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NON-GSO SATELLITE SYSTEMS FOR SAFETY OF LIFE

(Item on the Agenda: 3.1 (SGT1))

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Impact on the sector:

This document considers elements regarding the critical role of non-GSO satellite systems in delivering safety-of-life services. CITEL Members are therefore directly impacted as this agenda item can jeopardize services that safeguards the continuity and reliability of safety-of-life communications used in the Americas.

Executive Summary:

Non-GSO satellite systems are essential for delivering safety-of-life communications in maritime and aeronautical sectors, especially in remote and underserved regions where terrestrial networks are unavailable. These systems support critical services like the Global Maritime Distress and Safety System (GMDSS) and Aeronautical Mobile Satellite (Route) Service (AMS(R)S), enabling real-time distress alerts and emergency coordination.

The document warns that proposed regulatory changes under WRC-27 Agenda Item 1.5 could unintentionally disrupt these life-saving services, and urges CITEL Member States to ensure continued, uninterrupted access to non-GSO satellite communications in line with international safety obligations.

Background

Satellite technology is a cornerstone of modern communications, enhancing telecommunication services, and boosting operational efficiency especially in aeronautical and maritime domains where communication is vital for safety of life services.

There are several limitations to terrestrial maritime and aeronautical safety services, particularly in their ability to provide comprehensive coverage across expansive and remote areas. Maritime safety services, like coastal radar and VHF radio, often struggle to cover vast oceanic areas. Similarly, aeronautical safety services using ground-based systems like air traffic control and navigation aids are limited over oceans and remote areas.

The deficiencies of terrestrial maritime and aeronautical safety services, including limited coverage and dependence on local networks, are sufficiently addressed by satellite technology. In this regard, satellite operations are playing an essential role given its inherent characteristics of global connectivity and provision of services even in remote areas. As it becomes a crucial component to provide continuous and reliable communication around the world, it has become a valuable component for expanding the provision of safety of life services. This is, satellites are vital component in managing disaster response, ensuring safety, and supporting the exchange of relevant information when natural disasters strike and terrestrial telecommunications infrastructure collapses.

From prevention to assistance in emergency events, satellite communications have major relevance where real-time communications are imperative, especially for operations where terrestrial communications are not available. Its utility for distress operations has urged authorities to foster its continuous development to facilitate uninterrupted and reliable safety of life services.

Given the extensive maritime borders of the American continent, dense air traffic corridors, and proximity to remote and polar regions, the availability of reliable safety-of-life satellite services is of paramount importance. Non-GSO satellite systems play a critical role in ensuring uninterrupted communication for vessels and aircraft operating beyond the reach of terrestrial networks. Satellites enhance The Caribbean's resilience to climate-related challenges by providing critical data for predicting and monitoring storms, in particular during the north Atlantic hurricane season. These systems support vital functions such as distress alerts, search and rescue coordination, and real-time navigation updates, which are essential for safeguarding human life. Any disruption or regulatory constraint affecting these services could severely compromise the ability of countries in the Americas to respond to emergencies, undermining both international safety obligations and regional resilience.

The recognition and protection of current and emerging satellite technologies used for safety-of life communications is crucial. To ensure the reliability and resilience of these critical systems, it is essential to uphold their existing regulatory protections. In this regard, this document addresses the significance of safeguarding such communications and highlights the regulatory framework articulated in the International Telecommunication Union (ITU) Constitution and reinforced by ITU-R regulatory documents applied to these kinds of services.

Non-GSO satellite systems for safety of life

Non-GSO satellite systems provide communications in areas where terrestrial networks cannot be deployed. For some use cases such as some maritime and aeronautical activities, satellite technology is the only way to address communication needs. Non-GSO satellite systems are a valuable component in offering global services, and under some circumstances it may be the only option that could enable some systems to use data and voice communications. The polar regions are a good example, where terrestrial communication is very limited, or nonexistent, but maritime and aeronautical activities take place.

A key feature of the non-GSO satellites is their ability to facilitate distress communications, ensuring the automatic identification and routing of maritime distress and safety communications through highly reliable

connections. Using a combination of satellite and terrestrial technologies, on-board systems can handle distress events, promptly notify rescue authorities, and alert nearby vessels during emergencies.

In this regard, it is globally recognized the use of the Global Maritime Distress and Safety System (GMDSS), which is an integrated communication system used by ships to facilitate search and rescue communications at sea by sending an alert to a shore-based rescue coordination center, which would then accept the responsibility of co-coordinating the necessary rescue efforts.

The GMDSS was adopted by the International Maritime Organization (IMO) under the Safety of Life at Sea (SOLAS) convention, that complements the International Convention on Maritime Search and Rescue (SAR). The SOLAS convention sets uniform principles and rules for ensuring the safety of life at sea, while the SAR Convention mandates the enactment and implementation of all necessary laws, decrees, orders, and regulations, as well as other required measures, to ensure its full and complete effect.

With the full implementation of the GMDSS, ships communications entered a new era by integrating innovative satellite and terrestrial radiocommunication systems. Under the GMDSS, all passenger ships and all cargo ships over 300 gross tons on international voyages have to carry specified terrestrial and satellite radiocommunications equipment for sending and receiving distress alerts and maritime safety information. These systems are equally valuable and increasingly prevalent on 'voluntary fit' vessels such as recreational boats and leisure yachts as there is a need to ensure the safety, security and stewardship of maritime activity.

From the aeronautical perspective, specific radiocommunication services are designed to provide reliable safety communications to aircrafts. Particularly, the Aeronautical Mobile Satellite (Route) Service (AMS(R)S) provides communication between the aircraft earth stations (on-board an aircraft) and ground stations through a satellite link for the safety, regularity and efficiency of flight.

The AMS(R)S is designated by the International Civil Aviation Organization (ICAO) and the ITU for two-way communications via satellite(s) pertaining to the safety and regularity of flight along national or international civil air routes. The AMS(R)S uses standard telephony and data protocols for communication, to which the non-GSO satellite systems serve as a reliable element in its provision.

The ICAO Aeronautical Communications Panel (ACP) has carried out forward future air navigation systems planning that designated basic architectural concepts for using satellite communications, initially in oceanic and remote environments, and eventually in continental airspace. Progress in satellite communications for aeronautical safety is realized through the revision of Standards and Recommended Practices (SARPs) and guidance material by ICAO for the AMS(R)S, and through the interactions of ICAO with other international bodies to assure that resources are coordinated and available.

Due to the value of the safety of life communications, the reliability and continuity of its provision and further development must be ensured. Furthermore, it is necessary to have a broad understanding of current regulatory provisions applied to these services.

Regulatory provisions

The ITU plays a significant role in delivering efficient telecommunication services by promoting the rational, equitable, efficient, and economical use of the radio-frequency spectrum and satellite orbits. It is responsible for establishing, updating, and applying international regulations, as well as developing and adopting standards related to the use of radiocommunications.

The ITU acknowledges the significance of safety of life services within its legal framework, starting with article 1 of the ITU Constitution1, Purpose of the Union:

> *"17 g) promote the adoption of measures for ensuring the safety of life through the cooperation of telecommunication services;"*

Additionally, in its article 40, titled Priority of Telecommunications Concerning Safety of Life, the ITU Constitution estates the following:

> *"191 International telecommunication services must give absolute priority to all telecommunications concerning safety of life at sea, on land, in the air or in outer space, as well as to epidemiological telecommunications of exceptional urgency of the World Health Organization."*

Further, in relation to distress calls and messages, Article 46 of the Constitution specifies the following:

> *"200 Radio stations shall be obliged to accept, with absolute priority, distress calls and messages regardless of their origin, to reply in the same manner to such messages, and immediately to take such action in regard thereto as may be required."*

Consequently, it is acknowledged that life safety communications at sea, on land, and in the air take precedence over all other types of telecommunication services. Consequently, radio stations are required to receive and transmit priority messages in response to distress situations.

In regards of the ITU provisions applicable to the usage of the frequency bands, the Radio Regulations[2] (RR) in its Volume 1, establishes the following provisions related to distress communications:

> *"ARTICLE 4*
> ***Assignment and use of frequencies***
>
> *(...)*
>
> *4.9 No provision of these Regulations prevents the use by a station in distress, or by a station providing assistance to it, of any means of radiocommunication at its disposal to attract attention, make known the condition and location of the station in distress, and obtain or provide assistance.*
>
> *(...)*
>
> *ARTICLE 30*
> ***General provisions***
> ***Section I − Introduction***
>
> *(...)*
> *30.2 § 2 No provision of these Regulations prevents the use by a mobile station or a mobile earth station in distress of any means at its disposal to attract attention, make known its position, and obtain help (see also No. 4.9).*
>
> *30.3 § 3 No provision of these Regulations prevents the use by stations on board aircraft, ships engaged in search and rescue operations, land stations, or coast earth stations, in exceptional circumstances, of any means at their disposal to assist a mobile station or a mobile earth station in distress (see also Nos. 4.9 and 4.16).*
> *(...)"*

[1] Constitution of the ITU, ITU. Available in: https://www.itu.int/en/council/Documents/basic-texts/Constitution-E.pdf

[2] Radio Regulations, ITU, 2024. Available in: https://www.itu.int/en/publications/ITU-R/pages/publications.aspx?parent=R-REG-RR-2024&media=electronic

With this, the RR explicitly acknowledges the necessity for communication between stations in distress, and states that none of its regulations hinder the use of such communications to seek or provide assistance.
Distress communications for the GMDSS are considered to fall under the definition of a safety service[3]. In particular, the following pertains specifically to the provision of GMDSS services, to which the RR in its articles 31 and 32 state the following:

"ARTICLE 31
Frequencies for the global maritime distress and safety system (GMDSS)

(...)

31.15 § 7 Those coast earth stations assuming a watch-keeping responsibility in the GMDSS shall maintain a continuous automatic watch for appropriate distress alerts relayed by space stations.

(...)

ARTICLE 32
Operational procedures for distress communications in the global maritime distress and safety system (GMDSS) *(WRC 07)*
Section I – General

32.1 § 1 Distress communications rely on the use of terrestrial MF, HF and VHF radiocommunications and communications using satellite techniques. Distress communications shall have absolute priority over all other transmissions. (...)

(...)

32.5A § 4A Each administration shall ensure that suitable arrangements are made for assigning and registering identities used by ships participating in the GMDSS, and shall make registration information available to rescue coordination centres on a 24 hour day, 7-day week basis. (...)"

Therefore, the importance of the continuous provision of distress communications enabled by satellite systems is both confirmed and recognized in the RR. However, not all satellite communications are suitable for distress operations. In this regard, it is important to note that mobile earth stations used for GMDSS are operated by non-GSO systems within frequency bands allocated for the mobile-satellite service (MSS). Those frequency bands and its application must be explicitly recognized in the RR, Volume 2, Appendix 15.

As outlined before, GMDSS distress, urgency, and safety communications hold priority over non-safety communication within the same satellite system. It is also required to maintain a continuous automatic monitoring for distress alerts relayed by those satellite systems. Therefore, maintaining uninterrupted service is crucial for triggering distress events via satellite communications when needed.

It is also highly important to recognize that aeronautical mobile-satellite (R) services are provided by non-GSO systems. According to the No. 1.36 of the RR, Volume 1, this service is also used for safety communications:

*"**1.36** aeronautical mobile-satellite (Route) service: An aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes."*

Global communication services provided by non-GSO systems enable continuous aeronautical communications that are crucial for safety services. These services offer information to ensure the safe and orderly flow of air traffic, directing aircraft on the ground and in controlled airspace, and providing updates

[3] ITU, 2024. RR, Volume 1. *"1.59 safety service: Any radiocommunication service used permanently or temporarily for the safeguarding of human life and property."*

regarding aircraft in distress while still in flight. This contributes significantly to the efficiency of search and rescue efforts.

Based on the previous information, it is evident that there is an imperative need for reliable satellite communications to effectively respond to distress events. The non-GSO systems, which currently provide global communication services and have adhered to the ITU regulatory framework, are now recognized by the RR as suitable for the provision of safety of life services.

Challenges facing AI 1.5 (WRC-27)

Agenda item 1.5 aims to study potential regulatory measures to limit the unauthorized operations of non-GSO FSS and MSS earth stations in the Earth-to-space direction in order to cease such operations, taking into account technical and operational aspects, and to conduct studies on regulatory measures and its implementability without adversely affecting the provision of service in the rest of the service area of the non-GSO satellite system.

Potential measures addressing this agenda item may include the restriction of non-GSO satellite services in certain regions or countries and the application of such a regulatory framework to all non-GSO satellite systems will negatively impact those that provide safety of life services.

With the current generation of non-GSO satellites, it is technically impractical to precisely switch coverage on and off over a specific country. As a result, attempting to exclude a particular area would cause significant service disruptions in surrounding regions. This could potentially lead to unintended negative consequences on the satellite communication provision and disruption of safety of life services in the affected regions.

In situations where a ship or an aircraft is experiencing distress, it is imperative that communication systems function promptly and efficiently. Any regulatory framework that introduces uncertainty, additional authorization requirements, or operational restrictions for safety services could potentially lead to loss of life.

Furthermore, the absence of satellite services over any portion of a jurisdiction's territory, whether through deliberate blocking or unintended regulatory consequences, carries the serious risk of isolating that area from essential safety-of-life services in its airspace and maritime zones. Without these services, ships and aircraft transiting these areas could lose their only reliable means of communication for distress alerts, emergency coordination, and navigation support, leaving them vulnerable during critical situations. Such isolation not only undermines compliance with international obligations under the SOLAS Convention, the ITU Constitution, and the Radio Regulations, but also jeopardizes the ability of rescue authorities to respond effectively, potentially resulting in avoidable loss of life.

International conventions regulate the protection of life services by establishing unified principles and rules for their reliable provision. Those require the enactment and enforcement of all pertinent laws, decrees, orders, and regulations, and mandate taking necessary steps to implement these regulations effectively to ensure the provision of services for safeguarding human life.

In this regard, and as stated in the RR No. 31.15, 32.1, and 32.5A, safety of life operations, such as distress communications, have absolute priority over all other transmissions and must be ensured its continuous operation. Further, RR No. 4.9, 30.2, and 30.3 state that no provision of the RR prevents the use of a mobile earth station in distress to request attention and provide or obtain help.

With this, any cessation or disruption of non-GSO MSS satellite operations providing safety of life services will adversely affect assistance in distress situations. Likewise, by limiting the coverage from non-GSO MSS satellite systems, and restricting the use of earth stations, numerous satellite services for distress operations will be negatively impacted, potentially creating communication gaps during life-threatening emergencies.

It is also important to recognize that any new possible regulation that may negatively impact the provision of safety of life services contradicts the principles outlined by the ITU which include promoting measures to ensure the safety of life supporting the use telecommunication services.

Conclusion

While the ITU, through its Constitution, fully recognizes the sovereign right of each State to regulate telecommunications within their borders, it also recognizes the importance of promoting the adoption of measures for guaranteeing the safety of life operations through the cooperation of telecommunication services.

As non-GSO satellite communications are an essential element for the provision of safety of life services at sea and air, even more when terrestrial communications are not available, the compliance of its regulatory framework, its protection, and its uninterrupted provision must be guaranteed in order to prevent any negative impact on its operation and to avoid any possible loss of human lives.

Therefore, CITEL Member States are urged to consider that any possible regulatory and technical consideration concerning WRC-27 agenda item 1.5 must facilitate and enhance the operation of non-GSO satellite systems with the aim of not affecting its efficiency and usefulness. Especially, considerations must be taken into account when analyzing the critical need of having reliable and uninterrupted non-GSO MSS communications for safety of life services.