

# ITU International Satellite Symposium 2017



## WRC-19 Agenda: Challenges and Opportunities ahead

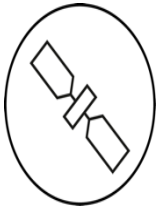
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PRESENTED BY  
Ting Ling Lee

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PRESENTED ON  
31 August 2017 in Bangkok Thailand

# SES - The World-Leading Satellite Operator

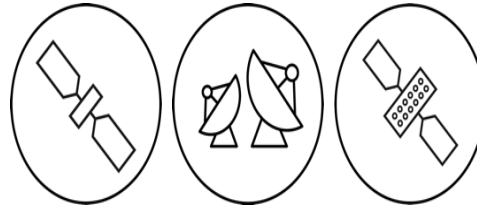


**65**

satellites covering

**99%**

of the globe and world population



Unique

**GEO-MEO**

constellation  
 complemented by a  
 ground segment, together  
 forming a flexible network  
 architecture that is globally  
 scalable

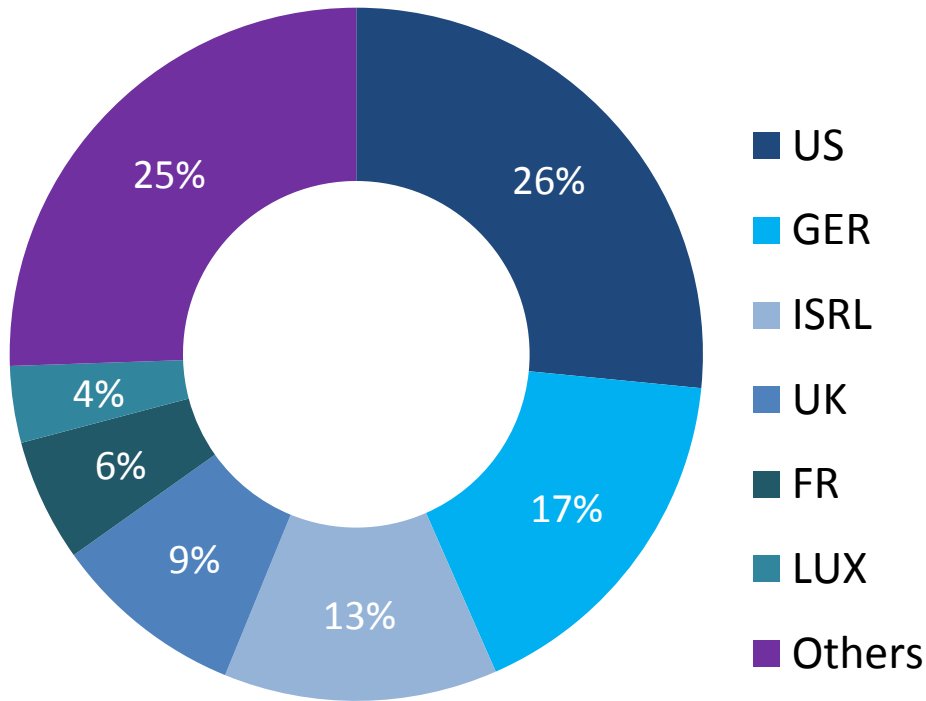


Driver of

**INNOVATION**

in next generation  
 satellite development

# Global Presence, International Team



**2,000**

employees of more than

**65**

nationalities in over

**20**

locations worldwide

**EUR 2**

billion annual revenue

\*SES employees with a permanent SES employment contract, excl. externals and students/trainees

# Leading Satellite Operator & Dynamic Market Leader

## PARTNER OF CHOICE

serving over 700 broadcasters, telcos, enterprises, governments and institutions in over 130 countries



# WRC-19 Agenda items of interest - Opportunities

	Agenda Item	Description	SES objective
Improve GSO and NGSO regulations	7	Satellite Coordination and Notification procedures	Maintain/gain flexibility and clarity in the RR, in particular for NGSO BIU
	1.6	Regulatory framework for non-GSO FSS satellite systems in V band	Develop NGSO framework while protecting future SES GSO operations in V band
	1.5	Earth Stations in Motion (ESIM) in shared portions of the Ka band	Develop regulatory framework for mobile applications
New spectrum	Issue 9.1.9	New uplink V band allocation at 52 GHz	Gain access to more uplink V band spectrum

# WRC-19 Agenda items of interest - Challenges

	Agenda Item	Description	SES objective
Defend Ka and V bands	1.13	Identification of frequency bands for IMT / 5G	Defend Ka and V bands
	1.14	Identification of frequency bands for HAPS in Ka 24 GHz (Region 2) and V band	Defend Ka and V bands
Protect C band	Issue 9.1.3	NGSO systems in C band	Protect SES GSO operations in C band
	1.12	Identification of frequency bands for Intelligent Transport Systems (ITS) at 5.8 GHz	Defend C band uplink
	1.16	Identification of frequency bands for RLAN (WIFI) in 5150-5925 MHz	Defend C band uplink

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# IMPROVE GSO AND NGSO REGULATIONS

## AI 7: Review of Satellite Regulatory Procedures

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- ▲ A standing agenda item to consider possible changes to satellite coordination, notification and recording procedures
  - Various issues will be identified, based on WRC Resolution 86
  - Any aspect of the RR governing satellite services can be considered but mostly Articles 9 and 11, including associated Appendices such as Appendices 30 and 30A
  
- ▲ The overall goal for AI 7:
  - To clarify and establish predictable regulations, aiming for improved efficiency of satellite procedures
  - In general favoring increased flexibility to access spectrum while protecting existing services
  - Does not support initiatives that would cause drawbacks for the satellite industry by unreasonably restricting access to spectrum or operational flexibility
  
- ▲ Among the issues discussed under AI 7 are:
  
- ▲ Issue A: Bringing into use of frequency assignments for NGSO satellite systems. Increased number of NGSO filings submitted to the ITU with different constellation characteristics. But there is lack of clarity in the Radio Regulations, with no specific BIU provisions for NGSO satellite systems
  - Support a BIU procedure which minimises abuse by speculative players and provides regulatory certainty to real NGSO systems. Extend period of BIU to recognize NGSO systems take longer to deploy. Develop milestones to ensure progress of satellite deployment



## AI 7: Review of Satellite Regulatory Procedures

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- ▲ Issue B: Introduction of coordination arc (CA) as the coordination trigger between FSS & MSS geostationary satellite networks and between MSS geostationary satellite networks in the Ka band. Administrations still have choice to apply RR No. 9.41 to include additional networks
  - Support studies to introduce the CA mechanism, as it could help to facilitate/improve the coordination procedures.
  
- ▲ Issue D: BR identification of coordination requirements under RR Nos. 9.12, 9.12A or 9.13. The idea is to specify the satellite networks/systems of affected administrations, and not only a list of the administrations as today
  - Support Method D2 which reduces the administrative workload in identifying potentially affected satellite networks and/or systems with which a new satellite network or system need to effect coordination. Also RR No. 9.21 should be excluded from the scope of this Issue D.
  
- ▲ Issue E: Harmonisation of AP30B with AP30&30A regulations. A complex issue considering three different specific amendments to Appendix **30B** for all Regions, in order to harmonise with Appendices **30** and **30A**
  - Do not support harmonisation as each of these appendices are having its own set of conditions and procedures established for two different satellite services for different purposes. Support splitting proposals into 3 separate AI 7 issues and not repeating issue E2 in Issue F
  - Support modifications of Appendix 30B only if it leads to simplifications of regulatory procedures while ensuring protection of existing networks. Further, SES is of the view that any modifications of Appendix 30B should be based on the practical difficulties of applying existing procedures faced by administrations or the Bureau.

## AI 1.6: Regulatory framework for NGSO FSS in V band

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- ▲ To consider a regulatory framework for non-GSO FSS satellite systems in the V- band
- ▲ 37.5-42.5 GHz (space-to-Earth) and 47.2-48.9 GHz (limited to feeder links only), 48.9-50.2 GHz and 50.4-51.4 GHz (all Earth-to-space) could be studied for the use of NGSO FSS
- ▲ WP 4A is conducting technical/regulatory studies for the operation of NGSO FSS while:
  - ensuring protection of GSO satellite networks in the FSS, MSS and BSS
  - not limiting/unduly constraining future GSO networks
  - not modifying the provisions of Article 21
  - developing equivalent power flux-density limits for NGSO FSS towards GSO or into any geostationary FSS earth station
  - developing epfd limits and sharing conditions between NGSO FSS
- ▲ The goal is to spur the development of FSS systems based on the use of new technologies above 30 GHz and associated with both GSO and NGSO satellite constellations to provide high-capacity and low-cost means of communication even to the most isolated regions

## AI 1.5: Regulatory Framework for ESIMs in Ka band

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- ▲ To consider the use of the bands 17.7-19.7 GHz /27.5-29.5 GHz by Earth Stations in Motion (ESIMs) communicating with GSO in FSS
  - This is to meet a large growing demand for mobile broadband satellite communications
  - ESIMs are small terminals, with high-precision tracking capabilities, associated with state-of-the-art Ka-band satellites used on ships or planes
- ▲ WP 4A is responsible to study:
  - Technical and operational characteristics and user requirements of different types of ESIMs, including the use of spectrum to provide the envisioned services and the degree to which flexible access to spectrum can facilitate sharing with other services;
  - Sharing and compatibility studies in order to ensure the adequate protection of current and planned stations of other services using the same frequency bands as ESIMs.
- ▲ The goal is to develop a clear regulatory framework to facilitate flexible implementation of ESIMs, support studying appropriate sharing techniques, such as e.i.r.p. or pfd limitations for ESIMs in order to protect the fixed and mobile services allocated

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# NEW SPECTRUM

## Issue 9.1.9: More uplink spectrum for FSS in V band

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- Looks at additional spectrum for FSS in the next generation of Very High Throughput Satellites (VHTS)
- To cater to the increasing capacity needs, several GHz of spectrum in each direction is required => Only Ka and Q/V bands could be used
- Since Ka band is already used by 1<sup>st</sup> generation of HTS, additional spectrum is look in the V band range
- FSS spectrum is available in Q/V band
  - Earth-to-space (uplink) : 42.5-43.5 GHz, 47.2-50.2 GHz and 50.4-51.4 GHz
  - space-to-Earth (downlink) : 37.5-42.5 GHz
- 42.5-43.5 GHz (Earth-to-space) adjacent to downlink band and not contiguous to other uplink bands
- Seeking allocation of the band 51.4-52.4 GHz for uplink
- The goal is to support more FSS allocation in the V band uplink ie 51.4-52.4 GHz as it is contiguous with other V band uplink frequencies

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# DEFEND KA AND V BANDS

## AI 1.13: Identification of bands for IMT/5G (1/2)

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- ▲ Agenda Item 1.13: Identification of frequency bands for IMT-2020/5G
  - Mobile industry seeking to identify a broad range of additional spectrum for terrestrial 5G services
  - Candidate bands: 24.25 GHz – 27.5 GHz, 31.8-33.4 GHz, 37 – 40.5 GHz, 40.5-42.5 GHz, 42.5 – 43.5 GHz, 45.5 – 47 GHz, 47-47.2 GHz, 47.2 – 50.2 GHz, 50.4 – 52.6 GHz, 66 – 76 GHz, 81 – 86 GHz
  - Bands with FSS allocation: 24.65-25.25, 27.0-27.5, 37.5-40.5, 42.5-43.5, 47.2-50.2, 50.4-51.4, 71.0-76.0, and 81.0-86.0 GHz
- ▲ WP 5D is responsible for studies on spectrum needs & technical and operational characteristics (including protection criteria, and deployment scenarios) for the terrestrial component of IMT
- ▲ WP 5D reports the results of these studies to Task Group 5/1 (TG 5/1) which is responsible to conduct the sharing and compatibility studies
- ▲ WP4A is responsible to provide FSS technical parameters and interference protection criteria to TG5/1

## AI 1.13: Identification of bands for IMT/5G (2/2)

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- ▲ Identification of frequencies for IMT-2020 would make it very difficult to use those frequencies for satellite applications
- ▲ Under Agenda Item 1.13, more than 30 GHz of aggregate spectrum was identified as potential candidate bands for IMT-2020, but the Ka-band satellite frequencies from 27.5 GHz up to 31 GHz were specifically not included
- ▲ Nevertheless, several influential countries (the U.S., Japan and Korea) have signaled their intent to begin deploying IMT-2020 in the 27.5-29.5 GHz band (“**28 GHz Band**”) – given the satellite’s existing use of this band and its exclusion from Agenda Item 1.13, there is no basis for its consideration for IMT-2020/5G
- ▲ V-band satellite spectrum – which is already being incorporated into next-generation VHTS designs – are also under consideration
- ▲ Indeed, there is over 30 GHz of other spectrum to be studied under Agenda Item 1.13 as potential IMT-2020/5G candidate bands
- ▲ The goal: FSS bands in parts of Ka band and V band have to be protected against the identification for IMT/5G. Bands already identified for IMT should be first utilised before further identification is being made. The bands specified within Resolution 238 (WRC-15) should be sufficient for discussion under this Agenda item



# AI 1.14: Identification of frequency bands for HAPS in V band

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- ▲ Looks at reviewing the existing HAPS identification with a view of possibly relaxing the constraints on the existing HAPS identification or establishing an identification of frequency bands for HAPS in 38-39.5 GHz, 21.4-22 GHz (Region 2 only) and 24.25-27.5 GHz (Region 2 only)
- ▲ The proponents of the issue have so far not provided characteristics of HAPS in Ka band or V band in order to assess the potential impact on FSS (both GSO and NGSO)
- ▲ The proponents need to also show that the current identifications aren't sufficient, before looking at the specific new bands in resolves to invite ITU-R 4.
- ▲ The goal is ensure that before any characteristics for the new HAPS are provided, there should be proper studies and proper justification for the new HAPS spectrum requirements

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## DEFEND C BAND

## AI 1.12, 1.16 & issue 9.1.3: C band related

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- Issue 9.1.3
- Looks at revisiting the equivalent power flux-density (epfd) limits in Article 22 in the bands 3700-4200 MHz/5925-6425 MHz, and developing such epfd limits for 4500-4800 MHz/6725-7025 MHz to accommodate the NGSO systems
- The goal is to ensure the protection of GSO networks is not compromised by these changes in the epfd limits
  
- AI 1.12 looks at harmonised frequencies for Intelligent Transport Systems (ITS)
- Possible global or regional harmonized frequency bands are being sought for compatibility to facilitate worldwide deployment of ITS, in accordance with Resolution 237 (WRC-15)
- looks at bands with existing mobile-service allocation, could include the 5.8 GHz band
- under the responsibility of WP 5A
  
- AI 1.16 looks at additional spectrum for Wireless Access Systems (WAS)/radio local area networks (RLAN) (WIFI) in the range 5150-5925 MHz in accordance to Resolution 239 (WRC-15)
- Similar to AI 1.12, it is under the purview of WP 5A
- The goal on both AIs: Protect FSS including their current and planned usage

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# CONCLUSION

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- ▲ All of us have a vital role to play in:
  - protecting;
  - developing; and
  - improving access to satellite spectrum
- ▲ The WRC Agenda items present:
  - opportunities to improve the GSO/NGSO regulations and access to potential new spectrum;
  - but also set challenges ahead of us in terms of defending the C, Ka and V bands.
- ▲ We need to be involved in national WRC preparatory meetings, regional conferences such as the APT Preparatory Group for WRC-19 (APG) meeting - develop position for each Agenda item which in the best interest of the satellite industry

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