Radcomms: A Day in the Life

SPEECH BY ACMA CHAIRMAN CHRIS CHAPMAN TO OPEN RADCOMMS 2006 CONFERENCE, SYDNEY, DECEMBER 2006

Talk to any big user of spectrum—telecoms operators, defence, space scientists, meteorologists—and they will all say that more spectrum is needed every year. But our ability to 'supply' spectrum, to make it available for use, is increasing very slowly. Even the higher bands, while able to carry more data, can only carry it over very short ranges. In effect, we will run out of spectrum unless we do something about it—which is the purpose of this conference.

Let me give you an example of a day in my life, which just as easily could be a day in your life.

I wake at 6.00 am to radio news brought to me at a frequency of around 702 kHz. After breakfast, I check my emails on the laptop—connected to the phone line by a wireless local area network operating at 2.4 GHz. I can't get a connection. Fiddle with the settings. Shut down. Restart. Still no connection. Now I'm running late. I dash out to the verandah, where my daughter is listening to music through a pair of wireless speakers. Puzzled, I say goodbye, go to the garage and unlock the car and garage doors with two remote keys operating at around 400 MHz.

On the Pacific Highway, traffic signs warn me of a delay ahead—they and the cameras that detect the traffic are linked back to the control room using 18 GHz fixed links. The traffic report on the radio has been fed back to the radio newsroom at 410 MHz from the helicopter overhead. Once past the delay at the Lane Cove construction works, I try to make up time. A flash registers in the corner of my eye. There'll be a ticket with photo attached in the mail—thanks to a radar gun at 10 GHz reporting back to base on a 2 GHz microwave link.

I cross the Harbour Bridge and head for the 'E' lane. There's a 'bleep bleep' as I pass through the toll gates—my E-Tag operating at around 5 GHz. Just then, the mobile rings—at 900 MHz—and use the hands-free, operating wirelessly with 'bluetooth' at 2.4 GHz. It's our Media Manager requesting we meet early to discuss a breaking story ... didn't I get his email?

Finally, I arrive at work. My 920 MHz swipe card opens the car park boom gates. My 400 MHz key locks the car doors. A 2.4 GHz motion detector keeps my vehicle safe throughout the day. As I approach the entrance to the office, a 10.5 GHz motion detector 'sees' me and the doors slide apart.

At my desk, I connect my laptop using the office's 5.8 GHz LAN and check my daily Ofcom alert—transmitted from London via satellite at 4 and 6 GHz. I catch the latest overseas market reports—coming directly to the antenna on the roof of our office, again via satellite, at 14 GHz. I make phone calls from a portable hands-free operating at 1800 MHz. Then it's time for the 9.00 am videoconference with one of our regional teams, streamed from Coffs Harbour to Sydney using fixed links at 6 and 7.5 GHz. At 10.30, I leave the office to fly to Canberra.

At Sydney airport, the flight's been delayed—a chance for some Christmas shopping. I buy my son a miniaturised helicopter that operates in the 27 MHz band and a mobile phone for my daughter that can download video on the 850 MHz band. At the checkout, the gifts are scanned at 925 MHz. While I'm handing over my credit card, there's a commotion to my left as the 918 MHz band helps apprehend a shoplifter. I hear the boarding call and make my way to the gate. Twenty minutes later, the plane is taxiing along the runway—ground guidance courtesy of 126.5 MHz. Take-off.

At 30,000 feet, the steward serves coffee while I read the paper and relax. In the cockpit, pilot and crew are monitoring the instrument panels. Air traffic control direct them using radar in the 2.9 GHz and 1.2 GHz bands. GPS guidance on 1650 MHz establishes the correct course to Canberra. Air traffic control coming in at 129.7 MHz ensures traffic avoidance. Automatic direction-finding at 428 kHz makes sure we stay on course. At Canberra airport, air traffic control on 118.7 MHz authorises the plane to land. An instrument landing system at 109.5 MHz brings it down safely, even though visibility is limited.

My taxi, dispatched by a call on 820 MHz, takes me to our Canberra office, where it's meetings, emails, phone calls, emails, phone calls, meetings, and then back in the taxi, on the plane and take-off.

By the time I reach the Sydney office, it's been a long day. I drive home, listening to a favourite CD, not noticing the lights ahead turning red. The vehicle in front of me slows suddenly. My reactions aren't quick enough, but my car's collision-avoidance radar at 26 GHz prevents an accident.

I'm home in time for the 7.00 o'clock news, brought to me by 750 MHz and linked from the TV studio to the transmitter at 2.3 GHz. My son is watching a DVD, but I pack him off to the other room, where he tunes into pay TV at 14 GHz from a satellite. My daughter's on the verandah again, listening to that incessant music through her wireless 2.4 GHz speakers linked to the MP3 player in her bedroom.

I flip open the laptop to check my emails, but again it refuses to connect to the 2.4 GHz wireless LAN. Baffled, I turn back to the news. An Al Qaeda stronghold in Afghanistan has been detected and destroyed. What the news doesn't tell me is that behind the scenes there was a network of surveillance satellites operating in various frequency bands listening to the 400 MHz land mobile radios used by the terrorists. This information was relayed to the strike aircraft using 800 MHz UHF and 15 GHZ tactical data links. The target was destroyed within 10 minutes of being detected. This story is followed by a live cross using 2.5 GHz to an outside broadcast unit reporting on the bushfires in north-east Victoria.

As my laptop's wireless connection mysteriously springs into life, acquiring the 2.4 GHz network, I notice my daughter wandering into the kitchen ... and the music from the verandah has stopped.

While realisation is finally dawning on me, I go to the Bureau of Meteorology website to check details of the weather report I heard on the news. The colour weather radar operating at 5 GHz confirms that a storm is on its way from the south-west. Somewhere overhead, a meteorological satellite is using five different bands to gather the data used in meteorological modelling. Hail is predicted. I go out to close the garage door—at 400 MHz. Back in the house, I shut all the windows and doors. In the kitchen, I microwave last night's leftovers at 2.5 GHz. Back in front of the TV, I wait for the storm.

This is today. It could be any day. A day in my life. A day in your lives. A day in the life of radio spectrum. And what about tomorrow?

In the future, every device in your house will communicate over the internet, wirelessly, using bands like 2.4 GHz, 5.8 GHz, 76 GHz, and maybe even infra-red. This will need more spectrum.

Our children will soon download entertainment on demand, requiring 10 times the bandwidth we're using today. This will need more spectrum.

The Department of Defence will operate as a network-centric unit requiring communications anywhere, any time in times of conflict. This will need more spectrum.

On the way to work and school, you and the children will be able to watch mobile TV and download from the internet, whereever you are. The world will become your virtual office, whether you are sitting at home, in your favourite café, or on the move in a taxi or train. This will need more spectrum.

Global warming will mean that earth-monitoring is more important than ever, not just to monitor the fingerprints of nature—those little signals that let us predict the weather—but to check up on producers of greenhouse gases and destroyers of forests. This will need more spectrum.

But there's one slight problem. No, it's a major problem. Essentially, there is no more spectrum.

Working out how best to use this finite resource, how to allocate it in an equitable way, is one of ACMA's chief responsibilities. As demand for spectrum increases, as more and more devices are deployed, as consumers expect greater speeds coupled with greater mobility, as wireless increasingly becomes the platform for delivery of broadcasting, telecommunications and other services, radcomms may well emerge as one of the foremost planning issues in this country and internationally.

As demand rises, as technologies change, as noise and congestion issues become increasingly pressing, solutions for spectrum management will need to be more innovative and imaginative. Solutions are generally complementary: developing delivery technologies that are more spectrum-efficient, including switching to digital television, and introducing sophisticated methods for sharing spectrum such that one service doesn't knock another 'off-air'—as I recently discovered my daughter's wireless speakers were doing to my laptop's wireless LAN!

ACMA is actively working towards scenario planning for solutions and management strategies. But optimum solutions will require your input. It's got to be a joint effort. In part, that's because successful spectrum management is complex and ultimately demands a joint solution. In the end, somebody, everybody, will have to compromise on spectrum rights they may have taken for granted in the past.

It no longer makes sense to plan this or that part of the spectrum in isolation, as if each part were somehow discrete. Spectrum must be managed as a whole, and here a converged regulator comes into its own. No longer split between two agencies—the ACA and the ABA—the radiofrequency spectrum is now managed under one roof. ACMA has the appetite, and is rapidly developing the capabilities, to deliver fairer and more efficient spectrum management arrangements. We are increasingly well-prepared and well-resourced to take the lead in planning Australia's radcomms future.

We recently released a discussion paper identifying additional spectrum that could be used to support future wireless access services in Australia. It considers how making additional spectrum available for wireless access services can support competition and diversity in broadband services, and can also help satisfy the unmet demand for spectrum, particularly in regional Australia.

By bringing together representatives from industry, government and the community from across Australia, we aim to lead the way in offering a social and intellectual environment that promotes coherent dialogue and stimulates the lively exchange of ideas. Conferences like this provide ACMA with an opportunity to listen and learn from you. We want this conference, which we intend to make an annual event, to be instrumental in building the collaboration necessary for making spectrum utilisation and management in Australia world class. We can only do what's best for Australia's collective and national interest if we better understand each other's positions and perspectives.

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On a visit to Ofcom in the UK—widely regarded as the world's leading converged communications regulator—I learnt that Australia is better positioned than almost any other country to plan radcomms well. Ofcom's planning is constrained by the UK's geographical proximity to Europe and its political affiliation with Europe—UK policy has to be consistent with EU policy. Australia, being a comparatively isolated island nation, has a real and unique opportunity to get radcomms right.

Having said that, our systems must not be so unique that we cannot benefit from global developments—ACMA continues to keep in tune with radcomms internationally. In January, a team of our engineers will be going to Thailand for the first in a series of four meetings leading up to the World Radiocommunication Conference.

At the forefront of this decision-making, keenly scanning the horizons for new possibilities, you will find ACMA. Again, I invite you to enjoin the discussion.

The full text of Mr Chapman's speech is on the ACMA website at www.acma.gov.au.