



HUMAN FACTORS IN ADVANCED MANUFACTURING:

Flinders University partnership
opportunities with industry

Summary Report

IMCFC | we champion
manufacturing
innovation

BAE SYSTEMS

Maritime Australia



Flinders
UNIVERSITY

SUMMARY

Next-generation digital technologies are fundamentally changing manufacturing. How humans interact with these technologies is the focus of Flinders University's Human Factors and Ergonomics (HFE) research. Flinders University is able to work with industry partners to improve performance using HFE across all aspects of the manufacturing value chain.

1 HFE is a critical factor in successful uptake and adoption of technologies

HFE combines a number of disciplines including social sciences (psychology, sociology), health sciences (medicine, physiology, biomechanics) and design sciences (engineering, industrial design, architecture, user interface design). HFE is the science of designing a job to fit the worker, rather than expecting the worker to fit the job.



2 Flinders University has a range of HFE assets that can be applied in manufacturing



Applied research depth and breadth through the Australian Industrial Transformation Research Institute



An ecosystem of industry partners anchored by BAE Systems



Access to state-of-the-art test facilities including Factory of the Future



Innovation capability including rapid prototyping and ideation

3 There are various ways industry can work with Flinders University to improve performance using HFE

1. Access consulting services
2. Access Innovation Central Adelaide
3. Participate in collaborative research
4. Get involved in Factory of the Future

THE IMPORTANCE OF HUMAN FACTORS IN ADVANCED MANUFACTURING AND SHIPBUILDING

Manufacturing – and shipbuilding specifically – is being changed in fundamental ways by new technology. How humans interact with these technologies is the focus of Flinders University's Human Factors and Ergonomics research area. HFE combines a number of disciplines including social sciences (psychology, sociology), health sciences (medicine, physiology, biomechanics) and design sciences (engineering, industrial design, architecture, user interface design). HFE is the science of designing a job to fit the worker, rather than expecting the worker to fit the job.

WHAT FLINDERS UNIVERSITY OFFERS TO INDUSTRY PARTNERS TO IMPROVE PERFORMANCE USING HFE

Flinders University is recognised for its contribution to advanced manufacturing and the role it plays in growing South Australia's economy. It is the anchor university at the Tonsley Innovation District, created at the former home of the Mitsubishi auto assembly plant. Tonsley is now home to an ecosystem of industry partners and innovation-focused facilities, including the pilot Factory of the Future.

Applied research depth and breadth through the Australian Industrial Transformation Institute

The Australian Industrial Transformation Institute (AITI) at Flinders University is a national leader in industry and workplace innovation research. AITI leads research on the future of work in the digital age and the human dimensions of technological change, playing a key role in informing strategy, policy and program development. At the heart of the AITI is the Digital Transformation Lab, a working showcase for hands-on application of Industry 4.0 technologies for manufacturers, designers, innovators, students and researchers, providing the opportunity for engaging with and configuring a range of advanced technologies to meet their needs.

Access to state-of-the-art test facilities including Factory of the Future at Tonsley

One of Australia's most promising large-scale modern manufacturing initiatives, the Factory of the Future, is in the early stages of development at Line Zero in the Tonsley Innovation District in Adelaide. A \$1.2m pilot Factory of the Future has already been established on-site as a partnership between BAE Systems Maritime Australia and Flinders University. A \$3m partnership project with the Innovative Manufacturing CRC has enabled trials to be undertaken in the facility.

Stage 1 of the Factory of the Future involves a \$10m co-investment from Flinders University and the South Australian Government.

Flinders University's ambition is to expand the Factory of the Future to create a large-scale industrial 'sandpit' where innovations can be tested in a production-level manufacturing environment. The Factory of the Future will connect companies to key enabling technologies and research capabilities, lowering barriers to entry at a time when support for businesses to grow and prosper is essential.



An ecosystem of industry partners anchored by BAE Systems

BAE Systems Maritime Australia (BAESMA) is the anchor industry partner at Tonsley, focused on next-generation shipbuilding. Joining BAESMA at Tonsley are over 1,700 innovators from more than 35 businesses, spread over a 61-hectare site. These businesses represent sectors as diverse as:

- Cleantech and renewable energy
- Mining and energy services
- Health, medical devices and assistive technologies
- Automation software and simulation.

Major organisations with a presence at Tonsley include:

BAE SYSTEMS

Maritime Australia

CISCO

SAGE
Automation

ZEISS

TESLA

SIEMENS

MICRO-X



Innovation capability including rapid prototyping and ideation

Flinders University's presence at Tonsley is grounded in applied research and innovation. Tonsley is a place where products are designed, built and tested and where ideas take shape.

Cisco recently established Innovation Central Adelaide (ICA) at Tonsley, offering a range of services to industry including:

- Ideation, market scanning and scenario modelling
- Access to equipment, sensors, and IT / OT resources
- Access to student talent and research expertise
- Rapid prototyping
- System automation
- Technology demonstration and testing

RESEARCH LEADERS IN HFE AT TONSLEY



Professor John Spoehr

**Pro-Vice Chancellor – Research Impact at Flinders University
Director of the Australian Industrial Transformation Institute**

John leads a multi-disciplinary team focusing on industry and workplace transformation in the context of technological change and innovation. His focus is economic and industry development, employment, unemployment and the socio-economic impact of change.



Dr Valerie O'Keeffe

**Senior Research Fellow
at the Australian Industrial Transformation Institute**

Valerie is a Certified Professional Ergonomist and Certified Chartered Work Health and Safety Professional who aims to transform workplaces using a people-centred and systems focus to improve performance. Her goal is to co-design work that is safe, productive, and satisfying and produces quality results.



Dr Sara Howard

**Senior Research Fellow
at the Australian Industrial Transformation Institute**

Sara is a registered psychologist and has extensive experience in applied research projects. With expertise in human factors, her focus is on understanding organisations and systems and how to optimise performance and wellbeing at the individual, team and organisational level.

WAYS INDUSTRY CAN GET INVOLVED

1 Access consulting services

Flinders University researchers are able to work with your organisation to assess opportunities for digitisation and identify workplace design considerations.

2 Access Innovation Central Adelaide

Innovation Central can help your organisation launch small-scale proof of concepts by providing ideation and prototyping services.

3 Participate in collaborative research

Flinders University welcomes opportunities to collaborate with organisations on real-world problems and solutions that could have a transformative impact on Australia's manufacturing industry.

4 Get involved in Factory of the Future

Leverage Factory of the Future's production-level manufacturing environment to test innovations before deploying them in the real world.

TAKING THE WORK FORWARD

and how Flinders University can help

Contact us to discuss how
we can help your organisation.

Australian Industrial Transformation Institute

Flinders University Tonsley

GPO Box 2100

Adelaide SA 5001

(08) 8201 5083

aiti@flinders.edu.au

www.flinders.edu.au/australian-industrial-transformation-institute

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