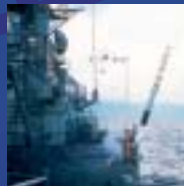




Australian Government

Department of Industry
Tourism and Resources

UNMANNED TECHNOLOGIES AUSTRALIA



Industry
Capabilities

UNMANNED

Australia has a well established aerospace and defence industry with world-class capabilities in a broad range of unmanned vehicle (UV) activities. Specific capabilities include R&D, engineering design and manufacture of: mission and vehicle systems; electro optics; sensors; vision systems; prognostics and health monitoring; photonics; software; communications and signal processing; autonomous and intelligent systems; composite and metal airframe components; heavy fuel piston, turbojet and turboprop aircraft engines; aircraft structures; ground control and support equipment.

Australia's involvement in developing systems for unmanned aerial vehicles (UAV) goes back 60 years to July 1947, when the Jindivik project was first planned. The Jindivik program, saw the first successful flight of a high performance jet-propelled unmanned aerial target on 28 August 1952 after five years of development. The Jindivik carried various Australian-developed remote sensing devices, including the 'fish-eye' 183 degree camera lens which was subsequently marketed worldwide.

Australia's remote and vast physical geography, natural resources, extreme environmental conditions and small population base, provides an ideal situation for developing and using UAVs. This has been a contributing factor to Australia's aerospace and defence industries ability to develop a range of unmanned technologies, which have attracted the attention of highly competitive UV markets. For example:

- BAE Systems Australia developed the unmanned Nulka Anti-Ship Missile Defence Decoy and is now a world-leader in developing autonomous systems technologies, and a global UAV centre of excellence for BAE Systems.
- Mediaware Solutions is a world-leader in developing UAV video exploitation systems, which allow analysts to view, edit, annotate, mosaic and search live compressed video streams whilst retaining critical multiplexed metadata. Its customers include General Dynamics, Lockheed Martin, Northrop Grumman, Raytheon, US Navy, US Air Force, UK DSTL and Australian Department of Defence.
- Aerosonde designs, develops, produces and operates unmanned aerial vehicles for both civilian and military purposes. Aerosonde's small long endurance robotic UAV

has undertaken missions for organisations such as the Australian Bureau of Meteorology, Australian Department of Defence, Australian Customs Service, NASA, US Office of Naval Research, US National Science Foundation and SAAB Systems. Most recently Aerosonde have conducted a series of missions for the implementation of electronic warfare, intelligent agents and swarming technologies.

- Agent Oriented Software has developed Intelligent Agent software (JACK) which is capable of simulating human intentions, thereby allowing UAVs to react to its changing operational environment by undertaking airborne mission replanning. Their JACTeams software also allows UAVs to work cooperatively as an autonomous team. Its customers include the UK Ministry of Defence, Northrop Grumman and QinetiQ. The company recently secured an order to supply the US Air Force with intelligent training environments to test and prepare for battlefield scenarios and develop appropriate Rules of Engagement.
- Jabiru Aircraft has developed a range of light aircraft engines consisting of 2200cc 4 cylinder 85hp, 3300cc 6 cylinder 120hp and 5100cc 8 cylinder 180hp. Jabiru has sold some 3,000 engines into 42 countries for use in light aircraft and UAVs. In response to UAV customers specifying engines capable of operating on heavy fuel, Jabiru is collaborating with Orbital Corporation to adapt the engines to operate on JP5 or JP8 fuel.
- Orbital Corporation has developed world leading direct fuel injection technologies, which converts spark ignition engines to operate on heavy fuels (JP5). The application of Orbital's fuel technology has allowed Mercury Marine to develop a 3.0 litre V6, 2-cycle low-emission OptiMax outboard which runs on JP5 class jet fuel, and which will be available for use by the US Military and Special Forces. This technology is also being applied to aircraft and ground vehicle engines.
- Tectonica has developed a range of generator sets comprising micro-industrial combustion engines and high efficiency lightweight generators to provide 30-100W of electrical power to demanding military and industrial applications, and powering of UAV and aerial target navigation, communication and sensor payloads. The engines operate on automotive



TECHNOLOGIES

diesel and JP8 fuel and are suitable for small long-range UAV propulsion applications.

- In partnership with Australian industry, the Defence Science & Technology Organisation (DSTO) under its Automation of the Battlespace Initiative, has demonstrated its ability to exploit autonomous UAVs in air, ground and maritime environments through the integration of various miniaturised electronic surveillance payloads comprising sensors, communication, EW, intelligent agents and data fusion technologies.
- Tenix Defence, in collaboration with the DSTO, recently developed a compact 2-axis gyro-stabilised UAV gimbal, supported by ground station software, which allows the operator to remotely steer the gimbal, as well as pan, tilt, zoom and modify the 25x camera settings to view highly stabilised streaming video. Communication between the ground station and gimbal can be via direct link, or radio modems for long-range remote control.
- Sydac is the developer of technologically advanced simulation, training and virtual prototyping tools for the transport, industry and defence sectors. Its customers include Boeing, Raytheon, Lockheed Martin, DSTO, Australian Defence Simulation Office, BAE Systems, Tenix Defence and GEC-Marconi.
- Codarra Advanced Systems' electric powered Avatar surveillance and tactical UAV is being trialled by the Australian Army, Australia's Defence Science and Technology Organisation (DSTO) and the Queensland University of Technology.

Codarra's Silverback unmanned ground vehicle (UGV) is suitable for carrying a wide range of payloads (including laser illuminator, robotic arms and weapons) in harsh and hostile environments with up to 16 hours of operational endurance.

A number of Australian research agencies are actively supporting the industry's UAV development activities. The CSIRO has developed inertial sensing and vision systems technologies for its autonomous rotary wing VTOL Mantis; the University of Sydney has developed the VTOL T-Wing and together with BAE Systems, the Mk II Brumby UAV; while the Queensland University of Technology is actively involved in developing UAV technologies

associated with civil airspace integration, mission planning and piloting, navigation sensors, autonomous health monitoring, collision avoidance and forced landing. The DSTO is also actively involved in developing autonomous systems for UAV, UGV and UUV applications.

Some UAV and aerospace products and technologies currently being exported from Australia include:

- BAE Systems Nulka Anti-Ship Missile Defence Decoy;
- Jabiru Aircraft 2200cc 85hp, 3300cc 120hp, 5100cc 180hp boxer engines;
- Orbital Corporation UAV heavy fuel systems;
- Aerosonde reconnaissance, surveillance and meteorological UAVs;
- Agent Oriented Software's intelligent agent software;
- Sydac simulation, training and virtual prototyping tools;
- Microair Avionics UAV transponders and VHF radios;
- Mediaware video exploitation systems; and
- LSM Advanced Composite components.

Australia's aerospace and defence industry, through the *Aerospace Industry Action Agenda*, has identified the growing UAV market as an opportunity for Australia to exploit its broad range of aerospace and unmanned technologies and capabilities. With the support of the Australian Government, industry is collaborating with Australian and international organisations to develop and commercialise technologies and products. Some areas of particular focus include; autonomous and network centric control systems, intelligent agents and software, inertial sensing and vision systems, electro-optics, cameras, video exploitation and mosaicing, avionics, UAV transponders, forced landing systems, heavy fuel engines and lightweight advanced composites.

In response to a recommendation of the *Aerospace Industry Action Agenda*, industry has agreed to:

- Develop a medium sized UAV certified for surveillance and reconnaissance operations over populated areas; and to demonstrate technologies that allow for safe and highly-autonomous operation in non-segregated airspace.



AUSTRALIA

Fifty Australian and international firms and research agencies have registered their interest to participate in the project, and have established a company limited by shares (**Unmanned Technologies Australia Pty Ltd**). The company is responsible for managing the development of the project over three years.

Australia's UAV operational requirements are similar to those of other countries and include:

- Defence and border security;
- Maritime and coastal surveillance
 - customs
 - fisheries
 - maritime safety
 - immigration
- Policing
- Fire control
- Forestry
- Meteorology
- Soil conservation and salinity monitoring
- Topographical and geological survey

In light of these requirements, industry has determined there is an opportunity to develop low cost UAVs capable of undertaking these activities with a high degree of:

- autonomy;
- endurance;
- fuel efficiency;
- reliability;
- structural integrity;
- low observability;
- payload carrying capacity (including systems/sensors and deployable items); and
- capable of flying at various altitudes and withstanding harsh environment.

The Australian Government is playing an active role in supporting industry with its collaborative efforts to develop and promote UV technologies and capabilities by leading industry delegations to the US, UK and Europe to meet with potential international customers. Support is also being provided to individual firms in developing and commercialising UV systems and products, as well as establishing collaborative activities with international organisations.

The Australian Government and industry welcomes foreign firms and research agencies participation in UV development projects, as there are mutual benefits in sourcing systems, products and services from Australia, or being involved in joint venture activities such as collaborative R&D of UV technologies, low cost manufacturing, investment, risk mitigation and access to Asia Pacific markets.

As one of the world's most technologically advanced countries, and having one the most stable, progressive economies, Australia is well placed to meet the challenges of being a key player in the global UV market.

A list of Australian and Australian-based foreign organisations' capabilities and contact details are listed below. More detailed information is available at www.industry.gov.au/uv

Additional firms and research agencies with relevant capabilities are invited to register their interest in UV products and technologies, or collaborating in UV development activities by contacting:

David Mitchell
Manager
UAV Development Project
Aerospace and Defence Industries Branch
Department of Industry, Tourism & Resources
Level 4, 33 Allara Street
CANBERRA ACT 2600 AUSTRALIA
Ph: +61 2 6213 7538
Fax: +61 2 6213 7205
Mobile: +61 (0)408 653 439
Email: david.mitchell@industry.gov.au
Web: www.industry.gov.au/uv



ORGANISATION

Absolute Data Group
ADI
Aero Plastics & Structures
Aerosonde
Aerostaff

Aerostructures Technologies
Aerovally Technologies
Agent Oriented Software
Air Affairs
Airborne Defence Research Organisation
AME Systems
Asia Pacific Aerospace
Auspace
Avalon Systems
Avoca Engineering
BAE Systems
BB Engineering
Bishop Manufacturing
Boeing Australia
CAE Australia
Calytrix
Cambridge Technologies
Codarra Advanced Systems
Complete Wiring Harnesses
Contract Personnel
CPE Systems
Electronic Navigation Ltd
Ferra Engineering
Fitzroy Engineering Group
GKN Aerospace Engineering
Helimetrex
Jabiru Aircraft
Kidde Australia
Lavender CE
LSM Advanced Composites
Marand Precision Engineering
Mediaware
Metaltec
Microo
Microair Avionics
Milspec
Mincom
Ocean Software

CAPABILITY

Technical data solutions
UAV systems integration
Vacuum/Thermo plastics
UAV, autonomous systems
Ground control stations, sheetmetal & composite assemblies
Aircraft design & structural analysis
Avionics
Intelligent software
Drone systems
UAV gimbals
Wiring harnesses
Defence aircraft engine repair, overhaul & test
SatCommelectro-optics & space systems
EW systems processing
Precision machining, tooling & stamping
Autonomous UAV & ISR, Ground Mgt Systems
Precision machining
Micron machining, tooling & assembly
Systems integration & support
Simulation & Training
Simulation tools
Mil-spec wire, cable & connectors
UAV, systems integration
Wiring harnesses
Defence & aerospace contract personnel
Software & hardware design
Navigation, acoustic & communication systems
Precision casting & machining
UAV launch & ground support equipment
Aerospace engineering design
UAV systems & services
Light aircraft & UAV engines
Fire control systems
Aeronautical engineering
Complex composite structures
Automated production, tooling
Video exploitation systems
Precision machining
Microwave electronic & photonic products
UAV Transponder
Precision machining
Defence logistics software
UAV command & control software

WEB

www.absolute-data.com
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www.aeroplastics.com.au
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www.aerostructures.com.au
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ORGANISATION

Orbital Corporation
Production Parts
Reliance Gear Company

Remote Vision Solutions
Rosebank Engineering
Seabird Aviation
Sydac
Tectonica

Tenix Defence
Trimcast
Turbojet Technologies
UP Industries
Varley Engineering
Vipac Engineers & Scientists
VMS International

Voyage Enterprises

CAPABILITY

UAV engines & heavy fuel management systems
Precision machining
Mechanical components & electro-mechanical assemblies
Remote visual inspection devices
Hydraulic & fluid flow systems
Light aircraft
Simulation, training & virtual prototyping tools
Electrical, mechanical & software engineering, micro heavy fuel engines & power generators
Surveillance & reconnaissance systems & tools
Specialist plastic storage & transit containers
UAV, turbojet engines
Composite & injection moulded components
Ground support equipment
Structural design, analysis PHM systems
Calibration & repair service
- test & measurement equipment
Defence/aerospace engineering

WEB

www.orbeng.com
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www.reliance.co.uk
www.remotevs.com
www.rosebank-eng.com.au
www.seabirdaviationjordon.com
www.sydac.com.au
www.tectonica.net
www.tenix.com.au
www.trimcast.com.au
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www.voyageenterprises.com

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+61 3 9381 6700
+61 8 8300 4523
+61 3 9720 4476
+61 9 478 1877
+61 3 9587 4455
+61 8 8362 5445
+61 7 3344 1866
+61 3 9650 6842

NATIONAL RESEARCH & TRAINING AGENCIES

Australian National University
Aviation Australia
CRC Advanced Composite Structures
CSIRO ICT Centre
CRC Sensor Signal & Information Processing
Defence Science & Technology Organisation (DSTO)
Monash University
Queensland University of Technology
University of Melbourne

University of Sydney
Wackett Aerospace Centre - RMIT

Animal & artificial vision systems research
Aviation & aerospace training
Advanced composites R&D
Computer vision & autonomous control
Video & sensor signal processing
Defence science & technology R&D
Communications & information engineering
UAV autonomy & emergency procedures
Dynamic optimisation of data, tracking & situation awareness for UAV networks
UAV design, development, testing, & evaluation
Aerospace design, test & certification

www.sbs.anu.edu.au
www.aviationaustralia.aero
www.crc-ac.com.au
www.cti.csiro.au
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AUSTRALIAN GOVERNMENT

Airservices Australia
Civil Aviation Safety Authority
Dept of Industry, Tourism & Resources
NSW Dept State & Regional Development
SA Dept Trade & Economic Development
QLD Dept State Development
VIC Dept Innovation, Industry & Regional Development

Airspace and air traffic control
Airworthiness certification
Operator certification
Aerospace & defence industry development
Manufacturing & defence industry investment
Defence industry development
Aviation & Defence industry
Advanced Manufacturing

www.airservices.gov.au
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