Joining processes contribute significantly to the performance and integrity of all products, which usually consist of similar or dissimilar materials. Advances in joining and bonding technologies have enabled a wide variety of metals, ceramics, polymer, composite materials, to be joined together with better efficiency, quality, and reliability.

JTG focuses on developing metal joining and polymer joining technologies. Its emphasis is on the comprehensive study and understanding of joining physics, chemistry, metallurgy, surface, and interface phenomena to ensure joints of high reliability and quality.

The group carries out collaborative research with academic institutions, co-develops processes and products with companies, transfers technology, and conducts training for the manufacturing industry.

**Core Competencies**

**Metal Joining**
- Arc welding
- Robotic friction stir welding
- Laser welding
- Hybrid laser welding
- Laser Aided Additive Manufacturing (LAAM)
- Brazing and soldering
- Hybrid LAAM
- Process simulation and modelling

**Polymer and Composite Joining**
- Joint design and optimisation
- Adhesive bonding
- Laser plastic welding
- Ultrasonic plastic welding
- Thermal bonding
- Solvent bonding
- Polymeric composites repair and bonding

**Target Industries**

- Aerospace
- Marine
- Automotive
- Medtech
- Electronics
- Oil & Gas
- Energy
- Precision Engineering

**SIMTech**

*for Industry*
Laser Aided Additive Manufacturing for Marine Turbocharger Maintenance, Repair & Overhaul (MRO)

Laser Aided Additive Manufacturing (LAAM) is a novel additive manufacturing technology which can be utilised for surface modification, repair and 3D printing.

A robotic LAAM system was developed and transferred to Tru-Marine, a leading turbocharger specialist. Four LAAM techniques were successfully developed and certified by DNV GL Det Norske Veritas Germanischer Lloyd, an international accredited registrar and classification society for repair of difficult-to-repair turbocharger components. This helped the company pioneer itself internationally specialising in the repair of marine turbocharger components with shorter lead-time and better product quality.

"Thanks to the SIMTech team for helping Tru-Marine developed four new processes with the innovative LAAM technology for turbocharger MRO. This expanded product range has upgraded our repair capability and technology image. This enhanced image would help to strengthen our leadership position amongst other premium repairers in the world."

Mr David Loke, Managing Director, Tru-Marine