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ICASA hearing on Draft Frequency Migration Regulation and Frequency Migration Plan

November 1st, 2012
www.inmarsat.com

Inmarsat Mobile Satellite Broadband system

- 10 geostationary satellites in orbit today using L-Band
- Planned launch of Alphasat in 2013, bringing into use extended L-band
- Three 4th Generation satellites operational with commercial life 2020+
- Ground network operating in C-band
- 100 satellite years without operational failure - 99.99% network availability
- Worldwide coverage with ubiquitous network and products
  - Land, sea, and air mobile services,
  - Including safety services for maritime and aeronautical users
  - Mobile broadband network available anytime, anywhere




Current and imminent Inmarsat services use L-band and extended L-band for service links as well as C-band for feeder links

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Mobile Satellite Broadband Supports

- **Critical Infrastructure**
  - Utilities (smart grid), oil, gas, mining applications
  - Mobile banking
- **Public Safety and Disaster Response**
  - Emergency preparedness/disaster relief communications when terrestrial networks are unreliable or fail
  - Restore and backhaul terrestrial communications (pico cell provides IP connectivity for LMR and mobile phones)
  - Humanitarian relief (Floods, Forest fires, Mining disasters)
- **Telemedicine**
  - Ambulances: perform lifesaving procedures and diagnostic tests in the field or ‘on the move’
  - Mobile clinics: deliver primary and specialty care in rural communities
  - Hospice and homecare: access to electronic medical records and support

Inmarsat services are used in South Africa for critical services which cannot be offered by any other technology

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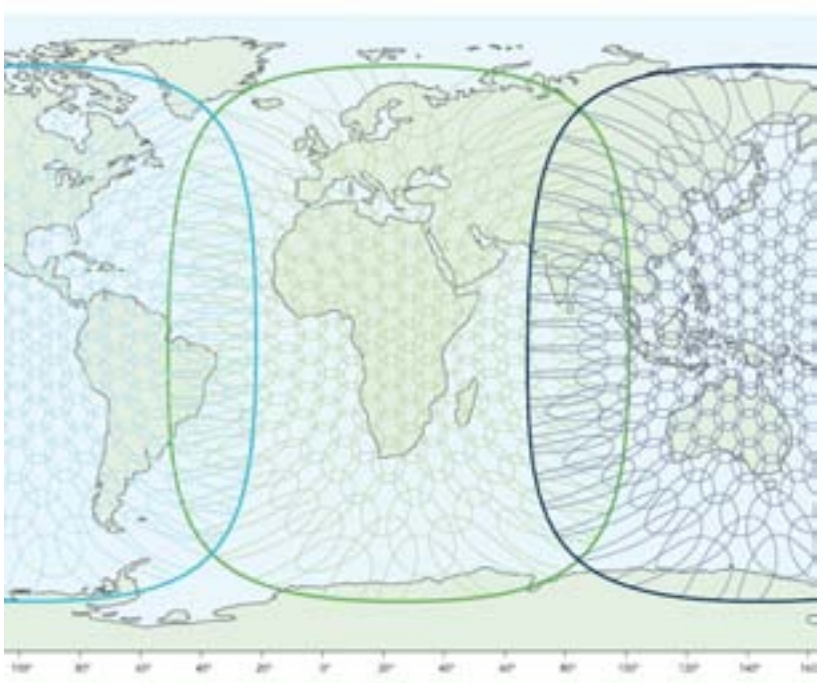
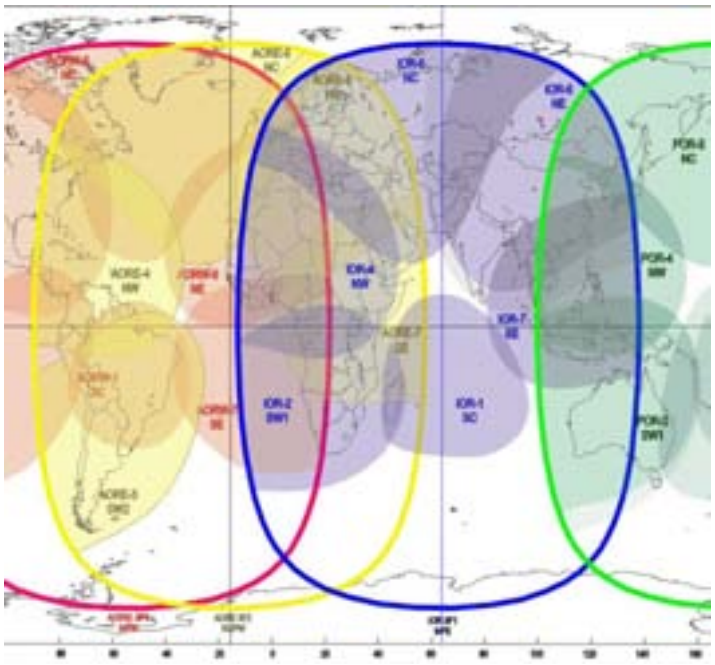
Supporting customers, in S.A and worldwide:

- Inmarsat sales office and several other providers based in South Africa
- Clients include:
  - S.A Government (wherever deployed), including SANDF, Special Forces, Home Affairs, Department of Environment Affairs, Department of Forestry and Fisheries, Disaster Management, Intelligence Services, Police, Presidential Protection Unit, SA Police Task Force
  - International relief agencies (International Red Cross, Télécoms Sans Frontières, UN)
  - Media (SABC, E-TV, CNN, NBC, Reuters)
  - Critical Infrastructure (Eskom, Water Affairs,utilities, oil, gas, electricity, mining)
  - Safety services – maritime, aero, land – Telkom is registered Accounting Authority.

International dimension of proposals



L-band small spot beams



L-band regional and global beams

- The same beam serves mobile earth stations that can operate on land, sea and in the air
- Roaming requires globally harmonised spectrum decisions
- Interference to MSS satellite may effect many users, including those outside of SA

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Issues raised in the ICASA plan

- Issue 1 - Proposed use of parts of “standard MSS L-band” by terrestrial applications (1525-1559 MHz)
- Issue 2 - Proposed use of “extended MSS L-band” by terrestrial applications (1518-1525 MHz and 1668-1675 MHz)
- Issue 3 - Proposed use of S-band MSS frequencies by terrestrial applications (1980-2010 MHz and 2170-2200 MHz)
- Issue 4 - Proposed use of C-band FSS frequencies by terrestrial applications

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Issue 1 - Proposals related to “Standard MSS L-band”

- Proposal 4.11.22
- ICASA proposes:
  - to make a national allocation to the FS in the band 1525-1530 MHz and to use the band for fixed links and ENG/OB systems.
  - to make no change to 1535-1559 MHz
  - proposals for the band 1530-1535 MHz are not defined – we assume no change

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Issue 1 continued

- Proposal for the band 1525-1530 MHz is not compatible with current MSS operations in South Africa
  - Band is allocated to and used for MSS downlinks
  - Heavily used by the current Inmarsat services, including critical national services
  - Spectrum also used by other MSS operators through coordination
  - High risk of harmful interference to be caused to mobile earth stations (land, sea and maritime), and no means of mitigation or coordination
  - Allocation in the Radio Regulations is a legacy from when the MSS allocation was made in 1992
  - Worldwide administrations generally do not deploy terrestrial systems in this band

Summary: MSS and terrestrial services cannot co-exist. In line with international practice, no terrestrial services should be introduced in any parts of the band 1525-1530 MHz

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Issue 2 - Proposals related to Extended MSS L-band

- Proposals 4.11.21 and 4.11.23
- ICASA proposes:
  - To allocate the band 1518-1525 MHz to repeater links for LMR and migrate repeater links and ENG/OB links to this band
  - To open the band 1668-1675 MHz to fixed links
- Proposals for the band 1518 MHz – 1525 MHz are not compatible with planned MSS operations
  - First satellite to use the Extended MSS L-band will be Inmarsat's Alphasat, due to be launched in 2013, to provide service in Europe, Middle East and Africa, including SA
  - Existing satellite user terminals are already capable of using this range
  - High risk for interference to receiving MSS terminals if the same band is used by terrestrial systems
  - Around the world, the general trend is to remove fixed links and use the band for MSS only

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Issue 2 continued

- Proposals for the band 1668-1675 MHz are not compatible with planned MSS operations
  - MSS uplink band, paired with 1518-1525 MHz, to be brought into use on Alphasat, in 2013, to provide service in Europe, Middle East and Africa, including SA
  - Existing satellite user terminals are already capable of using this range
  - Will cause interference to satellite receiver – causes interference to satellite users in SA and anywhere in the satellite beam
  - Interfered satellite beam may be “spot”, “regional” or “global” – many users potentially affected.
  - ITU studies contained in Recommendation ITU-R M.1799 show that very stringent limits would be necessary, making FS deployment impracticable
  - FS receivers would be at risk of interference from mobile earth stations – mobility makes coordination impracticable.

Summary: MSS and terrestrial services cannot co-exist in the bands 1518-1525 MHz and 1668-1675 MHz. Fixed and mobile systems should not be deployed in this band.

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Issue 3-Proposals on S-band MSS frequencies

- ICASA proposals 4.11.25 put forward:
  - To allocate the bands 1980-2010 MHz and 2170-2200 MHz to fixed links
  - To migrate in fixed links from other bands, and possibly use these bands for BFWA
- Proposals for both bands are not compatible with planned MSS operations
  - Inmarsat has been granted a pan-European award through a European Commission Decision (the "Selection Decision") and the right to operate a Mobile Satellite Services (“MSS”) system in a portion of the 2 GHz band (the “S-band”).
  - MSS services can be rolled out outside of Europe in the future
  - Fixed and BFWA are not compatible with national or international use
  - ITU Resolution 716 (Rev. WRC-2000) urges administrations to transition FS systems out of these bands

Summary - MSS and fixed service systems cannot practically co-exist in the bands 1980-2010 MHz and 2170-2200 MHz. Fixed systems should not be deployed in this band.

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Issue 4 - Proposed use of C-band FSS frequencies by terrestrial applications

- Proposals 4.11.30 and 4.11.31
- ICASA proposes:
  - To allocate the bands 3400-3600 MHz to the mobile service and migrate existing users out of the band
  - To migrate VSAT systems from the band 3600-4200 MHz to Ku-band
- Inmarsat opposes migration of FSS systems to other bands
  - Parts of the bands 3400-3600 MHz and 3600-4200 MHz are used by Inmarsat for the system feeder links
  - No feeder link stations located in SA, but Inmarsat is concerned about global plans for the introduction of BFWA and mobile broadband systems in the C-band
  - C-band will remain necessary for Inmarsat and many other FSS applications for the foreseeable future.
  - Uptake to C-band BFWA systems has been very low globally...

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Issue 4 continued

- Inmarsat opposes migration of FSS systems to other bands
  - C-band applications cannot be migrated to other frequency bands due to (inter alia):
    - Considerable financial investments made in C-band space capacity – which is continuing
    - Favourable technical conditions only available in C-band (e.g global beams, high availability)
    - Insufficient capacity in the geostationary orbit to accommodate the C-band requirements in Ku-band
  - Any use of 3600-4200 MHz by BFWA or mobile systems should be subject to defined coordination requirements to protect receiving FSS earth stations

Summary – VSAT systems should not be migrated from C-band. Any use of C-band by BFWA or mobile systems must be subject to defined coordination requirements to protect receiving FSS earth stations.

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Conclusions: request not to implement proposals damaging to MSS services

- Inmarsat MSS services offer unique and critical services for which there is no substitute
- The proposals regarding the standard L-band MSS frequencies and the extended L-band MSS frequencies bear serious risks of creating interference to existing and imminent Inmarsat services
  - These cannot be mitigated by coordination due to the global and mobile nature of the MSS services
  - Will affect MSS operations in other countries and international waters/airspace – not only users in SA
- The proposals regarding S-band would prohibit international deployment of MSS services
- Terrestrial services can be offered in a range of alternative bands while there are no suitable bands available for Inmarsat MSS services
- The trend internationally is for terrestrial services not to be deployed in L-band, extended L-band and S-band

ICASA proposals for L-band and extended L-band MSS frequencies, C-band and S-band should not be taken up.

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