

# HARNESSING INNOVATION

## TO ACCELERATE MODERN MANUFACTURING AT TONSLEY

imcfc



BAE SYSTEMS

Maritime Australia



# HARNESSING INNOVATION TO ACCELERATE MODERN MANUFACTURING AT TONSLEY

Innovation Central Adelaide will act as a catalyst for the involvement of major industry players in the Line Zero – Factory of the Future and other major manufacturing initiatives in Adelaide.



## ACCELERATING MODERN MANUFACTURING

Modern manufacturing is a major economic opportunity for South Australia and the nation. It is forecast to create thousands of new jobs in Adelaide in a range of sectors including defence, space, building and construction, and medical technologies.

One of Australia's most promising large-scale modern manufacturing initiatives, the Line Zero – Factory of the Future, is in the early stages of development at the Tonsley Innovation District in Adelaide. A \$1.2m Pilot Factory of the Future has already been established on the site as a partnership between BAE Systems Maritime Australia and Flinders University. A \$3m partnership project with the Innovative Manufacturing CRC has enabled early trials to be undertaken in the facility. Stage 1 of the Line Zero – Factory of the Future involves a \$10M co-investment from Flinders University and the South Australian Government. Founding partner, BAE Systems Maritime Australia has already established a pilot advanced manufacturing test facility in partnership with Flinders at the site.

Factory of the Future will serve as an industrial-scale sandpit for manufacturers, researchers and an ecosystem of large and small firms. The facility will be fully digitised – underpinned by Cisco's advanced networking technology – creating a test bed environment for the development of innovative processes, systems, applications and products. Cisco's recently established Innovation Central Adelaide facility – to be located at Tonsley – will help to catalyse innovation at Line Zero and ensure the facility creates opportunities for local startups and SMEs, as well as multinationals.

The ambition of Flinders University, BAE Systems Maritime Australia, Cisco and others is to work with the Federal Government to build on the initial investment by Flinders University and the South Australian Government to create Stage Two of the Line Zero – Factory of the Future masterplan. This plan is consistent with the Australian Government's Modern Manufacturing Strategy, which aims to help Australian manufacturing scale-up, become more competitive and resilient, and create jobs for current and future generations.

Creating a modern manufacturing capability results in more than new products and services; it provides a foundation for South Australia to develop the skills that underpin agile, efficient advanced manufacturing. By embracing digital disruption, South Australia can expose 'blue tech' workers and high-end technical specialists to the sort of advanced technology that will help Australian firms differentiate on a global scale.

## THE SCALE OF THE MODERN MANUFACTURING OPPORTUNITY

Australia's manufacturing sector has a choice: retreat and be surpassed by international competitors, or do what is necessary to become innovative, export-oriented and world-leading. The latter is the only way to ensure that manufacturing continues to support Australia's economic prosperity and standard of living. The 'size of the prize' from improving Australia's manufacturing competitiveness could be an additional 25-35% of national output, worth \$36 billion by 2025. This would help Australia move into the top 15 on the Global Manufacturing Index, up from its current position of 21st.<sup>1</sup> The opportunity is even larger as a result of heightened focus on local production.

**"2020 itself has faced its fair share of disruption and uncertainty due to the COVID-19 pandemic, which continues to threaten businesses, research organisations, industry and the economy. Yet, out of every crisis opportunity emerges including for increased collaborative investment, research impact and manufacturing innovation."**

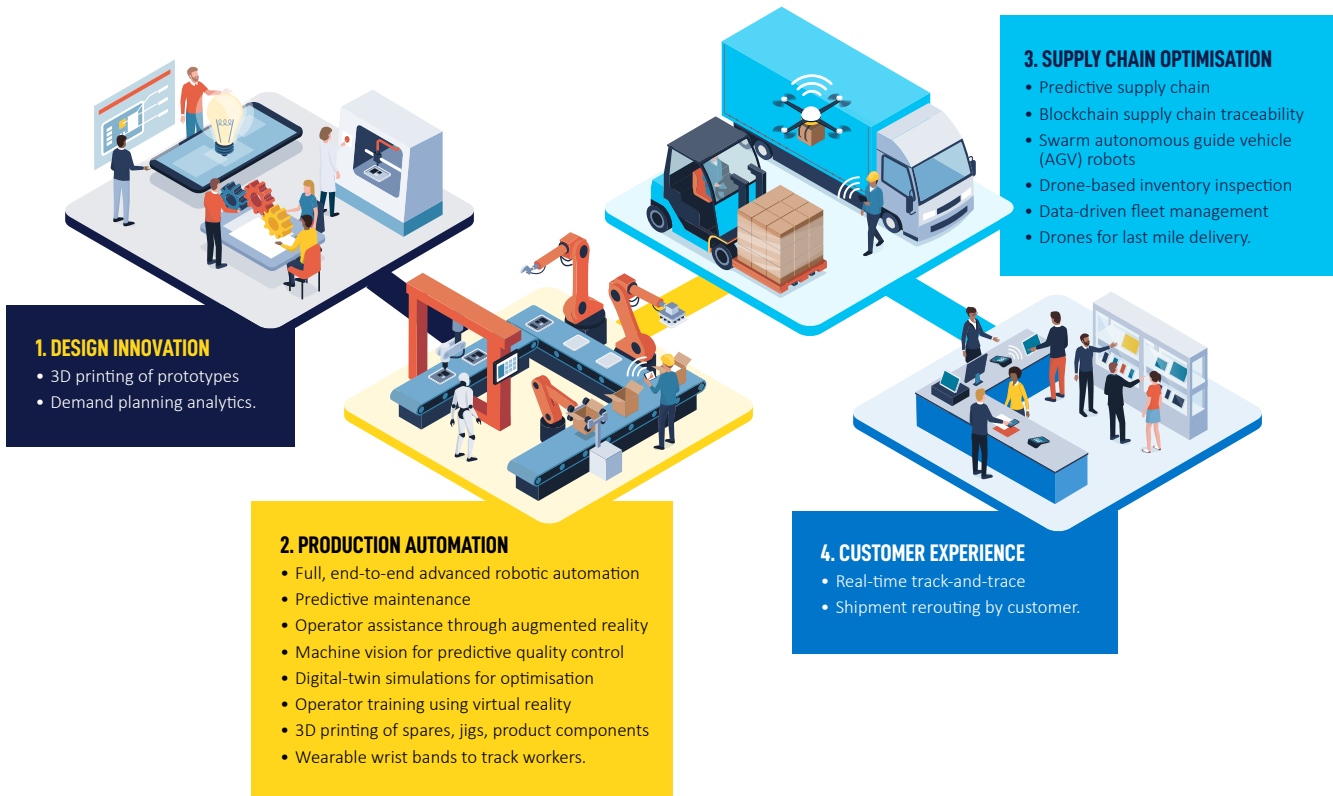
- David Chuter, CEO and MD,  
Innovative Manufacturing CRC

IMCRC


# BUILDING A MODERN MANUFACTURING CAPABILITY

COVID-19 has highlighted the strategic importance of insourcing, local control and capacity.

The Factory of the Future is poised to amplify these trends by building capacity for sustained digitisation and optimisation of manufacturing. Digitisation is occurring across all stages of the manufacturing process from design to production, supply chain management and customer experience.



For Australia to compete as a global centre for modern manufacturing we need to pay close attention to three major factors: innovation systems and mechanisms, supply of relevant skills and access to advanced technology. These factors cannot exist in isolation. By bringing together advanced technology with the right skills and innovation systems, Australia can create an enabling environment for manufacturing innovation to flourish.




**INNOVATION**

Mechanisms to identify and foster innovations with potential across the supply chain.

Rapid prototyping capability to develop minimum viable products and iteratively test innovations in real-world settings.


Capacity to diffuse innovation across the supply chain.



**SKILLS**

Blue tech apprenticeships that create a pipeline of tech-intensive workers.

Specialist skills that enable innovations to be identified and applied at every step of the supply chain.



**TECHNOLOGY**

Networks that are software-defined, intelligent, scalable, secure and built-on diverse technologies:

- WiFi6
- 5G
- LoRAWAN
- Ultra-Reliable Wireless Backhaul
- Edge computing

Internet of Things (IoT) sensors that enable data to be continuously gathered at every point of the supply chain.

AI and machine learning that extracts value from data to enable optimisation throughout the supply chain.

Robots that are increasingly capable of mimicking human traits such as dexterity and memory.

Cyber security that lays the foundations of a robust infrastructure to cope with any and all security threats in a constantly changing cyber landscape.

# INNOVATION CENTRAL ADELAIDE'S ROLE IN LINE ZERO — FACTORY OF THE FUTURE

Putting modern manufacturing building blocks in place requires deep collaboration and high levels of trust between universities, government and industry, and access to world-leading technology partners.



**Innovation Central Adelaide is based on a proven Cisco model adapted for the Flinders context. Based in a state-of-the-art, immersive facility, Innovation Central will facilitate:**

- Co-design of new products and services
- Immersive teaching and learning experiences for students
- Practical experience for students interfacing with advanced technology, which is an expectation for most jobs
- Connections between members of the South Australian innovation ecosystem
- Creation of commercial pathways.

## **INNOVATION CENTRAL FUNCTIONS:**

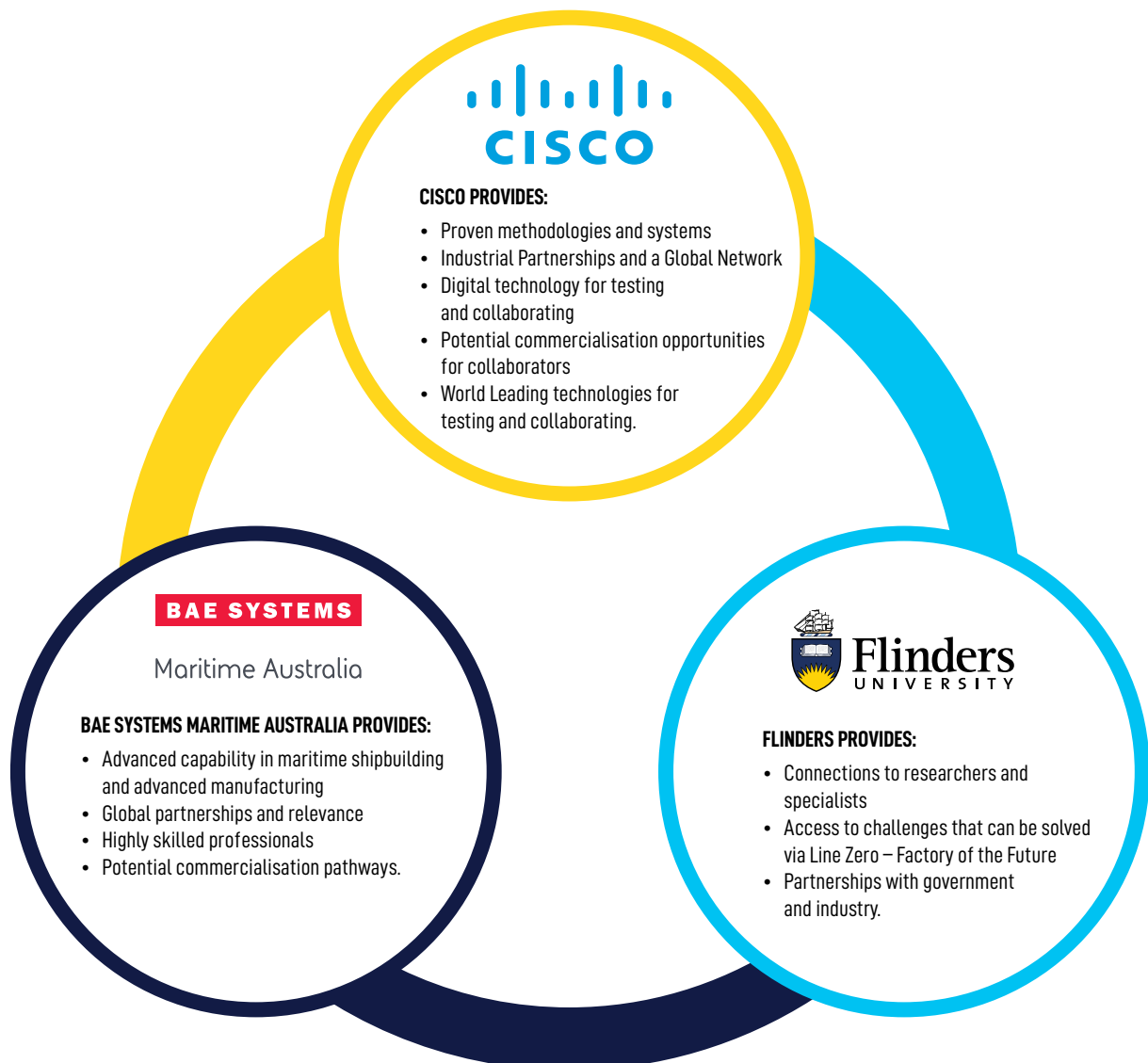
- Knowledge Sharing: IC's workshops, courses and events bring together members of the innovation ecosystem to connect and engage in a collaborative environment.
- Exploration and Ideation: IC's unique combination of technical and research expertise means it can rapidly provide well-rounded feedback on the feasibility of an idea focusing on technology and innovation.
- Rapid prototyping: IC's agile approach to rapid prototyping ensures the exploration of ideas before too many resources are used, as well as unlocking new concepts and processes.
- Research expertise: IC connects industry with computational and data scientists, and multidisciplinary research expertise, to explore connection, storage, analysis and visualisation of data as part of the ideation process.
- Student talent: IC provides opportunities for students to gain real-world industry experience in innovation management, while enabling industry to access a curated and managed student talent pool.
- Outreach into Line Zero: IC provides Line Zero with access to a digital lab consisting of on-demand innovation capability and equipment (from computing and hardware parts to industrial-grade wireless sensors) to enable testing of innovative solutions.
- Showcase environment: IC provides access to the latest digital infrastructure to trial and present innovations, and help to shift research translation and commercialisation.

## COHDA WIRELESS: A CASE STUDY IN MODERN MANUFACTURING INNOVATION

Cohda Wireless is a world-leading innovator in the development of cooperative intelligent transport systems (C-ITS).

Its vehicle-to-infrastructure software applications are used in more than 60% of C-ITS trials being undertaken globally. Cohda Wireless' success is driven by its capacity for real-world problem solving, rapid prototyping and customer-centric approach. Cohda Wireless' focus is on the automotive industry with emerging Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I) and Vehicle-to-Pedestrian (V2P) technology. It conducted trials in Australia and abroad, including a trial supported by the South Australian Government. Cohda technology is currently being deployed in the Flinders University / BAE Systems Maritime Australia pilot Line Zero – Factory of the Future facility. Cisco is now a shareholder in the South Australian company.

### PARTNERS IN THE INNOVATION CENTRAL INITIATIVE:



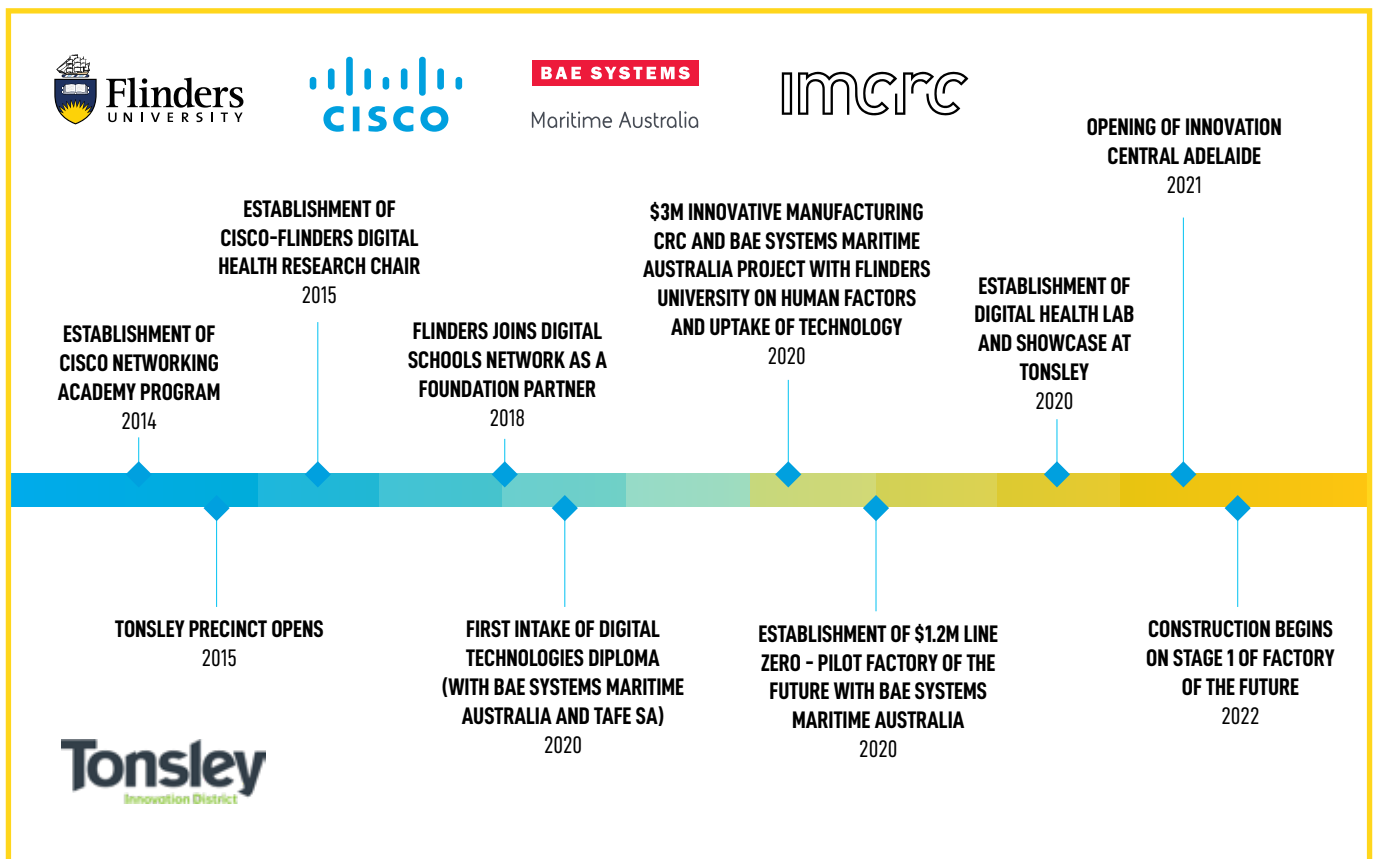
# MODERN MANUFACTURING FUTURE BUILT ON PARTNERSHIPS

Cisco and Flinders University have a deep, multi-faceted partnership that spans almost a decade.

The centrepiece of that partnership has been the co-funding of a Digital Health Research Chair (Professor Trish Williams) with a strong focus on making hospitals more resilient, safer and scalable. The partnership was built on the principle that collaboration produces better outcomes than siloed activity; the same principle that led to Cisco co-founding the National Industry Innovation Network, where Flinders is playing a role.

BAE has added its weight to the partnership with some joint initiatives and investments, including a dedicated shared resource between Cisco and BAE in Adelaide in support of the digital shipyard ambition of industry and government. This builds on a long-standing connection between Flinders and BAE including the establishment of an 'Industry 4.0' collaboration lab and pilot advanced manufacturing test and trial facility at Flinders based at Tonsley.

The establishment of Innovation Central Adelaide represents an elevation of the partnership and provides a missing piece in helping to ensure that great research results in innovative products and commercial benefits for the state.



The partnership between Flinders, BAE Systems Maritime Australia and Cisco builds on strong foundations already in place at the Tonsley Innovation District.

A range of entities are heavily invested in the success of the Innovation District, which occupies the site that was once home to Mitsubishi's car manufacturing plant. As an indicator of the model's success, there are now more people working at Tonsley than were employed at the car plant in the lead up to closure.

**The Tonsley model is unique in that it co-locates a range of critical players:**

- Flinders University and its New Venture Institute and Australian Industrial Transformation Institute
- TAFE SA, which is training blue tech workers for the future
- The Flinders-Cisco Health Design Lab
- Hydrogen Park SA
- BAE Systems Maritime Australia
- A range of startup and established tech-intensive companies.

# OUTCOMES THE PARTNERSHIP IN INNOVATION CENTRAL ADELAIDE WILL DELIVER



The combination of Innovation Central Adelaide and the Line Zero – Factory of the Future harnesses the collective capabilities of Flinders University, Cisco and BAE Systems Maritime Australia to deliver major benefits.

## 1. ECONOMIC BENEFITS FOR THE STATE AND NATION

- ✓ Improved economic diversity
- ✓ Export opportunities for the state's products and services
- ✓ Environment that stimulates startup growth
- ✓ Job creation in technology-intensive domains
- ✓ Attracting additional investment into the state
- ✓ Improved capability to deliver on economic priorities and commitments (e.g. shipbuilding)
- ✓ Building sovereign manufacturing capabilities in areas of critical national importance such as defence, medical equipment, energy and transport.

## 2. INDUSTRY BENEFITS

- ✓ Reduced lifecycle timeframes for innovation
- ✓ Capacity to differentiate in a global market
- ✓ De-risking investments in product development and process innovation
- ✓ Access to more job-ready graduates
- ✓ Improved linkages across the state's innovation ecosystem
- ✓ Accelerated pace of digitisation and realisation of benefits
- ✓ Linking local companies to national shipbuilding and construction projects.

## 3. STUDENT BENEFITS

- ✓ Linkages to potential employers while studying
- ✓ Greater pipeline of students into courses and fields that will deliver sustainable jobs
- ✓ Improved engagement in learning leading to better education outcomes
- ✓ Increased employability and capacity to make an impact in the workplace.

## EMBRACING MANUFACTURING BEST PRACTICE GLOBALLY

The Line Zero – Factory of the Future initiative at Tonsley leverages learnings and design elements from the best facilities worldwide. It has been inspired by some of the most successful innovative manufacturing accelerators in the world including:



US network of Manufacturing Institutes



UK High Value Manufacturing Catapult centres



The University of Sheffield Advanced Manufacturing Research Centre (Flinders University partner)



University of Strathclyde Advanced Forming Centre (Flinders University partner)

By creating a world class environment for developing, testing and trialling technologies, these facilities have contributed to the resurgence of manufacturing in developed economies.

# PLANS TO SCALE THE FACTORY OF THE FUTURE USING INNOVATION CENTRAL AS A CATALYST

The ambition of Flinders University, BAE Systems Maritime Australia and Cisco is to partner with the Australian Government to realise Stage 2 of Line Zero – Factory of the Future, broadening the focus from defence to a number of other high priority sectors.

## STAGE 2 OF THE FACTORY OF THE FUTURE WILL:

- Support Australian manufacturing businesses and entrepreneurs to translate and commercialise good ideas and create new products, services and solutions
- Accelerate adoption of new technologies by manufacturers
- Help Australian manufacturers to grow and build scale, and overcome challenges facing their sector (as outlined in the relevant priority road map)
- Create new, sustainable and rewarding jobs in the manufacturing sector
- De-risk the pivot to high value-added activities
- Attract investment and stimulate collaboration between industry and academia
- Increase local and national manufacturing capability, expertise and knowledge diffusion
- Grow high-value skills and jobs in the National Manufacturing Priority areas
- Develop a global and international reputation as a country with a growing modern manufacturing sector and capability.

### STAGE 1

Stage 1 of Line Zero – Factory of the Future will be constructed in 2022 and is a \$10M co-investment by Flinders University and the South Australian Government. Founding partner, BAE Systems Maritime Australia has established a pilot advanced manufacturing test facility in partnership with Flinders at the site.

**\$10M**

### STAGE 2

Expansion to enable construction of a large-scale industrial 'sandpit' where innovations can be tested in a production level manufacturing environment.

**\$50M**

## REFERENCES

<sup>1</sup> Advanced Manufacturing Growth Centre. 'Industry 4.0: An opportunity for every Australian manufacturer'. March 2018.