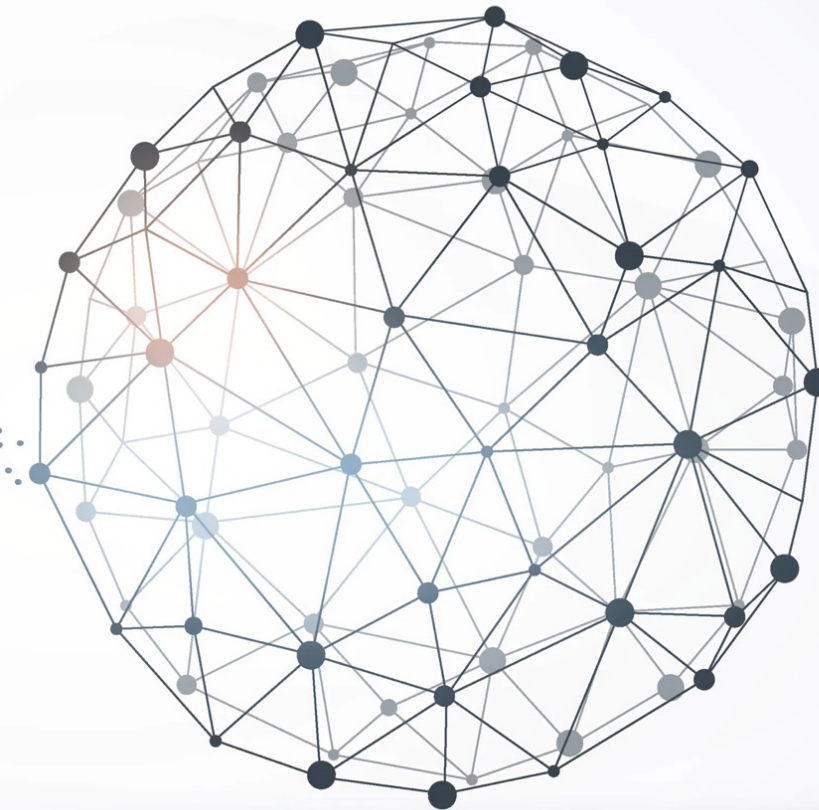


Additive Manufacturing

Cooperative Research Centre

Fostering collaborative investment in additive manufacturing and innovation that will help transform the Australian Manufacturing sector.



Australian Government
Department of Industry,
Science and Resources

AusIndustry
Cooperative Research
Centres Program

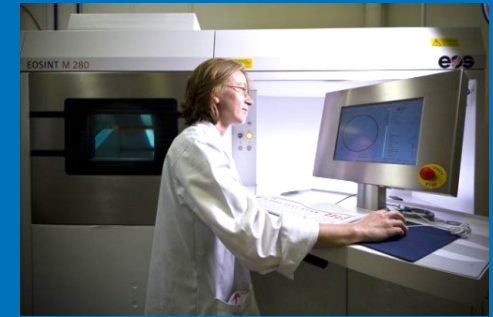
ADDITIVE
MANUFACTURING
AUSTRALIA MAKES



Australia Makes - Additive Manufacturing CRC Partner Opportunity.

- Welcome
- Acknowledgement
- What is the Governments CRC Program
- The Additive Manufacturing CRC Bid
- Local and overseas success stories.
- How to become involved.
- Benefits to Industry.
- Q&A session and wrap-up.

Recording plus slide deck will be available on the amcrc.com.au website



What is the Governments CRC Program...

The Cooperative Research Centre (CRC) Program is an Australian government initiative:

1. Launched in 1990
2. \$5.1b in grant funding across 236 CRCs
3. Solves major industry challenges
 - HILT CRC: Decarbonise heavy industry
 - SoMAC CRC: Building a composite manufacturing capability
4. Delivers commercial and economic impact
 - CRC ERT: Day & Night Contact Lenses
 - CRC HEAR: Cochlear Implants

Important

The CRC Program is one of largest continuous Government grant program that supports industry-led research collaborations.

The CRC Program

Grant funding available	Matched funding on partner cash contributions
Grant funding per CRC	\$7M - \$75M
Project period	Up to 10 years with no extension
Eligibility	Must have at least one Australian industry and one research organisation Will need to support SMEs
Partners	30 – 100
CRC Structure	Independent not for profit company, limited by guarantee
Application rounds	Competitive process opens once a year
Success rate: Stage 1	20% - 30%
Success rate: Stage 2	60% - 80%

A New CRC - Building a world class Additive Manufacturing Industry

- Bring together Australia's leading AM research organisations to do collaborative R&D with Industry.
- Providing \$40M in cash over 7 years to fund Industry specific projects.
- Creating a network of researchers, industry, and government focussed on helping companies grow successfully on a global scale.
- Establishing a specific AM training course for the next generation of machine operators and technicians. – And linking PhD candidates with industry.
- Supporting industry with services to assess AM opportunities to solve business challenges or create new business models. This will include commercialisation modelling and sustainability analysis.



Why ? Industry Faces Many Challenges and Problems

Globally Manufacturing is becoming more demanding.....

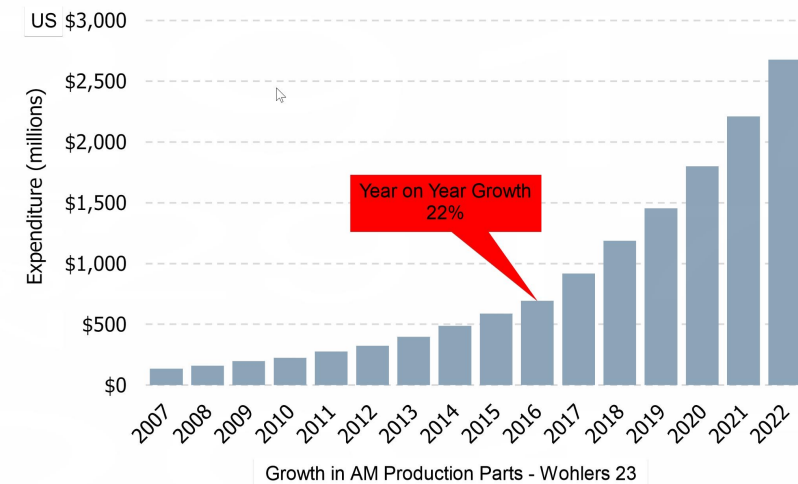
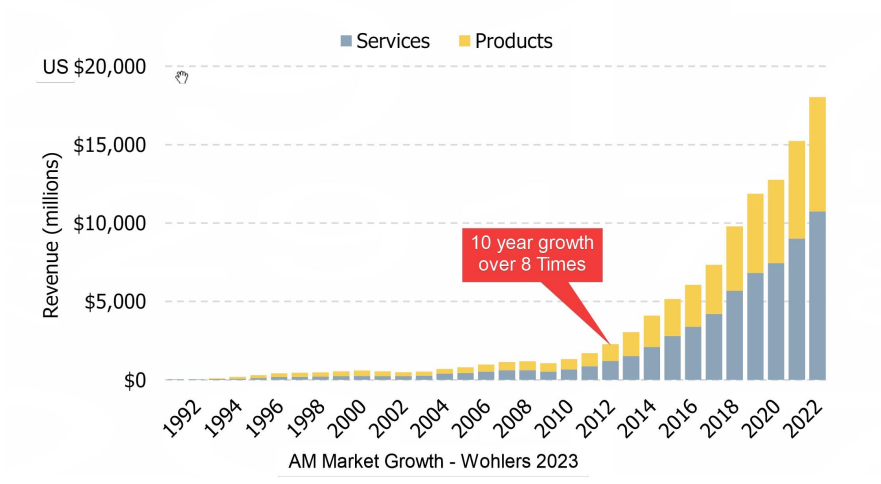
- Need for increasingly complex and customized parts is rising,
- Product life cycles are becoming shorter,
- Established supply chains are being called into question,
- Sustainability is playing an ever-greater role in product life cycle.

Multiple these factors with Australia's own challenges....

- Transport hurdles to significant markets.
- Reduction in skilled and semi- skilled work force – Down 250K since 2006.
- Sovereign Capabilities significantly eroded.

Additive Manufacturing building critical mass.

- Globally the industry grew to US\$18B – Year on year growth of 18%
- In 2022 over 29,000 Industrial Systems were sold – 10% were Metal platforms.
- Service Bureau’s produced US\$2.7B worth of AM Production Parts.



Medical Manufacturing - Personalisation Milestones.

stryker[®]

- In May Stryker announced that they has printed 1 million Knee Implants and over 2 million AM implants.
- Focused on glue less & porous implants.
- Expanding AM facilities globally (including Australia) for localised manufacture.
- Industry Partner for a 5 year \$5m CRC project to implant AM scaffold to replace bone cancer tumours.
- Mutliple research partners including RMIT, UTS, Melb Uni and St.Vincent's in Melb.



Defence Capability – New AM Technology Platform.

SPEE3D

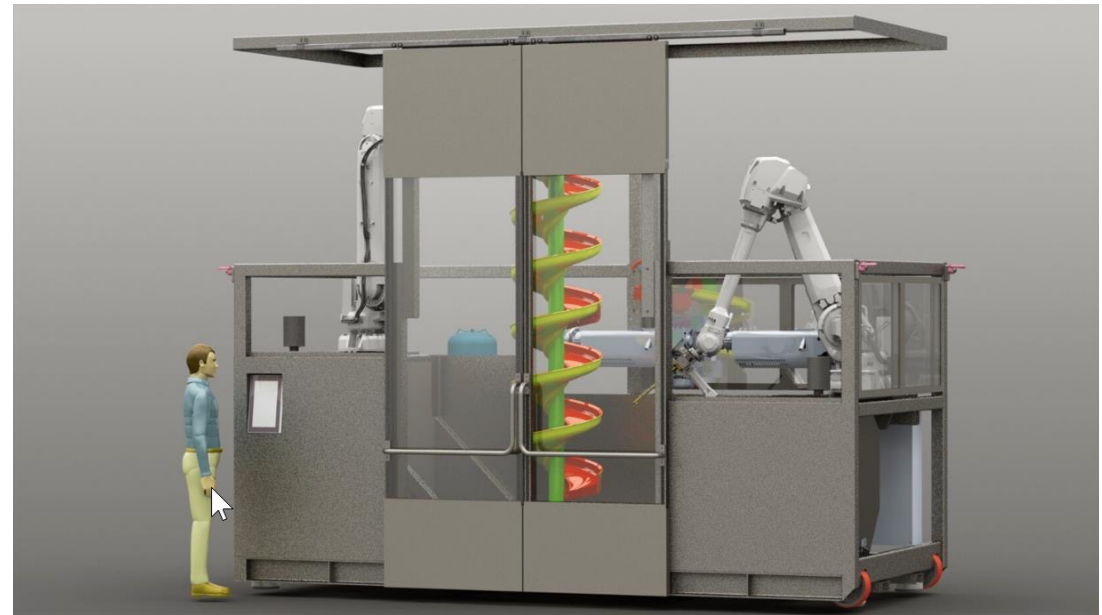
- Research Collaboration with CDU, UTS and SUT
- Sustainment Platform for front-line R&M
- Multiple Platforms now deployed globally to support defence supply lines



Mining and Resources – Distributed Manufacturing.



- Research Collaboration with UTS
- Manual Fibre-Glass lay-up to Robotic AM
- Reducing supply chain risk by manufacturing at the mine site.



National Reconstruction Fund transforming our Industry . Seven Priority Areas.



Commercialisation Support – Industry Growth Program.

As part of the 2023-24 May Budget, the Australian Government announced a new \$392.4 million Industry Growth Program for small and medium enterprises (SMEs) and startups.



Research Programs



Research Program 1
Application and Materials development



Research Program 2
Technology and Process development,



Research Program 3
Digital Eco System – Data management, AI and Digital Twins



Transformation Program
Education, training and transformation

Research Program 1

Application and materials development

The program aims to develop new and unique applications for AM technologies across key priority industries for Australia creating new Circular Economy business models.

- Researchers work on identifying and understanding the specific requirements of different applications to optimize the use of additive manufacturing.
- The program focuses on exploring novel ways to leverage additive manufacturing for complex geometries, personalisation, and advancing new materials.
- Application development includes areas such as aerospace, automotive, healthcare, consumer goods, construction and more.

The program emphasizes the development of sustainable new and reusable materials suitable for AM processes.

- Researchers aim to create the next generation the range of materials available for additive manufacturing, including metals, polymers, ceramics, composites, and biomaterials.
- Material development for advanced metals and polymers involves exploring nanomaterials and nanocomposites. Nanotechnology offers unique opportunities to tailor material properties at the nanoscale level by manipulating the size, shape, and composition of nanoparticles. Nanocomposites exhibit superior mechanical strength, electrical conductivity, and thermal stability compared to their bulk counterparts.
- The program also focuses on improving material compatibility with specific additive manufacturing technologies like; laser powder bed fusion (LPBF) selective laser sintering (SLS), fused deposition modeling (FDM), and stereolithography (SLA) etc.

Research Program 2

Technology and process development, production qualification and validation

This program will focus on the development of new additive manufacturing technologies and novel processes to grow our advanced manufacturing sector, including;

- New development and modification of existing additive manufacturing technologies and processes to use new and /or recycled materials.
- Creating the next generation of process parameters to enhance part quality and performance.
- Development of multi-material and hybrid additive manufacturing techniques.
- Development of software tools for design optimization and process simulation to support zero waste and zero emission opportunities.
- Development of new standards and guidelines for qualifying additive manufacturing processes.
- Validation of additive manufacturing processes to ensure part quality and consistency.
- Development of Certification protocols for additive manufacturing systems, materials, and processes.
- Development of test methods for evaluating mechanical, thermal, and chemical properties of additively manufactured parts.
- Characterization of microstructure and defects in additively manufactured parts.
- Assessment of the impact of process variations on part quality.
- Verification of part performance through mechanical testing and analysis.
- Development of efficient and environmental-friendly post-processing techniques (hard surfacing/cladding/ heat-treatment etc.) for improving surface finish, dimensional stability and part performance.

Research Program 3

Digital Eco System – Data management, AI and Digital Twins

A Digital Ecosystem will be crucial for the productive use of AM in an industrial environment. Digital AM solutions enable the Australian industry to exploit the full potential of AM.

- Data management, control and protection
Digital solutions for the full AM data life cycle are critical. From embedded sensor providing real-time data to the management and sharing of product and process data via secure and reliable infrastructure and including Big Data analysis for quality management multiple new solutions are needed to fulfill Cybersecurity standards, improve efficiency and participate in international supply chains.
- Scanning and 3D-image recognition and interpretation
Real-time digital modelling devices, new image and voxel recognition and interpretation are needed to integrate the physical with the digital world and increase the productivity of industrial AM. The combination of digital prototyping and physical testing cycles will be significantly accelerated.
- Process automation, Human Assistance and Industry 4.0 integration
Partial or full process automation and digital support for human operators are necessary to harness the full productivity potential of modern AM. The integration in smart Industry 4.0-based production systems and supply chains will give the manufacturing and related sectors a competitive advantage.
- Machine Learning and AI
Based on validated data innovative Machine Learning and AI models and algorithm will support operators of AM systems with real time advice, product, process and quality control. This includes performance improvements based on product design, multi-material selection, process selection and post-processing.
- Digital Twins for processes, product and materials
Digital Twin solutions consisting of full 4D models enriched with additional features and multi-physics simulation will enable the AM based production and life-cycle maintenance of complex, individualized and specialized components, products and systems. Innovative Digital Twins combined with AM will enable new value-creation such as local and personalised Manufacturing on Demand.
- Design optimisation and sustainability accounting
Leveraging product and process data will optimize the product design and increase sustainability by reducing resources and life-cycle cost and impact. A full sustainability accounting is essential to participate in modern international supply chains such as medical devices, defence, food or transport.

Transformation Program

Education, training and transformation

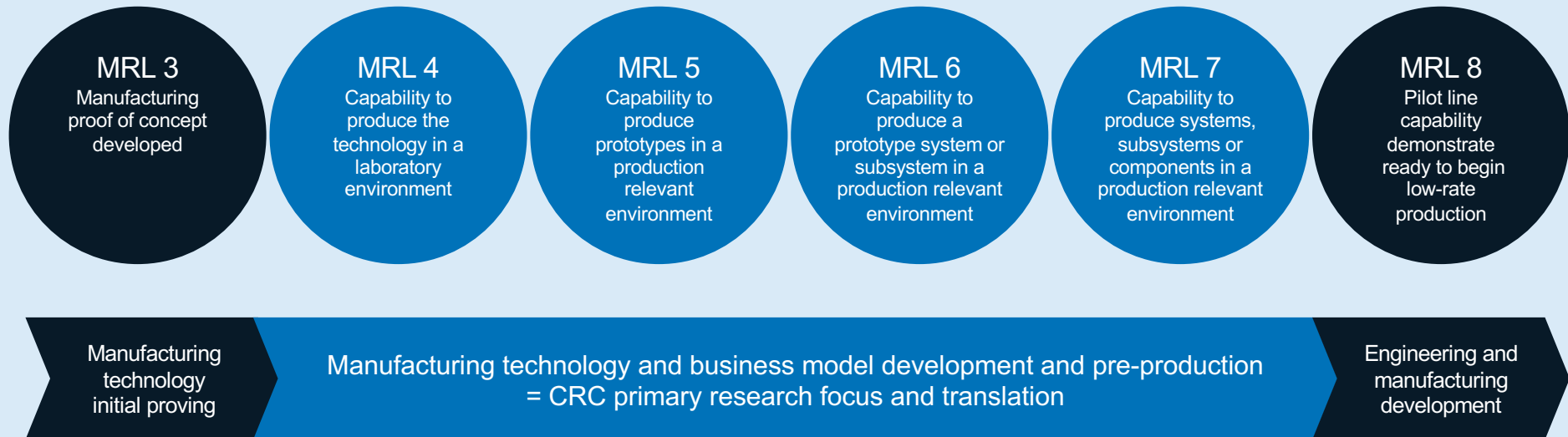
This program aims to provide training and support for Australia manufacturers in adopting additive manufacturing technologies. It focuses on enhancing knowledge, skills, and capabilities related to additive manufacturing to drive transformational change in the way new products are developed. Ultimately helping our industries be more sustainable and lifting our global competitiveness.

The program facilitates technology transfer by providing guidance on intellectual property rights, licensing agreements, and commercialization strategies. It helps participants navigate the complexities associated with bringing additive manufacturing innovations from the research stage to commercialisation.

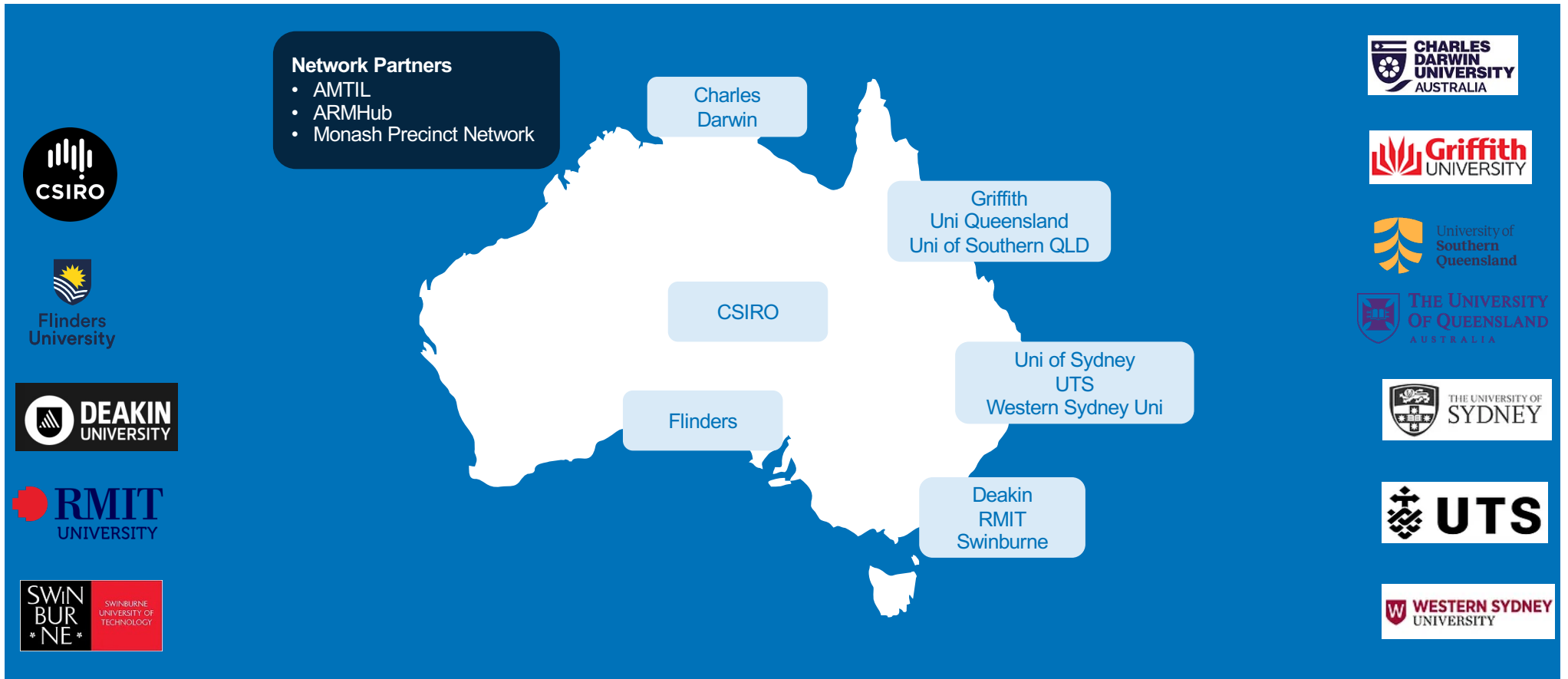
The program also recognizes the importance of developing a skilled workforce capable of leveraging additive manufacturing technologies. It offers training and certification programs to enhance the employability of individuals in the additive manufacturing industry with certificate III apprenticeship.

A key part of this program is the integration of PhD's into the collaborative research projects. These are partly funded by the CRC and Universities and enable career pathways for researches into industry.

Research Focus – Manufacturing Readiness Levels



AMCRC Australian Research Partners



Industry Partners – is this a good strategic fit?

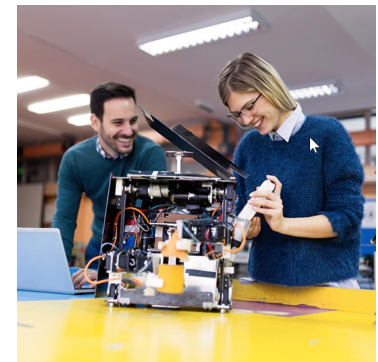
- ✓ Ambition and willingness to invest in an eligible transformative manufacturing R&D project
- ✓ Aligned with the CRC proposed Research Programs in collaboration with a CRC Research Partner(s), and with SMEs during the project of between 2 and 5 years in duration, and from MRL 4 (proof of concept onwards) through to 7 or 8 that can commence from 2H 2025 onwards
- ✓ Spending at least \$250,000 cash per project (which, if eligible, the CRC can match dollar for dollar – i.e. a further \$250,000 to enable a project of \$500,000 cash investment – up to a maximum of \$5 million per Industry Partner)
- ✓ SME Starter program – short-term projects (up to 12 months) total project cash investment between \$100,000 to \$200,000 – aimed at introducing SMEs to collaborative research engagement which funds the cost of researcher salaries and operating costs at a CRC Research Partner
- ✓ Research Partner(s) ideally conducting at least 50% of the overall project research effort
- ✓ Utilising and/or developing new manufacturing technologies and business models
- ✓ To deliver commercial outcomes, including within Australia, ideally within 3 years of completion of the project

Industry Partners – is this a good strategic fit?

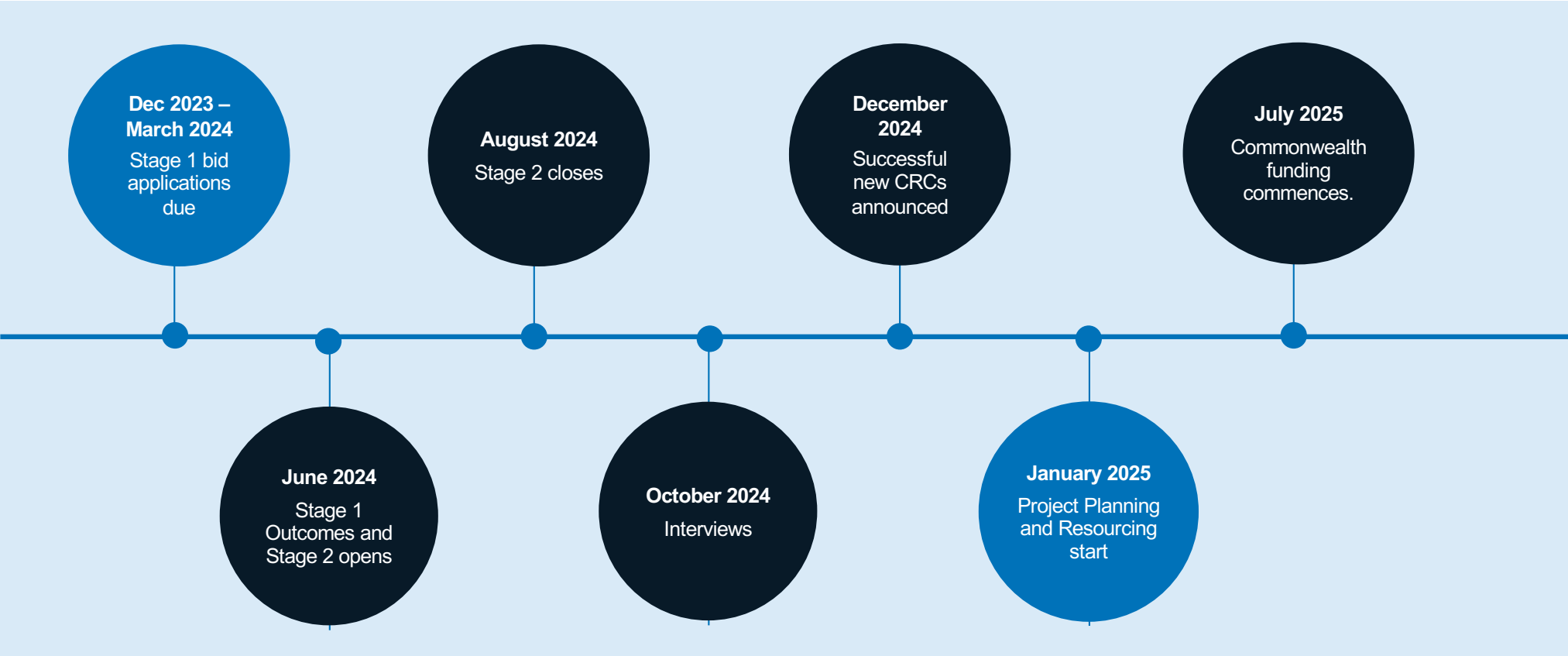
- ✓ Industry and Research Partners agree on the ownership of project Intellectual Property (IP) prior to the commencement of any project to ensure no barriers will exist to successful commercialisation – *CRC owns no share in IP and encourages the core IP to rest with the industry partners*
- ✓ CRC only uses Industry Partner cash contributions for the approved project
- ✓ Industry Partner payments are paid monthly to the CRC in line with approved project budget and Research Partner expenditure profile (ie cash payments are not required from to the CRC until project commencement)
- ✓ Research Partners are paid at the end of each quarter of research on Industry Partner and CRC approval of completed research and milestones
- ✓ CRC only provides matching cash funding for eligible expenditure at the Research Partner(s) and not for the Industry Partner's own internal project or other expenses (these may be eligible to be valued as in-kind costs)
- ✓ CRC requires in-kind contributions from both the Research and Industry project Partners, and ideally that the total project in-kind (staff in-kind and other non-staff in-kind) is at least 3x the value of the CRC project cash contribution
- ✗ CRC does not provide matched cash funding for capital equipment, production tooling, buildings or facilities

Benefits to Industry

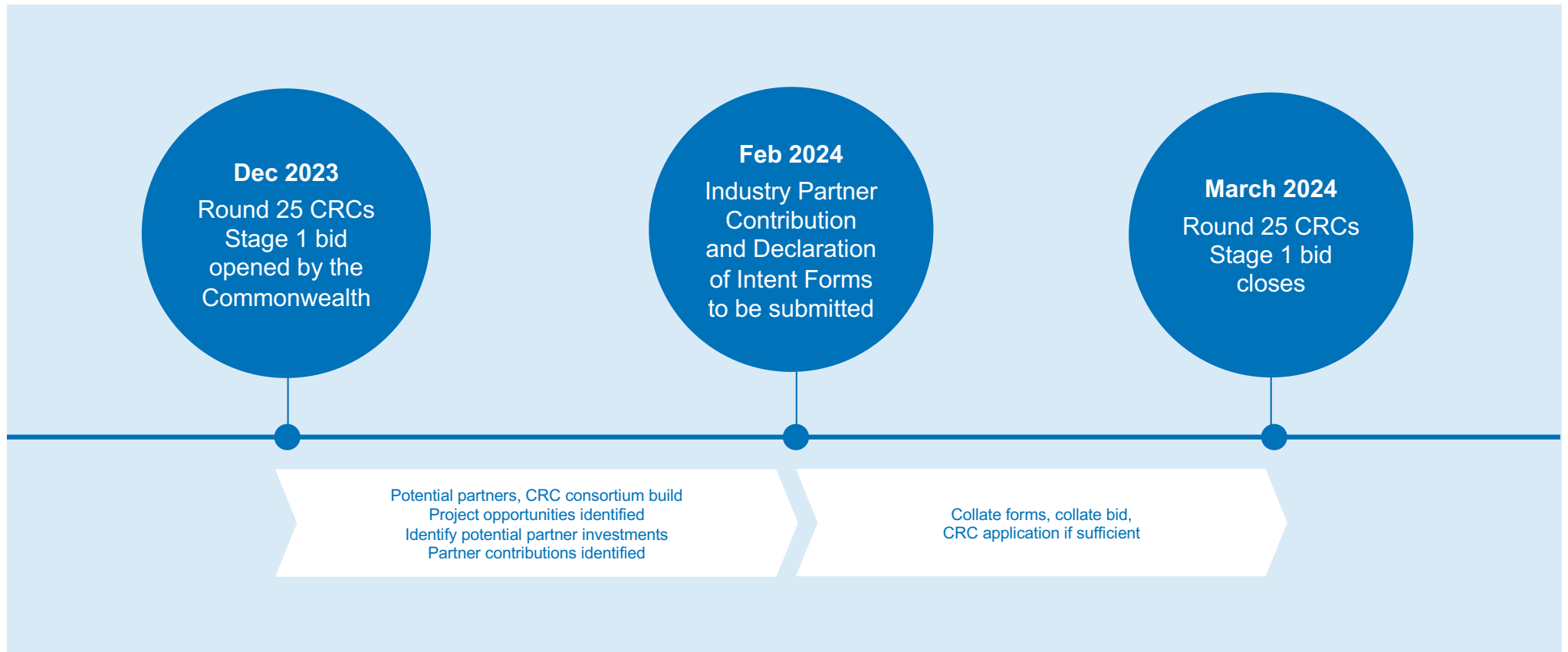
- Access to state-of-the-art facilities and equipment
- Collaboration opportunities with industry leaders
- Project Funding on a dollar-for-dollar basis, (Access to R&D Tax offset scheme for internal expenditure)
- Training and Capability Building.
- Industry Relevance and Commercialisation Support



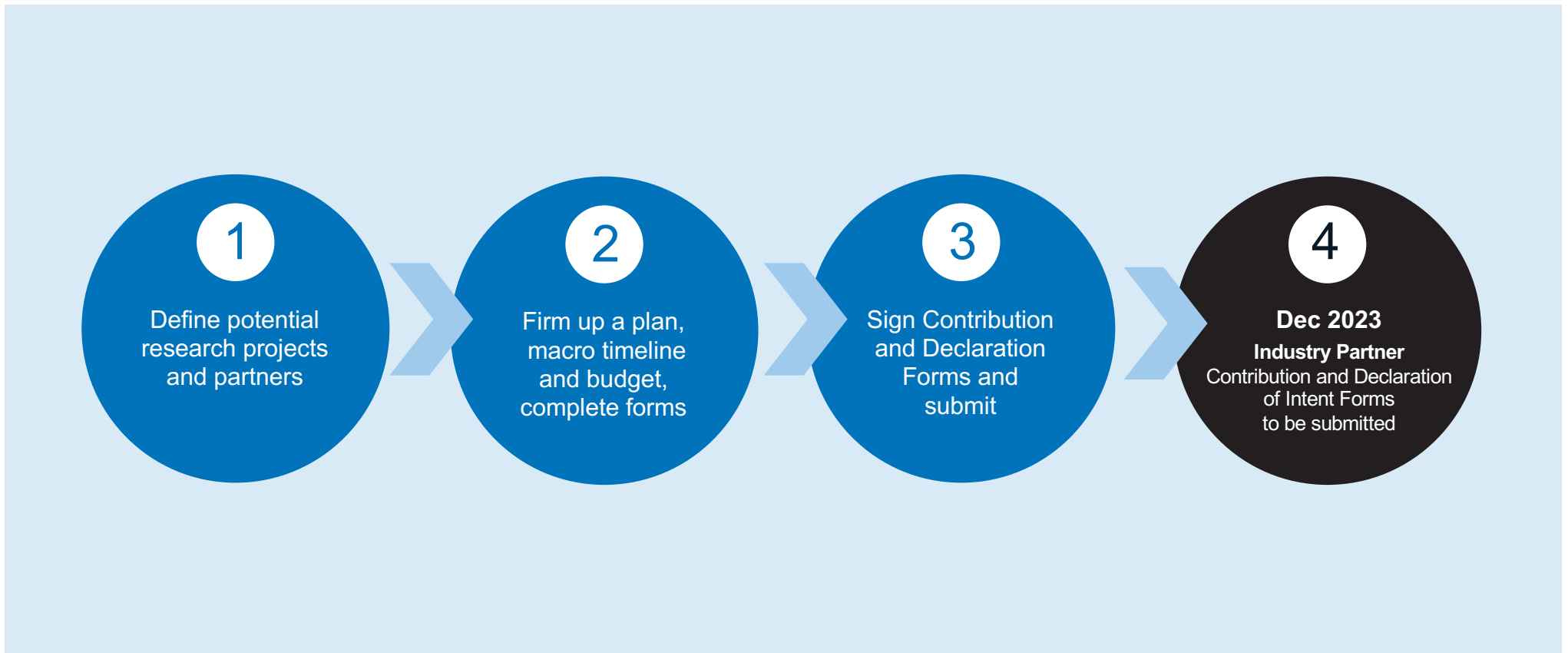
Round 25 - Stage 1 and 2 Application timeline



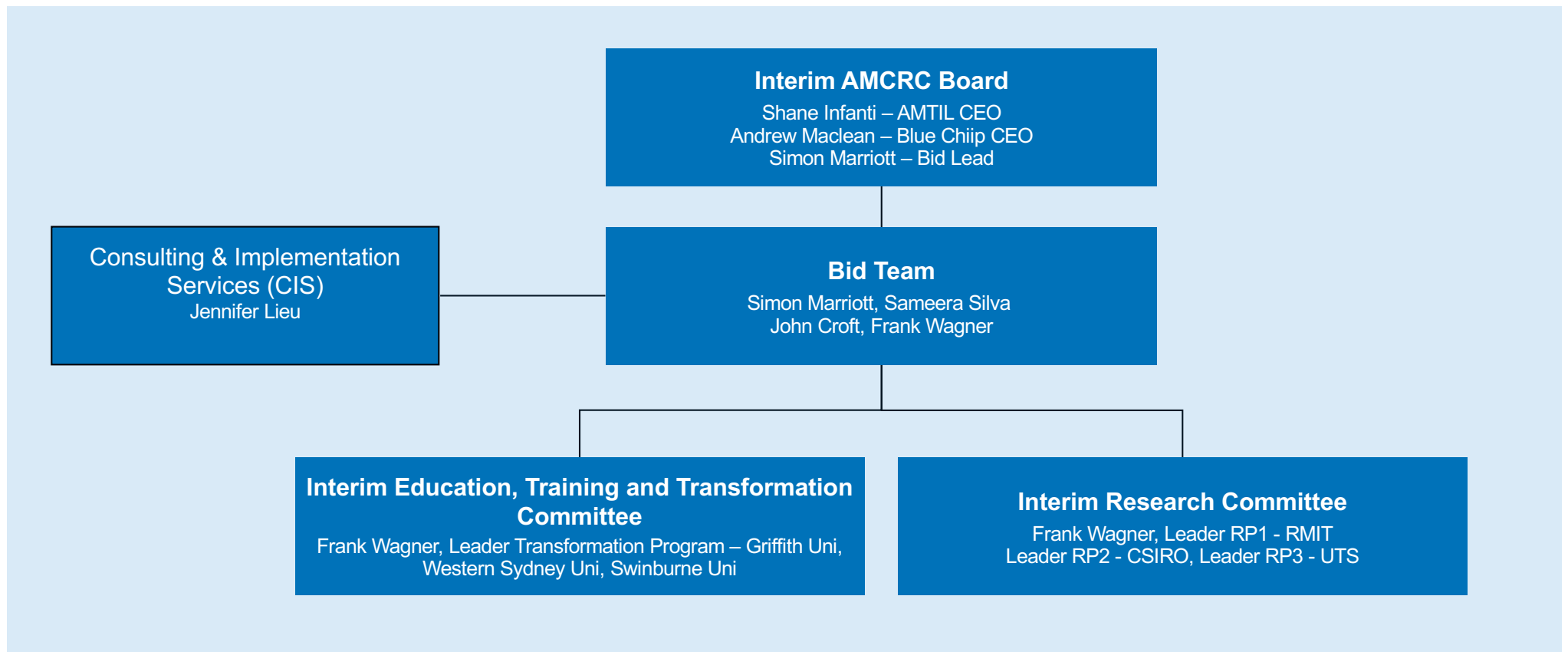
AMCRC – Round 25 bid timeline



Potential Partners – what do you need to do?



AMCRC Bid Governance Structure



Key Contacts for Engagement and Application process



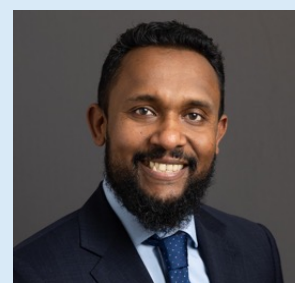
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Research Partner Key Contacts

Organisation	Primary Contact	Title	Email	Phone	State
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CSIRO	Dr Marcus Zipper	Director Manufacturing	marcus.zipper@csiro.au	+61 3 9545 8560	VIC
Deakin University	Professor Nick Birbilis	Executive Director – Faculty of Science, Engineering and Build Environment	nick.birbilis@deakin.edu.au	+61 3 5227 8248	VIC
Flinders University	Professor David Lewis	Deputy Director, Flinders Factory of the Future	david.lewis@flinders.edu.au	+61 8 8201 7905	SA
Griffith University	Dr Brit Winnen	Head, Research Development Team	b.winnen@griffith.edu.au	+61 421 946 560	QLD
Royal Melbourne Institute of Technology (RMIT)	Tim McLennan	Exec Director, Research Partnerships & Translation	tim.mclennan@rmit.edu.au	+61 3 99253570	VIC

Research Partner Key Contacts

Organisation	Primary Contact	Title	Email	Phone	State
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University of Queensland	Professor Michael Bruenig	Head of School – School of Electrical Eng. & Computer Science	m.bruenig@uq.edu.au	+61 7336 53869	QLD
University of Southern Queensland	Dr Gudrun Seynsche	Director Research Partnerships	gudrun.seynsche@usq.edu.au	+61 7 3470 4419	QLD
University of Sydney	Wicky West	Manager, Business & Research Development	wicky.west@sydney.edu.au	+61 425 677 330	NSW
University of Technology Sydney (UTS)	Herve Harvard	Centre Director, UTS Rapido	Herve.Harvard@uts.edu.au	+61 2 9514 2429	NSW
Western University of Sydney	Tim Horan	Senior Manager Strategic Partnerships	t.horan@westernsydney.edu.au	+61 414 948 174	NSW

Required forms and further information

Participant Contribution Form

Required details

- Business information
- Proposed involvement in the CRC, including potential research projects
- How contributions (cash and in-kind) will be provided
- Quantity and timing by FY of contributions (cash and in-kind)
- Contributions are aggregated to determine Commonwealth fund opportunity

Participant Declaration Form

Required details

- Declaration of *intent* to participate in the new CRC
- Proposed total contributions (cash and in-kind)
- Is signed and is included in the formal bid application by the CRC
- Contributions are subject to the CRC application being successful
- *Partner Declaration is not a contract between the Commonwealth and the Partner – does not create any binding legal obligation on the Partner*

Additive Manufacturing CRC bid team will email the relevant links to complete both forms on smartsheet in November 2023.

Deadline for draft submission is 5pm AEST - Wednesday 06th December 2023

Information available on Additive Manufacturing CRC website - <https://www.amcrc.com.au/resources>

- Additive Manufacturing CRC Information Brochure
- CRC Round 24 Guidelines, Declaration form and Fact sheet (Round 25 will be available in November 2023)

Coming soon (end of October)

- Draft Term Sheet
- Draft Contribution Guidelines

Questions?

Please either

Post a question using the Teams Chat function (not the Q&A function)

or

Use the 'Raise hand' button to ask in person

We have a FAQ form on our website www.amcrc.com.au

