

# Composites manufacturing

July 2025

# Composites manufacturing roadmap

	Short term	Medium term	Long term
Industry challenges	Effective product and process certification		
	High performance sustainable energy systems		
	Hydrogen storage and transport		
	Quality, rate or cost improvements from automated manufacture		
		Improved design and manufacturing through advanced data analytics	
	Reduced environmental costs through materials development		
	Reduced material and energy use and increased circularity		
	Reduced product emissions from lightweighting		
	Improved extreme environment performance through materials development		
	Modular and efficient products and systems		
Technology capabilities	UK supply chain resilience in critical materials and products		
	World-leading manufacturing skills and workforce development		
	Accelerated materials discovery		
	Accelerated product development and certification		
	Automated manufacture of structures >5m		
	Composite ultra high-pressure hydrogen storage and distribution		
	Composite cryogenic hydrogen storage and distribution		
	Joining composites in assemblies		
	Multi-sector hydrogen supply chain and supporting skills		
	New materials for extreme environments for new transportation and energy applications		
HVMC developments	UK supply chain of high-performance		
	UK supply chain of matrix precursors		
	Composites not from fossil fuels		
	Digital twin: Design-to-decommission data thread		
	Economically viable composites recycling market		
	Sustainable design and LCA methods		
	AI skills gap in manufacturing		
	Ceramic matrix composites design skills, production skills, equipment (layup, formulation, furnaces), testing capability and standards		
	Data science applied to composites		
	Knowledge dissemination, information and communication (internal and external)		
	Maintain relevance of existing AM capabilities at HVM Catapult centres through continuous improvement		

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HVM Catapult developments	Carbon pilot line for reduced embodied energy		
	Cryogenic testing capability		
	Energy usage monitoring equipment		
	Energy usage sensors		
	Insulation production		
	Lifecycle analysis software, databases and skills		
	Liner production		
	Pilot plants for composite recycling		
	Pressure testing capacity		
	UK carbon production volume (including novel materials)		
	UK filament winding capacity		
		Training on engineering	
	Advanced manufacturing process control		
	AI analytics for design, manufacturing and validation		
	Composites recycling method development		
	Design techniques for increased lifetime extension and circularity		
	Digital augmentation of manual manufacturing processes		
	Digital passports for performance and circularity		
	Digitally connected design methods		
	Effectively capture manufacturing data for digital twin		
	LCA method development		
	Manufacturing process energy monitoring and modelling		
	Manufacturing waste reduction and elimination		
	Robust and cost-effective modelling of manufacturing process and product performance		
	Sustainable design methods development		
	Collaboration with industry, other Catapults, regulatory bodies and universities		
	HVM Catapult builds reputation to become go-to resource		
	Influence R&I funding for AM (with IUK, ATI, APC, EPSRC)		
	Promote technology transfer and adoption in relevant key sectors		
	Bio-derived materials and product development		
	Ceramic matrix composites		
	Low-carbon thermoplastic composite intermediate materials		
	Sustainable materials discovery		
		Cryogenic hydrogen product and process development	
		Pressurised hydrogen product and process development	
	Develop appropriate technical and commercial training, including apprenticeships (for robotics and automation)		
		Training to develop supply chain	

