



Lociva
15330 Riding Club Dr
Haymarket, VA 20168

Federal Communications Commission
Office of the Secretary
445 12th St SW
Washington, DC 20554

17th August 2015

Re FCC 422 application for STA

Dear Sirs,

Please find enclosed our experimental license submission to conduct tests with the US Army over the next 12 months at various locations across the USA

The experiments we are conducting – as per the submitted images – will allow us to show mobility for an established IPSEC (secure) data call as a user moves between multiple MME/PGW's in an on the move LTE network environment

Yours faithfully

Paul Christoforou
LOCIVA
CTO



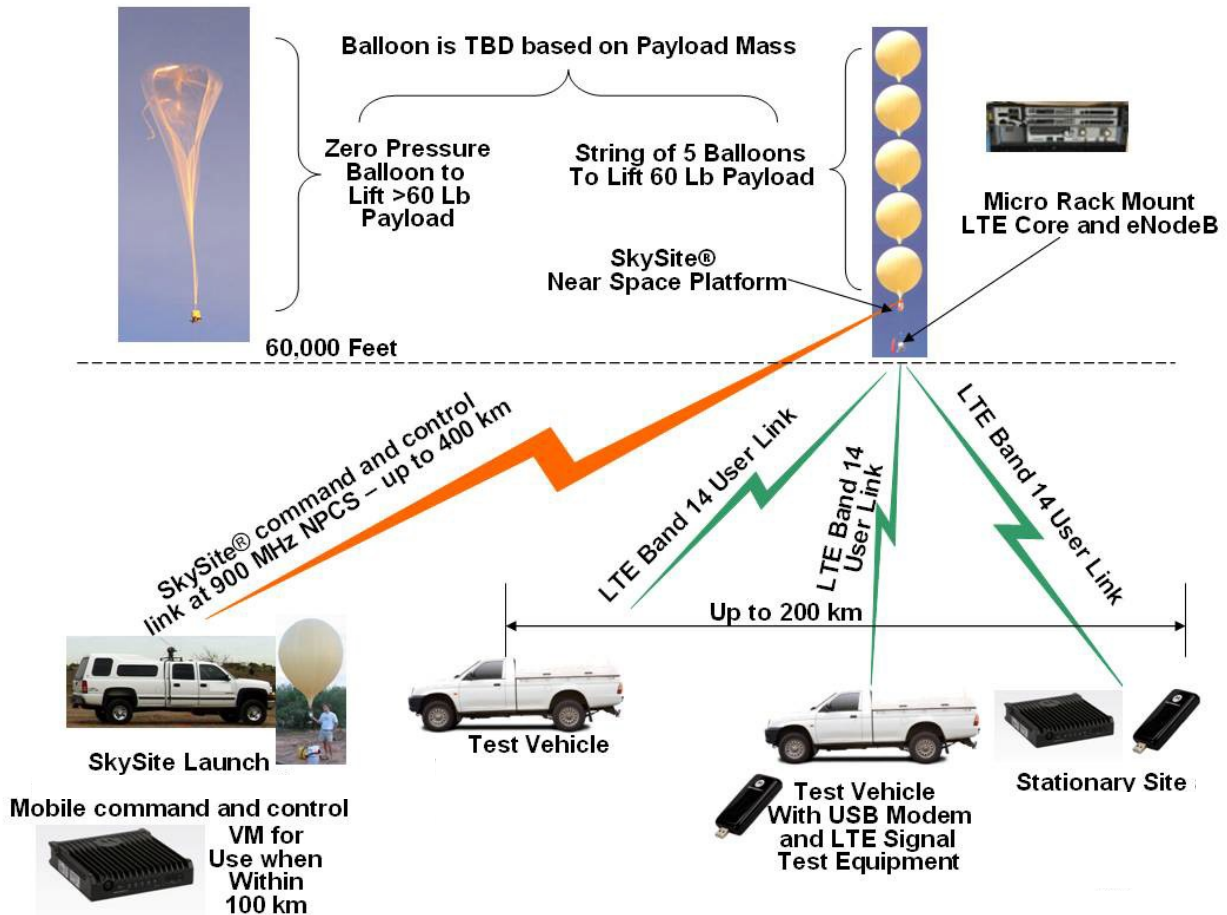
Attachment 1

Description

Lociva (the LTE equipment provider) and Space Data Corporation (Space Data) are conducting trials with various DoD agencies – including the US Marine, Corps, US Army, US Navy using the spectrum identified in the application submitted on form 442 to determine whether the LTE (Long Term Evolved) wireless protocol can operate effectively on Space Data's SkySite® platform, an innovative near space balloon-based telecommunications system currently used to provide messaging and other advanced wireless services. Space Data network is further described in the attached Exhibit 1. Space Data intends to conduct the trials using standard commercially available LTE-based public safety user devices to determine if such an approach can be useful in rapidly restoring LTE coverage during the first 72 hours immediately following a disaster that causes outages in terrestrial LTE networks or in areas where terrestrial LTE coverage is unavailable. It is anticipated that the results of these trials will be filed as ex parte comments in the Commission's ongoing Notice of Inquiry regarding Deployable Aerial Communications Architecture (DACA).

Operational Configuration

A series of high altitude balloon craft will carry LTE-based transceivers and float at altitudes between 65,000 and 90,000 feet. The flight altitude will be adjusted based on the winds at the float altitude. Once at altitude, the LTE transceiver will allow land-based LTE user equipment to establish test data sessions. The LTE transceiver will be enabled from the ground and will be active during ascent through it reaches the appropriate altitude. Mobile test trucks will gather certain information from the test flights. A schematic of the proposed tests is identified below. The tests are configured to prevent any uncontrolled transmission. After each test flight, the SkySite® platform will be released from the balloon craft and it will float to the ground for recovery. The payload control system used for the trials will be the same control system that Space Data has used in more than 25,000 SkySite platform flights to date. The SkySite altitude and position will be recorded approximately every four seconds for use in later link budget analysis.



Space Data's proprietary NPCS 900 MHz data link (which will utilize NPCS 900 MHz spectrum licensed to Space Data) from the SkySite® Platform to the ground station will provide the ability to control the LTE transmitter over a wide area (out to 300 miles from the test truck). There will be no backhaul link from the LTE system on the SkySite® Platform as the Oceaus Networks Xiphos core will be flown as well.

The LTE transceiver equipment is provided Lociva. The transmitting equipment is an Nokia Networks Flexi Macro Cell or FlexiZone MicroCell which has been Type Certified by the Commission.. The small system used for these demonstrations consists of the following:

- 1 x EdgeCentrix LTE Network Core (installed on a GumStix processor)
- 1 x Nokia FlexiZone eNB (14lbs)

In order to reduce weight, only the components listed above will be flown with batteries and a graphite composite structure. The battery pack design will ensure the voltage delivered to the components falls within the range already tested in the FCC Type Approval Testing for the radio. The structure and thermal management system will be designed to maintain the components within the temperature ranges they were tested to during FCC Type Approval testing. Furthermore, the active radio components (RUS) internally disable the transmitter if the temperature of the RUS is sensed by the RUS to be outside of its operational temperature range. Other



components are mechanical structure and their replacement will not affect the RF performance of the components.

The ground infrastructure includes the equipment, manpower, and logistics of the launch and recovery systems, and the ground station for tracking and controlling the airborne system. The core will be flown on the SkySite® Platform, but can be controlled from the ground via a low data rate ASCII command line interface.

Antenna Height

Space Data's network utilizes an innovative balloon-borne system, a type of stratospheric high altitude platform ("HAP"), which differs from traditional terrestrial, tower-based networks.¹ Space Data's system utilizes inexpensive weather balloons to carry miniature radio base stations to altitudes of between 65,000 and 90,000 feet. These balloon-based platforms are known as SkySite® platforms.

Space Data continuously launches platforms to fill the constellation so that as one platform drifts out of range another platform drifts into range. The weather patterns at the altitude to which SkySite platforms are deployed are generally uniform, allowing Space Data to predict a platform's movement and when to deploy additional platforms, ensuring consistent coverage. An on-board Global Positioning System ("GPS") receiver and associated processing provide tight control of transmit frequency, protocol timing, and transmit power near service area borders. Thus, Space Data's HAP network is highly reliable. The lightweight (less than six pounds) platforms parachute gently back to earth 12 to 24 hours after deployment and are recovered and reused.²

The SkySite platforms are so small that the FAA has concluded that Space Data's system is safe and has approved its use in the United States.³ Exhibit 4 includes a January 29, 2003 letter from the FAA to Space Data indicates the FAA's findings with regard to Space Data's SkySite platforms. While it is expected that in the future LTE equipment may be reduced in mass to meet the requirements of Title 14 of the Code of Federal Regulations (14 CFR) Section 101.1(a)(4), the LTE equipment flown in these trials will weigh more than allowed under 14 CFR 101.1(a)(4). Thus the flights for this trial will be flown in compliance with 14 CFR FAR 101 Subpart D -- Unmanned Free Balloons. To the extent necessary, Space Data will acquire any required Federal Aviation Administration ("FAA") flight clearances and will provide the needed flight controllers, technicians, and all logistics for the flights.

¹ The Commission has authorized Space Data to operate its balloon-borne devices as terrestrial base stations on narrowband PCS frequencies. *See Petition for a Declaratory Ruling, a Clarification or, in the Alternative, a Waiver of Certain Narrowband Personal Communications Services (PCS) Rules as they Apply to a High-Altitude Balloon-Based Communications System*, 16 FCC Rcd 16421 (WTB 2001) ("Space Data Order").

² Additional information regarding the technical operations of Space Data's network of SkySite platforms is set forth in the construction notification for one of Space Data's narrowband PCS licenses, KNKV204. *See* ULS File No. 0001900882 (filed October 13, 2004).

³ *See Space Data Order*, 16 FCC Rcd at 16427 (noting that Space Data has coordinated with the FAA regarding its balloon launches).



FAA Notiice

U.S. Department of Transportation
Federal Aviation Administration
800 Independence Ave, SW Washington, DC 20591

JAN 29 2003

Mr. Charles H. Tracy
Vice President, Flight Operations
Space Data Corporation
P.O. Box 1866
Chandler, AZ 85244-1866

Dear Mr. Tracy:

This is in response to your letter regarding your company's draft concept of operations for IU11Tlanned balloons.

We have reviewed and concur with the subject draft; however, we offer the following comments.

Space Data's utilization of a payload weighing less than six-pounds in total weight and three-ounces per square inch density are exempt from the Federal Aviation Administration (FAA) notification. Payload markings and in-flight reporting requirements are pursuant to Title 14 Code of Federal Regulations (14 CFR) Section 101.1(a)(4).

Additionally, the payload as described and being operated is consistent with 14 CFR part 101, and with special consideration to 14 CFR part 101, Section 101.7. This would not require FAA notification, payload markings or any in-flight reporting requirements.

If you have any questions on this matter please contact Kevin Haggerty at (202) 267-9295.

Sincerely,

Re.Jti'Jrd &. Matthews
Manager, Airspace and Rules Division