BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Satélites Mexicanos, S.A. de C.V.	)	
	)	File No. SAT-LOI-20140617-00070
Letter of Intent to Access	)	Call Sign S2926
the U.S. Market Using a Non-U.S. Licensed	)	
L-Band Radionavigation Satellite	)	
Service Satellite at the Nominal 117 W.L.°	)	
Orbital Location	)	

AMENDMENT TO LETTER OF INTENT

Pursuant to Section 25.116 of the Commission's rules, 47 C.F.R. § 25.116, Satélites Mexicanos, S.A. de C.V. ("Satmex") hereby amends its pending market access application to include additional information regarding its orbital debris mitigation plan. To the extent necessary, Satmex also requests a limited waiver of Sections 25.114(d)(14)(ii) and 25.283(c) of the Commission's rules. Other than the additional orbital debris information and accompanying waiver request contained herein, Satmex is not changing or amending any of the information originally provided in its market access application.[1]

I. ORBITAL DEBRIS MITIGATION RULES AND FURTHER INFORMATION REGARDING END-OF-LIFE OPERATIONS

Section 25.283(c) of the Commission's rules requires space stations to ensure, at end-of-life, "that all stored energy sources on board the satellite are discharged, by venting excess propellant, discharging batteries, relieving pressure vessels, and other appropriate measures."[2]

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1 FCC File No. SAT-LOI-20140617-00070, call sign S2926, filed June 17, 2014.

2 47 C.F.R. § 25.283(c).

Similarly, Section 25.114(d)(14)(ii) requires space station applicants to address in their applications "whether stored energy will be removed at the spacecraft's end of life, by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy, or through other equivalent procedures specifically disclosed in the application."[3]

In the Technical Annex to the market access application, Satmex provided an orbital debris mitigation plan describing end-of-life operations for Satmex 9.[4] In particular, Satmex stated that:

> Xenon is used as the fuel source for thruster and station-keeping operations on the SATMEX 9 satellite. Because Xenon is inert it requires far less end of life care and handling than bipropellant fuels. It is stored in tanks that are designed to leak before burst, and the residual pressure is low enough that there is no way to have a catastrophic leak event. There is therefore no need to leave valves open post de-orbit and shutdown. The batteries will be left in a permanent state of discharge.[5]

Satmex supplemented this statement in a letter to the Commission with additional information regarding the (i) mass of the xenon gas onboard Satmex 9; (ii) capacity of the spacecraft's fuel tank; (iii) tank burst pressure specification; (iv) presence of other gases on the spacecraft; and (v) situational awareness monitoring.[6] Satmex hereby reaffirms the accuracy of this information, but provides additional information related to end-of-life operations based on the request of Commission staff.

As stated in the Technical Annex and the 1.65 Letter, Satmex 9 is being constructed on the 702SP platform manufactured by Boeing Satellite Systems ("BSS"). The 702SP is an all-electric bus; there is no chemical propulsion onboard the satellite. Instead, the 702SP utilizes a

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3 47 C.F.R. § 25.114(d)(14)(ii).

4 *See* Technical Annex at A-5 through A-9.

5 Technical Annex at A-7.

6 Letter from Brian D. Weimer, Counsel to Satmex, to Marlene H. Dortch, Secretary, FCC, File No. SAT-LOI-20140617-00070, at 2 (filed Sept. 19, 2014) (the "1.65 Letter").

Xenon Ion Propulsion Systems ("XIPS") – fueled by electronically-ionized xenon – to perform all necessary propulsive maneuvers.

The XIPS system on the 702SP uses a single tank that has a total, unpressurized volume of ~233L. The mass of the xenon gas at the end-of-life of the Satmex 9 spacecraft is projected to be 4.2 kg once the spacecraft reaches its disposal orbit.[7] The pressure of the residual xenon gas in the tank at the end-of-life after disposal orbit has been reached is projected to be between 40 and 80 psi.

II. LIMITED WAIVER OF ORBITAL DEBRIS MITIGATION RULES

Satmex respectfully requests a waiver of Sections 25.114(d)(14)(ii) and 25.283(c) of the Commission's to the extent necessary. The Commission has authority to grant waivers of its rules for "good cause shown."[8] In general, good cause exists if grant of a waiver would not undermine the purposes of the rule and would otherwise serve the public interest.[9] As demonstrated herein, ample good cause exists to grant the requested waiver.

As noted above, Satmex projects that the amount of xenon gas remaining on the spacecraft at end of life will be 4.2 kg. Given that (i) xenon is inert to most common chemical reactions (such as combustion), (ii) the xenon tank on the spacecraft is designed to leak before burst, and (iii) the projected end-of-life residual pressure in the tank of between 40 and 80 psi is only a small fraction of the stated burst pressure specification of 7300 psi (and far below the qualification model testing indicating a 9300 psi burst specification), the "probability of

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7 As noted in the Technical Annex at A-9, the nominal disposal orbit will be 300 km, and Satmex 9 will utilize 0.6 kg of xenon propellant to perform final orbit raising maneuvers. Accordingly, Satmex projects that there will be 4.8 kg of residual xenon at end-of-life prior to the orbit raising maneuvers and 4.2 kg of residual xenon at end-of-life once the disposal orbit has been reached.

8 *See* 47 C.F.R. § 1.3; *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

9 *See, e.g., WAIT Radio v.* 418 F.2d at 1157; *Intelsat North America LLC*, 22 FCC Rcd. 11989 ¶6 (2007).

accidental explosions during and after completion of mission operations" is exceedingly low.[10] Furthermore, the xenon tank will be protected from the effects of any collisions with small debris through shielding.[11]

The inability of Satmex to fully vent all xenon based on the Satmex 9 spacecraft's design, along with the extremely low probability of the remaining xenon becoming a source of accidental explosions or orbital debris, demonstrates that the public interest would be served by a grant of the requested waiver. If the Commission were to grant the instant waiver request and underlying market access application, the benefits of the Federal Aviation Administration's next-generation Wide Area Augmentation System ("WAAS") would be deployed more quickly, increasing the safety of commercial aviation for millions of U.S. air travelers. To require Satmex to change the design of the satellite to fully vent the xenon propulsion system at a time when the satellite has already completed critical design review would not only substantially delay launch of Satmex 9 and the corresponding benefits of the next-generation WAAS system, but it would also constitute the kind of undue hardship which the Commission has rejected in the past.[12]

Moreover, the Commission has experience granting waivers to satellite operators unable to fully vent all xenon onboard a satellite at end-of-life.[13] While the 702SP is a relatively new satellite platform, the lightweight, all-electric propulsion bus makes the satellite *less* of a risk to become a source of accidental explosions or orbital debris than the previous generation of

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10 47 C.F.R. § 25.114(d)(14)(ii).

11 *See* Technical Annex at A-6.

12 *See, e.g.*, Stamp Grant, *Intelsat North America*, LLC, IBFS File No. SAT-MOD-20070207-00027, SAT-AMD-20070716-00102 (granted Oct. 4, 2007) (granting waiver of venting requirement for INTELSAT-11, an Orbital Sciences Star-2 satellite, in light of late stage of satellite construction); Stamp Grant, *Echostar Corporation*, IBFS File No. SAT-LOA-20071221-00183 (granted Mar. 12, 2008) (granting a waiver of venting requirement for AMC-14, a Lockheed A2100 satellite, in light of late stage of satellite construction).

13 *See, e.g.*, Stamp Grant, *XM Radio, LLC*, IBFS File. No. SAT-STA-20140922-00103 (granted Sept. 26, 2014) (granting a waiver to XM Radio of the venting requirement for the XM-2 satellite, a Boeing 702 satellite).

satellites for which the Commission has granted waivers of its orbital debris mitigation requirements.[14] Thus, the requested waiver serves the public interest.

III. CONCLUSION

For the foregoing reasons, Satmex respectfully requests that the Commission grant the requested waiver of Sections 25.283(c) and 25.114(d)(14)(ii) of the Commission's rules.

Respectfully submitted,

SATMEX

By: */s/ Hector Fortis*
Hector Fortis
Director, International Regulatory

November 19, 2014

Of Counsel:

Brian D. Weimer
Douglas A. Svor
Sheppard Mullin Richter & Hampton, LLP
2099 Pennsylvania Ave NW
Suite 100
Washington, DC 20006
(202) 747-1930

[14] *See, e.g.*, Stamp Grant, *DIRECTV Enterprises, LLC*, IBFS File No. SAT-LOA-20090807-00085 (granted Dec. 15, 2009) (granting waiver of the venting requirement for DIRECTV 12/RB2-A, a Boeing 702 satellite, given its imminent launch); Stamp Grant, *Lightsquared Subsidiary, LLC*, IBFS File No. SAT-MOD-20100405-00064 (granted Nov. 8, 2010) (granting waiver of venting requirement to Lightsquared Subsidiary, LLC for the SkyTerra-1 satellite, a Boeing 702 satellite); and Stamp Grant, *PanAmSat Licensee Corp*. IBFS File No. SAT-STA-20110112-00011 (granted Jan. 14, 2011) (granting waiver of venting requirement to Intelsat 2, a Boeing 601 satellite).