

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

In the Matter of Application by)
)
SES AMERICOM, INC.) File No. SAT-MOD-_____
) Call Sign S2156
For Modification of AMC-5)
Fixed-Satellite Space Station License)

APPLICATION OF SES AMERICOM, INC.

SES Americom, Inc. (“SES Americom,” doing business as “SES WORLD SKIES”¹), hereby respectfully requests a modification of its license for the AMC-5 fixed-satellite space station to assign the satellite permanently to 79.05° W.L., where it will serve as an in-orbit spare. SES WORLD SKIES also requests drift authority to move the satellite to its new assigned location from its current location of 78.95° W.L.² Grant of the requested authority will simplify stationkeeping at the nominal 79° W.L. orbital location and permit SES WORLD SKIES to make efficient use of its space stations to provide service to customers.

A completed FCC Form 312 is attached, and SES WORLD SKIES incorporates by reference the technical information previously provided in support of AMC-5.³ In addition,

¹ On September 7, 2009, SES S.A. announced that the newly integrated operations of its two indirect subsidiaries, New Skies Satellites B.V. and SES Americom would be conducted under a single brand name, SES WORLD SKIES. The new brand name does not affect the underlying legal entities that hold Commission authorizations or U.S. market access rights.

² The instant filing supersedes the May modification application seeking reassignment of AMC-5 to 79.05° W.L., which was dismissed without prejudice to refiling. *See* Letter of Robert G. Nelson to Daniel C.H. Mah, DA 10-1259, dated July 2, 2010 (“AMC-5 Letter”). No filing fee is being remitted with this application pursuant to the terms of the AMC-5 Letter, which specified that a resubmission that provides the additional information required but otherwise is identical to the May application could be filed without paying an application fee. *See id.* at 2 n.9.

³ *See* File Nos. SAT-MOD-20050609-00117; SAT-MOD-19980113-00002.

SES WORLD SKIES is providing information relating to the proposed modification to the AMC-5 license in the attached technical appendix.

SES WORLD SKIES currently operates two satellites at the nominal 79° W.L. orbital location: AMC-5, a conventional Ku-band space station, is assigned to 78.95° W.L., and Satcom C-3, a conventional C-band space station, has been positioned until recently at 79.05° W.L.⁴ SES WORLD SKIES recently received authority to relocate its hybrid AMC-2 spacecraft to 78.95° W.L. to replace both AMC-5 and Satcom C-3 at the nominal 79° W.L. orbital location.⁵ SES WORLD SKIES intends to deorbit Satcom C-3 later this year, and in the interim has been granted authority to relocate the spacecraft to 79.15° W.L.⁶ Once traffic has been transferred from AMC-5 to AMC-2 and Satcom C-3 has been repositioned, SES WORLD SKIES proposes to relocate AMC-5 to 79.05° W.L., the position vacated by Satcom C-3, and operate it there in inclined orbit.⁷ AMC-5 will thereafter serve as an in-orbit spare for the Ku-band capacity of AMC-2.

Accordingly, SES WORLD SKIES requests authority to relocate AMC-5 from 78.95° W.L. to 79.05° W.L. and to operate the Ku-band communications payload of AMC-5 at the 79.05° W.L. location. Grant of such authority will enable operation of AMC-5, as needed, to

⁴ The “conventional Ku-band” refers to the 11.7-12.2 GHz and 14.0-14.5 GHz frequencies. The “conventional C-band” refers to the 3700-4200 MHz and 5925-6425 MHz frequencies.

⁵ See File No. SAT-MOD-20100324-00056 (Call Sign S2134), grant-stamped June 21, 2010. Relocation of AMC-2 to 78.95° W.L. began prior to grant of the modification pursuant to special temporary authority. See File No. SAT-STA-20100608-00125 (Call Sign S2134), grant-stamped June 15, 2010.

⁶ See File No. SAT-STA-20100615-00137 (Call Sign S2447), grant-stamped June 30, 2010.

⁷ See Letter of Karis A. Hastings, counsel to SES Americom, Inc., to Marlene H. Dortch dated June 16, 2010 (notifying the Commission of the commencement of inclined orbit operations of AMC-5).

restore or supplement Ku-band capacity on AMC-2 at the nominal 79° W.L. orbital location. Furthermore, relocating AMC-5 from 78.95° W.L. to 79.05° W.L. will eliminate any overlap of the stationkeeping volumes of AMC-2 and AMC-5, facilitating safe operation of the satellites. For these reasons, grant of the instant request will serve the public interest.

As demonstrated in the technical appendix, relocation of AMC-5 will not adversely affect any other operators. The small proposed shift in AMC-5's orbital location will have a *de minimis* effect on the interference environment in which adjacent satellites operate. AMC-5 will be operated consistent with existing and future coordination agreements applicable to SES WORLD SKIES' operations at the nominal 79° W.L. orbital location, including the coordination agreement addressing the Argentine Administration's ITU filings at 81° W.L. SES WORLD SKIES notes that the Venesat-1 satellite operates at 78° W.L. under a Uruguayan ITU network filing that is lower in priority than the U.S. ITU filing at the nominal 79° W.L. location. Coordination discussions with the Venesat-1 operator are in progress to ensure that operations at 78° W.L. will not negatively impact the co-frequency SES WORLD SKIES operations at the nominal 79° W.L. orbital location.

For the foregoing reasons, SES Americom seeks a modification of the AMC-5 license to assign the spacecraft to the 79.05° W.L. orbital location.

Respectfully submitted,

SES AMERICOM, INC.

By: /s/ Daniel C.H. Mah

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Dated: July 6, 2010

Technical Appendix

1. Introduction

This technical appendix is submitted in support of the application of SES Americom, Inc. ("SES Americom," doing business as "SES WORLD SKIES") for a modification of its license for the AMC-5 Ku-band spacecraft. SES WORLD SKIES seeks permanent assignment of the spacecraft to 79.05° W.L. instead of 78.95° W.L. SES WORLD SKIES incorporates by reference herein the technical information it has already provided with respect to AMC-5,¹ and provides here technical information that is changing as a result of the proposed modification.

2. Gain Contours

SES WORLD SKIES is not submitting new contour maps with this application. The proposed shift in orbital location from 78.95° W.L. to 79.05° W.L. will produce no visible change in the gain contours from the maps already on file.

3. Link Budgets and Interference Analysis

An interference analysis was submitted to the FCC in connection with the initial operation of AMC-5 at 79° W.L. demonstrating that operation of AMC-5 was compatible with adjacent satellites and with the Commission's two-degree spacing requirements.² The proposed relocation of AMC-5 will not cause any material change to the interference environment. Specifically, SES WORLD SKIES has calculated that operation of AMC-5 at 79.05° W.L. rather than at the nominal 79° W.L. position translates into a change of approximately 0.3 dB in the interference environment of two-degree compliant earth stations communicating with a spacecraft at 77° W.L. or at 81° W.L., as shown in the table below.

	<u>77</u>	<u>81</u>
<u>Nominal Orbital Position (79)</u>		
Offset Angle	2.00	2.00
Gain (1) @ Offset angle	21.5	21.5
<u>Proposed Orbital Position (79.05)</u>		
Offset Angle	2.05	1.95
Gain (2) @ Offset angle	21.2	21.8
$\Delta (Gain(1) - Gain(2))$	<u>0.3</u>	<u>-0.3</u>

¹ See File Nos. SAT-MOD-20050609-00117; SAT-MOD-19980113-00002.

² File No. SAT-MOD-19980113-00002, Attachment C, Interference Analysis for GE-5 Ku-Band Transponders.

Given that the proposed offset operation of AMC-5 will not result in any material change to the existing interference environment with respect to AMC-5 and current or future adjacent satellites, no link budget analysis is provided herein. SES WORLD SKIES will operate AMC-5 in conformance with existing and future coordination agreements applicable to operations at the nominal 79° W.L. orbital location, including its coordination agreement with the Argentine Administration relating to operations at 81° W.L. In the unlikely event that any future concerns arise relating to operations of AMC-5 at the proposed offset location, SES WORLD SKIES will coordinate with the adjacent operators in order to arrive at a mutually satisfactory solution.³

4. Schedule S

As discussed above, the proposed modification of the AMC-5 license will not result in any material changes to the spacecraft's operating characteristics or to the interference environment. As a result, the information requested in Schedule S duplicates information that is already on file with the Commission concerning the technical parameters of AMC-5's operation. In similar cases involving requests for slight offsets from the nominal orbital position, the Satellite Division has not required the submission of a new Schedule S.⁴ Accordingly, SES WORLD SKIES is not filing a new Schedule S with this application. SES Americom will nevertheless prepare and submit a Schedule S if requested to do so by the Satellite Division.

5. Orbital Debris Mitigation Statement

This section provides the information required under Section 25.114(d)(14) of the Commission's Rules.

§25.114(d)(14)(i): SES WORLD SKIES has assessed and limited the amount of debris released in a planned manner during normal operations of AMC-5. No debris is generated during normal on-station operations, and the spacecraft will be in a stable configuration. Onstation operations require stationkeeping within the +/- 0.05 degree E-W control box.

SES WORLD SKIES has also assessed and limited the probability of the space station becoming a source of orbital debris by collisions with small debris or meteoroids that could cause loss of control and prevent post-mission disposal. SES WORLD SKIES requires that spacecraft manufacturers assess the probability of micrometeorite damage that can cause any loss of functionality. This probability is then factored into the ultimate spacecraft probability of success. Any significant probability of damage would

³ As noted in the narrative, the Venesat-1 satellite operates at 78° W.L. under a Uruguayan ITU network filing that is lower in priority than the U.S. ITU filing at the nominal 79° W.L. location. Coordination discussions with the Venesat-1 operator are in progress to ensure that operations at 78° W.L. will not negatively impact the co-frequency SES WORLD SKIES operations at the nominal 79° W.L. orbital location.

⁴ See, e.g., File No. SAT-MOD-20040405-00076 (PanAmSat request for authority to operate SBS-6 at 74.05° W.L. rather than 74.0° W.L.).

need to be mitigated in order for the spacecraft design to meet SES WORLD SKIES' required probability of success of the mission. The design of AMC-5 locates all sources of stored energy within the body of the structure, which provides protection from small orbital debris. SES WORLD SKIES has taken steps to limit the effects of any collisions through shielding, the placement of components, and the use of redundant systems.

§25.114(d)(14)(ii): SES WORLD SKIES has assessed and limited the probability of accidental explosions during and after completion of mission operations. As part of the Safety Data Package submission for SES WORLD SKIES spacecraft, an extensive analysis is completed by the spacecraft manufacturer, reviewing each potential hazard relating to accidental explosions. A matrix is generated indicating the worst-case effect, the hazard cause, and the hazard controls available to minimize the severity and the probability of occurrence. Each subsystem is analyzed for potential hazards, and the Safety Design Package is provided for each phase of the program running from design phase, qualification, manufacturing and operational phase of the spacecraft. Also, the spacecraft manufacturer generates a Failure Mode Effects and Criticality Analysis for the spacecraft to identify all potential mission failures. The risk of accidental explosion is included as part of this analysis. This analysis indicates failure modes, possible causes, methods of detection, and compensating features of the spacecraft design.

The design of the AMC-5 spacecraft is such that the risk of explosion is minimized both during and after mission operations. In designing and building the spacecraft, the manufacturer took steps to ensure that debris generation will not result from the conversion of energy sources on board the satellite into energy that fragments the satellite. All propulsion subsystem pressure vessels, which have high margins of safety at launch, have even higher margins in orbit, since use of propellants and pressurants during launch decreases the propulsion system pressure. Burst tests were performed on all pressure vessels during qualification testing to demonstrate a margin of safety against burst. Bipropellant mixing is prevented by the use of valves that prevent backwards flow in propellant and pressurization lines. All pressures, including those of the batteries, are monitored by telemetry.

At the end of operational life, after the satellite has reached its final disposal orbit, onboard sources of stored energy will be depleted or secured, and the batteries will be discharged. However, at the end of AMC-5's operational life, there will be helium remaining in the tank that cannot be vented. Following insertion of the spacecraft into orbit, the spacecraft manufacturer permanently sealed the helium tank by firing pyrotechnic valves. At a later date prior to commencing maneuvers to put AMC-5 in a disposal orbit, SES WORLD SKIES will seek any necessary waiver of Section 25.283(c) in connection with the residual helium that will remain in the tank at end of life.

§25.114(d)(14)(iii): SES WORLD SKIES has assessed and limited the probability of the space station becoming a source of debris by collisions with large debris or other operational space stations. Specifically, SES WORLD SKIES has assessed the possibility of collision with satellites located at, or reasonably expected to be located at, the requested orbital location or assigned in the vicinity of that location.

Regarding avoidance of collisions with controlled objects, in general, if a geosynchronous satellite is controlled within its specified longitude and latitude stationkeeping limits, collision with another controlled object (excluding where the satellite is collocated with another object) is the direct result of that object entering the allocated space.

The instant application seeks authority for operation of AMC-5 at the 79.05° W.L. orbital location with a stationkeeping volume bounded by 79.0° W.L. and 79.1° W.L. There will be no overlap between the requested stationkeeping volume of AMC-5 and that of AMC-2, which will be positioned at 78.95° W.L., or Satcom C-3, which is being relocated to 79.15° W.L. SES WORLD SKIES is not aware of any other FCC- or non-FCC licensed spacecraft that are operational or planned to be deployed at 79° W.L. or to nearby orbital locations such that there would be an overlap with the requested stationkeeping volume of AMC-5.

SES WORLD SKIES uses the SOCRATES system offered by the Center for Space Standards and Innovation to monitor the risk of close approach of its satellites with other objects. Any close encounters (separation of less than 5 km) are flagged and investigated in more detail. If required, avoidance maneuvers are performed to eliminate the possibility of collisions.

During any relocation, the moving spacecraft is maneuvered such that it is at least 30 km away from the synchronous radius at all times. In most cases, much larger deviation from the synchronous radius is used. In addition, the SOCRATES system is used to ensure no close encounter occurs during the move. When de-orbit of a spacecraft is required, the initial phase is treated as a satellite move, and the same precautions are used to ensure collision avoidance.

§25.114(d)(14)(iv): Post-mission disposal of the satellite from operational orbit will be accomplished by carrying out maneuvers to a higher orbit. The upper stage engine remains part of the satellite, and there is no re-entry phase for either component. The fuel budget for elevating the satellite to a disposal orbit is included in the satellite design. SES WORLD SKIES plans to maneuver AMC-5 to a disposal orbit at end of life and has selected a target minimum perigee of 150 km above the normal operational altitude. Fuel gauging uncertainty has been taken into account in these calculations, as discussed below. However, as the Commission is aware, there is no mechanism that allows precise calculations of the amount of fuel left on a spacecraft once it is in-orbit, and therefore it is possible that the AMC-5 spacecraft will not reach the targeted minimum de-orbit altitude.

AMC-5 is not subject to the minimum perigee requirement of Section 25.283(a) of the Commission's Rules because the satellite was launched prior to March 18, 2002. SES WORLD SKIES intends to reserve 2.0 kg of fuel in order to account for postmission disposal of AMC-5. SES WORLD SKIES has assessed fuel gauging uncertainty and has provided an adequate margin of fuel reserve to address the assessed uncertainty.

As noted above, AMC-5 is not subject to application of the IADC formula for determining a minimum disposal orbit perigee, but for the Commission's information, the disposal orbit altitude resulting from the IADC formula would be 293 km based on the following calculation:

Area of the satellite (average aspect area): 34.1 m²

Mass of the spacecraft: 790 kg

CR (solar radiation pressure coefficient): 1.34

Therefore the disposal altitude as calculated under the IADC formula is:

$36,021 \text{ km} + (1000 \times \text{CR} \times \text{A/m}) = 36,079 \text{ km}$, or 293 km above the GSO arc (35,786 km).

DECLARATION OF KRISH JONNALAGADDA

I, Krish Jonnalagadda, hereby certify under penalty of perjury that I am the technically qualified person responsible for preparation of the technical information contained in the foregoing exhibit; that I am familiar with the technical requirements of Part 25; and that I either prepared or reviewed the technical information contained in the exhibit and that it is complete and accurate to the best of my knowledge, information and belief.

/s/ Krish Jonnalagadda
SES Americom, Inc.

Dated: July 6, 2010