



Joint \$2.6 million Research Project to develop Titomic Kinetic Fusion™ (TKF) Standards

- Project will position Titomic as the global leader in transformational additive manufacturing technology for aerospace structural components.
- Further validation for aerospace primes currently working with Titomic to produce additively manufactured parts regulated by aviation standards.
- Titomic, CSIRO and RMIT will develop new industry standards for fatigue, crack growth, fracture toughness of titanium complex-shaped structures using Titomic Kinetic Fusion™.

Melbourne, Australia Friday 26th October 2018: Australian metal additive manufacturing company Titomic Limited (ASX: TTT) ("Titomic" or "Company") is pleased to announce its signing of the \$2.6 million Innovative Manufacturing Cooperative Research Centre ("IMCRC") program Additively Manufactured Titanium Complex Structures Project ("Project"). The project will standardise Titomic Kinetic Fusion™, with Titomic being the industry partner of the Project.

The program will focus on enhancing Titomic Kinetic Fusion™ as a transformational technology for the highest standards of aerospace and defence industries as outlined by *The Metallic Materials Properties Development and Standardization* (MMPDS), a widely accepted source for metallic material and recognised by the United States' Federal Aviation Administration (FAA), United States' Department of Defense (DoD), and the National Aeronautics and Space Administration (NASA).



(From Left) RMIT's Dr Liz Jazwinska, Titomic Managing Director Jeff Lang, CSIRO's Keith Mclean and IMCRC's Jason Coonan

Currently, the AM metal 3D printing industries which use laser and electron beam melting processes have significant limitations due to the melting of the metal causing layering inclusions, evaporation of some alloys, and thermal distortion within the parts meaning they are unable to be certified for the production of aerospace structures components. This Titomic-led IMCRC program will create new industry certification standards for Titomic's Kinetic Fusion™ process allowing it to be used for producing aerospace structures in continuation of the already approved processes for repairs on aircraft such as the B-1 bomber, F/A-18 Fighter and Black Hawk and Sea Hawk helicopters.

Successfully creating new aerospace standards for the TKF process will bolster Titomic's market position as a global leader in industrial scale metal additive manufacturing, resulting in significant commercial opportunities for Titomic Kinetic Fusion™ as the next-generation digital manufacturing process of titanium and titanium alloy complex shaped structures.

The evidence and enhancements resulting from this research, in addition to benefitting Titomic, will allow Australia to be at the leading edge of a transformational shift of the global metals industry, utilising Australian technology and resources.



Representatives from IMCRC, CSIRO, RMIT and Titomic sign the agreement at Titomic's R&D Production Centre.

Project partners IMCRC, CSIRO and RMIT University with Titomic will contribute \$2.6 million in funding and in-kind investment, with Titomic and IMCRC each contributing \$0.47 million in cash over the two-year project period.

As part of the Project, improvements to CSIRO's Background IP and the Project IP will be Utilised by Titomic in accordance with the terms of the Licence Agreement between CSIRO and Titomic. The technology advancement will provide a new industry standard for titanium and titanium alloy, complex shaped structures manufactured using Titomic Kinetic Fusion™.

Titomic Managing Director and project Industry Leader Mr Jeff Lang commented:

"The aerospace and defence industries are seeking new additive manufacturing capabilities for industrial-scale titanium alloy structures to improve upon time consuming, wasteful traditional subtractive manufacturing processes. Titomic, as the global leader of industrial scale metal additive manufacturing, will utilise this IMCRC Project to develop Australian export capability for the supply of TKF systems and consumables to meet the demand of the aerospace and defence industries."

Mr David Chuter, CEO and Managing Director of the IMCRC, stated:

"With metal additive manufacturing on the cusp of large scale industrialisation, this research project explores Titanium and its enhanced performance properties as an alternative for sustainable manufacturing across multiple industry sectors. When proven, this new technology not transforms additive manufacturing processes but provides Australia the opportunity to capitalise on the global demand for Titanium utilising our significant reserves of Titanium ore."

Dr Leon Prentice, Metal Industries Program Director of CSIRO Manufacturing, commented:

“CSIRO is helping industry make the transition to advanced manufacturing, using innovative materials, systems, and processes to deliver products that meet the needs of their customers. This helps companies like Titomic create a sustainable competitive advantage, support productivity gains, and help capture emerging opportunities in local and global markets. We are pleased to deepen our long-term relationship with Titomic and RMIT, and look forward to profound impact from this project’s outcomes.”

Professor Ivan Cole of RMIT University, stated:

“RMIT is proud to join with our partners on this exciting project to develop reliable and rapidly fabricated additive components for aerospace and defence industries. Our researchers will help to ensure reliable design of parts through numerical analysis of their stresses and mechanical properties, as well as microstructural studies of completed parts.”

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About the IMCRC:

The IMCRC is a not-for-profit, independent cooperative research centre that helps Australian manufacturing companies increase their relevance through collaborative, market-driven research in business models, products, processes, and services. IMCRC’s vision is for a thriving, relevant and globally integrated Australian manufacturing industry. In collaboration with manufacturing businesses, research organisations, industry associations, and government, the IMCRC co-funds broad, multidisciplinary and industry-led research projects that deliver commercial outcomes, and advances the wider cause of manufacturing transformation through industry education and public advocacy. For more information visit www.imcrc.org.

About CSIRO:

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is Australia's national science agency and one of the largest and most diverse research agencies in the world. Its innovations contribute billions of dollars to the Australian economy every year. As the largest patent holder in the nation, CSIRO's wealth of intellectual property has led to more than 150 spin-off companies. For more information visit www.csiro.au.

About RMIT University:

RMIT is a global university of technology, design and enterprise. One of Australia's original tertiary institutions, RMIT University enjoys an international reputation for excellence in professional and vocational education, applied research, and engagement with the needs of industry and the community. RMIT is a world leader in Art and Design; Architecture; Education; Engineering; Development; Computer Science and Information Systems; Business and Management; and Communication and Media Studies. For more information visit www.rmit.edu.au/research.

About Titomic:

Titomic (ASX:TTT) is headquartered in Melbourne, Australia. The company overcomes limitations of additive manufacturing (3D printing) for metals to manufacture complex parts without shape or size constraints. Titomic Kinetic Fusion offers manufacturing which enables speed-to-market, superior products with lower production inputs and using less resources for a more sustainable future.

Titomic systems can be customised to client requirements offering additive manufacturing advantages at industrial scale. Multiple robots can be utilised to scale up in both speed and size to compete with traditional subtractive manufacturing for industries such as aerospace, defence, resources (oil & gas, mining, industrial equipment), marine, construction, automotive and consumer & sporting goods.

Other benefits of the Titomic Kinetic Fusion technology include:

- Joining dissimilar metals and composites for engineered properties in a structure
- No heat-related oxidation or distortion issues when it comes to manufacturing large parts
- Reduced time to market with industry-leading deposition speeds

Titomic's business model involves providing clients with feasibility tests and manufacture of prototypes to work out the manufacturing costs of the product. Clients will be offered a licence to manufacture via Titomic Kinetic Fusion or choose to commission their own Titomic system. After the system sales, Titomic continues to support clients with powder and consumables supply, system upgrades, service and maintenance. For more information visit: www.titomic.com.

Forward-looking statements:

Certain statements made in this release are forward-looking statements and are based on Titomic's current expectations, estimates and projections. Words such as "anticipates," "expects," "intends," "plans," "believes," "seeks," "estimates," "guidance" and similar expressions are intended to identify forward-looking statements. Although Titomic believes the forward-looking statements are based on reasonable assumptions, they are subject to certain risks and uncertainties, some of which are beyond Titomic's control, including those risks or uncertainties inherent in the process of both developing and commercialising technology. As a result, actual results could materially differ from those expressed or forecasted in the forward-looking statements. The forward-looking statements made in this release relate only to events as of the date on which the statements are made. Titomic will not undertake any obligation to release publicly any revisions or updates to these forward-looking statements to reflect events, circumstances or unanticipated events occurring after the date of this release except as required by law or by any appropriate regulatory authority.