

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of

Application of Astronics AeroSat Corporation)	
To Modify its Existing Ku-band Earth Stations)	Call Sign E140087
Aboard Aircraft Blanket License To Add)	
Vehicle-Mounted Earth Stations and Earth)	File No. SES-MOD-_____
Stations Onboard Vessels Operating Authority)	
)	

APPLICATION FOR BLANKET LICENSE MODIFICATION

By this application, Astronics AeroSat Corporation (“Astronics AeroSat”) seeks modification of its existing Ku-band earth stations aboard aircraft (“ESAA”) blanket license, Call Sign E140087,¹ by adding earth stations onboard vessels (“ESV”) and vehicle-mounted earth stations (“VMES”) operating authority for its previously licensed HR129 and HR6400 terminals. Astronics AeroSat seeks to operate the proven HR129 and HR6400 terminals in ESV and VMES applications in the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), and 11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 GHz (Earth-to-space) bands, consistent with Section 25.222 of the Commission’s rules governing Ku-band ESVs, 47 C.F.R. § 25.222, and Section 25.226 of the Commission’s rules governing Ku-band VMESs, 47 C.F.R. § 25.226.

The authority sought herein will allow Astronics AeroSat to expand its Ku-band satellite mobility offerings and enhance operational flexibility to serve various customers and industries. Moreover, the ability to operate the HR129 and HR6400 terminals as ESVs and VMESs would

¹ See Astronics AeroSat Corporation, File No. SES-LIC-20140902-00688 and subsequent amendments and modifications, Call Sign E140087 (“*ESAA Blanket License*”).

serve the public interest by enhancing the diversity of services that Astronics AeroSat provides to customers in the United States, thus spurring competition and facilitating U.S. leadership in satellite-based, mobile broadband services. As described below, grant of the requested authority is consistent with Commission rules, policy, and precedent.

I. BACKGROUND

Astronics AeroSat develops innovative mobile terminals that are widely used by industry leaders to provide broadband connectivity services to customers in the commercial and private aviation industries. In addition, Astronics AeroSat operates its own ESAA network, the FliteStream™ system, which enables Astronics AeroSat to provide ESAA services on U.S. and foreign-registered aircraft in U.S. and international airspace.² Astronics AeroSat incorporates by reference the information regarding terminal functionality and other operational characteristics previously submitted in connection with its *ESAA Blanket License*.³

Astronics AeroSat seeks no changes to its existing ESAA operations or the number of authorized terminal units, and will continue to operate the HR129 and HR6400 terminals in accordance with the terms of the *ESAA Blanket License* and Section 25.227 of the Commission's rules governing Ku-band ESAAs.⁴ Additionally, as discussed below, Astronics AeroSat will

² *Id.*

³ When operating the terminals pursuant to ESV or VMES authority, Astronics AeroSat will not operate in the 10.7-10.95 GHz or 12.2-12.75 GHz bands, which are currently limited to non-conforming, non-interference ESAA operations outside of the United States. ESV and VMES operations will be limited to the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz bands.

⁴ See 47 C.F.R. § 25.227; see also *Revisions to Parts 2 and 25 of the Commission's Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands; Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the*

operate the HR129 and HR6400 terminals in the maritime and land mobility contexts consistent with the provisions of its existing authorization,⁵ the Commission's rules governing VMESs⁶ and ESVs,⁷ future rules governing such terminals,⁸ and applicable international requirements.

Below, Astronics AeroSat provides an overview of its proposed VMES and ESV operations.

II. DISCUSSION

A. Proposed Operations

Astronics AeroSat seeks to add ESV and VMES operating authority for the HR129 and HR6400 mobile terminals to support its expansion of services to new customers and industries. Specifically, Astronics AeroSat seeks to add ESV operating authority for HR129 and HR6400

Fixed Satellite Service, IB Docket Nos. 12-376 & 05-20, Notice of Proposed Rulemaking and Report and Order, FCC 12-161 (rel. Dec. 28, 2012) (“*ESAA Order*”).

⁵ Astronics AeroSat notes that the operational rules governing ESAAAs, ESVs and VMESs are fundamentally identical because all of these Ku-band mobility terminals are designed to comply with the FCC's two-degree spacing requirements and rules governing blanket-licensed Ku-band earth station operations.

⁶ See 47 C.F.R. § 25.226; see also *Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service*, IB Docket No. 07-101, Order on Reconsideration, FCC 13-1 (rel. Jan. 8, 2013) (“*VMES Order*”).

⁷ See 47 C.F.R. § 25.222; see also *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 GHz/11.7-12.2 GHz Bands*, IB Docket No. 02-10, Second Order on Reconsideration (rel. July 19, 2012) (“*ESV Order*”).

⁸ See *Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service*, Notice of Proposed Rulemaking, IB Docket No. 17-95 (rel. May 19, 2017) (“*ESIMs NPRM*”) (proposing to consolidate and streamline the technical, operational and coordination requirements of Sections 25.221, 25.222, 25.226 and 25.227 of the Commission's rules governing VMESs, ESAAAs and ESVs).

terminals to enable the extension of its mobile earth station offerings to vessels and other maritime applications (e.g., drilling platforms), allowing Astronics AeroSat to serve customers at sea and other remote offshore locations. Astronics AeroSat will operate the HR129 and HR6400 terminals on U.S. vessels in U.S. territorial and adjacent international waters, including the coastal regions of CONUS, Alaska, Hawaii, the U.S. Virgin Islands, and Puerto Rico.

In addition, Astronics AeroSat seeks to add VMES authority to operate the HR129 and HR6400 terminals throughout the United States to support the development and implementation of its new VMES offering. Astronics Aerosat has already conducted land-mobile operations under an existing experimental license,⁹ and there have been no reported incidents of interference. Long-term commercial authority will provide Astronics AeroSat with the flexibility to support U.S. customers as VMES service needs arise.

Astronics AeroSat seeks authority to operate the VMES and ESV terminals with any U.S.-licensed satellite or non-U.S.-licensed satellite on the Commission's Permitted Space Station List ("Permitted List").¹⁰ Permitted List authority is appropriate because Astronics AeroSat will operate the HR129 and HR6400 terminals below the off-axis ESD levels specified in Sections 25.222(a)(1)(i) and 25.226(a)(1)(i) at all times.¹¹ During ESV and VMES operations, the HR129 and HR6400 power levels will not exceed those currently authorized in the *ESAA Blanket License* and, to the extent applicable, will comply with the terms and conditions of the license. As noted, Astronics AeroSat does not seek to increase the number of authorized HR129 or

⁹ See Astronics AeroSat Corporation, File No. 0142-EX-ST-2018, Call Sign WH2XCJ (granted on Jan. 29, 2018).

¹⁰ See 47 C.F.R. §§ 25.221(b)(7), 25.222(b)(7) & 25.115(k)(1).

¹¹ See 47 C.F.R. §§ 25.222(b)(7) & 25.226(b)(9).

HR6400 terminals in the license and will operate up to 1,000 total units of each terminal regardless of application (i.e., ESAA, ESV, or VMES).

B. Compliance with Sections 25.222 and 25.226

At all times, Astronics AeroSat will conduct ESV and VMES operations consistent with Commission rules,¹² precedent,¹³ and the ongoing *ESIMs NPRM*. The proposal in the *ESIMs NPRM* to consolidate mobile earth station rules under a single earth stations in motion (“ESIM”) classification illustrates the fundamental similarities between Sections 25.222, 25.226 and 25.227 of the Commission’s rules and the duplicative nature of separate ESV, VMES, and ESAA licensing. Although the ESIM rules have not yet been finalized, grant of Astronics AeroSat’s request for combined ESV/VMES/ESAA operating authority is appropriate because, as the Commission recognizes, the “core rules” applicable to ESVs, VMESs, and ESAAs are identical.¹⁴ Thus, Astronics AeroSat relies on and incorporates its previously submitted materials to support its request to add ESV and VMES authority for the HR129 and HR6400 terminals.¹⁵

¹² See generally 47 C.F.R. §§ 25.222 and 25.226.

¹³ See, e.g., Kymeta Corporation, File No. SES-LIC-201702223-00195 and subsequent amendments and modifications, Call Sign E170070 (authority granted for a combined ESV/VMES blanket license).

¹⁴ *ESIMs NPRM* ¶ 20. The “core rules” include: (i) antenna pointing accuracy requirements, (ii) EIRP density limits, (iii) the self-monitoring (self-diagnostics) requirement, (iv) the network control and monitoring center requirement, (v) logging requirements, and (vi) the installation requirements related to radiation safety.

¹⁵ See Astronics AeroSat Corporation, File No. 0078-EX-ST-2014, Call Sign WH9XHX, Technical Appendix (providing off-axis ESD plots for the HR6400 terminal); File No. SES-MFS-20161003-00823, Call Sign E140087, Technical Appendix III (providing off-axis ESD plots for the HR129 terminal).

In all cases, the HR129 and HR6400 terminals will operate consistent with the “core rules” of the Commission’s existing ESV, VMES, and ESAA requirements, including: (i) operating at off-axis EIRP spectral density (“ESD”) levels below those set forth in the applicable FCC masks; (ii) maintaining a pointing accuracy of 0.2° or better; (iii) automatic cessation of emissions within 100 ms if pointing offset exceeds 0.5°; and (iv) not resuming transmissions until pointing accuracy is within 0.2°. ¹⁶ Astronics AeroSat has previously provided off-axis ESD plots,—which it incorporates into the instant application, ¹⁷—demonstrating compliance with the Commission’s two-degree spacing requirements consistent with Section 25.115(g)(1) of the Commission’s rules, 47 C.F.R. § 25.115(g)(1).

In addition to these fundamental operational characteristics, Astronics AeroSat will operate the HR129 and HR6400 terminals in accordance with the geographic limitations and coordination provisions in the Commission’s rules designed to protect other users of the spectrum. Specifically, Astronics AeroSat will not operate the ESV or VMES terminals in the 14.0-14.2 GHz band within 125 km of the NASA TDRSS facilities in Guam, White Sands, New Mexico, and other operational TDRSS facilities, including the facilities in Blossom Point, MD (latitude: 38°25’44” N, longitude: 77°05’02” W), ¹⁸ without first coordinating with the National Telecommunications Information Administration (“NTIA”) through NASA. ¹⁹ In addition, during ESV operations, Astronics AeroSat will not operate in the 14.47-14.5 GHz band within 45 km of the radio observatory service (“RAS”) facilities in St. Croix, Virgin Islands, or Mauna

¹⁶ See generally 47 C.F.R. §§ 25.222 and 25.226.

¹⁷ *Supra* n. 15.

¹⁸ See Public Notice, DA 14-992 (July 11, 2014).

¹⁹ See 47 C.F.R. §§ 25.222(c) and 25.226(c).

Kea, Hawaii, or within 90 km of the Arecibo Observatory in Puerto Rico without first coordinating with the National Science Foundation (“NSF”).²⁰ During VMES operations, Astronics AeroSat will not operate in the 14.47-14.5 GHz band within the relevant coordination distances of the relevant RAS facilities listed in the Commission’s rules without first coordinating with the NSF.²¹ Astronics AeroSat provides the attached FCC Compliance Matrixes and Certification addressing ESV- and VMES-specific requirements.

C. Hub Earth Stations

The ESV and VMES terminals will communicate with various licensed hub earth stations located throughout the United States depending on the serving satellite. Pursuant to multiple managed service agreements, network access for individual ESV and VMES terminals will be managed by the serving satellite operator, subject to Astronics AeroSat’s ultimate direction and control. Astronics AeroSat will utilize its existing Network Operations Center (“NOC”) facility and 24/7 point of contact located in the United States with the authority to cease ESV or VMES terminal transmissions remotely regardless of the serving hub station.²² The NOC will be staffed at all times, providing continuous supervision and monitoring of such operations.

Primary Point of Contact:

Networks Operations Center Coordinator
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Amherst, NH 03031
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²⁰ See 47 C.F.R. §§ 25.222(d).

²¹ See 47 C.F.R. §§ 25.2226(d).

²² 47 C.F.R. §§ 25.222(a)(4) & 25.226(a)(5).

Moreover, Astronics AeroSat confirms that the NOC will keep a record of vessel and vehicle locations (*i.e.*, latitude/longitude), transmit frequency, channel bandwidth, and satellite used for a period of not less than one year.²³ For ESV operations, Astronics AeroSat will also maintain detailed information on each foreign vessel's country of registry and point of contact for the relevant administration responsible for licensing ESVs.²⁴

D. Public Interest Considerations

Grant of the requested modification to add ESV and VMES operating authority will serve the public interest by enhancing the diversity of services Astronics AeroSat provides to U.S. customers, thus promoting competition and facilitating U.S. leadership in satellite-based mobile broadband services. In addition, grant of VMES operating authority will promote novel applications of the HR129 and HR6400 terminals for ground-based mobile vehicle communications and allow Astronics AeroSat the operational flexibility to immediately serve customers as needs arise.

Moreover, grant of this application will serve the public interest by facilitating Astronics AeroSat's introduction of ESV terminal offerings to maritime customers, thereby expanding connectivity options and enabling competition in the maritime communications industry. The addition of ESV operating authority will also enable Astronics AeroSat to expand into new markets and deliver broadband satellite services to an array of users in offshore locations, including commercial vessels, private yachts, and other maritime users that require satellite-based connectivity for their communications needs.

²³ 47 C.F.R. §§ 25.222(a)(5) and 25.226(a)(6).

²⁴ 47 C.F.R. § 25.222(a)(6).

III. CONCLUSION

For the foregoing reasons, Astronics AeroSat respectfully requests that the Commission modify its *ESAA Blanket License*, Call Sign E140087, by adding ESV and VMES operating authority for its previously licensed HR129 and HR6400 terminals.