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## Engineering Heritage Canberra Professional Career Series

The Institution of Engineers, Australia

Engineering Heritage Australia

National Engineering Oral History Program

### INTERVIEW TAPE LOG

**Interviewee: Professor Brian O’Keeffe**

**Tape Numbers: IEA EHA: MP 16 to 20**

**Interviewer: Dr Margaret Park**

**Number of Tapes: 5, Sides A & B**

**Place of Interview: 2 Tobermorey Place, Hawker ACT 2600**

**Dates of Interview: 17 June 2004**

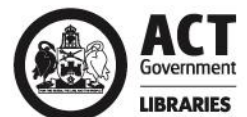
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Tape: IEA EHA: MP16, Side A		
Time/ Counter	Subject	Proper Names & Keywords
000-035	Provides full name, date and place of birth. Details family background. Father was a school teacher in Gympie, Queensland and moved to Brisbane in 1935 when Brian was one year old. Grandparents born in Australia, talks about their background – mother’s side = Swedish (Du Rietz, father’s side = Irish. Du Rietz = career background in architecture and engineering. One of the Du Rietz’s designed churches in Australia, including one in Gympie. Contributions to mechanical engineering on dairy machinery. Uncle Du Rietz, an academic in Sweden, studied lichen and mosses. Talks about engineering influences from this side of the family.	Hugo Brian O’Keeffe 1 February 1934 Family name = Du Rietz Church architecture Gympie, Queensland Mechanical engineering – agriculture
036-076	Youngest of 4 siblings. Names father and mother and siblings. Father worked in high schools, taught chemistry, maths and physics. Describes father’s influence – ‘a modern renaissance man’ – interests in classical music, spoke fluent French, read Latin, was mechanically inclined as well - ‘very hands on’. Retired in Brisbane but continued involvement in teaching. Worked on a science program for girls’ schools in late 1940s/50s. Mother was a housewife. Parents invested in children’s education.	Corneilius Daniel O’Keeffe Thelma May O’Keeffe nee Du Rietz Science teaching Education
077-119	Talks about siblings and their backgrounds. Dan, the eldest, most influenced Brian’s education. Apprenticed to the City Electric Light Co. Dan joined Navy during the war and was selected for Prof. Bailey’s radar course at Sydney University. Australian War Memorial has a small exhibition on the ‘Bailey Boys’. Continued as a RAN radar officer during War. Returned to university under Post War Reconstruction Scheme, completed his electrical engineering degree. Dan helped in Brian’s transition from university to work with Civil Aviation. John was in the Army during War. Stayed on as a civilian after the war. Paul attended university on a Main Roads scholarship.	Dan, John and Paul O’Keeffe City Electric Light Co. Second World War Royal Australian Navy (RAN) University of Sydney Professor Bailey Radar Bailey Boys Australian War Memorial Post War Reconstruction Scheme Army Main Roads Commissioner Rockhampton
120-189	Describes growing up in Brisbane during the War. Lived close to river, Americans tested submarines ‘fascinating to a small	Brisbane American submarines

	boy'. Father (a First World War veteran) volunteered as a commissioned officer and taught air force personnel during the War. Describes family home at Hawthorne, a typical wood Queenslander house and activities at home. Recalls Robert Menzies on the radio and father keeping track of battles on maps. Father served in France during First World War, spent time in Ireland visiting O'Keeffe relatives. Explains spelling of O'Keeffe and its origins.	First World War Hawthorne, Brisbane Robert Menzies Rationing France Ireland O'Keeffe name
190-336	Attended St Joseph's College in Brisbane from Grade 3 through to high school. Likes and dislikes during school – played a bit of cricket, handball, preferred maths, physics and chemistry, studied latin. Talks about early engineering influences and beginnings of interest in electronics, gadgets and transistors. Describes range of certificates and scholarships available. Extra subject at high school – geometrically drawing and perspective on Saturdays. Teachers and their influences – preparation for university work. Completed high school in 1951 at 17.	St Joseph's College, Brisbane Electronics Transistors Army Disposal Store High School Certificate Scholarships
337-end	Attended University of Queensland. Engineering course dominated by electrical engineering. Talks about difficulty of interest in electronics. Combined mechanical and electronics in final thesis project – control of a gas turbine jet engine. Describes Prof. Prentice's lightning data collection work.	University of Queensland Engineering Degree Electrical Engineering Mechanical Engineering Electronics Professor Prentice Lightning Detection Brisbane Valley Thunderstorms
<b>End Side A, Tape 16</b>		
<b>Tape: IEA EHA: MP16, Side B</b>		
000-016	Continues with lightning detection work with Prof. Prentice. Roy Hinkley, war-time electronics officer – taught all electronics at the University. Limited course work at University of Queensland in electronics or antennas.	Professor Prentice Roy Hinkley University of Queensland
017-092	Describes university work experience – required to work in an engineering firm and write a report as part of training. First year worked in a heavy engineering company in Brisbane – shipbuilders and repairers. Joined regular army reserves in second year as part of the University regiment. Placed in charge of electronics – radios, telephones, etc. Work experience with Royal Australian Electrical Mechanical	University work experience Evans Anderson Phelan Shipbuilders University of Queensland Regiment Royal Australian Electrical Mechanical Engineers

	Engineers. Third year work experience with Dept. of Civil Aviation at Eagle Farm Airport. Interest firmed in electronics. Invited by Ian Fowler to work at DCA depending on exam results. Finished university and began work at DCA on 1 February 1956.	Dept. of Civil Aviation (DCA) Eagle Farm Ian Fowler
093-144	One woman enrolled in civil engineering at university during Brian's time. Students from post-war reconstruction scheme, most completed by end 1951/52. Effects of Second World War on Brians' work at university and future career.	University students University Drawing Office Post War Reconstruction Scheme Second World War and Aviation
145-173	Institution of Engineers mainly a civil/mechanical body. Electronic engineers joined the Institution of Radio Engineers, member since 1956, was treasurer of the Brisbane Division. Still a member of the Institution of Electrical and Electronic Engineers – USA. IRE now a college within the Institution of Engineers.	Institution of Engineers Institution of Radio Engineers (IRE)
174-249	Offered position base grade engineer (now Class 1 engineer) with DCA's regional office, Brisbane at the airport. Worked on design of radio installations – converting surplus Second World War equipment (out of a bomber) for use in a control tower. Describes the national organisation of the DCA. Recalls the story of putting the Brisbane control tower off air and driving a car in front of a landing aircraft.	Dept of Civil Aviation (DCA) Radio installations Second World War Bombers Control Towers Brisbane Control Tower Brisbane Airport
250-272	Lectured for a year in metallurgy at the Central Training College, technical college in Brisbane.	Metallurgy Central Training College, Brisbane
273-end	Discusses reasons behind move to Adelaide and interest in extending education. While at DCA applied for a commonwealth scholarship to attend MIT, in USA. Harold White (senior engineer) suggested Brian as Prof. Willoughby's research assistant at University of Adelaide. Describes Prof. Willoughby, his work and influences on Brian. Took part in classes and learned about design of aerials for broadcasting, low and high frequencies; Mr Pawsey taught transmission lines; at this time learned a great deal about transistors and solid-state physics. The Weapons Research establishment was near Adelaide.	Harold White Commonwealth Scholarships Professor Willoughby, University of Adelaide Mr Pawsey Transistors Weapons Research Centre, South Australia
	<b>End Side B, Tape 16</b>	
	<b>Tape: IEA EHA: MP17, Side A</b>	

000-026	First work with computers in Adelaide solving electronic problems. Describes a hand-cranked calculator. Undertook a course in nuclear engineering at University of Adelaide.	Computers Adelaide Calculators Nuclear engineering
027-059	Recalls viewing Sputnik in 1957 and its benefits for future civil aviation. At the time, a maths and physics tutor at the University and lived at Aquinas College (run by the Jesuits). Advantage of being with one employer for 50 years – able to see projects through to fruition. (slight pause)	Sputnik (October 1957) Aquinas College
060-111	Recalls meeting future wife, Bridget through instigation of Mrs Brennan, matron of the College. Bridget grew up in Adelaide and did law at University of Adelaide. Practised law in Adelaide; after marriage and the move to Melbourne, continued with law work. Also became a lecturer on probate, wills and wrote a text book on the subject. Became involved with the Red Cross Tracing Bureau in Melbourne. Bridget retired when moved to Canberra and continued with Red Cross work, currently President of the ACT Red Cross. Received a Member of the Order of Australia award for her services.	Rita Bridget Rhys North Lawyer, Adelaide and Melbourne Red Cross, Melbourne Red Cross, ACT Member of Order of Australia (1997)
112-205	Married in 1961 in the College Chapel, University of Adelaide, then transferred to Melbourne. Promoted to Engineer Class 2. Due to work in Adelaide on instrument landing systems (ILS) in Adelaide gave training courses to engineers from all over Australia. Explains ILS, its origins and uses. Brian's job included the maintenance of the equipment at 16 locations around Australia and New Guinea. Required flight testing; used DC3s. Recalls story of Frank Partridge on one of these tests.	Marriage (1961) Melbourne ILS (Instrument Landing Systems) DC3 Frank Partridge Fokker F27 Fokker F28
206-272	Designed a new ILS antenna and monitoring systems –finding faults in seconds: 'an art as well as a science'. Published technical papers on design of antenna systems. Began using computers in design work. Made contact with friend at CSIRO, also in the maths department at Melbourne University. Talks about use of CSIRAC, fourth working general computer in the world (currently in the Science Museum, Melbourne). At this time, two in USA, one in Manchester, UK. CSIRAC came into service in 1949.	ILS Antenna Monitoring systems design Computers CSIRAC (1949) CSIRO Melbourne University Science Museum, Melbourne Prof. Frank Hertz Geoff Hill
273-296	Wrote technical papers on monitoring and antenna design	Institution of Radio and



	for the Institution of Radio and Electronics Engineers (IREE). Delivered papers at meetings. Involved in public speaking throughout career.	Electronics Engineers (IREE) Public speaking
297-end	Describes process of achieving instrument landing in all weather conditions. Used Monash University computer and established simulation of ground signals and aircraft (Boeing 707) systems. Measured instrument landing systems using precision flying (one hour after dawn), tested in Melbourne and also in Sydney. Results of analysis presented in a paper to ICAO (International Civil Aviation Organisation).	All weather landings Monash University Boeing 707 ICAO (International Civil Aviation Organisation)
	<b>End Side A, Tape 17</b>	
	<b>Tape: IEA EHA: MP17, Side B</b>	
000-029	Continues with description of ICAO, its tasks and activities. Member states invited to join panels – Brian invited to join the All Weather Operations Panel as a technical adviser. First overseas trip in 1965 – 3 months around the world, first ICAO meeting attended in 1967. ICAO predated United Nations, formed in 1944 as the Provisional International Civil Aviation Organisation.	ICAO PICAO (Provisional International Civil Aviation Organisation 1944) Montreal All Weather Operations Panel
030-119	Set up the Air Navigation Group in association with University of Sydney under Prof. Christiansen. Brian appointed Departmental Manager from Head Office. Describes the process of designing an all electronic system, method of testing system and patenting the system. US patent office at first refused system concluding 'this has already been done, not novel'. Pursued patent application with via US patent attorney. Finally advised they had re-invented the guidance system of the Trident Nuclear Missile. Patent was finally accepted as they had 'improved on the original patent' and granted a 'patent of improvement'. (mid-1960s) DCA sold a system to US, New Zealand and built three to four in Australia.	Air Navigation Group University of Sydney Prof. Christiansen Frank Partridge Keith Farmer US Patent Trident Nuclear Missile Guidance System





120-221	<p>Government asked to be part of worldwide Omega Navigation System = 8 transmitters omitting low frequency signals around the world. The Minister, Peter Nixon, wanted it in his electorate, Gippsland. Many protests at the time (Cold War). A team from Department of Transport (DCA was part of DOT by this time) including Brian set out to explain the system and its uses at public meetings throughout southern Australia. Story about Russian delegation and the Leningrad badge gift. (slight pause)</p> <p>Omega Navigation transmitter installed outside Orbost, Gippsland, replaced in the early 1990s by GPS (Global Positioning System).</p>	<p>Omega Navigation System The Cold War Peter Nixon Orbost, Gippsland Department of Transport (DOT) Public Meetings Albert Langer ACTU Robert Hawke Russian Delegation GPS (Global Positioning System)</p>
222-299	<p>Brian presented paper to ICAO in 1967 on the limited life of ILS. First worldwide paper on a new instrument landing system in civil aviation field. By 1969/70 ICAO decided to get involved in a new system. CSIRO and Brian's Department developed Interscan – a complete microwave landing system. Part of it can be seen today at Melbourne airport. There is a working Interscan at Canberra Airport today. Prepared Cabinet submission (\$3.5m) for funding Microwave Landing System for the Labor Government (1972). Placed in charge of the Departmental Microwave Landing System Program – coordination of all agencies involved. Learned 'technical diplomacy at the international level'.</p>	<p>Microwave Landing System CSIRO Interscan Melbourne Airport Canberra Airport Labor Government (1972) AWA University of Sydney Group</p>
300-325	<p>Met with Bendix, AWA, CSIRO, at AWA complex in Sydney and developed a plan of action.</p>	<p>United States of America Bendix FAA (Federal Aviation Administration) AWA CSIRO</p>
<b>End Side B, Tape 17</b>		
<b>Tape: IEA EHA: MP18, Side A</b>		
000-025	<p>Continues with microwave landing system demonstration in USA. System set up in Atlantic City, New Jersey, assisted by Bendix. Mounted a receiver in FAA airplane for flight testing. The USA picked the system and began a joint US-Australia program, Russians on board, and Germans. Accepted by ICAO and is in use today. One at Canberra airport, five at Heathrow.</p>	<p>Microwave landing system USA Bendix FAA Canberra Airport Heathrow Airport</p>



026-117	Describes role with ICAO, involved with selling of system to ICAO and the selection process for about eight years. 1978 (project started in 1967) when ICAO adopted the signal structure. Liaised with opposite number with Frank Frisbie of FAA. Initially was the Australian nominated member of study group to rewrite the testing of navigation aids. Brian wrote several chapters of a new manual (from 1965, 1967 appointed as technical adviser). Talks about multi-lingual aspect of ICAO meetings. Speaks of political influences within ICAO and also developing countries vs developed powers.	ICAO Frank Frisbie All Weathers Operation Panel Satellite Panel, ICAO Jan Smit
118-170	First opportunity to work with a satellite system in 1969/1970. Worked with George Fiege (designed receivers). Developed a new ranging technique largely used by GPS. Also on the Astra Panel of ICAO at this time. Undertook an experiment with a Qantas aircraft flying the Pacific route.	Satellites ATS – 1 George Fiege GPS Qantas aircraft
171-209	Involved with simulation/design of a simple aircraft navigation system using 'distance measuring equipment' = DME. Using Monash computer built proto-type instrumentation at home in garage in Melbourne, installed in simulator, AWA copied proto-type instrument. Promoted in 1971 to Engineer Class 5, top of engineering range and 1973 DCA became part of the Department of Transport. Charlie Jones, Minister in Whitlam Labor Government. Speaks of changes to the Department. Charles Halten, Head of Department (recruited by G. Whitlam from Canada).	DME (Distance measuring equipment) AWA Engineer Class 5 1971 Department of Transport 1973 Charlie Jones, Minister for Transport Whitlam Government Charles Halten
210-231	In charge of research and development on navigation aids with about five staff. Young engineers from universities. Moved to Executive Level with staff of 86 professional engineers and a budget of \$8m for capital works.	Department of Transport Research and Development Executive Level
232-337	Charles Halten appointed Brian to lead study team for Domestic Air Transport Policy Review (two airline policy review). Speaks about Government/airline expectations, the Steering Group and recommendations, including deregulating freight and ticketing. Produced a two volume report. Subsequent team established for implementation plan.	Charles Halten Domestic Air Transport Policy Review Two-Airline Policy Bureau of Transport Economics Air Freight Ticketing Ansett Peter Abeles



		East West Airlines
338-end	Placed on the Government Task Force on National Communications Satellite System in 1977, running the same time as the Air Transport Policy Review. Kerry Packer proposed a satellite system for television broadcasting throughout Australia. Task Force was represented by Government Departments including Finance, Telecom, Transport.	Government Task Force on National Communications Satellite System Kerry Packer Television Broadcasting Telecom
	<b>End side A, Tape 18</b>	
	<b>Tape: IEA EHA: MP18, Side B</b>	
000-083	Continues with Task Force on satellite communications. Harold White, Chairman of the Task Force. Describes the 'east coast' based radar system – J curve. Proposal to reduce the six air traffic control centres to three, preferred only two. Users of system: ABC, Department of Transport. Talks about requiring 'two transponders in each of two satellites for redundancy – new thought for broadcasters'. Outlines final proposal including two satellites, two dishes, two transmitters and two control centres (Brisbane and Melbourne). Plan implemented in the early 1980s, put in 100 ground stations, some solar powered. Satellite owned by Aussat (combination of Australia and satellite), sold off to Optus.	Government Task Force on National Communications Satellite System Harold White Radar 'J Curve' Air Traffic Control Centres ABC (Australian Broadcasting Commission) Australia's air space Solar Power Kim Beazley Peter Morris Aussat Optus
084-099	First to tell Minister (Peter Morris) of Fijian Coup. During the first coup in Fiji they pulled plug on telephone exchanges, unaware that aviation had own teleprinter links for filing flight plans. Brian received a teleprinter message from Fijian air traffic control.	Peter Morris Fijian Coup
100-119	Discusses effects of changes of government. Acted as a regional director in New South Wales for two months (1980). Ended float planes operated on Middle Harbour.	Government Politics Acting Regional Director, NSW Float Planes Middle Harbour, Sydney
120-154	Appointed Head of Airways Operations Division (1980). Central Office moved to Canberra. Responsible for air traffic controllers, flight service officers, airport firemen and	Airways Operations Division Canberra Airport Curfews

	aviation security and aircraft noise, highly political. Received delegation to issue dispensations against the airport curfews operations at Sydney Airport and others.	
155-194	Tells the story about phone request to lift the airport curfew for Adelaide for such things as a 'missing buffalo'. Had this responsible for ten years.	Airport Curfews Adelaide Airport
195-252	Appointed as First Assistant Secretary in 1982 when Department was reorganised to create a new Airways Division, comprising former Airways Operations Division plus Airways Engineering – over 6,000 staff, 300 reported directly. Describes Departmental responsibilities and tasks. Wal Fife was Minister under Liberal Government. Discusses study of options for the future of the airways systems. Became Australian member on ICAO's special committee for Future Air Navigation Systems (FANS).	Airways Division Airways Operations Division Airways Engineering First Assistant Secretary Wal Fife Liberal Government Third Runway for Sydney Hawke Government Henry Bosch ICAO FANS (Future Air Navigation Systems)
253-275	Acted as Deputy Secretary of the Department for about nine months, Peter Wilenski was Departmental Secretary. Describes role as Deputy Secretary and his method of keeping in touch with engineers and projects.	Peter Wilenski Deputy Secretary
276-319	Feelings about moving to Canberra - always a possibility and advised of such a move as much as 20 years before. First in a flat in Reid, off Ainslie Avenue (for six months), then to current house in Hawker, moved in winter of 1981. Still a member of Institution of Radio and Electronic Engineers. Became involved with Institution of Engineers when merged. Member of American Institutions due to output of papers and stimulation of ideas and learning from overseas experiences.	Canberra Reid Hawker Institution of Radio and Electronic Engineers Institution of Engineers
320-387	Beginning of ten year involvement with FANS (Future Air Navigation Systems). Describes why and how FANS developed. Lyn Helms, administrator with FAA, visited President of ICAO, Assad Kotaite, to discuss a new navigation system in about 1981. Decided to establish a new high level committee to examine existing problems, propose new system and undertake a cost benefit analysis.	FANS (Future Air Navigation Systems) Lyn Helms FAA (Federal Aviation Authority) ICAO Dr Assad Kotaite
	<b>End side B, Tape 18</b>	

<b>Tape: IEA EHA: MP19, Side A</b>		
000-107	Continues with the evolution of the FANS committee. Expertise required in satellites, navigation and communications systems, from organisations such as IATA, INMARSAT, airline industry and unions. Chairman was Jan Smit, Brian nominated as Vice Chairman. Explains the task of the committee, reviewing existing systems, agreed on using best of existing systems and incorporating the use of satellite communications. 40 countries/organisations on the committee, 150 people to each meeting and ran for three weeks. Committee reported directly to the Council of ICAO. Brian involved in 'institutional aspects' and process of change. Prepared a global cost benefit analysis. Completed first FANS committee with a report – shortcomings, technical design of the new system plus the cost benefit analysis. Recommended the development of a global plan to migrate from the old system to the new. Formed an interim committee to begin development. Brian was approached as Chairman.	FANS Committee IATA (International Air Transport Association) INMARSAT Trade Unions Airline Industry Jan Smit Council of ICAO Dr Assad Kotaite Cost Benefit Analysis
108-126	Work of the FANS interim committee described. First meeting in London. Formed sub-committees on research and development, operations, conferences, design. Also met in Paris.	FANS interim committee London Ron North Paris
127-202	Talks about the reason for ICAO meeting in Paris, the Russian representatives, including Tatyana Anodina, Russian GPS called GLONASS. Russians continued to deny the existence of any system. At final meeting in May 1988 Tatyana arranged for Moscow experts to explain about GLONAS. US and Russians signed memorandum of agreement to pursue development of satellite systems. Another meeting in Ottawa and FANS 2 committee established – phase 2 committee to coordinate implementation of FANS. Brian elected Chairman of FANS 2, coincided with formation of Civil Aviation Authority in Australia and Brian placed in charge of research and development and ICAO representative. (slight pause)	Russians GPS Tatyana Anodina Ronald Reagan GLONASS Victor Kuranov Ottawa FANS 2 committee Civil Aviation Authority (CAA) Col Freeland
203-260	Describes role of ICAO in committee work, large meetings, involvement of ICAO's legal committee. Legal aspects of	ICAO legal committee



	FANS placed on the agenda for the ICAO legal committee. Brian attended these meetings as technical adviser.	
261-319	Tells the story of getting FANS off the ground. Directors-General of Aviation meeting (Asia-Pacific region), held in Los Angeles in mid-1993, hosted by FAA, David Hinson, administrator. Ran trials – PET (Pacific Engineering Trials). Representatives from Australian, Fiji, US, New Zealand, including the airlines. Cycle was broken by presentation of paper by Doug Roser, CAA head, saying that Australia was developing new air traffic system and incorporating FANS in it. Dick Peel from Boeing agreed to develop system, by mid-1995 the air borne system was certificated.	FAA David Hinson PET trials Doug Roser CAA Dick Peel Boeing
320-361	Describes certification process in Australia. First certification done by FAA outside the USA. Boeing was coordinating authority, Qantas (VH - OJQ) provided the aircraft, INMARSAT provided the satellite and ARINC and SITA (communication service providers) provided ground linking. CAA (later Air Services Australia) collected and processed the data to demonstrate the system. Took about six months to gather the data, an international effort, coordinated in Canberra at the office of CAA. FAA certificated the system for the Boeing 747-400. Boeing also incorporated FANS into Boeing 777.	Certification FAA USA INMARSAT ARINC SITA CAA Qantas (VH - OJQ) Canberra Boeing 747-400 Boeing 777
362-388	Describes benefits of FANS to airlines – greater efficiencies but also extended range of aircraft – now able to fly direct from Los Angeles to Melbourne, previously only to Sydney.	FANS Air Route extensions
	<b>End Side A, Tape 19</b>	
	<b>Tape: IEA EHA: MP19, Side B</b>	
000-016	Explains PET (Pacific Engineering Trials) and countries involved, a forerunner to FANS.	PET (Pacific Engineering Trials)
017-061	Global consolidated plan for FANS. ICAO dissolved. Describes work in Australia with Civil Aviation Authority (CAA) (c1989), including Sydney airport debate and the third runway. Brian briefed the Prime Minister and Treasurer on noise impacts. Received a personal commendation from the Department for this work.	FANS Sydney Airport Third Runway Aircraft Noise Graham Evans Department of Transport Federal Airports Corporation Prime Minister, Bob Hawke



062-099	Re-organisation of CAA in 1991 under new CEO. Still heavily involved with ICAO, but also General Manager, research and development. Travelled every three years to ICAO's General Assembly for meeting of member states (about 180 then, now about 200), headquarters in Montreal. Regional offices: Paris, Cairo, Nairobi, Dakar, Bangkok, Mexico City and Lima. At the 1992 meeting, elected First Vice-President of the ICAO General Assembly.	CAA General Manager, Research and Development General Assembly, ICAO Paris Cairo Nairobi Dakar Bangkok Mexico City Lima
100-118	Air Services Australia formed in 1995, former CAA. CASA became the regulatory arm. Air Services = air traffic control, engineering and fire services. Brian remained in job, instead of research and development, now responsible for international aspects and ICAO. After a new CEO was appointed, Bill Pollard, Brian appointed as his Special Technical Adviser. Brian retired in mid-1997	Air Services Australia CAA Civil Aviation Safety Authority (CASA) Bill Pollard
119-135	In 1992 made Australian member of regional group re: implementation of FANS. Meeting in Bangkok, Asia-Pacific office. Brian elected Chairman of a sub-group, continued in that role until retirement. Produced detailed implementation plans for the Pacific region.	FANS regional planning sub-group
136-172	Explains bottle-neck problems over India and Bay of Bengal – Bangkok, Singapore, Kuala Lumpur to London route. Precision of new navigation system allowed Qantas to fly 'the silk route' and avoid the bottle-neck. Included this route in regional plans, Asia to Europe traveling north of Himalayas.	Qantas Silk route to London FANS China Himalayas
173-214	Brian elaborates on several world-wide speaking engagements including FANS seminars.	FANS Fiji Solomon Islands Nauru
215-292	Involvement with the Singapore Aviation Academy. Bong Kim Pin suggested course at the Academy (c1992) and Brian coordinated from Australia. Continues to coordinate course annually, lasts four to five days. Outlines content of the course to be held in June 2004.	Singapore Aviation Academy Bong Kim Pin Aircraft Surveillance Greg Dunstone
<b>End side B, Tape 19</b>		

<b>Tape: IEA EHA: MP20, Side A</b>		
000-068	Explains involvement with ICAO's legal committee. Objections were raised to FANS, technical and legal. Brian attended legal committee and made presentations. Discusses liaison work with Dr Guldemann, of Switzerland. George Paulson, UK committee member, arranged for a meeting in base of control tower at Heathrow Airport. Residual problems with legal framework in regard to global satellite navigation system. In 1996 Air Services Australia nominated Brian as the technical expert to serve on panel of legal and technical experts.	FANS committee ICAO Legal committee Dr Guldemann George Paulson UK Heathrow Airport Air Services Australia GPS USA
069-097	Discusses regional air routes and need for seamless FANS implementation. ICAO established CNS/ATM (Communication Navigation Surveillance Air Traffic Management). Brian invited to be a member of group until his retirement. Describes role of CNS/ATM group.	ICAO CNS/ATM (Communication Navigation Surveillance Air Traffic Management)
098-111	Invited by Boeing to be a member of US Government's Industry Free Flight Steering Committee from 1995 to 1998. Only two non-US members – other: Val Eggers from Europe.	Free Flight Steering Committee, USA Val Eggers
112-133	Explains European air space navigation system.	Europe
134-152	In 1997 invited to present FANS to US Vice President's (Al Gore) White House Commission on Aviation Safety and Security, held at George Washington University. Explains aviation safety and security, including high-jacking.	FANS Al Gore, US Vice President White House Commission on Aviation Safety and Security George Washington University
153-233	Brian speaks about his involvement with GPS since early days of FANS committee. President Reagan made GPS available for civil use. Brian one of the first to have a civil GPS. Tested his GPS at Greenwich Observatory meridian line. Tells story about using GPS at Dakar. Explains US government adding errors into the GPS released for civil use. Errors finally taken out during President Bill Clinton's office (2000). Approached by Australian Global Positioning Systems Society to be their Patron.	GPS Greenwich Observatory Dakar Pentagon President Bill Clinton Australian Global Positioning Systems Society
234-291	As FANS PLANS P/L contracted in 2002 to CASA to evaluate GPS and Australia's use of it. Provided a large report and evaluating new receivers. Describes the 'Tobermorey Place tracking station', the use of the roof of the University of	GPS CASA Tobermorey Place University of Canberra

	Canberra and the Department of Defence's computer facilities at South Australia.	Defence Science and Technology Organisation, Edinburgh, South Australia FANS PLANS P/L
292-333	Appointed Adjunct Professor in Communications Engineering, University of Canberra in 1995 while working with Air Services. Organises lecture series for 3 <sup>rd</sup> and 4 <sup>th</sup> year students in engineering management. Invites professional engineers to speak with the students. Also lectures the 4th year students on an aviation design.	Adjunct Professor Communications Engineering University of Canberra
334-368	Describes the Marconi centenary celebrations in 2001 and the reconstruction and demonstration of the Hertz Loop (the first demonstration of electromagnetic propagation of radio waves – a spark transmitter and a loop antenna receiver) by Heinrich Hertz in Germany in 1887. Brian describes the demonstration at the Marconi Centenary dinner.	Marconi Centenary 2001 Heinrich Hertz The Hertz Loop University of Rochester, USA
369-386	Retired from Air Services Australia in 1997. Received many gifts and presentations, including the FAA flag.	Retirement (1997) FAA Flag
	<b>End Side A, Tape 20</b>	
	<b>Tape: IEA EHA: MP20, Side B</b>	
000-024	Continues with retirement gifts and presentations. Boeing presented Brian with a model of the Boeing 777 (the first to fully incorporate FANS). Began consultancy, FANS PLANS P/L immediately after retiring. Consulted to Honeywell for two years, also for Airports Fiji Ltd, also incorporating FANS.	Retirement (1997) Boeing 777 Consultancy, FANS PLANS P/L Honeywell Phoenix, Arizona Minneapolis, Minnesota
025-037	Quote from former colleague, John Royes, upon Brian's retirement saying that his 'influence was worldwide'.	John Royes Air Services Australia
038-148	Outlines awards received for services to civil aviation in Australia and internationally beginning with the Certificate of Commendation from the US Federal Aviation Administration (FAA) in 1990; made an Officer in the Order of Australia in 1992; a Fellow of Institution of Engineers in 1993. Other awards include: Honorary membership of the Royal Institute of Navigation, UK; Aviation Week (1995) made Brian 'Aviation Laureate' in electronics field and inducted into Hall of Fame, Air and Space Museum, Smithsonian; Civil Aviation Authority of Singapore (1997) award; conferred with Doctor	Awards include: FAA Certificate of Commendation Officer, Order of Australia Institution of Engineers Fellow Smithsonian Hall of Fame Air Traffic Control Association, USA Singapore Civil Aviation



	of Laws honoris causa by Monash University; US Institute of Navigation's Capt. PVH Weems Award "recognizing continuing contributions to the art and science of navigation". Relates story of transporting the heavy bronze image of Capt. Weems through airport security; Canberra's Engineering Hall of Fame induction in 2002; ICAO bestowing highest award in civil aviation – the Edward Warner Award in September 2004.	Authority Monash University Doctor of Laws honoris causa Canberra Engineering Hall of Fame ICAO's Edward Warner Award.
149-159	Speaks about activities planned for retirement.	Retirement
160-215	Provides advice for young engineers at University of Canberra – "possible to make a difference". Speaks about his current female engineering students – in computer engineering and software. Michelle Robertson, Air Services, lectures students; also invites his nephew Leo O'Keeffe (son of brother, Dan O'Keeffe), Deputy Commissioner of Patents to lecture his students. Other nephew is a mechanical engineer and brother Paul's eldest son is also an engineer.	Engineering students Michelle Robertson Leo O'Keeffe O'Keeffe family engineers
216-245	Thoughts on the engineering profession today – heading away from the detail. Speaks about difficulties of professional indemnity.	Engineering profession Professional indemnity
	<b>End Side B, Tape 20</b>	
	<b>End of interview session on 17 June 2004</b>	

