FEDERAL COMMUNICATIONS COMMISSION
FCC 22-74
FIVE-YEAR DEORBIT RULE WAIVER APPLICABILITY QUESTIONNAIRE

PROJECT INFORMATION

1. PROJECT NAME:	2. PROJECT POINT OF CONTACT *(Name and title)*:
SPRITE	Brian Fleming Brian.fleming@lasp.colorado.edu 1-443-839-4471

3. QUESTIONS

QUESTION NUMBER	QUESTION	PROJECT RESPONSE (a) YES	PROJECT RESPONSE (a) NO
1	Will the spacecraft be operating at or below 2000 km?	☒	☐
2	Based on your current operational plan, will you be able to deorbit the spacecraft no more than 5 years after the end of the mission? If no, how many years is the spacecraft expected to stay in orbit following the end of the mission? ☒5-10 ☐ 10-15 ☐15-20 ☐20-25	☐	☒
3	Does your spacecraft have a deorbiting system? If yes, check one: ☐passive ☐ active	☐	☒
4	Describe the deorbit system, in detail, if there is one.		
5	For spacecraft without a propulsion system, are you intentionally performing actions that will change the spacecraft orbit (e.g., differential drag, drag sail, tether, boom, etc.) If so, describe how these actions will be accomplished and maintained throughout the orbital lifetime of the spacecraft. We have proven over several years with the CUTE spacecraft (operated by the same operations team) that orbit lifetime can be shortened or lengthened with orbital maneuvering to change the drag profile, however that is unlikely to shorten the SPRITE orbital lifetime by more than 1 year. This is not the default plan during science operations, as the spacecraft must point to science targets, however such drag maneuvers could be implemented at the end of the mission.	☐	☒
6	Are you participating in a government research program, grant, prize, challenge, cooperative agreement, or AO?	☒	☐
7	If you answered "yes" to question 6, please specify which program is providing the funding and how the funds were used to develop and operate the proposed mission. NASA Grant number 80NSSC24K0231		
8	Are the project costs, not including launch costs, supported at least 50% by the US government and/or NASA?	☒	☐
9	Are launch costs supported by the US government and/or NASA?	☒	☐
10	Specify the deployment orbital parameters: apogee altitude 510 km perigee altitude 510 km inclination 97.4 Specify the mission orbital parameters: apogee altitude 510 km perigee altitude 510 km inclination 97.4 Specify the end-of-mission orbital parameters: apogee altitude reentry perigee altitude reentry inclination		

4. QUESTIONAIRE COMPLETION RECOMMENDATION

(*To be completed by NASA Representative*)

Based on the information provided, NASA makes the following recommendation:

CLASSIFICATION (SELECT ONE) (a)	RECOMMENDATION (b)
☐	This project meets the criteria of FCC 22-74. No further analysis is recommended unless future changes to the project would change the response to one of the questions.
☒	The project does <u>not</u> meet all of the FCC 22-74 criteria. A waiver is required.

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▶ 3. Provide a description of the unique mission and research objectives that cannot be achieved at a lower altitude that would allow for reentry within the 5-year post-mission timeframe.

The SPRITE science program involves observing galaxies in the far-ultraviolet part of the EM spectrum. This portion of the spectrum is uniquely sensitive to absorption and emission in the exosphere of Earth, with attenuation increasing rapidly for altitudes below 500 km. While some science is still possible at altitudes below 500 km, the degradation would prevent SPRITE from achieving one of its baseline science objectives. Therefore, a starting altitude greater than 500 km is required.

▶ 4. Provide a description of the anticipated findings for the mission and any plans for publishing or otherwise reporting the findings.

SPRITE will take the first imaging spectroscopy measurements of low redshift galaxies in this bandpass every obtained. This data will be compiled into 3D maps (X, Y, Lambda) of the targets, providing spatially resolved images of the targets as each wavelength in the 100 – 175 nm SPRITE bandpass. The project has contracted with the Mikulski Archive for Space Telescopes (MAST) for full data archiving.

▶ 5. Provide a proposed operations survey incorporating any other research or related missions that indicate that the proposed operations would satisfy a unique area of research, including any findings and actions of other government agencies and educational institutions that support the importance and public interest benefits of the mission.

SPRITE has both technical and scientific objectives of broad interest. On the technical side – SPRITE was proposed as an orbital testbed of Habitable Worlds Observatory (HWO) supporting technologies, including mirror coatings and detectors. At one point in the mission, the HWO Project Office funded a coating effort for one of SPRITE's gratings to update the coating to the most relevant formula in order to support the TRL advancement. Scientifically, SPRITE's extragalactic survey of local galaxies will expand greatly on point-source measurements by FUSE and IUE which provide the vast majority of the spectroscopic datasets we have on these objects. This will help with targeting for HWO galaxy surveys, especially with the HWO integral-field spectrograph, which will have exquisite resolution, but ideally would have finder data to help identify the small fields to point the IFS. Over the course of the SPRITE development effort, over 20 students from the University of Colorado have been educated on the program, with multiple student-led papers published. The operations team for SPRITE will be almost entirely student led with professional oversight.

▶ 6. Provide a description of ways the spacecraft is providing situational awareness (Examples: GPS, reflective surface coating, increased surface area, etc.) and state if these would continue after passivation of the spacecraft.

The SPRITE mission has a nominal 2-year mission at this time, with plans to continue if operational and funded. If not funded, the program can either passivate, and it does carry passivation hardware for disconnecting the solar arrays and draining the batteries, or it can continue to operate in safe mode, with no science program, under automated control. If that is the state, then the spacecraft can perform drag maneuvers if needed for limited collision avoidance. The periodic beaconing of the spacecraft if still active will provide updated ephemeris. If passive the spacecraft has no control or active feedback. There is reflective Teflon tape on the chassis. SPRITE carries no GPS.

▶ For government supported missions, provide a description demonstrating that the proposed mission supports and serves a government purpose.

The 2020 Astrophysics Decadal Survey asks “How do galaxies provide ionizing radiation to the IGM?” and “What controls the mass, energy, and chemical flows within galaxies?” SPRITE is designed to address these two questions through a large spectroscopic survey of ionizing radiation emitting galaxies at redshift > 0.2, as well as a local galaxy mapping survey with its long slit – a first for any orbital far-UV spectrograph with sensitivity to wavelengths less than 115 nm and sub-arcminute resolution. This broad survey will map the youngest star clusters, dust and gas distributions, and energy profiles of some of the best known and studied galaxies in the local universe like never before. The data will be archived on MAST and provide essential precursor data for the HWO integral-field spectrograph to investigate individual star-forming clusters in our neighbors. The technology flying on SPRITE is pathfinding for HWO as well as other UV-sensitive missions. The coating effort undertaken over two years of the SPRITE effort helped to qualify advanced mirror coatings for the Aspera Pioneer, as well as HWO, and has driven mirror coating technology close to TRL 6 ahead of HWO phase A.

▶ 7. Additional discussion of the need and rationale for a waiver.

8. Attachments

☒	NASA letter of support for the mission.
☐	Letter from the project showing alignment with NASA strategic objectives.
☒	Orbital Analysis
☐	Other (Title)

d. NASA Sponsor (Name and title):	e. SIGNATURE	f. DATE
Shawn Domagal-Goldman		5/13/2026