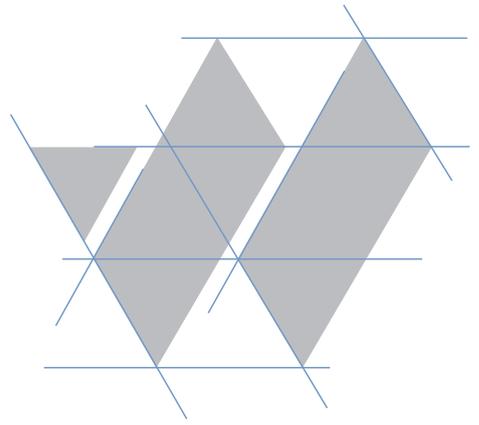


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THE WARREN CENTRE  
**INNOVATION**  
LECTURE

**Proudly Sponsored by**

Victorian Government  
Department of Innovation,  
Industry & Regional  
Development

Intelligent Manufacturing  
Systems

PricewaterhouseCoopers

Shelston IP

TAFE NSW



DELIVERED BY **DON FRY AO**  
OWNER & CHAIRMAN, AIMTEK



## SPONSORS & SUPPORTERS

The Victorian Government has long supported innovation. Innovation is not only about technology. Innovation is about people. It is about making sure we use ideas, technology and knowledge to give all Victorians a higher standard of living, more satisfying and rewarding jobs and a better environment in which to live, work and raise their families.

The Victorian Government, through the *Department of Innovation, Industry and Regional Development*, is delivering an unprecedented boost to innovation. Total funding committed in the last six years now exceeds \$1.6 billion and covers the full spectrum of innovation activities from infrastructure to skills, from technology to collaboration.

*IMS (Intelligent Manufacturing Systems)* is an international scheme that encourages Australian companies and researchers to participate in significant industrially relevant manufacturing R&D projects.

The IMS scheme facilitates the formation of multi-lateral R&D projects to develop advanced manufacturing and processing technologies. The scheme is open to all Australian companies and research organisations seeking to join projects or wishing to propose new projects.

IMS project partners cover the full spectrum of industry, being large & small companies, users & suppliers of manufacturing technologies and products, universities & research organisations, and governments.

IMS is conducted under an international arrangement between Australia, Canada, the European Union & Norway, Japan, Korea, Switzerland and the USA.

*The PricewaterhouseCoopers Technology Industry Group* is an international network of specialists from many disciplines who are committed to working with research and technology organisations to help them achieve their goals. Although our clients include some of the world's biggest corporations, they also include thousands of smaller, fast-growing firms in every area of technology. We provide "value added" assistance from the research phase through to development, commercialisation, equity raising and eventual merger/acquisition or float. Being a truly global firm, PricewaterhouseCoopers can provide a seamless service to clients as they group internationally.

*Shelston IP* provides high quality intellectual property advice and services that are cost effective, commercially relevant and responsive to our individual clients' needs.

We are a multidisciplinary practice, offering the full range of IP and related legal services from patent, trade mark and design registration through to strategic portfolio management, due diligence, licensing and litigation.

With our comprehensive international network of associates, Shelston IP offers a complete one stop shop for the creation, evaluation, management, commercialisation and enforcement of IP rights from a global perspective.

*TAFE NSW* has the reputation for equipping people with the skills and competencies they require. TAFE NSW has grown to become the largest training provider in the southern hemisphere. Our training covers all industry sectors, fast tracked commercial courses and fully customised training and assessment. Our trainers bring with them significant industry experience in addition to specialist adult education and other relevant qualifications.

TAFE NSW works with industry to develop training which is current, relevant and what employers need to ensure their staff are always skilled to industry standards.

We provide a flexible approach to learning including distance, online, multimedia, video conferencing and mobile technologies. We continually seek innovative solutions to training, incorporating emerging and new technologies.

*Melbourne Business School (MBS)* is an influential force in business education and management development within Australasia. Its strengths and reputation are built upon the principles of relevance and rigour, which are grounded in a heritage of scholarship with the University of Melbourne, and strengthened through enduring partnerships with business.

*MBS* is the largest and most comprehensive business school in Australia, combining Australia's number one MBA school with the Mt Eliza Centre for Executive Education, the country's unrivalled leader in executive learning and leadership development. Its position as the No. 1 business school in Australia has been reaffirmed by the latest independent rankings of the world's top MBA providers.



# PROLOGUE

The Warren Centre's Innovation Lecturer for 2006, Don Fry AO, believes that Innovation is **"converting childhood dreams into reality.."** and he has been and continues to be a shining example of this. When you read and listen to this great Australian's story you will be inspired and marvel at how much he has crammed into one lifetime.

Facing imminent knee surgery Don has been working with his medical team to find a better engineering solution. I discovered him in the Qantas Chairman's Lounge surrounded by bits of stainless steel and a metal template developed by one of the Warren Centre's Governors Dr Greg Roger, the managing director of ASDM, sketching and measuring. He revealed that he has postponed his operation so that he can participate in a surgical procedure as an observer. Don is a true Innovator.

"Networking Innovation", the motto of The Warren Centre, sums up what we do and how we are working with Industry, Government and Academia to solve the challenges facing Australia while realising the opportunities for prosperity and sustainability.

Australian governments in various degrees are supporting innovation but only Victoria has a Minister for Innovation. Who better than the Treasurer, John Brumby, could fulfil this role and allocate \$1.8 billion to a range of innovation initiatives. Speaking at the prestigious DuPont Innovation Awards (which were supported by The Warren Centre) the Minister called on all Governments to develop a National Innovation Agenda built around five thrusts:

- An increased public investment in innovation infrastructure;
- Increased private R&D spending;
- A research friendly regulatory environment;
- Federal funding for more university places; and
- Closer Government collaboration.

It is amazing that such obvious statements need to be made at a time when Australia is riding on the crest of a wave of prosperity driven by the resources boom and is unable to fund sufficient engineers and skilled personnel to realise its potential.

Innovation, according to The Warren Centre, is driving an idea or "childhood dream" beyond product invention and development through the valley of disenchantment to success in the market. The innovation heroes are the individuals and teams who use every means open to them to win in a highly competitive environment. Don Fry is one such person and an incredible role model.

His tenacity and persistence is heroic. He has surpassed temporary setbacks and financial challenges to succeed in venture after venture in his goal to realise his childhood dreams. His latest venture the Scramjet, developed in partnership with Queensland University, has the potential to put Australia firmly back in the space race. In doing so he is following the motto of the Royal Australian Air Force:

**"Per Ardua ad Astra" - Through Struggle to the Stars.**

Professor Michael Dureau  
Executive Director  
The Warren Centre for Advanced Engineering

THE **Warren** CENTRE  
FOR ADVANCED ENGINEERING



# DON FRY AO

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From an early age, I was continually building model boats and aeroplanes. They were all working models which achieved varying degrees of success.

My father allowed me the freedom of his tool box, and later his workshops to build things. I have no doubt this early experience had much to do with developing an innovative approach to my engineering career:

***"Innovation. Childhood dreams made real."***

My five year diploma course for Mechanical & Electrical Engineering studied by correspondence while serving a fitting and turning apprenticeship at my father's workshops, gave me a unique opportunity to experiment.

My father gave me a Jetex 200 jet propulsor. This gave a new dimension of speed to my model.

I then acquired a small pulse jet (model of the type Hitler used to propeller the V-1 doodle bug).

I attempted to be the first to arrive at school on a jet propelled bicycle.



As I began accelerating down the road, the tail pipe glowing near white from the noisy combustion process, began to droop. It was clear the thrust drag relationship would not achieve the 90 mph minimum speed required to keep the engine cool enough to sustain operation, but a great experiment.

At age 18, at a time when studying thermodynamics for my engineering diploma and attending the heat engines laboratory at the Brisbane George Street University (the present site of QUT), I built a single combustion chamber turbojet engine using parts from a World War II aircraft



***Morris Cowley utility with DGF jet turbo installed***



***Model boats built by Don Fry – Age 10-12. The stepped hull powered by a Jetex 200 solid rocket motor. Models have been recently repainted to preserve them.***

turbocharger. I built a fuel pump and spent one week's wages to replace a worn bearing in the turbocharger.

Amazingly the engine did start on the first attempt and ran for several seconds. I was not expecting it to be so powerful and failed to anchor it. It developed sufficient thrust to cause it to skid across the floor so disconnecting itself from its life support systems.

The project came to an abrupt halt as my father found me installing the unit in the back of his Morris Cowley utility.

***"Nothing beats practical experience."***

I recall a similar occasion when he caused me to stop construction of a helicopter, the blades for which subsequently became the foils for my first hydrofoil.

This early jet experience led to my developing a two stage waterjet in 1962 powered by a Ford Zephyr petrol engine to power my second boat, a 16 foot V bottom - all plywood construction.

The first attempt was a dismal failure - and realize that this was at time when the Hamilton jet inventor was experimenting with a centrifugal pump and water jets in general were not available. My research led to a design of intermediate and discharge stator which really made the unit fly.

I well remember operating the boat in near zero water depth on the Cairns mud flats just in front of the old Police Station when suddenly the jet produced a solid stream of mud. The impulse increase due to the mud density, the reduction in wetted surface area and the low frictional value due to the slippery surface enabled the boat to achieve well over 40 knots (25 was its normal top speed). This was a great lesson in all things to do with fast boats and jet propulsion. Someone stole this jet unit and I never pursued its development which is something I regret.



***Don Fry, Apprentice Fitter & Turner, Diploma Mech. & Elec. Engineering***



Proposed helicopter project

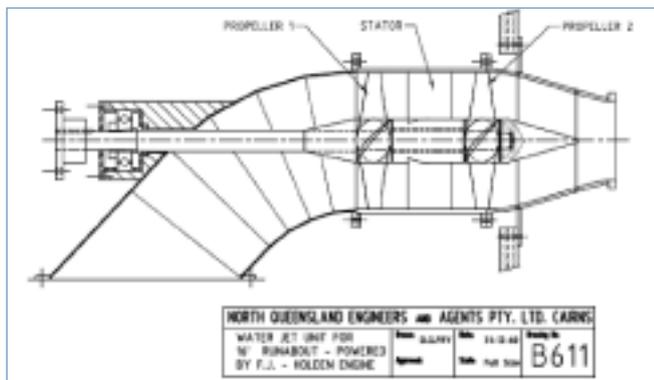


Blades from cancelled helicopter project reassigned to hydrofoil duty

*"Persistence with research will pay dividends".*

My involvement with jet propulsion continues, however I will elaborate on that later with Scramjet.

*"Take every opportunity to learn and don't stop trying to experiment and learn more."*



**EARLY LESSONS IN INNOVATION**

In 1960, NQEA won the contract to build and install much of the mechanical equipment for the Barron Falls Hydro Scheme. We contracted to the Co-ordinator General's Department and to the principal civil contractor, Transfield. Now I tell you, dealing with the founding partners of Transfield at that time was a steep learning curve in negotiation, an experience I treasure and was indeed fortunate to have. Hagglng and all that goes with the Italian way. I have the highest respect for those early pioneers of Transfield - Franco Belgiorno-Nettis, Carlo Salteri and in particular, John Panizza, all of whom I met often in their heyday.

The Transfield experience leads me to the conclusion that:

*"Being able to negotiate is fundamental to success in business..."*

yet it is not a taught subject - perhaps it should be.



First Real Boat built by Don Fry (Age 17) which was subsequently fitted with hydro foils.

In 1962, NQEA won the contract to build and install the mining and processing plant for Comalco at Weipa. I moved to Weipa as site engineer. The work included clearing forest, unloading equipment from landing craft, dragging it across the beach and erecting the structure and machinery using gin poles, a Blitz four wheel drive truck and a lot of initiative. I was the Minister for the Environment, Construction and Camp Commandant.

Weipa was the making of me. I learnt to improvise and be innovative. I say to all young engineers:

*"Take every opportunity to be involved with major remote projects. Remote projects accelerate your learning rate."*



Erecting First Weipa Benefication Plant - 1963



Second Weipa Benefication Plant - 1972

**BECOMING MORE INNOVATIVE**

The Australian Sugar Industry was booming during the early sixties. I saw an opportunity to introduce different ways of handling and processing sugar cane.

My development of the fully automatic cylindrical bagasse storage and reclaim system followed a visit to the Lucas Heights nuclear reactor in its early days.

Twenty-two bins have since been supplied in Australia plus 3 overseas and one is currently under construction for Brazil.

The rotating service crane in the Lucas Heights reactor building gave me the idea as to how a circular bagasse bin could be fitted with rotating automatic stacking and reclaim mechanisms. This causes me to state:

*"Be continually on the lookout for innovation by adapting or joining other good ideas."*

Stepping out in front of existing technology has its pitfalls. I remember well the day the Proserpine Mill Sugar Bin collapsed.

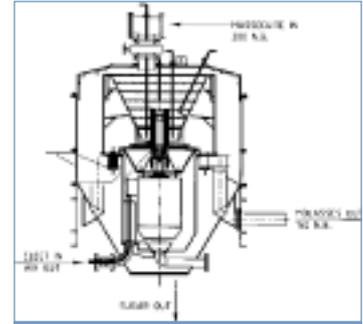
We replaced the bin at great expense with a modified design. Thankfully we were to build many more sugar bins as well as Bulk Sugar Storage sheds and associated conveyors. I carried out extensive research into bin design following the collapse in Proserpine. This was an expensive affair. My paper, "Design Criteria for Bulk Storage Bins", won the ASSCT President's Medal in 1978.

I have been able to make a significant contribution to the Australian Sugar Industry through the development of more efficient processing methods and equipment:

- *High Grade Continuous Fugal* - Installed in Australian Sugar Mills and now built under licence in England by the Broadbent Company and marketed to the European market.
- *Rotary filters*



**High Grade  
Continuous Fugal**



**Section Drawing of Fugal**

I failed to incorporate a sprag clutch. As a result, on one of its test flights, the engine back fired, the fan inertia overloaded the drive train causing the gearbox to explode with devastating effect. The pilot (me) survived. The hovercraft was built from my traditional building material - 3/16" marine grade plywood.

My father again interrupted proceedings and put a stop to further development. He saw it as a waste of money. The hull was destroyed but the fan was subsequently used for ventilating our shot blasting facilities for the next 20 years.



**Interior of Bagasse Bin**



**Invicta Mill Bagasse Bin**

### INNOVATIVE MACHINES

As a consequence of building a reputation for innovative design, opportunities arose to develop devices which were built and in the main successfully operated but for which there was a limited Australian market.

### FOLLOWING OTHER INNOVATORS

From approximately 1960 onwards, I received the English Engineering Journal.

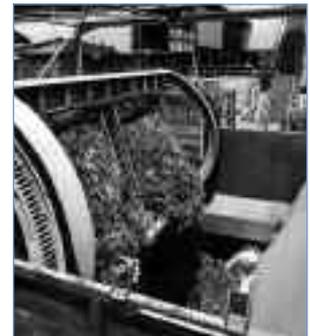
An edition gave details of the British Hovercraft development. I built one, being similar to the Britten Norman CC2. The low pressure lift cushion was contained by an outer high pressure peripheral nozzle not unlike the air curtain for large air conditioned spaces. Power came from a World War II air cooled Wright Cyclone radial piston engine used to power Army tanks. I designed and built a backward curve radial flow fan to provide all lift and propulsion air. It was directly driven from the engine via a reduction right angle gearbox.



**The Proserpine Mill Sugar Bin after the collapse**



**Experimental bagasse fired turbine with exhaust to evaporation station. Object is to eliminate the steam generation plant.**



**Automatic Weighbridge Tippler - 20 units installed throughout Queensland sugar mills.**

It is an irony that on the day my father died, I was in the office of British Hovercraft on the Isle of Wight signing a licence agreement to build their design of AP1-88 100 passenger hovercraft. Six hovercraft of this design were subsequently built. Ironically, we built two for Christopher Skase. I was paid in full. Three remain in service overseas today. In fact, one still operates in the UK on the route from Portsmouth to Ryde where



**"Hover Mirage II"  
One of two hovercraft built for Christopher Skase. It operated between Cairns and Port Douglas.**



*(L-R) Don Fry, Arthur Lakin (NQEA Machinist who trained Don Fry to be a machinist), Lord Casey and R.G. Fry CBE, during visit to NQEA Workshops 1960.*

Cockrell tested his first hovercraft. I conclude there are few opportunities for hovercraft to be viable. I don't plan to build any more.

Lord Casey, a civil engineer and Governor General (1965-69) was most impressed by my first hovercraft construction when he visited our workshops. He continued to send me copies of any articles on hovercraft which he came across until he died.

*"More mentors for young engineers - a must".*

My hovercraft experience was great. The day when Senator John Button came to launch the first one was memorable. He failed to bring his wife so we dispensed with the traditional launch procedures and then proceeded to teach the Senator how to drive the hovercraft around the crocodile infested backwaters of Trinity Inlet. I also recall dispensing with the traditional champagne bottle breaking ceremony. We drank it - ceremoniously, of course.

*"Research those things you find interesting. Something good will always emerge even if far from the objective."*

## INNOVATING TO SURVIVE

During the mid 1960's, we won a contract to build 11 Landing Craft for the Australian Army.

I masterminded the production of the landing craft, designing special jigs to achieve serious production gains. We built the first vessel in 9 months and one thereafter every 5 weeks. We built them using the same team which had just finished building the roof structure for the Cairns Bulk Sugar Shed.

The project was successful. We delivered on time, within budget and defect free. It was a financial success and paved the way for our shipbuilding.

Some years later, we built our first Roll On Roll Off Vessel to a design provided by Riley, Hercus and Boulton at a time when the trio were together.

As our ships became larger, so did the effort to launch. In 1975, we began the transfer of our works to be close to our slipway, although it still involved a road crossing.

I think I am the only person in Australia who has built a fully riveted ship (well almost), a 6,000 tonne tin dredge barge erected 100 miles west of Cairns. It was all rivetted

to meet the requirements of the Scottish designers. This was an experience. I salute those early shipbuilders.

*"The best results come from a combination of practical experience and theoretical knowledge."*

My patrol boat days were best. Taking on the contract as a 35 year old was a real adventure. We could not raise the funds to guarantee the down payment but contact with Sir John Bjelke Petersen soon fixed that - it meant work for Queensland. I heard the expression first hand, "Don't you worry about that!"

The design was from Brooke Marine in the UK. The detail was provided in 1/10 scale transparent drawings arranged for overhead projection onto the plate or by a special cutting machine which traced the 1/10 scale drawings. The cut components were not accurate and construction time was excessive.



*Fremantle Class Patrol Craft in NQEA workshops*

I took the plunge to install a numerical control plate cutting machine. The technology was in its infancy. The only unit in Australia was a demonstration model held by CIG which I saw at a machine tool exhibition in Melbourne. I placed an order at the exhibition. The CIG Sales Engineer at the time was the infamous Peter Farley, later to found Farley Cutting Machines. The machine was one thing but how to change the 1/10 drawings to a punched paper tape format was a challenge.

The task required relofting the lines. By this time in my life I realized obtaining permission from Navy for this would be impossible but it had to be done so I just did it. I located a company in Norway which could repair the lines by computational means and generate the NC

data. I recall having to take the original lines plan from Brooke Marine handcuffed to their chief loftsman. They were paranoid about losing their prize lines.

We halved the assembly time and along with the benefit of using the first Australian developed and built NC pipe bending machine (a tribute to Robert Pongrass of Pongrass Industries in Sydney), the project became very profitable.

Prior to building Seajet, many of our earlier fast ferries were designed by Phil Hercus of Incat Designs, Sydney, and many of his wavepiercer designs were built by my company.



*Fremantle Class Patrol Boats*

It was this type of enterprise which paved the way for the Australian high speed shipbuilding industry for which Australia is a world leader.

I have specialised more recently with low wash ferries.

Photograph(s) (below) show Rivercats® operating on Sydney Harbour, designed by Grahame Parker of Sydney, followed by our own design based on an extensive research programme.



One of six Rivercats® on Sydney Harbour - built in Cairns

Our low wash ferries now operate at 25-30 knots in Sydney, Rotterdam, Bora Bora and on the Thames in London. They are state-of-the-art and take pride of place amongst the ferries plying the Thames.

But then our dredge "Brisbane" was another Australian first using a revolutionary fluidised cargo concept which allowed the dredged material be pumped ashore, via a central weir. This arrangement significantly increased dredging and reclamation efficiency.

To show my confidence and win the contract, I agreed to fund the whole design and construction and be paid in full once it operated successfully, including the auto dredge and piloting functions.

This design won the Queensland Engineers Australia, Engineering Excellence Award - RWH Hawken Award - in 2001. We were paid.

The dredge story reminds me of another adventure where I teamed with Stuart Ballantyne to build his design of 3,000 tonne Ore Carrier and NQEA designed and built the automatic filling and discharge system. Again the client was nervous about my invention, which was a travelling gantry mounted bucket wheel reclaimer with



Ocean going Dredge "Brisbane" 4,000 tonne deadweight



"Hurricane Clipper"

top mounted travelling plough to fill the hopper from an overhead conveyor, fed from the land based stockpile.

When asked for more detail before contract signing, I advised most of the detail was still in my head. "What happens if you die after we give you the contract?" I quickly provided a written statement which declared I would live for at least the next eight weeks and complete the design. We signed immediately. Like the dredge, I funded the build with our Bank's support, until proven. The "Aburri" has since transferred four million tonnes of lead zinc ore since it was built.

Both these vessels were fitted with automatic docking devices which were developed in model form at my Malanda farm.

An adaptation of this was used on the Danish Ferries which enable turn around times of 8 minutes be achieved with 450 passengers and 120 cars unloading and loading.



Model of the Seajet AutoDock System

*"If you have an idea and you believe it is possible, then do it."*

The development of the semi swath hull form incorporated in the Seajet series of ferry coupled with the use of marinised gas turbines each delivering 14 mW driving waterjet which you could crawl through, rates high on my excitement list.

We were to have built these vessels in Australia but for complex reasons, I licensed the Danish company, Danyard, to build them. The builder was nervous about warranting the speed so I offered to forfeit the whole licence fee in the event the ferry failed to reach 42 knots in the specified Sea State.

You can imagine my anxiety whilst standing on the bridge during trials. Thankfully we reached 48 knots and 50 plus knots when light. The seakeeping was excellent.

Our very first catamaran, built from steel in 1976, incorporated a semi swath concept forward by virtue of its extended bulbous bow. It provided excellent seakeeping and is still in service operating to the reef from Cairns.

## INNOVATION IN THE FAST LANE

### (SCRAMJET)

Professor Ray Stalker at the University of Queensland encouraged me to support the development of Scramjet. I built and he tested a variable geometry test Scramjet engine at Queensland University's Mechanical Engineering Department, Hypersonic Tunnel.

My involvement with hypersonic research has intensified since Professor Allan Paull has taken over Ray's work.

We developed a new hypersonic test facility concept and manufactured and installed the first unit at Australian Defence Force Academy, Canberra early 2006.

## INNOVATION AND BEYOND

After 50 years at NQEA, I have elected to bend to the competitive pressures from Asia and to consequences of failing to win recent major Defence contracts and down size. AIMTEK is the new face of NQEA, essentially a design and project management organisation with a hitech machining and fabrication facility which will focus on providing Aerospace, Industrial and Marine Technology and Services.

### *What about these projects still on my drawing board...*

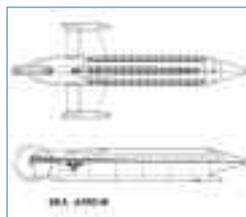
#### CAPA

*Controlled Atomic Particle Assembly*



#### "SEA ARROW"

*Fast Paddle Wheel Driven Boat  
Aerodynamically and  
gyroscopically stabilised*



#### THE SUPERSONIC CRUISE MISSILE

*An active, real project*



#### MICRO STUDY OF NATURE

*Finding better ways for  
man made things*



Test Tunnel at ADFA, Canberra



SCM-8 Prototype Model

### **We must all strive to:**

- *Conserve our fresh water resources;*
- *Eliminate the need for fossil fuels;*
- *Efficiently produce non toxic food;*
- *Eliminate the use of narcotics through education;*
- *Develop safe nuclear power with zero radioactive waste; and*
- *Utilise Solar Energy to generate hydrogen to power our home, transport and industry.*

*Reducing our dependence on oil will do much to stabilise our climate and promote peace on earth.*

*These objectives, when achieved, will provide the environment God intended and enable us to fulfil his purpose.*

#### DON FRY AO

*Dip. MEE, Hon. FIE Aust., CP Eng., FRINA, MI Mar. EST*

### **DON FRY - THE OTHER SIDE**

- Chair - Salvation Army Advisory Board - Cairns & District (30 years).
- Chair - James Cook Engineering Faculty Advisory Board (10 years).
- Chair - Commonwealth Committee advising Federal Government on Homelessness - 1999-2003.
- Adjunct Professor - Mechanical Engineering, University of Queensland.

#### *Other Interests:*

- 40 acre farm at Malanda including a well equipped research workshop.
- Classical Music - Concerts and Opera.
- Plays French Horn.
- Plays Cornet in Cairns Salvation Army Band occasionally.

#### *Patron:*

- Cairns Choral Society.
- Cairns Civic Orchestra.
- FNQ Independent Living Support Association Inc.

## The Warren Centre for Advanced Engineering

The Warren Centre for Advanced Engineering is the leading Australian forum for advanced engineering issues, recognised for its inclusive, forward-looking approach and the wide impact of its many achievements.

The Centre is a self-funding, independent, not-for-profit institute operating within the Faculty of Engineering at the University of Sydney, controlled by representatives from industry.

It has three principal objectives:

- to stimulate the application and further development of new engineering technology.
- to encourage the integration of innovation and engineering technology into the development of Australia's public policy and wealth creation.
- to provide independent comment and advice to government and industry on these and related issues.

The Warren Centre:

- identifies and supports major projects that bring together people at the leading edge in selected fields of engineering technology to develop new technical insights and knowledge in those technologies and accelerate their application in Australian industry.
- holds industry forums for companies in specific industry segments to explore opportunities of common or joint interest that will accelerate the development and/or exploitation of technology.
- organises events such as seminars, lectures and conferences that explore contemporary technology issues and disseminates the results of the Centre's activities.
- produces electronic and printed material to promote discussion and build awareness of contemporary, advanced engineering issues.
- recognises people and projects that make a unique contribution to encouraging excellence and innovation in all fields of advanced engineering.

Since opening in 1983, the Centre has gained wide recognition for its unique approach and its achievements in diverse fields of engineering technology and industry development.

The Warren Centre Innovation Lecture is an activity of The Warren Centre's Events Committee, aiming to promote understanding of new technologies and innovation and to encourage their use among Australian businesses.

### Disclaimer

The ideas and assertions put forward in this handbook are from the presentation of the 2006 Warren Centre Innovation Lecture, a Warren Centre event held at the PricewaterhouseCoopers building in Melbourne on 7 June 2006 and the Powerhouse Museum in Sydney on 8 June 2006. While a review and editing process has been performed on the material, it is not the intention of The Warren Centre or its management or the Centre's many sponsors, or the events' sponsors to present a formal Warren Centre, Sydney University or sponsor view of any of the matters presented. While care has been taken in compiling the information presented in this book with regards to accuracy, no responsibility will be accepted for errors or omissions.

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THE **Warren** CENTRE  
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