ADVANCED MANUFACTURING PRECINCT
CREATING INNOVATIVE SOLUTIONS

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RMIT University’s Advanced Manufacturing Precinct draws on the University’s international reputation for excellence in work-relevant education and high quality research that is engaged with the needs of industry and community.

The Advanced Manufacturing Precinct brings together RMIT’s expertise and strengths in innovative technology and design. It houses the latest in industrial platform technologies focusing on additive and subtractive technologies, and develops and realises conceptual design and its many iterations, across many disciplines of product and industrial design.

In this rapidly changing world, industry organisations need innovative solutions in order to advance their business operations. The Advanced Manufacturing Precinct provides the capabilities to move the manufacturing industry beyond its origins in labour-intensive production lines and heavy engineering. It links education, research and industry with a focus on the future, exploring ways to harness information and communications technology, new materials and process revolutions.

A multidisciplinary approach with resources and expertise from across the University allows the Advanced Manufacturing Precinct to deliver innovative ways to transform the Australian manufacturing industry.

Professor Peter Odey
Pro Vice-Chancellor Science, Engineering and Health
and Vice-President
RMIT University
VISION

From virtual design to rapid manufacturing

Recognising the important role manufacturing plays in Australia’s economy, RMIT’s Advanced Manufacturing Precinct was established to meet the challenges facing industry and to enhance the delivery of skills to effectively and efficiently compete in global markets.

It links research, education and industry across design and advanced manufacturing, enabling customisation of innovative and personalised design solutions.

Utilising a multidisciplinary, collaborative approach across the University’s expertise in design and scientific skills, RMIT can produce complex products and processes. RMIT’s dual-sector advantage as a university and TAFE, allows for whole-of-industry needs to be met in the development of value-added products.

Providing both research and training opportunities, the Advanced Manufacturing Precinct will complement RMIT’s Design Hub in offering expertise in advanced manufacturing, textile design and technology.

EXPERTISE

Collaborative innovation

A multidisciplinary team led by internationally recognised researchers brings together combined skills in applied design, research and development, engineering, IT and management.

The Advanced Manufacturing Precinct connects researchers, industry partners and students through a range of activities, encompassing large multinational organisations as well as small local companies, to meet the evolving needs of Australian industry.

It offers access to research, skill development, product design and testing across the full scope of the manufacturing process.
The Advanced Manufacturing Precinct uses new industrial platform technologies to enable innovative ways of using composite materials. Housing a range of specialised equipment, with a focus on additive and subtractive technologies, the Advanced Manufacturing Precinct provides access to cutting edge technology that can enable companies to develop new conceptual products or perform multiple design iterations, as well as developments to existing products. It offers:

- high speed multi-axis machining centres
- additive and subtractive process manufacturing in a range of materials
- reverse engineering
- highly trained technical staff.

**ADDITIVE MANUFACTURING**

A range of equipment enabling additive manufacturing can be utilised to build final products direct from a computer model in both polymers and high-tech metal alloy powders. Access to state-of-the-art additive manufacturing technologies includes:

- selective laser melting (metal-based technology)
- fused deposition modelling (polymer-based technology)
- objet machines (polymer-based technology)
- U Print machines (polymer-based technology).

Our equipment can process a range of metallic powders and polymers including:

- titanium
- stainless steel
- tool steel
- aluminium
- nickel
- precious metals
- ABS
- polycarbonate
- medical grade resins
- ULTEM.

**SUBTRACTIVE MANUFACTURING**

As components are being produced to tighter tolerances with more complex geometries, under increasing cost pressures and with sustainability considerations, the characteristics that make these materials attractive also make them much more difficult to cut and form.

The Advanced Manufacturing Precinct houses a number of internationally recognised multi-axis CNC machines (Okuma, Haas and BIESSE) for machining high-performance alloys and composites for engineering and furniture applications.

**INDUSTRIAL AUTOMATION**

Robotic technology enhances the subtractive manufacturing capability, affording greater diversity and flexibility of applications. A range of automation robotics is utilised for teaching and research to simulate manufacturing production lines, used in the furniture, textile and design industries.

The Advanced Manufacturing Precinct comprises the latest in CAD software, allowing students and researchers to design components and models.
ENGAGEMENT WITH ADVANCED MANUFACTURING PRECINCT

SERVICES
The Advanced Manufacturing Precinct offers a range of services including:
- contract research
- consultancy
- training.
Partnerships with industry may involve collaborative and contractual agreements, with RMIT’s capabilities complemented with appropriate industry contribution.
The Advanced Manufacturing Precinct offers commercial applications across a broad range of industries including:
- aerospace
- defence
- automotive
- consumer
- biomedical and dental
- manufacturing
- textile
- furniture.

TESTING AND ANALYSIS
The Advanced Manufacturing Precinct allows access to RMIT’s full capabilities. Prototypes can undergo a series of tests to determine limitations and specifications.
Testing can include:
- mechanical analysis
- material analysis
- system power
- acoustics testing
- fatigue testing
- tensile testing.
Highly accurate digital coordinate measuring machines allow detailed verification for quality assurance and reverse engineering.
ADDITIVE LASER MANUFACTURING: NEW TECHNOLOGY FOR MANUFACTURING SURGICAL GUIDES

Professor Milan Brandt from RMIT’s School of Aerospace, Mechanical and Manufacturing Engineering, in collaboration with orthopaedic surgeons from the Royal Children’s Hospital, is investigating the use of additive technology to provide customised patient-specific thoracic pedicle screw guides for correcting scoliosis.

Scoliosis produces rotated and mal-developed vertebral components. Screw usage has improved corrective and operative techniques in scoliosis pedicle. However, this can come at a cost of prolonged operative times and danger to the spinal cord.

The application of an additive manufacture technique for the improving accuracy of pedicle screw placement in scoliosis has the potential to provide a safer, more accurate and faster technique.
Dr Scott Mayson, an industrial designer with RMIT’s School of Architecture and Design, partnered with Victoria’s Bicycle Network to examine how much noise is deadened by bike riders wearing earphones.

Testing by the Bicycle Network was enabled by Dr Mayson’s creation of a synthetic model ear, specifically designed to fit the decibel meter in the back and earphones in the front. Results revealed that bike riders with ear-bud earphones playing music hear much more outside noise than car drivers, and that ear-bud headphones set at a reasonable volume still allow riders to clearly hear the warning sounds of other riders.
RMIT’s Applied Optimisation Group develops theoretical and physical models to provide optimal solutions to applied engineering problems. These solutions are of direct relevance to industry needs, and provide competitive advantage to industry partners.

By engaging with the capabilities of the Advanced Manufacturing Precinct, the Applied Optimisation Group has developed:

» Organically optimised structural components for high-value aerospace applications.

» Optimal automotive seat kinematics developed by the application of the Coordinate Measurement Machine (CMM) and metrological capabilities.

» Novel structures to resist biological fouling in maritime applications developed in collaboration with biosecurity specialists. These structures utilise the Fused Deposition Modelling (FDM) capabilities of the Advanced Manufacturing Precinct to enable cost-effective control of biological contamination in marine structures.

» Functional models of engineering systems designed by senior students to provide practical digital manufacturing experience and to enhance undergraduate teaching.
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