SUPPORTING STATEMENT

1. The Federal Communications Commission (Commission) is requesting that the Office of Management and Budget (OMB) approve a new information collection titled "Earth Stations Aboard Aircraft 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." This new information collection results from a Notice of Proposed Rulemaking and Report and Order released by the Commission on December 28, 2012 titled, "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 and Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service," IB Docket Nos. 12-376 and 05-20, FCC 12-161 (ESAA Report and Order).

Approximately 6 companies have pursued authorizations at the Commission to operate earth stations aboard aircraft (ESAA) communicating with Fixed-Satellite Service (FSS) geostationary-orbit (GSO) space stations operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz (space-to-Earth or downlink) and 14.0-14.5 GHz (Earth-to-space or uplink) frequency bands.

This Order contains the following new information collection requirements for which we seek OMB approval:

New Information Collection Requirements

47 C.F.R. 25.132(b)(3) – Applicants seeking authority to use an antenna that does not meet the standards set forth in §§ 25.209(a) and (b), pursuant to the procedure set forth in § 25.220, § 25.221, § 25.222, § 25.223, § 25.226 or § 25.227 of this part, are required to submit a copy of the manufacturer's range test plots of the antenna gain patterns specified in paragraph (b)(1) of this section.

47 C.F.R. 25.227(b) – Applications for ESAA operation in the 14.0-14.5 GHz (Earth-to-space) band to GSO satellites in the Fixed-Satellite Service shall include, in addition to the particulars of operation identified on Form 312, and associated Schedule B, the applicable technical demonstrations in paragraphs (b)(1), (b)(2) or (b)(3) and the documentation identified in paragraphs (b)(4) through (b)(8) of this section.

> (1) An ESAA applicant proposing to implement a transmitter under paragraph (a)(1) of this section shall demonstrate that the transmitter meets the off-axis EIRP spectral-density limits contained in paragraph (a)(1)(i) of this section. To provide this demonstration, the application shall include the tables described in paragraph (b)(1)(i) of this section or the certification described in paragraph (b)(1)(ii) of this

section. The ESAA applicant also shall provide the value N described in paragraph (a)(1)(i)(A) of this section. An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section shall provide the certifications identified in paragraph (b)(1)(iii) of this section. An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section shall provide the demonstrations identified in paragraph (b)(1)(iv) of this section.

(i) Any ESAA applicant filing an application pursuant to paragraph (a)(1) of this section shall file three tables and/or graphs depicting off-axis EIRP density masks defined by 25.227(a) and measured off-axis EIRP density levels of the proposed earth station antenna in the direction of the plane of the GSO; the co-polarized EIRP density in the elevation plane, that is, the plane perpendicular to the plane of the GSO; and cross-polarized EIRP density. Each table shall provide the EIRP density level at increments of 0.1° for angles between 0° and 10° off-axis, and at increments of 5° for angles between 10° and 180° off-axis.

(A) For purposes of the off-axis EIRP density table in the plane of the GSO, the off-axis angle is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite, and the plane of the GSO is determined by the focal point of the antenna and the line tangent to the arc of the GSO at the orbital position of the target satellite.

(B) For purposes of the off-axis co-polarized EIRP density table in the elevation plane, the off-axis angle is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite, and the elevation plane is defined as the plane perpendicular to the plane of the GSO defined in paragraph (b)(1)(i)(A) of this section.

(C) For purposes of the cross-polarized EIRP density table, the off-axis angle is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite and the plane of the GSO as defined in paragraph (b)(1)(i)(A) of this section will be used.

(ii) An ESAA applicant shall include a certification, in Schedule B, that the ESAA antenna conforms to the gain pattern criteria of § 25.209(a) and (b), that, combined with the maximum input power density calculated from the EIRP density less the antenna gain, which is entered in Schedule B, demonstrates that the off-axis EIRP spectral density envelope set forth in paragraphs (a)(1)(i)(A) through (a)(1)(i)(C) of this section will be met under the assumption that the antenna is pointed at the target satellite.

(iii) An ESAA applicant proposing to implement a transmitter under paragraphs (a)(1)(ii)(A) of this section shall:

(A) demonstrate that the total tracking error budget of their antenna is within 0.2° or less between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna. As part of the engineering analysis, the ESAA applicant must show that the antenna pointing error is within three sigma (б) from the mean value; and

(B) demonstrate that the antenna tracking system is capable of ceasing emissions within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna exceeds 0.5°.

(iv) An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section shall:

(A) declare, in its application, a maximum antenna pointing error and demonstrate that the maximum antenna pointing error can be achieved without exceeding the off-axis EIRP spectral-density limits in paragraph (a)(1)(i) of this section; and

(B) demonstrate that the ESAA transmitter can detect if the transmitter exceeds the declared maximum antenna pointing error and can cease transmission within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna exceeds the declared maximum antenna pointing error, and will not resume transmissions until the angle between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna is less than or equal to the declared maximum antenna pointing error.

(2) An ESAA applicant proposing to implement a transmitter under paragraph (a)(2) of this section and using off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(1)(i) of this section shall provide the following certifications and demonstration as exhibits to its earth station application:

(i) A statement from the target satellite operator certifying that the proposed operation of the ESAA has the potential to receive harmful interference from adjacent satellite networks that may be unacceptable.

(ii) A statement from the target satellite operator certifying that the power density levels that the ESAA applicant provided to the target satellite operator are consistent with the existing coordination agreements between

its satellite(s) and the adjacent satellite systems within 6° of orbital separation from its satellite(s).

(iii) A statement from the target satellite operator certifying that it will include the power-density levels of the ESAA applicant in all future coordination agreements.

(iv) A demonstration from the ESAA operator that the ESAA system will comply with all coordination agreements reached by the satellite operator and is capable of detecting and automatically ceasing emissions within 100 milliseconds when the transmitter exceeds the off-axis EIRP spectral-densities supplied to the target satellite operator.

(3) An ESAA applicant proposing to implement an ESAA system under paragraph (a)(3) of this section and using variable power-density control of individual simultaneously transmitting co-frequency ESAA earth stations in the same satellite receiving beam shall provide the following certifications and demonstration as exhibits to its earth station application:

(i) The applicant shall make a detailed showing of the measures it intends to employ to maintain the effective aggregate EIRP density from all simultaneously transmitting co-frequency terminals operating with the same satellite transponder at least 1 dB below the off-axis EIRP density limits defined in paragraphs (a)(1)(i)(A)-(C) of this section. In this context the term "effective" means that the resultant co-polarized and cross-polarized EIRP density experienced by any GSO or non-GSO satellite shall not exceed that produced by a single ESAA transmitter operating at 1 dB below the limits defined in paragraphs (a)(1)(i)(A)-(C) of this section. The applicant also must demonstrate that an individual transmitter and the entire ESAA system is capable of automatically ceasing emissions within 100 milliseconds if the aggregate off-axis EIRP-densities exceed the off-axis EIRP density limits minus 1 dB, as set forth in paragraph (a)(3)(i) of this section. The International Bureau will place this showing on public notice along with the application.

(ii) An applicant proposing to implement an ESAA system under paragraph (a)(3)(ii) of this section that uses off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(3)(i) of this section shall provide the following certifications, demonstration and list of satellites as exhibits to its earth station application:

(A) A detailed showing of the measures the applicant intends to employ to maintain the effective aggregate EIRP density from all simultaneously transmitting co-frequency terminals operating with the same satellite transponder at the EIRP density limits supplied

to the target satellite operator. The International Bureau will place this showing on Public Notice along with the application.

(B) A statement from the target satellite operator certifying that the proposed operation of the ESAA has the potential to create harmful interference to satellite networks adjacent to the target satellite(s) that may be unacceptable.

(C) A statement from the target satellite operator certifying that the aggregate power-density levels that the ESAA applicant provided to the target satellite operator are consistent with the existing coordination agreements between its satellite(s) and the adjacent satellite systems within 6° of orbital separation from its satellite(s).

(D) A statement from the target satellite operator certifying that it will include the aggregate power-density levels of the ESAA applicant in all future coordination agreements.

(E) A demonstration from the ESAA operator that the ESAA system is capable of detecting and automatically ceasing emissions within 100 milliseconds when an individual transmitter exceeds the off-axis EIRP spectral-densities supplied to the target satellite operator and that the overall system is capable of shutting off an individual transmitter or the entire system if the aggregate off-axis EIRP spectral-densities exceed those supplied to the target satellite operator.

(F) An identification of the specific satellite or satellites with which the ESAA system will operate.

(4) There shall be an exhibit included with the application describing the geographic area(s) in which the ESAA will operate.

(5) Any ESAA applicant filing for an ESAA terminal or system and planning to use a contention protocol shall include in its application a certification that will comply with the requirements of paragraph (a)(4) of this section.

(6) The point of contact referred to in paragraph (a)(5) of this section shall be included in the application.

(7) Any ESAA applicant filing for an ESAA terminal or system shall include in its application a certification that will comply with the requirements of paragraph (a)(6), (a)(9), (a)(10), (a)(11) of this section.

(8) All ESAA applicants shall submit a radio frequency hazard analysis determining via calculation, simulation, or field measurement whether ESAA terminals, or classes of terminals, will produce power densities that will exceed the Commission's radio frequency exposure criteria. ESAA applicants with ESAA terminals that will exceed the guidelines in Section 1.1310 for radio frequency radiation exposure shall provide, with their environmental assessment, a plan for mitigation of radiation exposure to the extent required to meet those guidelines. All ESAA licensees shall ensure installation of ESAA terminals on aircraft by qualified installers who have an understanding of the antenna's radiation environment and the measures best suited to maximize protection of the general public and persons operating the vehicle and equipment. An ESAA terminal exhibiting radiation exposure levels exceeding 1.0 mW/cm² in accessible areas, such as at the exterior surface of the radome, shall have a label attached to the surface of the terminal warning about the radiation hazard and shall include thereon a diagram showing the regions around the terminal where the radiation levels could exceed 1.0 mW/cm².

47 C.F.R. 25.227(c)(1) - Operations of ESAAs in the 14.0-14.2 GHz (Earth-to-space) frequency band in the radio line-of-sight of the NASA TDRSS facilities on Guam (latitude 13° 36' 55" N, longitude 144° 51' 22" E) or White Sands, New Mexico (latitude 32° 20' 59" N, longitude 106° 36' 31" W and latitude 32° 32' 40" N, longitude 106° 36' 48" W) are subject to coordination with the National Aeronautics and Space Administration (NASA) through the National Telecommunications and Information Administration (NTIA) Interdepartment Radio Advisory Committee (IRAC). Licensees shall notify the International Bureau once they have completed coordination. Upon receipt of such notification from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations.

47 C.F.R. 25.227(c)(2) - When NTIA seeks to provide similar protection to future TDRSS sites that have been coordinated through the IRAC Frequency Assignment Subcommittee process, NTIA will notify the Commission's International Bureau that the site is nearing operational status. Upon public notice from the International Bureau, all Ku-band ESAA licensees shall cease operations in the 14.0-14.2 GHz band within radio line-of-sight of the new TDRSS site until the licensees complete coordination with NTIA/IRAC for the new TDRSS facility. Licensees shall notify the International Bureau once they have completed coordination for the new TDRSS site. Upon receipt of such notification from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations. The ESAA licensee then will be permitted to commence operations in the 14.0-14.2 GHz band within radio line-of-sight of the new TDRSS site, subject to any operational constraints developed in the coordination process.

47 C.F.R. 25.227(d)(1)- Operations of ESAA in the 14.47-14.5 GHz (Earth-to-space) frequency band in the radio line-of-sight of radio astronomy service (RAS) observatories

observing in the 14.47-14.5 GHz band are subject to coordination with the National Science Foundation (NSF). The appropriate NSF contact point to initiate coordination is Electromagnetic Spectrum Manager, NSF, 4201 Wilson Blvd., Suite 1045, Arlington VA 22203, fax 703-292-9034, email esm@nsf.gov. Licensees shall notify the International Bureau once they have completed coordination. Upon receipt of the coordination agreement from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations.

47 C.F.R. 25.227(d)(2) - A list of applicable RAS sites and their locations can be found in 25.226(d)(2) Table 1.

47 C.F.R. 25.227(d)(3) - When NTIA seeks to provide similar protection to future RAS sites that have been coordinated through the IRAC Frequency Assignment Subcommittee process, NTIA will notify the Commission's International Bureau that the site is nearing operational status. Upon public notice from the International Bureau, all Ku-band ESAA licensees shall cease operations in the 14.47-14.5 GHz band within the relevant geographic zone of the new RAS site until the licensees complete coordination for the new RAS facility. Licensees shall notify the International Bureau once they have completed coordination for the new RAS site and shall submit the coordination agreement to the Commission. Upon receipt of such notification from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations. The ESAA licensee then will be permitted to commence operations in the 14.47-14.5 GHz band within the relevant coordination distance around the new RAS site, subject to any operational constraints developed in the coordination process.

The Commission has statutory authority for the information collection requirements under Sections 4(i), 4(j), 7(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), 303(r), and 303(y) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 154(j), 157(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), 303(r), and 303(y).

This information collection does not affect individuals or households, thus, there are no impacts under the Privacy Act.

2. The ESAA Report and Order implements ESAA as an application of the Fixed-Satellite Service (FSS). In particular, the ESAA Report and Order designated ESAA as a primary FSS use in the 11.7-12.2 GHz (space-to-Earth) band; an unprotected use in the 10.95-11.2 GHz and 11.45-11.7 GHz (space-to-Earth) bands; and a secondary use in the 14.0-14.5 GHz band (Earth-to-space). The ESAA Report and Order required ESAA licensees to coordinate their operations with stations in the Space Research Service and the Radioastronomy Service, adopted technical rules for the operation of ESAA systems to ensure that ESAA systems do not interfere with other FSS users or terrestrial Fixed Service (FS) users; and adopted licensing requirements and operational requirements for ESAA for both U.S.-registered aircraft operating in and outside U.S. airspace and for

non-U.S.-registered aircraft operating in U.S. airspace. Each applicant for an earth station, including ESAA operators, must submit a comprehensive proposal for each proposed earth station (FCC Form 312, Schedule B, and attached narrative exhibits) to the Commission to demonstrate that it complies with the Commission's legal and/or engineering rules. The Commission's Schedule S relates to space station technical information. The ESAA Report and Order did not change the space station technical information requirements.

3. Earth and space station applicants (or and parties seeking market access for a non-U.S. licensed space station) must file a comprehensive proposal for the station authorization requested. The application includes the FCC Form 312, Schedules B and S (as applicable), and narrative exhibits and it is filed in the International Bureau Filing System (IBFS). It is estimated that 100 percent of all applications are filed in the IBFS electronically. The Commission received approval for mandatory electronic filing of all satellite and earth station applications under OMB Control No. 3060-0678. Additionally, the FCC Form 312, Schedule B and Schedule S are approved by the OMB under OMB Control No. 3060-0678.

Current authorization holders and current applicants who file conforming modifications and/or amendments to their applications in compliance with this ESAA Report and Order will not be charged for their filing. In the future, applicants who file for a new ESAA authorization will be charged the current fees. Therefore, the application filing fees are not included in this Supporting Statement.

4. This information collection requirement is not duplicated elsewhere.

5. In conformance with the PRA, the Commission made an effort to minimize the burden on all respondents, regardless of size. The Commission limited the information collection requirements to those that are absolutely necessary for evaluating and processing the application and for deterring possible abuses of the application process. The Commission believes that information collection requirement of the ESAA Report and Order will not have a substantial impact on any small entities. The *Notice* solicited comment on alternatives for more efficient processing of ESAA applications and simplification of ESAA procedures. The *Notice* also sought comment on streamlining the application process for ESAA operations by permitting blanket licensing of multiple ESAA terminals in a single application, as an alternative to requiring all ESAA terminals to be licensed individually. In adopting blanket licensing for conforming ESAA terminals, the *Report and Order* simplifies the application process for ESAA and establishes licensing terms consistent with other similar services. Thus, adoption of the rules should reduce the costs associated with obtaining and maintaining authority to operate an ESAA network.

6. If various data in this collection were not filed in conjunction with our rules, then applicants and licensees would not obtain the authorization necessary to provide telecommunications services; the Commission would not be able to carry out its mandate as required by statute; and applicants and licensees would not be able to effectively provide services to the public.

7. The collection of information is not being conducted in any manner known to be inconsistent with the guidelines in 5 CFR 1320. There are no special circumstances associated with this collection.

8. A 60-day notice (78 FR 13666) was published in the Federal Register on February 28, 2013 seeking comments from the public on the information collection requirements contained in this supporting statement. The Commission did not receive any comments from the public.

9. The Commission does not provide any payment or gift to respondents.

10. The Commission does not provide assurances of confidentiality to entities submitting their filings and applications. However, entities may request confidential treatment of their applications and filings under 47 C.F.R. 0.459 of the Commission's rules. With regard to certifications filed pursuant to Part 2 of the Commission's rules, parties receive minimal exemption from the Freedom of Information Act (FOIA).

11. This collection does not contain questions of a sensitive nature.

12. Estimate of Burden Hours: Please see the chart below for the frequency of response, time per response, total annual burden hours, and explanation of burden estimate for the **6 respondents**[1] to this information collection.

Explanation of Burden Estimate	Number of Responses	Frequency of Response	Time Per Response	Total Annual Burden Hours
Rule Section: 25.132(b)(3) – ESAA applicants seeking authority to use an antenna that does not meet the standards set forth in 25.209(a) and (b), are required to submit a copy of the manufacturer's range test plots of the antenna gain patterns.	6 Responses	1 On occasion	2 Hours	12 Hours
47 C.F.R. 25.227(b)(1), (2), and (3) - ESAA applicants to file alternate demonstrations: one for antennas that meet the off-axis spectral density limits; another for antennas that exceed the off-axis	6 Responses	1 On occasion	4 Hours	24 Hours

[1] These respondents make up the majority of their universe of respondents.

spectral density limits; and a third for ESAA systems using variable power-density control.				

Explanation of Burden Estimate	Number of Responses	Frequency of Response	Time Per Response	Total Annual Burden Hours
Rule Section: 25.227(b)(4) - ESAA applicants to include an exhibit showing the geographic area(s) in which the system will operate.	6 Responses	1 On occasion	2 Hours	12 Hours
Rule Section: 25.227(b)(5) - ESAA applicants to include a compliance certification for systems using contention protocols.	6 Responses	1 On occasion	2 Hours	12 Hours
Rule Section: 25.227(b)(6) - ESAA applicants to provide a 24 hour, seven day a week point of contact.	6 Responses	1 On occassion	1 Hour	6 Hours
Rule Section: 25.227(b)(7) - ESAA applicants to provide a certification of compliance with operational rules.	6 Responses	1 On occasion	2 Hours	12 Hours
Rule Section: 25.227(b)(8) – ESAA applicants to provide a radiation hazard analysis.	6 Responses	1 On occasion	2 Hours	12 Hours
Rule Section: 25.227(c)(1) and (2) – ESAA applicants required to file notification of completion of coordination with the National Aeronautics and Space Administration regarding existing and future Tracking and Data Relay Satellite Systems.	6 Responses	1 On occasion/ Third Party Disclosure	2 Hours	12 Hours

Explanation of Burden Estimate	Number of Responses	Frequency of Response	Time Per Response	Total Annual Burden Hours
Rules Section 25.227(d)(1) (2), and (3) – ESAA applicants required to file notification of completion of coordination with National Science Foundation (NSF) on current and future radio astronomy service observatories.	6 Responses	1 On occasion/ Third Party Disclosure	2 Hours	12 Hours
Totals:	**54 Responses**[2]	**On occasion/ Third Party Disclosure**	**1 - 4 hours**	**114 Annual Burden Hours**

"In house Cost"- In house staff who will be working on the information collection requirements contained in the chart above is estimated to have an hourly salary of $60/hour. Therefore, the in house costs to respondents are 114 X $60 per hour = 6,840.00.

13. Estimate of the Total Annual Cost Burden to Respondents

Respondents are assumed to use outside legal or engineering assistance in order to complete their applications. The cost to applicants for these services is estimated at $300 per hour. This figure is based on a small survey of local firms in the D.C. area.

$300 per hour X 54 responses X 1 hour per response = $16,200 Annual Costs for Outside Legal/Engineering Assistance.

Application Filing Fees: The fees associated with ESAA filings shall be those associated with filings in Section 1.1107 of the Commission's rules. Current authorization holders and current applicants who file conforming modifications and/or amendments to their applications in compliance with this ESAA Report and Order will not be charged for their filing. In the future, applicants who file for a new ESAA authorization will be charged the current fees.

[2] The responses are part of each ESAA operator's earth station application (FCC Form 312, Schedule B and narrative attachment). The specific information sought by these new rules is requested as part of the narrative to the application (as opposed to the FCC Form 312 or Schedule B). An operator can put all narrative responses into one document or put its narrative responses into multiple documents at its discretion.

A total of 6 respondents X $0.00 filing fee X 1 filing = **$0.00**

Total Annualized Cost:

Total Costs to the Industry	**Totals**
Estimated Application Filing Fees	$0.00
Estimated Cost of Outside Legal/Engineering Assistance	$16,200
Total Cost to Respondents	**$16,200**

14. Estimate of Annualized Cost to the Federal Government:

The estimate of annualized cost to the Federal government is summarized in the chart below. As shown in the chart, the annualized costs to the Federal government are $17,407.60. The chart contains staff salaries, burden hours and annualized costs.

Federal Government Staff	**Number of Staff**	**Salary Per Hour**	**Annual Burden Hours**	**Annualized Costs**
GS-15/Step 5 Attorney	1	67.21	70	4,704.70
GS-14/Step 5 Attorney	1	57.13	70	3,999.10
GS-15/Step 5 Engineers	1	67.21	70	4,704.70
GS-14/Step 5 Engineers	1	57.13	70	3,999.10
				17,407.60

15. This Supporting Statement reflects program changes of 6 respondents, 54 responses, 114 annual burden hours, $16,200 in annual costs as a result of the information collection requirements adopted in the ESAA Report and Order.

16. The results of this information collection requirement will not be published for statistical use.

17. Not applicable. The Commission is not seeking approval to not display the expiration date for OMB approval of this information collection.

18. There are no exceptions to the certification statement.

B. Collections of Information Employing Statistical Methods:

Not applicable. This information collection does not employ statistical methods.