Stopping Interference Before It Starts

Recent figures from the Satellite Users Interference Reduction Group 'SUIRG' make interesting reading. For the past few years SUIRG has been analysing incidents that interfere with satellite transmissions – and these total some 4,000 reported each year, which raises an interesting question as to how many interference incidents go unrecorded!

Operator error or omission associated with the uplink ground segment has been identified as a critical factor. There have been too many avoidable incidents of 'wrong satellite / wrong frequency / wrong power level / wrong polarity / no communication with the satellite operator' and/or poor maintenance.

The official SUIRG incident figures for 2005 for global interference placed human error at 15.8%; adjacent satellite 7.3%; terrestrial services 0.8%; cross-pol 14.0%; equipment malfunction 39.7%; deliberate 0.7%; and unknown 21.7% - although much of the 'unknown' is put down to operator errors which are quickly realised and corrected!

Not unexpectedly, Africa and South America exhibit the highest incidences of human error, while Asia has a major problem with adjacent satellites… and satellite antennas that are too small.

Asia comprises sixty-three countries and the greatest cultural diversity on the planet. Sixty-three countries mean sixty-three operating Administrations each with its own regulatory environment. Furthermore, Asia is saturated with satellite operators. There are at least twenty-two operators offering service. Competition is intense and inter-operator relationships are competitive and sometimes uncooperative.

From experience within the industry and through association with the Asia-Pacific Broadcasting Union (ABU), and the Cable and Satellite Broadcasting Association of Asia (CASBAA), the realities present some difficult hurdles:

- Complaints to some Administrations regarding satellite interference generated by their operators elicit slow or ineffective responses.
- Countries (and some non-government entities) have deliberately jammed legitimate transmissions with apparent impunity.
- The skills and standards required of ground system and satellite system operators varies widely. Antennas whose side-lobe performance causes rejection by one operator, find space on the satellite of a less experienced or hungrier operator - and hence excessive adjacent network interference is common.
- Installation crews are rarely properly equipped. It is common for operators to have to explain to an inexperienced installer how to adjust the polarisation angle on a VSAT. Maladjusted antennas are a frequent interference source. Pick up of FM Radio stations that are subsequently up-converted and appear on another channel on the satellite are common occurrences. The culprit here is poor installation practice with long unprotected cables.

- Finding a common language of communication between operators on duty at the various satellite organisations can be an issue. Though English often serves as a common 'lingua franca' it is by no means universal. Reporting and correcting problems can be difficult and complex.

- Sub-tropical and tropical environments cause rapid performance deterioration from earth stations that are not properly maintained. Working stations then suddenly become a source of interference.

- Some operators fail to properly test new equipment which results in spurious signals appearing in other parts of the satellite. The rush to get paying customers into service drives this behavior.

A remedy to the above predicament lies in improved awareness of the interference problem together with appropriate skills training for satellite uplink operators. Research within the Asian satellite environment indicates that two-thirds of reported interference problems stem from undisciplined uplink power control, FM radio pick-up, and Satellite News Gathering (SNG) units uplinking to the wrong channel.

Therefore, right across the global satellite industry, there is a call for proficiency training and certification to encourage operational excellence in uplinking procedures.

To complement this thrust, SUIRG will be focusing on three specific areas during 2006: interference source identifiers, training certification procedures and protocols, and clarifying 'unknown' interference sources. BeaconSeek's Jonathan Higgins will be part of that initiative!

The Asian satellite interference problem was brought to Jonathan's attention by a New Zealand distance learning organisation that specialises in delivering unique vocational training through a blend of e-technologies. e-Blended Learning Solutions Ltd and BeaconSeek Ltd have teamed up to produce an interactive on-line uplink training course to meet the needs of the satellite industry. This initiative will introduce a very different approach to uplink training. It will be compiled in multiple languages, incorporate CD-Rom and on-line components, animation, professional explanatory video, practical self-paced learning with tutorial support, along with immediate and progressive assessment. Content will be industry sourced and academically approved with SUIRG over viewing proceedings and certification. Having succeeded and passed the informational and theoretical components, participants can elect to be practically assessed in a real live uplinking environment. Jonathan's two books published by *Focal Press* "Introduction to SNG and ENG Microwave" and "Satellite Newsgathering" will be recommended texts for the course.

Satellite interference remains an on-going and increasing global problem – it is a cancer that occurs unexpectedly and undermines our communications business. Mitigation is vital.
The combined BeaconSeek / e-BLS uplink training course will be made available world-wide. Initially it will be targeted at Asia, and will quickly become available in North and South America, Europe and the Middle East. Successful implementation will enable a global certification programme that will serve the industry worldwide.

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