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April 20, 2018

BY ECFS

Marlene Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: **Elefante Group Notice of Oral *Ex Parte* Presentation; GN Docket Nos. 17-183, 14-177, IB Docket Nos. 17-95, WT Docket No. 10-112 and File No. SAT-LOA-20161115-00117**

Dear Ms. Dortch:

On April 18, 2018, Christopher DeMarche of Elefante Group, Edward A. Yorkgitis, Jr., of Kelley Drye & Warren LLP, on behalf of Elefante Group, Inc. ("Elefante Group"), and Jennifer Warren, Scott Kotler, and Dr. Michael Hicks, of Lockheed Martin Corporation ("Lockheed Martin") (collectively, the "Representatives") met with Charles Mathias, Blaise Scinto, Linda Chang, Charles Oliver, Janet Young, Tim Hilfiger (on the telephone), Tim Maguire (on the telephone) and Meaghan Ryan of the Wireless Telecommunications Bureau ("WTB") to discuss Elefante Group's plans to deploy persistent stratospheric-based communications and infrastructure and to file a petition for rulemaking to seeking a regulatory framework for the operation and licensing of the Stratospheric-Based Communications Services ("SBCS") of Elefante Group and other operators.

In the meeting, Mr. DeMarche laid out the progress Elefante Group is making, working closely with Lockheed Martin on stratospheric airship and communications payload technologies, in design, development, collaboration, and marketing efforts to enable deployment of its systems in the next several years. Elefante Group's offering of SBCS will support high capacity, extremely spectrally efficient, fixed communications operating compatibly with other incumbent users in the same spectrum. Those offerings will include 5G and 4G marketwide backhaul, enterprise WAN, and fixed wireless access, on a wholesale basis. Elefante Group's stratospheric systems will also support integrated IoT and communications capabilities for a variety of potential applications.

Elefante Group Stratospheric Platform Stations ("STRAPS") are being designed to deliver 1 Tbps broadband infrastructure in each direction to User Terminals ("UTs") within a nominally 70 km radius footprint. By offering such capacity that can be rapidly deployed and upgraded in urban as well as rural areas, Elefante Group will provide capabilities that will be instrumental to achieving many Commission objectives, such as winning the race to 5G and what follows, closing the Digital Divide, supporting reliable communications during and after major weather events and natural disasters, and creating thousands of new American jobs. Elefante Group encourages the Commission to take prudent action now that gives the SBCS – which represents new and innovative technologies and allows for novel services warranting treatment under Section 7 of the Communications Act – access to adequate spectrum. In so doing, the Commission will ensure that this country's next generations of networks that roll out in the coming years will be able to exploit the complementary advantages offered by persistent stratospheric-based communications which are missing from other delivery solutions.

A copy of the written presentation materials used in the meeting is attached hereto (the "Attachment").[1]

Dr. Hicks reviewed the spectrum needs required to meet Elefante Group's performance requirements of the planned SBCS systems and compatibility requirements to operate with incumbent systems. After considerable work over the past year examining a number of spectrum bands, Elefante Group and Lockheed Martin have determined that the 21.5-24.0 and 25.25-27.5 GHz bands present the most suitable candidates for SBCS, specifically for communications between the UTs and the STRAPS. (The 71-76 and 81-86 GHz bands are where Elefante Group plans to deploy fixed feeder links between STRAPS and terrestrial network facilities.)

Dr. Hicks reviewed the considerable number of compatibility analyses that Elefante Group has undertaken in recent months to support the proposed candidate bands. To rigorously consider the prospects for compatible operations while meeting Elefante Group's performance requirements, the Representatives explained that the analyses were undertaken from the starting point of assuming worst case conditions before, if even necessary, moving to consider statistical, risk-based assessments. Elefante Group and Lockheed Martin were pleased to report that, by designing compatibility from the outset into the Elefante Group system, the study results have been extremely positive that deployments can occur practicably with minimal to no impact on current incumbent operations while allowing such incumbent operations to grow and expand even as Elefante Group is deploying its networks. Dr. Hicks focused specific attention on

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[1] A minor correction in the Attachment has been made to the second-to-last bullet on slide two to conform to the compatibility studies actually reviewed in the slides, namely compatibility between different SBCS systems and between SBCS and Fixed Service systems (rather than Inter-Satellite Service links).

analyses undertaken to demonstrate the anticipated compatibility, following coordination, among multiple non-exclusive SBCS deployments in the same geographic areas in common spectrum. He also explained the compatibility with existing fixed services in the 21.5-23.6 GHz range. The Representatives explained that the regulatory framework that Elefante Group envisions, and Lockheed Martin's analyses support, will be derived from the coordination that occurs among fixed links today. Further, traditional fixed services would be able to continue to deploy, following coordination, in the presence of SBCS system fixed UT links much as they do now in the presence of other fixed links. The Representatives also explained that IMT services would introduce special challenges were they to try to share compatibly with SBCS deployments, not to mention difficulties IMT would have sharing spectrum with other incumbent users of the bands. Elefante Group Representatives underscored that, in contrast, Elefante Group is offering to do something quite uncommon – introduce a high capacity service that will be essential for full deployment of this country's next generation networks that is highly spectrum efficient (~5bps/Hz and reuse of spectrum ~130 times by one STRAPS deployment), in a highly compatible fashion within encumbered spectrum without seeking to have any of the incumbents leave the band or be prevented from future growth.

The Representatives explained that they are in the midst of meeting with incumbent stakeholders in the candidate bands, both non-Federal and Federal to share their compatibility studies.

Elefante Group discussed its preparations to file a petition for rulemaking in the coming weeks to facilitate the deployment of the SBCS as a co-primary Fixed service, outlining the basic elements of the petition as set forth in the Attachment. The scope of the Petition will include both SBCS user links between UTs and STRAPS in the 21.5-24.0 and 25.25-27.5 GHz bands and feeder links in the 71-76 and 81-86 GHz bands. Where Fixed allocations do not already exist, Elefante Group will be seeking changes to the United States Table of Allocations. Elefante Group advocates a regulatory framework that would set technical parameters complementary to and consistent with the goals of compatibility with existing types of operations in the subject bands, including compatibility among diverse types of SBCS deployments. In locations where compatibility may not be achieved solely through adherence to the technical parameters for SBCS, the proposed framework would call for service-area STRAPS and site-specific UT coordination before deployment. Licensing of SBCS should be non-exclusive and on a rolling basis, combined with coordination where required and registration requirements as deployments of STRAPS and UTs occur so that other users of the band – both SBCS operators and incumbent operators – will be able to coordinate and deploy additional facilities in these non-exclusive spectrum bands.

Pursuant to Section 1.1206(b) of the Commission's rules, this letter is being filed electronically.

Respectfully submitted,

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Counsel to Elefante Group, Inc.

cc: Charles Mathias
Blaise Scinto
Linda Chang
Charles Oliver
Janet Young
Tim Hilfiger (on the telephone)
Tim Maguire (on the telephone)
Meaghan Ryan

Elefante Group & Lockheed Martin Stratospheric Platform Communications

18 April 2018

Meeting with

FCC Wireless Telecommunications Bureau

Agenda

- Elefante Group's Vision and Basic Business Plan
- Basic Characteristics of Elefante Group Airship-Based Operations, Including Spectral Efficiency and Designs to Operate Compatibly with Incumbent Services
- Spectrum Requirements of the Platforms and Terminals and Identify Primary Candidate Bands That Satisfy Performance Requirements and Support Compatible Operations
- Compatibility Analyses Concerning Sharing with Incumbent Fixed Services and Other Stratospheric Operations and Interference Mitigation Where Required
- Overview of Planned FCC Petition for Rulemaking for Stratospheric-Based Communication Services (SBCS)

This presentation was prepared specifically for use in discussions with FCC in connection with Elefante Group and Lockheed Martin positions in present and potential future regulatory proceedings and is not to be used or relied upon for any other purpose.

Overview of Vision and Business Plan

- Elefante Group aspires to be the world leader in transformative persistent stratospheric-based communications and IoT-enabling solutions

- Elefante Group, working closely with Lockheed Martin on the technology, seeks to be the first company to bring new and innovative stratospheric solutions to market

- Elefante Group will deploy a broadband infrastructure that supports 1 Tbps (both directions) wholesale fixed communications
  - 4G/5G Backhaul
  - Enterprise WAN
  - Residential Broadband
  - Sensor & IoT

EG Airship Systems Will Advance Multiple National Objectives

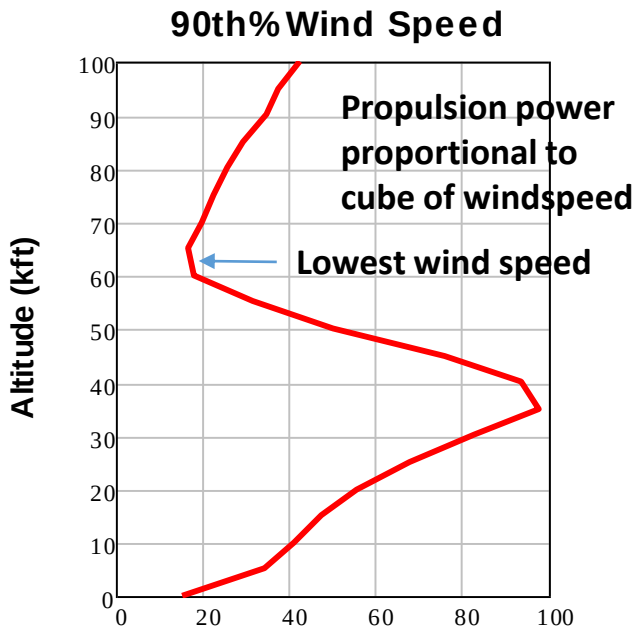
- Significant investment in **high speed broadband infrastructure** developed in the USA
- Capability to deploy innovative broadband solutions in both urban and rural areas to help **close the Digital Divide**
- Enable **densification of 4G, 5G and IoT** with greater flexibility and lower cost
- **Maximizes spectral utilization** with significant frequency reuse and other advanced techniques
- Systems architecture optimized for deriving additional uses in encumbered spectrum while **operating compatibly with existing services**
- Enablement of **continuous market-wide technology upgrades** with modular payloads in multiple bands
- Supporting uninterrupted communications during and after major storms and natural disasters and facilitating **rapid restoration for public safety and disaster relief**
- Will create **thousands of US jobs** in engineering, construction, and operations

Why a Stratospheric Airship as a Communications Platform?

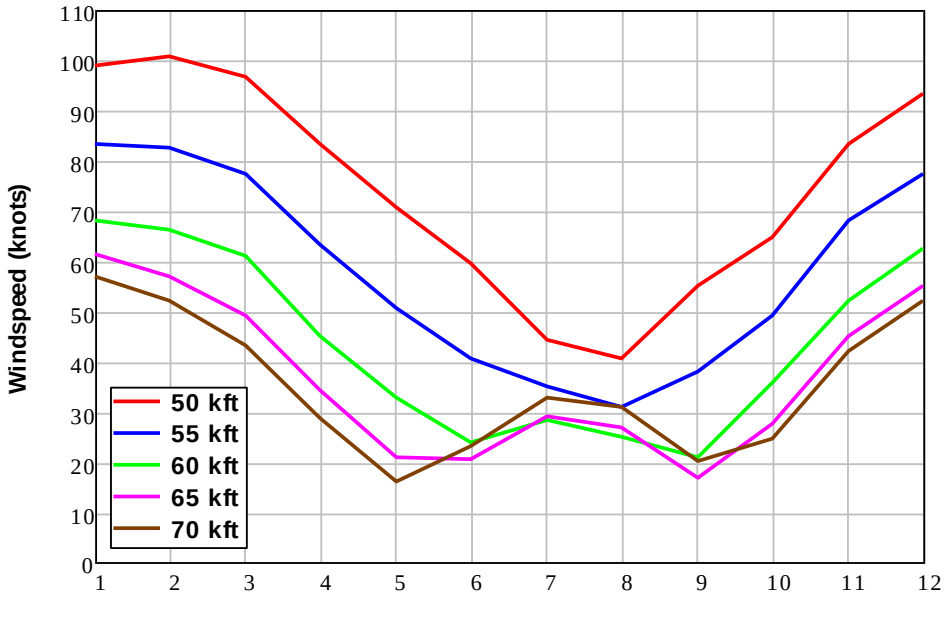
Unmanned Stratospheric Platform Stations (STRAPS) in development by EG/LM:

- Stable-platform at nominally fixed altitude of @ 65kft (19.8 km)
  - Ensures low latency communications (less than 5ms)
  - IoT and high-resolution sensing
  - Above congested airspace and most weather systems
- Nominal coverage of 70 km radius – ~15,400 km^2 per platform
- Possess large payload capability (1000+ kg, 10+ kW power)
- Provide substantial capacity and rapid deployment in both urban and rural areas
- Fully recoverable and serviceable and with upgradable payloads
- Utilize hybrid (solar-based and fuel cell) power/propulsion to support maintain nominally fixed location
- Ultra-long mission (> 6 mo. on avg.) on station with 10-15 year life
- Low operating, maintenance, and overall lifecycle costs

Why fly at 65,000 ft?



Typical year-round wind speed profile in the Northern Hemisphere



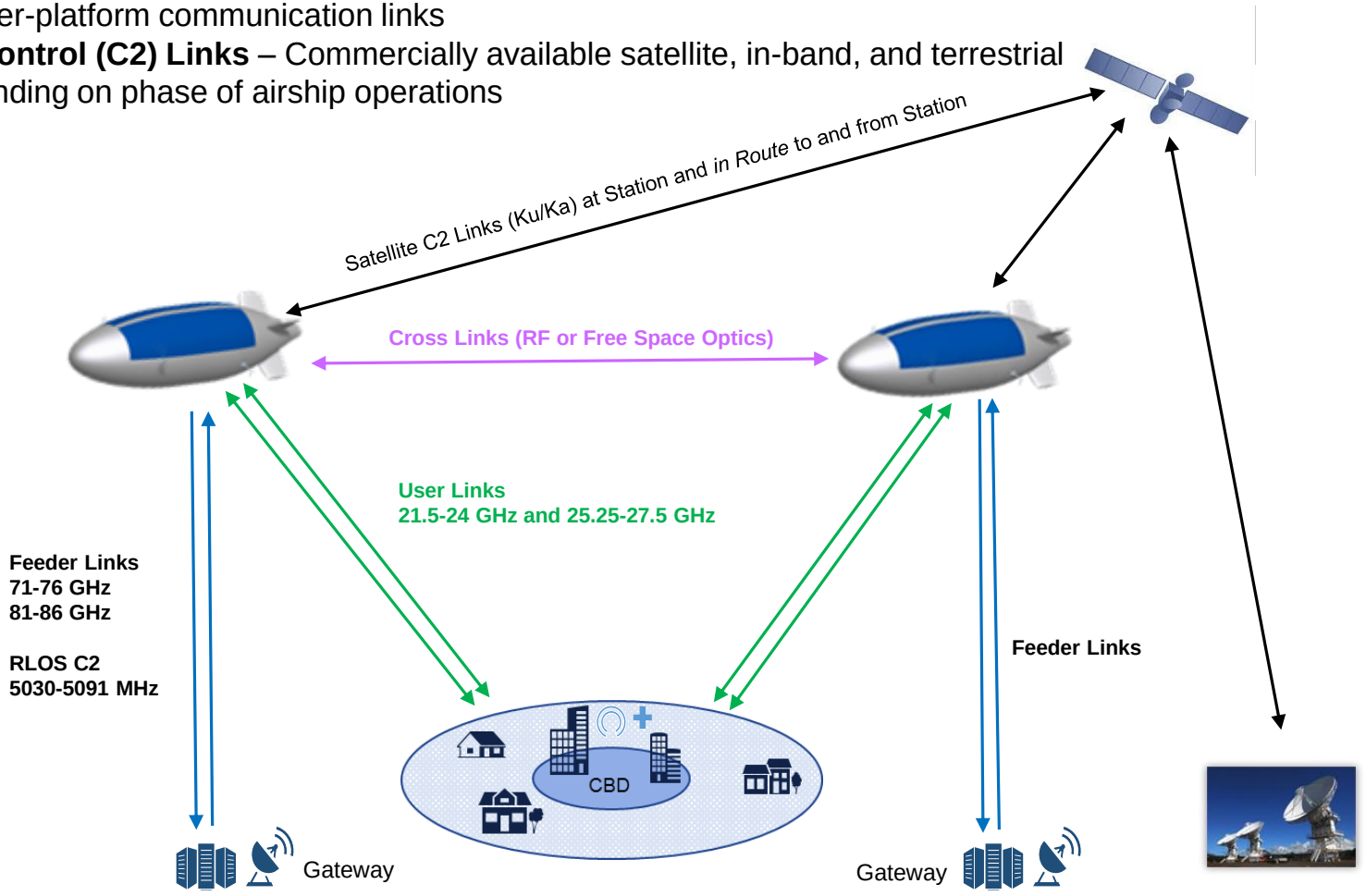
Comparison of the 95th% Monthly Winds in a Northern Hemisphere Location as a Function of Altitude

Airship: ~65 kft (19.8 km) is the optimum altitude for most locations of interest based on wind speeds and airship payload-carrying capability, and above the weather

Comm Payload: Large potential service area, low latency, low free space path loss permitting high spectral efficiency waveforms

Communications Architecture

- **User Links** - Access and transport/backhaul to customers
- **Feeder Links** – Customer to global network / datacenter connections
- **Cross Links** – Inter-platform communication links
- **Command and Control (C2) Links** – Commercially available satellite, in-band, and terrestrial control links depending on phase of airship operations



Spectrum Requirements

EG reference band plan designed to maximize throughput for an entirely new service while flexibly using spectrum to remain compatible with all existing services

- User Links: Between Platform and Terminals
  - To satisfy performance requirements of 1 Tbps in each direction, operate compatibly with incumbent services, and allow multiple stratospheric solutions, EG and LM have determined the need for 4.75 GHz total spectrum
    - EG reference band plan uses 4x 450 MHz channels in each direction
    - 1.15 GHz additional for protections of incumbent services (alternate channels), flexibility for alternate implementations, guard bands preventing adjacent band and self-interference
  - Highly efficient spectrum reuse (> 130 times per platform) and spectral efficiency (> 4 bps/Hz) minimizes spectrum required
- Gateway Links: Platform to Terrestrial Services
  - Platform gateway links will be in the 71-76 and 81-86 GHz bands, reusing the 10 GHz multiple times per platform.

U.S. Table of Frequency Allocations and Planned Frequency Bands

EESS (passive) 21.2-21.4 **NASA**

Federal Table	Non-Federal Table	Intended Use
21.4-22 FIXED MOBILE		21.5-22 GHz ONLY CPE **Uplink** / Downlink
22-22.21 FIXED MOBILE except aeronautical mobile US342		CPE **Uplink** / Downlink
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) **NASA, NOAA** FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY **NSF** SPACE RESEARCH (passive) **NASA** US342 US532		CPE **Uplink** / Downlink
22.5-22.55 FIXED MOBILE US211		CPE **Uplink** / Downlink
22.55-23.15 FIXED INTER-SATELLITE US145 US278 **Iridium, Audacy** MOBILE **DOD** SPACE RESEARCH (Earth-to-space) 5.532A US342 **NSF**		CPE **Uplink** / Downlink
23.15-23.55 FIXED INTER-SATELLITE US145 US278 **Iridium, Audacy** MOBILE **DOD**		CPE **Uplink** / Downlink
23.55-23.6 FIXED MOBILE		CPE **Uplink** / Downlink
23.6-24 EARTH EXPLORATION-SATELLITE (passive) **NASA** RADIO ASTRONOMY US74 **NSF** SPACE RESEARCH (passive) **NASA** US246		CPE **Uplink** / Downlink

Federal Table	Non-Federal Table	Intended Use
25.25-25.5 FIXED INTER-SATELLITE 5.536 **NASA** MOBILE Standard frequency and time signal-satellite (Earth-to-space)	25.25-25.5 Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space)	CPE **Downlink**/ Uplink
25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) **NASA NOAA** FIXED INTER-SATELLITE 5.536 **NASA** MOBILE **DOD** SPACE RESEARCH (space-to-Earth) **NASA** Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	25.5-27 SPACE RESEARCH (space-to-Earth) Inter-satellite 5.536 Standard frequency and time signal-satellite (Earth-to-space) 5.536A US258	CPE **Downlink**/ Uplink
27-27.5 FIXED INTER-SATELLITE 5.536 **NASA** MOBILE **DOD**	27-27.5 Inter-satellite 5.536	CPE **Downlink**/ Uplink

- Elefante Group and Lockheed Martin undertaking studies of compatibility with non-Federal fixed and ISS services
- Services from four federal agencies also identified for compatibility analysis and pre-filing discussion
- We are seeking information on any additional federal or non-federal uses not identified

U.S. Table of Frequency Allocations and Planned Frequency Bands

Federal Table	Non-Federal Table	Intended Use
71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) US389		(Gateway Downlink)
74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Space research (space-to-Earth) US389	74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) US389	(Gateway Downlink)
…		
81-84 FIXED FIXED-SATELLITE (Earth-to-space) US297 MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) US161 US342 US389		(Gateway Uplink)
84-86 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY US161 US342 US389		(Gateway Uplink)

- Elefante Group and Lockheed Martin undertaking studies of compatibility with non-Federal fixed services
- No Federal Agency uses currently identified for compatibility analysis with Elefante Group gateways
- We are seeking information on any federal uses not identified

Compatibility Analysis Summary – Non-Federal

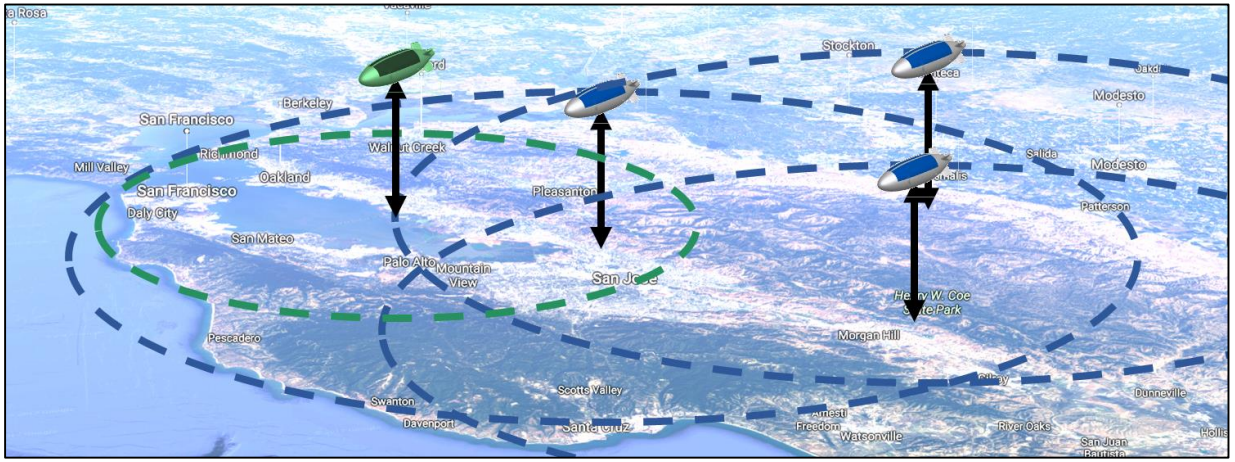
Org	Other Service	Other Link	Proposed STRAP Band	STRAP Link	EG Plan to Mitigate Interference	Study Results
FWCC	FS	P-P	25.25-27.5	User DL	Not Required	Airship transmission managed below satellite PFD limits per 25.208 (c)
FWCC	FS	P-P	21.5-24.0	User DL	Not Required	Airship transmission managed below satellite PFD limits per 25.208 (c)
FWCC	FS	P-P	25.25-27.5	User UL	Yes	Compatibility Analysis performed for each geographic area; limited site-specific coordination may be needed when UTs located in very close proximity to existing co-channel FS sites
FWCC	FS	P-P	21.5-24.0	User UL	Yes	Compatibility Analysis performed for each geographic area; limited site-specific coordination may be needed when UTs located in very close proximity to existing co-channel FS sites
FCC	FS-SBCS	User DL	25.25-27.5	User DL	Not Required	Adjacent SBCS service areas can overlap significantly – not mutually exclusive
FCC	FS-SBCS	User UL	21.5-24.0	User UL	Not Required	Adjacent SBCS service areas can overlap significantly – not mutually exclusive
Iridium	ISS	LEO->LEO	21.5-24.0	User UL	Not Required	Protection Criteria met under all conditions
Audacy	ISS	MEO->LEO	21.5-24.0	User UL	Not Required	Anticipate Protection Criteria met (pending analysis with Audacy receive characteristics)

Compatibility Analysis Summary - Federal

Org	Other Service	Other Link	Proposed STRAP Band	STRAP Link	EG Plan to Mitigate Interference	Study Results
DOD	MS	Aero-> Ground	25.25-27.5	User DL	Not Required	Minimal likelihood of interference
DOD	MS	Ground->Aero	21.5-24.0	User DL	Not Required	Minimal likelihood of interference
DOD	MS	Aero->Ground	25.25-27.5	User UL	Not Required	Minimal likelihood of interference
DOD	MS	Ground->Aero	21.5-24.0	User UL	Yes	Coordination/cooperation when <150 km of separation
NASA	ISS (DRS RTN)	NGSO->GSO	25.25-27.5	User DL	Not Required	Protection Criteria met under all conditions
NASA	ISS (DRS FWD)	GSO->NGSO	21.5-24.0	User DL	Not Required	Protection Criteria met under all conditions
NASA	ISS (DRS RTN)	NGSO->GSO	25.25-27.5	User UL	Not Required	Protection Criteria met under all conditions
NASA	ISS (DRS FWD)	GSO->NGSO	21.5-24.0	User UL	Not Required	Protection Criteria met under all conditions
NASA	EESS	GSO->ES	25.25-27.5	User DL	Yes	Airship can be placed to avoid interference assuming basic mission info available
NASA	EESS	GSO->ES	25.25-27.5	User UL	Yes	UTs placed relative to ES to avoid interference assuming basic mission info available
NASA	EESS	NGSO->ES	25.25-27.5	User DL	Yes	Airship can be placed to avoid interference assuming basic mission info available
NASA	EESS	NGSO->ES	25.25-27.5	User UL	Yes	UTs placed relative to ES to avoid interference assuming basic mission info available
NASA	SRS	Space->ES	25.25-27.5	User DL	Yes	Airship can be placed to avoid interference assuming basic mission info available
NASA	SRS	Space->ES	25.25-27.5	User UL	Yes	UTs placed relative to ES to avoid interference assuming basic mission info available
NASA	EESS	Passive sensors	21.5-24.0	User UL	Not Required	Determined proposed isolation criteria for 21.2-21.4, 22.21-22.5, 23.6-24 GHz
NSF	RAS	RAS passive	25.25-27.5	User DL	Not Required	Determined proposed isolation criteria for 23.6-24 GHz adjacent band
NSF	RAS	RAS passive	21.5-24.0	User UL	Not Required	Determined proposed isolation criteria for 23.6-24 GHz adjacent band

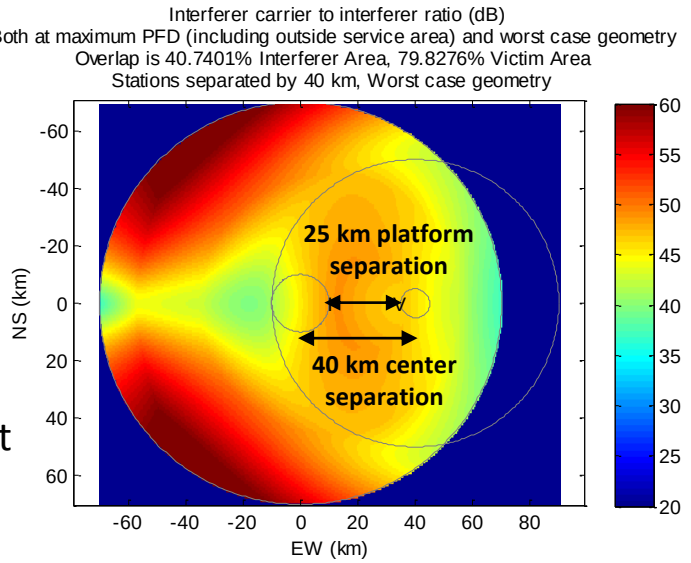
SBCS Peer to Peer Compatibility

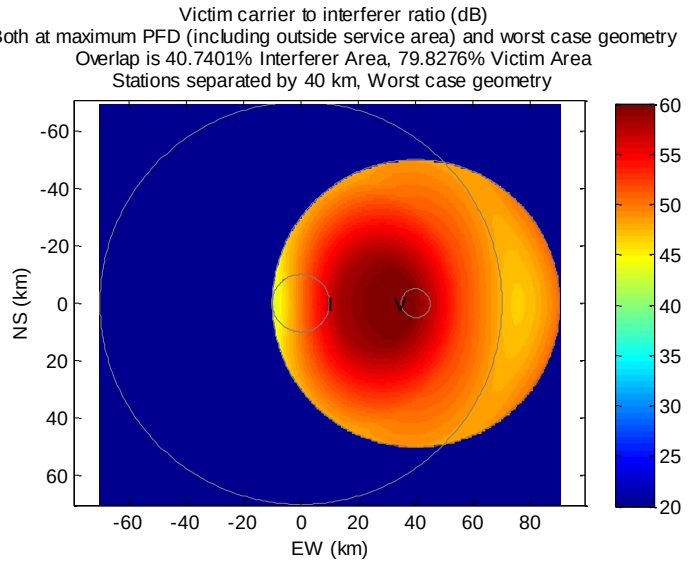
- Spectrum Utilization Is Maximized by Multiple Platform Re-use
- Stratospheric platform geometry permits complete spectrum re-use on a coordinated basis
- Analysis in downlink and uplink directions both show sufficient positive margin for overlapping systems following proposed regulations



Relying on spatial diversity, multiple airships can serve overlapping geographic areas in the same frequency bands

- Example DL analysis with EG reference system and system from ITU working party 5C
- Carrier to interferer ratio of both systems remains high enough to permit 5.9 bps/Hz with centers separated at most 40 km and airships separated at most 25 km

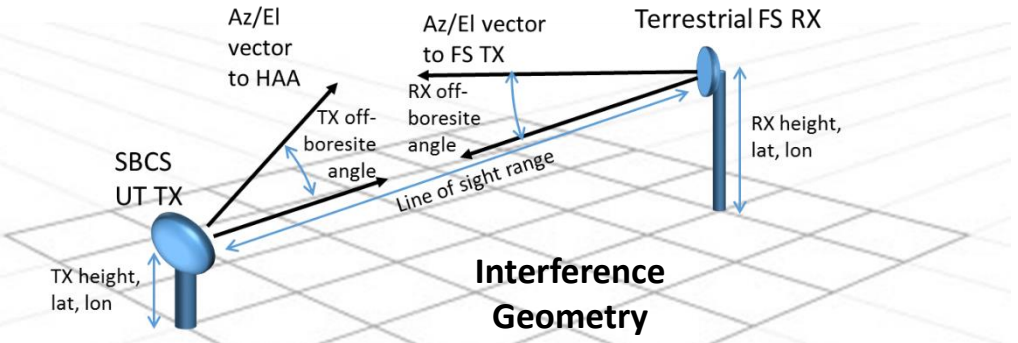




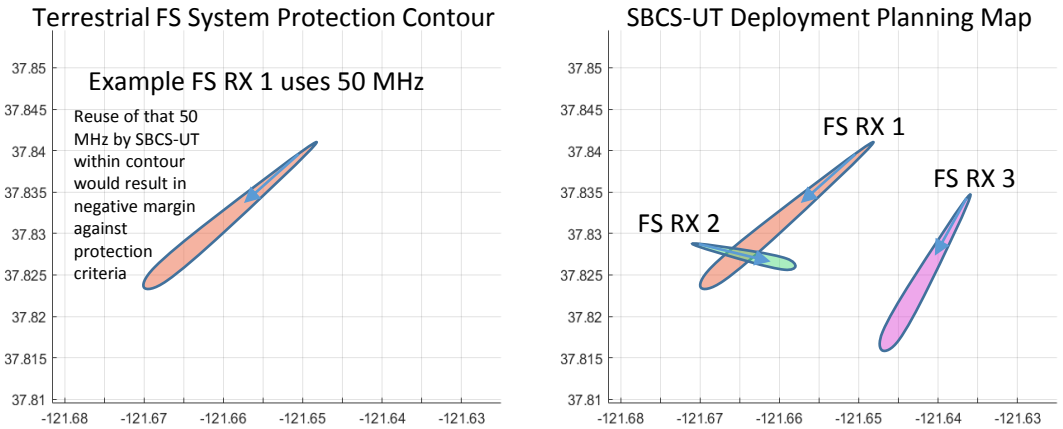
SBCS service areas are not mutually exclusive

FS Point to Point over 21.5-23.6 GHz– Interference from EG System User Uplink
Interference Geometry & Analysis Results

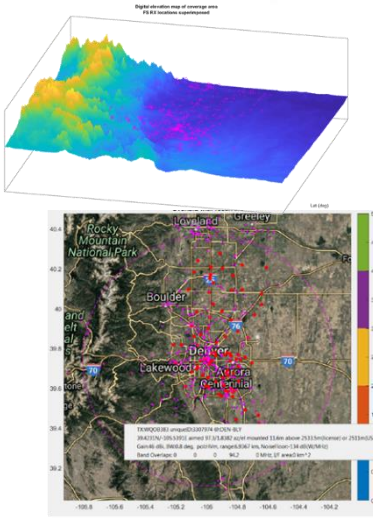
- SBCS-UT antennas have high rolloff and elevation angle – present low EIRP to terrestrial receivers
- Analysis determines protection contour for each licensed receiver
  - UT in contour cannot reuse RX licensed channels
  - Allows pre-coordination for rapid deployment
- Protection contours are small enough that SBCS network controller can assign bands to UTs based on constraints that honor coordinations

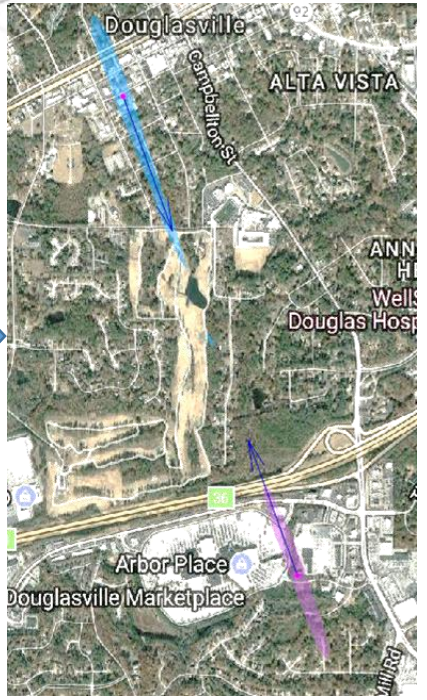


Interference Geometry



Notional Protection Contours





Terrain and FCC license database data used to evaluate realistic protection contours

FS fully protected by coordinating constraints on UT location and/or spectrum

Petition for Rulemaking

- Scope: Limited to SBCS User Links (21.5-24.0, 25.25-27.5 GHz) and Feeder Links (70/80 GHz)
- Seek new primary FIXED allocations or footnotes in the 23.6-24.00 and 25.25-27.5 GHz bands
    - New allocations could be limited to stratospheric-based communications service (SBCS) operations, if appropriate
- Service and operational rules for non-exclusive systems operating as a FIXED service in both urban and rural areas
- Foundation for SBCS would be compatibility with incumbent operators in shared spectrum
    - Proposed technical rules will ensure compatibility with incumbents in many scenarios (e.g., ISS, EESS, some AMS)
    - Proposed rules would provide for coordination with other Fixed Services in 21.5-23.6 GHz range and in E-Band in fashion consistent with current framework with slight modifications
    - Proposed rules would provide for service-area specific coordination with incumbents where necessary (AMS, EESS, SRS, RAS)

SBCS offers new technologies and services meriting Section 7 treatment of the Petition and the ensuing rulemaking

Petition for Rulemaking (cont'd)

- SBCS licensing rules should provide for non-exclusive SBCS assignments
  - Through coordination, multiple SBCS systems can serve the same geography in the same bands
  - No mutual exclusivity
    - In UL bands, would also share with "traditional" Fixed Services
  - SBCS licenses should be granted on a rolling-wide area basis (REAs)
    - STRAPS and User Terminal links (uplinks) should be registered prior to deployment
  - Appropriate rural commitments should be considered
- Bringing-into-use obligations, discontinuance rules, and transfer restrictions
- Licensees can choose to operate as a private carrier or a common carrier

Next Steps

- Continue briefings with Federal and non-Federal stakeholders
- File Petition for Rulemaking
- EG and Lockheed Martin plan to implement experimental licensing plan providing demonstrations of capabilities and compatibility and leading to deployment of airship prototype in next few years