



PROJECTS REPORT 2022

DEMONSTRATING MANUFACTURING TRANSFORMATION



434

nation-wide collaborations



~4,288

jobs projected



\$137.2 million

committed (AMGC,
industry and in kind)



~\$1.62 billion

in estimated
revenue generated

**\$105
million
total**

NORTHERN TERRITORY



25 jobs



2 projects

EXPORT OPPORTUNITIES

**\$50.72
million
total**

WESTERN AUSTRALIA



198 jobs



8 projects

**\$313.57
million
total**

SOUTH AUSTRALIA

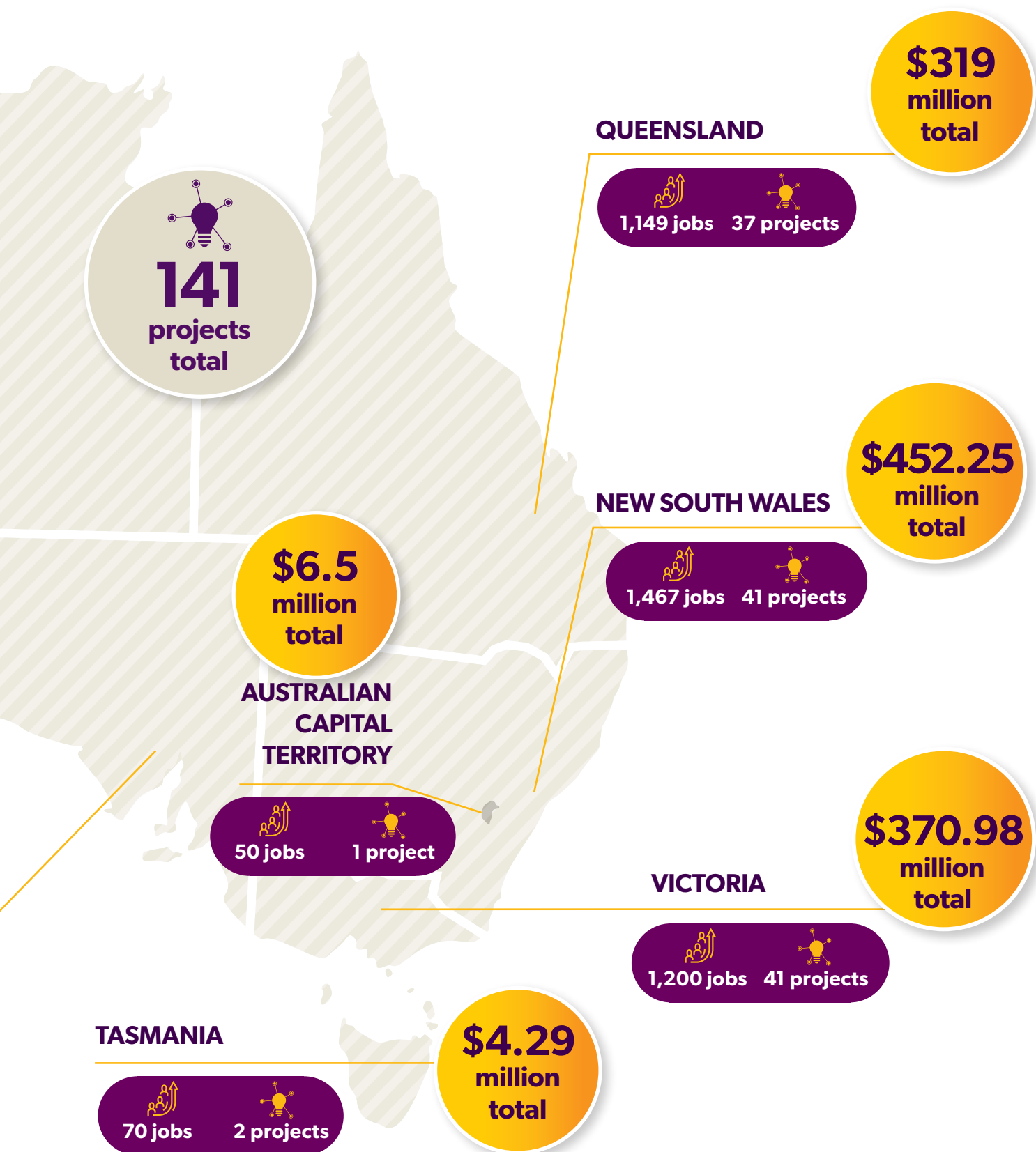


129 jobs



9 projects

EXPECTED OUTCOME OF OUR PROJECTS



AMGC PROJECTS BY SUB INDUSTRIES AND ADVANCED CAPABILITIES

	Aerospace/Aviation	Agriculture/Agribusiness	Apparel/Textile	Arts/Recreation	Automotive	Chemicals	Construction/Furniture	Defence	Electrical/Electronics	Energy, Gas, Water, and Waste
Additive Manufacturing/ 3D Printing	3	1	1	1	3	0	0	4	3	1
Advanced Composites/ Materials	7	2	6	3	5	4	7	6	2	6
Artificial Intelligence	5	3	0	0	2	0	1	4	4	4
Augmented Reality	1	0	0	0	1	0	0	0	0	0
Bio-manufacturing	0	5	0	0	0	3	0	0	1	1
Digital Data (Sensors, IoT, Industry 4.0, ect.)	6	4	1	4	5	1	5	9	7	9
Digital Design and rapid prototyping	2	2	1	1	2	1	2	3	2	6
Nano-, Micro- and Precision-manufacturing	2	2	0	0	0	3	0	2	1	3
Robotics/Automation	3	3	3	1	4	1	6	6	2	5
Sustainability and Life cycle	1	4	0	0	1	3	1	1	2	12

0	1	2	3	4	5	6	7+
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Projects (n=141) may influence several sub-industries and/or advanced capabilities

Engineering/Computer System Design	Food and Beverage	Logistics and Distribution	Machinery and Equipment	Medical equipment, pharma, and Health	Metal fabrication and primary metal production	Mining	Other services	Plastic, Rubber, Other non-metals	Printing (including 3D printing)	Ship/Marine and Railroad	Wholesale and Retail Trade	Wood Products
6	3	1	6	5	3	1	0	4	6	0	2	0
7	0	4	10	5	5	4	0	5	1	1	6	0
11	6	2	1	7	3	2	0	1	1	0	0	1
0	0	0	1	0	0	0	0	0	0	0	0	0
1	3	0	0	5	1	0	0	2	0	1	0	0
19	8	6	12	8	2	5	1	6	4	4	2	1
9	3	1	4	5	0	2	0	5	2	1	3	0
4	3	1	2	5	2	1	0	2	1	0	1	0
9	3	4	12	6	5	5	0	5	1	2	6	1
4	3	3	7	2	3	6	0	4	0	3	2	0



FOREWORD FROM THE MINISTER FOR INDUSTRY AND SCIENCE

Since its inception, the Advanced Manufacturing Growth Centre's (AMGC) contribution to Australia's innovation landscape has been immense.

This 2022 Project Impact Report showcases that contribution.

The report provides an overview of the AMGC's 141 co-invested manufacturing projects.

It also details the significant economic impact of the first 31 projects to be completed under the initiative.

The numbers are impressive.

The 141 projects supported by the AMGC so far are forecast to generate \$1.62 billion in revenue and create 4,288 new jobs.

Looking at the 31 completed initiatives, a total of 430 new or upskilled roles have been created, while an extra \$188 million has been injected into the Australian economy.

These figures demonstrate how the AMGC is doing precisely what it was established to do.

It was created to transform and grow Australian manufacturing, so that it could ultimately be more globally competitive and generate jobs.

Crucially, it has a focus on funding innovative projects that have the potential to make Australia's manufacturing industry more productive and competitive, but might be in areas where companies may not have the capacity or expertise to tackle the task on their own.

This report highlights how innovative professionals are bringing their ideas to life through manufacturing, helping transform the nation into a smart country.

The government wants to maintain this momentum, and it's an issue I've been emphasising since becoming Minister for Industry and Science.

Our 'A Future Made in Australia Plan' seeks to create jobs, boost skills, bring industry expertise back onshore and drive national productivity.

A key pillar of the plan is the \$15 billion National Reconstruction Fund.

The fund will provide crucial finance to drive investment in projects and revive Australia's ability to make world-class products.

Importantly, it will include \$1 billion in dedicated support for advanced manufacturing.

It's our commitment to home grown manufacturing that will support innovation and production in areas showcased in this report.

In doing so, we hope smart, skilled Australians stay on our shores.

Keeping talented Australians on home soil, and encouraging those who have left to return and work here, will make us a more competitive and prosperous nation.

As I've said on numerous occasions since becoming the new minister, instead of suffering from a 'brain drain', we'll reap the benefits of a 'brain regain'.

Organisations like the AMGC will play a critical role in ensuring our plan comes to fruition.

Congratulations on the release of this report, and for shining the spotlight on Australia's strength and ingenuity in advanced manufacturing.

I am looking forward to seeing more AMGC success stories in the near future, as we all work together to cement Australia's reputation as a smart, skilled, innovative nation.



The Hon Ed Husic MP
Minister for Industry and Science



PROJECT EVALUATION CRITERIA

Success in Australian manufacturing is less about what we make but how we make it; advanced characteristics and skills development are strongly linked to this success. That is why AMGC uses Advanced Knowledge, Advanced Processes and Advanced Business Models as the primary frame of reference when evaluating projects.

AMGC projects are industry led and seek to demonstrate the following advanced characteristics:

	<h2>ADVANCED KNOWLEDGE</h2> <p>Projects should enable Australian manufactures to become Innovation Leaders through increased demonstration of Advanced Knowledge characteristics, in areas such as:</p> <ul style="list-style-type: none">» Increase R&D expenditure» Increase collaborations with other firms/Research institutions» Increase the use of mathematics, engineering, science and technology (MEST) skills.
	<h2>ADVANCED PROCESSES</h2> <p>Projects should enable Australian manufacturers to become Process Winners through increased demonstration of Advanced Process characteristics, in areas such as:</p> <ul style="list-style-type: none">» Increase capital intensity expenditure» Increase new operational processes» Increase ICT and technology asset intensity.
	<h2>ADVANCED BUSINESS MODELS</h2> <p>Projects should enable Australian manufacturers to lift the value of their products by acting as Niche Players or Service Champions through increased demonstration of Advanced Business Models characteristics, in areas such as:</p> <ul style="list-style-type: none">» Increase new goods offered» Increase trade intensity (exports)» Increase new service offerings.

INITIAL PROJECT FUND

The AMGC Initial Project Fund will provide co funding for industry-led projects to improve the companies productivity, competitiveness and innovative capacity. Projects will build the capability of industry sectors and address barriers impeding their competitiveness on a scale that will deliver tangible results.



\$1.1 billion in estimated revenue

\$51.76 million committed (AMGC, industry and in kind)



2,735 jobs projected



66 projects



FULLY COMMITTED AND CLOSED

ADVANCED MANUFACTURING EARLY STAGE RESEARCH FUND

The Advanced Manufacturing Early Stage Research Fund (AMESRF) supports small-scale and pilot research projects to benefit smaller firms and early stage research, allowing the projects to then move quickly to larger-scale research or commercialisation.



\$319.47 million in estimated revenue

\$16.08 million committed (AMGC, industry and in kind)



496 jobs projected



18 projects



FULLY COMMITTED AND CLOSED

COMMERCIALISATION FUND

The Commercialisation Fund will provide grants to Australian companies to commercialise new products and processes based upon already existing or new IP. Investment in Australian manufacturing projects aim to transition a new product or process from the pilot/prototype stage to full commercial operations. The intended outcomes of the grant are to increase the capability and competitiveness of Australian manufacturers under the six National Manufacturing Priorities and to increase productivity and create jobs.



\$195.8 million in estimated revenue

\$69.1 million committed
(AMGC, industry and in kind)

National Manufacturing Priorities



Resources
Technology &
Critical Minerals
Processing



Food &
Beverage



Medical
Products



Recycling &
Clean Energy



Defence



Space



1,084 jobs projected



56 projects



FULLY COMMITTED AND CLOSED*

ADVANCED MANUFACTURING ECOSYSTEM FUND

The Advanced Manufacturing Ecosystem (AME) Fund of \$7.5 million seeks to build the advanced manufacturing ecosystem in the Northern Territory. The fund aims to grow advanced manufacturing capabilities and increase investment in and output of advanced manufacturing activity in the Northern Territory, and grow the number of advanced manufacturing jobs located in the Northern Territory.



\$4 million in estimated revenue

\$220 thousand committed (AMGC, industry
and in kind)



5 jobs projected



1 project

*Project fund has been fully allocated after creation of this report.

 OPEN

AMGC projects unlock new commercial opportunities and drive innovation in Australian manufacturing. They do this by fostering collaboration between industry enterprises and the research community.

AMGC projects demonstrate best practice to advance manufacturing in Australia and pave the way for similar initiatives.

ACKNOWLEDGEMENTS

This report reflects the expert project and financial management skills of Mark Peters, National Director Projects, and Jayne Ashton, Senior Business Analyst, AMGC.

Under Mark Peters' leadership, each project has been purposefully analysed for its commercial viability, its additionality to Australia's manufacturing capability, and its contribution to global competitiveness.

In parallel, Jayne Ashton has meticulously tracked each project's financial position, ensured investment payments upon milestone achievements, and reported to the highest level of governance standards.

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COMPLETED
PROJECTS



PROJECT IMPACT



31 (21.9%)
completed projects



\$20.26M
committed (AMGC,
industry and in-kind)



\$7.15M
committed (AMGC)

Commercialise innovation



~168.50%
average ROI on
project funding



~\$136M
estimated increase in
domestic sales



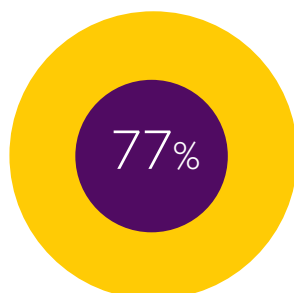
~\$52M
estimated increase in
export sales



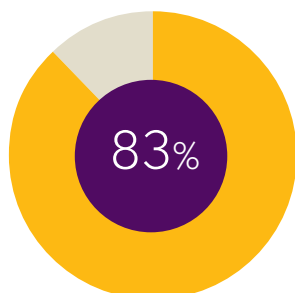
~\$33M
difference increase
in R&D Expenditure

PROJECT PARTICIPANTS REPORTED AN INCREASE IN Compared to before the project

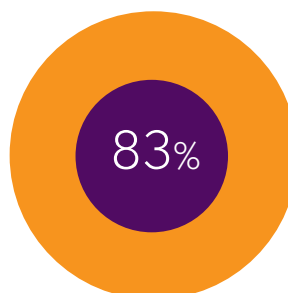
Profitability



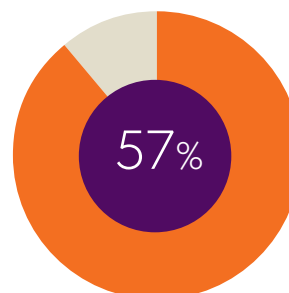
Productivity



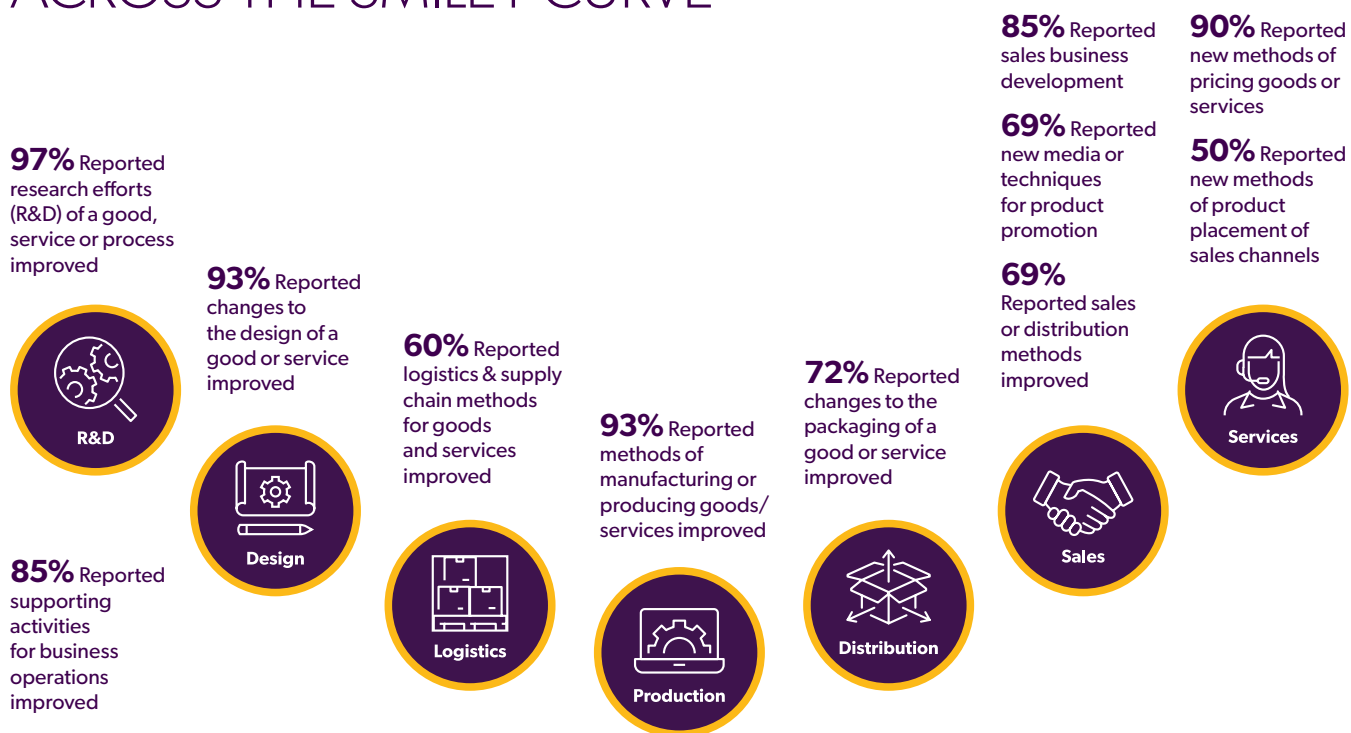
Range of products
or services



Margin



MANUFACTURERS REPORTED IMPROVEMENT ACROSS THE SMILEY CURVE



IMPROVING SKILLS



Job Growth

430 jobs were created or upskilled

- 200 New jobs created
 - 27 apprenticeships/ internships
- 230 Employees were upskilled
 - 55 Employees formal training (i.e. obtained certificate, diploma, etc).



MEST Skills*

Increase in MEST skilled staff

- 87% of manufacturers reported an increase in MEST Skills in their business as a result of the project

*Mathematics, Engineering, Science, Technology



Management Skills

69.89% of manufacturers reported strong improvement in...

- Knowledge of management processes
- New methods of organising work responsibilities and decision making
- Reviewing business models and strategic direction
- Getting involved in high risk/high reward projects
- Taking a proactive approach to market competition



IMPROVING COLLABORATION

Manufacturers engaged in the following collaborative arrangements as part of their project:

- › Joint research and development
- › Joint manufacturing/production of goods and services
- › Integrated supply chains
- › Other



~420+
nation-wide collaborations



~256 - 555+
additional connections

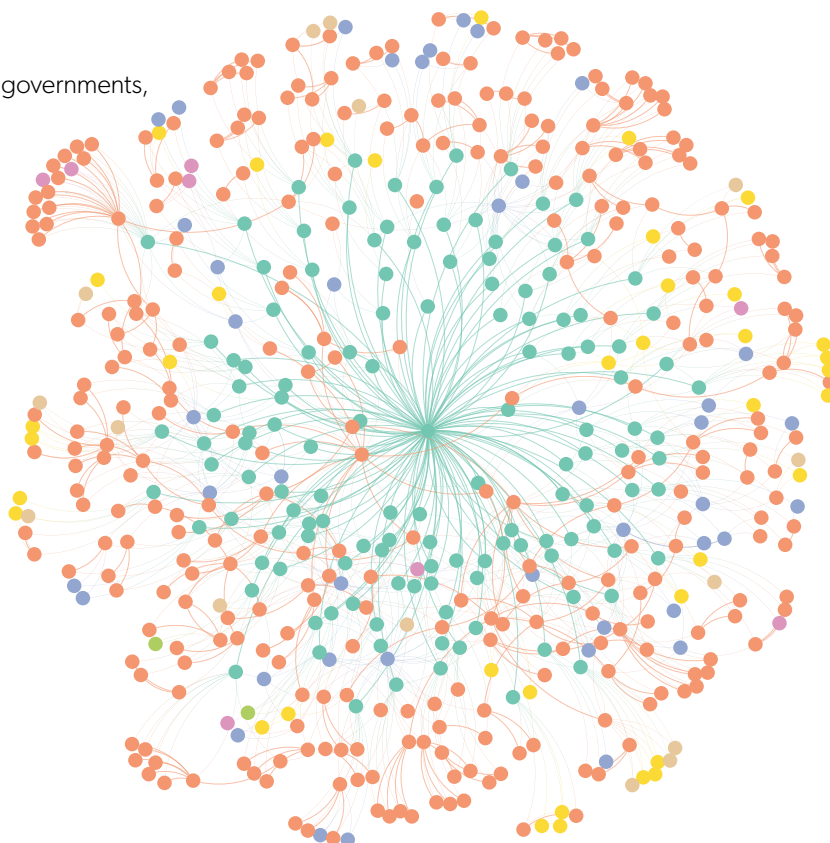


AMGC Project Network

Connecting industry with research institutions, governments, industry associations and professional services

Legend

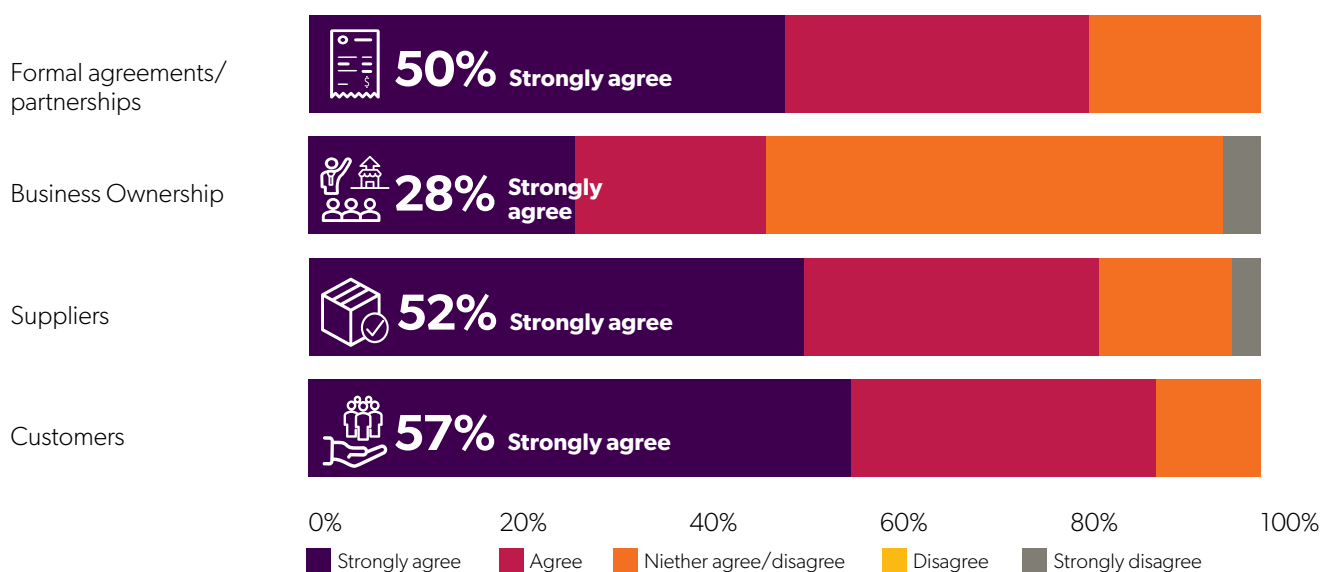
- AMGC Project
- Manufacturing Company
- University/Research Institution
- Government Agency
- Industry Network
- Professional Services
- Other



IMPROVING MARKET ACCESS

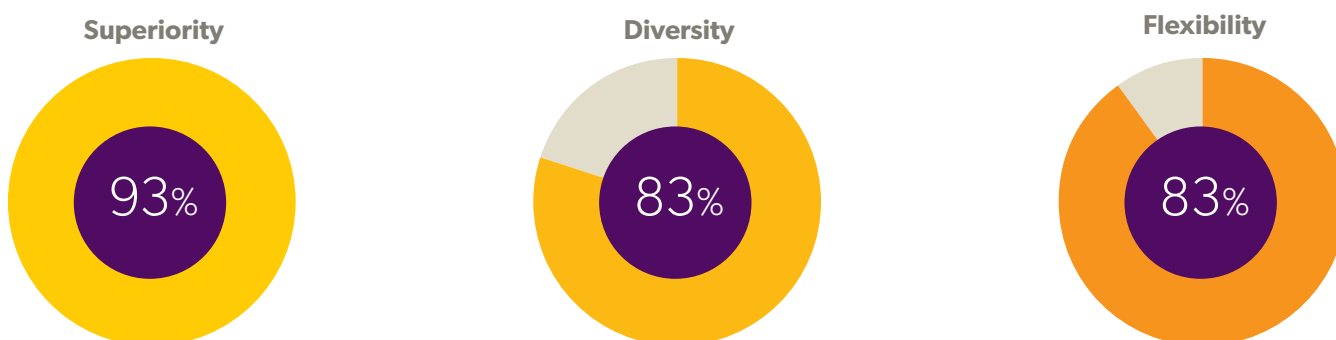


89% Of participants reported an increase in identifying or targeting export, niche, or underserved markets



PROJECT PARTICIPANTS REPORTED AN INCREASE IN RESILIENCY STRATEGIES

Compared to before the project





CARBON COMPOSITE CYCLE WHEELS

36T

INITIAL PROJECT FUND

Upscaling of 36T's manufacturing capability and commercialisation of a 'multi-material' bicycle wheel via global value chain partners

36T has developed patented multi-material technology for manufacturing highly optimised bicycle components.

This AMGC project seeks to scale-up 36T's manufacturing processes and production capabilities. Success will be demonstrated by taking a prototype multi-material bicycle wheel through to commercialisation.

To validate its manufacturing processes, 36T will produce an 'off-tool' sample, which represents the starting point for commercial production of a high-performance cycle wheel for elite and enthusiastic cyclists. The multi-material wheel is 30% lighter than a standard wheel, without compromising component strength, aerodynamics or material integrity.

The project involves developing a robotic manufacturing cell to produce multi-material products. It will culminate with testing and validating the 'off tool' samples, at which point 36T will be production-ready.

Following validation of 36T's manufacturing capability, the company will pursue opportunities in adjacent growth sectors to position 36T as an international leader in multi-materials manufacturing. In addition to bicycle wheels, 36T will exploit its technical leadership and production capability across other global value chains, including in the defence, automotive and consumer products.

MILESTONES

5/2/18	●	AMGC approval
16/3/18	●	Detailed plans for the robotic manufacturing cell designed, costed and confirmed
27/4/18	●	Robotic manufacturing cell, machining setup and testing completed
24/8/18	●	Production and testing of tooling completed
30/6/19	●	Testing and validation of 'off tool' sample completed. Team training on production processes completed

CONTRIBUTIONS: Government – \$175,000 | Industry – \$267,000 | In Kind – \$45,400



\$487,400

committed (AMGC, industry and in-kind)



\$175,000

Committed (AMGC)



123%

ROI on project funding



5 new

employees and 2 upskilled



~10

additional connections*

* Additional connections do not include the original partnerships within the project

“AMGC, in particular Mike Grogan, helped capitalise on the carbon fibre and advanced composites capabilities in the Geelong region through co-funding a new design and manufacturing enterprise 36T (now partington.cc), positioned to service the rapidly growing ultra-high-end cycling componentry sector. 36T now produces the world’s highest-performing cycling wheels, with ~90% of our products heading for export. Our ongoing focus is to grow our capacity 15-fold to service the \$30 million global market demand and create an additional 20-30 jobs over the coming years.”

PROJECT COLLABORATORS

36T

Boston

baum
PASSION PRECISION PERFORMANCE

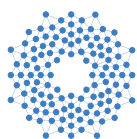


PLASTOOL

zedtex



HIGH PURITY ALUMINA MANUFACTURING PROCESS



Alpha **HPA**

AMESRF

Validation of an innovative high purity alumina manufacturing process and verification of a commercial plant design

Alpha HPA, in collaboration with its project partners, has developed an innovative and unique manufacturing process. This new manufacturing process is capable of selectively extracting alumina from a proprietary solution using a solvent extraction process.

The Alpha HPA process is estimated to have production costs that are conservatively two-thirds of the other commercial processes.

To realise this opportunity of validating and defining a commercial plant, Alpha HPA plans to design, build and operate a pilot plant that will run largely continuously for an extended period to validate end-to-end production processes, confirm material and energy balances, define commercial plant equipment requirements, thus complete key components for a final investment decision to be made in regards to the commercial plant.

The core financial metrics from smaller scale testing suggest that the commercial plant will be strongly profitable and able to make 4N purity HPA at a cost significantly lower than any other current commercial process. These pilot plant trials provide a final step in technical de-risking of the commercialisation project, which will likely then attract considerable investor interest and further investment.

MILESTONES

31/10/19		Pilot plant campaign – solvent extraction completed
15/4/20		Pilot plant campaign – precursor production completed
24/7/20		Assays – vendor test work completed
24/3/21		Reports completed on prototype system verification

CONTRIBUTIONS: Government – \$400,000 | Industry – \$410,000 | In Kind – \$330,000



\$1.14M

committed (AMGC, industry and in-kind)



\$400,000

Committed (AMGC)



15

jobs created/upskilled*



2

additional connections*



Company has reported an improvement of

MEST skills

* Additional connections do not include the original partnerships within the project

“The co-investment provided through AMGC arrived at a crucial time for Alpha HPA, allowing us to fast track the development of our novel process for alumina extraction. This in turn enabled us to move to commercialisation and progress agreements with our chemical partner Orica, and to consolidate plans to build a \$330 million processing facility in Gladstone, which will lead to 300 construction phase jobs and around 120 permanent local jobs.”

PROJECT COLLABORATORS



HPAlumina Pty Ltd





ELECTRIC VERTICAL TAKE-OFF AND LANDING AIRCRAFT



AMESRF

Filament wound and advanced composite structures for Vertiia – an electric vertical take-off and landing aircraft and Test flight of the assembled prototype.

The AMSL Aero Electric VTOL (Vertical Take-off and Landing) aircraft is being developed at a time of rapid innovation in the aerospace sector around the general concept of personal, electrically powered (or hybrid) VTOL vehicles.

The AMSL Aero entrant into this market is their Vertiia configuration which is a novel electric vertical take-off and landing aircraft that combines the vertical take-off and landing capabilities of a helicopter with the efficient high speed flight of a fixed-wing aeroplane. It has several patented features, including the wing structure and the system that tilts the wings from vertical (hover flight mode) to horizontal (aeroplane flight mode) which gives it a unique value proposition.

This new Vertiia configuration will take advantage of filament wound parts due to the unique shape of the Vertiia wing structure and lower sensitivity to local skin thickness.

There are four parts to this project:

- 1 Design, build and test a representative full-sized filament wound wing structure and determine the limitations of the filament winding process when applied to an aircraft primary wing structure.
- 2 Design, build and test a representative full-sized prototype composite fuselage.
- 3 Evaluate, select and prototype manufacturing methods such as automatic fibre placement, resin transfer moulding, resin infusion and vacuum assisted resin transfer moulding techniques.
- 4 Assembly of all aircraft components and a successful test flight of the Vertiia eVTOL prototype.

The AMSL basic configuration has some design attributes that are viewed as significant advantages over other eVTOL concepts and which make the design adaptable to a range of different missions.

MILESTONES

21/11/19	Initial design optimisation output design geometry and structural model completed
10/3/20	Detailed design of the wing and fuselage completed
29/6/20	Building and testing of wing structure
27/7/20	Building and testing of fuselage structure
03/12/20	Assembly of wing and fuselage completed
31/12/20	Integration of propulsion, flight control and energy storage systems

CONTRIBUTIONS: Government – \$400,000 | Industry – \$482,108 | In Kind – \$150,000



\$1.03M

committed (AMGC, industry and in-kind)



\$400,000

Committed (AMGC)



9 new

employees and 14 upskilled



3

additional connections*

* Additional connections do not include the original partnerships within the project



"AMGC's co-funding allowed AMSL Aero to accelerate the development of a novel manufacturing method for future high volume manufacturing of core components of our airframe structure. Significantly the AMGC project allowed us to collaborate early with Australian manufacturers for future commercialisation of our aircraft."

PROJECT COLLABORATORS





INTEGRATED CNC ROBOT



CNC Grinding Machines

INITIAL PROJECT FUND

Transitioning a locally developed prototype of an integrated CNC Robot to production ready status

ANCA Machine Tools, in collaboration with its project partners, seek to commercialise a locally developed prototype robotic and digital control system for computer numerical control (CNC) grinding and milling machines. The project aims to replace limited-functionality pneumatic solutions that are currently integrated with many CNC machines. This will enable full automation of common production so that users can achieve unsupervised 24/7 CNC operating capabilities.

The prototype robotic system integrates with ANCA CNC machines and should have broad market appeal in other industries such as pharmaceuticals and food production. The robotic solution is a flexible alternative to traditionally operated CNC machines, aligned with Industry 4.0 technologies. Real-time production data will be available for use within enterprise resource planning (ERP) systems, while the programmable robot's flexibility will help optimise production and enable rapid reconfiguration between manufacturing tasks.

When the project is completed ANCA, and its subsidiary companies will be equipped to provide an integrated robotic solution to its customers and establish a new robot export industry for Australia.

MILESTONES

22/1/18	●	AMGC approval
6/7/18	●	Final product design review completed
12/10/18	●	Product validation, testing and adjustments completed
28/3/19	●	Process validation completed and first commercial product produced
31/7/19	●	Volume production achieved and product launch completed

CONTRIBUTIONS: Government – \$325,000 | Industry – \$325,000 | In Kind – \$145,836



Advanced
knowledge

Advanced
processes

Advanced
business
models



\$795,836

committed (AMGC, industry
and in-kind)



\$325,000

Committed (AMGC)



166%

ROI on project funding



~10

jobs created/upskilled*



~10

additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.

** Additional connections do not include the original partnerships within the project

“Such a complex project and process wouldn’t be possible without the support of trusted partners such as CSIRO, Sutton Tools and AMGC. AMGC is pretty much the only organisation that can provide funding assistance for a business of our size...In terms of balancing what is applicable, AMGC works out perfectly for us.”

PROJECT COLLABORATORS





CARBON FIBRE REINFORCED GEOPOLYMER CONCRETE



INITIAL PROJECT FUND

Production of pedestrian bridge and validation of new construction material for the global supply chain

Victorian engineering firm Austeng is leading an AMGC project to develop a world-first construction industry innovation. The project involves members of the Advanced Fibre Cluster Geelong, Carbon Nexus and Rocla.

Combining Austeng's experience in polymer concrete projects with the world-class carbon fibre expertise of the Carbon Nexus research facility has allowed for the creation of a high-value product for use across the global construction industry.

Geopolymer and carbon fibre offers superior thermal stability, corrosion resistance and durability than concrete, plus it is rust-proof, acid-resistant, salt-resistant and thermally stable up to high temperatures. Austeng's Managing Director Ross George calls it "a cure for concrete cancer". This project is the first in the world to combine carbon fibre and geopolymer in concrete.

In addition to the product itself, Austeng will offer post-production design services based on this unique composite material.

According to IBISWorld research, the Australian concrete products market is worth \$2 billion. It has already been estimated that Austeng's new material could capture up to 1% of this (\$20 million) and enter the export market.

MILESTONES

1/12/18	●	Bride beam design
1/12/18	●	Computer modelling and optimisation
23/7/19	●	Manufacturer and test sleeper beam
23/7/19	●	Manufacture and test bridge beam
23/7/20	●	Review modelling in light of testing

CONTRIBUTIONS: Government – \$50,000 | Industry – \$85,000 | In Kind – \$35,000



Advanced
knowledge

Advanced
processes

Advanced
business
models



\$170,000

committed (AMGC, industry
and in-kind)



\$50,000

Committed (AMGC)



3

additional connections*



Company has reported an
improvement of

MEST skills

* Additional connections do not include the original partnerships within the project

“The AMGC co-funding was provided at a very early stage and accelerated our ability to respond to an opportunity and build collaborations with other partners. In conjunction with Rocla and Deakin University, we were able to ascertain whether or not a pedestrian bridge could be manufactured commercially and effectively with fibre-reinforced geopolymer material. As a result of the co-funded project we are now in a position whereby the commerciality and feasibility of the concept has been proven which has removed many potential barriers for future partners and customers. The AMGC initiative has demonstrated that even a comparatively modest amount of seed funding at the right time can result in very significant outcomes.”

PROJECT COLLABORATORS





DIGITISED MANUFACTURING VALUE CHAIN



INITIAL PROJECT FUND

Short interval decision making via an Industry 4.0 application

This project seeks to achieve a profound shift away from large-scale, production-centric manufacturing of commodity products, towards a more customised, smart and competitive manufacturing model. This new approach is backed by highly skilled individuals, and is more responsive to the rapidly changing needs and priorities of global value chain partners.

This project applies Industry 4.0 principles and technologies, embracing agility and delivering superior customer experience as a demonstration of AMGC's 2017 Sector Competitiveness Plan. In doing so, it aims to influence Australian manufacturing much faster than had previously been possible.

The technology aspect of this project involves collecting real-time manufacturing data and transforming it into meaningful analysis and visualisations. Project partners collaborate on designing and implementing digital technologies including smart sensors, location tracking devices, analytics, digital workflows and scheduling, and data visualisation tools.

B&R Enclosures is working with its project partners to develop a competitive advantage by enhancing decision-making capabilities across the manufacturing value chain. This will allow B&R Enclosures and every link in its value chain to more effectively respond to changing customer needs.

The project will result in an enhanced customer experience and accelerate participants' export growth into new and existing markets.

MILESTONES

1/8/17	●	AMGC approval
31/8/18	●	Design and development of the data collection system
29/1/19	●	Data validation, integration and output
29/5/19	●	Development and implementation of decision-making tools

CONTRIBUTIONS: Government – \$245,000 | Industry – \$245,000 | In Kind – \$580,000



\$1,826,150
committed (AMGC, industry
and in-kind)



\$245,000
Committed (AMGC)



~46
jobs created/upskilled*



~25+
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“This project allowed us to go from a 100% commodity manufacturer to a service/package manufacturer offering solutions. Solution sales now account for 55% of revenue with a higher margin. This occurred in 2017/18 about when the project started. B&R are now able to provide turn-key solutions.”

PROJECT COLLABORATORS



Complete Wiring





SOLID FUEL ROCKET PROPELLANT AND SOLID ROCKET MOTORS



INITIAL PROJECT FUND

Manufacture of solid fuel rocket propellant and solid rocket motors (SRM's)

There is no sovereign manufacturer of solid rocket propellant and subsequently solid rocket motors (SRM's) in Australia, which means all SRM's are currently imported. This project proposes to manufacture solid rocket propellant and SRM's locally for the civilian market initially (export and defence markets to follow) at far more economical prices and with quicker turnaround times.

It is expected that locally produced propellant and SRM's will also alleviate the burdens for international customers coming to Australia attempting to import propellant from overseas due to International Traffic and Arms Regulations (ITAR). Black Sky Aerospace (BSA) are able to supply a significant export market for other countries that are burdened with these regulations which BSA is keen to develop. It is estimated the international market could generate a further \$25–\$30 million per annum within the next five years.

BSA undertook initial lab scale prototyping at their USA facility by adapting and modifying existing equipment. They identified deficiencies with the existing rocket propellant manufacturing process. Through this work, BSA were able to characterise propellant, comparing traditional methods versus their new methods. The new process, whilst still manually controlled is automated in the extrusion and vacuuming.

This project is the foundation for future BSA opportunities. The framework developed from manufacturing rocket propellant for SRMs will enhance and contribute to grow a sustainable market leading presence for BSA.

MILESTONES

4/9/20	●	Sovereign manufacturing process compliant with Australia regulations developed
18/1/21	●	Detailed design and prototyping of SRM completed
4/3/21	●	Market preparedness, IP protection and export processes completed
24/6/21	●	Production realisation of SRM completed

CONTRIBUTIONS: Government – \$184,500 | Industry – \$184,500 | In Kind – \$60,000



\$429,000
committed (AMGC, industry
and in-kind)



\$184,500
Committed (AMGC)



86.25%
ROI on project funding



6 new
employees and 3 upskilled*



4
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“As this was our first AMGC project, we were exposed to a lot of new experiences which were very positive. The support from the entire AMGC team was fantastic. A special call out to Mark Peters who was always available to talk with us when we had questions and needed clarification.”

PROJECT COLLABORATORS



Department of
Defence



WINE-BOTTLING HARDWARE

**AMESRF**

Design and prototyping of 'smart' anti-counterfeit wine-bottling hardware

Wine counterfeiting is a global issue that costs wine producers and retailers billions of dollars each year.

This project seeks to overcome shortcomings in anti-counterfeit solutions within high-speed production environments. It also aims to solve RFID (radio-frequency identification) readability issues that occur near liquids and metal, which is a global issue in itself. The main objective of this project is to develop and validate an innovative, anti-counterfeit sealing system, building on the manual proof of concept Cellr has already developed.

This project will embed Cellr's technology into the capsule of cork and screw caps for wine and other beverages. The manufacturing challenge is in the unique design that allows this technology to be deployed automatically within the high-speed manufacturing environment. The solution must be robust enough to handle the rigours of a commercial bottling line, but fragile enough to be destroyed when the bottle is opened or there is an attempt to dislodge the sealing arrangement, thereby destroying its authenticity. Creating a tamper-proof element within the manufacturing process is a long-awaited solution that will bring significant innovation to the wine industry.

Cellr's product verification solution uses a blockchain system to automatically create immutable records on the bottling line, and will include the ability to communicate with customers directly through a web-based customer engagement platform, using the NFC protocol within the sealing arrangement. The project will also aim to create new intellectual property (IP) that can be applied across other industries that monitor and verify liquids, building on technology developed so far.

MILESTONES

5/12/19	●	Hardware design completed
22/1/20	●	Software design completed
19/3/20	●	First prototype completed
18/3/21	●	Proof of concept completed

CONTRIBUTIONS: Government – \$150,000 | Industry – \$150,000 | In Kind – \$59,800



\$359,800
committed (AMGC, industry
and in-kind)



\$184,500
Committed (AMGC)



7.2%
ROI on project funding



9 new
employees and 2 upskilled



3
additional connections*

* Additional connections do not include the original partnerships within the project

“The Advanced Manufacturing Growth Centre has been such a positive experience for my company. The diligence required whilst reporting on milestones was detailed enough, but not onerous on one’s time. Plus, the team around the country were always happy to help so much so that they played a huge part in our media launch in March of 2020. The Western Australian Director, Angela Doyle has been wonderful to deal with on a monthly basis whilst active.”

PROJECT COLLABORATORS





ADVANCED FIBRE BANDAGES



INITIAL PROJECT FUND

Advanced Fibre for targeted delivery of bio-active molecules to treat chronic wounds

The project will utilise short polymer fibre (SPF) biomaterial manufactured via a novel, patented method developed at Deakin University's Institute for Frontier Materials with commercial partners (HeiQ Australia and Cytomatrix). Unlike the conventional electrospinning method of manufacturing polymer fibers, this novel manufacturing method is highly efficient, is extremely versatile both in terms of the dimensions of the fibre produced and the possible polymer composition and is gentle enough that it does not damage biological molecules. This means that biological molecules can be incorporated into biodegradable SPF during manufacture. These biologicals are then slowly released from the SPF at a specific target site such as a chronic wound.

Granulocyte-macrophage colony-stimulating factor (GM-CSF) plays an important role in wound repair, as well as being an immune stimulating factor that causes migration of immune cells to wound sites. Clinical studies have demonstrated that local application of GM-CSF promoted wound healing of burns and chronic ulcers. GM-CSF is slowly released from SPF over time and remains biologically active. The process of incorporation into SPF actively protects GM-CSF, increasing its stability compared to GM-CSF in solution giving it enhanced longevity.

This project will investigate and optimise the incorporation and release profile of GM-CSF in SPF manufactured from two other biocompatible polymers, such as gelatine and chitosan.

These unique, functionalised SPF will be the basis for new healthcare products to enter the global chronic wound care market, reducing the financial burden on the healthcare system and the frequency of antibiotic use in chronic wound care.

The initial product will be focused on promoting self-healing of chronic wounds, which will reduce the financial burden on the healthcare sector and reduce the use of antibiotics and therefore the development of antibiotic resistance bacteria, and generate significant revenue and employment within Victoria.

MILESTONES

- | | | |
|----------|---|--|
| 14/6/19 | ● | Optimise manufacturer of chitosan and gelatine SPF |
| 31/12/19 | ● | Optimise uptake of biological molecules |
| 31/12/19 | ● | Investigate release profile and activity of biological modules |

CONTRIBUTIONS: Government – \$50,000 | Industry – \$50,000 | In Kind – \$159,366



\$259,370
committed (AMGC, industry
and in-kind)



\$50,000
Committed (AMGC)



123%
ROI on project funding



5 new
employees and 2 upskilled



1
additional connections*

* Additional connections do not include the original partnerships within the project

“Our experience working with AMGC has been overall very effective. The fact that we were able to get the project off the ground after a shaky start and then deliver improved knowledge and IP position was commendable.”

PROJECT COLLABORATORS





WEAR PLATE SENSING SYSTEM



INITIAL PROJECT FUND

Commercialisation of a prototype wear plate sensing system for the global mining industry via a servitisation business model

Wear plates are the armour plating of the mining industry and are used to protect the mining assets (fixed and mobile plant) from wear and degradation due to high volumes of ore flowing over their surface. Wear Plate Maintenance, which comprises the assessment and replacement of wear plates, is a major element of the operating costs of all global mining operators with up to \$400 million/year spent on wear plate replacement alone across Australia.

Davies has developed a wear sensing system (WearSense) that captures live measurement data, such as: wear, temperature and other characteristics of wear plates. This enables real time condition-based wear management that improves productivity, safety and profitability. The Davies technology replaces manual procedures for measuring wear plate degradation.

Project participants will collaborate to trial the Davies WearSense system in an operational environment with major mining company partners. This will enable Davies to optimise the product hardware specifications and test the software interface. Once the final product hardware specifications are known, Davies will develop production ready manufacturing processes and procedures.

The Davies software platform will provide real time wear data and an analytical service and platform to predict wear maintenance requirements, which will enable mining companies to utilise condition-based wear management. This in turn, will enable mining companies to plan for more efficient and less costly maintenance shut-downs. The Davies technology enables a new and enhanced level of service, which is not currently available through any other technology provider.

The project will assess the potential for broadening the commercialisation of the Davies IP to other markets where the management of surface wear is critically important. When successful, this project will provide the Australian manufacturing industry a tangible demonstration of the development and commercialisation of leading IP across global markets.

MILESTONES

19/11/18



AMGC approval

30/3/20



Commercialisation model and integration plan complete

CONTRIBUTIONS: Government – \$227,000 | Industry – \$227,000 | In Kind – \$266,000



\$720,000
committed (AMGC, industry
and in-kind)



\$227,000
Committed (AMGC)



7.5%
ROI on project funding



~8
jobs created/upskilled*



~25+
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“The results obtained at the end of the project were of a high standard. Davies have been able to use the data obtained to inform the ongoing development of the wear analytics within the WearSense reporting.”

PROJECT COLLABORATORS





INDUSTRY 4.0 DIGITISATION OF SME INFRASTRUCTURE

DematecAutomation

INITIAL PROJECT FUND

Industry 4.0 realisation via digitisation of existing SME manufacturing infrastructure and IIoT augmentation of manufacturing equipment

Dematec Automation and 17 small-to-medium sized Australian manufacturers from across the country will demonstrate how Industrial Internet of Things (IIoT) sensors can instrument existing manufacturing equipment to elicit valuable real-time operational data and identify opportunities for optimisation of manufacturing operations. Several SME Manufacturers will augment their manufacturing equipment product offerings with IIoT to introduce or increase servitisation opportunities.

The 17 manufacturers service a diverse range of industry sectors including metal fabrication, materials handling, textiles, chemicals, concrete, hydraulics, joinery, marine, masonry and packaging. They will each become case studies that help other manufacturers in allied sectors readily identify the potential return on investment for digitalising legacy manufacturing plant and equipment and bringing their operations into the Industry 4.0 context.

The project spans Western Australia, South Australia, Victoria, Tasmania, Australian Capital Territory, New South Wales and Queensland, and is associated with the Department of Industry, Innovation and Science's Entrepreneurs' Programme.

Digitisation of manufacturing equipment offers immediate and long-term benefits, not just limited to analysis of current operational workflows and resource utilisation. It is a critical step in achieving high-value-add product offerings such as detailed traceability throughout the manufacturing process and therefore opportunities for servitisation through predictive maintenance offerings. It supports the adoption of digital supply chain transparency and the optimisation of manufacturing resources at a supply chain level.

MILESTONES

1/6/19	●	Initial Workshops and Site Visits
1/12/19	●	Future State Defined
3/6/20	●	Solution Options Developed and Reported

CONTRIBUTIONS: Government – \$191,444 | Industry – \$191,696



\$383,140

committed (AMGC, industry and in-kind)



\$191,440

Committed (AMGC)



181.20%

ROI on project funding



5 new

employees and 6 upskilled



8

additional connections*

* Additional connections do not include the original partnerships within the project

“AMGC were very flexible in working with Dematec to evolve the project scope and milestones as feedback from potential industry participants was received. This enabled Dematec to obtain greater value from the project as well as create short term benefit for a broader range of industry participants as well as longer term partnership opportunities beyond the duration of this project.”

PROJECT COLLABORATORS



CUSTOMISED PRESCRIPTION EYEWEAR



INITIAL PROJECT FUND

Implementing an automated production system to scale-up manufacturing of mass-customised prescription eyewear for a global consumer market

Dresden Optics and its project participants are developing a fully automated production system to scale up the manufacturing output of Dresden's market proven prescription eyewear product.

The collaborative partnership between Dresden and Astor Industries seeks to improve production processes and enable mass customisation of spectacles manufactured from recycled material. This project is the first step in realising Dresden's advanced business model over the next 18 months.

The primary objective is to increase production volume by implementing an automated robotic system that will double current production from 400 units to 800 units per day.

When this project is complete, Dresden will have established a fully automated production system. The enhanced manufacturing capability will reduce operating costs, improve production efficiency and reduce resource inputs, including materials and electricity requirements.

MILESTONES

15/12/17	●	AMGC approval
15/3/18	●	Robotic system design completed
31/10/18	●	Robotic equipment commissioned and installation completed
30/11/18	●	Programming robotic functions for automated manufacture completed
31/12/18	●	Digital integration with materials handling system completed
31/1/19	●	Testing, refinement and validation of the robotic system
30/6/19	●	Fully operational robotic sub-cell production completed

CONTRIBUTIONS: Government – \$250,000 | Industry – \$250,000 | In Kind – \$467,000



Advanced
knowledge

Advanced
processes

Advanced
business
models



\$967,000

committed (AMGC, industry
and in-kind)



\$250,000

Committed (AMGC)



~7

jobs created/upskilled*



~10+

additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.

** Additional connections do not include the original partnerships within the project

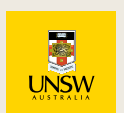
“AMGC is more than just a funding administration service, they really understand the challenges manufacturers face and provide a range of support services. The project aimed to improve our production processes and capabilities, and as a result we are now the only manufacturer making eyewear locally, from recycled plastics, to rival that of imported products – and exporting them as well.”

PROJECT COLLABORATORS



ELEMENTAL
MANUFACTURING

CONSONIC





DEVELOPMENT OF SEGNUT FIRST SYSTEM



INITIAL PROJECT FUND

Development of an advanced industrial bolting system for improved safety and speed in the resource sector

The Segnut has helped mining and resources companies to improve productivity and safety in their maintenance operations. However, there is now a desire to improve maintenance safety when attaching and removing the cutting edges on the dozers and other mobile plant used in their mining operations. In this case the hazard being addressed is crush injuries incurred using conventional removal methods. This has created the development of Segnut FIRST.

The Segnut FIRST project will bring to the Australian and global markets, a new system for applying and removing heavy duty fasteners with a clear focus on vastly improved safety to the worker tasked with installing and removing such fasteners. The system will comprise:

- A specialised attachment called a Reaction Socket unit
- A modified plow bolt design referred to as a "reaction bit plow bolt" or a "Segnut FIRST plow bolt".

The Segnut FIRST system will allow the use of nutrunners to install AND remove nuts to matching bolts without the need for a reaction bar - thus no finger crush danger is created. The Segnut FIRST system incorporates a Reaction Socket with a dual drive mechanism which attaches to the modified threaded end on the plow bolt, and inner Segnut section for installation. Another larger Reaction Socket with a dual drive mechanism attaches to the inner and outer Segnut sections for removal.

The existing Segnuts and plow bolts are produced in China. This project will increase Australia's capability in manufacturing fastening products and systems which will provide opportunities for local suppliers.

MILESTONES

8/12/20	●	Prototype and initial field tests completed
17/3/21	●	Field trials completed and design parameters confirmed
21/6/21	●	Engineering design freeze and QA metrics completed
20/10/21	●	Certifications and initial type testing completed

CONTRIBUTIONS: Government – \$252,500 | Industry – \$252,500 | In Kind – \$57,500



\$562,500

committed (AMGC, industry and in-kind)



\$252,500

Committed (AMGC)



2 new

employees and 2 upskilled



3

additional connections*



Company has reported an improvement of

MEST skills

* Additional connections do not include the original partnerships within the project



The assistance provided by AMGC has ensured that we have been able to take our TopTorque [previously Segnut] technology from concept to commercial-ready product that is now about to be introduced into service by the world's biggest miner. The Centre's understanding of the start-up environment ensured that the support was targeted, flexible and absolutely what we needed."

PROJECT COLLABORATORS





LITHIUM ION BATTERY MODULE

energy
renaissance

AMESRF

Design of a safe, hot-climate lithium-ion battery (LiB) module and associated automated advanced manufacturing production process

Energy Renaissance is leading the development of a purpose-built LiB manufacturing factory called 'Renaissance One', which will eventually leverage Australia's competitive advantage in abundant natural resources of lithium. The LiB manufacturing factory will produce batteries for industrial battery energy storage application such as solar farms, defence assets, mine sites, utilities, commercial and industrial applications, etc.

Energy Renaissance is seeking to exploit a market niche for safe LiBs in hot-climate operating environments. This project will bridge the gap between new product development and manufacturing of Australian made battery energy storage solutions.

Australia is the only country in the world that has all the mineral components required for LiB manufacture:

- ▶ Lithium – Australia is the lowest cost producer and has 20% of worlds reserves
- ▶ Lithium carbonate is now being manufactured in Perth and in NT (within 18 months)
- ▶ Battery Grade Graphite – Concentrate manufactured in South Australia.

The following items are mined in Australia but currently sent overseas for processing: Copper, Cobalt, Nickel, Aluminium, Manganese. When demand by Australian LiB manufacturers is sufficient, these minerals will be processed in Australia. At that point, input costs for the manufacture of LiBs in Australia will be considerably reduced and as a result, it is conceivable that Australia will become a manufacturing powerhouse for LiBs, utilising domestic commodities.

MILESTONES

21/5/19	●	Product design of hot-climate-optimised battery modules and ra
4/6/20	●	Virtual reality product model for sales and demonstration support
17/7/20	●	Training and knowledge transfer completed
14/8/20	●	Specification of production line layout and industrial automation specifications
3/12/20	●	Specification of production processes completed
11/3/21	●	Manufacture of functioning superStorage™ battery module

CONTRIBUTIONS: Government – \$246,625 | Industry – \$246,625 | In Kind – \$155,000



\$648,250
committed (AMGC, industry
and in-kind)



\$246,630
Committed (AMGC)



6 new
employees and 12 upskilled*



5
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“Outstanding program, well-structured and filling a very clear gap in the early life of an Australian advanced manufacturing start-up. An effective and very valuable program supported by experienced and professional staff. Jens Goennemann, Mark Peters and the Advanced Manufacturing Growth Centre helped when we really needed it. We’ll never forget that and stand ready to pay it forward in support of other Australian manufacturers.”

PROJECT COLLABORATORS





CORRUGATED METAL SHEET BENDING



INITIAL PROJECT FUND

A manufacturing process for bending corrugated metal sheets, and its commercialisation through global value chain partners

FormFlow worked with its project partners to develop a patented process for bending corrugated metal sheets, which has the potential to realise new market opportunities in the \$1 billion per annum global sheet metal market.

This project seeks to overcome deficiencies in corrugated sheet metal roofing constructions by eliminating:

- › Caps and flashing, which reduces building costs and improves visual appeal
- › Gaps and drafts, improving insulation
- › Gaps where moisture can enter during severe tropical storms
- › Gaps where dirt or animals can enter a structure
- › Gaps that facilitate ember attack during bushfires.

In addition to the corrugated metal sheet bending process, FormFlow has designed a business model based on manufacturing and then licensing FormFlow bending machines to sheet metal manufacturers. This enables other manufacturers to include bends in customised sheet metal orders.

By developing and validating the FormFlow machine for installation and integration in the sheet metal manufacturing process, FormFlow has created intellectual property that will deliver manufacturing revenue, employment and return on investment.

MILESTONES

10/11/17	●	AMGC approval
15/11/17	●	FormFlow machine operating environment and process engineering requirements identified and confirmed
20/11/17	●	Detailed design of the FormFlow machine developed and validated
15/12/17	●	Commercial FormFlow machine version 1.0 built and tested
31/7/18	●	Reference sites developed using products created on the FormFlow machine
31/10/18	●	FormFlow licensing model and technology integration plan established
31/3/19	●	FormFlow licensing model and technology integration plan realised

CONTRIBUTIONS: Government – \$250,000 | Industry – \$250,000 | In Kind – \$75,000



\$675,000
committed (AMGC, industry
and in-kind)



\$250,000
Committed (AMGC)



~10
jobs created/upskilled*



~26+
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“Our partnership with AMGC was critical in getting our world first FormFlow bend to market and establishing a deal with BlueScope Steel to market, manufacture and sell the product exclusively in Australia. AMGC support enabled us to fast track the development and validation of the technology, secure additional investment and complete early market validation studies. This technology is the foundation of our rapidly growing business.”

PROJECT COLLABORATORS





THERMALLY BONDED GEOCOMPOSITE MATERIAL

GEOFABRICS®

INITIAL PROJECT FUND

Re-shoring thermally bonded geocomposite manufacturing

Geocomposites and geotextiles are used for soil stabilisation in landfill, dams, water, roadways and mining tailings dams where steep inclines are encountered in these applications.

Geofabrics is proposing to develop a new “commercial grade” thermally bonded geocomposite material with superior technical performance characteristics and cost competitiveness. The thermal bonded geocomposite will have the following competitive advantages compared to existing imported products:

- Higher bond strength
- Improved drainage performance
- Capability to manufacture to project specific requirements such as length and width
- Cost competitive product from reduced manufacturing costs.

The cost benefit to the customer using the Geofabrics’ thermal bonded geocomposite will be:

- Reduced project installation cost – soil is added to the top of the geocomposite to achieve the filtration specification.
- Improved project implementation costs – by eliminating lead times of imported product and providing higher level of responsiveness, Geofabrics can react to changes in project specification or requirements

The project will involve the following stages:

- Finalise prototype development
- Trials of commercial scale machinery that has the capability for manufacturing at full scale

- Design and trials of automation and robotic technology for high risk (manual handling and high temperature operating zones) tasks.

MILESTONES

21/5/20	●	Development of prototype design completed
16/11/20	●	Trial result analysis and testing as per Australian standards
16/11/20	●	Machine fabrication and construction completed
27/12/21	●	Procurement of robots that perform high risk tasks completed
3/9/21	●	Electrical and mechanical installation completed

CONTRIBUTIONS: Government – \$322,000 | Industry – \$322,000 | In Kind – \$110,000



\$754,000

committed (AMGC, industry and in-kind)



\$322,000

Committed (AMGC)



+3

additional connections**



Company has reported an improvement of

MEST skills

** Additional connections do not include the original partnerships within the project

The co-funded project with AMGC has enabled us with the ability to manufacture cost-competitive bonded products with superior functional properties that are produced to specific project requirements. The project led to the development of innovative products that help build Australia's waste, road, and rail infrastructure. A program such as this, along with AMGC's broader support is invaluable as it assists in reshoring and creating jobs, strengthening sovereign manufacturing capability, and delivering innovative products that are central to Australian manufacturing future growth."

PROJECT COLLABORATORS



**Quinlan Engineering
Design Service Pty Ltd**



MANUFACTURING OF LIQUID GRAPHENE



INITIAL PROJECT FUND

Development of graphene powder into a range of graphene fluid dispersions

Graphene Manufacturing Group (GMG) has already developed scalable and relocatable process to manufacture graphene powder from hydrocarbon feedstock. GMG's graphene powder can be manufactured in a platelet size to order which is required as different applications require different sized platelets for different performance outcomes. No other known manufacturing methods can produce different size platelets so readily and easily and this advantage is paramount in many plastic, battery and paint applications.

With the collaborative support of UQ AIBN, and co-funding from AMGC for this project, GMG now intends to move to an improved technology and develop their graphene powder into a range of graphene fluid dispersions which will be, more readily, and easier to use in customer applications. This graphene fluid is classified as an "enabler" and compared with powder it has the following advantages:

- › Liquid can be dispersed more accurately in compounds than powder
- › Liquid can be diluted easier than powder
- › Liquids are much easier to work with from a material handling viewpoint
- › Liquids can be transported more economically (2,000 times less bulk than powder).

This project will trial and validate the benefits of liquid graphene in various commercial applications with the project participants.

The development of various specific dispersants is to enable a globally competitive, low cost, low carbon footprint process to manufacture graphene fluids in a scalable fashion. This would then be used to advance the usage and benefit of graphene's energy saving features through local and international markets.

CONTRIBUTIONS: Government – \$114,168 | Industry – \$114,168 | In Kind – \$4,000



\$323,340

committed (AMGC, industry and in-kind)



\$114,170

Committed (AMGC)



544%

ROI on project funding



11 new

employees and 6 upskilled



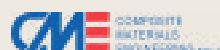
6

additional connections*

* Additional connections do not include the original partnerships within the project

“Overall, a great experience. Our progress was regularly check on, and we were introduced to many potential customers by our project manager, and National Director of Projects, Mark Peters.”

PROJECT COLLABORATORS





ON-SHORE MANUFACTURE OF NOTUS VIVERE INVASIVE VENTILATORS FOR COVID-19 PATIENTS



INITIAL PROJECT FUND

On shore Manufacture of Notus Vivere Invasive Ventilators for Covid 19 Patients based on Smiths Medical license

Invasive ventilation is an essential supportive treatment for patients in the critical-care stage of COVID-19. There is a world-wide shortage of invasive ventilators. Globally, there are many existing manufacturers, but they are swamped with orders and are manufacturing at the limits of their production capacity or supply chains.

While it is not easy to determine how many additional ventilators will be required to cope with the coming surge in demand in Australia, between 2,000 and 4,000 additional invasive ventilators are reasonable estimates given currently promulgated projections and recurring COVID-19 exposure. ResMed is the only Australian manufacturer of invasive ventilators, and the current approach by ResMed for manufacturing additional invasive ventilators is fully supported.

This project offers a well-considered and feasible, non-competitive ventilator supply strategy which resonated at a State and Federal level. Grey Innovation negotiated a licence agreement with Smiths Medical.

The licence agreement arrangement is to manufacture a minimum 2,000 Notus Vivere Emergency Invasive Ventilators in Australia derived from the Smiths Pneupac® ParaPAC® Plus Ventilators design with the initial 2,000 to be sold to the Australian Federal Government. Grey Innovation is leading this effort together with the Advanced Manufacturing Growth Centre to combine forces with other leading domestic manufacturers to make the Notus Vivere Emergency Invasive Ventilators in Australia. Production of key components and sub-assemblies, as well as final assembly and testing, will be undertaken by Grey Innovation and members of the AMGC manufacturing network.

In this project AMGC will provide funding to support Grey Innovation to manufacture sufficient Notus Vivere Emergency Invasive Ventilators, patient circuits and other consumables suitable for TGA approvals.

This project will cover the design and engineering needed to set up local production scale-up, with automation a consideration to efficiently manufacture machines in the shortest possible time span, due to the COVID-19 emergency.

MILESTONES

8/5/20	●	Local supply chain established
8/5/20	●	Supply chain contracted and materials ordered
18/6/20	●	Manufacturing line completed
14/08/20	●	300 units delivered
23/11/20	●	1700 units delivered

CONTRIBUTIONS: Government – \$500,000 | Industry – \$500,000



Advanced knowledge

Advanced processes

Advanced business models



\$1M

committed (AMGC, industry and in-kind)



\$500,000

Committed (AMGC)



24%

ROI on project funding



13 new

employees and 6 upskilled



2

additional connections*

* Additional connections do not include the original partnerships within the project

“Grey Innovation would like to thank AMGC for all support through this project. From the outset, the AMGC’s ability to broker the right introductions, both with government and their member base, was invaluable on a project that could not be delivered without a consortium. This project was a stark demonstration of the power of industry organisations such as AMGC.”

PROJECT COLLABORATORS





CUSTOMISED ORTHOTICS

iOrthotics

INITIAL PROJECT FUND

A mass-manufacturing process for customised orthotics

iOrthotics has invested in new printing technology, overcoming the limitations of its existing system and bringing larger markets within reach.

This project will allow iOrthotics to expand into the US market and create new areas for Australian manufactured goods, as a prelude to other overseas opportunities.

Using 3D printing within a fully digitised supply chain allows iOrthotics to reach new areas that previously used subtractive production techniques.

To achieve these expansion goals, iOrthotics and its project participants will scale up its new manufacturing processes. This will involve:

- Digitising the ordering process, including a portal that allows customers to submit their requests for fully digitised orthotics
- Developing a laboratory QR or barcode system to track the status of all orders
- Integrating digitised patient foot scans into the iOrthotics core system
- Refining the design to further reduce use of materials and consumables.

3D printing orthotics with the HP Jet Fusion printer is a first step in building new knowledge about how to 3D print other related plastic products. When this project is completed, iOrthotics will have an export-ready product for sale in global markets.

MILESTONES

1/11/17	●	AMGC approval
25/5/18	●	Digitisation of order-entry process completed
11/1/19	●	Laboratory QR/barcoding system completed to track all orders and order status
30/4/19	●	Digitised patient foot scan integrated into iOrthotics core system
14/5/19	●	Production optimisation to reduce material/consumables completed
20/6/19	●	Final product for export to the US market

CONTRIBUTIONS: Government – \$195,250 | Industry – \$195,250 | In Kind – \$60,000



\$450,000
committed (AMGC, industry
and in-kind)



\$195,000
Committed (AMGC)



~25
jobs created/upskilled*



26+
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“AMGC’s involvement in industry is vital for small-to-medium firms to access additional funding. The funding is central to a company like iOrthotics to undertake strategic and very specific R&D activities. Without it, it would have been very difficult to provide the overarching justification to undertake the material testing, the technology improvement, and enhance business processes across our supply chain.”

PROJECT COLLABORATORS

iOrthotics

 **evok3d**
3d printing solutions



 **THE UNIVERSITY
OF QUEENSLAND**
AUSTRALIA



AI ROBOTIC WELDING TECHNOLOGY



INITIAL PROJECT FUND

Development of a demonstration cell that showcases artificial intelligence technology

This project seeks to develop a demonstration cell in conjunction with its project partners, that showcases how IR4's artificial intelligence technology can be used to develop flexible automation solutions applicable across various industries.

Rheinmetall has engaged with IR4 in the development of the demonstration cell at SSS Manufacturing's premises, to validate that the AI automation technologies developed by IR4 has the ability to automate specific production processes for the Land 400 build program. The first 25 combat vehicles will be built in Germany, and after successful commissioning of the demonstration cell proposed in this project application, it is envisaged that in early 2019 Rheinmetall would look to engage with IR4 for the implementation of the derived solution into their manufacturing facility in the MILVEHCOE in Queensland and with the success of this implementation, Unterlues, Germany. This turn-key solution will include a gantry system with one welding robot and one pick and place robot utilising IR4 software.

Further opportunities for the application of these technologies also exist across an array of industries and applications which will also be considered as part of this project.

SSS Manufacturing currently operates this technology under license from IR4 to fabricate robotically welded structural steel. The automation solution uses the systems artificial intelligence to calculate in real time, the most efficient way to process the sections presented for fabrication. As a result, SSS Manufacturing has realised a greater than 70% reduction in the labour content required to fabricate steel sections.

MILESTONES

14/11/18	●	Project specified, interfaces defined and benchmarks established
12/12/18	●	Software development
1/7/21	●	Hardware design development
1/7/21	●	Hardware fabrication
18/1/22	●	Integration and testing
18/2/22	●	Demonstration

CONTRIBUTIONS: Government – \$279,275 | Industry – \$279,275 | In Kind – \$210,000



Advanced
knowledge

Advanced
processes

Advanced
business
models



\$768,550

committed (AMGC, industry
and in-kind)



\$279,280

Committed (AMGC)



90%

ROI on project funding



3 new

employees and 2 upskilled



5

additional connections*

* Additional connections do not include the original partnerships within the project

“AMGC was extremely flexible with project management. The outcome for the revised project scope has meant that we have been able to open up an entirely new market segment with the repeat sales opportunities.”

PROJECT COLLABORATORS

rexroth
A Bosch Company

FARO

QUT

RHEINMETALL
DEFENCE

SSS
MANUFACTURING



MRI COIL SET



INITIAL PROJECT FUND

Optimisation of MRI coil set manufacturer to achieve scale

Magnetica is developing and supplying customised coil sets and components to provide extremity musculoskeletal (MSK) scans for wrists, hands, elbows, knees, ankles and feet.

With AMGC's support, Magnetica is able to bring their coil set manufacturing from the TRL4 prototype level to TRL9, indicating that the system is proven and production-ready for full commercial deployment. This project will allow Magnetica to manufacture coil sets in Australia and distribute the manufactured goods to the global supply chain via the marketing arm of its OEM partner.

The challenge of manufacturing multiple coils economically while meeting customer demand for manufacturing at scale requires Magnetica to optimise two critical elements of the coil manufacturing process, RF coil testing and gradient coil potting.

Magnetica is collaborating with its OEM on test plans, test methods and criteria for commercial RF coils; validation of production volumes; and pricing strategies for gradient coils. The company will collaborate with University of Queensland to access the unique RF and gradient testing facilities at the university's biomedical imaging facilities. In doing so, Magnetica will contribute to the body of knowledge around coil design available to the Australian manufacturing industry.

MILESTONES

25/5/18	●	Coil testing
31/8/18	●	Coil potting
22/2/19	●	Coil testing/coil potting
3/3/21	●	System build
3/6/21	●	Coil testing/coil potting

CONTRIBUTIONS: Government – \$259,325 | Industry – \$259,325 | In Kind – \$44,000



\$562,650
committed (AMGC, industry
and in-kind)



\$259,330
Committed (AMGC)



2
additional connections**



1 new
employees and 7 upskilled

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“Working with AMGC and its team on this project has been an extremely valuable process for Magnetica. While the initial project aims were to develop equipment to enhance our manufacturing of core componentry of Magnetic Resonance Imaging (MRI) machines, where it ended was with Magnetica becoming a manufacturer of complete MRI systems. The project helped us focus our efforts to develop a compact, lightweight MRI system that fulfills a market need both locally and abroad.”

PROJECT COLLABORATORS





DEVELOPMENT OF AN IOT-BASED BATTERY MONITORING SYSTEM



INITIAL PROJECT FUND

Battery monitoring system

Battery energy storage system, stores energy to be used at a later time, usually using a bank of connected batteries called 'battery packs' that are set up to ensure that there is a steady flow of power.

To provide critical safeguards to protect the batteries from damage, battery monitoring systems (BMS) have been developed to manage the output, charging and discharging of battery packs. Megatronic has identified that the BMS currently available are not fully meeting customers' needs which can result in significant battery failures, which then impact operation, revenue and reputation. More reliable and affordable battery monitoring systems are needed to avoid such failures and to provide energy efficiency solutions to industry and residential markets.

To address some of these issues, Megatronic has already developed a first-stage industrial BMS prototype designed to reduce battery failures which offers system protection, reliability, risk reduction, efficiency and safety benefits, providing economic advantages to users.

Megatronic now seeks to develop an industrial IoT-based BMS that includes a user interface platform and a sensor-based power usage and testing measurement device which will enable the remote monitoring and management. Further development of the hardware to integrate with the new IoT platform and improve performance.

MILESTONES

30/3/20	●	Commercial FormFlow machine version 1.0 built and tested
15/12/20	●	IoT software and cloud interface development completed
18/8/20	●	Electronic and manufacturing process design completed
1/12/20	●	Enclosure and manufacturing process design completed
4/3/21	●	IoT software and mobile app interface development completed
4/3/21	●	Advanced business modelling and business plan development completed
5/5/21	●	Data validation testing, further trial testing completed

CONTRIBUTIONS: Government – \$304,918 | Industry – \$304,918 | In Kind – \$84,479



\$694,320

committed (AMGC, industry and in-kind)



\$304,920

Committed (AMGC)



5

additional connections*



1 new

employees and 3 upskilled



Company has reported an improvement of

MEST skills

* Additional connections do not include the original partnerships within the project

“They [AMGC] have definitely opened our eyes...through the process to say why they would support us and why they wanted to support collaboration. It has shown us that collaborations will speed along our development, and they definitely steered us towards a quicker process.”

PROJECT COLLABORATORS





DIGITISATION FOR MANUFACTURING SMES



INITIAL PROJECT FUND

Acceleration of innovative IIoT technology take-up by 50 Australian manufacturing SMEs that rely on continuous processes or machine-based production for their normal business operations

MOVUS FitMachine® provides 24/7 monitoring of the key equipment parameters and sends early alerts on equipment malfunction, therefore significantly reducing costs by minimising unplanned downtime, and reducing the need for manual routine machine inspections.

By installing MOVUS FitMachine sensors on business-critical and less reliable equipment, SMEs can immediately experience the benefits of Condition-Based Maintenance (CBM), an advanced maintenance regime that until now was unaffordable to SMEs.

The industrial sensor is magnetically attached to electrically powered equipment, making installation simple, with no need for tools or specialised knowledge.

FitMachine collects data on equipment temperature, vibration and acoustics, transmitting it to their secure cloud server. The cloud processes the data and provides equipment condition information 24/7 via the MOVUS Dashboard.

MOVUS and the project participants will provide 50 Australian manufacturing SME's with 50% discount on the subscription of the FitMachine 'Starter Kit' for the duration of 12 months. The 'Starter Kit' is comprised of 10 sensors, and an associated WiFi/4G gateway, as well as a smartphone/tablet application and access to the MOVUS Platform and Dashboard.

CONTRIBUTIONS: Government – \$64,800 | Industry – \$64,800 | In Kind – \$65,000



\$194,600

committed (AMGC, industry and in-kind)



\$64,800

Committed (AMGC)



12.3%

ROI on project funding



3 new

employees and 4 upskilled



5

additional connections*



Company has reported an improvement of

MEST skills

* Additional connections do not include the original partnerships within the project

“Through a co-funded project with AMGC, we’re excited our FitMachine® technology will help Australian SMEs to get ahead of equipment breakdowns and reduce maintenance costs, by minimising unplanned outages.”

PROJECT COLLABORATORS

AiGROUP

ilab

intellidesign
smart solutions®



DEVELOPMENT OF A PROTOTYPE ROAD TANKER UNIT



INITIAL PROJECT FUND

Omni Road Tanker

Omni Tanker has identified a need for road-tankers with improved chemical resistance in the USA. Currently the demand for road tankers in USA is being serviced by road tankers referred to as fibre reinforced (FRP) tankers. FRP tankers contain an internal lining, which is comparable to the linings used in traditional Australian road tankers.

The objective of this project is to design and produce a prototype road-tanker, then undertake a field-trial in the US that enables Omni Tanker to validate and commercialise its technology in the US market. This project will re-design the Omni Tanker product to satisfy US regulations, and establish US supply chain partners for final assembly of the road-tanker in market. On completion of this project Omni Tanker will have validated the prototype in an operational environment and demonstrated low rate production.

The patented Omni Tanker vessels offer the following advantages over traditional tankers:

- › Extended road tanker life
- › Significantly reduced maintenance costs and downtime due to eliminating the need for vessel relining, which is a requirement for stainless steel vessels
- › Light weight resulting in payload uplift via significant fuel savings over the life of the vehicle.

This project will develop the manufacturing tools, processes, supply chain partners and certification required to commercialise its patented technology in the US market. On completion of this project, Omni Tanker will have the capability in place to begin full rate production for the US market.

MILESTONES

24/4/19	●	CAD design of road tanker for the US market completed
20/6/19	●	Application for US special permit for road tanker completed
25/7/19	●	Identification and selection of US supply chain partners completed
17/4/20	●	Manufacture of prototype unit for US field trial completed
9/11/20	●	Delivery of field trial unit to customer

CONTRIBUTIONS: Government – \$250,000 | Industry – \$365,000 | In Kind – \$225,000



\$840,000
committed (AMGC, industry
and in-kind)



\$250,000
Committed (AMGC)



20%
ROI on project funding



16 new
employees and 40 upskilled*

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

“AMGC support goes beyond just funding, with the team willing to leverage its vast in-house experience to benefit local industry. This was proven in Omni Tanker’s launch into North America where AMGC’s support was critical to reaching commercialisation of our technology. Without the assistance of AMGC, we couldn’t have dreamed of having the Australian Ambassador to the US join us, let alone generate local and international media coverage and interest in our products. Success in North America has then enabled us to expand into sectors such as space and a partnership with Lockheed Martin – something we couldn’t have achieved without AMGC’s support.”

PROJECT COLLABORATORS





CONCRETE COLUMN BUILDING SYSTEM



AMESRF

Validation of a prototype system for manufacturing and installing structural concrete columns in multi-storey buildings

This project seeks to validate a prototype system for installing structural concrete columns in multi-storey commercial building projects. The core activity of this project includes refinement of product design, comprising interlocking steel and plastic components that form a concrete mould for weight bearing columns, then demonstrating the construction system via a multi-storey building project managed by Piety.

Ozwall Manufacturing has developed a patent pending concrete column building system where pre-fabricated steel moulds are used to accelerate the concrete pouring process. The construction time of multi-storey buildings is reduced through the combined utilisation of prefabricated products, enhanced processes and a service orientated business model.

The steel columns are produced by using roll formed steel components and a patented system of plastic connecting clips. The unique design profile of the roll formed steel components allows a modularised system that achieves any desired column size, shape and structural engineering specifications.

Achievement of these two steps will enable the Ozwall Manufacturing IP to be commercialised in terms of manufacturing revenue, employment and investment. The project will provide Ozwall with the necessary manufacturing processes and equipment to begin low rate production and marketing of the concrete column building system to the construction industry. The OZM system will scale globally via licensing and service agreements to construction firms.

MILESTONES

11/6/18	●	AMGC approval
6/7/18	●	Confirm process engineering requirements with project partner
13/8/18	●	Produce CAD files of final product design and patent filing completed
15/10/18	●	Produce roll form tooling, equipment and components
30/6/19	●	Production, installation and testing of prototype products
30/8/19	●	Licensing model and product specification manual completed

CONTRIBUTIONS: Government – \$159,725 | Industry – \$159,725 | In Kind – \$10,000



\$329,450
committed (AMGC, industry
and in-kind)



\$159,725
Committed (AMGC)



~10+
additional connections*

* Additional connections do not include the original partnerships within the project

“Partnering with AMGC for this co-invested project has given us a competitive edge, allowing us to get into the market before anyone else. As a result, 90 per-cent of our work has come about as a direct result of Ozwall developing this construction system under the guidance of AMGC and Michael Sharpe.”

PROJECT COLLABORATORS



PIETYTHP

**Metsquare
Pty. Ltd**

UNIQUE ENGINEERING GROUP





CARBON FIBRE COMPOSITE FENDER



INITIAL PROJECT FUND

A low-cost carbon fibre composite fender for the European automotive market

This project seeks to demonstrate the Quickstep production system for making carbon fibre fenders for a European automotive original equipment manufacturer (OEM). Quickstep's proposed method offers simplified tooling, quicker production from material to finished part, and less capital investment compared to traditional alternatives.

The AMGC project has seen Quickstep qualify to supply composite fenders for a German OEM, with a request for quote scheduled for mid 2018. The concept has attracted interest from other luxury European and British car makers.

Quickstep's position as a leader in technology depends on its collaboration with universities and other industry partners, as they work to develop solutions for global value chains. Quickstep has collaborated with Deakin University on this automotive project since November 2015. During this time 11 of the university's PhD candidates have worked on the Quickstep manufacturing process, now known as the Quickstep Qure Process.

The impact of the project is significant. The potential export value has been estimated at \$25 million and it could generate 30 new high-skilled jobs as production scales.

MILESTONES

1/2/17	●	AMGC approval
31/3/17	●	Design tooling to facilitate flexible process solutions
31/7/17	●	Development of automated preforming technology
30/9/17	●	Development of the isothermal Quickstep Qure Process
21/6/18	●	Selection of material systems and development of smart designs to allow for rapid curing cycles

CONTRIBUTIONS: Government – \$250,000 | Industry – \$317,003 | In Kind – \$789,583



Advanced
knowledge

Advanced
processes

Advanced
business
models



\$1,356,586
committed (AMGC, industry
and in-kind)



\$250,000
Committed (AMGC)



~22
jobs created/upskilled*



~10
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.

** Additional connections do not include the original partnerships within the project

“Upscaling of the Qure process from 0.8 bar to 2.5 bar of consolidation pressure, allowing the process to meet automotive quality requirements and demonstrate its applicability for aerospace production. Qure 2.5 has been instrumental to attract the interest of aerospace OEMs.”

PROJECT COLLABORATORS



Special Patterns
Giving Shape to Innovation



CONVEYOR TABLE AND MOTION-CONTROL SYSTEM



INITIAL PROJECT FUND

Developing a 'Smart Factory' conveyor table and motion control system for global logistics applications

Rotacaster and project participants will design, develop, and install a 'smart factory' conveyor table and digital control system for Tesla at its Gigafactory battery plant in Sparks, Nevada. Project participants will use Rotacaster's patented omniwheel to create a modular, servo-driven conveyor transfer system. The conveyor transfer system is capable of handling large and heavy objects, such as Tesla vehicle batteries.

This project aims to achieve a shift from large production-centric manufacturing to customised, smart and competitive manufacturing that is backed by collaborative research and development (R&D) together with highly skilled workers. This project will deliver an R&D asset, associated intellectual property (IP) and a commercial product. It will create a world-class reference site in form of Tesla's battery factory, which will help Rotacaster to sell smart factory solutions to other large companies around the world that operate sophisticated factories and logistics hubs.

Rotacaster's solution will be modularised to accommodate the use of 'plug and play' components with Internet of Things (IoT) functionality. This will give customers more flexibility and create an advantage over large, expensive, single-system solutions. Rotacaster's digital control system integrates with existing production systems and responds to live factory data for tracking and recording product movement.

MILESTONES

13/8/18	●	Technical report of design guidelines completed
31/10/18	●	Production and verification of prototype for testing
1/12/18	●	Commercial design of conveyor table finalised
25/10/19	●	Production of market ready conveyor table completed
15/11/20	●	Installation of conveyor table at customer site completed

CONTRIBUTIONS: Government – \$249,287 | Industry – \$249,287 | In Kind – \$240,886



Advanced knowledge

Advanced processes

Advanced business models



\$739,460

committed (AMGC, industry and in-kind)



\$249,290

Committed (AMGC)



10%

ROI on project funding



5 new

employees and 20 upskilled



4

additional connections*

* Additional connections do not include the original partnerships within the project

“The AMGC project is now leading future collaborations and projects with global potential. The application form provided a well structured format for the project management. Rotacaster are grateful for the flexibility with additional funds to complete the project.”

PROJECT COLLABORATORS





REMOTE MONITORING SOFTWARE



INITIAL PROJECT FUND

Accelerated development of CleanPath software to provide remote monitoring of Smartline endoscope drying cabinets

Smartline is developing its CleanPath data system which provides digital cleaning validation to help hospitals comply with the new hygiene standards.

The air systems in Smartline's cabinets use patented technology to ensure that endoscopes used in colonoscopy and gastroscopy hospital operations are dried and stored correctly. These well-designed cabinets are already a proven brand in several markets even with only basic data functions attached.

This project exemplifies how ICT can enable high-quality servitisation of data transmitted by software, allowing Smartline technicians in Australia to provide analysis to remote or overseas clients. The Smartline value proposition provides an aspirational benchmark for other Australian manufacturing entities. When the project is complete, Smartline will share the concept of this servitisation model based on Australia's cost advantages and high-skilled labour.

This project will demonstrate to the Australian manufacturing industry how to develop and commercialise leading intellectual property. It will enable Smartline and its project partners to transform their technology and businesses into global competitors. The project will take Smartline from being a basic cabinet manufacturer to being at an advanced level of Industry 4.0 integration. Manufacturing digitally enabled equipment for use in hospitals represents a significant shift towards competing on value and at scale.

MILESTONES

22/01/18	●	Software product evaluated
26/2/18	●	System development detailed
8/6/18	●	CleanPath system developed
2/12/19	●	Database generated with event log of translations
30/11/21	●	Field testing completed
30/11/21	●	Product marketed, evidenced by first commercial sale

CONTRIBUTIONS: Government – \$150,000 | Industry – \$150,000 | In Kind – \$40,000



\$340,000

committed (AMGC, industry and in-kind)



\$150,000

Committed (AMGC)



406%

ROI on project funding



2 new

employees and 8 upskilled



2

additional connections*

* Additional connections do not include the original partnerships within the project



Product development in complex fields like health can pivot greatly and face an ever-changing series of regulatory issues within the time period of the proposal – possibly the opportunity to revise the scope and specifics within milestones of the project, could give opportunity for higher project success rates and improved overall outcomes.”

PROJECT COLLABORATORS



HealthTag



PLASTIC BOTTLE REDESIGN



INITIAL PROJECT FUND

Intensive and fast tracked design project with the objective of reshoring the manufacturing of their customer's plastic injection moulded bottle range to Australia

Marco Engineering, as part of The Evolve Group, is partnering with a customer and the University of Queensland in a fast-tracked project to redesign and relaunch a range of plastic bottle products.

This AMGC project seeks to counter the trend of growing imports by demonstrating how Australia's high-skilled labour can provide design modifications, resulting in:

- ▶ A higher-quality product for the customer
- ▶ A more efficient manufacturing process requiring less rework
- ▶ An enhanced safety reputation for the customer, based on the 'Made in Australia' provenance.

The final product will be the world-first 100% leakproof plastic bottle under most conditions, including position and temperature. In addition to reflecting a modern design language, Marco Engineering will use root cause analysis to improve features and benefits while enhancing usability, reliability, longevity and value for money.

Marco Engineering is working with its customer from the initial concept stages, so it has the opportunity to ensure the product and manufacturing process benefit the company, the customer, the distribution partners and the consumer. By designing and then harnessing these efficiencies, the products Marco Engineering works on have an inherent advantage over those manufactured offshore.

MILESTONES

14/2/18	●	AMGC approval
15/6/18	●	Product and manufacturing process design completed
19/10/18	●	Prototype developed
30/9/19	●	Tooling completed
31/10/19	●	Quality control parameters established
31/12/19	●	Commercial manufacturing process completed

CONTRIBUTIONS: Government – \$221,000 | Industry – \$221,000



\$480,500
committed (AMGC, industry
and in-kind)



\$240,250
Committed (AMGC)



7.5%
ROI on project funding



26
jobs created/upskilled*



~10
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.

** Additional connections do not include the original partnerships within the project

“This project resulted in the reshoring of a crucial capability for Australia. As a result, we are now able to offer a range of local services that would have once been done offshore. Since completion, Evolve has gone on to grow its product portfolio, customers, staff and skills. The success of this project was in part thanks to AMGC’s depth manufacturing knowledge, its broad network, the commitment of its staff and its ability to see beyond the immediate win to grow long-term local capability and opportunities.”

PROJECT COLLABORATORS





ARTIFICIAL INTELLIGENCE COUNTERMEASURES



INITIAL PROJECT FUND

Real-time Artificial Intelligence Countermeasures for Production Anomalies

This project will deliver automated real-time countermeasures to address manufacturing production anomalies as and when they arise within manufacturing operations. The project will demonstrate the technology in four project participants.

The solution will act as an operational “co-pilot” that provides AI generated recommendations that can be applied by the human operations team to optimally and efficiently resolve production issues in real-time.

This project will demonstrate the convergence of AI, IIoT devices, advanced simulation, cloud computing, and analytics. Real-time process monitoring via IIoT sensors (where PLC/SCADA automation or MES do not exist) to model productive time on equipment and into the cloud-based AI and simulation count production quantities will feed live data into the Ailytic cloud-based AI and simulation engine. The engine will identify anomalies, explore simulated anomaly permutations and recommend optimised actions to improve workflows and counteract adverse real-time events.

This countermeasure capability will deliver more than standard manual or optimised deviation management of traditional decision support tools and will attempt to anticipate likely issues impacting production, predict production rate changes and provide pre-prepared alternate scenarios that production management can rapidly execute to achieve plan compliance.

Upon project conclusion, each of the project partner manufacturers will have demonstrated the generation of real-time AI scheduling and countermeasure recommendations in their respective operational environments via a production pilot.

MILESTONES

24/3/20	●	Real-time cloud analytics development and engineering completed
30/10/20	●	Phase 1 of countermeasure algorithm development and engineering completed
31/12/20	●	Countermeasure validation with partners completed
31/3/21	●	IIoT and MES integration completed
31/3/21	●	Pre-production validation completed

CONTRIBUTIONS: Government – \$224,352 | Industry – \$224,370 | In-Kind – \$43,200



\$491,920
committed (AMGC, industry
and in-kind)



\$224,352
Committed (AMGC)



31%
ROI on project funding



6
jobs created/upskilled*



4
additional connections**

* Employees who received formal training may or may not be included within the employees being upskilled and therefore not included in the total number of jobs.
** Additional connections do not include the original partnerships within the project

AMGC has been a critical enabler in the development of a novel approach to production optimisation for manufacturers with TilliT Scheduler, not just as a co-investment partner but as an advisory team and membership group. The project was designed to develop, test and deploy novel AI techniques to improve decision making and forward-looking production schedules, for manufacturers who have struggled to adopt advanced technology in this space. As a result of the project's success, we are now well on our way to implementing TilliT across numerous manufacturers with our new commercial partner SAGE Group."

PROJECT COLLABORATORS



Yalumba
Family Vignerons c. 1849





LITHIUM IRON PHOSPHATE MANUFACTURING



INITIAL PROJECT FUND

Improving the cost of lithium iron phosphate manufacturing

Lithium Iron Phosphate (LFP) batteries are a type of rechargeable battery, specifically a Lithium Ion battery, using LFP powder as the cathode material. These batteries are finding a number of roles in electric vehicle, utility scale stationary applications, and backup power storage. The LFP powders used as the cathode material have the following advantages over other cathode materials such as Cobalt Oxide, Nickel Oxide and Manganese Nickel Oxide:

- ▶ Low cost as compared to other cathode materials
- ▶ Low toxicity
- ▶ Well-defined performance
- ▶ Long-term cycling stability
- ▶ High thermal and chemical stability during operation etc.

The current VSPC Generation 4 LFP powder technology delivers more sustainable and high-performance LFP powder due to its unique uniform carbon coated nanoengineered particle morphology tailored for use as cathode materials in LFP batteries. Although there are substantial advantages to the established VSPC Generation 4 process, the high cost of certain input raw materials is still a major economic impediment to commercialisation in Australia and for global export.

In this project, VSPC and their partners aim to reduce the production cost of VSPC Generation 4 LFP powder by:

- ▶ Integrating “commercial grade” low cost iron sources into the VSPC manufacturing process.
- ▶ Determining the feasibility of alternative lithium sources in the VSPC manufacturing process

VSPC will continuously explore the prospects of technological integration and R&D partnerships, with its Brisbane facility well positioned to develop other high-performance battery materials.

MILESTONES

27/4/20	▶	Potential low cost raw materials that may be suitable for use
30/7/20	▶	Feasibility of low cost raw material sources
23/11/20	▶	Optimisation of the current VSPC Gen 4 process
19/7/21	▶	Validation of the feasibility of the low cost raw material sources
21/1/22	▶	Materials cost model for the integration into the full scale plant design developed

CONTRIBUTIONS: Government – \$185,000 | Industry – \$185,000 | In Kind – \$200,000



\$570,000
committed (AMGC, industry
and in-kind)



\$185,000
Committed (AMGC)



5
additional connections*



Company has reported an
improvement of
MEST skills

* Additional connections do not include the original partnerships within the project

“AMGC funding enabled VSPC to identify and demonstrate a significant saving in manufacturing cost for LFP which has been embedded in commercialisation plans for 3,500 tpa manufacturing plant. Communications and support provided by Mark Peters was helpful and effective in enabling the project to meet all objectives.”

PROJECT COLLABORATORS



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AME PROJECTS



SMART CATHODIC PROTECTION MONITORING SYSTEM

Corrosion Instruments (CI) has developed a new proprietary system for the monitoring of cathodic protection (CP) on large buried metallic structures such as pipelines, tanks, tunnels, bridges and wharves and other critical infrastructure valued at billions of dollars.

To enable automatic and semi-automatic assembly, testing, inspection, programming and calibration of its new product on-premise, CI's facilities in Palmerston will require design of custom tooling, scaling up and the introduction of cleanroom facilities. These upgraded facilities will allow the company to commercialise its new product and improve the development process for future products.

The ability to conduct small to medium batch assembly and testing on-site will expedite time to market. It will also allow CI to determine and refine their QC and unit-test procedures and build and test their own automated test equipment in the Northern Territory, removing the need to send prototypes to South Australia to have testing activities undertaken.

This project will allow CI to commercialise the first completed version of its new CP monitoring product. It will also enable CI to undertake ongoing design upgrades and manufacturing small runs of their products at their facility in Palmerston.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Smarter inventory management
- Greater capital intensity and newer equipment
- Higher trade intensity and more extensive backward links
- Larger geographical reach



GROWTH

- Corrosion Instruments forecast \$4M in revenue over 5 years.



JOBS

- This project is projected to create an additional five jobs during the project and within one year after project completion.

PROJECT COLLABORATORS



COMMERCIALISATION PROJECTS



COMMERCIALISATION – RECYCLING

DESIGNER HARDWOOD FROM WOOD RESIDUE



3RT has developed an innovative patented technology which converts low value wood residue into a new hardwood with the same properties as 100-year-old timber, thereby providing a new sustainable source of quality wood whilst protecting native forests.

At the heart of the 3RT technology is a patented process using a water-based, formaldehyde-free “Nano-glue” that biomimics the structure of a natural tree in just hours. It does not use the traditional resins such as formaldehydes or isocyanates used in today's engineered wood products and our products are therefore 100% safe and recyclable.

The technology revolutionises the approach to timber resource management, competitiveness, and sustainability by:

- ▶ Eliminating the need to harvest old growth forest trees.
- ▶ Reducing wood processing wastage from plantations and forests by recycling low value wood waste into high value timber products.
- ▶ Providing a solution to supply shortages of high-quality hardwood and an alternate to the high carbon footprint of steel and concrete in the building industry.

The technology leverages the latest in nanotechnology, materials science, and robotics. A small-scale prototype manufacturing line has been developed and installed in 3RT's Adelaide innovation centre.

To respond to accelerating market demand, 3RT is embarking on a production expansion project. This project aims to build and install 3RT's first large-scale production unit. There are two key objectives for this project; design, build and install a digital production unit, including industry 4.0 technology and develop new additives and material processing requirements for several new product applications.



IMPACT

- ▶ Increased collaboration with other manufacturers
- ▶ Increased spending on R&D
- ▶ Better qualified employees
- ▶ Increased levels of automation
- ▶ Larger geographical reach



GROWTH

- ▶ 3RT forecast \$44.5M in revenue over 5 years.



JOBS

- ▶ This project is projected to upskill and create an additional 51 jobs during the project and within one year of project completion.

PROJECT COLLABORATORS



BOSCH



COMMERCIALISATION – RECYCLING

THE DEVELOPMENT OF MELTFILTERS

Australian owned and operated Actionlaser is creating hard-wearing, cost-effective 'MeltFilter' discs to fit most industry-leading polymer and plastic recycling machines. Its R&D has determined the optimal steel type, annealing process, and heat treatment required, and developed a propriety method of perforating the steel disc, using a laser to drill precise micro-holes in a circular pattern that maximises disc strength.

Actionlaser has proven the durability and effectiveness of their design through prototyping. They now need to transform their manufacturing capability to mass-produce their new range of robust MeltFilters for various grades of recycled plastic, conforming to stringent industry standards.

This project will enable Actionlaser to implement new manufacturing technologies, boost productivity, and build a MEST-skilled workforce to become the global leader in aftermarket replacement filters for the plastic recycling industry.

Actionlaser's secure, onshore supply of competitively priced, durable and precisely perforated MeltFilters will maximise Australian plastic recyclers' productivity and revenue by enabling uninterrupted manufacture of high value, high purity, recycled plastic pellets. Actionlaser's competitive price, high quality and reliable worldwide delivery will also attract international customers.



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- Greater capital intensity
- Newer equipment
- Higher marketing expenditure
- Larger geographical reach



GROWTH

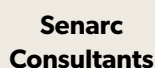
- ActionLaser forecast \$4.9M in revenue over 5 years.



JOBS

- This project is projected to upskill 10 employees and create an additional five jobs.

PROJECT COLLABORATORS



COMMERCIALISATION – DEFENCE

COMMERCIALISATION OF QUALITY SYSTEMS

Additive Assurance is commercialising a patented quality assurance technology for 3D printing. The unique method used for image capture produces details to the level of microns, while maintaining a manageable data rate. This delivers actionable information directly to the factory floor as the issues are occurring, allowing manufacturers to save significant costs through early termination or repair of faulty parts.

Additive Assurance will build two hardware alternatives capable of servicing the majority of commercially available powder bed fusion additive manufacturing machines. These two product variants will be supported by proprietary capture and analysis software, developed in-house. Additive Assurance will tailor its solution to the needs of 3D printing for the defence markets. Working with local manufacturers and specialists, Additive Assurance will ensure that the hardware unit is scalable.

The software developed by Additive Assurance uses advanced machine learning algorithms to provide alerts in real time to operators concerning the conformance of their part. This information is used to determine whether the printing process should be aborted to save raw materials and optimise the utilisation of the 3D printer.

The specific outcome of this project is the to take the current beta version and make it production ready. This will enable a significant growth in the additive manufacturing industry both in Australia and world-wide; create jobs in the manufacturing industry; and strengthen Australia's sovereign capabilities and expertise in additive manufacturing.

PROJECT COLLABORATORS



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Larger patent portfolio
- Better qualified employees
- Increased levels of automation
- Smarter inventory management
- Greater share of services in total revenue
- Higher product value density (by weight)
- Higher trade intensity
- More extensive backward links



GROWTH

- Additive Assurance forecast to sell up to 200 subscriptions over the next 3 years



JOBS

- Additive Assurance plan to employ six new staff

COMMERCIALISATION – MEDICAL PRODUCTS

MANUFACTURE OF THE VIRULIZER COVID-19 TESTING UNIT

Alcolizer are developing a COVID-19 testing unit branded "Virulizer". This opens the opportunity for Australia to minimise local transmissions and assist interstate and international borders to reopen using appropriate testing protocols.

The test collects saliva via an oral test panel (or iStrip) and it is then inserted into a hand-held COVID-19 Analyzer (the Virulizer) which is fully portable. The cassette is single use and encapsulates all the saliva, then is disposed of immediately. This same system is in use in Alcolizer's current drug testing product and no issues have been detected.

The sample will be chemically treated to break down the virus into non-infectious proteins and molecules and measure the viral load. The result is displayed on the hardware device screen and stored on the instrument. Positive test patients are then PCR tested as a final confirmation if deemed required.

Alcolizer will develop a software called AlcoCONNECT which will connect to the Virulizer. The Virulizer has an integrated Bluetooth interface to printing, can store over 10,000 records, and can push data to a cloud server and then to COVID health authorities. AlcoCONNECT software has GPS location technology and integration to cloud reporting tools that log test subject's identity, location of test, date and time. This technology can assist with contact tracing which can be integrated easily into existing health platforms.

The Virulizer product is targeting markets with low prevalence requiring extremely high sensitivity. Alcolizer are looking to deliver a rapid result in under 10 minutes.

PROJECT COLLABORATORS



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Larger patent portfolio
- Increased levels of automation
- Newer equipment
- Greater share of services in total revenue
- Higher product value density (by weight):
- Larger geographical reach



GROWTH

- Alcolizer forecast \$88.2M in revenue over 3 years and the market is expected to stabilize and reach \$4.73 billion.



JOBS

- 13 new staff with mathematics, engineering, science and technology (MEST) skills

COMMERCIALISATION – DEFENCE

THERMAL ARC SPRAY FOR FASTENING INDUSTRY

Allthread Industries supply structural specialty fasteners. Allthread Industries is planning to develop an automated thermal arc spray line, which will provide a corrosion resistant coating superior to Hot Dipped Galvanising for a cheaper cost and with a significantly lower energy and environmental impact.

Thermal arc spray has been used widely in the construction industry on items too large to galvanise, however the application of the technology has never been applied to fasteners in the past - and certainly never been automated.

In this project Allthread Industries will develop an automated thermal arc spray line designed for the fastener industry. This automated line would bring capabilities and it addresses issues with energy consumption, sovereign capability, environmental impact, and quality.

Thermal arc spray provides a higher quality finish compared with hot dip galvanising and has no impact on the structural integrity of the already heat-treated material. By comparison, hot dip galvanising can cause hydrogen embrittlement which can be catastrophic to structural fasteners.

By bringing the process in-house, Allthread Industries not only provide a superior foundation bolt but also reduce its overall cost of manufacture to better compete with overseas suppliers. Thermal arc spray would be transformational to the structural fastening industry as all manufacturers across all disciplines look to transition to a cleaner future.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Larger patent portfolio
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- Smarter inventory management
- Better energy efficiency
- Greater capital intensity
- Newer equipment
- More extensive backward links



GROWTH

- Allthread Industries forecast \$17.49M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 14 jobs during the project and one year after project completion.

PROJECT COLLABORATORS



COMMERCIALISATION – FOOD & BEVERAGE

COMMERCIALISATION NUTRACEUTICAL GUMMIES FOR DOGS AND CATS



Bestie Kitchen has developed a novel range of nutraceutical gummy-chews (gummies) for dogs and cats. The gummies address a burgeoning market demand by delivering clinically effective doses of nutraceuticals, that help chronic conditions like cognitive decline, halitosis, anxiety, and immune system health in companion pets. The gummies are created using natural food extracts or derivatives in clinically-effective therapeutic doses. The products are supported by a web app that uses proprietary algorithms to assess pets' conditions, make recommendations and give vet suggestions.

This project will focus on commercialising the product range and manufacturing processes the company has developed together with the CSIRO. As part of this commercialisation, Bestie Kitchen will design, build, buy and commission the equipment needed to make the gummies, and set up a commercial manufacturing facility.

Bestie Kitchen will be working closely with CSIRO scientists to translate the production processes developed, into a commercial environment. Once the dog products have been successfully launched into the market the company plans to build on the IP already developed and add gummy formulations for cats to their product portfolio.

The gummy is an easy-to-feed format, that does not involve thrusting fingers down a dog's throat to administer it, which is uncomfortable for both the animal and the owner.

There are no 'fake' meat flavourings; no synthetic vitamins and all formulations are based on peer-reviewed clinical research.

Bestie Kitchen also provides access to a free app, the bestie health club, that's been developed with a holistic

vet, and is Australia's first virtual health club for dogs and cats. It provides tailored health support. Using proprietary algorithms, it assesses the dog and recommends the right gummy-based health plan; tracks effectiveness and provides vet suggestions. It also helps manage food quantities and provides vet tips around the four essentials of holistic health.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Larger IP portfolio
- Better qualified employees
- Increased levels of automation
- Greater capital intensity
- Newer equipment
- Greater share of services in total revenue



GROWTH

- Bestie Kitchen forecast \$7.4M in revenue over the next 5 years.



JOBS

- Bestie Kitchen plan to employ six additional staff during this project and one year after completion of this project.

PROJECT COLLABORATORS





COMMERCIALISATION – CLEAN ENERGY

RE-SHORING MANUFACTURING OF CT200i SMART GATEWAY PRODUCT

CarbonTRACK will develop and commercialise the CT200i Smart Gateway product. The CT200i Smart Gateway product is a physical device that connects to any energy assets such as solar and battery systems, generators and home appliances to maximise the use of the free solar energy that is generated. It provides control when appliances run during the day, to reduce the total energy used from the grid due to improved energy efficiency.

It securely communicates all energy asset data via a robust and secure connection method over cellular and Wi-Fi to the carbonTRACK Distributed Energy Resource Management System (DERMS) platform, which provides grid operators the ability to charge, discharge and limit energy generation of energy assets behind the meter.

The CT200i Smart Gateway has been deployed in the field in 10 different countries over the last 3-years as a wide scale trial. This has provided invaluable real-world data that has been used to redesign the product to ensure it meets the needs of the energy industry.

The CT200i Smart Gateway aims to target residential and commercial customers who have deployed energy assets such as solar and batteries and are looking to maximise their efficiency and get the highest return on investment possible for these assets.

This project will support the final stages of commercial design, development, certification and commercialisation of the product, making it ready for mass deployment into the market.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- Greater share of services in total revenue
- Larger geographical reach



GROWTH

- CarbonTRACK forecast \$66.4M in revenue over 5 years



JOBS

- This project is projected to upskill two employees and create an additional 11 jobs.

COMMERCIALISATION – MEDICAL PRODUCTS

FACEWAY

Elenium Automation will develop and commercialise the FaceWay device, an access control device with the aim of restoring the freedom of movement in a post pandemic world.

The goal of this project is to develop a small form factor, Therapeutic Goods Administration (TGA) medically approved portable device that can be deployed into a range of environments to automatically provide in less than 1 second:

- ▶ Contactless health checks (fever detection)
- ▶ Identification with biometrics
- ▶ Contact tracing check-in; and
- ▶ The confirmation of a person's compliance status (i.e. vaccine)

The proposed new FaceWay device will adapt and miniaturise the TGA certified sensor array from Elenium's HealthGate device into a cost-effective portable device. The systems are all cloud based allowing connectivity anywhere and updates can be pushed out, ensuring the devices always have the latest software versions.

FaceWay will help restore the convenience and efficiency we are accustomed to, helping the public adapt to the complexities of an ongoing COVID infectious world. Elenium has developed a stage 1 prototype and this project will bring full commercialisation, including miniaturisation and ensuring manufacturing readiness of the product to be built in Melbourne Australia.



IMPACT

- ▶ Increased spending on R&D
- ▶ Increased collaboration with other manufacturers
- ▶ Higher information and communication technology (ICT) intensity
- ▶ Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- ▶ Better qualified employees
- ▶ Higher trade intensity
- ▶ Larger geographical reach



GROWTH

- ▶ Elenium forecast \$20M in revenue over 5 years.



JOBS

- ▶ This project is projected to upskill and create an additional 22 jobs.

PROJECT COLLABORATORS



COMMERCIALISATION – MEDICAL PRODUCTS

MANUFACTURE OF PORTABLE PERITONEAL DIALYSIS DEVICE



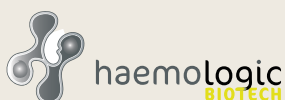
This project seeks to manufacture and validate an award-winning inexpensive portable peritoneal dialysis system suitable for developing countries where there is a significant unmet need for affordable home-based dialysis.

Peritoneal Dialysis (PD) has steadily grown in acceptance as the recommended first response treatment for kidney failure by the global peak body. However, widespread use of PD in the developing world is limited by the absence or only partial reimbursement/subsidy for dialysis costs.

This has an impact on the affordability of PD fluid bags and dialysis equipment for patients and their families. There are also limitations on movement and space to store bulk fluid bag supplies at patient homes. The cost of PD fluid bags is driven by the cost of manufacture and transport of bulk sterilised medical grade PD fluid bags to patients' homes, often in remote locations. If the cost of manufacture and transport of PD fluid can be significantly reduced, PD solutions will be more accessible to more patients in the developing world.

EMD has developed a breakthrough CAPD type PD system to provide access to life-saving dialysis treatment for the first time by providing access to sterilised water at point of care and radically reducing the cost of PD bags by removing the need for central manufacture and long distance transport of PD fluids.

PROJECT COLLABORATORS



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- Smarter inventory management
- Better energy efficiency
- Greater capital intensity
- Newer equipment
- Higher product value density (by weight)
- Larger geographical reach



GROWTH

- Ellen Medical Devices forecast \$206.1M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 17 jobs during the project and within one year of project completion.



Advanced knowledge

Advanced processes

Advanced business models

COMMERCIALISATION – CLEAN ENERGY

THE DEVELOPMENT OF ELECTROBANK 14

The project will deliver Australia's first cost-effective solar-battery storage product 'ElectroBank 14' exclusive of government subsidies, through a combination of manufacturing and lifecycle cost reductions, and an increase in the cost savings performance of the solar-battery storage product.

This will entail value engineering from the bottom-up, across the full manufacturing, installation and operational stages of the product, and the development of new electrical, mechanical, manufacturing, installation and operational strategies to reduce the product's lifecycle costs while improving its lifecycle benefits.

Empower Energy's ElectroBank 14 solution reduces solar-battery storage complexity, increases reliability and makes it cost effective via its unique, all-in-one, integrated hardware design. As the only solar-storage manufacturer with its own IP across the BMS, inverter, enclosure and software, Empower Energy is exceptionally well placed to bring down the cost of solar-battery storage, while increasing its benefits.

Empower Energy will have an Australian designed product that will not only showcase Australian engineering and manufacturing capability to the world, but will also help improve the security, reliability and power quality of the Australian national electricity grid, while at the same time delivering 100% renewable, zero emissions electricity around the clock through the combination of its solar PV and battery storage technologies – all in the one box. Every 8 kW solar-storage system sold will reduce CO2 emissions by 9.2 tonnes per year, or the equivalent of taking 3 cars off the road.

PROJECT COLLABORATORS



outerspace



UNSW
SYDNEY



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Smarter inventory management
- Better energy efficiency
- Greater share of services in total revenue
- Higher product value density (by weight)
- Larger geographical reach



GROWTH

- Empower Energy forecast \$58.5M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 13 jobs.

COMMERCIALISATION – CLEAN ENERGY

PILOT LITHIUM-ION BATTERY MANUFACTURING PLANT

Energy Renaissance (ER) was formed in 2015 to manufacture safe and affordable lithium-ion batteries in Australia, optimised for lowest total cost of ownership in hot climates to satisfy rising domestic and export demand for grid-scale lithium-ion battery storage systems. Working with CSIRO, ER developed a proprietary battery system ('superRack™ and superPack™'), which is a unique plug-and-play prismatic cell system. This is combined with the Renaissance BMST™ which is a CSIRO-developed cyber-secure battery management system comprising custom circuit boards, software, and wiring.

Collectively, these systems are known as the superStorage™ platform of battery energy storage systems ('BESS') which will revolutionise how battery storage technologies can be safely deployed in hot-climate markets. Once fully developed, the superStorage™ platform will monitor, benchmark and self-diagnose battery performance autonomously and efficiently, supported by human intervention to develop customer specifications and deliver customer service.

ER will design, commission and operate a pilot lithium-ion battery manufacturing plant (Project 'Apollo') to develop, test and document the technology, systems and processes required to operate a full-scale manufacturing facility ('Renaissance One') at Tomago, NSW.

ER's superStorage™ products will be the first lithium-ion battery energy storage system and battery management system to be manufactured in Australia. Project Apollo is a key step towards supporting scale manufacture of lithium-ion batteries in Australia and onshoring key parts of this supply chain.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Newer equipment
- Smarter inventory management
- Greater capital intensity
- Higher product value density (by weight)
- Larger geographical reach



GROWTH

- Energy Renaissance forecast \$95.7M in revenue directly related to this project (excluding the larger Renaissance One facility) over the next 5 years



JOBS

- Energy Renaissance plan to employ 11 new staff during this project

PROJECT COLLABORATORS





COMMERCIALISATION – RT&CMP

LARGE-SCALE XRT SORTING OPERATIONS FOR TUNGSTEN RECOVERY



EQ Resources Ltd (EQR) will transform low-grade ore and historic mine waste into economic and sustainable sources of critical minerals through X-ray sorting technology (XRT). This technology has proven to be a suitable process solution with optimisation recently conducted with Mt Carbine's pilot unit. EQR will commercialise the process and upskill its labour force to be able to operate a large-scale XRT sorting operation for tungsten recovery from its historic mine waste.

The project will comprise of the installation of a hyperspectral imaging (HSI) sensor that will be mounted to front-end loaders extracting material from the waste stockpile. The HSI technology is customised to the project and waste material characteristics and will deliver highly accurate real-time data on material properties.

Using artificial intelligence, process feed material will be evaluated by characterising tungsten containing rock from barren material, for immediate decision on further processing material to the XRT sorting plant, or for waste disposal. The combined technology application will maximise separation efficiency and thus enable cost efficient mine waste reprocessing enabling sustainable critical minerals production.

The project will improve industry confidence in adopting XRT sorting methods for processing heterogeneous low-grade materials, drive economic growth and mine rehabilitation in Australia. The project incorporates innovative machinery to recycle mine waste materials, while a successful commercialisation will expand the mining sector's

competitiveness and sustainability. The project outcome is the production of primary produced tungsten – which currently is non-existing in Australia.



IMPACT

- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Increased levels of automation
- Better water and energy efficiency
- Higher trade intensity
- Larger geographical reach



GROWTH

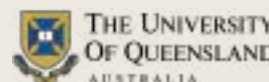
- EQ Resources forecast \$12M in revenue over 5 years generated from existing waste stockpile.



JOBS

- This project is projected to upskill and create an additional 10 jobs.

PROJECT COLLABORATORS



COMMERCIALISATION

AUSTRALIAN PROCESSED RECYCLATE

Through this project, Geofabrics will increase the use of locally processed recyclate (recycled plastic materials) into locally manufactured products for the Australian infrastructure sector. The project will assist in building and automating Australian manufacturing capability to manufacture new innovative drainage products using Australian recycled content.

Geofabrics has designed and developed the proof of concept for drainage products that will deliver new and improved drainage performance that are cost competitive. Aimed at increasing recycling capacity, the project includes a capital solution, integration of new machinery into the existing production line and collaboration with local recycled polymer suppliers as part of the local supply chain. The project will also deliver a purpose-built automated end of line process that will increase usage of larger volumes of Australian recycled raw material, improve manufacturing efficiency, meet the market demand, and thereby contribute to the circular economy.

The outcome will be increased demand for Australian recycled plastics, address the low demand for recycled plastics (a critical barriers for plastic recycling across its value chain), deliver a technically advanced cost competitive product, and enable Geofabrics to go further into the consumable supply chain (which includes material wrapping/packaging products made from 100% recycle material).



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- More extensive backward links
- Larger geographical reach



GROWTH

- Geofabrics forecast \$3.8M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 17 jobs.

PROJECT COLLABORATORS



Advanced
knowledge

Advanced
processes

Advanced
business
models

Harvest B

COMMERCIALISATION – FOOD & BEVERAGE

PLANT BASED PROTEIN INGREDIENTS

The plant-based meat category is expected to grow 10 times over the next decade. However, the proteins used as key ingredients in this category today are currently all imported to Australia. The global supply is constrained with increasing lead times, cost and lack of innovation for this rapidly changing category. This poses a risk for the continued growth of Australian food brands and manufacturers in plant-based meats.

To address this growing category opportunity, a local supply chain needs to be developed in Australia that integrates both the R&D and manufacturing capability required to produce novel ingredients domestically.

Harvest B uses plant-based materials to manufacture novel textured ingredient systems specifically designed for use by creators of plant-based meats. With a dedicated focus on serving the plant-based meat category, Harvest B will use locally sourced ingredients from Australia and take a whole foods approach. With local R&D and utilizing advanced manufacturing technologies, Harvest B will produce plant-based meat ingredients that offer function, taste and nutrition far beyond what is available today.

On completion of this project, Harvest B will be the supplier of plant-based meat ingredients to food brands and manufacturers across Australia, offering sustainability, security in their supply chain and advanced ingredient capability.



IMPACT

- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased collaboration with research institutions
- Increased collaboration with other manufacturers
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Increased levels of automation
- Better energy efficiency
- Higher product value density (by weight)
- Increased marketing spend
- Larger geographical reach



GROWTH

- Harvest B forecast \$37.2M in revenue over the next five years.



JOBS

- This project is projected to create an additional eight jobs

PROJECT COLLABORATORS



UNSW
SYDNEY



Advanced knowledge

Advanced processes

Advanced business models



COMMERCIALISATION – MEDICAL PRODUCTS

DEVELOPMENT OF THE NUROCHEK PRO

The purpose of this project is to develop the “Nurochek Pro” brain injury assessment device which is a clinical console extension model of the basic Nurochek device so that it can be used in clinical and mobile settings in the US health system. In addition, the company is in discussions with various sporting bodies in Australia i.e. AFL, ARL, and ARU for mobile applications.

Headsafe IP has developed a fast, portable, affordable and objective test of brain function, essentially a “brain scanner in a briefcase”. This portable headset uses clinically validated technology to measure the brain’s electrical activity and send results to a smart device for analysis and to the cloud for secure, online (HIPAA and GDPR compliant) storage. In a two-minute assessment Nurochek Pro will demonstrate when a result differs from a previously obtained base reading of the patient’s brain electrical activity and also when it has returned to the previous base reading following an injury, so that patients can resume normal activity.

The device will enable fast and reliable diagnosis without the need for expensive equipment or time delays whilst patients are transported to test equipment. To function effectively in the clinical context, the Nurochek Pro briefcase must be self-standing, robust, water and weatherproof with additional battery storage to power both the headset and an integrated screen to make it more suitable for use outside the hospital and easy to integrate into hospital IT systems.

This project will ensure that the manufacturing of the medical device remains in Australia and that IP is also retained.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Larger patent portfolio
- Better qualified employee
- Greater share of services in total revenue
- Higher product value density (by weight)
- Higher trade intensity
- More extensive backward links
- Larger geographical reach



GROWTH

- HeadsafeIP forecast \$83.6M in revenue over the next 5 years



JOBS

- HeadsafeIP plan to employ 17 new staff during the project and within one year of project completion.

PROJECT COLLABORATORS





KINALTEK

COMMERCIALISATION – RT&CMP

KINALTEK TECHNOLOGY FOR METAL ALLOY POWDERS

Kinaltek has a proprietary platform technology for direct production of metal alloy powders based on 27 different metals. The technology is most suited for processing and production of complex alloy compositions, including alloys based on critical metals such as tungsten, tantalum and cobalt. The technology uses precursor chemicals of metal chlorides and metal oxides and is the only technology in the world capable of reducing metal oxides at low temperatures, leading directly to formation of metal powders.

In this project Kinaltek will develop and commercialise the pilot manufacturing plant. The technology has been demonstrated at small scale, where it proved highly agile with apparent universal capabilities for direct low-temperature synthesis of metallic powders and composites. Kinaltek wishes to setup a 2-5 kg semi-batch system (nominal capacity ~5 tons per year) with the capability for synthesis of pure metals and metal alloys, starting from metal chlorides and metal oxides.

The pilot manufacturing plant will be used for producing kilogram quantities for testing in 3-D printing and jetting, in particular for applications using metal composites. Powders produced using the Kinaltek process are most suitable for directly being used in jetting using a binder or in conventional powder metallurgy.

The Kinaltek technology can produce almost any composition based on 27 different metals starting from low-cost precursors. The technology is likely to disrupt the metal alloy and metal compound powder market.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Larger patent portfolio
- Better qualified employees
- Better energy efficiency
- Greater capital intensity
- Newer equipment
- Larger geographical reach



GROWTH

- Kinaltek forecast \$50M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional seven jobs during the project and within one year of project completion.



PROJECT COLLABORATORS



THE UNIVERSITY OF
SYDNEY

AMAERO
ADDITIVE MANUFACTURING



COMMERCIALISATION – RT&CMP



MANUFACTURE OF LOUPE MARK II

Near surface conductivity measurement systems are used predominantly in the mining industry to locate mineral deposits and Loupe Geophysics have successfully marketed and created Loupe Mark 1 device for this application.

In this project Loupe Geophysics will develop a new Loupe Mark II by redesigning the receiver electronics to remove the need for a cable link between transmitter and receiver and eliminate receiver electronic noise. This will allow multiple receivers to be used with a single transmitter in motion and/or a stationary transmitter with roving receiver, which will significantly increase productivity and ground coverage, thus opening access to drone mounted receiver systems and underground use in 'dark mines'.

The development and redesign of Loupe Mark II will include:

- › WiFi-enablement
- › Multiple receivers
- › Multi-frequency
- › Capability for drone mounted
- › Dynamic not stationary operation
- › Low frequency high fidelity spatial resolution

The development of Loupe Mark II will remove the need for a cable link between transmitter and receiver and eliminate receiver electronic noise, which increases productivity by allowing multiple receivers to be used.

PROJECT COLLABORATORS



IMPACT

- › Increased spending on R&D
- › Increased information and communications technology (ICT) intensity
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Better energy efficiency
- › Newer equipment
- › Greater capital intensity
- › Larger geographical reach



GROWTH

Loupe Geophysics estimated revenue:

- › 2022 \$640,000
- › 2023 \$1.6M
- › 2024 \$3.2M
- › 2025 \$7M
- › 2026 \$14M



JOBS

This project is projected to create additional employment as follows:

- › Seven Technicians
- › One Admin Officer



COMMERCIALISATION – RT&CMP

THE MDETECT SCANNING SYSTEM

mDetect has designed, developed, and patented a unique muon-based scanning system that is able to provide a cost effective, long-term, stand-alone detection capability that will offer mining companies an early warning mechanism to prevent tailings dam failure.

Muon tomography is a technique that uses naturally occurring cosmic rays (muons) to generate three-dimensional images of subsurface structures and substances, similar to an X-ray scan. Muography offers many advantages over conventional scanning approaches, including that no bulky measuring equipment, high power sources, or radiation licenses are required.

This project aims to develop the processes to produce an automated system for production and enhance cost-effective scalability of the physical devices. Together with the corresponding software pipeline development, this will allow the full automation of data analysis and geophysical reporting for the commercial product.

The mDetect scanning system is a general-purpose low-power, portable, lightweight, system which incorporates silicon photomultiplier-based smart sensors. It is a rugged system that can be deployed with ease, without specialised training or licences, and can be used for analysing large structures such as tailings dams.

This project will open significant commercial opportunities for mDetect through the ability to produce devices at scale and have real-time monitoring of the structural integrity of tailings dam facilities, while enhancing the safety of the surrounding ecosystem and sustainability of mines.

Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Greater share of services in total revenue
- Larger geographical reach



GROWTH

- mDetect forecast \$7.7M in revenue over 5 years.



JOB

- This project is projected to upskill and create an additional 31 jobs during the project and within one year after project completion.

PROJECT COLLABORATORS





Advanced knowledge

Advanced processes

Advanced business models



COMMERCIALISATION – MEDICAL PRODUCTS

MANUFACTURE OF THE REVOLUTIONARY GLYDEIT™ SYSTEM

Meditati's GlydeIT™ system provides a reimagined sanitary hygiene applicator to better support the needs of women the world over.

Current solutions, while functional, are not sensitive to the psychological and physiological needs of young women/girls and those who live in low socio-economic societies. Women understand what women need. This product has been designed by women for women.

The GlydeIT™ system overcomes some barriers to purchase in the global economy both in developed countries and undeveloped countries where running water, hygiene education and costs are significant impediments to the health of females. Materials comprising the GlydeIT™ system have been designed as "Earth Friendly" to be biodegradable to directly minimise pollution, landfill and waste.

Meditati will build trust in the brand through development of quality automated production techniques, keeping standards consistently high reinforced by its 'Made in Australia' provenance.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Locally developed and owned patent portfolio
- Increased levels of automation and adoption of i4.0 advanced manufacturing
- Higher marketing expenditure
- Larger geographical reach and export revenues



GROWTH

- Meditati forecast \$20 million in revenue in the first 5 years.



JOB

This project anticipates upskilling and creating additional employment as follows:

- Automation / Mechatronic Engineers
- Machine Operator/ Electrical
- Additional Factory Hands
- Quality Control Engineer
- Sales Manager

MICRO-X

COMMERCIALISATION – MEDICAL PRODUCTS

ULTRA MOBILE X-RAY TROLLEY

Micro-X has developed a patented novel carbon nano tube (CNT) x-ray source that enables the miniaturization of x-ray tubes. The CNT technology is reliable and can be reproduced at near 100% yield with the in-house designed processing. Micro-X has commercialised this technology in a mobile x-ray cart that is used for bedside imaging in hospital wards.

The core technology components of the CNT tube and the x-ray generator are all designed and manufactured by Micro-X in Tonsley, having invested in re-shoring of the manufacturing of these components. Micro-X currently sources over 90% of materials and components domestically in Australia and is a net exporter of devices.

The device will have a remote tablet to avoid any complex integration of computers or screens. It will be battery powered and/or run from mains. The batteries will charge when plugged in and a separate charger will be provided. Potentially off the shelf (DeWalt 12v) batteries may suffice.

This project intends to provide a disruptive technology in a format that is specifically designed for outdoor workflow challenges of human imaging that will be deployed in the vet sector to trial and open up revenue streams to support human trials. A successful outcome will be a significant exploitation of the vet market, changing the use of x-ray in that market globally, and a pathway to providing true point of care x-ray for humans.

PROJECT COLLABORATORS

outerspace



RESONATE
SYSTEMS

Quickstep



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Greater capital intensity
- Newer equipment
- Greater share of services in total revenue
- Higher product value density (by weight)
- Higher trade intensity
- Larger geographical reach



GROWTH

- Micro-X forecast \$22M in revenue over the next 5 years.



JOB

- Micro-X plan to employ 15 new staff during the project and within one year of project completion.



Advanced knowledge

Advanced processes

Advanced business models

COMMERCIALISATION – DEFENCE

INFECTID PCR PLATFORM



This project is the first phase of re-shoring manufacturing capability for Primers from sub-contract manufacturers, who are based in the United States, and most importantly, being able to protect Microbio's core IP for Primer manufacturing from now on. Upon completion of component manufacture, Microbio will be in a position to conduct scale manufacture of its Primers in Brisbane.

InfectID is a unique PCR platform technology that provides rapid, highly sensitive bacterial, fungal and viral pathogen identification in clinical samples for both defence and civilian personnel. InfectID provides a significant reduction in test setup and running costs compared to fluorescent probes.

At the core of the unique design, the InfectID tests are aimed at highly discriminatory genetic targets. These targets have been applied to unambiguously identify blood-borne pathogens that cause Sepsis, including bacteria and yeast species, as well as the identification of biothreat agents.

The aim of this project is to develop and provide Good Manufacturing Practice, Good Laboratory Practice and ISO13485 certifiable primer manufacturing capability for Microbio and the wider Australian ecosystem. Microbio will be able to supply high-quality manufactured primers for its own products as well as supply Australian laboratories with microbial DNA-free, ultra-pure and high-quality primers. Microbio is creating manufacturing capability not currently available in Australia. This capability will then enable sovereign product manufacture of the entire InfectID product suite.



IMPACT

- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Greater capital intensity
- Newer equipment
- Higher trade intensity
- More extensive backward links
- Larger geographical reach



GROWTH

- Microbio forecast \$15M in revenue over 5 years.



JOBS

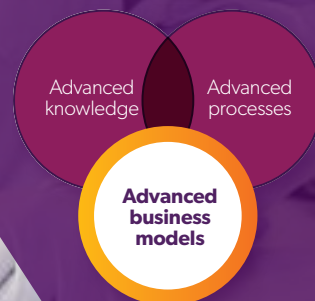
- This project is projected to upskill and create an additional 25 jobs.

PROJECT COLLABORATORS



Australian Government
Department of Defence
Science and Technology





COMMERCIALISATION – MEDICAL PRODUCTS

COMMERCIALISATION OF MICHECK® PROSTATE



Minomic has developed an in-vitro diagnostic (IVD) test called MiCheck® Prostate (MiCheck®) specifically designed to indicate the percentage risk of aggressive prostate cancer and enable a consulting physician to determine the need for biopsy. MiCheck® is a patented, clinically proven algorithm that measures a ratio of 3 protein analytes from a standard patient blood test combined with a clinical factor to determine a patient's risk of having aggressive prostate cancer that needs an urgent confirmatory biopsy and possible rapid treatment.

It is designed for use initially as an adjunct to an abnormal PSA result prior to prostate biopsy. Pathology labs processing blood samples will test the 3 MiCheck® blood markers. The result plus the clinical factor is sent to the MiCheck® Web Portal where the MiCheck® cloud-based algorithm analyses the result and returns a completed report to the pathology lab for onward transmission to the clinician.

This Project will bring to market Minomic's MiCheck® Prostate test, an algorithm driven, in-vitro diagnostic (IVD) test specifically designed to indicate the risk of aggressive prostate cancer and enable a consulting clinician to determine the need for a biopsy.



IMPACT

- Increased spending on R&D
- Larger patent portfolio
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Greater share of services in total revenue
- Higher marketing expenditure
- Higher trade intensity
- More extensive backward links
- Larger geographical reach



GROWTH

- Minomic International forecast \$164.2M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 11 jobs during the project and within one year after project completion.

PROJECT COLLABORATORS



HGM consultants

Thao ho le

IMPLEMENTATION OF NEXT GEN OF GREEN STEEL TECHNOLOGY

In this project, Molycop, UNSW and Crawford Boots will develop technology which enables the recovery and reuse of the carbon and hydrogen from end-of-life Tyres, Conveyor belts and other rubber products in the electric arc furnace (EAF) steelmaking process.

The introduction of this technology simultaneously reduces Molycop's reliance on imported carbonaceous materials from China, reduces the volume of problematic wastes going to landfill, improves energy efficiency of the EAF steelmaking process and further reduces the carbon intensity of Molycop's steel products.

This in turn will help steel manufacturing, to be more competitive, through lowered production and import costs and be more sustainable through decreased emissions and energy consumption.

Molycop will implement the Next Generation of Green Steel technology at its Newcastle facility and will collaborate with UNSW to engineer new, unprecedented, high percentage waste material blends for making steel. The project will enable Australia to divert all components of tyres, conveyor belts and boots from landfill and enable MolyCorp to develop new global markets.

This project will enable Australia's recycling industry to capture new opportunities from the value-added outputs generated from the waste tyres, conveyor belts and boots to new materials transformation process that can be created under the condition of EAF steel making.

PROJECT COLLABORATORS



UNSW
SYDNEY



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Better qualified employees
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better energy efficiency
- Greater capital intensity
- Higher trade intensity
- Larger geographical reach



GROWTH

- Molycop has calculated the expected revenue growth of \$5.2M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 34 jobs during the project and one year after project completion.



COMMERCIALISATION – FOOD & BEVERAGE

SELF-CONTAINED ALL-IN-ONE CALIBRATED HYDROGEN AND OXYGEN SUPPLEMENTATION SOLUTION



Hydrogen Technologies (HT) has developed and tested prototype technology to introduce molecular hydrogen and supplementary oxygen to high density ship seawater holding tanks and land-based salt and freshwater holding tanks and ponds, for coral trout and other white meat finfish.

The benefit of the technology is a significant reduction in mortality and an actual improvement in fish health thereby improving yield and grade price/kg of fish sold to market. HT also anticipates a marked effect towards the eradication of White Spot in prawns.

HT will develop a commercially ready hydrogenated water infusion machine to prolong the lifespan, health and commercial value of wild caught and commercially farmed finfish, focusing initially on coral trout and barramundi.

The complete system provides a single self-contained all-in-one calibrated hydrogen and oxygen supplementation solution. Hydrogen supplementation has been scientifically demonstrated to down-regulate pro-inflammatory genes, and up-regulate anti-inflammatory genes in fish, improving fish health and resistance to bacterial infection which is commonplace in high density holding tanks or fish farms.

HT's nano-bubble system for supplementing water is a superior technology compared to standard pressure-injection systems that saturate water with gases. The electro-chemical properties of gas bubbles at the micro- and nano-scale have been shown in various studies to have a positive effect on a wide range of organisms, when compared to larger gas bubble sizes.

PROJECT COLLABORATORS

This project will result in the manufacture of a value added and innovative product, which will enhance the competitiveness of the local food industry.



IMPACT

- Increased spending on R&D
- Larger patent portfolio
- Better qualified employees
- Higher product value density (by weight)
- Greater share of services in total revenue
- Higher trade intensity
- Larger geographical reach



GROWTH

- Hydrogen Technologies Holdings forecast \$15M in revenue over 5 years.



JOB

- This project is projected to upskill and create an additional 10 jobs during the project and one year after project completion.

COMMERCIALISATION – CLEAN ENERGY



HYDROGEN FUEL CELL MANUFACTURING IN AUSTRALIA

This project will establish a Proton Exchange Membrane (PEM) fuel cell manufacturing facility in Australia which will reduce dependency on imported fuel cells. Locally manufactured fuel cells can cater for growing demand for fuel cells in power supply units, telecom industry, mining industry and fuel cell vehicles. Most importantly, it will give Australia control over the sovereign risk of the hydrogen eco-system supply chain. A long-term sustainable solution is to manufacture fuel cells and hydrogen eco-system in Australia with strong local tech-support network to help Australian key industries meet their net-zero targets.

The world-class hydrogen fuel-cell manufacturing plant which will be located in Springfield City, QLD. Springfield City seeks to position itself as the world-first green hydrogen city, an Australian “Hydrogen Valley”. Their intention is to extend and expand this direction in coming years using the Nedstack advanced manufacturing fuel cell facility as a catalyst for this expansion.

The Nedstack facility will be the first full scale fuel cell manufacturing facility in Australia. The expansion plan is for it to be the largest in the southern hemisphere. It is their intention to follow this path of high volume throughput and be able to do this through the internal capacity demand provided by the LAVO hydrogen battery being developed in parallel. Besides the LAVO product, the fuel cells will be sold to a range of hydrogen/electrical application developers. Generally these developers will in turn be providing bespoke hydrogen power solutions to a range of different industries where lithium ion batteries are deemed unsuitable for these applications.

PROJECT COLLABORATORS

The project of making Fuel Cells in Australia will not only win on quality and pricing, as it is backed by Nedstack’s decades of manufacturing expertise, but also on dedicated local after sales support and continued future enhancements through R&D inputs of Australian Research Institutes.



IMPACT

- › Increased spending on R&D
- › Increased collaboration with other manufacturers
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Better qualified employees
- › Larger patent portfolio
- › Increased levels of automation
- › Newer equipment
- › Better energy efficiency
- › Greater capital intensity
- › Larger geographical reach



GROWTH

- › Nedstack forecast \$130.6M in revenue over 4 years.



JOBS

- › This project is projected to upskill and create an additional 21 jobs.

MAGNETO MODULAR DEPLOYMENT PLATFORM – MAGNETO MDP

Nexxis, in partnership with CSIRO|Data61, has developed Magneto Modular Deployment Platform (MDP). Magneto MDP is a multi-limbed, climbing inspection robot far exceeding mobility and versatility of existing inspection solutions.

The Magneto MDP will be development and deployed on asset inspections and will provide testing and measuring for a variety of applications, including onshore & offshore oil rigs, subsea installations, engines, machinery, mining operations, infrastructure projects and manufacturing processes.

Magneto MDP is at TRL 4, prototypes have been demonstrated and industry interest is strong for Nexxis to commercialise the technology. Nexxis will develop and manufacture Magneto MDP to TRL9, addressing commercial demands.

Magneto MDP is autonomous and spatially aware with 12 degrees of freedom, actuated limbs and feet, is capable of dexterity previously unseen. It will be further developed to use advanced sensors and cameras, and incorporate Artificial Intelligence and 3D SLAM allowing collection of high-density data used for photogrammetry, digital twinning, localisation and mapping technologies providing insights on asset condition and integrity.

Magneto MDP is currently focused on asset integrity inspection in the resources industry, although expansion to other sectors will be considered as part of the strategic growth strategy.

PROJECT COLLABORATORS



Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Larger patent portfolio
- Better qualified employees
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Greater capital intensity
- Newer equipment
- Greater share of services in total revenue
- Higher trade intensity
- Larger geographical reach



GROWTH

- Nexxis forecast \$8.67M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 90 jobs during the project and one year after project completion.

COMMERCIALISATION – CLEAN ENERGY

DEVELOPMENT OF TYPE IV AND TYPE V CARBON FIBRE REINFORCED POLYMER TANKS

Omni Tanker, and partner organisations Lockheed Martin and UNSW, are developing two types of Carbon Fibre Reinforced Polymer (CFRP) tanks for storing and transporting cryogenic liquid propellants.

These will include a Type IV CFRP tank, incorporating a seamless thermoplastic fluoropolymer liner, and a Type V CFRP Linerless tank. The Type IV tank offers extremely broad chemical resistance, improved thermal insulation and low gas permeation. The Type V tank will offer the lightest tank weight with good thermal insulation properties.

For each type of tank, the project tasks include structural design; characterisation of commercially available materials (mechanical, thermal and permeability characteristics); production of small-scale tanks for testing at room temperature and at -196°C in liquid nitrogen; and production and room temperature testing of an operational scale demonstrator. An assessment of commercialisation potential across many sectors will be undertaken for each type of tank.



IMPACT

- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Increased levels of automation
- Increased capital intensity and newer equipment
- Higher product value density (by weight)
- Higher trade intensity
- Larger geographical reach



GROWTH

- Omni Tanker forecast \$7M in revenue over 5 years.



JOBS

- This project is projected to create an additional four jobs.

PROJECT COLLABORATORS



UNSW
SYDNEY



great wrap.

Advanced knowledge

Advanced processes

Advanced business models

COMMERCIALISATION – RECYCLING

COMPOSTABLE STRETCH WRAP AT COMMERCIAL SCALE

Great Wrap is on a mission to remove the 150,000 tons of non-compostable plastic stretch wrap sent to Australia's landfill each year. Stretch wrap takes the form of cling wrap, silage wrap and pallet wrap. Stretch wrap has traditionally been made from petroleum and thus has had a significant negative environmental impact due to ultimate carbon emissions and being poorly recycled.

Great Wrap is currently leading a CRC-P to create a process to convert food waste into polyhydroxyalkanoates (PHA) wrap, this being the only biopolymer that is compostable, landfill/anaerobic biodegradable and marine biodegradable.

This project will give Great Wrap the ability to manufacture biopolymer resin from organic waste generated by Australian food and beverage production and use it to manufacture compostable stretch wrap that can replace plastic cling, silage and pallet wraps.

This project will accomplish a complete commercial scale up of the technology and development of commercial scale facility in Tullamarine. It will translate research outputs of a CRC-P led by Great Wrap from an integrated pilot system demonstration (TRL 7) to a commercial scale up (TRL 9).

This project will allow Great Wrap to use waste sources from the vegetable industry in Greater Melbourne (such as potato waste) to produce its compostable pallet wrap at commercial scale.



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Smarter inventory management
- Better energy efficiency
- Greater capital intensity
- Newer equipment
- More extensive backward links
- Larger geographical reach



GROWTH

- Great Wrap forecast \$97M in revenue over 5 years.



JOB

- This project is projected to upskill and create an additional 65 jobs.

PROJECT COLLABORATORS



MONASH
University

COMMERCIALISATION – DEFENCE

LAND BASED MILITARY VEHICLE DEVELOPMENT



Australia has a shortage of sovereign capability in engineering for land-based military vehicle with respect to powertrain development.

This project will allow Premcar to solve the problem of not having export-ready versions of land-based military vehicles. This project will mean that such vehicles will be optimised to access export markets and meet ADF requirements. Additionally, Premcar's capabilities will be expanded to be appropriate for a number of different land-based military vehicles.

This project will include the installation of a latest-technology powertrain into an existing vehicle, thereby making the vehicle suitable and ready to capture an export opportunity.

The powertrain components will be developed and manufactured in Australia and complement the Cummins engine imported from Cummins USA. By delivering this engineering program, Premcar will develop sovereign engineering and manufacturing capabilities to support land based military vehicle development and production in Australia.

Premcar will add sovereign capability in the area of defence vehicle powertrain engineering to existing product development and manufacturing capabilities, incorporating the unique requirements presented by vehicles for military application. By doing so, Premcar will be the only Australian-based organisation with this comprehensive suite of skills.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Higher marketing expenditure
- Higher trade intensity
- More extensive backward links
- Larger geographical reach



GROWTH

- Premcar has forecast \$5.25M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 60 jobs during the project and within one year after project completion.

PROJECT COLLABORATORS

Cummins South Pacific



COMMERCIALISATION – RECYCLING

RESEARCH INTO RECYCLABLE PLASTIC MOULDED J-POLE

Pryde Fabrications currently hold the Queensland State Government contract to manufacture and supply the Translink bus stop shelters and J-pole signage. J-pole signage is used to display the locations of the bus stops.

Pryde Fabrications will assess the technical, superior attributes of a recyclable plastic-moulded version of the J-pole over the current steel design which is costly to maintain and replace due to the corrosive nature of steel.

The recyclable plastic moulded J-pole would be a technically superior product in many ways. The use of thermoforming polymers can reduce production time and energy when compared with making J-poles from metal which require bending, welding and cutting tools.

The recycled plastic J-poles technology has no direct competing products other than the current steel version. The distinguishing points of difference can be defined as:

- › Tough and Durable
- › Circular Economy
- › Inexpensive
- › Unique – No other company can combine the “know how” of steel fabrication and plastic moulding
- › No indication in the literature of recyclable plastic moulded J-poles is available globally

This project would combine the “know how” from each business. Pryde Fabrications would design the aluminium J-pole moulding cast to be used by PG Plastics’ equipment to heat the recyclable polymer in the aluminium cast thus forming the J-pole. a recycled plastic-moulded J-pole design

would solve many of the corrosion problems of the current metal version and would result in a technically superior product manufactured at an overall reduced cost.



IMPACT

- › Increased spending on R&D
- › Increased collaboration with other manufacturers
- › Better qualified employees
- › Larger patent portfolio
- › Increased levels of automation
- › Higher product value density (by weight)



GROWTH

- › Pryde Fabrication forecast \$2.5M in revenue over 5 years.



JOBS

- › This project is projected to upskill and create an additional six jobs

PROJECT COLLABORATORS





Advanced knowledge

Advanced processes

Advanced business models



COMMERCIALISATION – MEDICAL PRODUCTS

SMART ORTHOTICS SENSOR SKIN

Reid Print Technologies (Reid) has developed a novel sensor for measuring shear based on printed flexible substrates. The sensor has wide ranging potential applications and this project is focused on the application of a smart shoe insole which can be used to monitor the onset of foot ulcers which commonly afflict diabetes sufferers.

The concept of a smart shoe insert is not new, and most have used pressure and/or temperature sensors with a focus on measuring foot pronation to be able to better customise compensating orthotics. Whilst pronation and pressure distribution within the foot is important in relation to foot ulcers, the key factor is the rubbing action across the surface and hence measurement of friction is what is being sought by clinicians. Reid's technology now makes that possible.

Reid's approach essentially decouples the normal force into the surface from the lateral movement using a unique arrangement of capacitance and pressure sensors which provides the only genuine measurement of the frictional force and can monitor it as a function of position.

The Reid solution has the ability to also measure friction occurring in different areas of the foot which is of paramount importance in application to Diabetes-related Foot Disease (DFD). Frictional data as well as the pressure data provides the ability to accurately predict the onset of DFD, so the key uniqueness and difference to all other smart insole technologies currently available is the ability to measure friction.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Larger patent portfolio
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Greater share of services in total revenue
- Higher product value density (by weight)
- Higher marketing expenditure



GROWTH

- Reid Print Technologies forecast \$54M in revenue over 5 years.



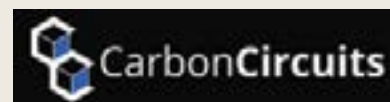
JOBS

- This project is projected to upskill and create an additional 19 jobs during the project and one year after project completion.

PROJECT COLLABORATORS



Healthia Limited
(iOrthotics & My Foot Doctor)





Advanced
knowledge

Advanced
processes

Advanced
business
models

COMMERCIALISATION – FOOD & BEVERAGE

MANUFACTURE OF THE HONE GLOBAL DIGITAL HAND-HELD LAB DEVICE

Hone Global is developing a range of digital hand-held lab devices that collect complex light signals using a patented spectrometer (sensor array) from any food sample placed inside it. These light signals are then decoded using a proprietary industry leading machine learning software to deliver lab test results on food products, in real-time, to the user's mobile phone.

This project takes this improved device to production and manufacture 100 market-ready devices for sale to the broadacre cropping market through established market connections. This involves establishing a component supply chain, and an assembly process in Australia and supporting software product release processes.

The device allows traceability of food quality and assurance of safety and origin allowing the creation of higher grade, higher value products. The testing capability is applicable beyond grain. This improved data visibility will empower farmers to make better decisions on-farm, increasing profits through data-based harvest management and enabling self-management of storage and marketing of grain on-farm. Ultimately this will enable more profitable farms to produce higher quality food products.

This is a transformational project for the food industry as it will digitise grain quality across the grain supply chain from its source on-farm, to domestic mills and ports.



IMPACT

- › Increased collaboration with other manufacturers
- › Increased spending on R&D
- › Increased information and communication technology (ICT) intensity
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Larger patent portfolio
- › Increased levels of automation
- › Greater capital intensity
- › Newer equipment
- › Greater share of services in total revenue
- › Higher product value density (by weight)
- › Higher trade intensity
- › Larger geographical reach



GROWTH

- › Hone forecast \$15.6M in revenue over the next 5 years.



JOBS

- › Hone plan to employ 15 new staff during the project and within one year of project completion.

PROJECT COLLABORATORS





SAMSARA

COMMERCIALISATION – RECYCLING

INFINITE PLASTIC RECYCLING - SOLVING THE PLASTICS CRISIS

This project aims to develop advanced manufacturing processes for the recycling of waste plastic. The project will establish a pilot plant for an innovative plastics recycling facility using revolutionary technology developed by Samsara Recycling. The technology enables the sustainable and low energy recycling of plastic polymers (PET, Nylon, Polyurethane etc.) through the use of proprietary enzymes.

The pilot plant will break down plastic (polymer) waste into its original building blocks (monomers) for reuse to manufacture new food-grade plastics and polyester. Building a prototype process facility will provide Samsara Eco with the opportunity to refine its technology before moving into scale production. The pilot plant will have the capacity to process 20 tonnes per day.

Samsara Eco has developed a unique enzyme (a biological catalyst) technology for plastic recycling. The technology converts post-consumer PET plastic and polyester - polymers made of ethylene glycol and terephthalate building blocks (monomers) - back to these original monomers to allow re-synthesis into virgin-quality plastic. This process, which has >95% yield, allows for infinite plastic recycling. Samsara Recycling technology allows 100% of PET to be recycled, including coloured, multi-layered and other hard to recycle post-consumer waste.

The Samsara Eco process is economical, with a low carbon footprint, and produces food-grade recycled plastics with the same structural integrity as virgin plastics. This project will build capability in Australia to divert up to 100,000 tonnes of

waste PET per year from landfill and generate an equivalent volume of PET for the Australian plastic industry.



IMPACT

- Increased spending on R&D
- Larger patent portfolio
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Better energy efficiency
- Higher product value density (by weight)
- Higher trade intensity



GROWTH

- Samsara Eco forecast \$118.75M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 55 jobs during the project and one year after project completion.

PROJECT COLLABORATORS



Australian
National
University





Advanced knowledge

Advanced processes

Advanced business models

COMMERCIALISATION – CLEAN ENERGY

DEVELOPMENT OF AUSTRALIAN BATTERY ELECTRIC MOTORCYCLES



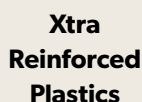
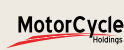
Savic Motorcycles will develop the first Australian designed, assembled, and tested high performance battery electric motorcycle to roadworthy certification.

Transport emissions represent 17% of all emissions and are growing commensurate with population growth and economic activity. CO2 emissions from passenger road transport in 2020 was estimated to be 3.64 Gigatons which is 16% higher than 2010. Although efficiency improvements to the internal combustion engine and emission scrubbing technologies have reduced vehicle emissions per kilometre travelled, this is easily outweighed by the growth in vehicle sales. Industry change depends on vehicle fleet turnover and removal of aging vehicles with lower engine efficiency and higher emissions output.

Consumer take-up of electric vehicles, and two-wheeled battery electric vehicles has been slow. This is due to the high costs, perceptions of poor performance, lack of non-home and fast charging infrastructure, design aesthetics and limited choice.

Savic Motorcycles will develop a range of affordable electric to address the challenges that consumers face. The Savic motorcycle uses a proprietary modular low-cost development platform, battery pack, powertrain, and IoT enabled vehicle on-board sensor and dashboard system to deliver an affordable emissions-free aesthetically designed product for the market which will include custom colour options.

PROJECT COLLABORATORS



Savic Motorcycles is the only Australian manufacturer of battery electric motorcycles. This project will help to develop an Australian locally manufactured supply chain for key component subsystems needed for the Savic development platform.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Larger patent portfolio
- Increased levels of automation
- Greater capital intensity
- Greater share of services in total revenue
- Larger geographical reach



GROWTH

- Savic Motorcycles forecast \$55M in revenue over 5 years.



JOBS

- This project is projected create an additional 27 jobs during the project and one year after project completion.

COMMERCIALISATION - MEDICAL PRODUCTS

THE DEVELOPMENT OF THE AXIT REHAB SYSTEM

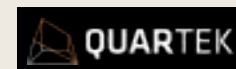
Strength By Numbers (SBN), are developing a medical-grade digital strength assessment system specifically for the Rehab market – the 'AxIT Rehab' system. AxIT Rehab comprises 4 independent devices that enable medical and allied health professionals to test and monitor an almost unlimited range of injuries. The system tracks recovery progression over time whilst also providing real-time biofeedback for physical therapy.

AxIT Rehab empowers practitioners with actionable data to make better decisions; allows tracking of interventions along the way; and provides a better understanding of an individual's recovery.

It is a core design principle that AxIT Rehab does not create any unnecessary friction in the operator's workflow. The data is presented in a simple and intuitive fashion. The key with AxIT Rehab is not presenting an overwhelming volume of data, but presenting only the data that is needed right at the moment that it is needed. AxIT Rehab is designed with portability and accessibility in mind. This enables the Allied Health professionals to take AxIT Rehab to patients for in-home visits as well as for onsite workplace assessments.

This project will see the development of the AxIT Rehab system using advanced manufacturing techniques locally, that are able to maintain extremely low unit costs whilst simultaneously maintaining high quality. At the conclusion of this project, SBN will be able to rapidly scale up the work conducted in this project into commercialisation activities globally.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- Smarter inventory management
- Greater share of services in total revenue
- Higher product value density (by weight)
- Larger geographical reach



GROWTH

- SBN forecast \$39.3M in revenue over 5 years.



JOBS

- This project is projected to upskill and create additional 18 jobs during the project and one year after project completion.

COMMERCIALISATION – CLEAN ENERGY

MANUFACTURE OF A HYBRID AIRCONDITIONING SYSTEM

Seeley International has developed a hybrid 'Climate Wizard' platform which integrates its patented 'Microcore' heat exchanger technology with heat pump technology. This combination addresses a major industry problem in high-value export and domestic markets. It is also one of the cleanest and most efficient forms of electric-powered heating and fresh air cooling.

This high efficiency system will reduce consumer energy consumption and peak demand on the electrical distribution network. It is specifically designed as a direct replacement (or retrofit) for existing HVAC systems and targets major market sectors in which escalating efficiency standards are being applied. Seeley's commercial Climate Wizard products previously only competed in the cooling market. The introduction of a Hybrid unit will allow it to compete more competitively in new markets and market sectors.

This project will support an accelerated production design and the development of an Australian-based automated assembly line. It will also support field trials and regulatory compliance activities which are necessary for market development and to overcome market barriers.

The Seeley CW-Hybrid platform is a disruptive innovation that offers an immediate solution to a widespread industry problem. It offers a "plug and play" solution to enable customers to reduce their energy consumption by making the leap to a new technological paradigm. This technology is the first of its kind, has unrivalled performance characteristics, and is significantly different to previous concepts.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Newer equipment
- Greater capital intensity
- Higher marketing expenditure
- Higher trade intensity
- Large geographical reach



GROWTH

- Seeley International forecast \$20M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 24 jobs.



COMMERCIALISATION – MEDICAL PRODUCTS

REMI – SLEEP SECURE

This REMi – Sleep Secure project will deliver revolutionary technology to directly improve the lives of some of the most vulnerable in our community – older and aged Australians. The patented REMi technology will be fast-tracked for commercial manufacturing in Australia.

The REMi product includes stretchable, soft sensors embedded into a medical-grade mattress protector which will non-invasively and unobtrusively collect data. The sensor data, as electronic signals, are transferred by a miniaturised processor to the cloud for real-time data analytics. The first REMi product will target aged care providers, to provide real-time measurement of three critical biometric parameters of a resident in a bed; presence, position and posture.

The REMi technology would provide a constant monitoring and alert system across all beds at all times. The data analysis software will also be fully debugged and certified during this phase, and the consortium will explore opportunities to also reliably extract key biometric data (eg breathing patterns and heart rate) from the sensor data.

The successful commercialisation of the REMi product will deliver real and enduring value to the aged care sector and ageing community in Australia. This product is innovative, virtually undetectable to the user and will offer significant benefits to the aged care facility operator and product user.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Larger patent portfolio
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Greater share of services in total revenue
- Larger geographical reach



GROWTH

- Sleeptite forecast \$7.5M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 11 jobs during the project and one year after project completion.

PROJECT COLLABORATORS

Sleepeeze
Bedding Australia
Pty Ltd

 **RMIT**
UNIVERSITY

Joyce 

Royal Melbourne
Institute Of
Technology

COMMERCIALISATION – CLEAN ENERGY

SOLARCONNECT

SolarConnect by Solar Analytics brings together rooftop solar monitoring and control with world class clean energy services. With its proprietary hardware and software solutions patented, designed and developed by Solar Analytics, SolarConnect works across all available solar technologies and integrates with grid-side communications to provide the lowest-cost energy management solution for the growing rooftop solar market.

Solar Analytics will work with project partners on the hardware and firmware engineering and design, to deliver a SolarConnect device that:

- Is robust for field deployment, with a target 5+ year warranty,
- Collects data, ideally at a range of collection frequencies, and communicates primarily via WiFi or in the event of failure via 4G
- Has some onboard storage in the event of communication failures, where the Firmware can be upgraded remotely using the same communications and where the device can send control signals.

The SolarConnect hardware and software solution combines monitoring and control of rooftop-solar energy generation and local demand with grid-side signals, weather, and energy forecasting. Solar Analytics use these inputs and apply patented algorithms for energy prediction, including machine learning on hardware responses and human behaviours, to optimise energy decision making at the site level.

PROJECT COLLABORATORS



SolarConnect brings these complex aspects together using Wi-Fi and 4G communications, cloud-computing and user-experience testing to deliver a customer-centred solution that allows the site owner and the grid operator to integrate more solar into the system, saving electricity costs locally while maintaining grid stability more broadly.



IMPACT

- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Greater capital intensity
- Newer equipment
- Greater share of services in total revenue
- Higher product value density (by weight)
- Larger geographical reach



GROWTH

- Solar Analytics forecast \$16.8M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 54 jobs during the project and within one year after project completion.

SPIRAL BLUE

COMMERCIALISATION – SPACE

PROJECT RAINBOW PYTHON



This project will see the development and space qualification of the Rainbow Python: a world first integrated hyperspectral instrument and onboard computer. Satellite based hyperspectral imaging can be used for chemical analysis of any location on the Earth, enabling applications for agriculture, forestry, mining, and other industries. Spiral Blue will work with the primary partner Esper, and this project will see contributions from Wise Networking and UNSW.

Australia spends an annual \$5.3 billion on satellite observation to provide data for national industries such as defence, mining, oil & gas, agriculture, and finance. However, there are many problems associated with satellite imaging.

Rainbow Python tackles the satellite imaging problems by utilising Spiral Blue's Space Edge 1 Hyperspectral (SE-1H) to analyse stored hyperspectral data cubes while Esper's Over The Rainbow high resolution hyperspectral imager (OTR) will attempt to capture these data cubes. Rainbow Python will be Australia's first hyperspectral mission.

The AMGC project funding will be used for hardware upgrade; data processing software; redundant hardware and software. In addition, the space qualification hurdle is being overcome through this collaboration and by flying as a hosted payload. This collaborative hosted payload model is repeatable, and may be used to help accelerate timelines for other new space hardware companies.



IMPACT

- Increased collaboration with other manufacturers
- Increased collaboration with researchers
- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Larger patent portfolio
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Greater share of services in total revenue
- Higher product value density (by weight)



GROWTH

- Spiral Blue and other project partners together forecast \$36M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 49 jobs during the project and one year after project completion.

PROJECT COLLABORATORS





COMMERCIALISATION – FOOD & BEVERAGE

DEVELOPMENT AND COMMERCIALISATION OF MUSHROOM GROWBAGS AND RUMINANT FEED STOCK



Sustinent has developed a sustainable and scalable process that utilises sugarcane waste to make higher value products. This project is the first stage of a multi-stage program that will help secure the future of the NSW Sugar Industry by taking advantage of the 130,000 tonnes of cane biomass that is burnt before harvest each year.

Sustinent has identified a unique opportunity to manufacture gourmet mushroom farming inputs for mushrooms growers. They have demonstrated that Oyster Mushrooms can be cultivated on artificial Gourmet Mushroom Growbags comprised of sugarcane fibre that has been inoculated with *P. ostreatus* fungus under aseptic conditions.

These Growbags will produce Oyster Mushrooms a few weeks after delivery to local mushroom growers. Under this unique circular economy model, growers will return the used fibre substrate which can then be processed for sale as a ruminant feed commodity on a small scale with existing facilities.

This project will allow Sustinent to manufacture and commercialise Gourmet Mushroom Growbags in their purpose-built pilot production plant situated on the Harwood Sugar Mill site. The integration of IoT-enabled sensors will enable process management and product traceability.

The Sustinent solution is designed to be superior to existing agricultural waste management processes through improved safety, reduced environmental impact, and economic sustainability.



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Greater capital intensity
- Newer equipment



GROWTH

- Sustinent forecast \$8.6M in revenue over 5 years.



JOBS

- This project is projected to create an additional 21 jobs.

PROJECT COLLABORATORS





COMMERCIALISATION – RT&CMP

HYDRAULIC TENSIONING FOR MINING

This project covers the extension of the EziTite® Hydraulic Nut range to encompass new markets with a process that will bring a new mechanical invention to market acceptance.

The Technofast tensioning device, seeks improved outcomes in terms of productivity and workers' safety in the activities directed towards the maintenance of rock and ore crushing machinery, particularly gyratory and cone crushers. These machines are used extensively globally, for preparation of ores for mineral processing and for sizing of aggregate material used in construction, roadbase and concrete.

This project will focus on rapid production and distribution of Technofast products to the resources sector, both in the domestic market and globally. Crushers used in Australia are common to other major target markets. In order to optimise the value proposition for potential users, the company proposes to grow distribution channels and increase production of applicable Hydraulic Nut hardware to take advantage of relevant economies of scale.

The Technofast Hydraulic Head Nut replaces any standard mechanical nut originally fitted to the gyratory crusher. The core advantage is that the Technofast replacement is hydraulically activated to produce the force directed to clamp the mantle in place without the manual need for hammers, wrenches or other means formerly used to tighten down the Head Nut. This hydraulic system overcomes many of the safety issues associated with manual nut removal systems.



IMPACT

- Increased collaboration with other manufacturers
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Smarter inventory management
- Higher marketing expenditure
- Larger geographical reach



GROWTH

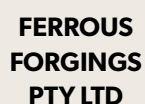
- Technofast forecast \$8.3M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 16 jobs.

PROJECT COLLABORATORS





COMMERCIALISATION – FOOD & BEVERAGE

KOOLPAK ADVANCED MANUFACTURING

TomKat Global Solutions has developed a new thermal container for the food cold chain – the KoolPak. Currently the most commonly used container for this purpose is expanded polystyrene (EPS) containers. However, polystyrene is being phased out because it is single use and is creating a significant environmental waste problem. The KoolPak has superior thermal performance to a polystyrene container, is multi use, and is fully recyclable.

Manufacturing of the KoolPak requires bespoke machinery to implement the sealing and stamping processes developed. This project involves engineering design and construction to implement the processes developed into more automated production stations. In addition field trials of the KoolPak with the new process and production stations will be conducted. A detailed life cycle analysis and development of high throughput reading capability for the NFC tracking tags will be completed.

The outcome will be the ability to manufacture to a capacity which will allow market entry with the first high-end customers. The machinery designed will also provide knowledge as to how best to create more fully automated machinery as a second phase to facilitate higher volume and lower cost manufacturing.

The main advantages of the KoolPak over cardboard products is much lower price; ability to flatpack which makes the economics of return shipping much more viable; and the KoolPak is fully recyclable and can be re-used at least 10 times.

PROJECT COLLABORATORS



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- Greater capital intensity
- Newer equipment
- Higher marketing expenditure
- Higher trade intensity



GROWTH

- TomKat Global Solutions forecast \$18.9M in revenue over 5 years.



JOB

- This project is projected to upskill and create an additional 8 jobs during the project and within one year after project completion.



COMMERCIALISATION – FOOD & BEVERAGE

TPS SMART DIGITAL WATER QUALITY INSTRUMENT

TPS has developed proof of concept electronic digital sensors for testing water based quality parameters for Food & Beverage and Resources Technology & Critical Minerals Processing.

The TPS Smart Digital Water Quality instrument utilises novel software algorithms to measure and analyse various sensor parameters to reduce the settling time of an accurate reading, compensate for sensor drift and predict in advance, the need for sensor calibration, cleaning and/or maintenance. The product will be able to be offered in one version only, that can be used with any combination of sensors (up to five), ending the industry standard practice of locking out features and capability.

The project will support design for manufacture of the sensors and electronics, development of commercial ready software and algorithms, sensor and instrument enclosures, verification testing and certification. The project will also support design and purchase of manufacturing equipment, procedures and training to manufacture the instrument in Australia and the upskilling of production staff.

The TPS Smart Digital Water Quality Instrument is one meter that can be integrated with any probe. It can be used all day, anywhere, anyhow by anyone. It has the lowest cost of ownership in its class and allows operators to work smarter, safer and faster than ever before. It is Australian made by an Australian owned company.



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- Greater capital intensity
- Newer equipment
- Greater share of services in total revenue
- Larger geographical reach



GROWTH

- TPS forecast \$9.9M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 13 jobs during the project and one year after project completion.

PROJECT COLLABORATORS





COMMERCIALISATION – MEDICAL PRODUCTS

NEEDLE-FREE VACCINATION PLATFORM

Vaxxas is a clinical-stage biotechnology company commercialising a novel needle-free vaccination platform, the High-Density Micro-projection Array Patch (HD-MAP), to improve the efficacy, reach, safety and economics of vaccination. The Vaxxas HD-MAP is expected to revolutionize the delivery of vaccines, making the 169-year-old needle and syringe technology obsolete for many applications.

The manufacturing process includes the production of sterile HD-MAP devices and the coating of those devices with a vaccine product in a clean-room manufacturing facility. The company has completed Phase I clinical trials for three different vaccine products on the device platform and is poised to begin Phase II trials for one of those. Vaxxas must manufacture sufficient volume of safe and efficacious vaccine product whilst ensuring compliance to regulations for the Phase II clinical studies. At the same time there is a requirement to integrate automation and in-process quality control steps (using process analytical technologies) into the fill and finish manufacturing process to start closing the gap between late-stage-clinical and commercial production.

This project targets a significant bottleneck in the final product manufacturing process where the vaccine is applied to the HD-MAP in a controlled cleanroom environment. Specifically, the manual In-Process Testing and high level of manual manipulation steps associated with the existing Phase I manufacturing process, exposes the system to various risks and inefficiencies.

PROJECT COLLABORATORS



Teelyn Pty Ltd

Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- Increased collaboration with other manufacturers
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Increased levels of automation
- More extensive backward links



GROWTH

- Vaxxas forecast \$7M in revenue over 5 years.



JOBS

- This project is projected to upskill and create 4 jobs in additional to the Vaxxas growth forecast of 40 jobs within one year of project completion.



Advanced knowledge

Advanced processes

Advanced business models



COMMERCIALISATION – RECYCLING

ATLAS TEC PALLET PROJECT

The Venlo mission is to eliminate pallets going to landfill and being prematurely scrapped. Venlo will undertake an intensive fast-tracked project to design and develop a world-leading Technology Enhanced Circular (TEC) pallet solution.

The Atlas TEC Pallets in this project will deliver a best-in-class logistics solution, with pallets made from 100% recycled polymer materials, managed within an entirely circular and closed-loop automated repair and remanufacturing system that is tracked/traced and serviced within an advanced global data tracking network. The data collected from the product and pooled from the product will greatly reduce damage and stock losses throughout the supply chain and drive continual improvement.

This project will see the Venlo team transition their designs and prototypes from a TRL4 through to TRL9, with a market-ready, commercialised, and scalable solution. The project will carry out a deep dive, fast to fail, rapid iteration design and validation process across both product and process to deliver the final solution.

This project will rapidly create more than 30 jobs in Australia through the initial product development, tooling, prototype, manufacturing, and recycling phases. This project will result in significant commercial and economic outcomes for Australia by delivering a transformative product to the global market.



IMPACT

- Increased spending on R&D
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Larger patent portfolio
- Increased levels of automation
- Smarter inventory management
- Greater share of services in total revenue
- Larger geographical reach



GROWTH

- Venlo forecast \$63.7M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 30 jobs.

PROJECT COLLABORATORS



COMMERCIALISATION – FOOD & BEVERAGE

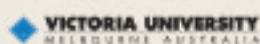
SENSOR BOX FOR IOT KANBAN SYSTEM

Food waste occurs at many points of the food service industry supply chain. Youc are developing a Smart Box system using IoT and sensors for a Kanban inventory control system. The Smart Box will replace the current carton boxes used in the Food and Beverage food service supply chain. The box will be able to track the status of the food at every point of the supply chain. Users of the Smart Box system will have access to the data. The information will allow users to do just in time restocking, automatic reordering or on-demand ordering which will ensure stock freshness and reduction of food waste.

The solution is focused around the development of wireless smart containers and the necessary digital infrastructure primarily to monitor food content in the supply chain. The containers (Smart Boxes) will monitor parameters such as content weight, time in transition, and temperature from manufacturing to end user. The system will use weight sensors that are composed of load cells or beam weight sensors. Sensors will also measure distance, temperature, relative humidity, barometric pressure, movement and position. The technology will be provided as a service to clients.

The Smart Boxes will be reusable, come in various sizes, sensorised and connected to the Youc wireless network. The boxes will be offered as part of a monitoring service, and the technology will be transparent to users.

PROJECT COLLABORATORS



outerspace



**Newswell
Pty Ltd**

**Chinese
Gourmet
Express Pty**

**W&Y 1st Pty
Ltd**

**Australian yuhan
international trading pty
ltd**

Ecot Pty Ltd



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Larger patent portfolio
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Smarter inventory management
- Better water efficiency
- Greater share of services in total revenue
- Higher trade intensity



GROWTH

- YOUUC forecast \$3.7M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 30 jobs during the project and within one year of project completion.

MANUFACTURE OF THE ZELLA STACK

Zella DC is a global leader in the design and deployment of turn-key micro data centres for use in edge computing and critical infrastructure support applications.

This project will accelerate the development of a next-generation Micro Data Centre (MDC) called 'Zella Stack', which is expected to deliver the following competitive advantages:

- › A unique stacking configuration that enables unprecedented scaling and flexibility options;
- › A lighter, more rugged, and reduced form factor design, achieved through the use of advanced polymer manufacturing technologies, which significantly lowers the cost of freight and installation;
- › A highly efficient control system that optimises power usage and substantially reduces operating costs as compared to existing (on-premise) data centres;
- › A fully-customisable assembly that end-users and resellers can self-design and order via Zella DC's online intelligent configurator platform.

The proprietary intellectual property supporting the Zella Stack MDC is the subject of an International Patent Application and is owned entirely by Zella DC in Australia. The development and commercialisation of the Zella Stack MDC is yet another example of the innovative ambitions of the Zella DC business and its focus on delivering next generation MDC solutions that are fast, secure, scalable, and cost effective.

PROJECT COLLABORATORS



IMPACT

- › Increased collaboration with other manufacturers
- › Increased spending on R&D
- › Increased information and communication technology (ICT) intensity
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Larger patent portfolio
- › Better qualified employees
- › Increased levels of automation
- › Smarter inventory management
- › Better energy efficiency
- › Higher marketing expenditure
- › Higher trade intensity
- › Larger geographical reach



GROWTH

- › Zella DC forecast \$25M in revenue over the next 5 years.



JOBS

- › Zella DC plan to employ 10 new staff members and upskill 20 current staff members during this project.

ZERO^{CO}



COMMERCIALISATION – RECYCLING

THE DEVELOPMENT OF FOREVER-USE BOTTLES



Zero Co has developed a world-first, holistic solution to the global plastic problem. Their solution deals with the plastic problem at both ends of the supply chain – stopping the production of new plastic and cleaning up plastic waste that’s made its way into our oceans.

The project will commercialise Zero Co’s fully prototyped holistic solution to the global single-use plastic problem, by developing an end-to-end closed-loop supply chain that replaces single-use plastic bottles with forever-use pouches.

Whilst most commercial waste/recycling projects currently in-market deal with the waste problem towards the middle/bottom of the EPA’s waste hierarchy – ie recycle and/or treat waste, Zero Co’s world-first system deals with the waste problem at the absolute top of the EPA’s waste hierarchy. This is a ground-breaking change in thinking about waste, avoiding it in the first place rather than trying to recycle/treat waste after it’s been created.

In your first box of Zero Co you receive:

- › A set of “forever bottles” made from plastic waste pulled from the ocean
- › A set of refill pouches (made from plastic waste diverted from landfill) containing the liquids for your first set of “forever bottles”
- › A reply-paid envelope

You keep the forever bottles (forever) at your house and refill them (forever) from the refill pouches. You then send the refill pouches back to Zero Co in the reply-paid envelope to be cleaned, sanitised, refilled and re-used over and over again.

The engine-room for the Zero Co solution is their world-first refill pouches made from recycled materials and their world-first pouch cleaning/sanitisation equipment and processes. Combined, these two innovations cut off the waste stream entirely, stopping waste being created in the first place.

It is simple. You order, Zero Co deliver, you return, Zero Co refill.



IMPACT

- › Increased spending on R&D
- › Increased collaboration with other manufacturers
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Better qualified employees
- › Increased levels of automation
- › Higher marketing expenditure
- › Higher trade intensity



GROWTH

- › ZeroCo forecast \$100M in revenue over 5 years.



JOBS

- › This project is projected to upskill and create an additional four jobs during the project.

PROJECT COLLABORATORS



TrendPac

Bit Image

COMMERCIALISATION OF THE ZETIGATE



Zetifi has developed the ZetiGate, an innovative wireless network gateway that optimises low earth orbit satellite internet and terrestrial LTE networks to bring transformational connectivity to regional, rural and remote areas. The game-changing speed of low earth orbit satellite solutions coupled with the reliability and range of Zetifi's technology will accelerate the digitisation of the Australian food and beverage sector.

Many key activities in the Australian food and beverage supply chain occur in areas that are poorly served by traditional telecommunications infrastructure and services. These connectivity issues have limited the sector's ability to fully embrace the benefits of digitisation.

This project will address these connectivity limitations through the commercialisation of the ZetiGate – a high availability gateway that uses Software Defined Networking to seamlessly combine the speed of low earth orbit satellite technology with the reliability of a backup 3G/4G LTE network. In doing so it provides a superior internet connection and options to extend connectivity into areas with little or no mobile coverage using Zetifi's long-range Wi-Fi solutions.

By addressing the reliability, complexity and coverage issues of existing technologies, Zetifi has developed a transformational and practical solution that will deliver the fast, pervasive and reliable connectivity that food and beverage manufacturers need. Zetifi will unlock supply chain efficiencies, quality improvements and provenance transparency for food and beverage manufacturing businesses through the commercialisation of the ZetiGate.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Increased information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Larger patent portfolio
- Better qualified employees
- Increased levels of automation
- Greater share of services in total revenue
- Larger geographical reach



GROWTH

- Zetifi forecast \$38.6M in revenue over 5 years.



JOBS

- This project is projected to upskill and create an additional 45 jobs during the project and within one year of project completion.



AMESRF PROJECTS



AMESRF

MINIATURE THERMOELASTIC STRESS ANALYSIS CAMERA

1 MILLIKELVIN (1mK) have been developing lab-based thermoelastic stress analysis (TSA) camera hardware in collaboration with Defence Science and Technology (DST) who have created the analysis software. This project proposes to create a miniaturised camera capable of being used for in-situ observations allowing deployment of the technology within the structure under test or operation.

In addition, the 1mK system can be used in-situ to monitor stress in concrete tunnels and bridges. This application is currently being serviced via CAD modelling packages and specialised testing where 100's to 1000's of strain gauges are placed all over a structure.

In this project 1mK and their engineering partners, Outerspace and DST Group, aim to take this revolution in dynamic material testing to the world stage via development of the technology to an advanced prototype, ready for in-situ testing with defence primes and the DST Group.

Once the product has been validated by DST Group and defence primes, this product will be ready to be launched into the defence and aerospace markets. There is likely to be applications in the new space industry, and 1mK along with its development partners will assess this and determine what further development will be required.



IMPACT

- Increased spending on R&D
- Increased information and communication (ICT) technology
- Increased collaboration with other manufacturers
- Increased collaboration with research institutions
- Larger patent portfolio
- Increased levels of automation
- Greater share of services in total revenue
- Higher product value density (by weight)



GROWTH

1mK estimate the following projected revenue:

- 2022 – \$1m
- 2023 – \$2m
- 2024 – \$4m
- 2025 – \$8m



JOBS

This project is projected to create additional employment as follows:

- An additional eight skilled jobs at 1mK
- An additional one skilled job at Outerspace Design
- An additional two-4 jobs across domestic project partners and prospective future partners

PROJECT COLLABORATORS



LIMBIC SCAFFOLDING FOR ADVANCED SUPPORT COBOTS

Industrial robots have become a common feature in modern production-line processes, but are limited to simple, repetitive tasks. Interactive cobots are more advanced and capable of customised tasks, working alongside humans, accepting feedback, problem-solving together, and reporting on progress.

Industrial and commercial cobots/robots suffer from the lack of a common interface that can link sensory input to analytical and interactive capabilities. A 'scaffolding' layer is needed to couple deep intelligence, software controllers and robotic hardware such as actuators and sensors

A-kin's solution brings together brains and bodies via a limbic scaffolding for advanced support cobots. A-kin wants to build intelligent robotic assistants to enable advanced manufacturing via complex production tasks, while interacting with humans and performing real-time analytics. They will be able to take unique instructions from people to complete tasks and analyse task performance. A-kin will develop a limbic scaffolding layer that will make it easier to couple a brain, controller, and hardware embodiment together. The purpose of this scaffolding will be to enable faster development and greater component interoperability for custom cobots/robot prototypes that need to be integrated with an AI core.

A-kin calls this platform the 'limbic scaffolding' as an analogy to the equivalent part of the human brain, which is responsible for integrating sensory, cognitive and effector functions. Therefore 'limbic scaffolding' represents its role in bringing together sensory awareness, cognitive function, and actions.

PROJECT COLLABORATORS



Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- › Increased spending on R&D
- › Larger patent portfolio
- › Increased collaboration with other manufacturers
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Increased levels of automation and digitalisation
- › Higher marketing expenditure
- › Larger geographical reach



GROWTH

A-kin estimated revenue:

- › 2022 \$300,000
- › 2023 \$800,000
- › 2024 \$1.2 million
- › 2025 \$4 million



JOBS

- › A-kin anticipates this project will employ an additional two software engineers.



Advanced knowledge

Advanced processes

Advanced business models

AMESRF

HEAT TO ELECTRICITY ENGINE



This project aims to deliver patent-pending, The Barton Engine concept for power generation from waste heat at a comparative nominal cost of 5 cents per kWh. The project scope will build on learnings from the 10 kWe proof of concept model, and via three-dimensional CAD and fast prototyping, turn this into a factory-tested minimum viable commercial scale product using bottled gas as the heat source.

The Barton engine, uniquely for its small to medium scale, extracts energy from external heat sources generated by industries such as:

- › Piggeries
- › Feedlots
- › Abattoirs
- › Industrial processes (e.g. furnace offtake)
- › Agricultural waste (e.g. straw).

In applications based on these heat sources, the Barton engine takes full advantage of high temperatures with the engine in this project designed to achieve 33% efficiency at 450°C. The Barton engine will be able to use a greater variety of external heat sources and will operate at pressures less than 20 bar which allows use of standard, low-cost materials.

The Barton engine will compete in the gas flare market, where it will compete against internal combustion technology like gas-fired reciprocating engines or gas turbines. The engine has external combustion and simply exchanges the heat from an existing, or new, gas flare flue.

PROJECT COLLABORATORS



synapse design

Bruce Energy



IMPACT

- › Larger patent portfolio
- › Better energy efficiency
- › Increased R&D investment
- › Increased collaboration with research institutions and other manufacturers
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Greater share of services in total revenue



GROWTH

- › 2020/21 – \$1,350,000 (of which \$0.1m is SME electricity sales)
- › 2021/22 – \$7,360,245 (of which \$1.2m is SME electricity sales)
- › 2022/23 – \$37,066,545 (of which \$6.7m is SME electricity sales)



JOBS

- › This project is a key enabler for expansion and further technology development, with product development and advanced manufacturing positions becoming available at Austeng. With this project investment, the company is expected to grow by 10 people during 2019 and, meeting commercial milestones, double in size each year.



Advanced knowledge

Advanced processes

Advanced business models

AMESRF



INNOVATIVE CRUTCH WEAR

Cast Equipment & Chain Products Pty Ltd (CECP) have invented and patented a new chain system which is part of the immense Dragline Bucket assembly. Dragline machines remove overburden and dig out clean coal, iron ore or other resources at mines. This CECP chain will revolutionise the chain business globally by significantly increasing the life expectancy of chains, improving productivity, saving on maintenance costs and reducing downtime for the mining sector, locally and globally.

Limited trials of these drag chains were undertaken, which verified the 50% reduction in wearability of the crutch design. This current project aims to prove the commercial viability of the chains, resulting in the eventual sale of trial chains.

The technology for dragline chains has not changed in more than 40 years. This Australian patented invention demonstrates advanced processes with technical leadership in designing a 400+ BN removeable crutch system.

Drag chains used in the Australian mining industry are currently imported from US companies such as Columbia and cost \$100 million annually. This project will provide an opportunity for a local manufacturer to reshore a portion of this market back to Australia.



IMPACT

- Higher spending on R&D and collaboration with research institutions to validate designs
- Greater share of services in total revenue by charging a leasing or rental fee per bank cubic metres



GROWTH

- \$43.2 million per annum with a potential 10% market share



JOBS

- This project will generate additional jobs for 10 staff members at CECP, five at White Industries, six at Alfabs and three UQ graduates

PROJECT COLLABORATORS

GLENCORE





ROBOTIC LASER DENTAL DEVICE

Dentroid Technologies (Emudent) will develop a hands-free robotic dental device that combines the precision and efficiency of laser with the appropriate digital control.

The technology represents a platform for mobile and remotely controlled dentistry, with particular benefit to rural, remote and disadvantaged communities; conflict and disaster zones; offshore naval vessels; and cruise ships. Additionally, early stage diagnosis and intervention may be performed through units installed at schools, rural health centres and aged care facilities. This can potentially save critical time by avoiding waiting lists and commuting, as there will be no need for a dentist to be physically present at this initial stage; a nurse or a staff member with basic training can clip the device onto the tooth of concern and the dentist will log-in, check and analyse remotely.

The technology is expected to reduce the costs of dental treatments. Automation reduces physical and mental burnout of dentists and increases productivity. Dental treatments can be done in fewer visits, particularly when Dentroid is paired to an in-clinic milling machine. Improved precision and standardisation will also reduce human errors and consequently medico-legal complications.

Until now, dental clinics have not existed on the data grid. Industry 4.0 has had little applicability in the dentist settings and armamentarium. Dentroid will not only automate clinical work, but it will also convert the manual/analogue mode of working into a complete digital process. Hence, the visual feed will be recorded and analysed. Data can be shared,

aggregated and processed by artificial intelligence (AI). It is through this AI that Dentroid will introduce Industry 4.0 to the dental industry which will allow clinical guidance and optimisation of the surgical work. optimisation of the surgical work.



IMPACT

- Increased spending on R&D
- Higher information and communication technologies (ICT) intensity
- Larger patent portfolio
- Increased levels of automation
- Greater share of services in total revenue
- Increased level of extensive backward links



GROWTH

- Dentroid Technologies expects sales of \$347,750,000 over the next five years



JOBS

- Dentroid Technologies anticipates that the project will generate six -10 employment opportunities over the coming 12 months
- Dentroid Technologies anticipate that within the first year of the manufacturing stage 40+ jobs will be generated

PROJECT COLLABORATORS



Advanced
knowledge

Advanced
processes

Advanced
business
models

AMESRF

MANUFACTURE OF SUPERIOR LITHIUM-ION BATTERY (LIB)

As passenger vehicles move to energy efficient electric vehicles, battery options for larger vehicles and marine vessels are also being sought. This sector includes buses and trucks with a general requirement for a battery with a capacity of 350kWh compared to electric vehicles with a battery around 80kWh capacity. An emerging market is also developing for the electrification of marine vessels with an immediate emphasis on efficient, small, high-speed ferries.

A well-known problem with some current lithium-ion battery designs is that the batteries overheat when high currents are used. This presents safety issues and limits the battery life and performance.

FELINE intends to manufacture a superior lithium-ion battery that addresses the performance and safety requirements in a range of applications which are currently not possible due to insufficient balance between power and safety. This project will expedite the rapid initial feasibility testing of FELINE's novel Li-ion battery (LIB) cell format architecture.

FELINE's solution is to deliver a LIB cell that includes a new, large format design that when discharged, has a very low internal impedance, therefore reducing heat generation. This will permit a high-power draw without generating significant internal heat in the cells that would severely affect cell performance.

On completion of this project, FELINE and the project partners will have manufactured 200 prototype cells for testing by Defence Science and Technology Group (DST) for a maritime application. Demonstrated successful project outcomes is expected to have an immediate lift in business and product profile. It will allow a sovereign manufacturing capability in Queensland.



IMPACT

- › Larger geographical reach
- › Increased collaboration with other manufacturers
- › Increased spending on R&D
- › Higher information and communication technology (ICT) intensity



GROWTH

- › The FELINE battery selling price is intended to be cost-competitive with competing high-performance battery systems. Using standard materials, chemistries and manufacturing processes, they are not anticipating higher costs than those seen in the market today.



JOB

- › FELINE estimate that this project will generate an increase of more than Fifteen+ skilled jobs within 1–2 years.

PROJECT COLLABORATORS

PWR Advanced Cooling Technology



MANUFACTURE OF LIGHTFIELD 3D RETINAL IMAGING SYSTEM

More than 285 Million people globally suffer from preventable blindness. This has imposed an estimated US\$23 billion costs on healthcare systems worldwide. In 80% of cases, blindness can be prevented or cured through better and earlier access to both imaging and diagnostic capabilities.

Integral Scopes has developed a lightfield 3D retinal imaging system that uses lightfield/plenoptic imaging and improves the alignment precision requirements that complicate the use of most portable retinal imaging devices. The Integral Scopes technology will improve the detection and diagnosis of diseases of the retina in professional and primary care settings.

This project will enable Integral Scopes to offer the following product advantages over existing solutions:

- ▶ Superior 3D colour image quality
- ▶ Additional 3D diagnostic information that can enhance patient-specific outcomes
- ▶ Lower purchase costs
- ▶ Lower lifecycle costs
- ▶ Smaller, lighter, robust physical footprint for improved portability

On completion of this project, Integral Scopes will have developed a prototype of its patented Retinal Plenoptoscope focused lightfield camera. The prototype will allow Integral Scopes to run clinical validation, develop market acceptance and pass regulatory clearance for the 3D-RPS product in the growing ophthalmic imaging market.

The project will also enable Integral Scopes to offer a flexible platform technology from which to develop other advanced 3D medical diagnostic instruments. This project will demonstrate high-tech manufacturing in Australia and create a platform technology for a range of locally developed imaging products.



IMPACT

- ▶ Increased spending on R&D
- ▶ Higher information and communication technologies (ICT) intensity
- ▶ Larger patent portfolio
- ▶ Increased collaboration with other manufacturers
- ▶ Greater share of services in total revenue
- ▶ Higher marketing expenditure
- ▶ Increased level of extensive backward links



GROWTH

- ▶ Integral Scopes is targeting 3D-RPS ophthalmic camera sales of 200 units during the first year of production climbing to 1,000 units per annum within 5 years.



JOBS

- ▶ Integral Scopes forecast of 11 FTE positions when they achieve full production.

PROJECT COLLABORATORS





AMESRF



"DROP-IN" FUEL

Mercurius's long-term stated ambition is to build and operate up to five commercial biorefinery projects in regional Queensland, to convert biomass into biocrude along with one central processing facility to convert the biocrude into renewable fuels while concurrently producing high value biochemicals and bioplastics. The REACH™ technology will produce "drop-in" fuels faster, cheaper and with a higher quality than other biorefining processes. Drop-in fuels are a synthetic and fully interchangeable substitute for conventional petroleum-derived hydrocarbons (gasoline, jet fuel, and diesel), meaning it does not require adaptation of the engine, fuel system or the fuel distribution network.

In this project, Mercurius proposes to locate the pilot plant at Southern Oil Refining's (SOR) Northern Oil Refinery in Gladstone and conduct the trials in partnership with QUT and SOR.

The pilot plant will optimise their biorefining processes initially with bagasse (sugar by-product) and then aims to test additional non-food feedstocks, and further optimise the processes. Additionally, with potential strategic partner Kolon, Mercurius will be helping to develop and promote a new sustainable biochemical and bioplastics sector.

Mercurius is amongst a limited number of entities proposing to use second generation feedstocks such as municipal waste, waste food and cotton gin trash to create biofuels, biochemicals and bioplastics. Mercurius also believes that the second-generation feedstock with lessened input costs will result in a product that will be price competitive with fossil based fuels.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Collaboration with Queensland University of Technology
- Increased collaboration with other manufacturers
- Larger geographical reach due to the increasing emphasis on the replacement of carbon-based fuels with sustainable fuels
- Development of this technology will reduce Australia's petroleum import bill significantly and provide access to local fuel source that is not subject to global price fluctuations



GROWTH

- Mercurius' long-term stated ambition is to build and operate up to five commercial biorefinery projects in regional Queensland, to convert biomass into biocrude along with one central processing facility to convert the biocrude into renewable fuels while concurrently producing high value biochemicals and bioplastics



JOBS

- Mercurius and SOR expect to employ five additional personnel during this project



AMESRF

ELEVATING ADDITIVE MANUFACTURING



Mineral Technologies (MT) are not the nominal lead participant in this project. However, it is their vision that is driving it. MT have a five-year plan to adopt additive manufacturing for their spiral manufacturing and they see the Boundless AM technology as highly viable and are willing to collaborate with AMGC and Boundless AM to fund the development of the Boundless AM technology. This project seeks to deliver a commercially viable 2 metre single revolution 300mm spiral for Mineral Technologies. This is a project which attempts to grow 3D objects such as spirals from the ground up, using new resins, new hardware, and new software.

The proposed Boundless AM system is a new conceptualized manufacturing platform that features bottom-up resin additive manufacturing and integrated curing for the creation of large composite products. Existing manufacturing techniques used to create large composite products have a number of disadvantages, which Boundless AM seeks to overcome with their portable solution.

The project will help speed up the development of the Boundless AM system to a TRL 4. The commercialisation efforts that will follow will initially be focused on manufacturing spirals for MT, hence the cash contribution by that company. This commercialisation effort will include a containerised version of the system, such that it can be transported to the site where spirals are being used so they can be manufactured on site.

PROJECT COLLABORATORS



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Smarter inventory management
- Newer equipment
- Larger geographical reach



GROWTH

- Increase of \$15 million in sales over Five years



JOBS

- This technology platform will be part of a solution to provide graduates of the new advanced manufacturing centre at Griffith University as part of the Gold Coast Health and Knowledge Precinct some of the following jobs they will be seeking such as chemical engineering; software engineering; industrial design; mechanical engineering; electrical engineering; mechatronics engineering; additive manufacturing technicians; sensor engineering; and optics engineering
- Should this technology prove itself, Mineral Technologies could regain the 30% of sales currently captured by the two other global players in spiral manufacture, adding approximately 30 jobs to their Australian manufacturing facilities and potentially generating \$300 million over five years based on current financial projections



MANUFACTURE OF ENERGY EFFICIENT PVT COOLSHEET SYSTEM

PVT Lab developed a heat exchanger module, "THE COOLSHEET", that is to be placed under commercial photovoltaic panels (PV panel). The heat exchanger module draws heat from the PV panel, reducing the temperature of the PV panel (thereby increasing its efficiency) and transfers this heat into a water system and/or other applications.

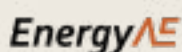
PVT Lab has improved the PVT concept and designed the Coolsheet as a patented system that requires no custom PV; can be retrofitted to most framed PV modules; and has been designed to ensure recyclability of all components of the system at the end of life. It is a PVT system that delivers high efficiency gains by transferring excess heat to water. The water/heat can then be used in the building, increasing the overall thermal efficiency of the building design.

The key points of differentiation of the Coolsheet include:

- ▶ Can fit almost any PV module with a frame
- ▶ Light weight
- ▶ Optimal flowrate whilst remaining energy efficient
- ▶ Can withstand extreme heat
- ▶ Unlimited number of PVT panels connected in parallel in one row

As part of a recent research project with UNSW, the Coolsheet system was measured to deliver 65% efficiency (combined thermal and electrical). As an outcome of this project, the data collected will drive further improvements in the efficiency of the system.

PROJECT COLLABORATORS



Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- ▶ Increased collaboration with research institutions
- ▶ Increased collaboration with other manufacturers
- ▶ Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- ▶ Larger patent portfolio
- ▶ Better energy efficiency
- ▶ Better water efficiency
- ▶ Larger geographical reach



GROWTH

- ▶ PVT Lab forecast \$5M in revenue over 3 years with a total market size of \$205M in new capital works and potential retrofits available.



JOBS

This project is projected to create additional employment as follows:

- ▶ CNC Laser/Router Operator
- ▶ Machine Operator/Electrical
- ▶ Two Factory Hands
- ▶ Quality Control Engineer
- ▶ Process Worker/Assembly line worker
- ▶ Sales Manager



AMESRF

Advanced knowledge

Advanced processes

Advanced business models

VALUE FROM SOLID WINE WASTE

This project seeks to validate a semi-continuous production process for transforming solid wine waste into high-value compounds. Once the process is validated, project participants will produce plans for an industry-scale production plant.

The Viridi Innovations 'waste to value' technology enables on-site processing of solid wine waste to produce tartaric acid and grape sugar. These are both key ingredients in the global food manufacturing value chain. Applying this technology to large-scale wine production improves production flexibility and generates better environmental outcomes.

Viridi's business model involves partnering with progressive wine producers, such as project participant Accolade Wines, to reduce their key input costs and share the value generated by selling excess product to other customers. The market demand for tartaric acid alone is expected to be US\$3.16 billion by 2022.

On conclusion of the project, project participants will have validated the 'waste to value' production process and produced designs for an industrial-scale application.



IMPACT

- Higher spending on R&D to design, construct and test a small-scale demonstration plant in collaboration with Swinburne University
- Larger patent portfolio
- Collaboration with Austeng to produce plans for an industrial-scale pilot plant
- Larger geographical reach by offering the Viridi technology to international wine producers



GROWTH

- The Viridi process has the potential to unlock more than \$600 of value per tonne of solid wine waste
- The potential gross value – addressing only the top five wine producers in the top 5 global wine producing regions (less than 4% of global wine waste production) – is more than \$500 million per annum



JOBS

- Ten medium to high-skilled jobs

PROJECT COLLABORATORS





INITIAL PROJECT FUND PROJECTS

INITIAL PROJECT FUND

PALM VEIN BIOMETRIC SCANNING SOLUTION

Card or token based identification and access control is commonly used by organisations and in locations with large numbers of users and/or members. At Universities for example, staff and student ID cards are issued to manage personal identification, physical access to campus locations, electronic payments on campus and various other transactions such as library borrowing.

Considered to be the only viable solution to any card-based identification problem is biometric technologies which use scanning patterns of a person's anatomy. Biometric technologies provide enhanced security and convenience, as well as eliminating complexity and security risks. They are inextricably linked to individuals and therefore cannot be forgotten, counterfeited, or stolen. They enable users to automatically confirm identity by comparing patterns of physical or behavioural characteristics in real time against enrolled computer records.

Of all potential biometrics solutions, Palm Vein (PV) biometric identification, over which AerVision has patented technology with its AerPalm system, is an advanced solution. AerVision's proposed palm vein biometrics solution (AerAccess) has the following advantages; highly reliable, encrypted repository for template storage and enterprise level event logging capability, fast and easy registration, fully compliant with cyber security and privacy requirements, contactless, can be retrofitted into any wall or surface, cost effective and AerAccess's PV system has 99.99% accuracy compared to 95% accuracy of only facial or finger biometric systems.

The aim of this project is to design and manufacture, a commercial version of the Palm Vein Biometrics Solution.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Larger patent portfolio
- More automation
- Larger geographical reach
- Increased trade intensity



GROWTH

AerVision Technologies estimate sales for the Five years to 2025 are:

- FY2020 \$840K
- FY2021 \$3.4M (requires the conversion of two major accounts)
- FY2022 \$9.6M
- FY2023 \$19.3M
- FY2024 \$27.3M



JOBS

AerVision anticipates adding:

- Two to 3 additional staff with engineering and software development domain skill
- Fifteen to 18 technical service and support personnel on conclusion of the project

INITIAL PROJECT FUND

CUTTING TOOLS USING ADDITIVE MANUFACTURING

Tungsten carbide cutting tools account for 70% of the cutting tool market, with the 30% balance being High Speed Steel (HSS) tools. China produces 84% of the world's tungsten carbide and Chinese Government controls on supply of this material in the last 10 years has resulted in prices for tungsten carbide becoming highly volatile.

As an innovative alternative, ANCA has been working with CSIRO to develop an additive manufacturing (AM) process to produce a near net shape tool with a hardened cutting edge which can then be finished using a grinding process. A 6-month pilot project was completed in early 2019 which proved that an additive manufacturing machine can successfully deposit a matrix with acceptable cutting performance.

The near net shape of the cutting tool means less material is used and less material needs to be removed in the grinding process, reducing waste and saving processing time. It makes sense to try and incorporate an additive manufacturing process inside the ANCA machine to eliminate this double handling process.

This project will position ANCA as a global leader, since there does not appear to be any dedicated hybrid machines. There is the potential with a new ANCA machine platform that the entire tool manufacturing process can be automated from start to finish.



IMPACT

- ▶ This project will enable ANCA together with its project partners to develop a patented and world leading technology, which has the potential to add significant value to manufacturing processes across many global industries, such as mining (drills, drill buttons, buckets and blades), aerospace (turbine blades), agriculture (blades and augers) and other manufacturing (hardened journals)
- ▶ A significant number of carbide tools are manufactured in China and imported into Australia due to a lower cost base. The more competitive nature on the new ANCA manufacturing process will allow Australian manufacturers to replace these imports in sizes 30mm and above



GROWTH

- ▶ ANCA conservatively estimate a revenue increase of AU\$9.80 million per annum



JOBS

- ▶ Five to 10 skills jobs including research engineers

PROJECT COLLABORATORS



GLOBAL SUPPLY CHAIN INTEGRATION

This project will identify and explore options for establishing a practical, openly published specification for trusted digital interoperability between supply chain participants. A prototype implementation will be explored and proven using the F-35 Joint Strike Fighter Australian manufacturing supply chain. Successful implementation within the aeronautical domain is expected to lead to broader adoption of the approach within the Hunter Class Frigate program, JORN, and throughout the Defence industry and beyond.

Manufacturing, business and information technology experts from Advanced Focus and Flinders University will work with BAE Systems, their F-35 supply chain partners Axiom and RUAG Australia, Special Processing Centre of Excellence, and a cross-section of SME Manufacturers from BAE Systems' broader supply chain to derive a practical digital information exchange approach.

Increased supply chain transparency between supply chain participants promises to deliver faster issue identification and resolution, improve trust relationships between customers and suppliers, provide a collective understanding of supply chain priorities, support improved risk management, and enable resource utilisation. Significant savings are expected across the supply chain via the elimination of paper-based processes that will become digital and dynamic.

This project's value in demonstrating real-time, cross-enterprise manufacturing status and digital supply chain management goes beyond advanced Defence manufacturing. Both direct and indirect transfer of this

technology into other key Australian industries such as mining, agriculture and construction sectors is anticipated. These sectors have similar challenges with real-time transparency of upstream and downstream supply chain, materials, people and tools.



IMPACT

- ▶ Demonstrated bi-directional supply-chain transparency between Australian F-35 manufacturers
- ▶ Reduced supply chain transactional costs for Australian F-35 SME manufacturers
- ▶ Prototype specification outlining a viable, non-proprietary approach to supply chain digitisation
- ▶ Recommendations for progressing the prototype specification into a potential de-facto standard via either a standards body or an industry consortia



GROWTH

- ▶ Knowledge gained via this project will contribute to a longterm goal to devise a freely available, broadly adopted, open standard that will aim to remove the burden on manufacturers having to adopt expensive proprietary commercial solution offerings in order to achieve inter-company digital supply chain interoperability

PROJECT COLLABORATORS



INITIAL PROJECT FUND

FULL CUSTOMISABLE 3D-PRINTED BICYCLE

This project will enable Bastion and project partners to achieve a valuable and highly differentiated market position by offering superior products that leverage Bastion's technical leadership in manufacturing lattice structures using Titanium alloys. This project also represents a gateway for the spill-over of Bastion's technology into other markets and mainstream products.

To achieve this objective Bastion Cycles together with the project partners must complete the following:

- ▶ Establish domestic in-house additive manufacturing capabilities and skills.
- ▶ Redesign, test and certify mass-customisable bicycle components.
- ▶ Develop mass-customisable carbon fibre components using 3D printed plastic moulds.
- ▶ Design and manufacture new Bastion bicycle model for commercialisation.

On completion of this project, Bastion and project participants will have established the additive manufacturing capability, knowledge and skills to commercialise fully-customisable premium bicycles.

This project will serve as a case study on how Australia SMEs can establish additive manufacturing capabilities for manufacturing mass-customisable products in a high-

value global market. The capabilities, knowledge and skills developed in this project are transferable to other industries that consume high-strength, light-weight components, i.e., aerospace, defence, automotive, marine and recreational sports.



IMPACT

- ▶ Greater share of services in total revenue
- ▶ Newer equipment to establish domestic in-house additive manufacturing capabilities and skills
- ▶ Increased automation



GROWTH

- ▶ Forecasted sales growth of 330% through the additional models from 60 bicycles per year in FY18 to over 200 bicycles per year in FY20
- ▶ Long term potential to produce over 1,000 units p.a., generating revenue in excess of \$10m p.a. manufactured components by 40–50%



JOBS

- ▶ Five to 10 new jobs will be created over the next two years with a further 10 forecast beyond 2020

PROJECT COLLABORATORS



INITIAL PROJECT FUND

MANUFACTURE OF AN RPCVD MACHINE



In an increasingly connected world, the demand for smarter, more powerful, and efficient electronics, delivered at lower-cost and higher-volume, continues to grow. The demand is starting to test the limitations of the incumbent manufacturing technology. This project aims to drive the commercial adoption of a game-changing Australian invention for the manufacture of semiconductor electronics such as Laser Diodes, LEDs, and microLEDs around the globe. The successful execution of the project will place Australia's technical leadership of plasma deposition technologies at the global forefront, in readiness for this continued industry growth.

BluGlass' breakthrough deposition technology called Remote Plasma Chemical Vapour Deposition (RPCVD) is a revolutionary, low temperature approach for the manufacture of semiconductor materials such as gallium nitride (GaN) at lower temperatures to create higher performing devices at lower cost. BluGlass has validated the RPCVD technology on 2-inch circular wafers, and now aims to increase the uniform deposition area suitable for up to 12-inch wafers in order to meet customer demand and scale up production.

The RPCVD technology, because of its low temperature and highly flexible nature, offers many potential benefits over existing technologies. These benefits include higher efficiency, lower cost, and substrate flexibility including GaN on silicon.



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Increased collaboration with research institutions
- Larger patent portfolio
- Better qualified employees
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Greater share of services
- Higher trade intensity
- Larger geographical reach



GROWTH

- BluGlass economic scenarios – GaN laser diodes target revenue
- BluGlass' target revenues for its laser diode business (subject to a number of economic scenarios) are estimated to grow to (AU\$M) \$40M* – \$74M** by FY2025

* Downside revenue target is based on a delay in the attainment of certain technical milestones that reduces the number of laser diode products for sale or slower customer demand and market growth

** Upside revenue target is based on the timely achievement of BluGlass' technical milestones and accelerated customer demand and market growth



JOBS

- During the project, BluGlass will employ nine employees
- On successful completion of the project, BluGlass estimates up to 50 new jobs will be created

PROJECT COLLABORATORS



Australian
National
University

Objective 3D
Printers – Parts – Scanners

Akela
Laser Corporation



BOSCH



Connect. Inform. Grow.

Advanced
knowledge

Advanced
processes

Advanced
business
models

INITIAL PROJECT FUND

INDUSTRY 4.0 PILOT

This pilot project is designed to help 12 Australian manufacturers, operating in a diverse range of industry segments, to improve their knowledge and adoption of Industry 4.0 technologies. This will provide a compelling demonstration to the wider Australian manufacturing industry of the benefits and pitfalls of integrating a fully integrating digital technology into operations and production processes.

Bosch has developed an audit tool that identifies technological capability gaps preventing SMEs from embracing Industry 4.0. The tool makes recommendations on how these companies can transition their businesses to the digital manufacturing era. Implementation recommendations may span the breadth of Industry 4.0 topics and will not be tied to specific proprietary technology platforms.

Implementation projects will assist companies to expand their technology capabilities and develop advanced characteristics. Depending on the site, these could include embracing highly integrated robotics, digitalisation of production processes, development of cyber-physical systems and high levels of automation. The implemented solutions will always be in line with the SME's business goals and ambitions delivered through IIoT and Industry 4.0 digital solutions.

After project completion, all SMEs will have taken steps to implement digital technologies that allow them to increase their contribution to global value chains. These SMEs will also serve as reference sites for three years and feature as Industry 4.0 case studies – made available to the broader manufacturing industry via site visits, AMGC's website, as well as via social media and partner channels.

PROJECT COLLABORATORS



Connect. Inform. Grow.

+ Ecosystem of 12 SMEs to be announced



IMPACT

- Higher spending on R&D to transition their legacy equipment to the digital manufacturing era
- Increased ICT intensity using the Industry 4.0 audit tool outcomes
- More collaboration with other manufacturers by producing case studies and facilitating site visits
- More automation through implementation projects



GROWTH

- After project completion, all SMEs will have taken steps to implement digital technologies that allow them to increase their contribution to global value chains. These SMEs will also serve as reference sites for three years and feature as Industry 4.0 case studies – made available to the broader manufacturing industry via site visits, AMGC's website, as well as via social media and partner channels



JOBS

- New and highly skilled jobs are expected to be created as Industry 4.0 principles are implemented, allowing manufacturers to increase their contribution to global value chains

INITIAL PROJECT FUND

CHABRIAT CONCRETE CONVEYANCE SYSTEM



Chabriat has developed and tested a ground-breaking new hose design which can convey ready-mix concrete with greatly reduced friction. This is the fundamental innovation upon which a revolutionary new concrete conveyance cycle can be built which requires vastly reduced machinery bulk and brings about major manual handling improvements from reduced onsite lifting demands.

The Chabriat concrete pumping equipment is less than 20% of the size and weight of conventional line pumping equipment. It weighs approximately 450 kg in total, compared to the approximately 2,700 kg load of a conventional hydraulic pump used for similar jobs. The Chabriat equipment does not need to be transported by a specialised truck and can be integrated on a ready-mix delivery truck.

By comparison with the high pressures involved in conventional line pumping, Chabriat's new pumping process is much simpler, safer and less demanding for the operators. The commercial upshot of this transformative new technology is that ready-mix concrete orders of 1 to 3 delivery truck loads can be readily conveyed from the chute of the concrete truck to the required location on site for a fraction of current cost.

The reduction in the scale of equipment involved and the relative ease of the manual handling requirement is a game changer for the concrete industry both in Australia and worldwide.

The object of this project is to produce a limited capacity working prototype of the Chabriat machine which effectively demonstrates in the field the essential functions of the new concrete conveyance technology.

PROJECT COLLABORATORS



IMPACT

- › Larger patent portfolio
- › Increased collaboration with other manufacturers
- › Increased levels of automation
- › Better energy efficiency
- › Greater share of services in total revenue



GROWTH

The potential Australian-based machinery sales revenue is calculated to reach approximately \$30 million per year in 5 years with the following escalation:

- › 2022 – \$0
- › 2023 – \$1 million
- › 2024 – \$3 million
- › 2025 – \$10 million
- › 2026 – \$30 million



JOBS

- › During this project, Chabriat is projected to employ one person to produce the working prototype



**CHIRON GLOBAL
TECHNOLOGIES**

Advanced
knowledge

Advanced
processes

Advanced
business
models

INITIAL PROJECT FUND

LIGHTWEIGHT CARBON FIBRE BODY COMPOSITE ARMOUR

Chiron Global Technologies (CGT) have developed a lightweight carbon fibre body composite armour that provides very high levels of protection and extended mobility, allowing unparalleled levels of realism in training. Chiron's armour is unique in design and functionality and has been identified as world-leading by industry experts.

The Chiron technology was validated with extensive testing undertaken to demonstrate the safety and degree of movement that is possible when wearing the armour. CGT received positive feedback from all of these trials, including that the current armour provides more protection than much of their operational armour.

In this project CGT will develop and validate, at commercial scale, the Chiron-X1 body armour – building on the Gen 1 prototype armour that they have developed and trialled with multiple defence and law enforcement users over the last 12 months.

The CGT business model includes close collaboration with global distributors to scale exports of the body armour to allied defence forces, law enforcement agencies, security companies and corrections facilities globally. Once these vital steps are achieved, CGT's IP will become a commercial reality in terms of manufacturing.

Following successful development of the Chiron-X1 armour, the product development pathway includes the development of armour with embedded biometric and impact sensors that record the force and location of strikes for training and operational use ('Chiron-X2') and ballistic operational armour ('Chiron-X3').

PROJECT COLLABORATORS



IMPACT

- Higher spending on R&D
- Increased collaboration with research institutions
- Larger geographical reach
- Higher trade intensity



GROWTH

Chiron Global Technologies estimate to generate \$144M in revenue over five years from 2020 as follows:

- 2020 – \$1.3M
- 2021 – \$4.9M
- 2022 – \$28.2M
- 2023 – \$50M
- 2024 – \$60M



JOBS

The project will generate the following increase in employment:

- Approximately six staff will be engaged directly by CGT
- One to two additional staff may be engaged by The Smart Think

After the project it is anticipated that new staff opportunities will occur as follows:

- Thirty to 40 skilled jobs at CGT
- One to two skilled jobs at The Smart Think
- Up to 20 jobs across domestic project partners and prospective future partners



Advanced
knowledge

Advanced
processes

Advanced
business
models

INITIAL PROJECT FUND

COMPRESSED AIR POWERED UPS (UNINTERRUPTIBLE POWER SUPPLY) FOR UNDERGROUND MINES



Underground coal mining has gone through many rapid changes in the last 20 years, with the introduction and revision to Safety & Health Legislation, the advancement of technology supporting this legislation and operational progressions incorporating technological advancements. Geographically this has seen mines become more complex and an increase in physical size with life of mine extensions. With the increase in mine size comes an increase in mine activities and ultimately an increase in exposure to principle hazards.

Underground coal mining relies on either electricity, pressurised water, or compressed air for energy sources to enable the mining activities. When a mine's underground workings advance, so do the three reticulated services supplying the mining equipment and processes. Harnessing a mine's widespread and reliable compressed air supply for energy conversion, Air2Volts™ (UPS) offers an inexpensive and reliable solution for supplying intrinsically safe power to critical and non-critical mine environmental monitoring, communications and control systems.

With no moving parts, Air2Volts™ provides a convenient, reliable and uninterruptible power supply for underground roadways geographically too remote or areas without ease of access to electrical reticulation. It is a more reliable and economically viable solution to powering communications equipment in today's smart mines. Air2Volts™ is a platform technology employing two phenomena that when combined, controlled and applied, create electrical energy through the energy conversion and harvesting of a compressed air supply.

Cool Mine has patented and completed Stage 1 Concept Design of the development of Air2Volts™. With Phase 1 completed and successful, this project will continue and allow Cool Mine to develop, design, test, review, certify and commercialise.



IMPACT

- › Increased spending on R&D
- › Increased collaboration with research institutions
- › Increased collaboration with other manufacturers
- › Better qualified employees
- › Newer equipment
- › Better energy efficiency



GROWTH

CoolMine estimate the following projected revenue:

- › 2021 – \$2M
- › 2022 – \$5M
- › 2023 – \$10M



JOBS

During this project Cool Mine estimate they will employ approximately 10 additional people

PROJECT COLLABORATORS

ingenuity

INITIAL PROJECT FUND

EMBLASER3 – WORLDS FIRST SAFE PORTABLE LASER CUTTING DEVICE

This project will develop the world-first classroom-ready, student-friendly, affordable desktop laser cutting device, complete with mathematics, engineering, science and technology (MEST) education materials for easy integration into primary and secondary curricula. The Emblaser3 will be a safe, affordable, low-maintenance, easy-to-use laser cutter, manufactured in Australia for a global market and is expected to significantly displace imported alternatives in the Australian education and small office/home office (SOHO) market sectors.

The Emblaser3 will be designed for portability and hands-on use in the classroom by students and teachers alike. The solution will include a number of unique features relating to safety, maintenance and ease of use that will make it a leader amongst devices competing in the target market segments.

The solution will expand the use of solid-state laser technology, which Darkly Labs has pioneered, and which forms the backbone of their technologies and IP. This technology provides superior reliability, efficiency and safety over traditional and inefficient systems that use CO2 technology for laser cutting and engraving.



IMPACT

- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Increased use of automation
- Newer equipment
- Better energy efficiency
- Higher trade intensity
- Larger geographical reach



GROWTH

Darkly Labs estimate they will be able to increase their domestic and export sales revenue with the Emblaser3 as follows:

- 2021 – Domestic +30%, International +30% – \$1,350,000
- 2022 – Domestic +30%, International +50% – \$2,500,000
- 2023 – Domestic +25%, International +50% – \$3,250,000
- 2024 – Domestic +25%, International +30% – \$4,500,000
- 2025 – Domestic +25%, International +30% – \$5,250,000



JOBS

- During this project Darkly Labs estimate they will employ 10 additional staff

PROJECT COLLABORATORS



INITIAL PROJECT FUND

ACTIVE WHEEL ALIGNMENT SYSTEM

It is well-established that one of the major factors influencing the handling, performance, safety, fuel efficiency and tyre life in any vehicle is the wheel alignment. Until now, wheel alignment can only be adjusted manually by a mechanic in a workshop, where a single wheel alignment setting is chosen. In an ideal world, wheel alignment should vary in real-time.

To address this challenge, DOFTEK has developed and patented the first commercially viable solution to this problem, namely DOFTEK's Active Wheel Alignment System. The system electronically adjusts and optimises the wheel alignment under different driving scenarios, and in real-time. The benefits of the system include:

- » Fully compatible with front axle, rear axle and existing suspension geometries used by the vehicle manufacturers today;
- » Rapid, independent control of wheel camber, toe and castor;
- » Adjustment provided by push-button, dynamic control (semi-active) or adaptive control (real-time);
- » Compact and bolt-on fitment with no changes to the vehicles required, and
- » Lightweight with a negligible increase in fitted weight.

DOFTEK's goal is to translate their system into as many new cars as possible, with mass scalability being a major consideration for their product from the beginning. DOFTEK's system has been designed to leverage as many existing automatable manufacturing processes as possible, such as CNC machining, injection moulding, additive manufacturing and robotic assembly/handling.

PROJECT COLLABORATORS

In this project, DOFTEK and engineering partners will develop a scalable and commercial-grade Active Wheel Alignment System for testing in a vehicle's production and operational environment.



IMPACT

- » Increased spending on R&D
- » Increased collaboration with other automotive manufacturers
- » Upskilling of current workforce
- » Increased levels of automation
- » Larger geographical reach
- » Increased trade intensity
- » Increased fuel efficiency and tyre longevity



GROWTH

- » Potential to generate significant new revenue for Australian manufacturing ahead of global licencing and export opportunities



JOBS

- » Forty new jobs across DOFTEK, its domestic project partners and prospective future partners

3D PRINTING OF ANATOMICAL TISSUE

This project will develop and field-test novel methods for extending the haptic and tactile properties of 3D printed replica human tissues for use in surgical training models.

Fusetec 3D recently released the world-first 3D-printed sinus model that accurately replicates the tactile and haptic characteristics that surgeons would experience when operating on a human patient. The 3D sinus model is available with a range of pathologies to enhance surgical training scenarios. However, the models already push the boundaries of currently available high-end commercial 3D printing technologies.

While Fusetec 3D's sinus model has already been broadly accepted by leading ENT surgeons around the world, the tactile and haptic fidelity required to accurately replicate certain other human tissues is not achievable using off-the-shelf 3D printing technologies. This project seeks to augment commercially available additive manufacturing technologies with other techniques and processes to achieve the material characteristics necessary to replicate a range of human tissue types for use in high-fidelity surgical training scenarios.



IMPACT

- Increased collaboration with research institutions
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Optimised automation and energy efficiency
- Broader export-focused product portfolio
- Larger geographical reach



GROWTH

- Fusetec 3D projects 20X growth by 2024



JOB

This project will generate the following increase in skilled employment:

- Fusetec 3D – During: Two, Post Project: Six
- University of South Australia – During: Two
- University of Adelaide – During: One

PROJECT COLLABORATORS

COMPOSITE-WOUND ROCKET TANKS

Gilmour Space Technologies is developing a hybrid propulsion launch vehicle to deliver payloads of up to 250 kg into Low Earth Orbits (LEOs). Their most recent suborbital prototype was constructed primarily using aluminium tank components. However, whilst aluminium is cheaper, it does result in a heavier launch vehicle. Gilmour anticipates that by using carbon fibre composite tanks for their three-stage rocket, they would be able to achieve a lower weight mass for their launch vehicle which will be needed for a globally competitive LEO orbital launch vehicle.

Typical launch prices quoted by rocket launch companies are around \$45,000 per kg. The effect of the weight savings would translate into an increased revenue potential of \$945,000 per launch for Gilmour and conversely, it will make them more competitive by a similar amount.

The composite tanks will be designed using filament winding process. This involves an automated process of wrapping resin impregnated filaments (rovings or tows) in a geometric pattern over a rotating male mandrel. The component is then cured under high pressure and temperature.

This project will enable Gilmour Space in Australia to design, develop, test and produce high-quality carbon fibre wound rocket propellant tanks for their hybrid propulsion motor systems. It is a capability that would enable this leading rocket company to manufacture and export lightweight, price-competitive rockets for customers around the world as well as launching rockets in Australia.

PROJECT COLLABORATORS



Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- Increased collaboration with other manufacturers
- Increased spending on R&D
- Increased collaboration with research institutions
- Larger geographical reach
- Reshoring of rocket tank manufacturing
- Newer equipment



GROWTH

- Gilmour forecasts that the business of launching small LEO satellites to space using their launch vehicles could bring in revenues of over \$100 million by 2025



JOBS

Gilmour estimate that deployment of their tank manufacturing facility will see the appointment of the following skilled staff:

- Two production engineers
- Five semi-skilled production assistants

CLOSED LOOP MANUFACTURING

HeliMods is a uniquely vertically integrated aerospace technology company with complete capability across design, engineering, manufacturing, certification, and integration. Due to the nature of the work in which HeliMods specialises, there is a high proportion of 'first-of-type' items produced when compared with other manufacturing organisations.

First-of-type production requires much higher levels of control and oversight to ensure:

- ▶ New item information is interpreted and understood by manufacturing as intended by the design capability
- ▶ Process steps are validated
- ▶ Quality is maintained throughout production
- ▶ Any issues encountered are accurately captured and fed back for update
- ▶ Any improvements can be suggested and incorporated for review and update

HeliMods has identified that through Closed Loop Manufacturing (CLM), many elements relating to these points can be addressed to greatly improve the effectiveness and efficiency of both first of type production and production in general, which will significantly improve HeliMods' competitiveness in local and global markets, positioning the business to scale and continue offering unique sovereign industrial capability.

The aim of this project is to apply CLM across HeliMods' manufacturing capability through implementation of a state-of-the-art Siemens Manufacturing Execution System

PROJECT COLLABORATORS



Advanced knowledge

Advanced processes

Advanced business models



(MES), closely integrated with existing advanced Product Lifecycle Management (PLM) and Enterprise Resource Planning (ERP). While MES provides numerous benefits when considered independently, it is the close integration of all three systems (PLM, ERP and MES) that can be classified as CLM and provides the greatest overall potential benefit. HeliMods' aims to integrate its systems across the organisation.



IMPACT

- ▶ Higher information and communication technology (ICT) intensity
- ▶ Increased levels of automation
- ▶ Increased operational effectiveness and efficiency
- ▶ Larger geographical reach
- ▶ Increased collaboration with other manufacturers



GROWTH

- ▶ This project will aid HeliMods to become even stronger and more competitive in the global marketplace, opening new, high-value export opportunities with larger customers in key European and North American markets



JOBS

- ▶ During this project HeliMods estimate they will employ approximately 10 additional people



INITIAL PROJECT FUND

PRODUCT LIFESTYLE MANAGEMENT SYSTEM



This project aims to introduce a digital manufacturing environment, centred around a digital-twin, which enables advanced manufacturing processes and improved collaboration, increased responsiveness and flexibility between the various supply chain partners that contribute to the HSV end-product.

HSV has identified a range of process improvements that must be implemented to enable product line expansion and to take advantage of export opportunities. HSV and project participants will implement a state-of-the-art Product Lifecycle Management (PLM) system. The resulting platform provides a digital collaborative working environment that enhances the design and production of a vehicle and its components. The project will deliver the following operational advantages to HSV:

- Improved design efficiency and production preparation processes
- Improved product design integrity due to new technology
- Enhanced services between suppliers and customers due to improved business model
- Improved compliance monitoring and adherence due to improved external collaboration capabilities.

To realise these opportunities, HSV must now implement the PLM system as well as the necessary changes to internal processes and supply chain partner integration.

AMGC and project participants will conduct a series of five workshops (one in each mainland capital city) entitled "How to apply Digitalisation as a strategy for process improvement and enhanced supply chain integration". The workshops will be presented and hosted by AMGC and the workshops will note that attendees will not be tied to a specific proprietary technology platform.

PROJECT COLLABORATORS

The intended output of the workshops is to increase the uptake of digital technologies in Australian manufacturing firms via peer-to-peer knowledge sharing of HSV's experience in implementing the PLM system, as well as educating SME's on the benefits of digitisation and enhanced supply chain integration.



IMPACT

- Increased ICT intensity
- Increased collaboration with other manufacturers
- HSV anticipates an increase of 350–500 new components per product line, with these components being designed and manufactured by Australian component suppliers
- Benefits also extend to supply chain partners that develop new products for HSV in the new digital-twin working environment, which enables SME's to enhance their new product development capabilities



GROWTH

- On completion of the PLM system implementation, HSV and its Australian supply chain will be positioned to evolve beyond what is seen, in global terms, as a local, bespoke engineering firm, to become a viable low-volume Australian manufacturer of premium automotive products for both domestic and export markets



JOBS

- Over the past three years HSV has grown staff numbers from just under 300 to over 500



DASSAULT SYSTÈMES VIRTUAL SHIPYARD

The Dassault Systèmes Virtual Shipyard is the first national level Industry 4.0 capability development program in Australia, benchmarked against world's best practise approaches.

This project identifies and bridges digital capability gaps of 14 SMEs looking to advance their Industry 4.0 capabilities and improve their readiness to participate in major future manufacturing opportunities such as Australia's Future Submarine program.

The project will facilitate critical knowledge transfer from global experts to the University of Adelaide, TAFE South Australia and University of South Australia to build curriculum for future independent training delivery.

AMGC is co-funding the provision of ICT support and 12 months of post-training access to cloud-based infrastructure to enable participating SMEs to embed their new-found skills into standard day-to-day operations.

Upon conclusion of the project, SMEs will have gained the skills necessary to integrate themselves into global value chains, and will have applied those skills within their own companies on real manufacturing projects.

The project will provide the Australian manufacturing industry a tangible demonstration of increased digital capability and advances the Australian manufacturing eco-system towards achieving a world class Industry 4.0 capability to exploit global value chain opportunities in multi-billion-dollar defence, mining, health, water and energy industries.



IMPACT

- Higher information and communication technology (ICT) intensity and increased SME digital capability to increase opportunities for global supply chain participation within major projects
- More collaboration with other manufacturers during the AMGC project
- Higher manufacturing digital literacy as a result of training on the Dassault Systèmes 3D Experience platform
- Newer equipment and systems as a result of integrating the Dassault Systèmes platform into SME manufacturing operations
- Larger geographical reach and increased potential for accessing global value chains using the Dassault Systèmes platform
- Multiple future I4.0 tertiary education options via University curriculum development supported by Dassault Systèmes during the Virtual Shipyard project



GROWTH

- Curriculum developed by University of Adelaide, TAFE South Australia and University of South Australia with assistance from Dassault Systèmes as part of the Virtual Shipyard project will help grow Australia's high-skilled workforce ready for I4.0 jobs required by global supply chains to deliver future naval ships and submarines, mining, health and energy sectors
- Participating SMEs will have the digital literacy of relevance to global primes, enabling them to more easily participate in digital supply chains for major projects

Advanced knowledge

Advanced processes

Advanced business models



JOBS

- ▶ SMEs are expected to create new high skilled jobs, enabled by increased efficiencies driving increased revenue streams in new and existing markets

PROJECT COLLABORATORS





Advanced knowledge

Advanced processes

Advanced business models

INITIAL PROJECT FUND

SUPERCAPACITOR ELECTRODE MATERIALS



There is a wide range of energy storage solutions available for the plethora of devices that are available to consumers today, all of which have a different balance of energy and power.

New applications are increasingly hungry for both power and energy, and the challenge for modern energy storage technologies is to create devices that combine high energy and high power. One way to achieve this is to create supercapacitors that store more energy while retaining their capacitor qualities of high power and long lifecycle.

Ionic, in collaboration with researchers at Monash University, has developed roll-to-roll electrode materials for use in fabricating high-performance graphene supercapacitors (SC). Specifically, the team has developed a proprietary ink that is combined with several printing and curing processes to deliver more energy while retaining their capacitor qualities of high power and long lifecycle. This project seeks to commercialise this technology and realise the market opportunity.

The surface area of activated carbon used in supercapacitors is one of the limitations of supercapacitors. A higher surface area would mean a better energy charge storage. Nano-engineered graphene materials show excellent potential as a replacement for activated carbon in supercapacitors, in part due to graphene's high relative surface area which is significantly greater than that of activated carbon. In addition, graphene-based supercapacitors capitalize on its light weight, elastic properties and mechanical strength.

PROJECT COLLABORATORS



This project will provide the Australian manufacturing industry with a tangible demonstration of the development and commercialisation of leading IP. The project will enable Ionic and its supply chain partners to transform the energy storage market in Australia and globally.



IMPACT

- › Better energy efficiency
- › Larger geographical reach
- › Increased collaboration with other manufacturers
- › Newer equipment
- › Larger patent portfolio



GROWTH

Over the next five years Ionic conservatively estimates USD\$ sales to be:

- › 2020/21 – \$160,000
- › 2021/22 – \$800,000
- › 2022/23 – \$1,600,000
- › 2023/24 – \$8,000,000
- › 2024/25 – \$16,000,000



JOBS

Ionic estimate:

- › Three full time plus casual staff for the pilot plant
- › 10–30 full time staff for the final manufacturing set-up

INITIAL PROJECT FUND

PRODUCTION SCALING OF ORTHOTICS

The first AMGC grant was utilised to allow mass customisation of material orthotics to replace the rigid orthotics manufactured by subtractive machining of polypropylene. These orthotics types account for 50% of the iOrthotic product range and result in an annual reduction of around 60 tonnes in waste polypropylene.

This new project is focussed initially on replacing top cover and add-on materials with Thermoplastic Poly-Urethane (TPU) powder material in a new HP Fusion Jet printer model (HP5200) suitable for that material. This will enable significant scale of production. The findings from TPU material testing will be used to develop a replacement for subtractively manufactured Ethylene-Vinyl Acetate (EVA) orthotics which will result in an annual reduction of 15 tonnes of waste EVA.

Substantial product advantages and variations for other specific medical conditions together with manufacturing improvements will be achieved through this technology development, as the current process is the most manual labour intensive manufacturing step in any orthotics laboratory.

This contrast in material deposition inclusive of the interface between macro and microstructures is what is being obtained through the technology advancement of this grant. To achieve this, iOrthotics will require the purchase of a new Model 5200 3D printer that can print TPU and thereby remove the reliance on traditional CNC milling. The second goal of this project is to develop the technology components for a fully integrated ERP (Enterprise Resource Planning) system.

PROJECT COLLABORATORS



IMPACT

- Increased collaboration with research institutions
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Better qualified employees
- Newer equipment
- More automation through technology development
- Smarter inventory management
- Larger geographical reach



GROWTH

- An additional \$25 million globally within five years



JOBS

During the project, iOrthotics will require:

- One junior applications developer
- One senior applications developer
- One web developer
- Five to 10 full time positions will be created within two years of the project



Advanced knowledge

Advanced processes

Advanced business models

INITIAL PROJECT FUND

LAVO HYDROGEN ENERGY STORAGE SYSTEM



Providing reliable, affordable and sustainable power generation and supply without CO2 emissions is one of the biggest challenges facing governments, energy corporations and individuals. Renewable energy production is leading the push to a low carbon economy; however, it faces the challenge of overcoming intermittency of supply in order to become a long-term and viable substitute for coal, gas and nuclear energy sources.

Energy storage systems have emerged as a vital complement to the variable nature of wind and solar power intermittency. Market-available systems, currently dominated by Lithium-ion batteries, have a limited lifespan and create negative environmental impacts during production and disposal.

The patented LAVO technology solves some of these problems by creating a Hydrogen-based power unit, LAVO hydrogen energy storage system. The LAVO hydrogen energy storage system uses innovative, patented metal hydride technology to store hydrogen equivalent to up to 60kWh which will produce 40kWh of useable electricity. This is enough power for approximately three days of some commercial applications and most domestic applications.

LAVO will in the long term be expanding to markets other than small commercial and domestic units by targeting shopping centres, manufacturing plants, hospitals, solar farms and wind generation plants with their H2Store commercial storage batteries.



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Larger patent portfolio
- Increased levels of automation
- Better energy efficiency
- Greater capital intensity and newer equipment
- Higher product value density (by weight)
- Higher marketing expenditure
- More extensive backward links
- Larger geographical reach



GROWTH

- LAVO expect \$253 million in sales revenue by 2023.



JOBS

This project is projected to create an additional 250+ jobs by 2025

PROJECT COLLABORATORS



PROVIDENCE
ASSET GROUP



UNSW
SYDNEY



VARLEY
EXCELLENCE SINCE 1886

GREATER
SPRINGFIELD



MANUFACTURING OF HIGH-VALUE ALGAE SPECIES

Many people suffer from infectious, inflammatory, and cardiovascular diseases. Protein-based drugs are the fastest growing class of drugs for the treatment of these diseases in humans and other diseases in animals. The numbers of people with diseases such as diabetes are growing, and while new technologies are making proteins easier to produce, the current methods of production of proteins for pharmaceutical applications are predicted to fall short of future demand.

Algae is an alternative basis for the manufacture of these protein compounds. Existing algae production systems are capable of producing only 12 (out of a possible 5 million) algae species in GMP compliant facilities. Production limitations restrict the potential discovery and commercialisation of high value natural products and impede the viability for algae to be used in pharmaceutical, agrochemical and food applications.

This project aims to scale up Provectus Algae's biorefinery platform for commercial production of high-value algae species and realise the commercial potential of their technology. Provectus Algae have established a minimum viable biorefinery platform by utilising algae which offers major production advantages over bacteria, fungal and mammalian cells for the synthesis of next generation biologics. The automated bioreactors with IIoT integration and AI capabilities are designed to be CGMP compliant and suitable for the production of pharmaceutical, food and agricultural products.

On completion of this project, Provectus Algae will have implemented a fully automated, commercial scale, algae biologics manufacturing facility. This project is expected to

benefit the Australian biological manufacturing industry by improving yields through real-time optimisation, and reduced contamination through automation.



IMPACT

- » Increased spending on R&D
- » Increased information and communications technology
- » Increased collaboration with other manufacturers
- » Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- » Increased levels of automation
- » Better energy efficiency
- » Newer equipment
- » Higher trade intensity
- » Higher market expenditure



GROWTH

- » Provectus Algae expect to generate \$1–\$2 million/year per product range enabling the operation to continue and allow advancements on the pharmaceutical platform licencing to develop further



JOBS

- » During this project Provectus Algae expect to create an additional 20 jobs

PROJECT COLLABORATORS



CURING TECHNOLOGY

Quickstep and AMGC have undertaken a project to develop a low-cost carbon fibre composite fender aimed for the European automotive market. This project has seen Quickstep qualify to supply composite fenders via a joint venture entity in Europe to satisfy requirements for just-in-time manufacture within 200km of their assembly plant. The concept has since attracted interest from composite material suppliers and aerospace manufacturers.

Quickstep is now seeking to adapt the Qure process for aerospace applications. The proposed 'AeroQure' solution will be an enhancement of the technology developed for the automotive industry in the previous AMGC project with Quickstep. In this follow-on project, the system pressure will be increased from 0.8 bar, used in the Qure process for Automotive components, to 2.5 bar in order to achieve the level of porosity and void content required for aerospace components while keeping production cycle times closer to typical production rates for sports and luxury cars.

Out of Autoclave (OOA) technologies promise those cost reductions and higher rates of unit production. The main OOA technologies the industry is currently focusing on still require significant cycle times or be some way from reaching technology maturity. These technologies have the potential to be much faster, but currently they involve significant risk and are slower than conventional autoclave technologies.

A closed mould, high rate curing technology like Quickstep's AeroQure 2.5 to be developed in this project, has the potential to reduce price per aerospace component by 25–35% due to a faster and more automated process and a lower capital cost amortisation.



IMPACT

- ▶ This project aims to develop a superior product offering via an advanced manufacturing process that achieves the future rate needs of commercial aircraft manufacturers for current and new programs (expected to reach monthly rates close to 100 aircraft and higher). The process will be significantly faster and more cost competitive than traditional autoclave curing and will be competitive with other out-of-autoclave curing processes being developed internationally.



GROWTH

- ▶ Technology ready for increased production volume of 100 parts per month on completion of this project, with future potential to reach a monthly target rate of up to 500
- ▶ Reduce product rework issues such as core crush (collapse of composites during the autoclave process)



JOBS

- ▶ Three to 10 positions when a contract is in place

PROJECT COLLABORATORS



THE POWER OF **REDARC**[®]

INITIAL PROJECT FUND

INDUSTRY 4.0 SMART FACTORY

This project will enable REDARC in collaboration with the other project participants to accelerate the adoption of advanced Industry 4.0 capabilities throughout its Adelaide-based manufacturing operations, thereby allowing REDARC and other SME's to capture a greater proportion of global defence and export opportunities that exist in the immediate term. REDARC has recently invested in a substantial factory expansion; AMGC's co-funding will enable planned advanced manufacturing benefits to be brought forward and to be a leading Australian-owned mid-sized manufacturer addressing global market opportunities.

Currently, there are few local examples or pathways to effectively apply I4.0 knowledge in the local SME context. How I4.0 delivers value for Australian SME manufacturers is still emerging. Early adopters must invest disproportionately in order to de-risk the execution and gain first mover advantages.

REDARC recognises it cannot just do this work on I4.0 internally but also must lead this new knowledge transfer to its local strategic suppliers. Sharing outcomes and case studies with the broader Australian industry from this early adoption will help project participants and many other Australian companies to better understand what is possible in Australia through the outcomes and lessons developed in REDARC's I4.0 program.

This project will further develop REDARC's workforce, Industry 4.0 technology adoption, and business processes through collaboration with key supply chain partners and expert local service providers.

PROJECT COLLABORATORS

Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- › Increased spending on R&D
- › Increased information and communication (ICT) technology
- › Increased collaboration with other manufacturers
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Better qualified employees
- › Increased levels of automation
- › Smarter inventory management
- › Newer equipment



GROWTH

- › REDARC's 2025 strategic plan aims to drive product portfolio growth with a focus on export and defence markets.



JOB

- › This project is projected to upskill and create an additional 36 jobs.



INITIAL PROJECT FUND

3D PRINTED METAL AND CARBON FIBRE CUSTOMISED WHEELCHAIR

Globally, there are 75+ million people that need or use a wheelchair according to the World Health Organisation (WHO). In Australia alone, there are an estimated 175,000 people who require the use of a wheelchair.

Getting a wheelchair fitted to each individual body is much like getting a pair of shoes fitted. There is no one-size-fits-all. For an active, full-time wheelchair user, the fit and weight of a wheelchair are extremely critical for good health and wellbeing all reducing ongoing health issues.

Rove Concepts has designed and developed a new wheelchair, using advanced manufacturing methods including 3D printed metal alloy lugs and carbon composite tube. This new design combined with advanced digital processes reduces manufacturing time, enabling the production of a lightweight and stiffer wheelchair that is mass customised to the body type of each user.

This solution will provide the following benefits to customers:

- Perfect fitment.
- Fast lead times.
- Lightweight.
- Modularity and Repairability.
- Improved measuring and scripting process.

On completion of this project, Rove Concepts will achieve the following capabilities and competitive advantages; Mass customisation of frames, manufacturing process becomes more streamlined, improved measuring and scripting and

lower labour cost due to improvements in process and automation which will minimise the amount of labour required for wheelchair build.



IMPACT

- Increased spending on R&D
- Higher information and communication technology (ICT) intensity
- Increased collaboration with other manufacturers
- Higher relative salaries and wages
- Increased levels of automation
- Smarter inventory management
- Higher trade intensity
- Larger geographical reach



GROWTH

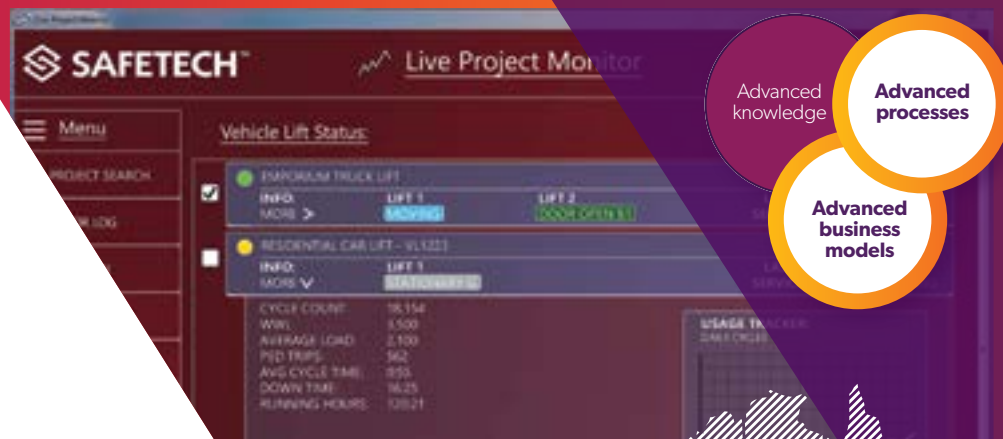
- Rove Concepts has forecast sales growth of sales of wheelchairs from 60 units in 2021 to 350 units in 2024
- Long term potential to produce over 1,000 units p.a generating in excess of 10m p.a
- Projected sales growth will also generate significant new work for project partners



JOBS

- Up to five new jobs will be created over the next 2 years with a further 10 forecast beyond 2022

PROJECT COLLABORATORS



Advanced knowledge

Advanced processes

Advanced business models

INITIAL PROJECT FUND



SERVITISATION PLATFORM

Safetech's goal is to develop an interface that delivers equipment and job flow information in a format that is flexible and suited to individual customer needs. This interface must be adaptable by Safetech for new customers and to the changing requirements of established customers. The project will utilise IMF (project participant) sensors, hardware, and possibly their software if it is flexible and capable enough to meet all of Safetech's requirements.

The Safetech Information Management System – SIMS Plus will allow:

- Real time feedback from a range of sensors installed on their lifting and door equipment that will detect out-of-parameter incidents
- Real time product diagnostics and analytics which will provide predictive maintenance data for more efficient uses of customer resources
- Customers to access workflow data to improve their operating efficiency, lower their maintenance costs and improve future equipment purchasing decisions.

This project aims to make this detailed workflow information and problem solving capability widely available to service all their customers. Enhanced visibility over operations, real time KPIs, better scheduling and increased product performance feedback will all help their customers to generate greater operational insight and increase the value of Safetech's equipment to their end users.



IMPACT

- Increased collaboration with research institutions
- Greater share of services in the total revenue through the selling of software
- Larger geographical reach
- Flexibility of maintenance cost by using a predictive maintenance schedule



GROWTH

- \$1m per annum of new product from one major retailer alone if use becomes mandatory, increasing to \$5m per annum with other retailers.
- Between \$1m and \$1.3m in software sales to mining companies, in addition to the \$525k each in hardware unit sales



JOBS

- Twelve product engineers, 2 control engineers, 3 production engineers, 2 draftsmen, 13 technical sales plus specialist marketers

PROJECT COLLABORATORS



INITIAL PROJECT FUND

RESHORING AND MANUFACTURE OF SEABIN 6.0

Seabin Smart Technology was developed to collect ocean bound trash, microplastics, oil, fuel and even plastic fibres. The smart tech moves up and down with the tide collecting floating rubbish. Water is sucked in from the surface and passes through a catch bag inside the Seabin, with a submersible water pump capable of displacing 25.000 litres per hour, plugged directly into 240 or 110V outlet and also being solar compatible. The current Seabin is predominantly manufactured with HDPE and marine grade stainless steel. The next tech Seabin 6.0 will be designed for manufacture using a larger percentage of either Nylon 6 or HDPE recycled fishing nets and also will see a reduction of up to 70% in the steel components.

This project seeks to re-shore the manufacturing of Seabins from France to Australia to create employment opportunities and in the process create a much more efficient, smarter and more sustainable product.

The development of the sensor and connectivity-enabled Seabin 6.0 is a critical element to be used in conjunction with the Pollution Index®, working with authorities like The United Nations Environment Program to become an indicator for the Sustainable Development Goal 14 (Conservation and Sustainability for Marine Resources) as well as working with Environmental Protection Agencies world-wide to quantify the health of our waterways and the amount of plastics in our oceans. The IoT enabled Seabin 6.0 and the Pollution Index® will be an important hardware and software platform combination to measure the success of solutions in the upstream marine environment.



IMPACT

- Higher spending on R&D
- Increased collaboration with research institutions
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT) intensity
- Better qualified employees
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Newer equipment
- More automation



GROWTH

Seabin estimates its sales will be as follows:

- 2020 – \$5,806,091
- 2021 – \$11,844,130
- 2022 – \$18,094,951
- 2023 – \$27,682,030
- 2024 – \$31,003,873



JOBS

- During this project Seabin expect to employ an additional nine staff

PROJECT COLLABORATORS





INITIAL PROJECT FUND

LASER ETCHING OF INDIVIDUAL OYSTERS

The Australian oyster industry suffers from its inability to differentiate its products from imports and compete on cost in both the domestic and export markets. With validation of each state-of-the-art technology component completed in this project, Shellfish Culture is ready to proceed with the development of a prototype hardware system for the automated processing and laser etching of individual oysters through:

- › A vision system for the identification of the unique and variable shape of the oysters,
- › A 'soft-grip' automated robot to correctly orientate and align the oysters for accurate delivery to the laser, and
- › A CO2 laser for etching of symbol(s) on the underside of the oyster to identify the provenance of the oysters.

Shellfish Culture will offer this service to the entire Tasmanian oyster industry to differentiate product, open access to new markets and reduce processing costs with an increased capital intensity. Once the Tasmanian business model is proven, the technology will be opened to other states through licensing agreements where the benefits could be realised in the \$112 million Australian edible oyster market.

Shellfish Culture have prepared long term strategic goals which plan for future applications with other shellfish such as Abalone and Scallops.



IMPACT

- › Increased collaboration with research institutions
- › Larger patent portfolio
- › Better qualified employees
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Newer equipment
- › More automation
- › Greater share of services in total revenue



GROWTH

- › Shellfish Culture estimates an increase in export sales of 25% or 350 tonnes annually, resulting in an increase in revenue of \$3.5 million



JOB

- › This project is projected to upskill and create an additional 10 jobs.

PROJECT COLLABORATORS





Advanced
knowledge

Advanced
processes

Advanced
business
models

INITIAL PROJECT FUND



MANUFACTURE OF DUAL-LENS FISHING CAMERA

Siren Cameras, in collaboration with project partners has designed and patented a bespoke dual-lens floating action camera to supplement consumer desire for visually documented footage of their fishing experiences. The Siren camera offers a solution while satisfying the deep-rooted anglers desire to visualise trophy fish and themselves throughout their encounters. Once a fish has taken the bait, the angler attaches the Siren camera to the fishing line with a simple clip attachment, where upon the camera slides down the line before settling on the surface due to its buoyancy and deliberately engineered stable design. This offers recreational anglers a radical new perspective of their fishing experiences, with its dual-facing lens views delivering never seen before insights through video content.

Siren Cameras are committed to supporting fishing sustainability throughout the fishing community and have developed an innovative environmental sustainability use for their product in the form of a mobile App which not only transmits the video footage through Wi-Fi, but also collects vital data.

The Wi-Fi connected fishing App being developed by Siren Cameras will provide robust data sets to overcome the inadequate information currently impeding the rational control of marine resources.

Fisheries management decisions are often based on population models, but the models need quality data to be accurate. Scientists and fishery managers would be better served with simpler models and improved data which the Siren camera will deliver.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT)
- Increased levels of automation
- Greater share of services in total revenue
- Higher marketing expenditure



GROWTH

- Siren Cameras forecast to sell over 2.8 million cameras units cumulatively within the first 10 full financial years of trade, ranging from 1,150 units in Year 1, to 693,000 units by Year 10



JOB

- During the project, Siren Cameras will employ an additional two staff for the Android/iOS Application build
- It is expected that several additional staff will be employed within local parts suppliers



INITIAL PROJECT FUND

AUTOMATED CRASH HELMET

Existing composite motorcycle and motorsport crash helmets have inherent inconsistencies stemming from their manufacturing process. With these inconsistencies, manufacturers rely heavily on the physical inspection of every shell.

This project commenced when the Defence Materials Technology Centre (DMTC), Deakin University and The Smart Think (TST) developed a revolutionary composite forming technology known as 'Double Diaphragm Deep Drawing' (D4). The technology converts a 2-dimensional stack of composite material into a 3-dimensional object in a single step. This technology removes the need for the traditional splicing of materials for the finished products hence significantly reducing weight and producing a higher-performing composite.

TST, in conjunction with their project partners have adapted and advanced DMTC's technology and designed a split tool version. This version is a unique cost-effective method of manufacturing that uses a combination of deep drawing and vacuum forming. The TST D4 machine is currently the world's fastest and most advanced forming machine with an automated lay-up, cure and ejection cycle producing ballistic helmets within 15 minutes. The machine must be heavily redesigned to incorporate the split tool required to form a crash helmet and requires bespoke equipment pre-and post-processing to run effectively.

TST has performed initial validation with small scale prototype equipment, including an automated resin applicator and a robotic controlled laser cutter. This validation also included ubiquitous data collection and a longitudinal Product Lifecycle Management system that will remove the barriers to automation and online compliance checking.



IMPACT

- Higher spending on R&D
- Increased collaboration with research institutions
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Newer equipment
- Reshoring of crash helmet manufacturing to Australia



GROWTH

- Increase in revenue of \$90 million over five years



JOBS

- Twenty additional team members

PROJECT COLLABORATORS





Advanced knowledge

Advanced processes

Advanced business models

INITIAL PROJECT FUND

WORLD LEADING COMPOSITE MANUFACTURING PROCESS



This project seeks to address a global challenge among composite manufacturers by aiming to reduce the occurrence of defects arising when resin shrinks during composite manufacturing, and improve the quality of the surface finish when composite materials come out of the mould. Successful execution of this project will lower the failure rate of complex components, reduce manufacturing cycle times, and enhance capabilities in modelling and simulating composite materials.

Understanding how to control and eliminate this fundamental problem will create a sustained competitive advantage. The technical leadership will increase international recognition of Australia's composite manufacturing industry.

The project is developing a customised software package that enables complex components to be designed and manufactured without these shrinkage issues. These components will be used in the production of Sykes Boats and Carbon Revolution Wheels.

The project will help ensure Australian composite manufacturers remain globally competitive. The tools, knowledge and protocols developed during this project will improve Australia's composite manufacturing value offering, enabling the design and manufacture of complex composite solutions at a quality and consistency not available elsewhere.

If successful, this project will demonstrate how the Australian manufacturing industry can develop and commercialise a new, world-leading composite manufacturing process using customised software and Australian ingenuity.

PROJECT COLLABORATORS

The industry-wide impact will continue through Deakin University's engagement with project participants and other firms seeking to adopt advanced processes in complex composite manufacturing. The university will provide ongoing education for postgraduate students, covering advanced process for complex composite manufacturing.



IMPACT

- Increased spending on R&D to develop software that improves understanding of and reduces the occurrence of resin shrinkage
- Increased research collaboration with Deakin University, to reduce the occurrence of defects
- Manufacturing process development with Carbon Revolution which provides specific expertise in composite manufacturing
- Advanced processes achieved by implementing new manufacturing techniques that reduce defects and the need for repairs
- Growth in the patent portfolio



GROWTH

- \$4–5 million per year in new sales



JOBS

- Five to 10 high-skilled jobs



Geelong Advanced
Fibre Cluster



INITIAL PROJECT FUND

3D PRINTING FOR CUSTOMISED CLOTHING

Tec.Fit's goal is to disrupt the global clothing industry by enabling retail customers to easily purchase customised garments online without the need to visit a retailer or tailor. To achieve this, Tec.Fit has developed a smartphone human-body scanning app that converts 2D smart-phone photos into accurate 3D digital layouts of the customers body and their measurements.

Tec.Fit has also recently completed a 12-month proof-of-concept on a 2nd generation prototype 3D printer. The printer uses the 3D digital layouts of the customers body to produce a life-sized physical mannequin for producing customised clothing. The physical mannequin provides an accurate representation of an individual customer, which is used by the clothing manufacturer to produce tailored garments such as suits, wedding dresses, wetsuits, uniforms, etc.

In collaboration with Bosch and UTS, Tec.Fit is now ready to test a 3rd generation printer and undertake field trials with eight clothing manufacturers. The body scanning technology and 3D printed mannequins will be trialled in an operational environment to produce garments for customers.

The combination of remote measurement, digital modelling and 3D printing technologies eliminates the need for customers to visit a retailer or tailor, thus enabling Australian clothing manufacturers to sell their product globally with a perfect fit. Australia has many talented designers whose products are in demand, and Tec.Fit's technology will enable retailers and clothing manufacturers to provide valuable new services through a unique global platform.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Increased collaboration with research institutions
- Higher information and communication technology (ICT)
- Increased levels of automation
- Greater share of services in total revenue



GROWTH

Tec.Fit estimated revenue for the three years to 2023:

- FY2021 \$2.1 million – \$5.2 million
- FY2022 \$10 million – \$24.3 million
- FY2023 \$53 million – \$139 million



JOBS

- Tec.Fit estimates that this project will generate an increase of more than 15+ skilled jobs within 1–2 years of it being completed



Advanced
knowledge

Advanced
processes

Advanced
business
models

INITIAL PROJECT FUND

AUGMENTED REALITY INSPECTION SYSTEM FOR PRINTED CIRCUIT BOARD MANUFACTURING



For many SMEs, their current Printed Circuit Board (PCB) manufacturing quality checking method using optical sensing systems has various issues. Tekt Industries and project participants have identified these issues and will develop an AI Camera based compact vision processing and control module to address these issues. The modules will operate within in-line conveyor system developed by Tekt Industries to be used in conjunction with either a standard 3-axis gantry or alternative can be utilised with an off-the-shelf cobot solution to complete automated scanning and recognition tasks.

By developing the Augmented Reality Automated Optical Inspection (AugmentAOI) system, this module can be placed anywhere in the production line to inspect the quality of the outcome of any stage within electronics manufacture processes. It may also be either utilised off the linear production line or in other product quality control processes in future where Augmented Reality based feedback and operator control are required.

The camera module attached to the 3-axis gantry will provide the real-time video streaming function that can work with the augmented reality application developed in-house. The application uses the 3D model generated from PCB design software such as Altium Designer to match and validate the quality of the assembly by overlaying the 3D model onto the PCB showing different layers of the board.

The project will create a more efficient and cost-effective assembly line. The aim is to create a solution with the ability to inspect printed circuit boards for any faults using Tekt's image recognition and AR technology.

PROJECT COLLABORATORS



IMPACT

- Increased spending on R&D
- Increased collaboration with other manufacturers
- Higher information and communication technology (ICT)
- Larger patent profiles
- Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- Increased levels of automation
- Smarter inventory management
- Higher quality product fabrication capability
- Greater share of services in total revenue



GROWTH

- Tekt Industries estimates it will be able to generate recurring revenue of approximately \$700,000 annually from the 700 units after the first two years of release
- Tekt Industries expects by the end of 2024, that a subscription model will generate additional annual cash flow of \$2.815 million



JOBS

- By the end of 2025, Tekt Industries and its future subsidiary will create at least 29 to 40 new full-time employment opportunities



INITIAL PROJECT FUND

LOAD ORIENTATION SOLUTION

Verton has developed the world-first remote control load-control system to help reduce risks and drive productivity in lifting operations. Our solutions enable safe control and rotation of loads to their target destination – no matter the complexity. Workers are often required to be in the proximity to moving loads, putting them at significant risk of injury or fatality.

Drawing on project participants expertise, they wish to collaborate on development of a Verton load orientation solution (project name Windmaster) for the accurate orientation of wind turbine blades in the difficult windy conditions in which wind turbines are naturally located. This will achieve assembly at height with accurate remote positioning of the root end of blades into the turbine hub in an efficient and controlled movement. Verton will utilise their expertise and IP in novel approaches for the accurate orientation of the suspended wind turbine blades.

The systems envisioned to be developed will be compatible with a range of current Vestas wind turbines and installation methods, with provision for upgrades for larger systems and offshore installations. Provision will also be made for compatibility with a tower climbing crane currently under development by Mammoet to allow control by a single operator.

PROJECT COLLABORATORS



Advanced knowledge

Advanced processes

Advanced business models



IMPACT

- › The major technology components of the Windmaster product developed in this project will be designed and manufactured in Australia. Verton have been in contact with a number of Australian companies for supply of various items



GROWTH

- › Sales of \$15 million per annum



JOB

- › Verton would expect at least an extra 10 highly skilled jobs to be created either internally at Verton or via external contract input within 12–18 months post-pilot phase

VOLGREN

A Marcopolo Company

Advanced knowledge

Advanced processes

Advanced business models

INITIAL PROJECT FUND

HIGH-STRENGTH ALUMINIUM ALLOY

Volgren and other project participants identified an opportunity to commercialise their research on super high strength aluminium alloys to reduce the weight of bus bodies and chassis.

Research undertaken by Deakin University and Clean TeQ has developed high-strength aluminium alloys containing small amounts of scandium, a rare earth metal that has the ability to substantially increase the strength of aluminium and therefore reduce overall vehicle weight. The resulting product is key to the next generation of lightweight aluminium electric vehicles.

This project will allow Volgren to use the patented technology in manufacturing buses. This gives Volgren a competitive advantage both domestically and internationally, and an entry into electric vehicle manufacturing, where weight is a major factor, and many sectors where strength to weight ratios of alloys are critical.

Compared to traditional aluminium alloys, the new product delivers:

- › 20% increase in strength
- › 30% reduction in weight
- › 25% reduction in component cost
- › Enhanced corrosion resistance
- › Reduced fuel and energy costs as a result of reduced vehicle weight
- › Reduced carbon emissions as a result of reduced vehicle weight

PROJECT COLLABORATORS



IMPACT

- › Advanced knowledge as a result of high-strength alloy R&D
- › Growth in the patent portfolio
- › Research collaboration with academic and industry partners to develop complex new products
- › Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- › Better energy efficiency due to the reduced weight of bus bodies and chassis
- › Increased trade intensity and more geographically diverse export markets



GROWTH

- › Potential to generate significant new revenue and skilled employment for Australian manufacturing ahead of global licensing and ongoing R&D opportunities



JOBS

- › Fifty to 60 new employees expected at Volgren as a result of successfully commercialising the new alloy
- › One hundred and forty jobs expected at Clean TeQ as the mine goes into operational production mode

WATER PURIFICATION UNIT

Maintaining and servicing water purification units in remote communities is challenging and expensive. The Water Source solution is tackling this issue through collaborative research with Monash University, and product development with Bosch Engineering.

The AMGC project seeks to commercialise a potable water purification unit that is compatible with the Internet of Things (IoT) and does not require consumables, such as chlorine or replacement filters throughout its operating lifespan of more than 10 years.

The unit will be remotely monitored and controlled through a cloud-based, IoT-connected platform with inbuilt artificial intelligence (AI) software. This combination of features establishes a valuable and unique position for Water Source in the global water purification market.

Water Source has developed a diverse business model that aims to deliver multiple benefits to its users. For example, the water purification unit can provide remote Indigenous communities with potable water, while a bottling plant incorporated in the unit establishes a source of income for the community.

On conclusion of this project, Water Source will have a market-ready product. This will provide a reliable potable water supply for domestic and small-scale commercial situations in remote communities, developing nations, defence settings and other challenging environments.

PROJECT COLLABORATORS



Advanced
knowledge

Advanced
processes

Advanced
business
models



IMPACT

- Increased ICT intensity by remotely monitoring and controlling the unit via a cloud-based, IoT-connected platform
- Advanced knowledge development through increased research collaboration with Monash University and product development with Bosch Engineering
- A complex new product that provides potable water for domestic and small-scale commercial situations, and does not require consumables
- Increased trade intensity and access to geographically diverse export markets, including remote communities, developing nations and other challenging environments



GROWTH

- \$20 million (medium term)
- \$100 million (long term)



JOBS

- 15 high-skilled jobs (medium term)
- 150 high-skilled jobs (long term)



INITIAL PROJECT FUND



MANUFACTURE OF GREEN SUSTAINABLE CONCRETE

This project aims to develop sustainable partial substitutes for cement and construction sand using recycled glass waste, which would normally end up in landfill. The technology, while having been internationally validated, is currently being studied further by the University of New South Wales, School of Civil and Environmental Engineering and XL Precast. The collaboration seeks to develop a glass-impregnated concrete for various structural and non-structural applications.

In this project, XL Precast proposes to use recycled glass from kerbside collections to:

- ▶ Replace up to 50% of cement in a concrete mix by using a glass powder
- ▶ Replace up to 40% of sand in a concrete mix by using glass fines

This project intends to provide an environmentally more sustainable solution to construction materials in the form of concrete manufactured from glass waste material. By processing, washing, refining, and pulverising glass particles the project ensures that the product derived from glass waste recycling is suitable to be used in the production of concrete. By alleviating/minimising the consumption of finite and environmentally degrading resources such as sand and cement, the construction industry will advance by the production and supply of construction materials which not only meet Australian Standard specifications but also offer a more sustainable solution to an environmental challenge.

The solution proposed by XL is superior to other green concrete alternatives due to XL's plan to address the issue of

surplus glass waste, which would typically end up in land fill, and repurpose this into sand and cement used in concrete production both on a commercial and residential scale. By setting a precedent within the Australian market and implementing this recycled material into the construction industry, XL Concrete would obtain a high Green Star rated product due to aiding the environment.



IMPACT

- ▶ Increased spending on R&D
- ▶ Increased collaboration with research institutions
- ▶ Larger patent portfolio
- ▶ Increased number of staff with mathematics, engineering, science and technology (MEST) skills
- ▶ Newer equipment
- ▶ More extensive backward links



GROWTH

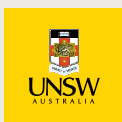
- ▶ XL Precast expect sales will build on average at 5% Y.O.Y (year over year), with 20% anticipated growth as soon as 2025



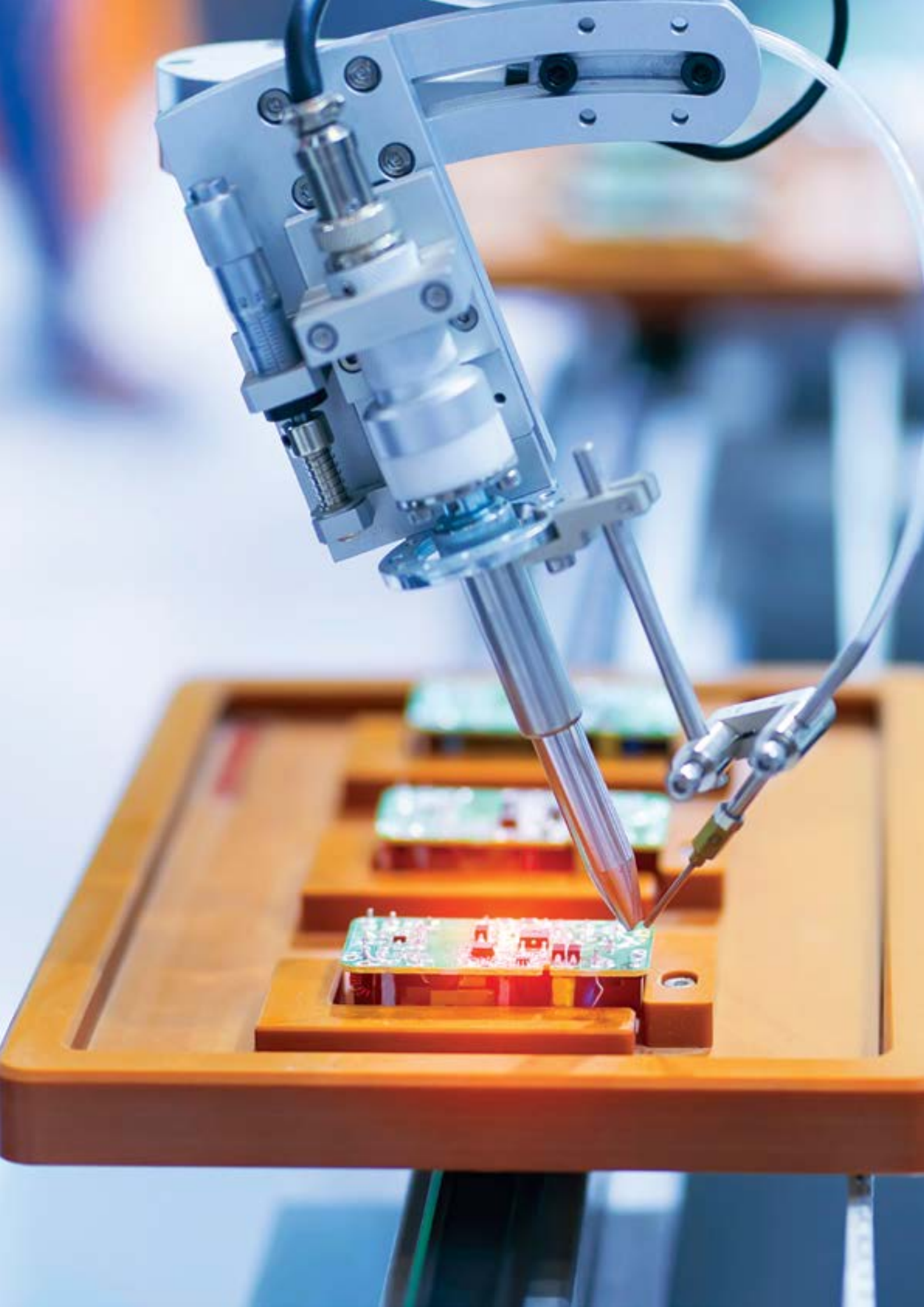
JOBS

- ▶ XL Precast estimate they will require an additional 10–20 FTE's, including Civil Engineers, Quality Assurance staff and skilled labour

PROJECT COLLABORATORS



GLASS
RECYCLING
NSW





MANUFACTURING
ACADEMY

A blend of research and real world application presented by authentic Australian manufacturers

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20 real stories of
Australian success

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Sector Competitiveness Plan 2020



Building Resilience in Australian Manufacturing



Advanced Manufacturing, a new definition for a new era



Sector Competitiveness Plan 2017



Industry Knowledge Priorities

PROJECTS REPORT



AMGC Impact - 2015 - 2020



Project Report 2020



Project Report 2019



Project Report 2018

POLICY SUBMISSIONS



Prefab Innovation Hub:
Feasibility Study



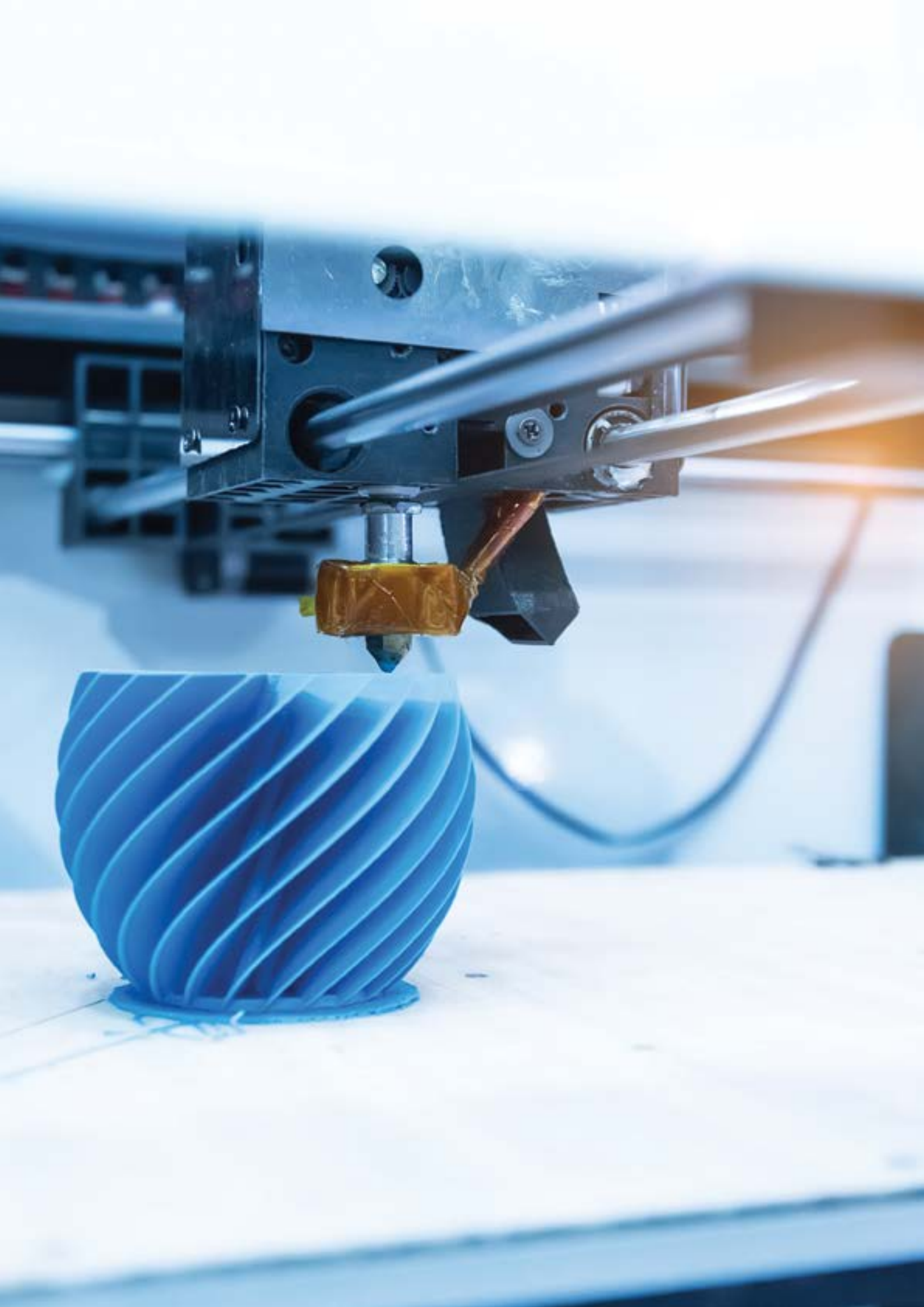
COVID-19 Manufacturer Response
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