Flying high with Field Operations

The ACMA's Field Operations Section has many responsibilities, including the important role of identifying and resolving interference to radiocommunications services. Recently, the team received notice of interference to the new 6.8 kilometre CLEM7 tunnel in Brisbane. An ACMA team was assembled to investigate the issue.

The CLEM7 tunnel is one of the largest infrastructure projects ever to be completed in Queensland. Construction of the $3 billion tollway commenced in September 2006 and was completed seven months ahead of schedule in March 2010. The CLEM7 opened to traffic on Monday 15 March 2010, with more than one million trips recorded in the first three weeks of toll-free operation.

In May this year, the ACMA's Field Operations Section received a report about interference to CLEM7's land mobile radio systems. The interfering signal only seemed to occur between 9.00 am and 11.00 am for a period of exactly two hours. The CLEM7 communicating systems operate immediately above 403 MHz in the land mobile band.

In an effort to track down the interference, Field Operations officers used a range of direction finding equipment, including the new Rhode and Schwarz PR100—a receiver used to ascertain where the interference is coming from. The issue, they discovered, was that every week the interference seemed to change direction.

In June, the team attempted to triangulate the direction of the interference to get a clear indication of where it was coming from. The result: a firm direction towards Morton Island, which indicated the interference could be associated with shipping, dredgers, wave buoys (used to measure wave height) or channel buoys (used to help guide shipping into busy ports).

'After researching possible licenses on RADCOM and contacting the Brisbane Port Authority, we received confirmation that they were not aware of any devices that were operating in the 403 MHz range. The direction of the interference then changed once again,' said ACMA Field Operations Officer, Ian Barker.

Many theories were put forward by the team, including the possibility that a ship was moving up and down the river creating a moving interference vector. Another thought was that surveyors could be moving a malfunctioning or spurious differential global positioning system (DGPS) from location to location. A DGPS is used by surveyors as an extremely accurate measuring tool.

One morning as the team was monitoring the CLEM7 interference signal from the ACMA office in Brisbane, Dhammika DeSilva, from the Interference Management and Monitoring Section, said he had heard a similar signal while working in Fiji. Dhammika suggested that this interference may be caused by a weather balloon's radiosonde transmitter, which measures various atmospheric parameters and transmits them to a fixed receiver.

'This information seemed to fit with the type of interference we were experiencing,' said ACMA Field Operations Officer Michael Cooper. 'Some quick phone calls to the Brisbane office of the Bureau of Meteorology confirmed that they released a weather balloon every morning at 9.00 am with a radiosonde attached that transmitted on a frequency of approximately 403 MHz.'

The next morning, members from the Field Operations team met at the Brisbane Meteorological Weather Station and proved that the weather balloon's transmitter was causing the interference. This of course explained why the position of the interference kept changing. The wind direction would be consistent for a week, for example, giving the teams great direction readings, and then suddenly change with a new wind direction.

The Brisbane Meteorological Weather Station advised the Field Operations team that, while they have a spectrum frequency allocation of 400–403 MHz, the frequency of the transmitter on the weather balloon was drifting above this range and causing interference to CLEM7's land mobile radio systems.

Radiosonde's weather balloons are classified as meteorological aids. The Australian Radiofrequency Spectrum Plan allows their operation between 400.15 and 403 MHz. However, the radiosondes being used in Brisbane were causing interference because they were operating above 403 MHz in spectrum allocated for land mobile services.

This is potentially a national issue and the Field Operations Branch is currently working with the Australian Bureau of Meteorology to prevent any further interference to land mobile radio systems.

The cause of the interference to Brisbane's CLEM7 tunnel: a small transmitter located inside a meteorological balloon.

A meteorological balloon, similar to the one that caused the interference.

A tracking radar device used by the Bureau of Meteorology.