

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
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Mitigation of Orbital Debris in the New Space)	IB Docket No. 18-313
Age)	

COMMENTS OF MAXAR TECHNOLOGIES INC.

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April 5, 2019

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I. INTRODUCTION AND SUMMARY.

¹ *Mitigation of Orbital Debris in the New Space Age*, IB Docket No. 18-313, Notice of Proposed Rulemaking and Order on Reconsideration, FCC 18-159, ¶ 3 (rel. Nov. 19, 2018) (“*NPRM*”).

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reviews for prospective applicants, spur growth, and help maintain a competitive advantage for U.S. companies.

Maxar shares the Commission's concern regarding the importance of the safety and sustainability of the commercial space environment. The federal orbital debris policy must protect critical satellite-delivered services which governments, the private sector, non-profits, researchers, and individuals worldwide rely upon. These systems enable and support vital communications networks, essential data and imagery services, the delivery of various forms of media, and much more.

The prioritization of safe and sustainable space operations must occur in a balanced manner, measured to *also* enable economic growth and innovation in the commercial space industry. The U.S. Government Space Policy Directives underscore that to “[f]oster continued growth and innovation in the U.S. commercial space sector” agencies should “streamline processes and reduce regulatory burdens that could inhibit commercial sector growth and innovation, enabling the U.S. commercial sector to continue to lead the world in [commercial space]-related technologies, goods, data, and services on the international market.”³

Duplicative regulatory regimes for orbital debris run counter to these objectives, slowing U.S. companies as they strive to keep pace with global competition. The Commission is one of several agencies that regulate orbital debris mitigation, all of which do so in service of the public interest. Accordingly, Maxar is encouraged that the NPRM asks important questions about the FCC's continuing role as a gatekeeper in this area. To be clear, Maxar does not advocate for the Commission to shirk its statutory public interest obligations. Rather, through this rulemaking,

³ The White House, Presidential Memoranda, *Space Policy Directive-3, National Space Traffic Management Policy* (Jun. 18, 2018).

the Commission has an opportunity to leverage other orbital debris regulatory regimes and formally incorporate these approvals into its own rules. Removing these barriers and modernizing its rules will facilitate swift deployment of new, innovative technologies and provide an immediate boost to U.S. companies and domestic job creation.

Maxar also urges the Commission to retain its policy of technological neutrality and permit the use of technologies and standards that fulfill baseline public policy objectives. Maxar further believes that operators of satellites in orbits with apogee altitude above 400 km should fully participate in active collision avoidance, and operators of satellites capable of propulsion should include encryption capabilities for telemetry, tracking and control (“TT&C”).

II. BACKGROUND.

Maxar shares the FCC’s prioritization of ensuring that operations are conducted safely and in a manner that is consistent with the public interest.⁴ Specifically, Maxar supports Chairman Pai’s goal to “mitigate the threat posed by orbital debris” through various means, including better satellite design, disposal procedures, and active collision avoidance.⁵ Maxar is a leading global provider of advanced space technology solutions, delivering unmatched end-to-end capabilities in satellites, robotics, Earth imagery, geospatial data, analytics, and insights. The world’s foremost businesses and governments trust Maxar to solve their most mission-critical challenges. With roughly 5,900 employees in over 30 global locations, Maxar was formed by uniting the industry-leading space companies of DigitalGlobe, SSL, MDA, and Radiant Solutions. Every day, billions of people rely on Maxar to communicate, share information and data, and deliver global insights. Maxar is involved in nearly all aspects of

⁴ *NPRM* at ¶ 2.

⁵ Statement of Chairman Ajit Pai, FCC Rcd. 18-159, *Mitigation of Orbital Debris in the New Space Age*, IB Docket No. 18-313; *Mitigation of Orbital Debris*, IB Docket No. 02-54 (Terminated).

commercial space operations from planning, design and construction, to launch and deployment, through ongoing orbital maneuvers and the delivery of products and services to customers.

Before becoming Maxar Technologies, DigitalGlobe was granted the first U.S. license to operate a high-resolution commercial imaging satellite in 1993 and, via Maxar, DigitalGlobe continues to provide groundbreaking enhanced Earth imagery and geospatial information. As the first and only company to deliver true 30cm resolution imagery, DigitalGlobe offers state-of-the-art services from environmental monitoring and mapmaking, to capturing mission-critical images in support of defense and public safety-related operations. Maxar's Space Solutions division delivers integrated space technologies and systems for communications, exploration, data gathering, and next-generation services. Maxar Space Solutions designs and manufactures innovative spacecraft and space-related systems with an advanced product line that includes high-power geostationary satellites, state-of-the-art small satellites, and next-generation robotics and automation. Maxar's Canadian-based subsidiary, MDA, develops and delivers advanced surveillance and intelligence solutions, defense and maritime systems, radar geospatial imagery, space-based robotics, satellite antennas, and communication subsystems. Finally, Maxar's Radiant Solutions group combines more than 1,000 aerospace engineers, geospatial analysts, weather and ocean experts, software developers, data scientists, and DevOps engineers to provide unmatched geospatial information and insights to solve both national security and commercial challenges.

Moreover, Maxar personnel have been and continue to be active on a variety of relevant Federal Advisory Committees. For example, Maxar's Executive Vice President and Chief Technical Officer, Walter Scott (the founder of DigitalGlobe), served on the National Oceanic and Atmospheric Administration's Advisory Committee on Commercial Remote Sensing.

Additionally, Maxar's Vice President for Regulatory and Policy, Mike Gold, was appointed to the Commercial Space Transportation Advisory Committee ("COMSTAC," the federal advisory committee to the Federal Aviation Administration Office of Commercial Space Transportation / Department of Transportation) in 2008 and was elevated to chair the COMSTAC in 2012. Mr. Gold was also appointed last year to the NASA Advisory Council ("NAC") and was tasked by the NASA Administrator with establishing and chairing the NAC Regulatory and Policy Committee.

Additionally, Maxar has been an active participant in a number of industry efforts to address debris. Maxar is a co-signer on GVF's "Best Practices for Sustainable Space Activities." Maxar has also played a leading role in DARPA's Consortium for Execution of Rendezvous and Servicing Operations ("CONFERS"). Maxar wrote the initial draft of the CONFERS Guiding Principles and supported the development of the recommended design and operational practices for commercial rendezvous and proximity operations and on-orbit satellite servicing. Both of these documents address minimizing debris.

III. THE COMMISSION SHOULD WORK WITH OTHER FEDERAL AGENCIES TO AVOID AND STREAMLINE REDUNDANT REGULATORY REGIMES.

The NPRM seeks comment on "whether there are any areas in which proposed requirements may overlap with requirements that are clearly within the authority of other agencies, so that [the Commission] may seek to avoid duplicative activities."⁶ Maxar applauds the Commission's willingness to take a hard look at its role in the regulatory ecosystem, and it encourages the FCC to work with other lead federal agencies to avoid redundant regulatory requirements, joint jurisdiction, and overlapping approval processes of orbital debris mitigation plans. Specifically, where another lead federal agency, such as the Federal Aviation

⁶ *NPRM* at ¶ 17.

Administration (“FAA”) or the National Oceanic Atmospheric Administration (“NOAA”) has or will approve final orbital debris plans, the FCC should accept the expertise and judgment of that sister agency and not reevaluate the decision.

There are parallel constructs to point to in the Commission’s own rules—wherein the FCC accepts and incorporates the judgment and approval of other agencies. For example, owners of any proposed or existing antenna structure that requires notice of proposed construction to the FAA, due to physical obstruction, must also register the structure with the Commission. However, if the FAA exempts an antenna structure from notification, it is exempt from the requirement that it register with the Commission.⁷ Here the Commission does not reevaluate the FAA’s judgment in the matter, it streamlines the process by accepting the agency’s expertise and final decision. A similar construction should be adopted with respect to approved orbital debris plans.

Requiring applications to be revisited is burdensome not only for the applicant—because it takes additional money and time (in both preparing the application and waiting for its ultimate approval) — but it is an inefficient use of limited government resources. The Commission’s staff need not perform secondary reviews on top of their federal counterparts. Reporting to and seeking the same approvals from two or more U.S. Government agencies does not serve the public interest. Such inefficiencies in regulatory regimes are outdated, counter to sound public policy, and should be avoided. Instead, as the FCC wisely does elsewhere in its rules, the Commission should accept the decisions of other federal agencies and simply require applicants to certify, as a condition of their license, that approvals have already been obtained or will be obtained from the relevant U.S. agencies prior to launch.

⁷ See 47 C.F.R. §17.4, *see also* 47 C.F.R. §17.7(e).

This inefficiency has been duly recognized by the Commission. As the NPRM notes, the Commission has a shared role with other federal agencies “in evaluating orbital debris mitigation plans associated with non-federal space operations.”⁸ NOAA requires that commercial remote sensing satellites are subject to certain regulations, disclosures, and approvals.⁹ Specifically, plans are required for “post-mission disposal of remote sensing satellites.”¹⁰ As a result the Commission “concluded that to the extent a remote sensing applicant has submitted its post-mission disposal plans to NOAA [it] would not require such information.”¹¹

The FCC also recognizes that the FAA has regulatory authorities under the Commercial Space Launch Act, and that such matters are “appropriately addressed” by that agency.¹² Moreover, permitting deference to sister agencies would not diminish the Commission’s public interest mission. Like the Communications Act, the Commercial Space Launch Act bestows the agency with a public interest obligation.¹³ The FAA “is responsible for ensuring protection of the public, property, and the national security and foreign policy interests of the United States during commercial launch or reentry activities, and to encourage, facilitate, and promote U.S. commercial space transportation.”¹⁴ Through its Office of Commercial Space Transportation (“AST”) the FAA has licensed or permitted more than 370 launches and reentries.¹⁵

⁸ NPRM at ¶ 16.

⁹ See 51 U.S.C. § 60101, et seq (delegating to the Assistant Administrator for NOAA Satellite and Information Services the responsibility for licensing of the operations of private space-based remote sensing systems); see also 15 C.F.R. Part 960 (concerning the licensing of private remote sensing space systems).

¹⁰ NPRM at ¶ 16.

¹¹ *Id.*

¹² See *id.*

¹³ See 51 U.S.C. § 50901, et seq.

¹⁴ See FAA, *Fact Sheet – Commercial Space Transportation Activities* (Rel. Feb. 7, 2019).

¹⁵ *Id.*

In its *Annual Compendium of Commercial Space Transportation: 2018*, AST outlines, in part, how the U.S. regulatory picture is cumbersome and complex for commercial space operators:

The U.S. government carries out its space-related responsibilities through several different agencies. AST regulates the U.S. commercial space transportation industry; encourages, facilitates, and promotes commercial space launches and reentries by the U.S. private sector; recommends appropriate changes in federal statutes, treaties, regulations, policies, plans, and procedures; and facilitates the strengthening and expansion of the U.S. space transportation infrastructure. The National Oceanic and Atmospheric Administration (NOAA) is responsible for issuing licenses to U.S.-based nonfederal organizations that intend to operate remote sensing satellites (under the 1992 Land Remote Sensing Policy Act). The Federal Communications Commission (FCC) requires operators of non-federal satellites that employ radio communications to be licensed. The provisions of the 1976 Arms Export Control Act are implemented under the International Traffic in Arms Regulations (ITAR), which control the export and import of defense-related technologies and services identified on the United States Munitions List (USML) managed by the Department of State, which includes some space hardware. In addition to ITAR, there is the Export Administration Regulations (EAR), which contains the Commercial Control List (CCL) managed by the Department of Commerce. The CCL also captures various space-related technologies.¹⁶

Yet, this picture is limited in scope; it does not include the multitude of Department of Defense or Intelligence Community reviews that may occur and does not scratch the surface on broader international obligations. Although the Administration has encouraged a streamlining of onerous obligations in its Space Policy Directives, unnecessary regulatory redundancies remain.

Most importantly, the critical goals of space safety and sustainability are not compromised by relying on the expertise and approvals of expert officials at other lead agencies. Indeed, in its 2004 review of orbital debris rules, the Commission determined that the FCC need not re-examine certain debris mitigation plans subject to approval by the FAA.¹⁷ This Commission policy should be expanded.

¹⁶ FAA Office of Commercial Space Transportation, *The Annual Compendium of Commercial Space Transportation: 2018*, 88 (Jan. 2018).

¹⁷ *NPRM* at ¶ 16.

It appears a majority of Commissioners recognize that the FCC should leverage deep expertise existing elsewhere in government. Maxar agrees with Commissioner O’Rielly that “the Commission is not the lead governmental agency dealing with this issue, with both domestic and international entities containing far greater expertise and authority” and that the FCC’s “primary role should be to ensure that current satellite providers are good stewards of their orbital and launch activities, to prevent exacerbation of the problem.”¹⁸ Further, a draft circulated by Chairman Pai recognized that “a number of [the FCC’s] sister agencies that have expertise and jurisdiction over the launch and tracking of satellites, including NASA, DOD, the FAA, the State Department, and the new Office of Space Commerce.”¹⁹

Without compromising safety or sustainability, the FCC can avoid expending its own limited resources and defer to the breadth and depth of experience at these other agencies. The Commission can confirm, by way of applicant certification, that appropriate capabilities and conditions will be met prior to granting a license, but it need not reassess the approvals and expertise of other agencies. The FCC should recognize and honor decisions from lead U.S. government agencies and permit operators in its licensing process to certify compliance with safety and orbital debris mitigation requirements.

IV. THE COMMISSION SHOULD REMAIN TECHNOLOGICALLY NEUTRAL.

As the Commission modernizes its orbital debris rules, it should be wary and avoid mandating overly specific technical standards to be used for compliance purposes. The technological capabilities and functions of existing on-board instruments and on-ground receipt facilities vary from operator-to-operator and would be costly and difficult to change. Moreover,

¹⁸ Statement of Commissioner Michael O’Rielly, *NPRM*, at page 57.

¹⁹ Statement of Commissioner Brendan Carr, *NPRM*, at page 60.

due to the fast-paced speed of technological advances in the satellite communications industry, the adoption of any technical standard is likely to quickly become obsolete. Therefore, the FCC should remain technology agnostic and decline to impose specific technical requirements or mandate the use of certain technologies or software when other means are available to fulfill public policy objectives. The FCC confirmed in 2015 that it “has historically adopted rules that are technologically neutral and remains committed to this policy.”²⁰

Other agencies routinely champion a technology-neutral approach. The National Institute of Standards and Technology’s recently updated Cybersecurity Framework confirms that it “remains effective and supports technical innovation because it is technology neutral.”²¹ Additionally, last year, the National Telecommunications and Information Administration noted that it helped improve broadband infrastructure “by providing solution- and technology-neutral advice on many issues.”²² And in a recent report, the U.S. Department of Treasury recommending helping “financial regulators adopt regulation in the legal identity space that is flexible, risk-, principles-, and performance-based, future-proofed, and technology-neutral.”²³

If the Commission determines that certain benchmarks must be met, it should implement baseline functional requirements, while leaving it to the applicant or licensee to determine the best available technical standard or software to be implemented for compliance purposes based on their specific system design.

²⁰ See *Office of Engineering and Technology and Wireless Telecommunications Bureau Seek Information on Current Trends in LTE-U and LAA Technology*, Public Notice, DA 15-516 (rel. May 5, 2015).

²¹ NIST, *Framework for Improving Critical Infrastructure Cybersecurity*, Version 1.1, at 2 (April 16, 2018).

²² NTIA, *Broadband USA Newsletter*, Volume 3, Issue 5 (May 2018).

²³ U.S. Dept. of Treasury, *Report on Nonbank Financials, Fintech, and Innovation*, at 44 (July 2018).

V. SATELLITES ABOVE 400 KM SHOULD BE CAPABLE OF ACTIVE COLLISION AVOIDANCE.

The Commission seeks comment on whether it should require “all NGSO satellites planning to operate above a particular altitude to include propulsion capabilities reserved for station-keeping and to enable collision avoidance maneuvers,” and if so, “above what altitude” should this requirement be applied.²⁴

Maxar believes orbital debris mitigation standards are necessary to prevent on-orbit collisions with other satellites and debris to ensure the safety of the space environment. In response to a Department of Commerce (“DOC”) Advance Notice of Proposed Rulemaking (“ANPRM”) last summer, Maxar suggested that satellites in orbits with apogee altitude above 400 km should fully participate in active collision avoidance which would include these requirements: (i) the satellite must have propulsive capability to perform collision avoidance maneuvers, (ii) the operator must submit predicted trajectories that include upcoming maneuvers to the U.S. Space Situational Awareness governing agency to be screened against the space object catalog to detect upcoming close approaches, and (iii) the satellite must deorbit within five years subsequent to the completion of its mission.²⁵ These requirements would greatly reduce the risk of collisions in orbit and substantially contribute to the sustainability of commercial space endeavors. However, if such rules are put into place the relevant federal agency should take steps to ensure that existing satellites which do not meet the new requirements are grandfathered into the system.

²⁴ *NPRM* at ¶ 34.

²⁵ Comments of Maxar Technologies Holdings Inc., NOAA-NESDIS-2018-0058, at 24 (filed Aug. 28, 2018) (“Maxar ANPRM Comments”).

VI. SATELLITES CAPABLE OF PROPULSION SHOULD BE ENCRYPTED.

The NPRM notes that currently, “there is no requirement that space station licensees encrypt telemetry, tracking, and command communications [(“TT&C”)]. However, as a practical matter, most satellites do operate with secure encrypted communications links, and all operators have an interest in security against unauthorized actors interfering with their mission.”²⁶

Maxar believes that the security of space station TT&C communications is essential. In response to the previously referenced DOC ANPRM, Maxar proposed that any satellite with propulsive capability should be capable of command and control encryption/authentication of TT&C to prevent the unauthorized access or possible redirection of the satellite.²⁷ Additionally, the Commission should work with other federal agencies and industry stakeholders to ensure that any TT&C encryption requirements are technologically neutral.

VII. CONCLUSION.

Maxar appreciates the opportunity to provide comments on the Commission’s efforts to modernize its orbital debris rules. Maxar encourages the FCC to leverage the processes already in place at other agencies to streamline its own approval process, thereby increasing speed to market and providing a boost to U.S. companies.

²⁶ *NPRM* at ¶¶ 74-75.

²⁷ Maxar ANPRM Comments, at 24.

Respectfully submitted,

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