

**Before the
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Washington, DC 20230**

In the Matter of)
)
Private Remote Sensing Satellite Disposal and) Document Number: 2024-05004
Debris Mitigation)

COMMENTS OF IMPULSE SPACE

As the space industry evolves, the intersection of radiofrequency regulation and orbital debris mitigation becomes increasingly complex. Impulse Space, Inc. (“Impulse”), therefore, recognizes and welcomes the National Oceanic and Atmospheric Administration (“NOAA”) efforts to explore how to close any regulatory gaps that may impose liability for potential improper supervision of U.S. space objects under relevant international space treaties.¹ New guidance should clarify how NOAA remote sensing licensing applicants, which do not hold Federal Communications Commission (“FCC”) radiofrequency authorizations, can satisfy post-mission disposal and orbital debris obligations consistent with the country’s international obligations. It should also cross reference the U.S. Orbital Debris Mitigation Standard Practices (“ODMSP”) when developing any definitions, revised condition language, and disposal and orbital debris mitigation plan assessment.² Any subsequent rules or policies adopted, if necessary, should be limited to NOAA licensing applicants that do not hold FCC radiofrequency authorization. Proceeding this way will minimize U.S. liability, avoid duplicative space regulatory framework

¹ See generally *Private Remote Sensing Satellite Disposal and Debris Mitigation*, Request for Information, 89 FR 16730 (Mar. 8, 2024) (“2024 NOAA Inquiry”); Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies Art. 6 (“Outer Space Treaty”); Convention on International Liability for Damage Caused by Space Objects (“Liability Convention”).

² See U.S. Government Orbital Debris Mitigation Standard Practices (last updated 2019).

application, and clarify regulatory obligations to foster U.S. space science and commerce leadership.

I. IMPULSE BACKGROUND

Founded in 2021, Impulse is a Space 2.0 pioneer that provides agile, economical, in-space payload delivery and hosting.³ Its mission is to accelerate our future anywhere in space (low-Earth orbit (“LEO”), geostationary orbit, Moon, Mars, and beyond) through efficient transportation. To date, Impulse has launched and is operating the Impulse-1 spacecraft, including mission assurance imaging equipment,⁴ in LEO after deploying one third-party satellite. Impulse-2 is another LEO spacecraft that will host multiple Impulse and third-party imaging payloads and test propulsive capabilities later this year. Impulse’s own spacecraft and customer licensing experiences inform these comments.

II. THE BENEFITS OUTWEIGH THE DRAWBACKS FOR HAVING NOAA CLARIFY ITS SUPERVISION OF REMOTE SENSING SYSTEM DISPOSAL AND ORBITAL DEBRIS MITIGATION UNDER ITS EXISTING AUTHORITY

NOAA is evaluating whether to clarify its supervision of remote sensing system disposal and orbital debris mitigation under its existing authority.⁵ For such an inquiry, the benefits are the United States can satisfy international space treaty obligations for authorizing and continually supervising U.S. space activities; clarify industry’s regulatory obligations; and allow private parties to secure necessary radiofrequency rights elsewhere when FCC jurisdiction might not apply (*e.g.*, foreign U.S. earth station communications) or when investment or strategic opportunities

³ Impulse was founded by Tom Mueller, a founding SpaceX member and the creator of Merlin (the most reliable rocket engine in history).

⁴ Impulse-1 is also known as Mira-1 and LEO Express-1.

⁵ *See generally 2024 NOAA Inquiry.*

may arise.⁶ One drawback is that NOAA would need to review congressional and/or federal agency statutory or regulatory changes that could alter the current legal landscape and prompt NOAA rule, guidance, and/or license modifications. Another drawback is the possibility of forum shopping. But neither drawback should prevent potential NOAA clarification as explained below.

Narrow guidance can best clarify acceptable means for NOAA licensees without FCC authorizations to satisfy their post-mission disposal and orbital debris obligations. Without further rulemaking, NOAA could review, authorize, and continually supervise a private remote sensing satellite's orbital debris compliance as proposed in NOAA's third option.⁷ The pertinent congressional statutory authority states "[a]ny license issued pursuant to this subchapter shall specify that the licensee shall comply with all of the requirements of this chapter and shall . . . upon termination of operations under the license, make disposition of any satellites in space in a manner satisfactory to the President."⁸ NOAA regulation reiterates that "[a]ll licenses granted under this part shall specify that the licensee shall . . . "[u]pon termination of operations under the license, make disposition of any satellites in space in a manner satisfactory to the President."⁹ The

⁶ Not all NOAA license applicants hold an FCC radiofrequency authorization and may instead rely on a foreign jurisdiction's radiofrequency authorization. That foreign jurisdiction, however, may not always continually supervise the satellite operations or register those operations in national and international space object registries. The NOAA license (or a launch by a U.S. launch provider or from a U.S. territory) may nevertheless expose the United States as a "launching state" and thereby place liability on the United States under international legal standards. *See generally* Outer Space Treaty Art. 6; Liability Convention.

⁷ As a general matter, NOAA authority applies for the entire mission (not only for post-mission disposal) because pre-disposal operation success is critical for post-mission disposal success.

⁸ 51 U.S.C. § 60122(b)(4).

⁹ 15 C.F.R. § 960.8(a)(4).

2020 NOAA Decision reserved the right for NOAA to “issue guidance or undertake a separate, narrow rulemaking to revise this license condition as future developments may warrant.”¹⁰

Given this authority, issuing narrow guidance is the optimal method to clarify acceptable means for NOAA licensees without FCC authorization to satisfy their post-mission disposal and orbital debris obligations. Such guidance would be the most efficient means by which to adjust any change in regulatory frameworks, such as new space sustainability and safety legislation/regulation or ODMSP modifications. Grandfathering and transitioning time periods are always possible to accommodate these changes. Further, FCC licensing typically applies because most missions require U.S. earth stations (and associated FCC authorization) given the large U.S. space industry customer base and large landmass hosting numerous earth station options. As a result, few private parties without FCC authorization would likely seek NOAA licensing and orbital debris approval after any NOAA guidance release regarding this matter.¹¹ Should a rulemaking be necessary, however, the scope should explicitly be limited to parties without FCC authorizations as proposed in NOAA’s second option. NOAA should not undo the tremendous regulatory streamlining and burden reduction measures it undertook in 2020.¹²

III. THE U.S. GOVERNMENT STANDARD BEST PRACTICES OFFER WELL-VETTED, HOLISTIC CRITERIA TO EVALUATE ORBITAL DEBRIS MITIGATION COMPLIANCE

Since 2001, the U.S. government has developed and refined orbital debris mitigation practices. The ODMSP goals are to “limit the generation of new, long-lived debris by the control

¹⁰ *Licensing of Private Remote Sensing Space Systems*, Final Rule et al., 85 FR 30790, 30799 (May 20, 2020) (“*2020 NOAA Decision*”).

¹¹ As NOAA acknowledged in 2020 and 2024, most NOAA applicants hold FCC authorizations after showing compliance with a comprehensive ruleset. *See 2024 NOAA Inquiry* at 16731; *2020 NOAA Decision* at 30799.

¹² *See generally 2020 NOAA Decision*.

of debris released during normal operations, minimizing debris generated by accidental explosions, the selection of safe flight profile and operational configuration to minimize accidental collisions, and post-mission disposal of space structures.”¹³ The latest ODMSP revisions further introduce related qualitative limits and preferred post-mission disposal, removal, and storage methods while clarifying “operating practices for large constellations, rendezvous and proximity operations, small satellites, satellite servicing, and other classes of space operations.”¹⁴ The U.S. government has characterized these ODMSP updates as “significant, meaningful, and achievable,”¹⁵ and NOAA has previously reviewed orbital debris-related compliance based on earlier ODMSP editions.¹⁶ U.S. government satellites (many of which support remote sensing operations) follow these best practices. So should commercial U.S.-licensed remote sensing systems that may secure radiofrequency approval outside the United States.

The ODMSP provides insights on how to potentially clarify “termination of operations” and sufficient post-mission disposal options in any new NOAA guidance (or, if necessary, any narrow rulemaking). Regarding termination of operations, the definition might further clarify passivation. The ODMSP describes how to limit accidental explosion and associated orbital debris risk after completing mission operations through passivation, as follows:

[a]ll on-board sources of stored energy of a spacecraft or upper stage should be depleted or safed when they are no longer required for mission operations or postmission disposal. Depletion should occur as soon as such an operation does not pose an unacceptable risk to the payload. Propellant depletion burns and compressed gas releases should be designed to minimize the probability of

¹³ ODMSP at Preamble.

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ See, e.g., *Licensing of Private Land Remote-Sensing Space Systems*, Final Rule, 71 FR 24474, 24479 (Apr. 25, 2006).

subsequent accidental collision and to minimize the impact of a subsequent accidental explosion.¹⁷

Regarding potentially sufficient post-mission disposal options, NOAA's list might cross reference specific options. The ODMSP established "preferred disposal options for immediate removal of structures from the near-Earth space environment, a low-risk geosynchronous Earth orbit (GEO) transfer disposal option, a long-term reentry option, and improved move-away-and-stay-away storage options in medium Earth orbit (MEO) and above GEO."¹⁸ Further clarification is merited because space missions have become intricate given their complex mission plans and orbits considered.

IV. AN ONLINE, FILLABLE FORM AND CERTIFICATION REQUIREMENTS COULD HELP VERIFY SATELLITE DISPOSITION COMPLIANCE

To ensure efficient access and use of new guidelines, NOAA could consider publishing the ODMSP in fillable Word document format on the NOAA website just like they do for the current NOAA license application guide. An applicant would be able to demonstrate compliance by inserting (a) narrative where necessary and (b) as applicable, supporting National Aeronautics and Space Administration debris assessment software or higher fidelity analysis calculations. As a general matter, such NOAA review should not be challenging because most remote sensing satellites tend to operate at lower altitudes, where satellites typically demise completely and quickly. One guidance (or narrow rulemaking) point that NOAA might convey is that orbital inclination and equipment selection deliberations should occur early to address any post-mission disposal and orbital debris mitigation compliance challenges.

¹⁷ ODMSP at Objective 2-2.

¹⁸ *Id.* at Objectives 4-1, 4-2.

Verifying post-mission disposal compliance is a fact dependent process. The underlying considerations will include the number of satellites, each satellite's size, and the post-mission disposal method selection, among other factors. At a minimum, an application certification (and any associated license condition) would allow CRSRA to ensure compliance with the license requirement for satellite disposition.

V. CONCLUSION

Through this current exploratory proceeding, NOAA has a unique opportunity to close a regulatory gap to limit U.S. international liability and clarify private remote sensing licensing obligations to foster U.S. space commerce and science leadership. Impulse appreciates and looks forward to advancing this important initiative.

Respectfully submitted,

/s/ Margaret Abernathy

Gerry Oberst
George V. John
555 Thirteenth Street, NW
Washington, DC 20004
george.john@hoganlovells.com
+1 202-637-6989

Margaret Abernathy
VP, General Counsel & Gov't Relations
Impulse Space
2651 Manhattan Beach Boulevard
Redondo Beach, CA 90278

Counsel to Impulse Space

April 8, 2024