

OVER THE HORIZON

Newsletter of the Jindalee Operational Radar Network

Vol 2 No 2

Jindalee Radar Wins an International Audience



Star attraction: Harrier jump jet used by defence forces around the world — The Photo Library, Sydney



Jindalee Over The Horizon Radar (OTHR) gained its first major exposure to potential international customers at the recent Paris Air Show – the world's biggest.

Defence Minister, Senator Ray, who visited the Australian stand at the show said later, "It is encouraging to see the technology being developed by Telecom Australia, as Jindalee prime contractor, being promoted overseas."

The airshow, held every two years at Le Bourget Airport and Exhibition Centre, attracts 100,000 visitors a day over 10 days. This year's show was the subject of controversy when some large American exhibitors withdrew, citing U.S. fears of industrial espionage.

But that, and an increasingly northern-hemisphere focus, did not diminish the over-all impact of the show: 1570 exhibitors showed

everything from aircraft components to civil and military aircraft and spacecraft. Exhibits ranged from small 10-sq. m. static stands to \$5 million displays – and, of course, spectacular fly pasts by some of the world's most advanced aircraft.

Senator Ray said international exposure of Jindalee OTHR could win significant benefits for Australian industry. "It's good to see Telecom strongly promoting a technology with significant export potential – with all that means in possible earnings for Australia."

Telecom is taking the lead with major projects in Australia, particularly those involving the research and development of unique solutions. Senator Ray said the Jindalee technology, originally developed by Australia's Defence Science and Technology Organisation, is a world leader and has numerous unique capabilities which

should appeal to foreign governments for both civilian and military surveillance.

Representation at the air show comprised Jindalee Project Commercial Director, Mr Lino Rizio, Business Development Manager, Mr Andrew Davis, and Technical Director, Dr Bob Jarrott. Mr Davis said the airshow was a cost-effective way of meeting potential customers, suppliers and strategic allies all in the one place.

"It provides a forum for the latest in numerous related fields of technology and, while we did not expect to come away from Paris with a full order book, it did prove to be a very useful vehicle for raising the international profile of Jindalee OTHR – and for discussions with potential users," he said. ■

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Another Boost for 'Australian Made'

The Jindalee Project's continuing commitment to involving local industry has been further strengthened by the appointment of Mr Frank Evans to the Adelaide project office.

Mr Evans, who is on secondment from the South Australian Industrial Supplies Office (ISO), joins Mr Jim Yarra who has been the resident representative of the ISO national network and based in the Melbourne project office since June, 1992. The ISO, an enterprise funded by State Governments, facilitates import replacement nationally. It is able to help the project in a number of ways through:

- Identifying potential Australian suppliers of equipment and services to Telecom and its sub-contractors.
- Assisting potential suppliers in maximising the Australian production in their proposals.
- Providing information to suppliers about Jindalee Project requirements.

Following a successful ISO secondment to the AMECON frigate programme, Telecom and the

Victorian ISO agreed to Mr Yarra providing his services to the Jindalee Project.

"The ISO has an important role to play in the promotion of Australia's industrial capabilities and the replacement of imports with competitive Australian products," said Mr Graham Sutton, Executive Director of the South Australian ISO. "Direct involvement in major projects like Jindalee means that we can be more effective in that role."

In addition to the secondments, State ISO offices throughout Australia have also selected individual staff members to facilitate Australian industry's participation in the Jindalee Project.

Mr Andrew Davis, Telecom's Business Development Manager for the Project said, "Jim Yarra is doing a great job in helping Telecom to identify the best Australian sub-contractors and suppliers for the Jindalee Operational Radar Network. The addition of Frank Evans to the team will further strengthen our efforts in this area." ■



In South Australia: Frank Evans

Industry News

The list of Australian companies sub-contracted for the supply of equipment and services to the Jindalee Operational Radar Network (JORN) continues to grow.

Roche Bros. Pty Ltd have completed earth works at the Queensland radar sites in accordance with their \$3.5 million contract and are now undertaking \$2.7 million worth of work at the Western Australia radar sites - with 50% of work at all sites undertaken by local sub-contractors.

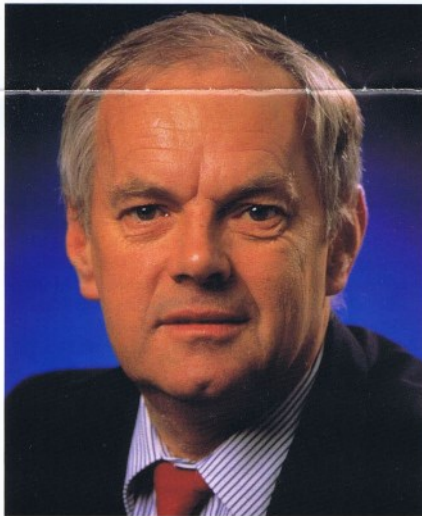
Not only was the GMSPL tender technically and commercially attractive, it also offered the highest level of Australian content.

Lewis Drilling has been awarded a contract of approximately \$480,000 for the drilling of bore holes at the Queensland sites.

Marconi Radar and Control Overseas Limited (MRCOL) and its supplier DY-4 of Canada have selected British Aerospace Australia to manufacture some of the JORN VME processor equipment and negotiations are under way between the companies. MRCOL also is considering a number of Australian companies for manufacture of the remaining elements of the VME equipment.

Telecom has selected GEC-Marconi Systems Pty Ltd (GMSPL) to design and manufacture transponders for the Frequency Management System (FMS). The elements of the FMS will play a critical role in optimising performance of the JORN.

A number of Australian firms competed for this work, but not only was the GMSPL tender technically and commercially attractive, it also offered the highest level of Australian content. GMSPL will undertake the design work in Adelaide and the manufacture at its Sydney plant. The contract is to be signed in mid-July.



In Victoria: Jim Yarra

Australian firms start to deliver

Tenders for the Radio Frequency (RF) Equipment and Vertical Incidence Sounders, which also form part of the FMS, are being evaluated and Australian suppliers are expected to be chosen soon.

Other tenders presently under consideration relate to:

- Camp accommodation at Longreach and Laverton sites.
- Queensland access roads.
- Queensland site antenna array fencing.

On 29 June, Telecom called for tenders on a range of works involved in construction of facilities for the JORN Coordination Centre (JCC) at Edinburgh RAAF base, Adelaide. A further

four packages soon will be released for tender, bringing the total value of the works to about \$14 million. Principal works to be completed are:

- Clearing and grubbing, site preparation, earthworks to site roads, car park areas and the building platform.
- Construction of storm water drains.
- Construction of site roads and car parks.
- Provision of water, sewerage and electrical supply services.
- Erection of the complete structure and architectural finishes of the JCC and Remote Plant building, including management of the specialist sub-contractors and all necessary design co-ordination.
- Provision of electrical, fire and mechanical services, including management and design co-ordination with the other works.
- Provision of security services and non-secure communications.
- Purchase, supply and fixing of furniture and fit-out items.
- Landscaping and fencing, including security fencing.
- Provision of a lawn sprinkling/plant watering system.

Requests for Tender for the JCC facilities contract have gone to McConnell Dowell Constructions (Aust.) Pty Ltd, McMahon Construction Pty Ltd, Fletcher Construction Ltd; AMEC Construction Pty Ltd and Clough Engineering Group. Telecom will be inviting a number of suppliers for mechanical, electrical and fire services and equipment to tender for the JCC works and will be selecting from these the nominated subcontractors to the successful JCC facilities contractor.

In accordance with its contract with Telecom, Radio Frequency Systems Pty Ltd (RFS) will commence delivery of antenna and related equipment progressively from December as complete equipment and as prototypes.

By the end of this year, Telecom is planning to call for tenders for the supply of equipment required for the installation of electronic equipment at the JORN sites. This includes underground bunkers for housing the receive-sites equipment; racks and cabinets; harnesses, power supplies and ducting systems. ■

The Story Behind the Prime Contract

On 24 July, 1986, the then Minister for Defence, Mr Kim Beazley, got to his feet in Parliament and tabled the long-awaited Dibb Report that reviewed Australia's defence capabilities.

Included in the Minister's accompanying speech was a statement of profound significance for the Jindalee Project. He said Australia had a high priority for intelligence-gathering and surveillance. Special attention should be given to Over The Horizon Radar (OTHR) as it offered a very real possibility of allowing continuous monitoring of the great expanses of sea and airspace to our north.

Australia had a high priority for intelligence-gathering and surveillance.

"We are looking at ways in which this (OTHR) programme can be accelerated and expanded," he concluded.

Looking back, Air Commodore Max Brennan, Director General Jindalee Project, says that on 24 July, another event, less known but also powerfully significant, took place.

"On that same day the Defence Force Development Committee endorsed the recommendation that development and acquisition of an operational OTHR should be given a high priority, the initial priority being two radars – one in the south-west of Australia and one in the north-east," says AIRCDRE Brennan.

"It also agreed to the upgrading of the Jindalee facility at Alice Springs, now Number 1 Radar Surveillance Unit (IRSU), to provide a research and operational development test bed."

In August of 1986 the Minister approved a Request for Tender for the upgrade and at the same time approved Phase One of the Joint Project Brief under which the development of an operational radar network was to be managed.

Things had not always looked so bright. "Despite some successes in the early days by the Defence Science and Technology Organisation installation at Alice Springs, including some demonstration of ship detection, scepticism about the capability of the technology remained," says AIRCDRE Brennan.

"It required a series of joint service evaluation trials in 1984-85 to provide impetus and bring about the formation of an OTHR review group to comprehensively review the way ahead.

"Major support for the Jindalee Operational Radar Network (JORN) really came out of the Defence White Paper of 1987 which was presented to Parliament in March, 1987, by the Minister, Mr Beazley. The Government announced a critical change in defence policy – to one of defence self-reliance.

"The White Paper discussed a national requirement for broad area surveillance and the potential of OTHR offering the only affordable solution. It also mentioned its ability to monitor the great expanses of our air and sea approaches and provide long-range detection and tracking of aircraft and ships.

"The White Paper went on to identify a requirement for up to three new radars and stated that studies were under way as to their precise location. The paper also stated that the combination of an OTHR network and AWAC aircraft offered considerable potential for airspace surveillance.

"That indicated that AWACs and JORN were not competitors in the surveillance business

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Challenges will be met: AIRCDRE Max Brennan

but were recognised as being complementary systems."

In November 1987 about 20 contracts were awarded for project definition studies. Following on from these studies, around mid-1988, there was an invitation to industry to register interest for the project.

"A number of caveats were related to that invitation – a primary one was that Defence really wanted to have an Australian prime contractor," says AIRCDRE Brennan.

"That was basic for two main reasons: we wanted to build within this country the ability to manage very complex and technologically complex major defence project activities. And because of the significance of the asset to defence capability, we wanted to have the ability to adapt, modify and maintain the system within Australia. We didn't want to be reliant on overseas companies for that activity."

In May 1989 the first request for tender was released and subsequently the number of potential prime contractors was reduced to three: BHP, AWA and Telecom Australia. Deliberations by the Defence Source Definition Committee (DSDC) saw BHP out of the running with AWA and Telecom still fighting it out.

"During the 12-month period between the responses to the first round of tendering and the request for the second round of tendering, Defence elected to fund a number of risk-reduction studies," says AIRCDRE Brennan.

"These were aimed at focussing on some of the higher risk factors, not only technological risk but some commercial risk areas, and one of the latter areas to be given particular focus was that of Defence going into a turnkey arrangement for facilities." (This refers to a project where the prime contractor provides complete design, commissioning and implementation of a system. All the user has to do is "turn a key" to start the system.)

"In this case it was decided that the provision of the capability, and the buildings housing the capability were so well inter-connected that we ought to go for a turnkey. The project is precedent-setting in regard to having a turnkey arrangement for facilities.

"Other risk-reduction studies concentrated on technical issues to aid a better understanding of requirements and were aimed at development of technical solutions and reducing the risk and uncertainty in those solutions.

"Following the responses to the second round of tendering, we again went through a very formal source-evaluation activity. Coincidentally that was about the time I joined the Project Office, in August 1990, which was about six weeks before the tenders closed. The DSDC met on about five different occasions totalling about 40 hours and finally agreed on a recommendation to go to Cabinet.

"About the same time the Force Structure Policy and Programming Committee (FSPPC) agreed that the network should comprise a 90° radar in Queensland and 180° radar in Western Australia. That was an option that was sought in the final round of the request for tender and one that the FSPPC decided that we should take up.

The processes and skills are now in place to meet the demands of this and future projects, including international exports.

"In December of 1990 Federal Cabinet gave the go-ahead to the Queensland and WA radars – and confirmed Telecom Australia as the prime contractor for the project. During February, 1991, we started contract negotiations with Telecom. They continued until early June and culminated in the contract being signed with Telecom on the 13 June 1991."

The 13th proved to be a propitious day for Telecom and the start of a great project which, in its risk-sharing contractual arrangement, recognises that the JORN is an undertaking that truly tests Australia's resources of determination and intelligence.

"We are now two years into what is a complex and technically demanding contract, arguably the biggest development contract of this type ever attempted in Australia. Sound progress has been made and there is now little doubt that the defence capability we sought will be delivered," says AIRCDRE Brennan.

"Of equal importance, the industry capability to manage projects of this type is being established and the processes and engineering and management skills are now in place to meet the demands of this and future projects, including international exports. I have also observed and been impressed by the dedication and effort that people, both Contractor and Defence, are willing to devote to this project and that commitment provides me with confidence that the challenges yet to come will be successfully met." ■

AIRCDRE Max Brennan joined the RAAF in 1957 as a radio apprentice and was commissioned in 1961 after completing a Radio Engineering Diploma. He toured Vietnam with No 2 Squadron and later attended RAAF Staff College in 1973. Senior postings in Washington, DC, and Burbank, California, followed before he became Commanding Officer of No 3 Aircraft Depot at Amberley. He was promoted to Air Commodore in 1988 and appointed Director General Jindalee Project in August 1990.

In The Beginning was The Bush

The land around Longreach in Western Queensland can break a strong man's heart. This is Dorothea Mackellar's "Sunburnt Country" of droughts and flooding rains.

In summer, weeks of 40° heat reduce the dead-flat horizon to a shimmering heat haze. Then the sudden arrival of torrential rain can turn a lazy creek into a six-kilometre-wide river that obliterates the entire landscape of red dirt, turkey bush and spinifex.

And this is where the Jindalee Operational Radar Network (JORN) is first becoming a physical reality. Where remote areas of scrubland are being transformed into the array platforms from which High Frequency radar beams will reach far beyond the horizon to provide Australia with its first wide-area surveillance system.

For local residents the JORN has a more personal significance than national security, both military and civilian. For them it has meant contracts, jobs and use of local skills and equipment at a time when the bush has been doing it hard.

The just-completed earthworks at the Longreach transmit site and the receive site at Stonehenge 150km to the south-west have seen contractors, Roche Bros. Queensland, expending 50% of the total \$3.5 million cost on local labor, services and equipment.

Longreach has some reputation as the home of the Stockman's Hall of Fame. Stonehenge could be typically familiar to anyone who has travelled the Outback: a pub, run by a genial couple who make it the social centre for the cattle and sheep farmers from hundreds of kilometres around, plus a clutch of five or six weatherboards on either side of a ruler-straight main road.

It is in this setting that Telecom's JORN Team Facilities Manager, Jim Dunlop, has had the multiple task of both ensuring that the massive construction works have happened on time and on-budget – and of ensuring that local sensitivities are taken into account. (Getting to know the locals almost involved him in steer-wrestling at the Stonehenge Annual Rodeo but sanity prevailed.)

The work has been demanding. Both in terms of large-scale and fine detail. The transmit site (TX) which is 35km south of Longreach has involved the clearing of a 40ha swathe for the TX antenna through the flat, sparsely vegetated, black soil country. The receive site (RX) at Stonehenge has an antenna array of about 60ha carved out of the more densely vegetated red soil country.

The fine detail has been most testing. Contractual specifications demanded that the sites, although totalling more than 100ha., be exact to within just a few centimetres. Radio Frequency Systems (RFX) which will build the 3km-long receive antenna array and the 1km-long transmit array insisted on this precision so that their technology works at peak efficiency.

These rigid tolerances could be achieved only by the use of the most advanced laser-grading technology. At both the TX and RX sites electronic graduating devices were centred on the areas to be levelled. A laser beam from the devices activates the blade of a grader to attain the set grades and, considering the scale involved, achieves what could be considered as billiard-flatness.

A veritable armoury of equipment was needed to fulfil all the tasks. The biggest equipment, which makes a four-wheel drive look like a Dinky toy, came from Rockhampton. But for the most part scrapers, bulldozers, bobcats and water carts were all obtained locally.

Other construction works, while not as precise as the array platforms, have been no less challenging – particularly in such remote locations.

It has been necessary, for instance, to ensure



An armoury of equipment: An elevating scraper dwarfs a four-wheel drive while working on the RX access road

**Stonehenge has a pub run by
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that each site has a reliable water supply and in a country where drought alternates with flood that has posed a substantial problem. Jim Dunlop ruefully admits that catchment weirs built across Anderson's Creek at the TX site and across Thomson River at the RX site have had to be re-thought as a result of the current drought which has shown the problem of relying on even 100 years of meteorological records when the world weather system is in a time of change.

The weirs on the Thomson have been used to provide construction water which was used at a rate of 1million litres per day. To ensure security of supply during drought conditions for the operation phase, artesian bores are being sunk down to 1700 metres for permanent water supplies, with the weirs remaining as a back-up.

Both sites have 40 mega-litre dams to ensure adequate supply for the remainder of the construction phase which will see the building of power houses, water purification plants, accommodation units, and equipment, administration and storage buildings.

Lindsay L. Ekert and Associates Pty Ltd, in association with Bassett Consulting Engineers, as Project Manager and designer of the buildings and infrastructure have optimised the use of materials found on the sites thus minimising costs, both financial and environmental. For example, the material excavated from the dams has been used for roads and platforms thus saving the importation of material from 300km away.

The possibility of flooding around Longreach was an early concern and the floods in 1989 provided the opportunity for aerial surveys which revealed that the sites chosen by the Commonwealth were above the high-water mark. The Defence Science and Technology Organisation had first postulated Longreach/Stonehenge as appropriate JORN sites because of their flat terrain, suitable earth conductivity and appropriate geographical relationship to areas to be covered by the JORN surveillance.



The JORN takes shape: an aerial view of receive site at Stonehenge

Then there are the purpose-built roads, vital for ensuring site access at all times and in all conditions. At the RX site a 5.5km stretch of sealed road – 1km of which doubles as an emergency aircraft landing strip in times of flood – links to the existing shire road system. At the Longreach site a 4km access road has been built and according to a Courier-Mail journalist who recently visited the site "It has to be just about the best piece of road in western Queensland."

Work on both sites, which together provide a 90° radar, was concurrent and finished just as work began on the accompanying 180° radar sites at Laverton in Western Australia. The stringent JORN construction schedule does not allow prime contractor, Telecom Australia, time for respite. ■

Telecom has participated in all Commonwealth activities associated with environmental management and protection and is committed to managing this and subsequent contracts as a responsible Corporate citizen. Commonwealth requirements have been accepted by Telecom and these have been mandated in all subcontracts entered into by Telecom. Adherence to the stringent environmental standards will be monitored by the Federal Department of Arts, Sport, Environment and Territories and, where appropriate, in respect of anthropological and archaeological standards, aboriginal agencies and local communities will be kept informed by the Jindalee Advisory Committee which is attended by representatives of local shire councils, pastoralists, local interest groups, the Commonwealth and Telecom.