Experimental Application Narrative

York Space Systems LLC ("York Space") is a Colorado limited liability company that designs, develops and manufactures small satellites. York Space has developed the York Space S-Class satellite bus, a 3-axis stabilized satellite bus with up to 100W of orbit average power and a wet mass between 100 and 180 Kg with mission payloads. The S-Class satellite bus is composed of the structure, propulsion, power, guidance and communication subsystems to support its customer-furnished payload; as well as a high rate downlink transmitter and electric propulsion module. The S-Class satellite bus can accommodate wide variety of payloads and support a wide range of missions, including Earth observation and communications connectivity. York Space seeks to conduct experimental low-Earth orbit ("LEO") operations with the S-Class satellite bus under contractual agreement with the U.S. government (47 CFR §5.3(c)) and to continue technical demonstration of the spacecraft (47 CFR §5.3(e)), as specified herein.

York Space has established procedures to manage the proposed operations, which are implemented by qualified personnel with experience developed from years of service for established satellite manufacturers and operators, including Orbital Sciences (now Northrop Grumman), SAIC, Ball Aerospace, and Lockheed Martin. York Space is not a representative of a foreign government.

I. Background

A. Purpose of Mission

The S-Class satellite bus was built under a Cooperative Research and Development Agreement ("CRADA") with the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command ("U.S. Army") who have interest in affordable standardized satellite bus designs which are at low price points, can be rapidly manufactured, and support a variety of

interchangeable payloads.[3] Further, the Department of Defense and other government agencies have demonstrated needs for all-weather situational awareness in denied areas (i.e., natural disasters, no-permissive air space, etc.) which require near-real-time or rapid earliest possible data downlinks as well as responsive satellite build and deployment timeframes.

B. Licensing

York Space also applied for and received a launch payload authorization from the Government of New Zealand for the launch of the S-Class satellite bus by Rocket Lab. The launch was procured by the U.S. Air Force in support of the U.S. Army CRADA and the satellite was launched from the Rocket Lab launch site in New Zealand on May 5, 2019. Because the launch was procured by the U.S. Air Force, the United States registered the satellite on the U.S. National Space Object Registry pursuant to the Convention on the Registration of Objects Launched into Outer Space. The spectrum license for the S-Class satellite bus was procured from a foreign government by the payload manufacturer.

C. Current Disposition

York Space originally intended to transfer the ownership and operational control of the S-Class satellite bus to the payload. However, since that time, communication between the payload and bus has ceased and may not be recoverable and it now seems that the payload manufacturer may not exercise their option to purchase the satellite. Without the involvement of the payload manufacturer, the foreign government's regulatory jurisdiction over the satellite will no longer exist. York Space is now faced with the prospect of either operating the satellite without any national authorization, or letting it drift and eventually deorbit uncontrolled.

[3] York has a CRADA with the U.S. Army for the purpose of demonstrating that the S-Class satellite bus can provide the U.S. Army with increased access to space and with responsiveness to U.S. Army tactical space needs. CRADA # 16-02 (18 October 2016).

II. Experimental Satellite License

A. Purpose & Scope of Experimental Operations

The experiments with the U.S. Army will be extended to the duration of the operational lifetime of the S-Class satellite bus in order to provide additional demonstrations of the capabilities of the spacecraft and to provide U.S. Army personnel with more extensive experience in its operation and maintenance. York Space also has a significant interest in obtaining experimental authorization not only to perform the mission objectives under the CRADA, but also so it can continue to actively mitigate any creation of orbital debris and safely deorbit the spacecraft at the end of its useful life.

Consequently, York Space is seeking an experimental radio license to operate the satellite radio stations under FCC authority for two years in place of the existing foreign government authorizations.

B. Orbital Debris Mitigation and Satellite End-of-Life

York Space has submitted the attached Orbital Debris Mitigation Analysis and Plan ("the Plan"). The Plan is compliant with the Inter-Agency Space Debris Coordination Committee ("IADC") Space Debris Mitigation Guidelines (IADC-02-01) as well as the National Aeronautics and Space Administration ("NASA") Process for Limiting Orbital Debris (NASA-STD-8719.14A). The IADC guidelines and NASA requirements are essentially the same as the requirements of 47 CFR §5.64(b) (Special provisions for satellite systems) and meets both NASA's and the Commission's requirements. The Plan was reviewed and accepted by the U.S. Air Force as well as the government of New Zealand prior to the launch. A matrix showing Plan compliance with the IADC guidelines is shown below.

Table – Assessment of Compliance

Reference Document	Section ID	Section/Requirement Text	Compliance
IADC-02-01	5.1	Limit Debris Release During Normal Operations	**COMPLY**
IADC-02-01	5.2.1	Minimize the potential for post mission break-ups resulting from stored energy	**COMPLY**
IADC-02-01	5.2.2	Minimize the potential for break-ups during operational phases	**COMPLY**
IADC-02-01	5.3.2	Objects Passing Through the LEO Region	**COMPLY**
IADC-02-01	5.4	Prevention of On-Orbit Collisions	**COMPLY**
NASA-STD-8719.14	4.3-1	Debris passing through LEO - released debris with diameters of 1mm or larger	**COMPLY**
NASA-STD-8719.14	4.4-1	Limiting the risk to other space systems from accidental explosions during deployment and mission operations while in orbit about Earth or the Moon	**COMPLY**
NASA-STD-8719.14	4.4-2	Design for passivation after completion of mission operations while in orbit about Earth or the Moon	**COMPLY**
NASA-STD-8719.14	4.5-1	Limiting debris generated by collisions with large objects when operating in Earth orbit	**COMPLY**
NASA-STD-8719.14	4.5-2	Limiting debris generated by collisions with small objects when operating in Earth or lunar orbit	**COMPLY**
NASA-STD-8719.14	4.6-1	Disposal for space structures in or passing through LEO	**COMPLY**
NASA-STD-8719.14	4.6-4	Reliability of post-mission disposal operations in Earth orbit	**COMPLY**
NASA-STD-8719.14	4.7-1	Limit the risk of human casualty	**COMPLY**

The S-Class satellite bus does not generate debris as part of normal operations; there is no considerable probability for on-orbit breakup; there is no probability of impacting the ground upon re-entry; and there is very low probability for an on-orbit conjunction.

The S-Class satellite bus was launched on May 5, 2019 and is operating in its designated orbit. Consequently, it is not now possible to change the orbit debris mitigation plan. York, therefore requests that to any extent that the Plan does not conform to 47 CFR §5.64(b), those requirements should be waived.

III. Conclusion

There is significant experimental value to York Space and to the U.S. Army in continuing to operate the S-Class satellite bus in order to complete the three remaining mission objectives. York Space will assume responsibility for the safe operation of the spacecraft, including disposal at the end of its design life. York Space will avoid harmful interference with other authorized spectrum users.

Grant of this request will serve the public interest by facilitating the growth and development of next-generation satellite technology and the sharing of important space operational information for the benefit of U.S. satellite industry participants as well as the U.S. national defense. Accordingly, York respectfully requests that the Commission consider and authorize the proposed experimental satellite operations as soon as practicable, to ensure York obtains the necessary authority to maintain command and control of the S-Class satellite.