



September 14, 2020

BY ELECTRONIC FILING

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

Re: *Space Exploration Holdings, LLC, IBFS File No. SAT-MOD-20200417-00037*

Dear Ms. Dortch:

This is to inform you that, on September 10, 2020, representatives of Space Exploration Holdings, LLC ("SpaceX") had a conference call with members of the Commission's International Bureau to discuss the above referenced application to modify SpaceX's existing authorization to deploy and operate a non-geostationary orbit ("NGSO") satellite system.¹ To facilitated the discussion, SpaceX shared the presentation attached hereto with the staff during the meeting.

SpaceX began by providing an overview of its progress to date in deploying its Starlink constellation, including beta testing that confirms speeds above 100 Mbps of throughput and latency below 40 ms. SpaceX then addressed arguments related to radiofrequency interference and orbital debris mitigation raised in this proceeding, explaining that the modification would dramatically improve space safety while maintaining or improving the interference environment. SpaceX specifically refuted one commenter's novel contention that band splitting during in-line events occurs independently on the uplink and downlink frequencies, noting that such an approach is not practical, inconsistent with precedent, and had never even been suggested before now. SpaceX also updated the staff on the successful launch and operation of 233 additional satellites since before its last report.

Sincerely,

/s/ David Goldman

David Goldman
Director of Satellite Policy

SPACE EXPLORATION TECHNOLOGIES CORP.
1155 F Street, NW
Suite 475
Washington, DC 20004
Tel: 202-649-2641
Email: David.Goldman@spacex.com

¹ Participants on the call are listed in Exhibit 1 hereto.

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Attachments

cc: International Bureau participants

EXHIBIT 1
CALL PARTICIPANTS

International Bureau

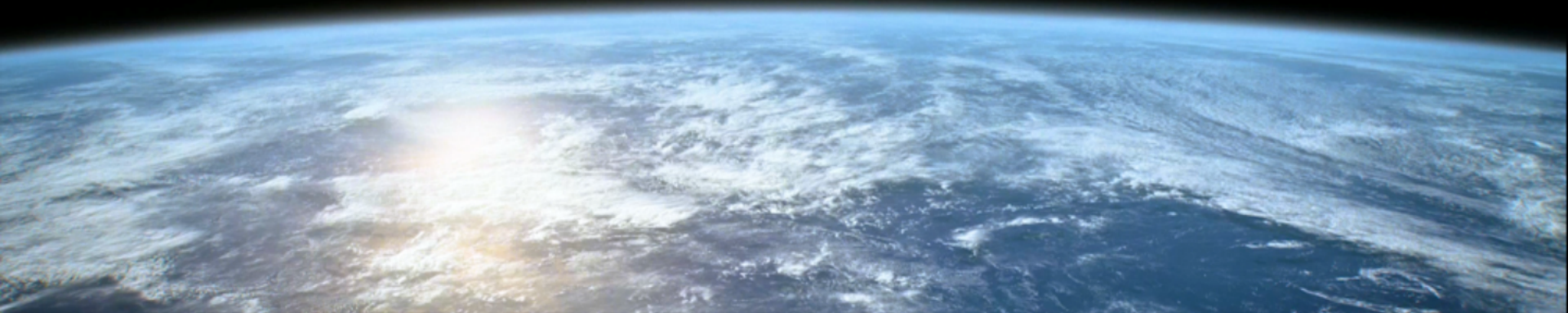
Karl Kensinger
Jameyenne Fuller
Joseph Hill
Jay Whaley

SpaceX

David Goldman
Mihai Albulet
Armor Harris
Jonathan Herman
Zahid Islam
Mary Shurtz
Ryan Wallace
Kevin Wu
Bill Wiltshire

Starlink Update

International Bureau | September 10, 2020



Starlink Deployment Status

- In the past two years, SpaceX has:
 - Built a U.S. world-leading manufacturing system, now building 120 satellites per month
 - Deployed over 700 satellites to date, now by far the largest satellite constellation in the world
 - Building gateway ground stations throughout the United States and internationally
 - On track to produce thousands of consumer user terminals per month, heading toward high-rate production
 - Begun beta service for users across multiple U.S. states
 - Tested at over 100 Mbps using standard user equipment
 - Latency <40-50ms round trip to internet
 - Rapid build-out of constellation – gearing to launch 120 satellites per month with SpaceX's reusable Falcon 9 launch system



MODIFICATION OF KU/KA-BAND LICENSE

Partial constellation modification

- Move remaining satellites to lower altitudes of 540 km to 570 km
- Align polar shells to speed deployment to Polar Regions, including Alaska

Further enhance space safety

- Updated orbital debris showing

Slightly reduce number of satellites

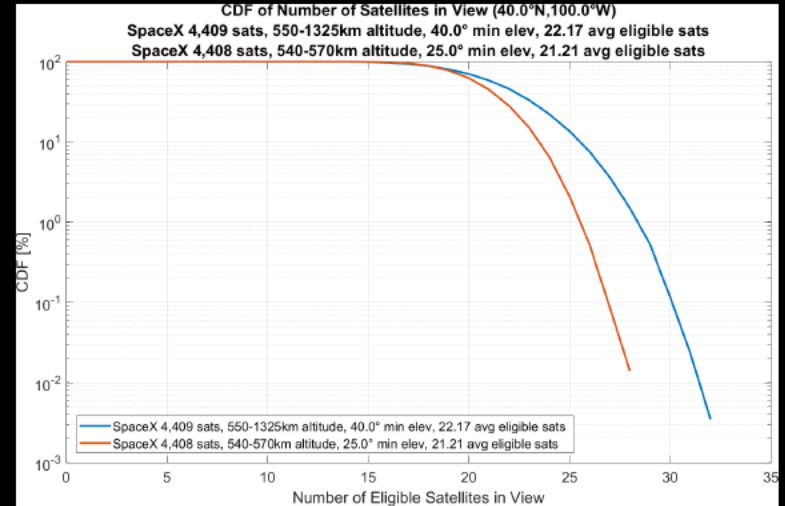
- Now 4,408 satellites
- Demonstrated EPFD, PFD compliance to protect space, terrestrial systems
- Demonstrated lack of significant impact on other licensed NGSO systems



SPACEX PROPOSED MODIFICATION					
Orbital Planes	72	72	36	6	4
Satellites per plane	22	22	20	58	43
Altitude	550 km	540 km	570 km	560 km	560 km
Inclination	53°	53.2°	70°	97.6°	97.6°

RF COMPLIANCE APPROACH: NO SIGNIFICANT INTERFERENCE

- altitude: $\sim 1150\text{km} \rightarrow \sim 550\text{km}$
- min elevation: $40\text{deg} \rightarrow 25\text{deg}$ for added system flexibility
- PFD is the same or reduced
- no FCC filings for ESs intended for operation with high altitude orbits
- G/T on satellite is reduced
- SpaceX agreed to accept Delta susceptibility increase
- $N_{co} = 4 \rightarrow N_{co} = 8$, PFD is reduced by 3dB to account for this
- I/N does not change significantly
- no impact on geometric in-line events at a given location
- the number of gateway sites is cut in half



Improved Space Safety

- Reduced passive decay times for failed satellites and debris clouds
 - 1200 km => ~1000 year deorbit time
 - 550 km => ~5 year deorbit time
- Reduced large object collision risk
 - >100x reduction due to shorter decay
 - Further reduction from lower debris density on decay path
- Low small object densities due to atmospheric drag
- Reduced collision severity
- Despite inherently safer altitude we are still driving higher reliability
 - Since before its latest report to FCC in June, SpaceX has launched 233 satellites with no failures
- SpaceX will not fly all satellites in orbits overlapping with Amazon despite Amazon's repeated claims to the contrary
 - Nonetheless, SpaceX has not opposed others (eg, Swarm) with overlapping orbits; better addressed through coordination

SPACEX

