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May 21, 2002

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
The Portals
445 Twelfth Street, S.W.
Washington, DC 20554

Re: ***Notice of Ex Parte Presentation***:
IB Docket No. 01-185

Dear Ms. Dortch:

On May 20, 2002, Richard Vos, Chairman of Inmarsat Ventures plc ("Inmarsat"), Alan Auckenthaler, Vice President of the Americas and General Counsel of Inmarsat, Gary Epstein of Latham and Watkins, and the undersigned, met with Commissioner Kevin Martin and his Legal Advisor, Sam Feder. The topics of discussion were those described in the enclosed set of presentation materials and the Inmarsat positions of record in this proceeding.

An original and one copy are enclosed.

Respectfully submitted,

John P. Janka

Enclosures

cc: Commissioner Kevin J. Martin
Mr. Sam Feder

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# Presentation to the FCC

# Terrestrial Use of the L-Band

## Inmarsat Ventures plc

IB Docket No. 01-185

May 20-21, 2002

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# Overview of Inmarsat MSS System

- 9 GSO spacecraft in orbit and 244,000 registered terminals
  - Use the L-band (1525-1559 MHz & 1626.5-1660.5 MHz)

- Heavily used by
  - US Navy, Coast Guard and FAA
  - Commercial airlines, cargo ships and passenger ships
  - Humanitarian aid and media organizations
  - U.S. oil and mining businesses in remote parts of the world

- Inmarsat 4 system (in service 2004)
  - Broadband service at up to 432 kbps (about 10x typical telephone modem speed)
  - Enhanced spectrum reuse through efficient spot beam design
    - supports high-data-rates and more users
  - $1.6 Billion being invested

- New services since October 2001 U.S. market access decision
  - Mobile packet data service
    - pay only for the bytes sent, not the time connected

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# MSS Bands Proposed for Terrestrial Use

- 1.6/2.4 GHz ("Big LEO") band
  - Only Iridium and Globalstar have launched
- 2 GHz band
  - Only ICO has launched (1 of 12 spacecraft)
- L-Band
  - Used by Inmarsat, MSV/TMI, Solidaridad, Volna, More, MTSAT, and other satellite systems around the world



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# Current Satellite Use of L-Band

- L-band is heavily used by non-U.S-licensed satellite networks, including Inmarsat
- Different MSS systems share the entire L-band on a co-channel basis around the world
  - Other MSS systems reuse the same frequencies that MSV uses in the U.S.
- No MSS operator has a "fixed" L-band spectrum assignment
  - Unique and creative worldwide spectrum sharing mechanism
  - Spectrum is to be reassigned annually, based on projected demand for MSS service on each satellite system
- These factors distinguish use of the L-band from use of 2 GHz band and the Big LEO band



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# Main Problem: Terrestrial L-Band Use Causes Harmful Interference into Inmarsat

- Harmful interference into all Inmarsat spacecraft that see the U.S.
  - In-orbit (15.5W, 54W, 98W, 142W, 178E, 179E); planned (143.5E and other)
  - Greatest harm to the state-of-the-art Inmarsat 4 spacecraft under construction
- Harmful interference into Inmarsat mobile terminals operating near terrestrial base stations
- Disruption to vital safety, maritime, aeronautical and land mobile communications both within and outside the U.S.
- U.S. may not deviate from ITU Table of Frequency Allocations if doing so results in harmful interference outside the U.S.
  - No ITU allocation for this terrestrial use in the U.S.



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# Other Problems With Terrestrial Use of L-Band

- There is no "free lunch"
  - Proposed terrestrial uses would consume spectrum needed by operating L-band MSS systems
  - MSV would use more L-band spectrum for "ancillary" terrestrial service than for its stand-alone satellite service
  - Inmarsat and other satellite operators need additional L-band spectrum for existing MSS businesses
- Emission limits that adequately protect L-band MSS would make terrestrial use unfeasible---spectrum reuse would be too limited



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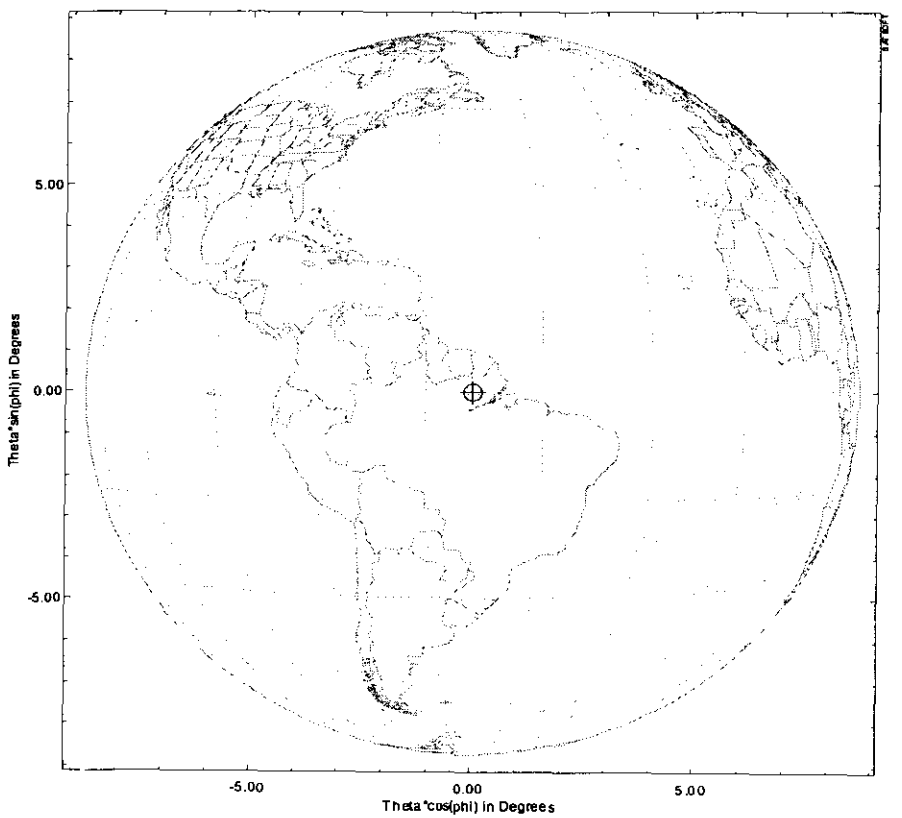
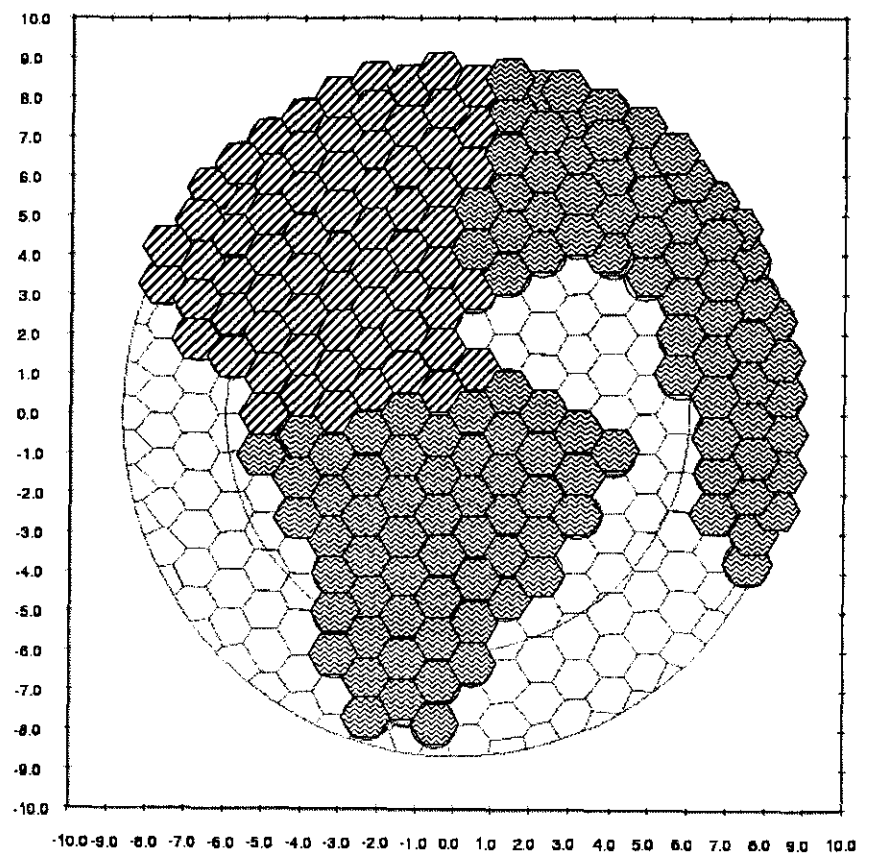
# Potential L-Band Reuse By MSS Spacecraft

Field of View from Inmarsat-4 at 54° W.L.




Inmarsat-4 Spot Beam Coverage Pattern




I4 beams that cannot reuse MSV spectrum

I4 beams that can reuse MSV spectrum

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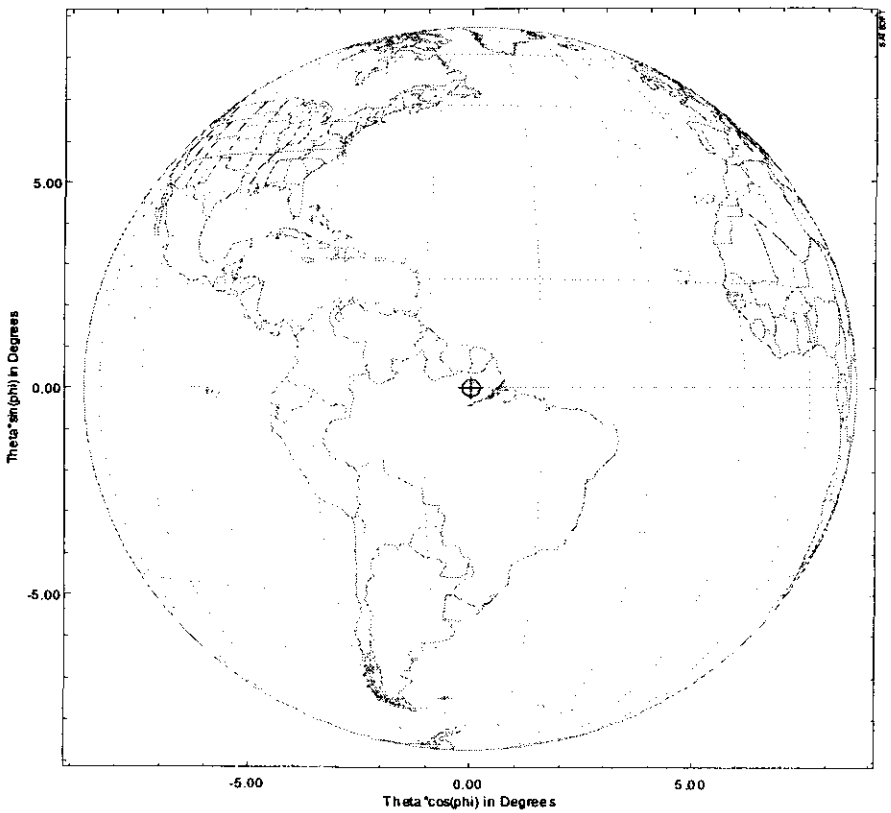
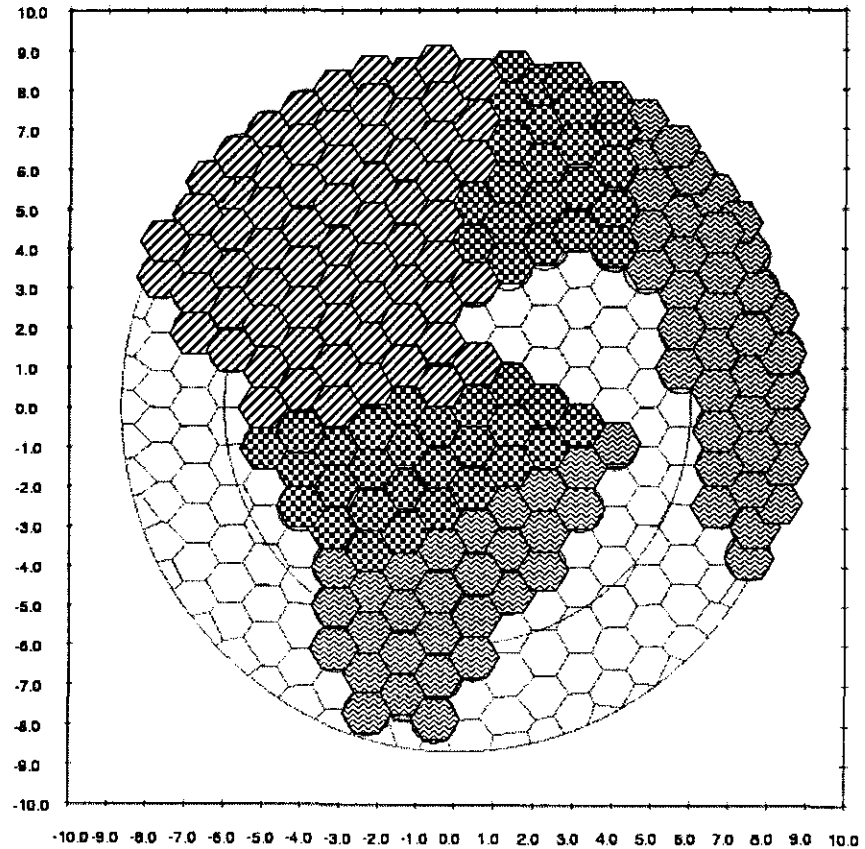
# Terrestrial L-Band Use Limits MSS Spacecraft Reuse

Field of View from Inmarsat-4 at 54° W.L.




Predicted Interference From Terrestrial L-Band Use




I4 beams that cannot reuse MSV spectrum due to satellite sharing

Additional I4 beams that cannot reuse MSV spectrum if ATC is authorized

I4 beams that can reuse MSV spectrum with ATC

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# Details of Harmful Interference Into Inmarsat Spacecraft

- Many terrestrial L-band uses would produce harmful interference into Inmarsat spacecraft
  - *Thousands* of terrestrial "cells" versus *only 10* simultaneous MSS reuses over U.S.
- Inmarsat spacecraft antennas will "see" terrestrial interference from the U.S. even when the spacecraft receives signals from other areas
  - "Shielding" from buildings will not keep terrestrial signals from reaching MSS spacecraft
- MSV spacecraft cannot "see" the interference Inmarsat suffers at different orbital locations, and thus cannot measure or control the interference
- To adequately protect MSS, terrestrial L-band use must be limited to ~10 co-channel spectrum re-uses throughout the U.S.---an insufficient level to support a mobile terrestrial business
- *Absent such limits, Inmarsat spacecraft must forego using part of the L-band outside the U.S. to avoid terrestrial interference from the U.S.*



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# Details of Harmful Interference Into Inmarsat Earth Terminals

- High-powered terrestrial base stations would block reception by nearby Inmarsat earth terminals in the U.S.
  - Aeronautical MSS terminals would be harmed within ~22 miles of a base station when flying below ~8,200 feet
  - Land mobile MSS terminals would be harmed within ~6.2 miles of a base station
  - Maritime MSS terminals would be harmed within ~6.2 miles of a base station

- Inmarsat earth terminals are designed to be sensitive enough to receive signals from geo-stationary orbit 23,000 miles out in space
  - Cannot co-exist with nearby, high-powered terrestrial transmitters
  - No reason for Inmarsat or its manufacturers to have anticipated terrestrial use of L-band in derogation of ITU Table of Frequency Allocations

- *No realistic solution to this threat to Inmarsat earth terminals in parts of U.S. where terrestrial systems would be deployed*

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# Legal Issues Unique to the L-Band

- Terrestrial use violates the 1996 Mexico City MOU international coordination agreement to which the U.S. is a party
  - MOU parties must "avoid situations that could potentially give rise to unacceptable interference"
  - No basis under MOU to use any L-band spectrum for terrestrial service

- MSV's refusal to coordinate under the MOU constitutes impermissible "warehousing" of L-band spectrum
  - MOU requires the U.S. to release that spectrum to other MSS operators with demonstrated needs
  - Inmarsat and other L-band satellite systems need additional spectrum today to support user demand for MSS services

- No basis for MSV to seek to hold its unused L-band spectrum for terrestrial use



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# Other Issues With Terrestrial Use of L-Band

- Dual-band handsets already exist in other frequency bands and can solve MSV's business problem
- Terrestrial use of Big LEO band creates an out-of-band emissions interference threat into Inmarsat spacecraft receivers
- Even greater interference problems with stand-alone (non-integrated) terrestrial providers



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# Conclusion

- Terrestrial use of the L-band
  - presents significant threat of harmful interference into Inmarsat
  - would cause U.S. to violate its obligations under ITU Radio Regulations and Mexico City MOU
- Emission limits that adequately protect MSS would make terrestrial use unfeasible---spectrum reuse would be too limited
- Segmentation of the L-band would exacerbate an already critical shortage of L-band spectrum needed for MSS service
- Terrestrial use of L-band also would
  - consume spectrum at the expense of users of the primary MSS service
  - significantly reduce satellite coordination flexibility
  - curtail use of future advances in MSS technology



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