



Cutaway examples of an additively manufactured rocket nozzle with integrated lattice for fuel pre-heating / bell cooling

# AMAERO

## ADDITIVE MANUFACTURING

General Presentation  
December 2021



**AMAERO**  
ADDITIVE MANUFACTURING

# Summary Capability Data – Amaero Engineering

Site	Employees	Equipment	Certifications	Services
Notting Hill VIC Australia  <i>Company HQ</i>	11	6 LPBF Printers (inc. large format) Ancillary Powder Handling Equipment 1 DLD (Trumpf 7400) 1 HIP Furnace 4 Specialised Furnaces (hi temp/Ar/Vac) Workshop / post processing facilities	AS9100D ISO9001 DISP	Specialised Alloy & Materials Development Design for Additive Manufacturing & Advanced Simulation Prototype Development & Evaluation Samples Qualification & Serial Production of LPBF Parts Metal Printing Machine Sales & Turnkey Solutions Ti64 Powder Production ( from Q3 2022 )
Edinburgh North SA Australia	3	4 LPBF Printers 1 Specialised Furnace (Argon Atm) Ancillary Powder Handling Equipment Workshop / post processing facilities	AS9100D ISO9001 DISP	Design for Additive Manufacturing Prototype Development & Evaluation LPBF Parts Qualification & Serial Production of LPBF Parts
El Segundo CA USA  <i>USA HQ</i>	7	4 LPBF Printers Ancillary Powder Handling Equipment	AS9100D	Design for Additive Manufacturing Prototype Development & Evaluation LPBF Parts Qualification & Serial Production of LPBF Parts Metal Printing Machine Sales & Turnkey Solutions
Chesterfield MI USA	1	Sales office		AM Applications, Metal Printing Machine Sales
	22			

## AMAERO International – Introduction

Established in 2013 AMAERO is a leading full-service metal Additive Manufacturing(AM) solution provider. Our organization is founded on core values of Safety, Quality and Delivery. Our AM solutions begin with a deep understanding of Materials Science, Technology and Repeatability. AMAERO offers a full-service suite supporting DfAM Engineering, Iterative Prototyping, Serial Production and integrated Machine solutions. We are partnered with leading universities, research organizations and technology providers. With locations in Australia and North America we provide an ecosystem of AM solutions to some of the world’s largest Commercial and Defense Aerospace Companies.

### Partner Organisations



Monash Centre for  
Additive Manufacturing  
(MCAM)



# Emergence of Amaero Engineering

Spinout from Monash University, Founded mid-2013

- Co-located with Monash Centre for Additive Manufacturing
- First Concept Laser Xline production parameters
- Xline system hardware and software improvements
- Demonstration projects with federal government funding support
- Worlds first **3D Printed Jet Engine**
- First offshore production facility established in Toulouse 2016
- Worlds first **3D Printed Aerospike Rocket Motor** test fired 2017
- Completion of **Apache Gearbox** project 2018 for Boeing
- Establishment of USA Manufacturing Facility Sept 2019
- Listed on ASX Dec 2019
- Launch of Adelaide facility Mar 2020
- AS9100D Certification 2020 for Notting Hill (Feb), El Segundo (July), Edinburgh North (Sep)
- Approval for Ti Alloy Powder Manufacturing 2021



# Amaero International Locations

## Australia



### Headquarters and R&D Centre

13 Normanby Road  
Notting Hill  
Melbourne, Victoria 3168  
Australia

## United States



### North American Head Office

445 S. Douglas Street, Suite 200  
El Segundo California 90245  
United States

### Regional Sales Office














Greater Detroit Area

# AMAERO International – Who We Are

## Executive Team

<p><b>Barrie Finnin</b> Chief Executive Officer</p> 	<p><b>David Hanna</b> Chairman</p> 	<p><b>Stuart Douglas</b> Exec Director</p> 	<p><b>Kathryn Presser</b> Non-Exec Director</p> 
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## Australian Team

<p><b>Sam Tartaglia</b> Program Manager Tooling</p> 	<p><b>Sandy Awad</b> AM Engineer</p> 	<p><b>Michael Devitt</b> AM Engineer</p> 	<p><b>Bernie Wirz</b> Project Manager</p> 	<p><b>Mike Wong</b> AM Engineer</p> 	<p><b>Henry Hondros</b> AM Engineer</p> 	<p><b>Marina Arrighi</b> Administration and Quality Coordinator</p> 
<p><b>Dr. Dacian Tomus</b> Manager. Digital Manufacturing</p> 	<p><b>Daniel Collingwood</b> Quality Manager</p> 	<p><b>Jane Storey</b> Accounts &amp; Admin Manager</p> 	<p><b>Amit Tamber</b> AM Engineer</p> 	<p><b>Jason Miller</b> Program Manager Aviation, Defense &amp; Space</p> 	<p><b>Simon Bartlett</b> AM Consultant</p> 	

## North American Team

<p><b>Kenneth Davis</b> Vice President North America</p> 	<p><b>John McKellar</b> VP Strategic Operations</p> 	<p><b>Dr. Jim Sears</b> Technology Fellow</p> 	<p><b>Darryl Cummins</b> Manager Digital Manufacturing</p> 	<p><b>Rod Soltero</b> AM Engineer</p> 	<p><b>Hansel Weihs</b> AM Quality Engineer</p> 
<p><b>Shon Dionne</b> Sales Engineer</p> 	<p><b>Jef Amirian</b> AM Engineer</p> 				

## Our Clients

### Working with the world's foremost Aviation, Defence, Space and Mining Companies

AMAERO is proud to be the first company to provide certified 3D printed metal products to Virgin Australia. Some of the largest Manufacturers lean on AMAERO to develop integrated Part and Manufacturing solutions through Additive Manufacturing(AM)



Australian Government  
Department of Defence  
Science and Technology



BOEING

THALES



## Our Capabilities

- Additive Manufacturing
- SLM, DED Technologies
- Serial Production
- Repair (laser cladding)
- Alloy Development
- Metallurgical Testing
- Heat Treatment
- Modelling and Simulation
- Multi-Material Structures
- Laser Joining
- Machine Sales and Service
- Powders for AM
- Tooling Cores and Inserts
- Design for Additive Manufacturing
- Prototype Development
- First Article Qualification
- Post-Processing and Finishing
- Non-destructive Testing

## R&D and Manufacturing Facilities

- North America, El Segundo, CA AS9100 Rev D, ISO9001
- Notting Hill, Australia AS9100 Rev D, ISO9001
- Adelaide, Australia AS9100 Rev D, ISO9001





## Materials Available

### Qualified materials

Ti6Al4V

AlSi10Mg

AlSi7Mg

316L Stainless Steel

Inconel 625

Inconel 718

Hastelloy X

Invar 36

MS1 Maraging Tool Steel

H-13 Tool Steel

CoCr alloys

## Materials in development

Amaero H0T Al – excellent strength at 250°C for over 3000hrs

Amaero Beta Ti – superior fatigue strength performance

BNNT strengthened alloys – advanced metal matrix nano composite

Advanced CoCr alloys – specialised hot tooling applications



# AMAERO full range of Laser Powder Bed Fusion Printing Machines and Ancillaries

Safe powder handling equipment



**Amaero SP800**  
Largest production  
Laser Powder Bed  
machine  
*available from 2022*



**DU40**  
Decanting Unit

**PS20/PS60**  
Powder Storage

**PS20/PS60**  
Powder Storage

**VC40**  
Vacuum Unit

**G4**  
Glove Box Unit



**SP100**  
100 Ø x 80mm  
build volume

**SP260**  
250 x 250 x 400mm  
build volume

**SP400**  
400 x 400 x 400mm  
build volume

**SP500**  
500 x 250 x 260mm  
build volume

**SP800**  
build volume to be confirmed

# Equipment Currently in Australian Facilities – Adelaide and Melbourne



**Adelaide Facility**  
 Renishaw AM 400 - Al Alloys  
 Renishaw AM 400 - Ferrous Alloys  
 Renishaw AM 400 - Ti Alloys  
 250 x 250 x 300mm build volume



**EOS M280 - Multiple Alloys R&D**  
 250 x 250 x 325mm build volume



**EOS M290 - Multiple Alloys R&D**  
 250 x 250 x 325mm build volume



**SP500 dual beam - Tool Steels**  
 500 x 250 x 250mm build volume



**Concept laser Xline 1000R - Multiple Alloys**  
 620 x 400 x 500mm build volume



**Concept laser Xline 2000R – Multiple Alloys**  
 800 x 400 x 500mm build volume



**Trumpf TrueLaser 7040 DLD - Multiple Alloys**  
 4500 mm x 1800 mm x 1500mm build volume



**SP100 – various alloys**  
 100 Ø x 80 mm build volume

# Post Processing Capabilities (Australia)



Inert atmosphere powder handling unit



Modular powder handling systems



Inert atmosphere heat treatment up to 1200°C



Avure QIH-9 Hot isostatic press up to 3000 Bar (43.5 ksi) and 2000°C



Wire EDM



De-Powdering & Fettingling



Media blaster



Assembly and Inspection

# Equipment Currently in USA Facilities - El Segundo



**EOS M400**  
400 x 400 x 400mm  
build volume



**Amaero SP500**  
500 x 250 x 350mm  
build volume



**EOS M280 - Multiple Alloys R&D**  
250 x 250 x 325mm build volume



**SP100 – Ti Alloy**  
100 Ø x 80 mm build volume

The facility has floorspace capacity for another **five** production M400 machines and will be expanded as demand grows. Also included are areas for post processing, machining and finishing, assembly, storage and shipping/receiving.

Remaining floorspace is dedicated to a showroom for new printing machines and ancillaries distributed by Amaero.



**DU40**  
Decanting Unit

**PS20/PS60**  
Powder Storage

**PS20/PS60**  
Powder Storage

**VC40**  
Vacuum Unit

**G4**  
Glove Box Unit

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