DELIBERATE INTERFERENCE – WHAT CAN BE DONE

WBU-ISOG Forum 16:30 – 17:30 18th November 2014

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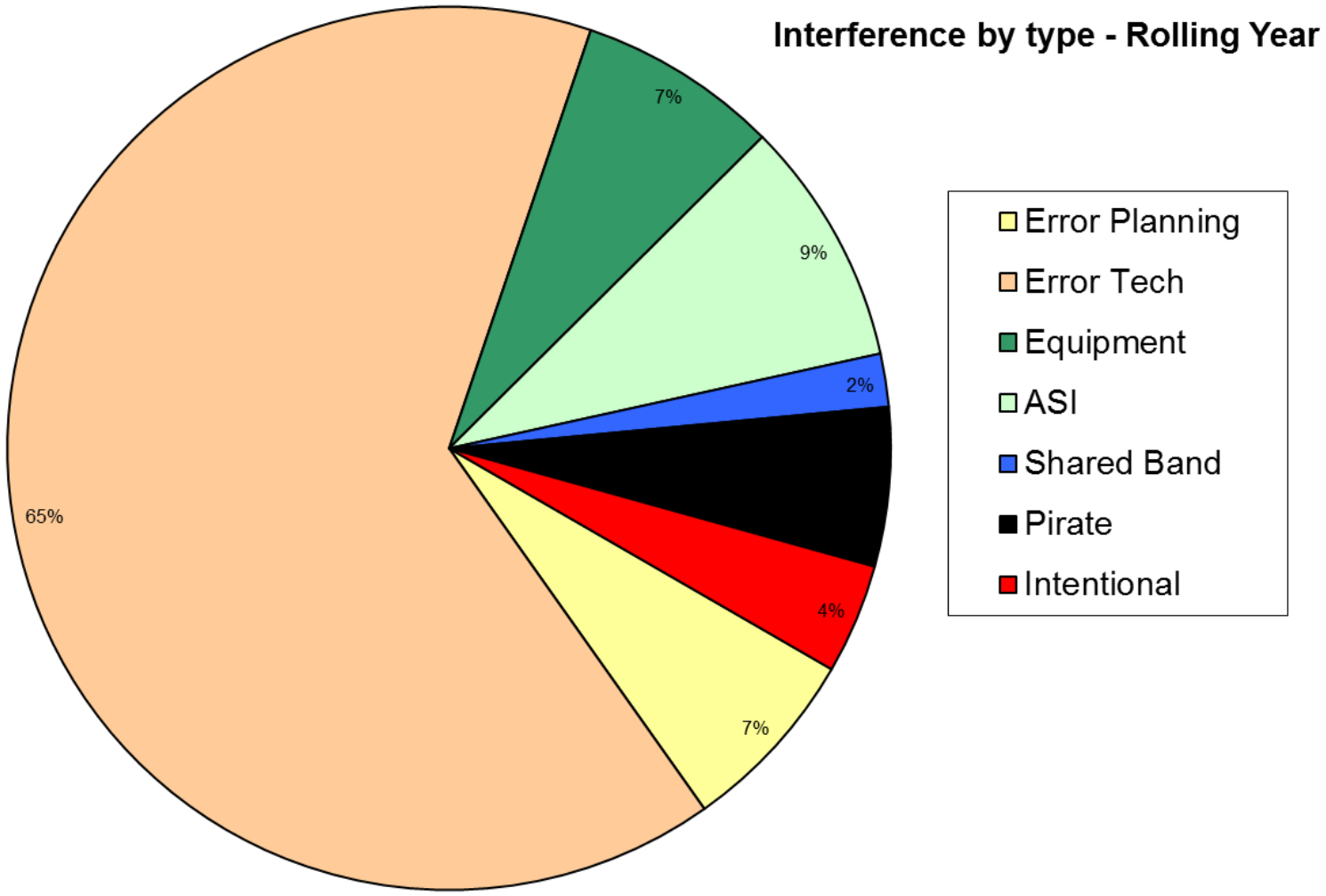
INTERFERENCE ORIGIN



JAMMING TO SATELLITE BROADCASTS

Satellites contribute to the free flow and dissemination of information "regardless of frontiers" .

Whenever there is interference (whether voluntary or not), there is automatically breach of freedom of expression and information

Two years ago, by end of 2012, the overall situation with regard to deliberate jamming was very alarming.

In 2014, the situation seems to have massively improved as the volume of jamming has decreased.

January 2011:	**148 min**
March 2012:	**4,714 min**
May 2013:	**46,000 min**
August 2013:	**53,000 min**
January 2014:	**6,250 min**
May 2014:	**1,610 min**

JAMMING AND NEW CHALLENGES

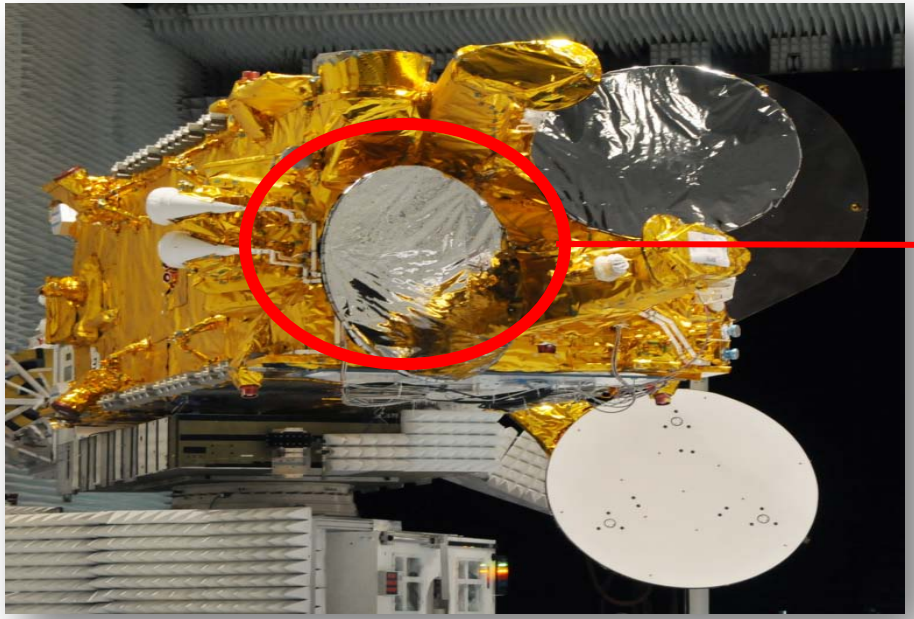
- The nature of intentional jamming forces to re-think practically across the board for a satellite operator for **monitoring the QoS delivered to our clients**, **detection of jamming** and **implementing counter-measures:**
  - ➔ **Satellite concepts and technology**
  - ➔ **Ground monitoring systems**
  - ➔ **Consumer terminals**
  - ➔ **Organization of teams and processes, internally within the company and with our clients**

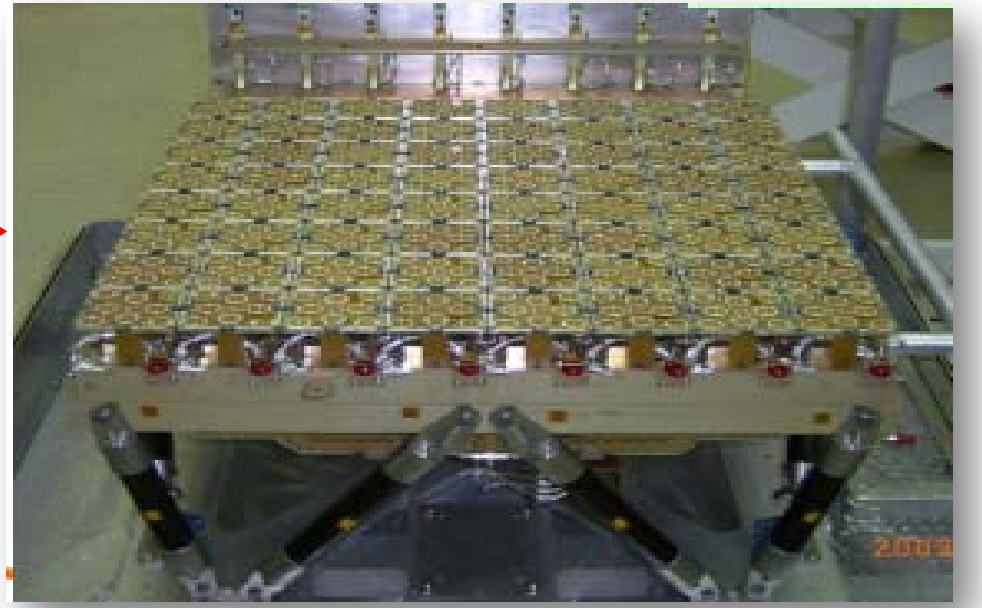
- Actions need to be also undertaken through **associations** of peers to counteract jamming actions, and through **institutional and political actions** to raise awareness for **new regulatory and legal framework**

- The challenge is to develop the most advanced techniques in space and on the ground that can **bring more resilience against jamming** and to develop highly skilled integrated teams that can react quickly and efficiently

- **It is the people, more than the technology, that ultimately raise the level of QoS**

Future Technical Trends – Satellite Receive antennas





Mechanical reflector antennas

- beam shape is fixed
- jamming direction detection achieved separately
- isolation from jamming is provided
  beam pointing mechanically away
  from the jamming direction(s)

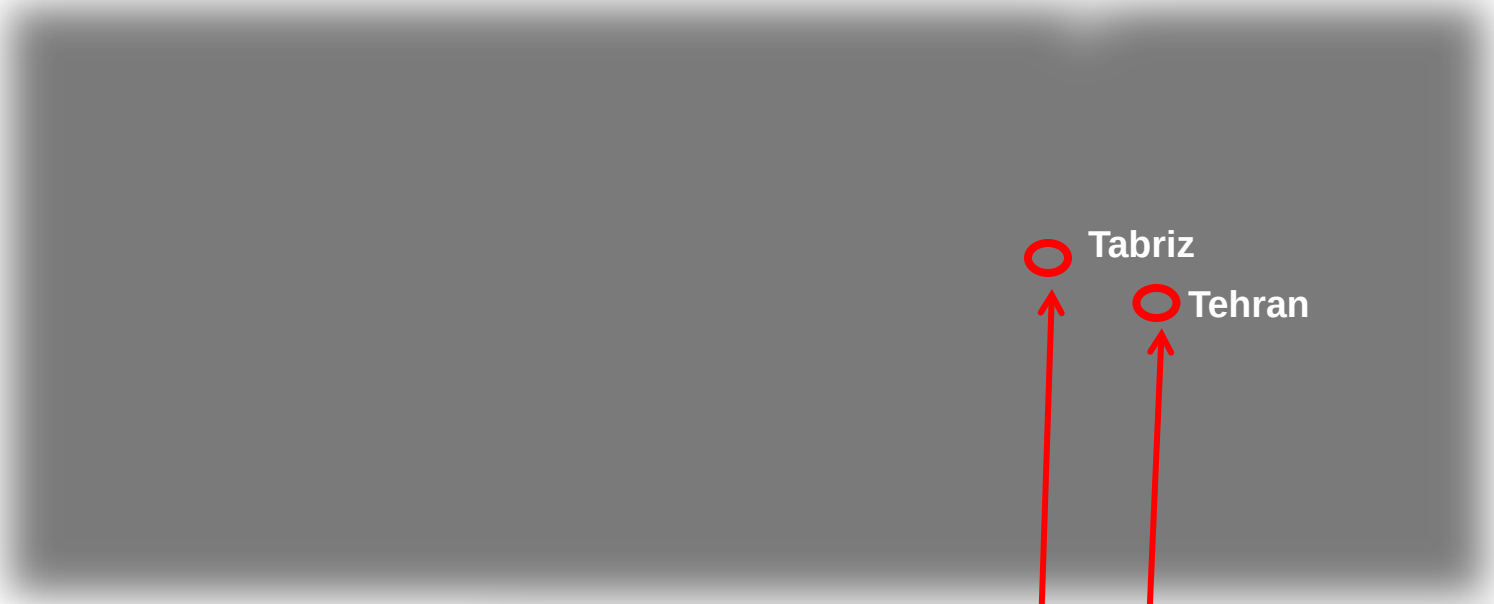
Active antenna (Earth deck)

- beam shaping electronically
- shaping of useful receiving zones
- also used for jamming direction detection
- shaping of receiving beam for exclusion zones

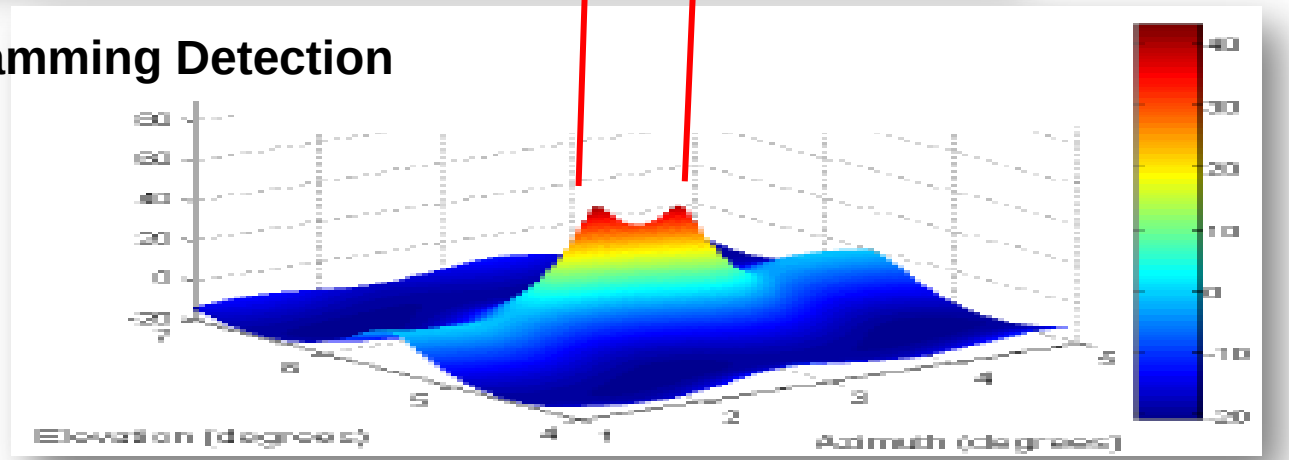
TODAY

TOMORROW

Jamming directions detection and isolation



Example simulation:
Active antenna providing
5 uplink zones and isolating
Tabriz and Tehran after
jamming direction detection



C BAND FREQUENCY PROTECTION

- • The wireless industry's spectrum-demand estimates are overblown
- • The spectrum already allocated to the wireless industry is under utilized
- • C-band satellite services are of vital importance to key user groups, including broadcasters, civil aviation, disaster response, humanitarian, and many others
- • NOC allows for those nations who still want to "opt in" and permit IMT services at extended C-band to proceed without a global identification that would disadvantage the many nations who want to continue to support C-band satellite applications delivered via C-band.
- • NOC must also be the position pertaining to all other satellite spectrum.

AFRICA - USE OF C Band IS A LIFELINE

- **7000 C Band terminals in Nigeria, DRC an Angola alone!**
- **70 satellites deliver C Band services to Africa**
- **370 TV channels delivered by C band into Sub Saharan Africa**
- **Air Navigation, Telemedicine / Health, Security and Defence, Critical Communications / Disaster recovery, Broadcasting, Telecoms, Finance and Banking, Bridging the digital divide, Oil / Gas / Mining, Agriculture / Water access…**

BUT….

We are on top of it – Eutelsat notices:

- 30% increase in satellite capacity, 10% increase in interference cases
- Time to solution reducing

How?

More information – we are TALKING about it WHILST we are DOING something about it…

- Investing in Training and informing, our teams and the satellite users
- Improving our own monitoring and control systems and processes
- Identifying interference hotspots – targeting our efforts
- Industry Collaboration, even with our competitors to resolve problems and protect our operating environment
- Antenna type approvals, testing and validation, maintaining the quality of the equipment pointed at our satellites