



9 September 2021

Senator Anthony Chisholm
Chairman
Senate Standing Committee on Economics
Inquiry into the Manufacturing Industry
Parliament House
Canberra ACT 2600

Inquiry into the Australian manufacturing industry

Dear Senator

Thank you for the opportunity to respond to this inquiry of the Senate Standing Committee on Economics into the manufacturing industry.

Amaero International Limited is an Australian-based and ASX listed company specialising in the provision of end-to-end metal additive manufacturing solutions (AM – also known as 3D printing) in terms of materials, services, equipment and technology to its key clients in the aviation, defence and space sectors, as well as in the tool and die industry.

The global 3D Printing sector was estimated in the recent Ark Invest, Big Ideas Report 2021 to be growing at an annual rate of roughly 60 per cent from US\$12 billion last year to US\$120 billion in 2025, making it the fastest growing sector on earth.

Amaero is well positioned to capitalise on the growth of the sector, particularly in aviation, defence, space and tooling with key clients in Australia and the United States.

Amaero has worked with many of the world's leading manufacturers of aerospace and defence products in both research and development and in manufacturing capability. We operate manufacturing plants in Melbourne and Adelaide, as well as Los Angeles in the United States.

I wish to comment on the following terms of reference under which the inquiry is being conducted.

Sectors in which Australian manufacturers enjoy a natural advantage

Australia enjoys a clear comparative advantage in its mineral reserves, not only in export staples such as iron ore, coal and gas but also in critical minerals and rare earths.

There is considerable scope for Australia to build sovereign manufacturing capability and add significant value in the processing and development of critical minerals. Australia should be capturing more of the economic value of the outputs by value-adding rather than by exporting the resources at their lowest unprocessed value.

For example, Amaero's manufacturing business is heavily reliant on access to titanium alloy powder, which is one of the key inputs to the additive manufacturing process.

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With the rapid uptake of additive manufacturing in the defence and aerospace industries, titanium alloy powder is quickly becoming a strategic input for these sectors. Countries that dominate its manufacture and distribution will have enormous influence in defence supply chains.

Australia, holding the world's largest titanium reserves (rutile and ilmenite), exports the minerals at around A\$400 per tonne. Amaero purchases the Ti Alloy powder from overseas at around A\$300,000 per tonne to 3D print components.

Australia has an opportunity to make itself the supply base for titanium alloy and titanium alloy powder.

We have in previous submissions to the Federal Government recommended that Australia move to establish and secure a sovereign facility to process titanium alloy powder that is sourced from raw materials mined domestically. Amaero announced in July this year that it is building a world-class atomisation facility in Melbourne to produce titanium alloy powder that will become operational in 2022.

With this development, Australia will be self-sufficient in the production of titanium alloy powder, without relying on the supply chains presently dominated by China, Kazakhstan and Russia.

With additional investment, Amaero's facility in Australia could not only reliably supply local defence markets but also our defence partners within the Five Eyes (USA, UK, Canada, New Zealand and Australia) network.

The Federal Government can assist by influencing our defence partners and defence prime suppliers to the Department of Defence to buy Australian metal powders and 3D-printed metal products.

Energy

Energy is a crucial input and cost driver in the processing of resources to transform them from raw minerals to metals, adding significant value to the outputs. I note that Australia no longer enjoys the advantage of cheap, reliable energy.

Australia's post-war manufacturing industries were able to expand and diversify because of the nation's access to electricity and gas that was plentiful and relatively cheap.

While Australia has made major strides in developing renewable energy sources to supplement less environmentally sustainable alternatives, the overall energy supply base must be competitive, certain and reliable to capitalise on the value-adding opportunity.

Role of government - education and technology development

Our additive manufacturing processes are highly specialised. We depend on a highly skilled workforce that can adapt the benefits of additive manufacturing into new areas of component production.

Given the disruption to skilled migration caused by the Covid-19 pandemic, the Australian manufacturing industry will in the immediate term rely more heavily on domestically-trained graduates.

The higher education sector has a number of world-leading institutes supporting the growth of the additive manufacturing industry and the education of undergraduates and post-graduate students and researchers. These institutes include the Monash University Centre for Additive Manufacturing (MCAM), RMIT Centre for Additive Manufacturing (RCAM), CSIRO's Lab 22 and Sydney Manufacturing Hub (University of Sydney). Continued investment in these institutes will provide a strong talent pool for the local additive manufacturing industry, as well as provide future foreign student education revenues.

Continued research and technology development is the key to maintaining a leadership position in the industry globally. Sustaining collaborative partnerships with Monash University, CSIRO, The University of Adelaide, Deakin University, University of South Australia, Defence Science and Technology Group (DSTG) and Swinburne University will generate new technology that Amaero will commercialise, especially in the space and defence industry sectors.

Role of government – procurement and capital investment

Governments may not directly run manufacturing industries but they can strongly influence capital investment programs through industry sectors under their control.

Both the defence and health sectors, for example, are large-scale purchasers of capital infrastructure, ranging from aircraft, sea vessels and land vehicles to hospital and clinical equipment. Many of the components for such major outlays should be sourced from Australian manufacturers.

Both Federal and State governments should mandate that such capital investment within their control requires, where possible, a significant proportion of local content.

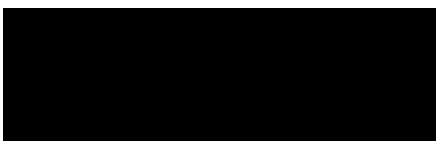
In certain circumstances, governments can support the growth of industries by investing in equipment and infrastructure that can benefit the whole industry, such as a capability that can be used to validate the performance of manufactured products to accelerate qualification and industry uptake. For additive manufacturing, a prime example is the need to verify the integrity of 3D-printed metal components using high power X-ray computerised tomography (CT) scanning equipment. Rapid feedback on performance reduces the product development cycle and speeds up the qualification process. This is important for research and development, as well as commercial opportunities.

Such a facility would cost in the order of \$5 million once the equipment, operational expenses and training of staff has been taken into account, making it out of reach for most individual companies. To operate this equipment also requires highly qualified and experienced technicians. A shared facility made available to the industry sector and the research and education sector would represent a local capability equal to the best in the world enabling these sectors to compete on a world stage.

It is our recommendation that the government co-invest in a high power X-ray CT scanning facility and have it located at a specialist AM centre, such as Monash University's MCAM, the Australian Synchrotron facility operated by ANSTO or the CSIRO's Lab22. Being co-located at an established facility such as those mentioned would capitalise on the specialist skills cluster already located there and the high concentration of industry within close proximity.

I look forward to the report of your committee's inquiry and would be pleased to present to the committee to expand upon the growing role of additive manufacturing in Australia's industrial output.

Yours sincerely



Barrie Finnin
Chief Executive Officer
Amaero International Ltd