

Terms of Reference

In collaboration with the EPSRC Future Composite Manufacturing Research Hub (FCMRH), the National Composites Centre (NCC) launched its Technology Pull-Through (TPT) Programme in 2017. Now in its fifth iteration, the programme is fully funded by the NCC's Catapult budget 2022-2023.

1. Purpose of the programme

The purpose of the TPT programme is to **transfer technologies** developed within the UK academic environment with high potential for industrial application into the NCC semi-industrial setting. The objective is to scale-up such technologies to make them viable for industrial uptake, thereby providing the NCC industrial cohort with the competitive advantage of exploiting cutting-edge technologies. The programme benefits the academic partner by providing them with a clear case study that demonstrates the **impact** of their technology in an industrial and commercial context.

2. Proposal requirements

Priority will be given to those technologies which can substantiate claims of having reached TRL3 or above¹, and have proved to be mature for upscaling out of the university environment.

The programme funds 12-month research projects, however, the Academic Principal Investigators (APIs) should outline in their proposals the plan to develop the technology up to full industrial uptake (if necessary, beyond the 12 months duration of the project). Priority will be given to those proposals where a clear format and route to commercialisation have been identified.

3. Assessment criteria

Submissions to the TPT programme will be assessed according to the following criteria:

- **Technical Background & Overview:** The proposed technology has a solid, proven and tested technical background.
- **Industrial Applications and Benefits:** The technology could make a significant industrial impact.
- **Proposal Objectives:** The proposed approach is credible, value-for-money and the team could deliver successfully
- **TPT Programme Suitability:** The technology is mature enough, and the proposal aligns with NCC capabilities and priorities

4. Process steps and relevant dates

The definition process is structured in two stages (detailed fully in the table on the next page):

- **Stage 1** is based on the provision of high-level, short expressions of interest (EoIs) submitted by the APIs (using a dedicated form, to be provided) which are then reviewed by two bodies: the *Knowledge Exchange Committee* (KEC, formed by the members identified by the FCMRH management board) and the *NCC TPT Committee* (formed by NCC staff identified by the NCC

¹ The NASA TRL definition may be used for reference:

https://www.nasa.gov/pdf/458490main_TRL_Definitions.pdf

Technology Pull-Through Programme 2022-2023



Technology Board). The outcome of Stage 1 is a down-selected list of proposals approved to transfer to Stage 2.

- **Stage 2** requires the approved applicants, together with the support of an NCC Champion (identified by the *NCC TPT Committee*), to submit a fully detailed proposal. The Stage 2 proposals are subsequently reviewed by the *NCC TPT Committee* and the output is a final list of funded projects.

The stage 1 call closes at 12.00 midnight on the 21st November 2021. Proposals received after this time will be rejected.

Step		Completed by
Open Call		11 October 2021
Stage 1		
Eols submission	APIs send Eol to tpt@nccuk.com	21 November 2021
Eols preselection	KEC reviews Eols and provides recommendations to TPT committee	03 December 2021*
	TPT Committee performs a down-selection of the Eols based on KEC's recommendations and assigns an NCC Champion to successful projects for stage 2.	17 December 2021*
Stage 2		
Proposals submission	APIs in conjunction with NCC Champions prepare and submit full proposals to TPT Committee	28 January 2022*
Proposals selection	TPT Committee performs a final selection of full proposals identifying those to be funded	11 February 2022*
Programme kick-off	TPT Projects begin	04 April 2022
		<i>Dates marked with * are approximate</i>

5. What the NCC will offer

For all the successful Eols, the NCC will assign an NCC Champion to work through the required steps of Stage 2. These steps will be:

- Identification of the current TRL;
- Establish fit to NCC technology roadmap, competence and capabilities;
- Establish the critical steps towards achieving the target development;
- Definition of a costed plan to achieve such target;
- Compilation of a proposal based on such plan to be submitted in Stage 2 (template to be provided).

For the funded projects, the NCC, in close collaboration with the API, will:

- Carry out and report on the plan;
- Carry out a formal TRL assessment and appraisal of commercial potential at end of the project;
- Disseminate the results of the project to academia and to the composites industry, as appropriate.

For the funded projects judged to have good commercial potential, the NCC will in addition:

Technology Pull-Through Programme 2022-2023



- Map out a route to TRL6, at which point the technology should transition into the commercial space;
- Work with the academic team to define the best route to market and commercialisation;
- Work with the academic team to identify funding sources and apply for suitable further development funding.

The NCC will utilise Catapult funds to carry out this programme and will not require any funding from the academic partner.

The advantages of the NCC's offering are:

- The potential for a rapid response to proposals;
- Access to a wide range of technical capabilities, including full-scale industrial plant;
- Access to Business Development and Marketing expertise;
- No cost to the academic partner;
- Up-front clarity on IP ownership;
- Access to a wide range of potential end-users in the NCC members and customers cohort.

A limitation of the NCC's offering is that the Technology Pull-Through fund is limited, so that it cannot be guaranteed that any particular project can be carried all the way to a commercial launch. Equally, some dilution of the academic lead's personal control of the technology development is inevitable.

If a proposal is not successful within the NCC acceptance criteria, alternatives to using the NCC Technology Pull-Through funding could be:

- Application for IUK funding with a commercial partner
 - this approach is relatively low risk
 - this would almost certainly lead to significant dilution of the academic lead's personal control of the technology development
 - funding is cash-limited
 - funding strike rate is not high
 - commercial partner may not have all the required capabilities
- Licensing or sale of the technology to a commercial organisation or a potential end user for further development
 - in principle, this could be the fastest route to full commercialisation, if the buyer/licensee has financial viability
 - the academic lead's personal control of the technology development could be minimal
 - commercial partner may not have all the required capabilities or funding needed
 - IP position could become confused
- Spin-out of a company to commercialise the technology by the academic lead
 - in principle, this potentially maximises the academic lead's personal control of the technology development
 - funding will be needed from one or more investors and IUK funds will probably also have to be sought

- this is a high-risk approach (most start-ups fail) to get the company into positive cash-flow before the start-up funds dry up
- a spin-out company will probably have to have multiple strands of income and keeping the company afloat rather than developing technology may become the dominating objective

6. Project governance

The projects will be **governed by the NCC internal processes**. These include a series of technical gates overseen by the NCC Champions as well as by the project functions allocated internally: all funded proposals will be assigned a Technical Authority, a Project Manager and an Independent Reviewer by the oversight team. These roles will be assigned to personnel within the NCC or subcontracted to the NCC. The purpose of these roles are:

- **Technical Authority (TA)** – technical lead of the project accountable for the technical quality of the output from the project. This person will work for the NCC directly (either existing internal resource or a specifically subcontracted resource).
- **Project manager (PM)** – accountable for schedule, finance and delivery of the project.
- **Independent Reviewer (IR)** – an NCC employee responsible for monitoring the quality of the output from the project. No deliverable from the project – physical or literature – will be released until the Independent Reviewer has authorised issue. This should not be confused with accountability, which will remain with the Technical Authority.

The project team will be agreed by the NCC oversight team, the PM and the TA, and assigned to the project. Such team will contain personnel from the NCC and is likely to **include subcontracted expertise** from an academic partner, generally the **academic proposer**. The project will be **monitored against** both the **schedule** and the **budget** with actions and mitigations put in place by the PM with agreement from the NCC Champions if the project deviates from the original scope. If the Champion considers the project to be deviating from its planned direction, the mitigation action may include the termination of the project.

The project will be reviewed on a pre-set frequency. The frequency of the project reviews will be dependent on the scale and term of the project and outlined at the kick-off stage. However, as a minimum, the reviews will be held on a monthly basis. The project will be considered complete when the final deliverable has been officially completed, with Independent Reviewer sign-off.

7. Intellectual Property management

Intellectual Property (IP) management terms will be part of a Collaboration Agreement to be put in place on a case-by-case basis between the NCC and the academic partner. The API wishing to apply to TPT funding will be given visibility of such agreement prior to submission. The IP is managed according to the following principles:

- The relevant background IP owned by the academic institution at the point of project start remains the property of the academic institution.
- The relevant background IP owned by the NCC at the point of project start remains the property of the NCC.

- Any foreground IP developed during the project will be owned by the NCC, and academic institution will be granted a perpetual, irrevocable, non-exclusive, non-transferrable, non-sub-licensable and royalty-free licence to use the foreground IP for research and teaching purposes.
- Should **either** the NCC or the academic institution wish to commercially exploit the foreground IP generated within the project within five years from the end of the Collaboration Agreement, then the two parties will meet to determine the exploitation rights of such foreground IP. Such negotiation will take into account background IP brought into the programme to reflect fairly the research efforts of each party prior to the TPT project launch.
- The academic lead will make its relevant background IP available to the NCC on fair and reasonable terms to enable this and future projects to be carried out and commercialised.
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8. Post project: what happens next?

Post project assessment will be carried out to allow the NCC and the academic partners to develop the offering and process over time. Multiple potential outcomes are envisaged:

- Technology development is successful and ready for implementation in commercial environment via licensing or spin-out.
- Technology development is successful but requires additional mid-TRL development through InnovateUK or similar funding streams; the NCC considers opportunity sufficient to justify investing further funds.
- Technology development is successful but requires additional mid-TRL development through InnovateUK or similar funding streams; the NCC does not consider the opportunity sufficient to justify investing further funds.
- Technology development process has demonstrated significant limitations requiring more work in university space.
- Technology development process has demonstrated significant flaws limiting the potential for further development.

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