

الاجتماع الدولي الـ 25 لمراقبـــة ردايـــــو الفضــــ

	Name	Mr. SULAL MEHMOOD	Euilding success from in					
	Presentation Title	Regulating NGSO Constellation Pre & Post Launch						
	Abstract	Our view and technics to regulate and coordinate NGSOs filings a measurements within the regulated country.						
•	Biodata	Sulal Mehmood is a seasoned Electrical Holding a degree from the University of INTEGRASYS team since 2020. In his role instrumental in promoting, selling, and pacross the region.	Engineer with extensive ex Engineering and Technol le as EMEA Technical Sales providing technical suppor					

Communicationsهيئة تنظيمRegulatory AuthorityالاتصالاتState of Qatarدولة قطر





expertise in the satellite communications industry. ology Taxila, he has been a pivotal member of the les and Customer Support Engineer, Sulal has been ort for INTEGRASYS's innovative product portfolio

Managing NGSO Mega Constellations: Monitoring, Interference, and EPFD



ISRMM 2024, Qatar Sulal Mehmood, Integrasys

Software company SMART SOLUTIONS FOR THE SATELLITE INDUSTRY



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R&D Investment in 2 new Products in 2023 **80** Integrasys Employees

Smart Solutions for Satellite Network Automation



R&D Projects

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Regional Office FLORIDA, USA

Excelence center KYIV, UKRAINE

Multi Orbit, Multi Vendor network automation

MONITORING & DETECTION		NETWORK DESIGN & CAPACITY MANAGEMENT			REGULATING AND EPFD CALCULATIONS	DEPLOYMENT & MAINTENANCE		INTERFERENCE MANAGEMENT		
TOOL	ADD-ON	TOOL	ADD-ON	TOOL	TOOL	TOOL	TOOL	ADD-ON	TOOL	TOOL
Controlsat	Vectorsat	Beam Budget	BestPath	FlexCap	LEO NMS	VeryFilling	Satmotion	Alusat	InterGeo	CleanRF
Spectrum monitoring, detecting signal degradation, and reporting any anomaly.	Carrier under Carrier analysis, Constellation monitoring, MER, and distortion measurements.	Links design for an optimal infrastructure with different scenarios to define the requirements of the future	ldentifies the best connectivity path, with the customers' antennas or satellites.	Manages the pool of capacity dynamically by allocating a different kind of users and agreements.	Manage, monitor, qualify & report any provider network in a single screen. Multi-Orbit and Multi-vendor.	User-friendly EDFD calculation software aligned with ITU/FCC standards, for Satellite Operators and Regulators.	Helps the installation team to install a link, certifying communication with NOC.	Allows unattended maintenance of the links with the different VSATs on the network.	Geolocation for operational changes in government environments.	Eliminates interferences modifying the required parameters to end with them.
		network.								

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Multi-Orbit Regulation

This concept has gained significance with the growing number of satellites being launched into different orbits for various purposes, including communication, navigation, Earth Observation, scientific research, and more. Some of the key aspects:

Diverse Orbital Paths



Coordinating activities across multiple orbits requires careful planning and management.

Spectrum Management



Prevent interference between satellites in different orbits and ensure efficient use of available bandwidth. The operation of satellites and spacecraft is governed by international agreements, such as the Outer Space Treaty and the Radio Regulations of the ITU. Multiorbit regulation involves compliance with these agreements.

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International Agreements and Regulations



Multi-Orbit Challenges

Spectrum Interference

Coordinating frequency assignments and minimizing interference between satellites in various orbits is a complex task, especially as the number of satellites needs continue to grow.

Data Sharing and Coordination

Satellites in different orbits may need to share data for collaborative purposes, such as Earth observation or scientific research. Establishing efficient data-sharing mechanisms and ensuring synchronized data collection can be challenging.

Orbital Congestion and Collision Risk

Coordinating the movement of satellites to avoid collisions requires precise calculations, timely communication, and manoeuvre planning.

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Communication Delays

Satellites in higher orbits may experience communication delays due to longer signal travel times. Coordinating activities and real-time communication between satellites in different orbits becomes more complex as signal delays increase.

Regulatory Compliance

Compliance with international agreements and regulations, such as collision avoidance guidelines and frequency coordination, is essential. The filing process is quite complicated and arduous.

INTEGRASYS **Traditional Regulation Process**



Constellation LifeCycle Regulation



Regulation

SERVICE



CONTROLSAT

Regulator Measurements and comparison based on EPFD Data

Filing and Monitoring







Real Operation Report Certificate or Regulatory file





EPFD Calculation

Comparison ITU DB



Monitoring

Controlsat measures and compares EPFD filing the effect of proliferated NGSOs into existing GEOs by combining multi-orbit measurements and provides a comprehensive report of EPFDS filled and in operation.

- Easy Operation for the user.
- Remote Operation 24/7 with support team involved.
- **Cost-effective LEO/MEO solutions for monitoring Gateways and** ightarrow**User Beams.**
- **RF Interference Detection.**
- **Constellation Identification Record and Post-Measure EPFD** Scenario.
- Customizable event and report Alarms.
- Record and Post Measure scenarios.

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Conclusion



Monitoring is valuable for regulatory bodies operating within multi-orbit environments.

It enables efficient spectrum management, interference detection, compliance monitoring, resource optimization, emergency response, and international coordination, —all of which contribute to a well-functioning and interference-free communication ecosystem.

These tools ensure timely and accurate decision-making for regulating NGSOs prior to have a completely unusable spectrum in the country by allow NGSOs to operate without control.

Automating the regulatory measurement

process for multi- orbit constellations is essential to efficiently manage the complex logistics, regulatory requirements, and operational challenges that come with deploying and operating satellites across multiple orbits.

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