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April 9, 2008

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street, N.W.
Washington, DC 20554

Re: Notice of *Ex Parte* Communication
File Numbers Listed on Exhibit A

Dear Ms. Dortch:

On April 9, 2008, Diane Cornell, Christopher Murphy, Ruy Pinto, Dean Hope, all of Inmarsat, and John Janka, of Latham & Watkins LLP, had a teleconference with Karl Kensinger, Scott Kotler and Stephen Duall of the International Bureau to discuss the station-keeping condition in the licenses referenced in Exhibit A. The attached *ex parte* letter dated January 9, 2004, which we provided, and Inmarsat's positions of record in the proceedings listed in Exhibit A, served as the basis for the discussion.

Sincerely yours,

John Janka (JAM)

John P. Janka

cc: Karl Kensinger
Scott Kotler
Stephen Duall

Attachment

EXHIBIT A

Applicant/Call Signs	File Nos.
Stratos Communications, Inc.	
E000180	SES-MFS-20051122-01614
E010048	SES-MFS-20051122-01616
E010049	SES-MFS-20051122-01617
E010047	SES-MFS-20051122-01618
E050249	SES-LFS-20050826-01175
Vizada	
KA312	SES-MFS-20051123-01626
KA313	SES-MFS-20051123-01627
WA28	SES-MFS-20051123-01629
WB36	SES-MFS-20051123-01630
E000280	SES-MFS-20060118-00050
E000282	SES-MFS-20060118-00051
E000283	SES-MFS-20060118-00052
E000285	SES-MFS-20060118-00053
KB34	SES-MFS-20071011-01413
SkyWave Mobile Communications Corp.	
E030055	SES-MFS-20051207-01709
Amtech Systems LLC	
E990316	SES-MFS-20070511-00637
E030120	SES-MFS-20070511-00638
Deere & Company	
E010011	SES-MFS-20071107-01535

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January 9, 2004

ORIGINAL

BY HAND

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: ***Ex Parte Presentation***:
In the Matter of Mitigation of Orbital Debris, IB Docket No. 02-54

Dear Ms. Dortch:

This letter is written on behalf of Inmarsat Ventures Limited ("Inmarsat") to elaborate on matters discussed with Commission staff in Inmarsat's ex parte presentation of December 22, 2003. For the reasons set forth below, Inmarsat urges the Commission *not* to reduce the ±0.10 degree east/west station keeping tolerance that currently applies to MSS spacecraft. If the Commission nonetheless does so, (i) the Commission should not retroactively apply this requirement to MSS spacecraft that are in orbit or are being physically constructed, and (ii) the Commission should define the requirement so that compliance is measured in terms of east/west motion at the equatorial plane, and not at locations north or south of that plane.

In the NPRM in this proceeding, the Commission proposed to slightly modify certain FCC service rules that have governed the station keeping tolerance for FSS spacecraft; namely, the requirement that GSO FSS spacecraft be maintained at ±0.05 degrees of their assigned longitudes. Significantly, the Commission did not propose extending this ±0.05 degree east/west station keeping tolerance requirement to MSS networks, which use FSS frequencies for feeder links (communications between the MSS spacecraft and the large "gateway" terminals that provide interconnections to the public switched network). Rather, the Commission simply asked whether the requirement should be extended to space stations in other services, such as MSS networks and remote sensing satellites.[1]

No party endorsed such a requirement, and Inmarsat is not aware of any information in the record that would warrant extending this ±0.05 degree east/west station keeping requirement to MSS networks. To the contrary, MSS networks, such as Inmarsat's, have been designed and implemented in accordance with longstanding ITU standards requiring

[1] NPRM at ¶ 47.

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that they maintain a ±0.10 degree east/west station keeping tolerance, which is identical to the Commission's longstanding station keeping standard for both MSS and DBS systems. The current ±0.10 degree east/west station keeping tolerance accommodates a number of factors that drive the design and orbital performance of MSS spacecraft. This tolerance should be changed only in order to solve a compelling problem where the associated cost of not changing it outweighs the resulting increased design and daily operational burdens of changing it.

As Inmarsat explained in its December 22, 2003 ex parte presentation, applying a ±0.05 degree east/west station keeping requirement to MSS spacecraft would change one of the fundamental "rules of the road" under which MSS spacecraft have been designed and have operated for years. In order to take advantage of the performance of MSS user terminals, and maximize the life of the spacecraft, MSS spacecraft typically do not maintain the type of orbit that FSS spacecraft maintain. Rather, MSS spacecraft are designed to utilize an inclined orbit, which results in the spacecraft tracing a "figure eight" in the sky, from the perspective of a user on the earth's surface. This means that the spacecraft, in the course of a day, spends most of its time above and below the equatorial plane, as opposed to most FSS spacecraft, which are maintained close to equatorial plane. An example of an inclined orbit is shown in Figure 1 below.

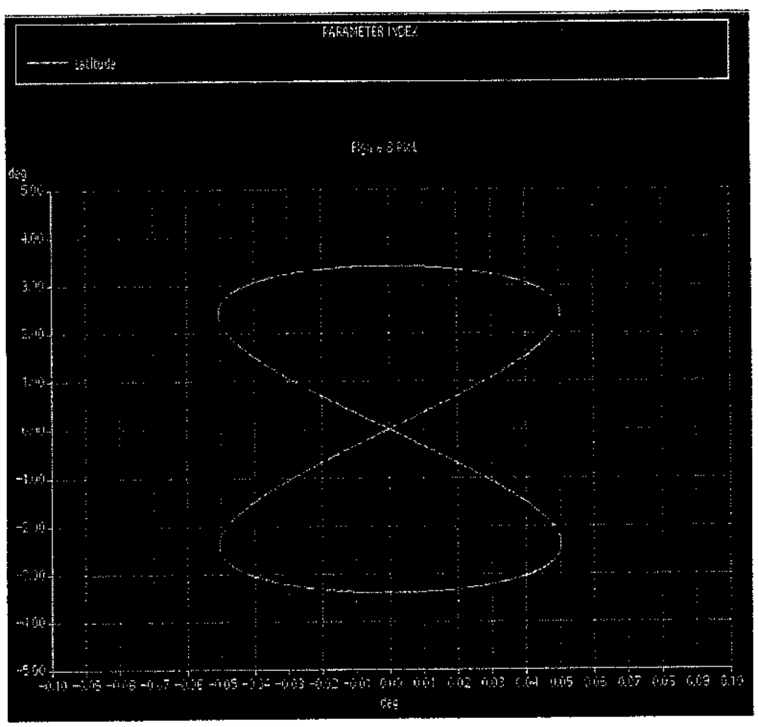

Figure 1

DC\645059.1

Figure 1 depicts the motion of an ideal inclined orbit spacecraft whose north/south inclination in 3.4 degrees. The position noted on the vertical axis as 0.00 degrees represents the equatorial plane. At locations above and below the equatorial plane, the width of the figure eight orbit is a function of the height of the orbit. The width of the figure eight is a matter of physics. As the height of the figure eight orbit increases, its width rapidly expands as the square of its height. And once the height of the figure eight extends above 2.7 degrees north/south, an MSS operator has to significantly increase the number of operating maneuvers in order to limit east/west motion of the spacecraft to within ±0.05 degrees. These maneuvers consume valuable fuel on board the spacecraft, and thereby shorten the life of the spacecraft. Thus, they are not typically undertaken unless absolutely necessary. And once the height of the figure eight extends above approximately 3.4 degrees north/south, it is no longer possible to maintain a ±0.05 east/west station keeping tolerance, as shown in Figure 1. No amount of east/west station keeping can change this.

There are other factors that affect the east/west station keeping of a spacecraft. Due to varying gravitational forces at different longitudes in the geostationary orbit (caused by the fact that the Earth is not a perfect sphere), some orbital locations are more susceptible to longitude drift than others. There are four gravitational "nulls" around the geostationary orbit located at longitudes of 75°E, 162°E, 105°W and 11.5°W. Unfortunately, for most operators, their spacecraft are located in the regions between these nulls where they experience non-zero drift accelerations which must be opposed in order to keep the spacecraft within the assigned station keeping box. The longitude drift causes the whole figure eight pattern to move from one edge of the box across to the other, thus, the size of the longitude margin between the edge of the figure eight and the edge of the box directly determines how often an operator must perform east/west station keeping. A smaller box requires more frequent station keeping maneuvers.

Moreover, east/west station keeping is affected by the amount of eccentricity in the orbit of an MSS spacecraft, which is driven of the physical characteristics of a spacecraft. An ideal spacecraft that presented no surface area to the sun in a perfectly circular orbit would trace a perfect figure eight in the sky, and, putting aside the effects of longitude drift, would cross the equatorial plane at the same place each day. Unfortunately, no objects in space, neither the moon, the earth, nor man-made spacecraft are ideal. Much like the sail of a sailboat "catches" the wind, large reflector antennas and solar arrays on spacecraft tend to "catch" solar particles, which increase the eccentricity of their orbit. The impact of these particles add to the orbit velocity of the spacecraft as it moves away from the sun (the night side) and conversely, they subtract from the orbit velocity as the spacecraft approaches the sun (the morning side). As a result, the figure eight in the orbit of an MSS spacecraft becomes distorted, and it then intersects the equatorial plane at different locations.

Figure 2 shows the effects of unmanaged eccentricity combined with 14 days of longitude drift. By contrast, Figure 3 shows that rotating perigee into the equatorial plane would restore a more symmetric figure eight and thus, minimizes longitude excursions at the equatorial plane.

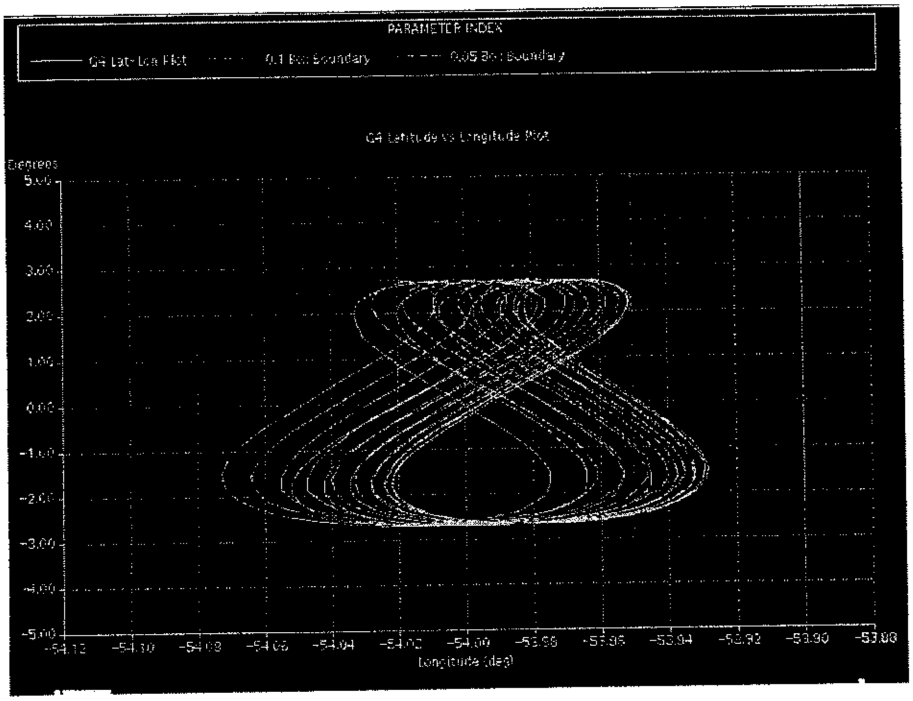

Figure 2

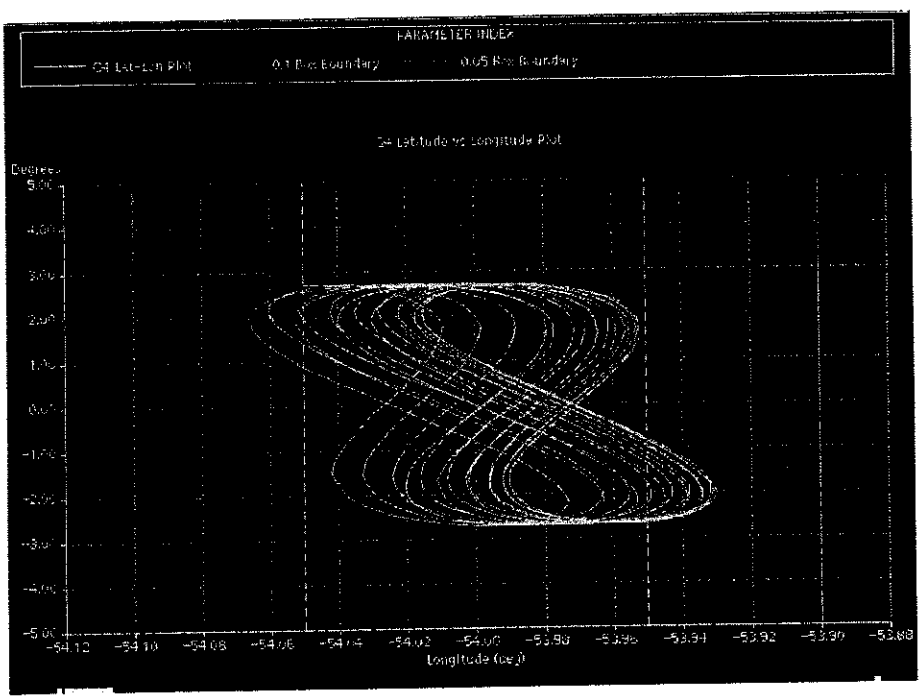

Figure 3

The extent of orbit eccentricity is driven by the surface area presented to the solar wind. This is clearly dependent on the size of the spacecraft and its appendages such as large solar arrays and large communications antenna reflectors. Information that Inmarsat has recently received in its discussions with manufacturers about the future of spacecraft design indicates that future MSS spacecraft will be larger, have bigger antenna reflectors, bigger solar arrays, and therefore, will be even more susceptible to eccentric orbit longitude excursions than MSS spacecraft today.

Each of the separate factors explained above---the impact of north/south excursion in an inclined orbit, longitude drift, and orbital eccentricity---contributes to the overall east/west station keeping tolerance that could be maintained by an MSS spacecraft. The north/south orbital excursion establishes a nominal east/west tolerance that is theoretically achievable, but that value needs to be increased to take into account other variables such as (i) longitude drift, which varies at different orbital locations around the world, and (ii) eccentricity, which is driven by the size and physical configuration of an MSS spacecraft. Combined, these factors make it simply infeasible to maintain an MSS spacecraft within ±0.05 degrees east/west in all parts of its orbit.

Inmarsat believes that the Commission's current ±0.10 degree east/west station keeping requirement for MSS spacecraft adequately accounts for the impact of each of these factors, and that this tolerance does not have any material adverse impact on the operation of other spacecraft. Inmarsat therefore believes that no change in the Commission's rules regarding station keeping of MSS spacecraft is warranted. Any rule that would limit east/west station keeping to less than ±0.10 degrees would unnecessarily constrain future spacecraft design. And even if the operations of MSS spacecraft that are in orbit or are being built could be modified to comply with a new east/west station keeping tolerance of ±0.05 degrees (which is far from certain), doing so would adversely impact the operation and reduce the useful life of those spacecraft.

Moreover, the Commission should not adopt any regulation governing the characteristics of inclined orbits that could require satellite operators to license a patent from another entity. Just after Inmarsat's December 22, 2003 ex parte meeting, Boeing alerted the Commission that it holds a U.S. patent for a method of controlling the eccentricity of inclined GSO orbit spacecraft.[2] Inmarsat is still assessing this patent. Before adopting any ±0.05 degree east/west station keeping tolerance requirement, the Commission should be certain that space station operators would not have to use techniques that potentially overlap with this or other existing patents in order to manage orbital eccentricity and thereby comply with such a station keeping requirement.

Furthermore, any station keeping tolerance regulation that is adopted should be applied only on a prospective basis, and it should not apply to MSS spacecraft that are either in-orbit or currently under physical construction. Inmarsat is in the midst of completing its next generation Inmarsat 4 satellites, at an investment of over $1.5 Billion (U.S.). This mobile

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[2] United States Patent No. US006305646B1, October 23, 2001 (Inventor: Jeoffrey R. McAllister, et al.)

satellite system has been designed in conformance with the existing ITU and FCC ±0.10 degree east/west station keeping tolerance requirement for MSS spacecraft.

The Inmarsat 4 spacecraft are the heaviest commercial satellite generation in existence, have large solar arrays and antenna reflectors, and therefore are more susceptible to the types of orbit eccentricity issues discussed above. These spacecraft are designed with the latest available propulsion system technology: each Inmarsat 4 satellite will use plasma thrusters for both north/south station keeping and for eccentricity control, and will rely on standard chemical propulsion only for longitude drift control. However, Inmarsat has not yet gained operational experience in maintaining this new type of spacecraft. It therefore is far from certain whether, in practice, an Inmarsat 4 spacecraft could comply with a ±0.05 degree east/west station keeping tolerance that is adopted at this very late stage in the Inmarsat 4 program.

Should the Commission nonetheless adopt an east/west station keeping requirement for MSS spacecraft, Inmarsat urges the Commission to define it with reference to the equatorial plane as follows:

> MSS space stations operated in the geostationary satellite orbit must be maintained within ±0.05° of their assigned orbital location in the east/west direction *at the equatorial plane,* unless specifically authorized by the Commission to operate with a different longitudinal tolerance, and except as provided in Section 25.282 (End-of-life disposal).

Doing so would achieve a number of things. First, it would constrain east/west drift only at the location of concern—at the equatorial plane. Second, it would not constrain the width of the "figure eight" above and below the equatorial plane that is inherent in the orbit of a spacecraft in an inclined orbit. Third, it would allow for the possibility of "non-grandfathered" future MSS spacecraft coordinating greater than ±0.05° station keeping tolerances with respect to other spacecraft in adjacent orbit locations.

In conclusion, Inmarsat urges the Commission not to impose a ±0.05 degree east/west station keeping tolerance on MSS spacecraft. But if the Commission nonetheless does so, Inmarsat requests that the Commission (i) apply such a requirement only on a prospective basis, and not to MSS spacecraft that are in-orbit or are currently under physical construction, and (ii) define the requirement so that compliance is measured in terms of east/west motion at the equatorial plane, and not at locations north or south of that plane.

An original and three copies are enclosed.

Respectfully submitted,

John P. Janka
Alex D. Hoehn-Saric

cc: Sheryl Wilkerson
Rod Porter
John Martin
Jackie Ruff
Sankar Persaud
Steven Spaeth
Karl Kensinger
Stephen Duall
JoAnn Lucanik