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AFFILIATE OFFICE

MUMBAI, INDIA

May 29, 2018

**By ECFS**

Marlene Dortch, Secretary  
Federal Communications Commission  
445 12<sup>th</sup> 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 May 24, 2018, Brian Terkelsen, CEO of Elefante Group, Inc. (“Elefante Group”), Christopher DeMarche, COO, of Elefante Group, Edward A. Yorkgitis, Jr., of Kelley Drye & Warren LLP, counsel for Elefante Group, David Markham, Vice President, New Ventures, Lockheed Martin Corporation Space (by telephone) and Ryan Terry, Director, Regulatory Licensing and Policy, Lockheed Martin Government Affairs, (collectively, the “Representatives”) met separately with (1) Commissioner Michael O’Rielly and his advisor, Erin McGrath, (2) Rachael Bender from the Office of Chairman Pai, (3) Will Adams from the Office of Commissioner Carr, and (4) Umair Javed from the Office of Commissioner Rosenworcel.

Mr. Terkelsen described the progress of Elefante Group’s plans, working with Lockheed Martin Corporation (“Lockheed Martin”) on the technology, to deploy transformative low latency, persistent stratospheric-based communications and infrastructure in the United States beginning as soon as 2022. The Elefante Group Representatives explained how Stratospheric-Based Communications Services (“SBCS”), in particular as envisioned by Elefante Group, would help the United States win the race to 5G – provided that the Commission enable access to suitable and sufficient spectrum for SBCS. They demonstrated how Elefante Group’s stratospheric platform stations (“STRAPS”) operating at ~ 19.8 km altitude, once deployed, would provide wholesale availability “on day one” of a total of 1 Tbps capacity both up and down to user terminals (“UTs”) located anywhere within a 70 km radius. As they explained, a single STRAPS’ 15,400 sq. km (6,000 sq. mi.) coverage area would *inherently* cover, in almost

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all market deployments, both urban and surrounding rural areas. Because this coverage would be independent of intermediate infrastructure requirements and challenges faced by ground-based deployments, this means that Elefante Group's SBCS deployments would help make entire markets 5G ready (and upgradeable) almost instantaneously, supporting 4G, 5G, and Internet of Things ("IoT") backhaul and densification. Significantly, the Representatives explained that Elefante Group's lighter-than-air ("LTA") STRAPS will have on-board networking capability – "Network in the Sky" – which will allow UT locations, whether a pair or a multi-point private network, to be connected without any ground-based network support.<sup>1</sup> The latency of these SBCS deployments (~5 ms) will make them comparable to ground-based deployments at a fraction of the cost (~ 20%), thanks to the materially reduced upfront and ongoing infrastructure costs.

The advantages of SBCS for the rollout of 5G in urban as well as rural markets are clear. The Elefante Group Representatives explained that SBCS will also help meet a number of other Commission objectives including not only major private investment in next generation infrastructure, but bridging the Digital Divide in both urban deserts and non-urban areas, network densification, maximizing spectrum utilization and spectral efficiency, creating thousands of American jobs in construction, engineering, and operations, and maintaining and restoring communications in the contexts of hurricanes and other natural disasters.

Mr. Markham, the lead at Lockheed Martin on the Elefante Group program, and the other Representatives, explained that Lockheed Martin and Elefante Group are ready to begin construction on an Alpha airship (to be launched in 2020) accompanied closely by an in-parallel effort to build a full-scale Beta airship for flight in 2021. Commercial deployment is planned for 2022.

The Elefante Group Representatives explained that the company intends to deploy first in the United States, provided the regulatory framework is in place to facilitate that end. Elefante Group and Lockheed Martin expressed confidence that the Commission has the resolve to achieve this: As Chairman Pai recognized just last week with respect to the race to 5G, "[w]e need to be aggressive in our policy decisions. We should act—and I use that word advisedly, in opposition to 'talk'—as if U.S. leadership is the only acceptable option."<sup>2</sup> In a recent speech where he discussed facilitating 5G services, Commissioner O'Rielly stated "the Commission must create the appropriate regulatory environment for the U.S. private sector to undertake the

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<sup>1</sup> Elefante Group primarily plans to operate on a private carrier, wholesale basis to other providers.

<sup>2</sup> "Remarks of FCC Chairman Ajit Pai at the Wireless Infrastructure Association Connectivity Expo," 2 (May 23, 2018).

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huge capital expenditure critical for success.”<sup>3</sup> Commissioner Carr last month affirmed the need to learn lessons from the race to 4G, which the United States won only after having lost the races to 2G and 3G; these lessons include moving quickly to open up new spectrum bands and taking tangible steps to facilitate the deployment of infrastructure.<sup>4</sup> Commissioner Rosenworcel has also astutely acknowledged “[w]ith 5G service we will see unprecedented demand for our airwaves. To manage what is coming we need to look at new models for spectrum management. We need innovative ways to make more room on the road.”<sup>5</sup>

Elefante Group encouraged the Commission to take major steps toward implementing a bold next generation network policy by adopting rules for SBCS as well as other platforms. Enabling SBCS in a timely fashion will help secure United States leadership, stimulate substantial private sector investment in major new communications infrastructure, and facilitate systems that have the ability to bypass many of the physical and local regulatory infrastructure challenges that persist (increasing costs, imposing delays, and creating urban deserts as well as depriving rural areas of access to the latest generation of wireless broadband services). Consequentially, such action gives the United States a further jump in deploying next generation networks, both 5G and beyond, and serves as a new model for spectrum management.

The Representatives reviewed the spectrum needs required to meet Elefante Group’s performance requirements for its planned SBCS systems. They explained how, over the past year, Lockheed Martin and Elefante Group engaged in significant critical examination of spectrum bands in the United States between 17 and 47 GHz to identify suitable spectrum bands, taking into account allocations and planned and proposed uses. A central part of that search was to examine the potential for compatible operations by SBCS with incumbent operators, enabling both SBCS and incumbent users to grow and evolve. Lockheed Martin and Elefante Group underscored how they are designing spectrum compatibility into the Elefante Group SBCS system from the outset. The Representatives explained how Lockheed Martin and Elefante Group have performed more than 25 compatibility analyses to that end.<sup>6</sup> As a result of that

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<sup>3</sup> “Remarks of FCC Commissioner Michael O’Rielly before the American Enterprise Institute,” 1 (Apr. 19, 2018).

<sup>4</sup> See “Remarks of FCC Commissioner Brendan Carr at CTIA’s Race to 5G Summit ‘Next Steps on the Path to 5G,’” 2 (Apr. 19, 2018).

<sup>5</sup> “Remarks of Commissioner Jessica Rosenworcel at Mobile World Congress,” 2 (Feb. 27, 2018).

<sup>6</sup> In conjunction, the Representatives explained that they have initiated constructive dialogue with the various non-Federal and Federal users about their proposed use of these bands, noting that they have shared their study methods and results with these other stakeholders.

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analysis, Elefante Group and Lockheed Martin have determined that the 21.5-23.6<sup>7</sup> and 25.25-27.5 GHz bands (respectively, the 22-23 and 26 GHz bands) present the most suitable candidates for communications between UTs and STRAPS to allow SBCS to attain the Elefante Group's proposed performance levels. (Elefante Group also plans to deploy STRAPS feeder links in the 71-76 and 81-86 GHz bands (the "70/80 GHz bands").)

There were questions in several of the meetings regarding the prospects for IMT (i.e., commercial mobile wireless) and SBCS to share the 26 GHz band. The Elefante Group Representatives explained in response that the analysis that has been performed to date by Lockheed Martin on that issue indicates that, while SBCS is very unlikely to create a threat of harmful interference into IMT operations, IMT operations are unlikely to be able to use the band without imposing material constraints on the deployment of SBCS systems. Lockheed Martin and Elefante Group will continue to examine this issue and would be open to such sharing if deployment and growth of both types of systems could be reasonably and mutually accommodated.

Elefante Group explained that it is working toward filing a petition for rulemaking ("Petition") by the end of this month to request that the Commission adopt a regulatory framework for SBCS to access spectrum in the 22-23, 26, and 70/80 GHz bands and to govern the operation and licensing of SBCS in those bands. 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 the same geographic areas in the same spectrum. 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.

The Representatives explained that Elefante Group believes that SBCS clearly involves substantially new and innovative technologies and allows for novel services. Accordingly, Elefante Group's Petition will qualify for treatment under Section 7 of the Communications Act.

Finally, the Representatives discussed the draft Third Further Notice of Proposed Rulemaking ("FNPRM") recently released in the *Spectrum Frontiers* proceeding on May 17,

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<sup>7</sup> Elefante Group and Lockheed Martin continue to analyze the prospect of using 23.6-24.0 GHz as well.

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2018, which considers “whether the 26 GHz band would be suitable for flexible fixed and mobile use.”<sup>8</sup> Since, as explained during the meetings, the 26 GHz band is essential for the introduction of SBCS in the United States in order to win the race to 5G, the Representatives respectfully request that the Commission remove 26 GHz from the *Spectrum Frontiers Third FNPRM*, deferring consideration of that band. The Representatives also urged the Commission to expeditiously place Elefante Group’s Petition on public notice to develop a record on SBCS.

In the alternative, the Representatives asked that the Commission: (1) expand the *Spectrum Frontiers Third FNPRM* to specifically seek comment on Elefante Group’s proposal to use the 26 GHz Band (and 21.5-24.0 GHz) for Fixed SBCS (along with the 22-23 GHz bands and the 70/80 GHz bands); (2) seek comment on whether dynamic coordination and information sharing mechanisms could permit technically and economically feasible sharing between SBCS and flexible fixed and/or flexible mobile operations; (3) inquire regarding the comparative advantages and disadvantages of non-exclusively licensed SBCS service versus only allowing individual Upper Microwave Flexible Use Service (“UMFUS”) licensees to deploy stratospheric applications in 26 GHz; and (4) promptly put Elefante Group’s Petition out for public comment when filed and/or consolidate it with the *Spectrum Frontiers* rulemaking.

A copy of the written presentation materials used in the meetings is attached. The same slides were used in each meeting. The short set of talking points was handed out in the meeting with Mr. Adams.

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<sup>8</sup> See *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14-177, *Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 to Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services*, WT Docket No. 10-112, Third Report and Order, Memorandum Opinion and Order, and Third Further Notice of Proposed Rulemaking, FCC-CIRC1806-01, ¶ 76 (May 17, 2018) (“*Spectrum Frontiers Third FNPRM*”).

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

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'E. Yorkgitis, Jr.', written over the printed name.

Edward A. Yorkgitis, Jr.  
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(202) 342-8400

*Counsel to Elefante Group, Inc.*

Attachments

cc: Commissioner Michael O'Rielly  
Rachael Bender  
Erin McGrath,  
Will Adams  
Umair Javed  
Julius Knapp  
Ron Repasi  
Jamison Prime  
Donald Stockdale  
Charles Mathias  
Blaise Scinto  
Tom Sullivan  
Troy Tanner  
Jim Schlichting  
Jose Albuquerque



# ***Elefante Group & Lockheed Martin Stratospheric-Based Communications Services***

***May 24, 2018  
FCC Meetings, Offices of the  
Chairman & Commissioners***

# Meeting Agenda

- Stratospheric-Based Communication Services (SBCS) Are Essential to Win the Race to 5G
- Schedule
- Spectrum Requirements
- Petition for Rulemaking
- Draft *Spectrum Frontiers Third NPRM*

*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.*



# Vision and Business Plan

- Be the world leader in transformative persistent, low latency, stratospheric-based communications and IoT-enabling solutions
- Bring 1 Tbps bi-directional stratospheric capacity (per platform) to U.S. market first and help the country win the race to 5G
- Support wholesale fixed communications serving urban and rural areas
  - 4G/5G Backhaul
  - Enterprise WAN
  - Residential Broadband
  - Sensor & IoT
- Bypass significant infrastructure challenges inherent in ground-based wireless and IP network deployments and upgrades
  - Ubiquitous, near-instantaneous reach within footprint
  - “Network in the Sky”
  - Flexible resource management

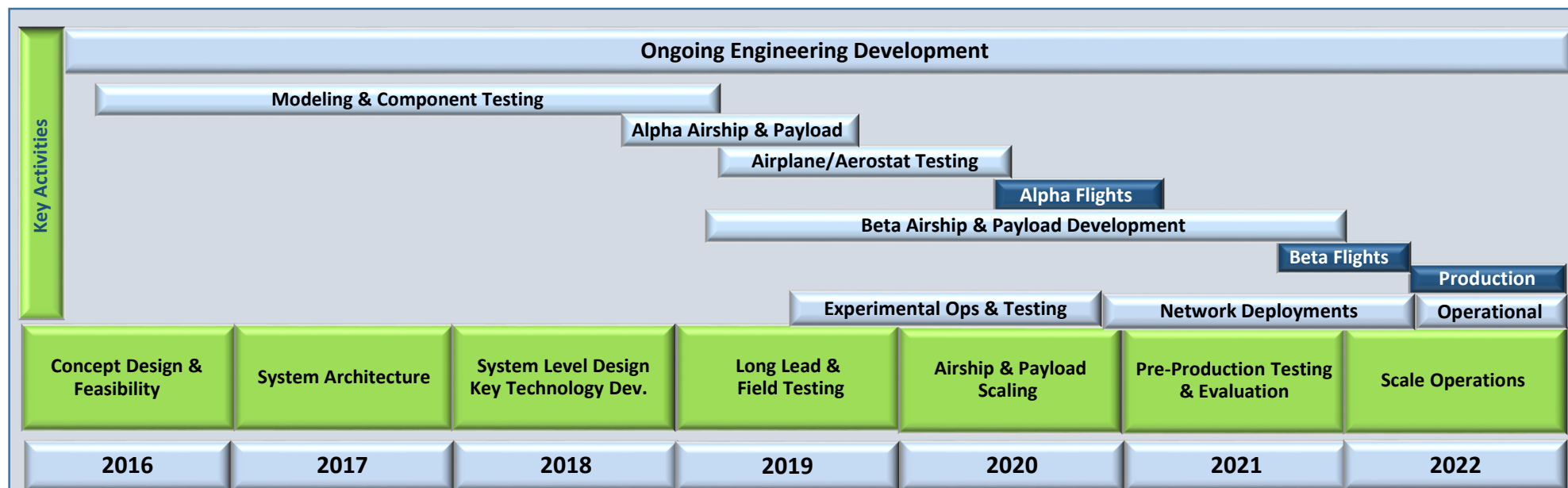


Elefante Group's broadband solution will cost at least 80% less to deliver equivalent services as alternative ground-based builds, *including 5G*

# Elefante Group Airship Systems Will Advance Multiple National Objectives

- Significant investment in **high speed broadband infrastructure** developed in USA
- Next-gen solutions in both urban and rural areas to help **close the Digital Divide**
- **Densification of 4G, 5G and IoT** with greater flexibility and lower cost
- **Maximized spectrum utilization**
- **Compatible operation with existing services** in encumbered spectrum
- Enables **continuous market-wide technology upgrades** with modular payloads
- **Uninterrupted communications** during major weather events
- **Rapid restoration** for public safety and disaster relief
- **Thousands of US jobs** in engineering, construction, and operations

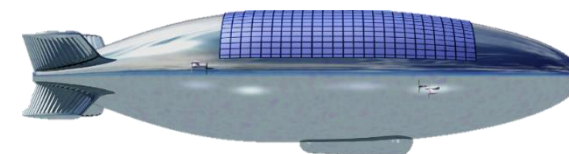
# Program Plan



## Alpha



- Demonstrate key performance objectives
- Verify specific engineering metrics
- Further demonstrate compatibility and mitigation methods through field tests

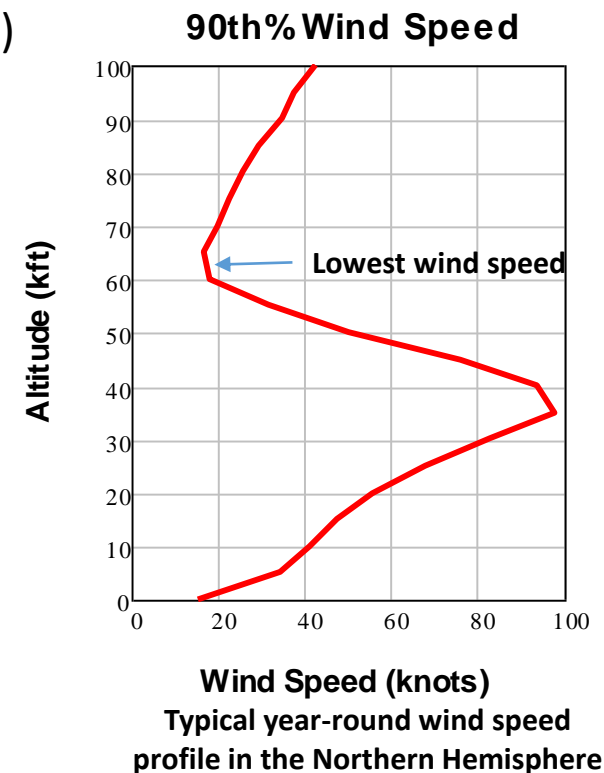


## Beta

- Scale up from Alpha to Production Design
- Finalize Production methodologies

# Unmanned Stratospheric Platform Stations (STRAPS)

- Nominally fixed, stable platforms at altitude of approx. 65kft (19.8 km)
  - Ensures low latency communications (less than 5ms)
  - IoT capable and high-resolution sensing
  - Above congested airspace and most weather systems
- Nominal coverage of 70 km radius – ~15,400 km<sup>2</sup> per platform
- Possess large payload capability (1000+ kg, 10+ kW power)
- Fully recoverable and serviceable and with upgradable payloads
- Utilize hybrid (solar-based and fuel cell) power/propulsion to 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

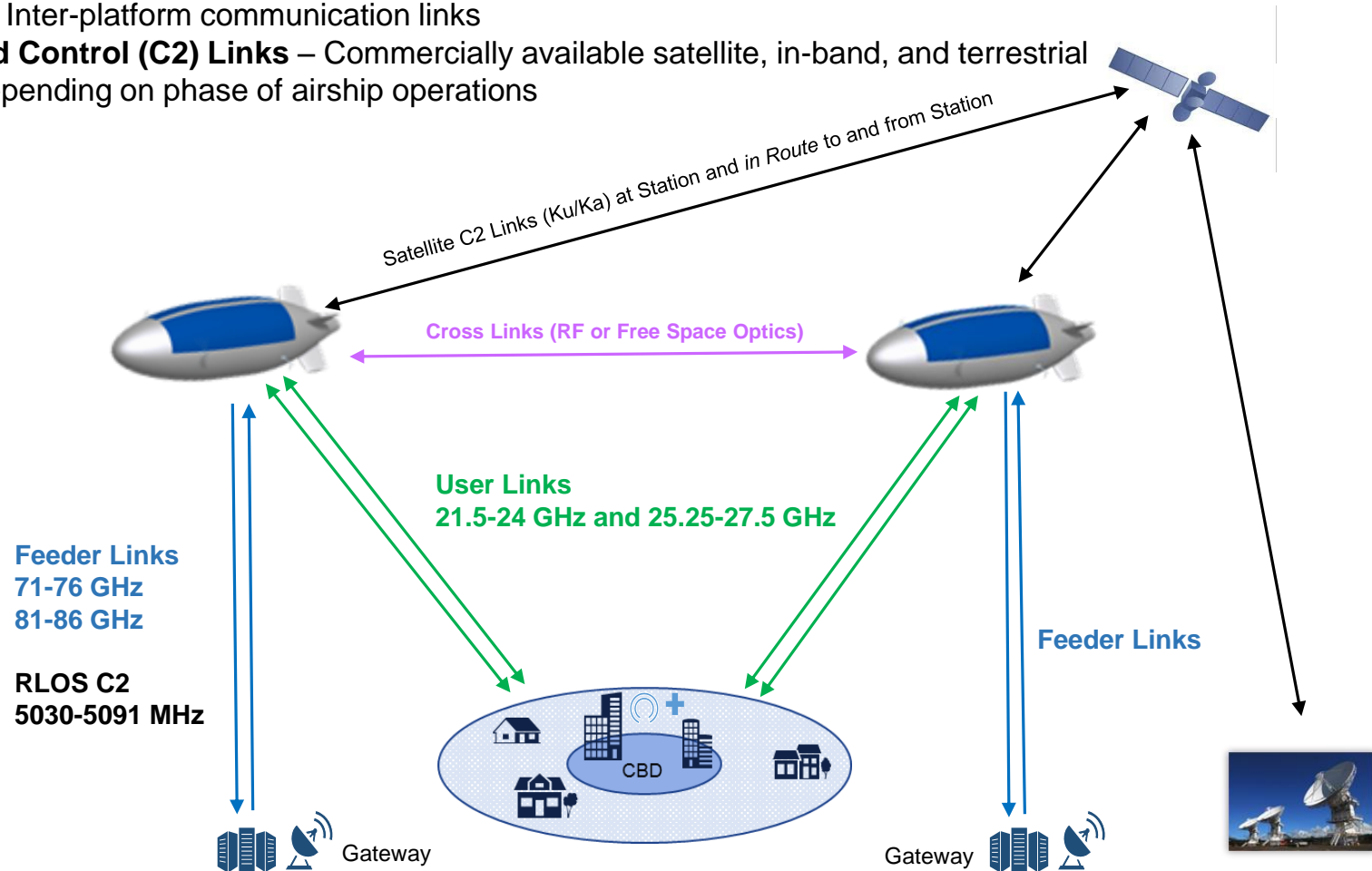


**Airship: ~65 kft (19.8 km) is the optimum altitude for most locations of interest based on wind speeds and airship payload-carrying capability, and above the weather**

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

# Elefante Group's STRAPS 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

- User Links: Between Platform and Terminals
  - Examined bands between 17 and 47 GHz to determine suitable spectrum to deliver 1 Tbps
  - Over 25 sets of Federal & non-Federal spectrum compatibility studies completed
  - In encumbered spectrum, more spectrum will be needed than in exclusive licensing scenarios to achieve same throughput and enable high degree of compatibility
  - Conclusions:
    - 21.5-24.0 GHz (uplink) and 25.25-27.5 GHz (downlink) are clear best candidates for SBCS in the United States allowing continued growth of co-band services
      - Will reuse the spectrum >130 times by each stratospheric platform
      - Will provide high spectral efficiency ( > 4 bps/Hz)
    - U.S. risks losing innovative SBCS service and technology if no access to these bands
- 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

**Bands designed to maximize throughput for an entirely new service while flexibly using spectrum to remain compatible with all existing services**

# Petition for Rulemaking under Section 7

- Scope: User Links (21.5-24.0, 25.25-27.5 GHz) and Feeder Links (70/80 GHz)
- Seek new primary FIXED non-Federal allocations or footnotes in 23.6-24.0 and 25.25-27.5 GHz
- Service and operational rules for non-exclusive systems operating in both urban and rural areas
- Foundation for SBCS technical rules would be compatibility with incumbent operators
  - Proposed technical rules standing alone will ensure compatibility with incumbents in many scenarios (e.g. ISS, EESS passive, some AMS, FS in 25.25-27.5)
  - 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 (some AMS, EESS non-passive, SRS, RAS)

**SBCS offers new technologies and services that will service the public interest and merits Section 7 treatment of the Petition and the ensuing rulemaking**

# Petition for Rulemaking (cont'd)

- SBCS licensing rules should provide for non-exclusive assignments
  - No mutual exclusivity
    - Through coordination, co-band SBCS systems can serve the same geography
    - In UL bands, SBCS would also share with “traditional” Fixed Services
  - SBCS licenses should be granted on a rolling-wide area geographic basis (REAs)
    - STRAPS and User Terminal links (uplinks) should be registered prior to deployment
    - Only actual employment secures use of spectrum for SBCS-User Terminal Links
  - Appropriate rural commitments should be considered
- Bringing-into-use obligations and discontinuance rules should apply to registered links
- Licensees should have flexibility to operate as a private carrier or a common carrier



# Draft *Spectrum Frontiers 3d FNPRM* on 26 GHz

- 26 GHz Band is essential for the introduction of SBCS in the United States to win race for 5G
- The Commission should promptly
  - Place Elefante Group's Petition for Rulemaking on Public Notice and
  - Remove 26 GHz from the *Third FNPRM*
- Alternatively, the Commission should
  - Expand the *Third FNPRM* to specifically seek comment on Elefante Group's proposal to use the 26 GHz Band (and 21.5-24.0 GHz) for Fixed SBCS,
  - Seek comment on whether dynamic coordination and information sharing mechanisms could permit technically and economically feasible sharing between SBCS and flexible fixed and/or flexible mobile operations,
  - Inquire what are the comparative advantages and disadvantages of non-exclusively licensed SBCS service versus only allowing individual UMFUS licensees to deploy stratospheric applications in 26 GHz, and
  - Promptly put Elefante Group's Petition out for public comment when filed and/or consolidate it with the *Spectrum Frontiers* rulemaking

# ELEFANTE GROUP AND LOCKHEED MARTIN THANK YOU

## CONTACTS:

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## **Elefante Group and Lockheed Martin Stratospheric-Based Communications Services (SBCS)**

May 24, 2018

### **Vision and Business Plan**

- Be the world leader in transformative persistent, low latency, stratospheric-based communications and IoT-enabling solutions
- Bring 1 Tbps bi-directional stratospheric capacity (per platform) to U.S. markets first
- Elefante Group will support communications service to fixed terminals, including 4G/5G Backhaul, Enterprise WAN, and Residential Broadband
- Elefante Group's broadband solution will cost 70-90% less than alternative ground-based builds (100 Mbps service) by bypassing infrastructure challenges and offering a "Network in the Sky"

### **Elefante Group Airship Systems Will Advance Multiple National Objectives**

- Win the race to 5G
- Invest significantly in high speed broadband infrastructure developed in USA
- Create thousands of US jobs in engineering, construction, and operations
- Help bridge the Digital Divide in both rural and *urban* areas

### **Program Schedule**

- The companies are ready to build: Alpha (airship field testing in 2019 and flights in 2020); Beta (flights in late 2021/early 2022); full scale operations and production commence in 2022

### **Unmanned Stratospheric Platform Stations (STRAPS)**

- Stable-platform at nominally fixed location at altitude of approx. 65kft (19.8 km) above congested airspace and most weather systems based on operational maximization
- Nominal coverage of 70 km radius – ~15,400 km<sup>2</sup> (6000 sq. mi.) per platform
- Large payload capability (1000+ kg, 10+ kW power) to support communications and sensing

### **Elefante Group's STRAPS Spectrum Requirements**

- User link bands identified after 8 months and dozens of Federal and non-Federal compatibility studies of bands between 17 and 47 GHz
- User Links - Access and transport/backhaul to customers (21.5-24 and 25.25-27.5 GHz)
  - Elefante Group will operate efficiently on a non-exclusive basis in encumbered spectrum, reusing spectrum 130-180 times and achieving greater than 4 bps/Hz
- Feeder Links – Customer to global network / datacenter connections (71-76 and 81-86 GHz)
- Cross Links – Inter-platform communication links (RF or Free Space Optics)
- Command and Control (C2) Links – Commercially available satellite (Ku/Ka-Band), in-band, and terrestrial (e.g., C-band) control links, depending on phase of airship operations

## Petition for Rulemaking under Section 7

- SBCS is a new and innovative service based on novel; technologies that is economically and technological feasible and in the public interest, qualifying for Section 7 treatment
- Scope of Petition: Rules for User Links (21.5-24.0, 25.25-27.5 GHz) and Feeder Links (70/80 GHz)
- Seek new primary FIXED non-Federal allocations or footnotes in 23.6-24.0 and 25.25-27.5 GHz
- Foundation for SBCS technical rules would be compatibility with incumbent operators
  - Proposed technical rules standing alone will ensure compatibility with incumbents in many scenarios (e.g. ISS, EESS passive, some AMS, FS in 25.25-27.5)
  - Proposed rules would provide for coordination with other Fixed Services in 21.5-23.6 GHz range and in E-Band consistent with current frameworks, with slight modifications
  - Proposed rules would provide for service-area specific coordination with incumbents where necessary (some AMS, EESS non-passive, SRS, RAS)
- SBCS licensing rules should provide for non-exclusive SBCS license assignments
  - No mutual exclusivity
    - Through coordination, co-band SBCS systems can serve the same geography
    - In UL bands, SBCS would also share with “traditional” Fixed Services
  - SBCS licenses should be granted on a rolling-wide area geographic basis (REAs)
    - Pre-coordinated STRAPS and User Terminal links should be registered prior to deployment which secures use of spectrum
    - Appropriate rural commitments should be considered
- Bringing-into-use obligations and discontinuance rules would apply to registered links

## Draft *Spectrum Frontiers 3d FNPRM*

- 26 GHz Band is essential for the introduction of SBCS in the United States to win race for 5G
- The Commission should promptly
  - Place Elefante Group’s Petition for Rulemaking on Public Notice
  - Remove 26 GHz from the Third FNPRM
- Alternatively, the Commission should
  - Expand the Third FNPRM to specifically seek comment on Elefante Group’s proposal to use the 26 GHz Band (and 21.5-24.0 GHz) for Fixed SBCS
  - Seek comment on whether dynamic coordination and information sharing mechanisms could permit technically and economically feasible sharing between SBCS and flexible fixed and/or flexible mobile operations
  - Inquire what are the comparative advantages and disadvantages of non-exclusively licensed SBCS service versus only allowing individual UMFUS licensees to deploy stratospheric applications in 26 GHz
  - Promptly put Elefante Group’s Petition out for public comment when filed and/or consolidate it with the *Spectrum Frontiers* rulemaking