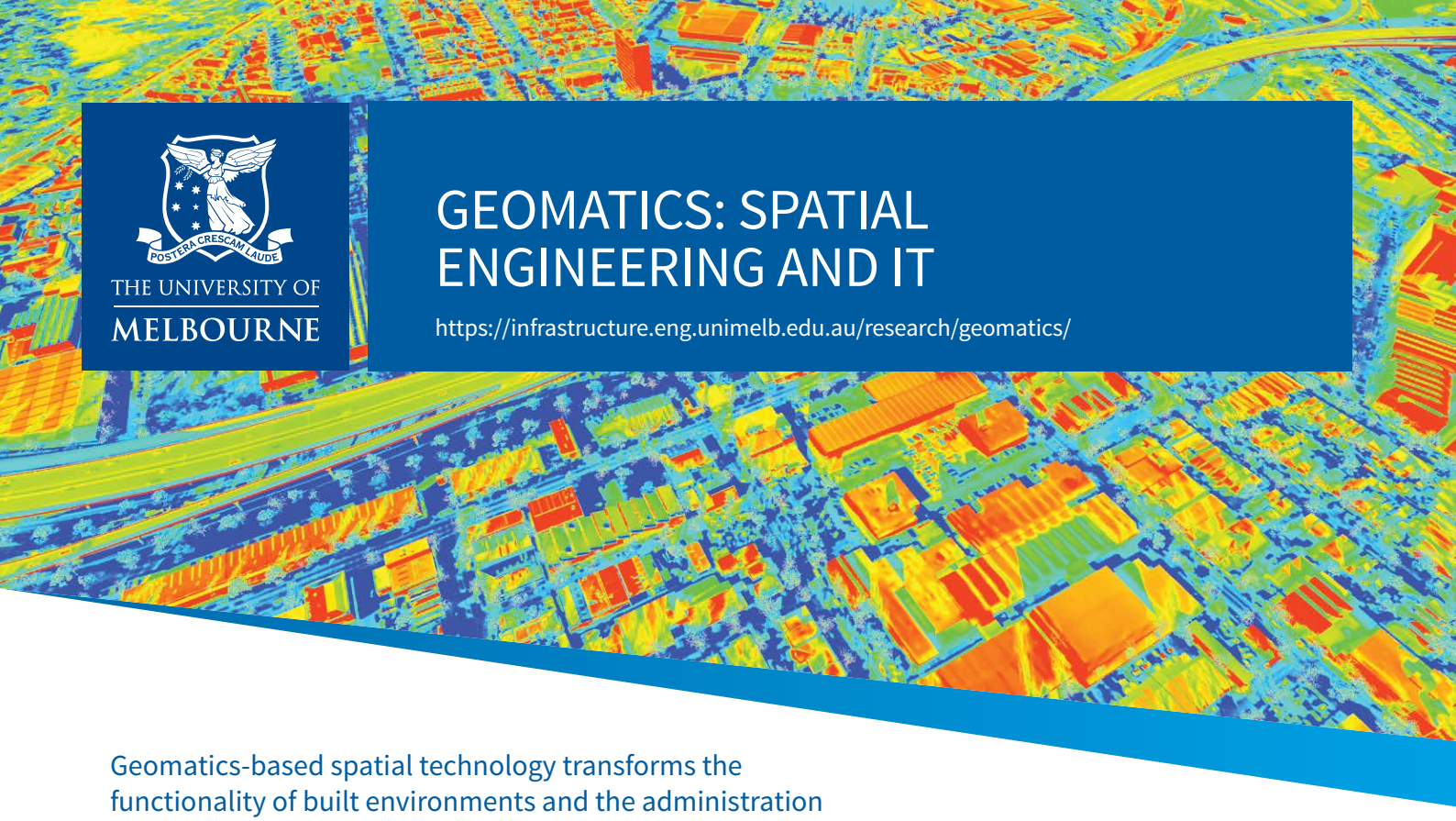


GEOMATICS: SPATIAL ENGINEERING AND IT

https://infrastructure.eng.unimelb.edu.au/research/geomatics/

Geomatics-based spatial technology transforms the functionality of built environments and the administration of both public services and private enterprises.

Geomatics at the University of Melbourne develops and applies spatial sensing, mapping, analysis and communication technology. The resulting spatial intelligence solutions enable new functional capabilities and enhance the resilience and productivity of myriad systems, from transport and planning through to disaster management.

How to engage with us

We work with private and public sector partners on a broad range of real-world challenges, including precision positioning, location-based Internet of Things (IoT), 3D and virtual models, digital twins and building information models, urban analytics, and mobility analytics and support. A range of partnership models are available:

» **Consulting and strategic use of technology** – assessing emerging technologies, technology implications for policy, research and systems engineering.

» **Research projects** – based on contract or collaborative research models.

» **Student projects, internships and placements** – undergraduate and graduate student work experience, PhD candidate and postdoctoral internships.

Collaborators and partners

Public Service Agencies: national and international organisations.

Industry: the spatial and surveying sector, and sectors using spatial engineering and IT including transport, retail, infrastructure, and agriculture.

Research Partners: collaborations with leading institutions around the world including in the USA, Germany, Switzerland, Netherlands and India.

Our capabilities

Our engagement with industry partners is underlined by an intensive, multidisciplinary R&D program, which focuses on:

» Ubiquitous positioning in indoor and outdoor environments

» Remote sensing, photogrammetry, LIDAR from aerial and ground-based platforms, including unmanned aerial vehicles (UAVs)

» Computer vision and scene understanding

» Engineering surveying

» 3D cadastre and land administration systems

» Spatial data infrastructures

» Disaster management and public safety

» Spatial analytics, simulation and visualisation

» Urban mobility and navigation systems

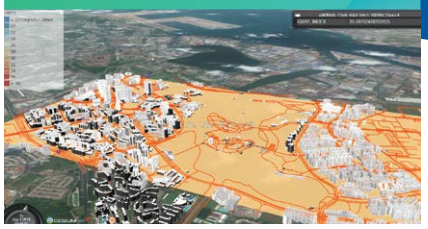
» Spatial cognitive engineering

» 3D mapping and modelling of indoor and outdoor environments.

Our research capability is supported by the outstanding R&D infrastructure and the transdisciplinary Research Platforms of Melbourne School of Engineering.

CASE STUDIES

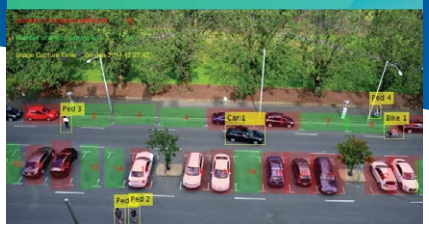
CONNECTED AND RESILIENT CITIES



Geomatics boosts the productivity and competitiveness gains our cities achieve via network effects. We use sensing, mapping, modelling and visualising technology to build 3D models that allow multi-scale analysis of buildings, streets, trees, parks, city furniture, rivers, bridges, tunnels and underground infrastructures. Other applications include:

- Digital models of the interior and exterior of buildings that address the limitations of current 2D property map bases for managing property rights, restrictions and responsibilities (RRRs) across the vertical dimension of buildings.
- Delivery of real-time, harmonised, interoperable data to support the modelling, designing, planning and management of Australia's growing cities.
- Capabilities to help manage urban disasters by integrating spatial technologies with an advanced optimisation simulation engine.
- Real-time collection, management, analysis, distribution and visualisation of information for enhanced situational awareness.
- Visualisation of disasters and their locations in real time in ways that accelerate mapping the disaster's distribution and enable predictions of trajectories.

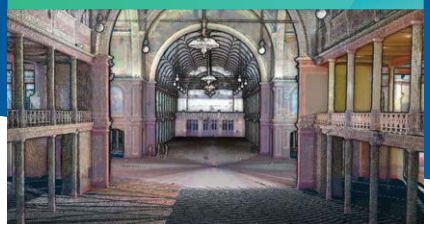
INTELLIGENT TRANSPORT AND MOBILITY



Mobility and access are increasingly challenged by urban growth, by transport infrastructure that is operating at or beyond capacity, and by disruption from autonomous vehicles. Geomatics has a role developing solutions by providing advanced:

- Pattern recognition and machine learning methods for automated extraction of spatial information from sensed data
- Spatiotemporal data analytics, modelling and prediction of mobility demand and transport choice
- Positioning and navigation information within collaborative intelligent transport systems, including for road user charging, emergency caller location, advanced driver assistance, vessel traffic management and anti-collision systems
- Tools that address the first/last-mile problem, parking guidance and information systems, crowding and evacuation challenges
- Analytics of individual mobility for secondary purposes, such as epidemiology, choice behaviour or demand patterns, including in retail analytics.

ARCHAEOLOGY AND CULTURAL HERITAGE



Spatial information plays a key role in the protection and management of our cultural heritage. Our expertise lends itself to digitisation – the first step in the documentation and preservation of historical buildings, collections and archaeological excavations. Example areas of research include:

- Efficient capture and 3D modelling of historical buildings and heritage sites
- Mapping and documentation of excavations
- Documentation of restoration works
- Monitoring structural health of historical buildings
- Visitor tracking and trajectory analysis for enhanced visitor experience
- Gaze and gesture recognition and analysis of visitors' visual interaction with artefacts.

PARTNER AND COLLABORATE WITH US

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