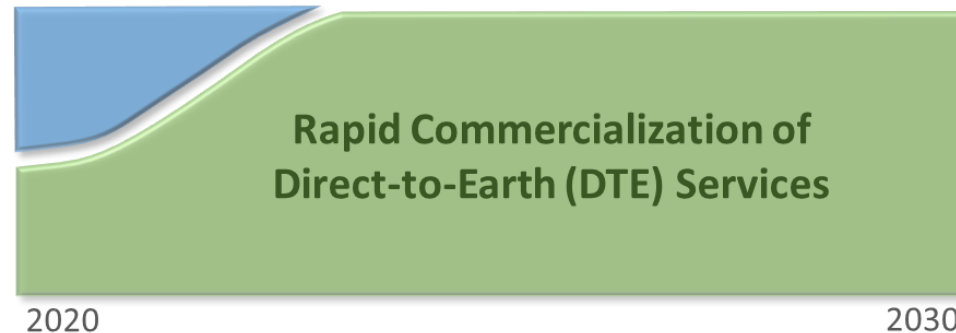
Space Network:
Commercialization Target



- NASA has no plans to build/deploy additional Tracking and Data Relay Satellites (TDRS); current network can support users into the early 2030's
- Time required to gradually transition future NASA users
- New commercial SATCOM capability used only for new missions; legacy missions fly out on the Space Network
- Glenn Research Center (GRC) is assigned responsibility for demonstration and initial planning for acquisition of SATCOM services



Near Earth Network:
Commercialization Target



- Near-term increase in services provisioned by current commercial & partner ground sites
- Infuse new vendors drawing on vibrant and growing market
- Targeting 2023 for 100% commercial service; applies to existing and new missions
- Responsibility assigned to Goddard Space Flight Center (GSFC)

- NASA-owned service capability
- Commercially-provided

SCaN Commercialization Team



- Overall responsibility for demonstration and acquisition of commercial services
- Lead user transition to commercial services
- Pursue spectrum regulatory changes required to use commercial services
- Invest in supporting technology and standards



- Manage Communications Services Project
- Execute commercial SATCOM demonstrations building on successful COTS approach
- Assess and provide recommendations for operational services
- Perform initial planning for acquisition of SATCOM services



- Maintain existing networks
- Solicit new DTE providers from diverse / existing market
- Onboard new DTE providers
- Divest NASA assets as appropriate

Commercializing Direct-to-Earth Comms

Vibrant Commercial Ground Station Market *Already Exists*

Pursue commercial services in accordance with the market:

- Direct-to-Earth (DTE) service, wherein missions transmit directly to antennas on the ground, is an established commercial market with multiple vendors

Creates an opportunity for NASA to develop a near-Earth service portfolio with multiple vendors

- Robust and flexible architecture for the user community; not reliant on a single vendor
- Contribute to market stimulation and growth
- Savings in infrastructure, ongoing operations, and maintenance costs to NASA

Working with GSFC, the Near Earth Network and Space Network have been reorganized to align with the commercial objectives

- NASA must maintain support to existing users during transition

Identifying implementation steps to meet the goal of 100% commercial DTE service by 2023



Communications Services Project

Focus on demonstrating the feasibility of commercial SATCOM providing data services to space users:

- Establish public private partnerships to leverage private investment and existing commercial satellite communications infrastructure for the development and demonstration of end-to-end capability
- Critical step to increasing confidence and ensuring services are ready for operations

Rolling wave approach of demonstrating new or expanded services over the 2020's

Objective is to have multiple providers demonstrate services during each demo period

- The business case, user burden, performance and security are key aspects to address
- Nearer term opportunity to meet a subset of user needs with existing commercial capabilities
- As commercial capabilities are matured and demonstrated, broader set of capabilities and user needs will be met – take advantage of dynamic market capability and evolution

NASA will evaluate acquisition and operationalization of demonstrated services



Challenges

Challenge: commercial space-based providers have different spectrum allocations and standards

- Strategic investments being made in wideband & multilingual user terminals
- Give users the flexibility and autonomy to operate in a heterogeneous government and commercial network environment
- Avoids missions being locked in to using a single vendor's spectrum allocation and waveform

Challenge: radio frequency spectrum regulations do not currently support using commercial frequency allocations for space-to-space use

- NASA coordinating at national and international levels to complete the necessary studies and get approvals for regulatory change
- Long-term process that will take most of the decade

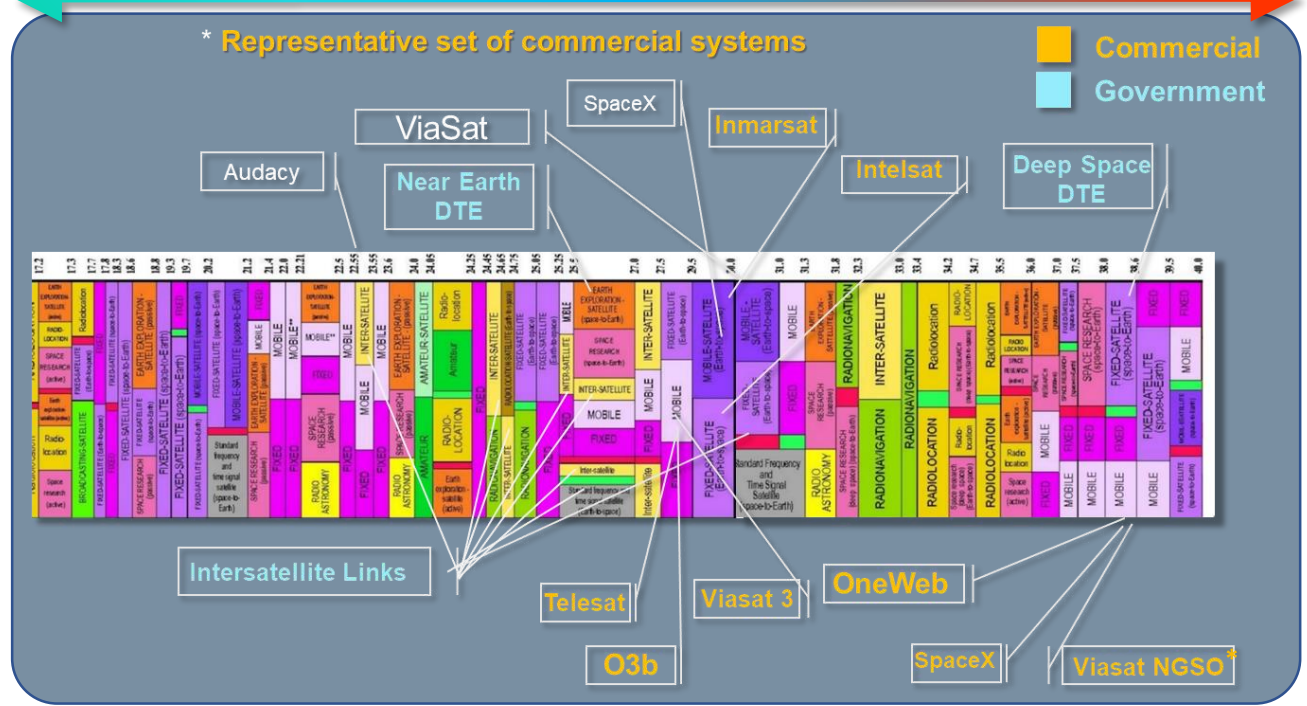
Challenge: commercial service presents new and increasing security challenges

- Security compliance is critical
- Collaboration with industry required to ensure NASA requirements are met

Frequency flexible hardware that allows users to roam free



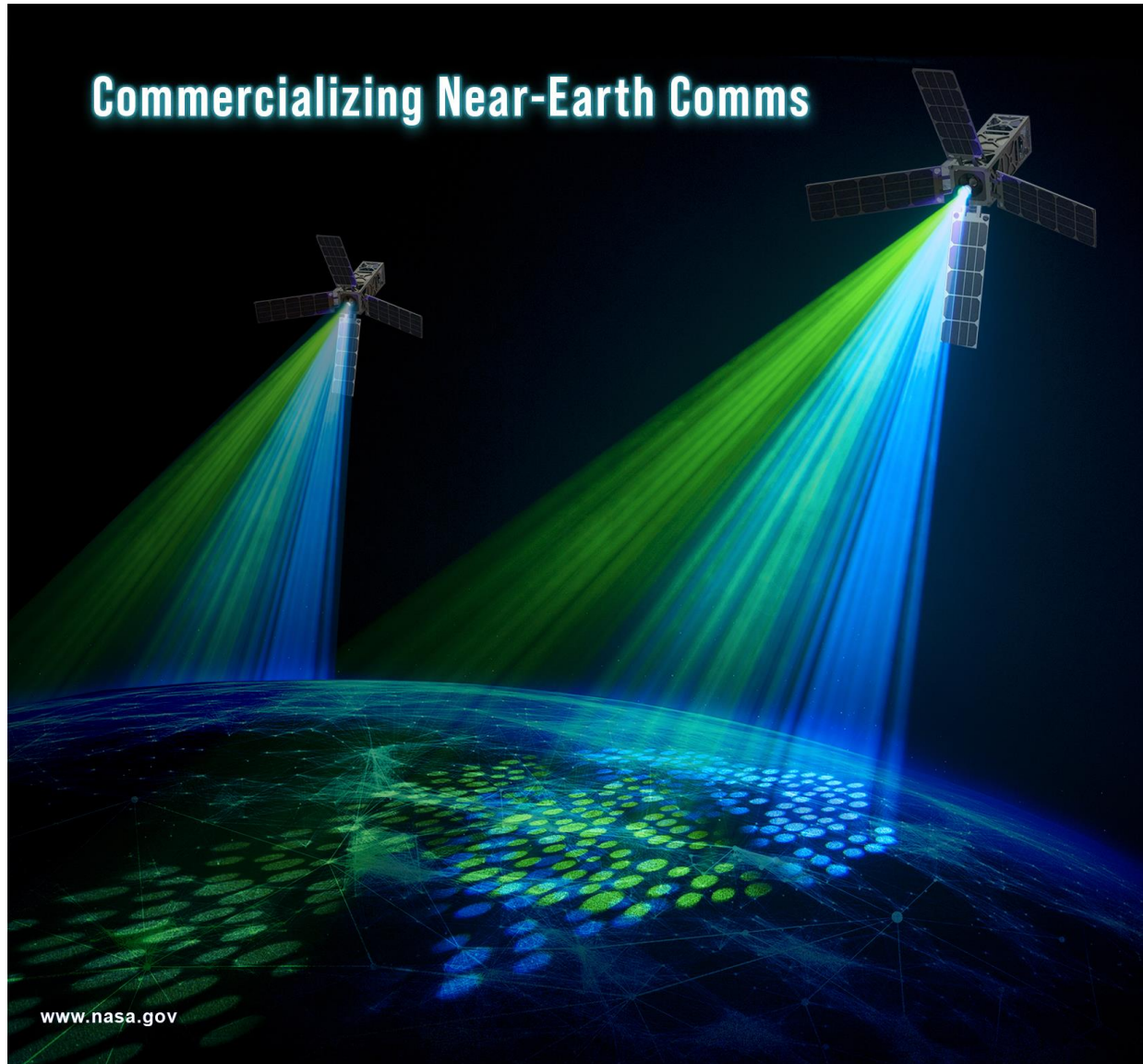
Tunable from 17.2 GHz to 31.0 GHz



* NGSO = Non-Geostationary Orbit

Summary & Next Steps

Commercializing Near-Earth Comms



FY 20 was a pivot point – established strategy and completed preparatory steps including:

- Executive-level strategy documented
- Reorganization of network projects to align with commercial objectives
- Public engagement initiated with SCaN The Future town hall event (October 29, 2020)
- CSP acquisition strategy approved by the Agency (December 15, 2020)

SCaN is ready to proceed:

- Leading the transition to commercial communications services
- Maintaining our commitment to mission users
- Continuing to be an enabling organization for the Agency