



# Defence and aerospace

Industry capabilities



## About ANSTO

ANSTO is home to Australia's most important landmark research infrastructure – totalling more than \$1.3 billion. Our unique capabilities are used by thousands of Australian researchers, industry partners and academia every year. Drawing on more than sixty years of materials, engineering, and environmental research since the days when it was known as the Australian Atomic Energy Commission, ANSTO has developed a unique set of facilities and expertise that support the requirements of the advance manufacturing and materials sector.

### ANSTO landmark infrastructure



OPAL multi-purpose reactor



Australian Centre for Neutron Scattering



Centre for Accelerator Science



Australian Synchrotron



National Research Cyclotron Facility



Gamma Technology Research Irradiator

**Our people** include expert scientists, engineers and technicians who are actively engaged with industrial and translational research, collaborating with the best and brightest of Australia.

Collaboration and connection is key to the best translational research outcomes. ANSTO has strong academic and commercial connections with all the publically funded research organisations currently supporting the delivery of goods, services and advice to the defence sector in Australia.



# Our capabilities

**Engineering** for critical components subject to unusual conditions is an area of expertise that ANSTO has developed as Australia's authority in nuclear technologies and only operator of nuclear technology.

## Critical weld failure

### CHALLENGE:

*Predict weld failure in critical components.*

### SOLUTION:

*Non-invasive residual stress analysis using neutron scattering.*



## Modelling armour and blast resistance

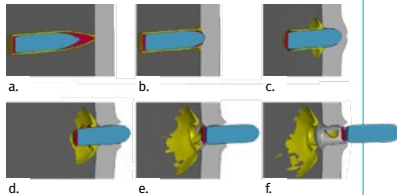
DST Group

### CHALLENGE:

*Accelerate armour development.*

### SOLUTION:

*Sophisticated computer and measurement-validated simulations.*



**Manufacturing** techniques for advanced materials require specialised knowledge and facilities not commonly available. ANSTO's experience in developing waste encapsulation technology offers new solutions. Manufacturing the most advanced piezoelectric materials for new SONAR applications or utilising the most sophisticated Hot Isostatic Pressing (HIP) facility in Australia to strengthen 3D printed components.

## Advance metal and ceramic components

### CHALLENGE:

*Optimise strength in sintered material.*

### SOLUTION:

*De-voiding and densification with HIP process Synroc.*



## Novel sensor materials for submarines

DST Group | Thales

### CHALLENGE:

*Develop next-gen transducers for SONAR.*

### SOLUTION:

*Innovate new piezo-ceramic materials.*



**Materials** at the most basic level define what a component can do and how long it will last. The Australian Centre for Neutron Scattering and the Australian Synchrotron provide tools that can help solve materials-based problems when more conventional testing techniques are not enough. Understanding why a polymer composite is degrading, how a metallic coating can be improved for longer life or when a complex 3D component build is failing can require the use of infrared, X-ray and neutron techniques.

## Laser cladding metal surface

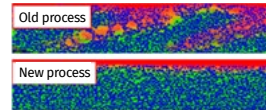
Laserbond

### CHALLENGE:

*Assess new process.*

### SOLUTION:

*Synchrotron elemental mapping of alloy and parent metals in coating.*



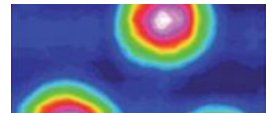
## Carbon fibre manufacturing

### CHALLENGE:

*Improve pre-carbonized fibre.*

### SOLUTION:

*Synchrotron infrared mapping of carbon-nitrogen bonding.*



## Complex 3D metal printing

Conflux

### CHALLENGE:

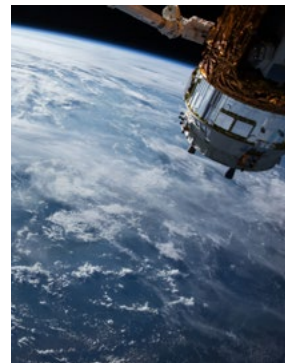
*Improve 3D print.*

### SOLUTION:

*Synchrotron 3D X-ray imaging at micron resolution for non-destructive internal inspection and process optimisation.*



**Testing** the resistance or hardness of electronic components and systems to different kinds of radiation to gauge their suitability for vehicles and satellites in low and high earth orbits - as well as deeper space missions. High energy ion beam, gamma-ray, high-energy X-ray, as well as slow and fast neutron irradiation are available at ANSTO campuses. We are in the process of developing new standard offerings for SMEs in the defence and space sectors.



## Collaboration

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Collaboration with industry and academia is fundamental to our relevance. As an example, the ANSTO Innovation Precinct co-locates a community of industrial users with ANSTO infrastructure at Lucas Heights, NSW. *nandin*, the heart of the Innovation Precinct is home to a community of researchers, students and startup companies dedicated to a number of challenges relevant to the defence sector.

To complement this, the newly-formed ANSTO Graduate Institute will further assist early career talent in Australia by co-developing graduate project proposals with Australian Universities and other partners. Opportunities for student scholarships and joint supervision of student projects exist.

## Security

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Security and intellectual property protection is a vital component of business operations and is built into the structure of ANSTO. ANSTO enjoys the best of both worlds – secure and ISO accredited research sites, as well as long-standing collaboration with DST, CSIRO and Australian Universities. ANSTO can also accommodate work requiring AGSVA clearances.

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*“The synchrotron was able to confirm, visually, how the process changed the material.”*

### Greg Hooper

Executive Director,  
Laserbond



Australian Government



## Contact

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## Location

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### NSW campus

New Illawarra Road,  
Lucas Heights, NSW 2234

### VIC campus

Australian Synchrotron,  
800 Blackburn Road,  
Clayton, VIC 3168

[www.ansto.gov.au](http://www.ansto.gov.au)

September 2020