



Lunar Spectrum Management

Cathy Sham, Lunar Spectrum Manager (LSM)
catherine.c.sham@nasa.gov

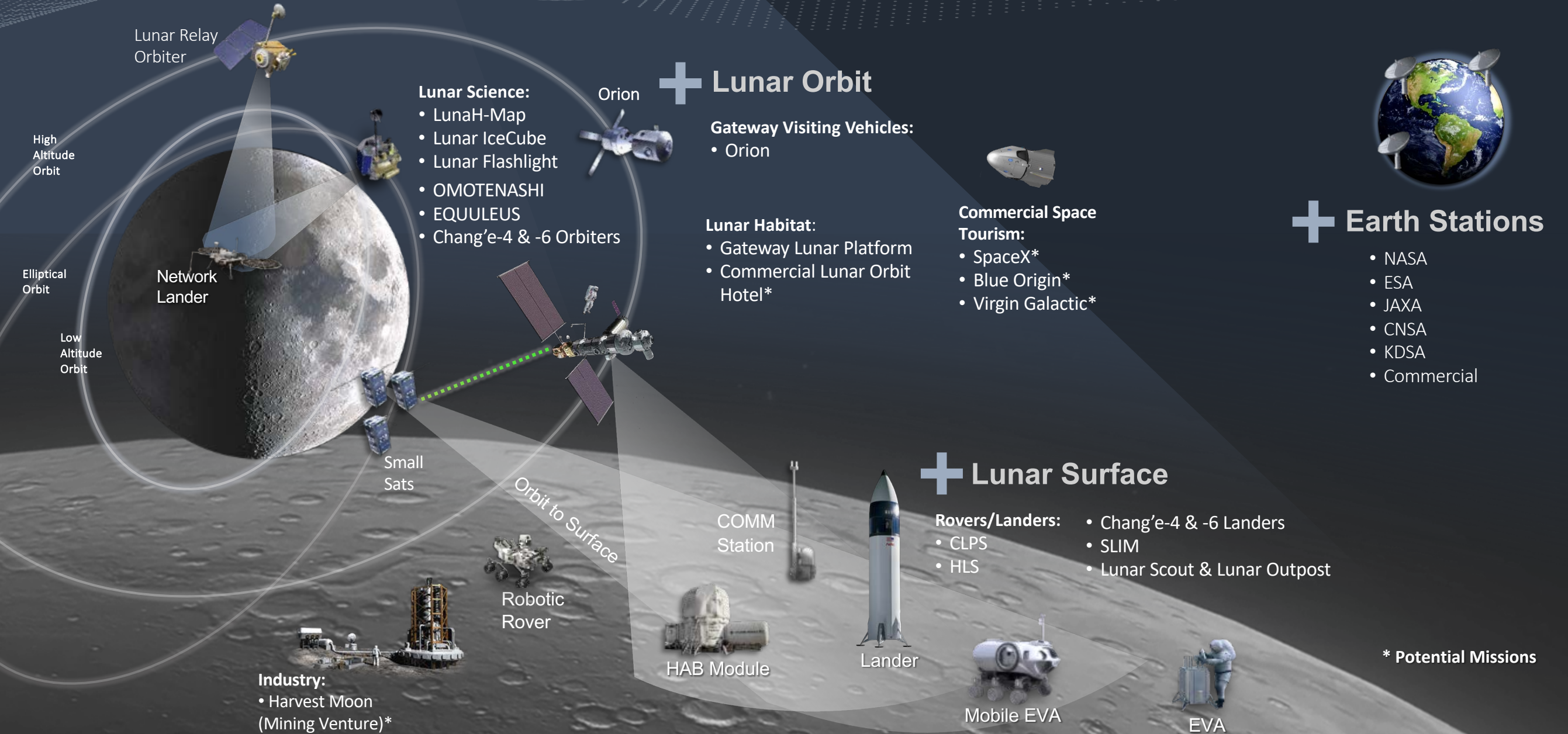
9 December 2021

Overview

- **NASA is charged to return humans to the Moon in cooperation with private industry and international partners**
 - Spectrum environment in the lunar vicinity is expected to be complex with government, private sector, and international entities operating joint and/or independent missions
 - NASA experiences demonstrated that a centralized focal point in the lunar region for advanced spectrum planning and facilitating pre-coordination is a win-win for all involved
 - Lunar Spectrum Manager has been identified to fulfill this role

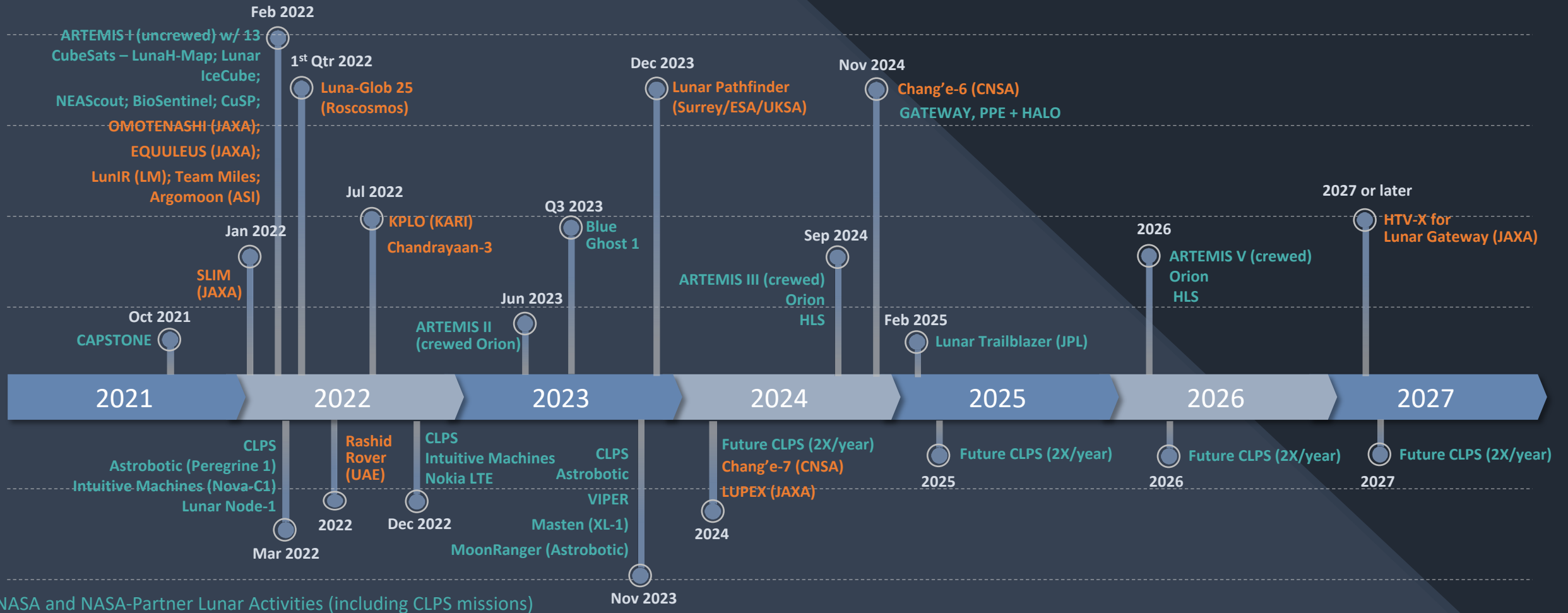


Notional Lunar Spectrum Environment



* Potential Missions

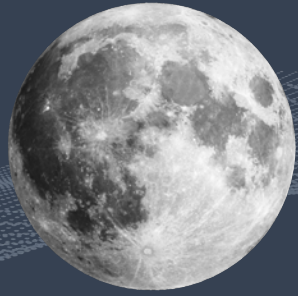
Lunar Mission Landscape*



- NASA and NASA-Partner Lunar Activities (including CLPS missions)
- Other Lunar Activities (e.g. International Space Agencies, Commercial Ventures)

TBD Launch Date
 Lunar Flashlight
 CUE3 (UC Boulder)
 Cislunar Explorers (Cornell)

* Suite of lunar missions being actively supported and/or monitored by the LSM as of November 2021



LSM Functions



Provide **information** on available spectrum and applicable spectrum use **policies** and **constraints** pertinent to lunar region missions



Perform **frequency selection** (if requested) and **sharing analyses**



Leverage knowledge of current and future spectrum usage to enable **early technical coordination** and develop viable mitigation approaches while **minimizing impacts** to involved lunar missions (U.S. missions, foreign space agencies, commercial missions)



Track **status** of lunar activities and **prioritize** spectrum pre-coordination actions based on launch timeframe, lunar project maturity, etc.



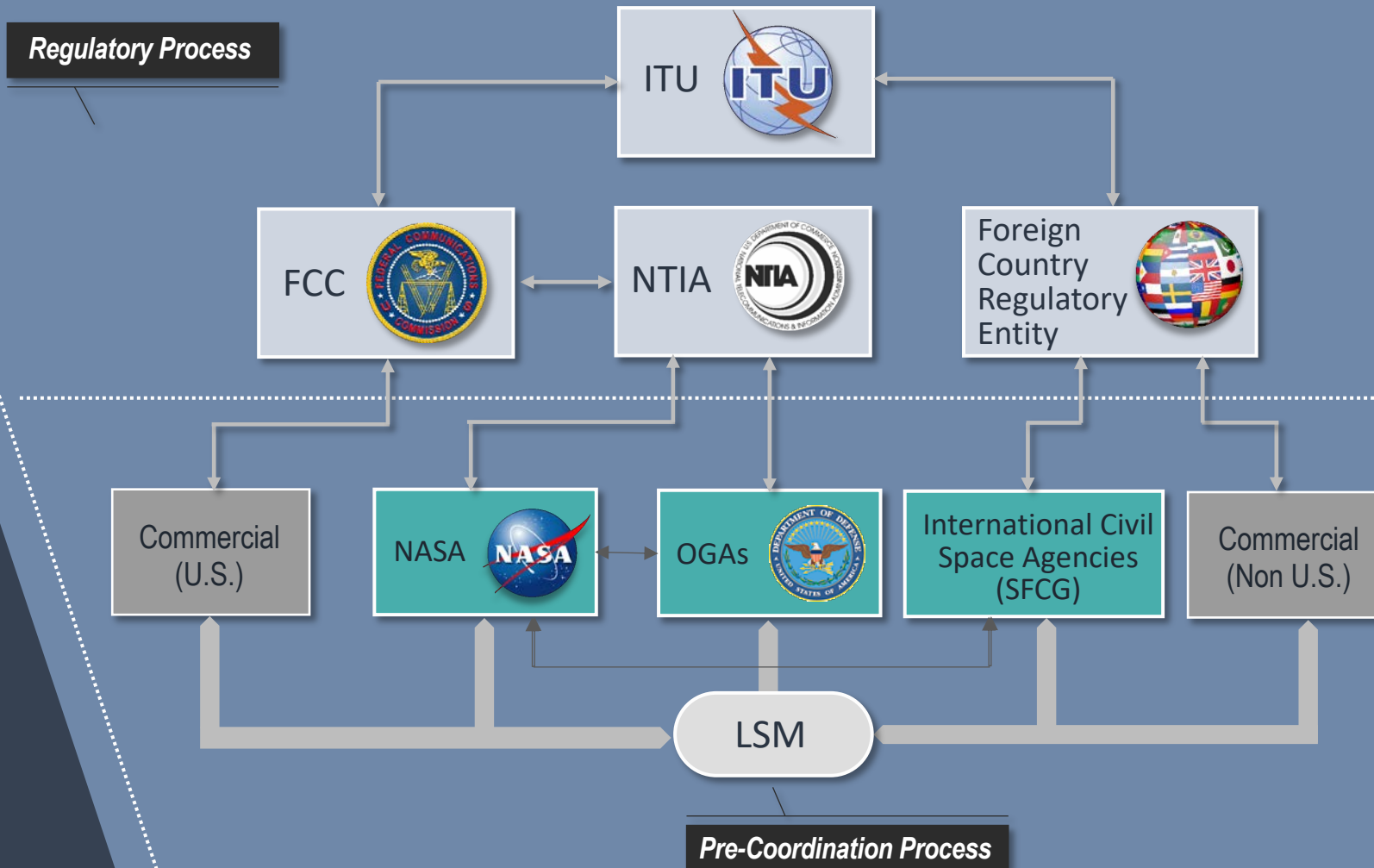
Provide post-launch **interference resolution assistance** when requested

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*Serves as the
Central Focal Point
to facilitate a
comprehensive and
efficient spectrum pre-
coordination between
lunar and near-Earth
missions*

Pre-Coordination Process with LSM

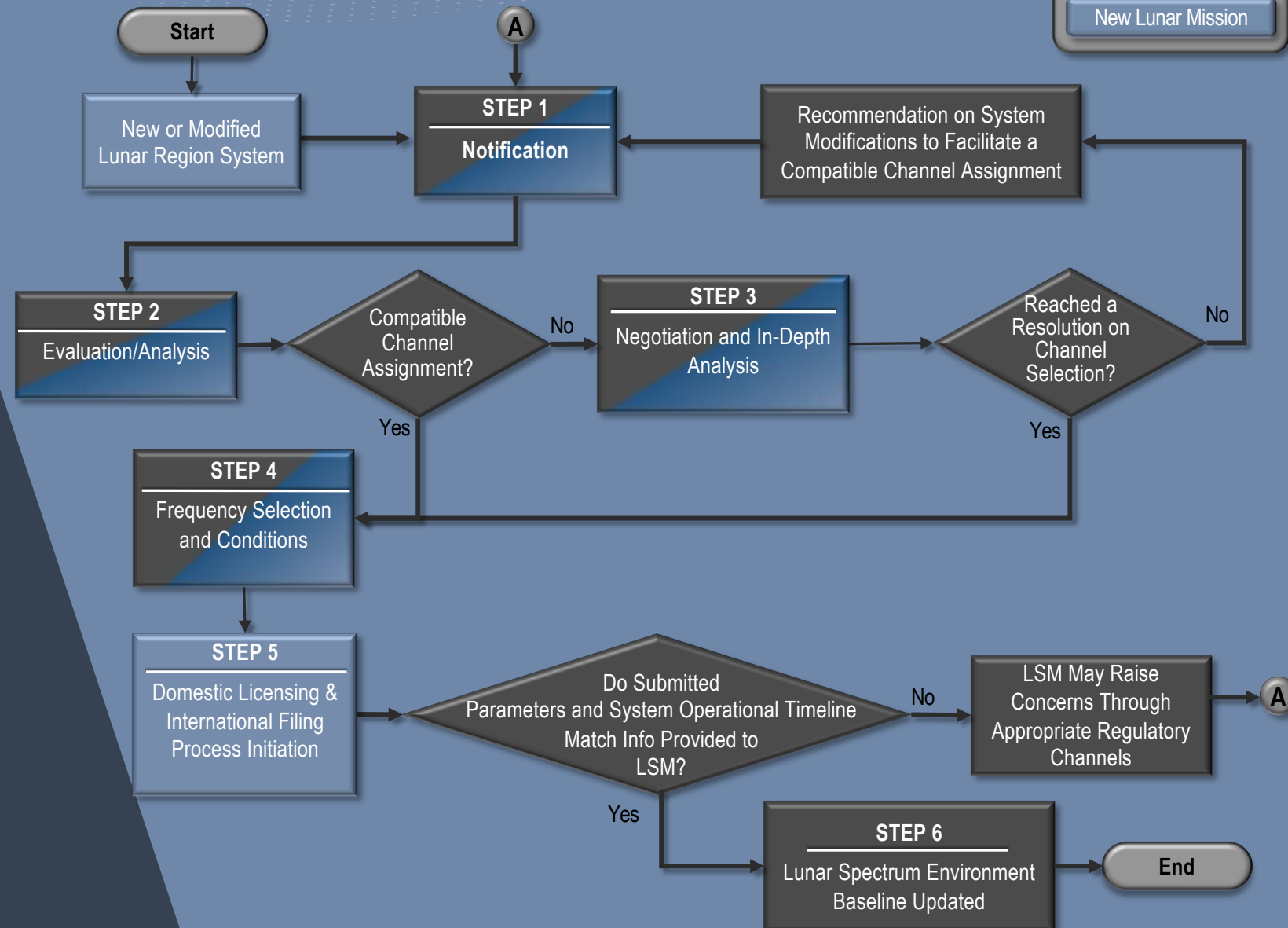
- **Promote maximum compatibility and mission success** by facilitating technical analysis and pre-coordination between lunar-region missions, on a voluntary basis.
- **Identify/minimize/avoid problems** that might otherwise only be found during the formal regulatory process (by which time changes are costly to implement), or worse, during mission operations when interference has occurred.
- This model has worked well with the International Space Station; the need for pre-coordination is even greater in the lunar region.



Lunar Pre-Coordination Process

Responsibility

- LSM / NASA SMs
- New Lunar Mission



- The Pre-Coordination Process aims to **minimize delays** or the need for rework during formal equipment certification and spectrum licensing efforts

- Process supported by the **Lunar Spectrum Management Portal*** (LSMP, see next slide for details)

*Note: LSMP does not support tasks involved in or which flow from licensing and filing activities.

LSM Portal



Background

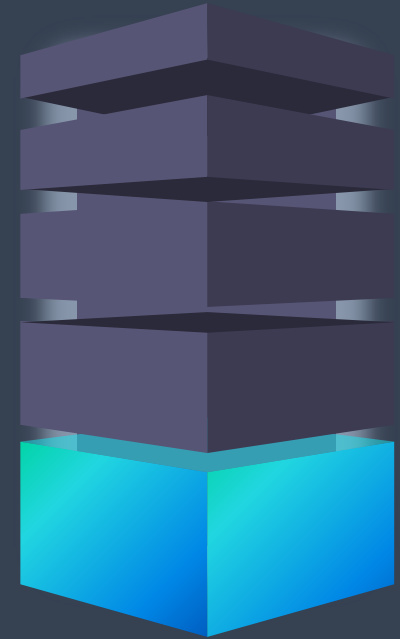
The LSM Portal serves as a centralized platform to help support the LSM in managing the Pre-Coordination Process and disseminating information about spectrum in the lunar region to stakeholders.

Key Functions

- LSM Portal enables lunar mission stakeholders to share information about new missions in the lunar region with the LSM and **supports pre-coordination activities**
- LSM Portal serves as centralized resource for **information about spectrum planning** in the lunar region

Key Resources

- Overview of relevant regulations and policies, and other government documents
- Summary information about known lunar region missions
- Overview of LSM role and Pre-Coordination Process
- Downloadable Lunar Frequency Selection Input Form to initiate Lunar Pre-Coordination Process



- To gain access to the LSMP, contact SCanVAS Support: support@scanvas.nasa.gov
- Request access to the “Lunar Spectrum Management Portal” and provide the name of the mission(s) you support

Takeaways



Earlier Technical Collaboration

- Identify requirements and proper spectrum to support functions and mission objectives
 - Pre-coordination is recommended for both missions and any payloads planning to use RF equipment in the lunar region
- Identify possible technical and spectrum licensing concerns
- Identify pre-coordination paths



Benefits of Pre-Coordination

- Assist with frequency selection for communications and navigation services
- Facilitate coordination with other Lunar missions (U.S. and International, commercial, and academia) on frequency conflicts and concerns
- Minimize delays and rework during formal equipment certification and spectrum licensing efforts



LSM Portal

- LSM Portal serves as a centralized platform for all lunar spectrum management activities
 - Repository for mission requirements
 - Supports pre-coordination activities
 - Shares information about spectrum planning in the Lunar region

Contact Information

Cathy Sham

catherine.c.sham@nasa.gov

(281) 483-0124

For access to the LSMP, contact:

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