

# Novel process for manufacturing acoustic metamaterials

DST is exploring how acoustic metamaterials can provide enhanced stealth capabilities to Defence platforms.

Acoustic metamaterials are artificially structured composite materials designed to control, direct and manipulate sound waves.

DST scientists have created entirely new classes of acoustic metamaterials that demonstrate promising outcomes that could redefine the boundaries of stealth materials.

However, widespread application of these metamaterials is often limited by the difficulty of manufacturing the complex geometries required to realise their novel performance.

Traditional manufacturing processes do not readily provide high-throughput solutions to manufacture critical features from the microscale to the macroscale or allow precise alignment of structural cells in three dimensions across large volumes. Therefore, manufacturing of these materials at the volume and quality needed for practical applications requires process innovation.

## Technology features

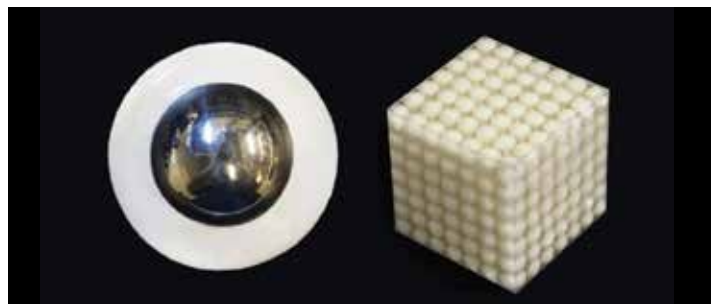
In response to a global demand, DST has conceptualised a novel manufacturing process, comprising:

- Integrated and stand-alone metrology solutions that can evaluate at high resolutions, across multiple scales and dimensions
- A sensor-controlled Resin Intake Unit
- A Pattern Read Unit
- A Pick Up/Place Unit

The combination of these features addresses critical barriers to scaled metamaterials manufacturing, and enables manufacturing from disparate materials.

## Partnering opportunities

DST is looking for a partner to help develop the conceptualised process, build the machinery, lab-test, and raise the technology readiness level of this acoustic metamaterials manufacturing process.



*Samples that first realized a locally resonant acoustic metamaterial. Left: The cut-away view of a sample unit cell consisting of a small metallic sphere coated by a thin uniform layer of silicone rubber. Right: The sample made by using epoxy to glue together the units shown on the left.*

## For more information contact:

PartnerWithDST@dst.defence.gov.au

