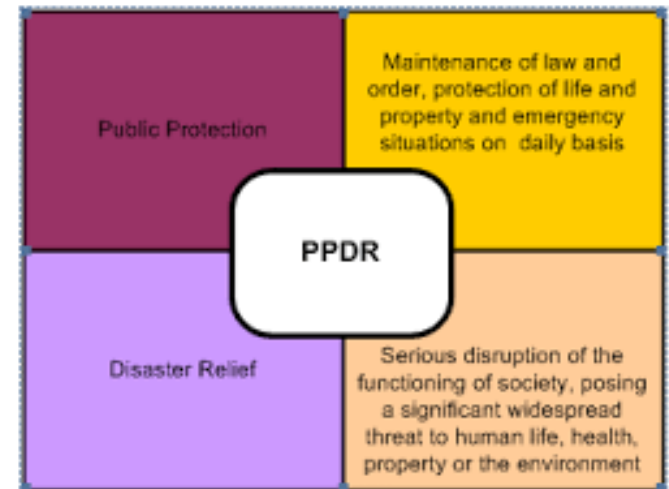




# Outcome of World Radiocommunication Conference, 2015

**Radiocommunication Bureau,**  
International Telecommunication Union

# Mobile services

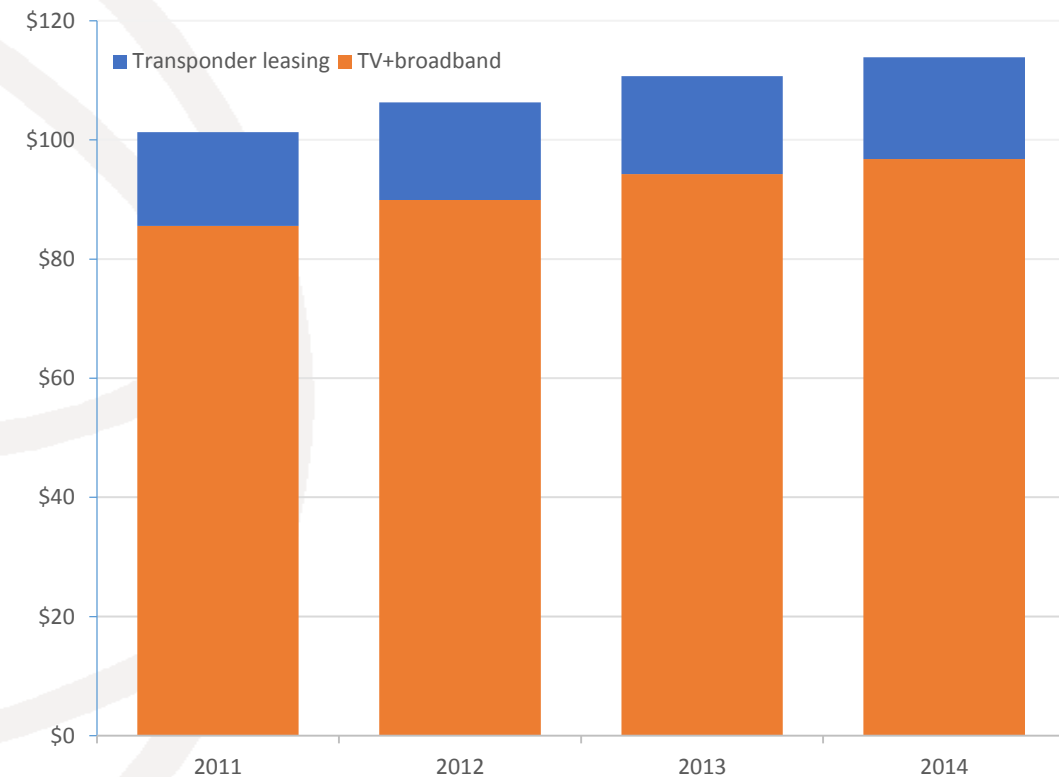


	Broadband mobile	PPDR
<i>Issue</i>	New applications, growing requirements for high data rate	New requirements for high data rate (video)
<i>Economic effect</i>	Worldwide annual revenue $\approx$ 3 trillion US\$ ( <i>GSMA,2015</i> ) 7.1 billion users, 2015 ( <i>ITU,2015</i> )	1980- 2005, 7000 natural disasters, 2 million lives, economic losses 1.2 trillion US\$.
<i>WRC-15 decision</i>	Identification of harmonized additional 318 MHz in more than 80% countries (total 1228 MHz) +10% in Region 3 (total 976 MHz)	Encouragement to use harmonized bands 694 – 894 MHz – Global 4 940-4 990 MHz – Region 3 Use Rec. ITU-R M.2015 for national planning
<i>Impact</i>	Economy of scale, increase number and quality of service, interoperability	Economy of scale, interoperability, cross-border circulation

# FSS allocations

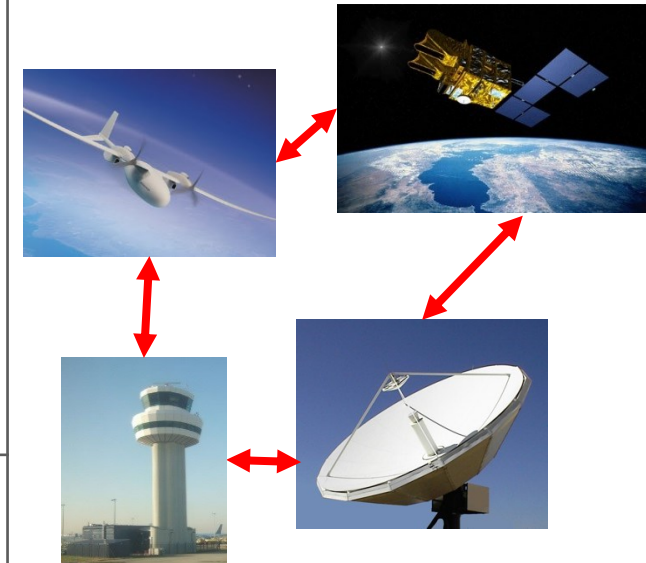
- **Issue:** Spectrum/GSO overloading. About 480 existing satellites. 18 satellites to be launched each year . Difference in up/down link allocations for symmetric traffic
- **Economic effect:** FSS revenue in 2014 - 112 billion US\$ **WRC-15 decision:**
  - ✓ 250 MHz up-link in Region 1,
  - ✓ 250 MHz up-link in 30 countries of Regions 1 and 2
  - ✓ 200 MHz in 10 countries of Region 3
- **Impact:** Enhance satellite access and service delivery, competition, reduced cost per transponder

FSS WORLDWIDE REVENUE (SOURCE-SIA)



# FSS applications

<b>Issues</b>	Use FSS band for UAS (Unmanned Aircraft Systems)	Operational restrictions for ESVs (Earth stations on Board Vessel)	Use FSS bands for ESOMPs (Earth Station on Mobile Platform)
<b>Economic effect</b>	Future use for civil aviation	Annual revenue 1.8 billions US\$	Use of existing infrastructure
<b>WRC decision</b>	Possibility to use Ku band: 970 MHz globally, 1520 MHz regionally, Ka band: 1000 MHz globally Antenna pattern specification	Min 1.2m antenna in C-band (2.4m before) Increasing of coordination distance- from 300 to 320 km	Use of 500 MHz in Ka-band under defined technical conditions ITU-R studies
<b>Impact</b>	Framework for new ICAO standard and ITU studies up to 2023	Simplification operation and installation, ↓ service cost	New ICT services for all kind transport



# FSS regulation

- **Issue:** Complexity, length and recourse consuming satellite frequency registration procedures
- **Economic effect:** up to 15-20% cost of satellite project
- **WRC decisions:**
  - ✓ Suppression of API (Advanced Publication Information)
  - ✓ Reduction of coordination arc
  - ✓ Reduce regulatory period of suspension day-by-day
  - ✓ Increase transparency when one space station is used to bring into use assignments to GSO networks at different orbital locations within a short period of time
  - ✓ BR is requested to provide a reason for query on orbit use
- **Impact:** Facilitation of spectrum/orbit access for new comers, decreasing of transactional cost



Photocredits: ITU/SHUTTERSTOCK

# Radiolocation service

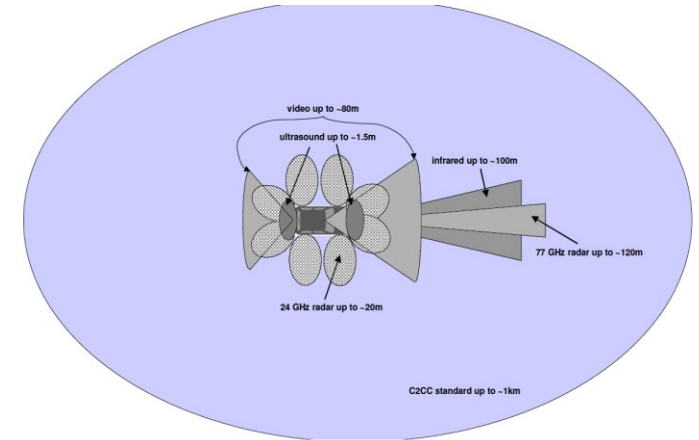
**Issue:** Introduction of Intelligent Transport System- safe, efficient user-friendly and green road transport

**Economic effect:** Annual turnover 2.9 trillion US\$ (*European Union Road Federation*)

**WRC decisions:** Allocation of 500 MHz for ground based radar application- 4 GHz (77-81 GHz) worldwide continuous band for automotive radars

**Impact:** in EU in 2020 reduction up to 3250 fatalities and 52000 injuries after car accidents (*eImpact*)

Reduction of traffic congestion costs -EU 100 billion in 2013 (wasted fuel, insurance, delivery delay, damage of cargo)



# Maritime services

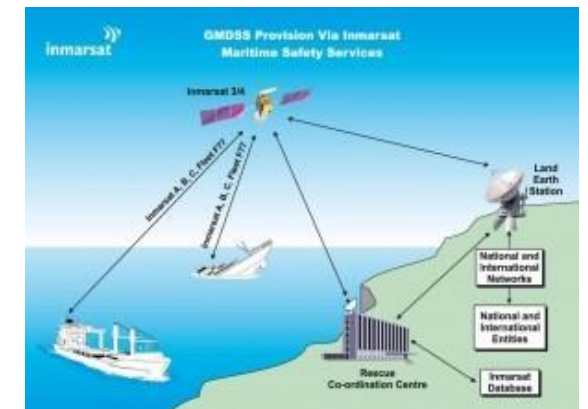
**Issue:** Overloading existing maritime spectrum, introduction of broadband applications, safety of life requirements

**Economic effect:** 0,5 trillion US\$ (UNCTAD, 2014)

**WRC decisions:**

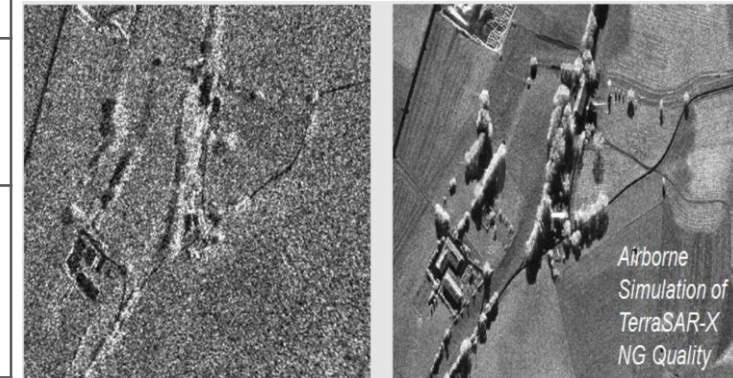
- new channel arrangement for on-board communications- introduction of digital modulation, mod App
- 161.9375-161.9625 MHz and 161.9875-162.0125 MHz for MMSS (Earth-space) – satellite receipt of AIS (automatic identification system )
- 400 MHz allocation for MMSS (space-Earth)- new broadband

**Impact:** increase safety and efficiency of maritime transport, global coverage, introduction of new broadband services on ships



# EESS allocations

	TT&C (telemetry, tracking and command systems)	Active sensing
<b>Issue:</b>	Only TT&C 2 025-2 110 MHz and 2 200-2 290 MHz. About 100 existing and up to 90 new satellites to be launched until 2019 ( <i>FAA</i> ). High-speed data for operations and software modifications. Existing TT&C 8 025–8 400 MHz allocation.	Existing EESS (active) allocation in 8-9 GHz 600 MHz. Higher resolution (less than 0.2 m) requires continuous 1200 MHz
<b>Economic benefit</b>	in EU decreasing of economic losses caused by natural disasters up to €61.5 billion/year ( <i>Eumetsat</i> )	
<b>WRC-15 results</b>	Primary EESS up-link allocation of 80 MHz	Primary EESS(active) allocation of 600 MHz (RR No. 9.21 in 8 countries)
<b>Impact</b>	Simplification operation and maintenance, ↓ service cost	New high resolution scanning service





# Aeronautical services

	<b>GFT (Global flight Tracking)</b>	<b>WAIC (Wireless Avionics Intra-communications)</b>
<i>Issue</i>	Lack of global tracking , e.g tragedy of MH370	Wire lines-up to 30% plane weight
<i>Economic effect</i>	2,4 trillion US\$ or 3,4% global GDP ( <i>ATAG: Air Transport Action Group</i> ) supported by aviation	
<i>WRC-15 decision</i>	New allocation of 4.6 MHz for ↑AMS(R)S	Allocation of 200 MHz for AMS(R)
<i>Impact</i>	Improving safety of flight and rescue operations	Producer's surplus 21 billion US\$/year, ↓CO <sub>2</sub>



# Future Universal Time

- **Issue:** UTC adjusts atomic time UT1 and ephemeris time TAI based on Earth rotation time by the insertion of leap seconds. Digital systems are highly dependent on keeping very precise time synchronization
- **Economic Benefits:** to prevent discontinuities that can lead to serious financial consequences in case of time maintenance or failure
- **WRC-15 decision:** Keep current UTC until WRC-23
- **Impact:** Currently, there are **4 billion GNSS devices** in use worldwide and the number will **triple by 2023** (*GNSS Market Report*)

**7% of EU GDP GNSS** dependent (*Munich SatNav Summit 16*)



## WRC-19

- ***Future broadband-*** RLAN (6 GHz), pico- femto- cells (24.25-86 GHz,) IoT (Internet of Things), HAPS, global NGSO FSS ( >30 GHz) , identification in 275-450 GHz for land-mobile and fixed services
- ***ITS (Intelligent Transport Systems) and unmanned transport-*** M2M for maritime, railway, road transport
- ***Green economy-*** wireless power transmission
- ***Pico- nano- satellites-*** specific band and protection of existing services
- ***Safety of life-*** development of Global Aeronautical and Maritime distress and safety systems (GADSS and GDMSS)

- Thank you