



Federal Communications Commission  
Washington, D.C. 20554

**June 3, 2020**

Ms. Sallye Clark  
Ms. Laura Stefani  
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.  
701 Pennsylvania Ave., NW  
Suite 900  
Washington, D.C. 20004

Re: IBFS File No. SAT-PDR-20200413-00034;<sup>1</sup> Call Sign: S3065

Dear Mmes. Clark and Stefani:

On April 13, 2020, AST&Science, LLC (AST) filed the above-captioned application requesting access to the U.S. market for its constellation of low-Earth orbit V-band satellites. To assist in the Satellite Division's review of AST's application, please provide the information requested below.<sup>2</sup>

1. In accordance with Sections 25.102(a) and 25.114(c)(4) and (7),<sup>3</sup> for AST's proposed service links, please specify the exact frequencies and directions of transmissions within the 617-960 MHz, 1710-2200 MHz and 3410-3980 MHz bands on which AST intends to operate. Also, given that none of these frequencies are allocated to the Mobile Satellite Service, please provide a waiver request and justification for each of the frequencies being requested. All justifications should include a detailed technical sharing analysis, including all assumptions, with the other services allocated on those frequencies, with a particular focus on operations in the U.S. (including possessions and territories) and adjacent countries that may be impacted by transmissions by the satellite to U.S. earth stations. Also, please specify if AST will accept all interference it may receive on these frequencies from other international system(s) operating in accordance with the International Table of Frequency Allocations.
2. Please identify any terrestrial operators with which AST has an agreement to provide service and the frequencies covered by any such agreement.
3. As part of its petition, AST provided the Papua New Guinea license for a single satellite (Blue Walker 1) in a polar orbit at 698 km with an expiration date of November 13, 2023.<sup>4</sup> However, AST's petition requests access to the U.S. market for a constellation of 243 satellites in 16 orbital planes at altitudes between 725-740 km. Please indicate whether a Papua New Guinea

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<sup>1</sup> AST's petition was originally filed under SAT-LOI-20200413-00034, however, section 25.137 of the Commission's rules specifies that a petition for declaratory ruling is the means to request U.S. market access through any type of non-U.S. licensed space station in any frequency band. Accordingly, we have changed AST's IBFS file number from a Letter of Intent (LOI) to a Petition for Declaratory Ruling (PDR).

<sup>2</sup> 47 CFR § 25.111(a).

<sup>3</sup> 47 C.F.R. §§ 25.102(a), 25.114(c)(4), 25.114(c)(7).

<sup>4</sup> See AST Petition, Attachment B.

license has been issued for the satellites for which market access is requested, and, if so, please provide a copy.

4. Please confirm which country will register all satellites in AST's constellation with the UN, and identify any pre-conditions for registration and any supervisory activities that will be carried out by that country.
5. AST states that it will monitor TT&C operations from its system control center located in Midland, Texas, and will conduct routine TT&C from international locations distributed worldwide.<sup>5</sup> Please identify the facilities outside of the United States from which AST will conduct TT&C and the owners of these facilities. Please also clarify the status of contracting with each facility. In addition, please identify any contractual provisions that guarantee the ability to transmit high-priority messages, such as commands for cessation of operations i.e. does the contract provide for something more than the lowest tier of use, preemptable by other satellites using the facility, and contain no limitations that would significantly delay the time necessary to cease operations of any of AST's satellites?
6. What is the expected mission lifetime per satellite? How many satellites are expected to be launched over a 15-year period beginning with the deployment of the first satellite in the system?
7. AST notes that each satellite will have an on-board electric propulsion system that will be used for collision avoidance. Please specify if the propulsion system will be used also to maintain the orbits. If yes, please specify the orbital tolerance with which the apogee, perigee and inclination will be maintained.
8. Please provide additional information about the reliability of the propulsion capabilities of AST satellites, including any information concerning flight heritage. In addition, using the NASA Debris Assessment Software or a higher fidelity model, please provide the in-orbit collision risk for satellites that lose propulsion capability at the operational altitude, assuming a 10% failure of the on-board propulsion system. Please also provide the orbital lifetime for a satellite that fails and has no propulsive capability at the operational altitude.
9. AST notes that sufficient propellant will be maintained throughout the mission in order to provide the deorbit maneuver at end-of-life. This maneuver will be used to lower the satellite to an altitude of approximately 400 km, at which point the array can be pitched with magnet torquers that can control the exposed surface array, effectively throttling the drag.<sup>6</sup> Please provide greater detail concerning the measures AST will take to avoid collisions with large objects. Please include within this discussion any specific measures with respect to crewed space stations, including the ISS and visiting vehicles, as the satellites pass through the region in which such spacecraft operate.
10. Regarding the semi-controlled re-entry of AST's satellites, please provide information on any approach to altering the ground track of the satellite, including any criteria used in deciding whether to alter the satellite's trajectory to minimize casualty risk.

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<sup>5</sup> See AST Petition at 5.

<sup>6</sup> See AST Petition, Attachment C.

11. AST states that “of the debris that does not demise before reaching the surface, those substantially contributing to the total casualty area are well below the 15 Joule kinetic energy requirement. Those components above the 15 Joule requirement contribute a total debris casualty area characterized by the 1:19,700 casualty risk assessment.”<sup>7</sup> Please provide a complete list of components (size, mass, and material type) expected to survive re-entry, along with the impact energy for each component. Please provide information concerning any steps taken to design the spacecraft to demise completely upon re-entry. Please also provide information on any indemnification arrangements concerning re-entry casualty risk with Papua New Guinea, with the country registering the satellites with the United Nations, or with any other country exercising a supervisory role concerning the re-entry.

The requested information must be submitted no later than **July 6, 2020**. Failure to do so may result in the dismissal of AST’s application pursuant to Section 25.112(c) of the Commission’s rules.<sup>8</sup>

Sincerely,

/s/ Jose P. Albuquerque

Jose P. Albuquerque  
Chief, Satellite Division  
International Bureau

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<sup>7</sup> See AST Petition, Attachment C.

<sup>8</sup> See 47 C.F.R. § 25.112(c).