



Federal Communications Commission
Washington, D.C. 20554

October 27, 2021

VIA ELECTRONIC MAIL

Ms. Iulia Davies
Umbra Lab, Inc.
133 E De La Guerra, #39
Santa Barbara, CA 93101
Iulia.davies@umbra.space

Re: Umbra Lab, Inc., IBFS File No. SAT-LOA-20210616-00080; Call Sign S3095

Dear Ms. Davies:

On June 16, 2021, Umbra Lab, Inc. (Umbra) filed the above-referenced application requesting authority to construct, deploy, and operate six satellites (the Umbra SAR Constellation). The licensed spacecraft would include a spacecraft, Umbra-2001, currently operating under an experimental license, ELS File No. 0424-EX-CN-2020. On September 2, 2021, the Satellite Division requested additional information regarding the application.¹ On September 21, 2021, Umbra filed a response to that letter.² We request that Umbra provide further information to facilitate review of this application:

1. The originally filed Schedule S indicates operations of the spacecraft in only one orbital plane at 555 km.³ Umbra's September 21 response indicates that the Umbra SAR Constellation will in fact operate in four orbital planes at 565 +/- 30 km.⁴ Please clarify whether the +/- 30 km figure is to account for the potential range of launch altitudes, or if this indicates the stationkeeping tolerance for the spacecraft. The application mentions a tolerance of +/- 10 km.⁵ Please indicate whether this tolerance is still applicable. Also, as the information reflected in the original Schedule S has changed with respect to orbital planes, please file an updated Schedule S in .pdf form under the "Pleadings and Comments" tab in IBFS.
2. Umbra proposes to perform post-mission disposal of its spacecraft by lowering them to elliptical orbits,⁶ which may cross altitudes at which inhabitable space stations operate. Please provide more detailed information on the method or methods Umbra will employ to protect inhabitable spacecraft (e.g., the International Space Station and Chinese space station, at a minimum) during each Umbra spacecraft orbit-lowering phase.
3. Umbra's September 21 response indicates that Umbra did not include certain components and materials in the Orbital Debris Assessment Report (ODAR) analysis because these components

¹ Letter from Kerry E. Murray, Deputy Chief, Satellite Division, International Bureau, to Iulia Davies, Umbra Lab, Inc., dated Sept. 2, 2021.

² Letter from Iulia Davies, Umbra Lab, Inc., to Kerry E. Murray, Deputy Chief, Satellite Division, International Bureau, dated Sept. 22, 2021 (Umbra Response).

³ Umbra Application, Schedule S Tech Report at 5.

⁴ Umbra Response at 1.

⁵ Umbra Application, Attachment C at 12.

⁶ Umbra Application, Attachment B at 28.

and materials demise at high altitudes.⁷ Please provide a new ODAR analysis that includes these materials and components.

4. Please provide the probability of post-mission disposal failure due to collision with small objects for the Umbra-2001 satellite, with failure defined as an orbital lifetime greater than six years .⁸

Please submit the requested information by **November 3, 2021**.

Sincerely,

Karl A. Kensinger

Karl A. Kensinger
Chief, Satellite Division
International Bureau

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⁷ Umbra Response at 2.

⁸ See 47 CFR § 25.114(d)(14)(i); § 5.64(b)(1)