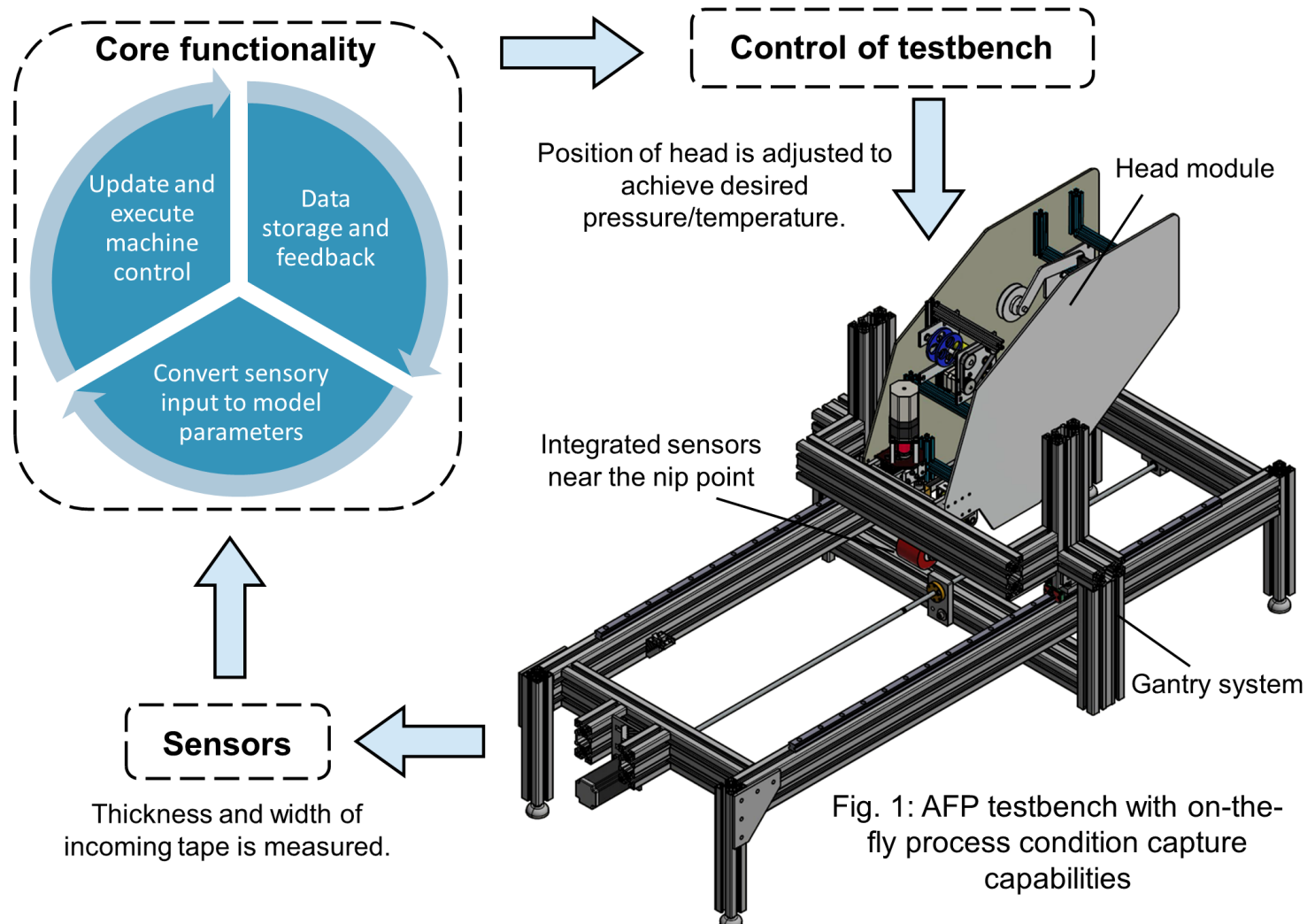


In-process sensing and control in AFP composites manufacture

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Automated Fibre Placement (AFP) is widely recognised as one of the most advanced manufacturing processes for structural composite components. Current AFP process control has focused on producing defect-free parts by using fibre trajectory design, course monitoring and optimisation of processing parameters. These are usually determined on a trial-and-error basis, through both off-line material and process condition measurements, leading to prolonged machine downtimes. Deviations between as-designed and as-manufactured parts are thus inevitable, and so on-the-fly tuning of the key AFP parameters using real-time measurements is proposed to solve this issue.

To demonstrate this idea, a novel prototype AFP testbench (Fig. 1) is constructed, which houses multiple sensors to measure material properties and processing conditions in real-time. This data will then be used to update “live” processing conditions, such as speed, pressure, and temperature to improve the final deposition accuracy.



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Key Benefits

- Increased throughput
- Improved deposition accuracy

Key challenges

- Precise measurements of thickness and width
- Processing the data in real time