

## Evaluation of progress with delivering NERC's Technologies Theme

### Management Response

#### **Background**

1. NERC Commissioned this evaluation in order to meet the need for evidence on progress with implementing the science themes set out in NERC's strategy.
2. This document provides the management response to the evaluation report from the NERC Director, Science Delivery (DSD), who is the customer for the evaluation. The evaluation report has been discussed by NERC's Science & Innovation Strategy Board (SISB) and, alongside this management response, reported to Council.

#### **MANAGEMENT RESPONSE**

3. The evaluation report provides valuable evidence on progress with delivering the Technologies theme.

4. I welcome the overall positive conclusions of the Evaluation Panel, which were endorsed by SISB, including the findings that:

(i) the Technologies theme has *“made good progress against its challenges through well targeted and implemented investments”* and is meeting *“strategic expectations, and implementation is on track, progressing well overall”*;

(ii) the Theme Leader (TL) and Science & Innovation Manager (SIM) have worked well together in *“maintaining the profile of the theme, coverage of the challenges”* and in *“successfully implementing a theme which is particularly diverse, and hence challenging, in remit”*;

(iii) the panel *“strongly commended the move towards more cross-theme actions, in which the technology development is incorporated as a core component of the delivery of strategic research”*;

On this latter point, I recognise the need highlighted by the Panel to ensure that the intended technologies component of such actions is protected during implementation.

5. The report raised a number of issues and concerns, and made proposals to tackle them. These proposals are considered, in the light of SISB discussions, in the action plan below.
6. This section addresses the nine proposals made on pages 4-11 of the evaluation report. The words in italics are taken from the report.

## Action Plan

***Proposal 1: To capture the value created by the Technology Proof Of Concept (TPOC) programme, NERC should ensure that it has a robust system in place for supporting technology and instrument development across all TRLs. Although RM is an appropriate funding mechanism in most cases, there remains a perception that the process is hostile to technology development. Given the clear value and unique contribution of the TPOC programme, NERC should therefore consider the value of extending the programme on a four year cycle.***

**Management response: Proposal accepted.**

7. The Panel's observation that there remains a perception that the Responsive Mode (RM) process is hostile to technology development, despite the introduction of measures to provide a level playing field for technology-led research in RM, will be considered by the Peer Review College Pool of Chairs.

8. As Panel notes, it is probably too early to draw conclusions about the overall Theme impact. The TPOC awards were made in 2010 and 2011 and so more time is needed before the broader impact of the programme can be assessed.

9. As part of considering the value of extending the programme, NERC will first conduct an evaluation of the impact of existing TPOC investments. On the proposed 4-year cycle, the next investment would be from 2014 with a review conducted 2012/13. NERC's ability to support technology may also be affected by the capital availability.

Action 1	Peer Review College Pool of Chairs to decide whether further action required to level playing field for technology-led RM proposals
Responsibility	Peer Review College Manager
Deliverables	Decision on any further action required.
Due	Within one month of next annual Chairs' meeting – April 2012
Action 2	Evaluate existing TPOC investments to inform future strategy for potential future funding rounds
Responsibility	SO – Externally commissioned with Evaluation Group / SIM / TL oversight
Deliverables	An evaluation that informs any future TPOC action.
Due	Initiate evaluation 2012, to inform investments from 2014 (brought forward in TAP 4 or 5).

***Proposal 2: To clarify the programme's scope for any potential future investments in Networks of Sensors, the Technologies theme should make clear the relevance to Challenges 1 and 2.***

**Management response: *Proposal accepted***

10. I agree with the Panel's comments on the potential relevance to both Challenges 1 and 2. In this instance although the programme did not specifically exclude space-based measurements, the amount of funding available may have constrained some options.

11. In practice, *in situ* surface sensors have received far less resource over the past two decades than space-based sensing, and the action has addressed this relative under-investment.

12. Following the establishment of the UK Space Agency (UKSA), responsibility for strategic development of EO technology has been transferred from NERC. This does not mean that NERC will no longer invest in EO technology where there is a specific environmental science application (as we have done for example with the TAP3 UAV action).

13. Although there are no current plans for further development of the Network of Sensors programme in the next TAP cycle, the Panel's comments will inform the development of any future investments in this area.

***Proposal 3 The Theme Leader should continue to pursue metrology as a priority theme action, with a broader scope than climate metrology alone. The Panel support further scoping to more clearly identify priorities for NERC investment.***

**Management response: *Proposal accepted***

14. The Technologies Theme Leader proposed a broader Metrology action in TAP2 and a subsequently a revised action, more focused on climate metrology in TAP3. In both instances SISB was not able to support these actions. SISB has made clear the importance of data accuracy and interoperability, but has questioned how best to deliver this where responsibility lies across both NC and RP funding streams as well as with other bodies.

15. Following the most recent decision by SISB, NERC has sponsored a workshop on environmental metrology<sup>1</sup> in cooperation with STFC and the National Measurement Institutes (NMIs)<sup>2</sup>. This workshop has highlighted the need for joined-up research between NERC and the National Measurement System to deliver high-quality environmental data.

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<sup>1</sup> <http://www.nerc.ac.uk/research/themes/technologies/events/metrology-launch.asp>

<sup>2</sup> National Physical Laboratory and Laboratory of the Government Chemist

16. The Theme Leader has identified the need for a further, more detailed review of existing investments by NERC and others to identify funding priorities for NERC. Subsequent implementation will be dependent on funding mechanisms that allow funding across NERC RP and NC (see Action 7), and also across different BIS funding streams, since the vast majority of funding for environmental metrology research is awarded directly to the UK NMIs (that don't actually make any real-world measurements).

Action 3	Review of existing UK metrology activities.
Responsibility	Theme Leader
Deliverables	Review report. Identification of investment priorities for NERC (RP, NC).
Due	Review commissioned from 2012 when funding mechanism in place (see Action 7).

***Proposal 4 NERC should explore potential alternative networking opportunities, including a demand analysis, for the challenges that do not have a Technology Cluster (Challenges 2 and 3).***

**Management response: Proposal accepted**

17. Technology Clusters were not developed in Challenges 2 (Field Sensors & Networks of Sensors) and 3 (Novel Laboratory Instrumentation); mainly due to low demand, probably related to existing arrangements for the community (e.g. Knowledge Transfer Networks, such as in Electronics Sensors and Photonics [ESP-KTN]).

18. Since the Technology Clusters action, new communities have become established around subsequent technology-theme actions which are relevant to the unfunded Clusters areas (e.g. through TPOC and Network of Sensors). The post-award management of the Network of Sensor programme (managed by the ESP-KTN) includes activities such as a series of annual workshop events and a community website<sup>3</sup> which will enable wider participation beyond those holding awards. The review of TPOC (Action 2) will also explore strengths and weaknesses in community organisation.

19. In part therefore, challenges not addressed by Technology Cluster investments are in the process of being addressed through other actions. These activities will be allowed time to become established before a more detailed review of their effectiveness. This relates directly to, and should be coordinated in part with, Action 1.

<sup>3</sup> <https://connect.innovateuk.org/web/network-of-sensors/overview>

Action 4	Review sufficiency of existing mechanisms and activities relevant to community organisation around Challenges 2 and 3 (coordinate with Action 1).
Responsibility	SO – Evaluation Group working with SIM / TL
Deliverables	Review report. Identification of potential investment priorities.
Due	Initiate evaluation 2012, to inform investments from 2014 (brought forward in TAP 4 or 5).

***Proposal 5: The Panel advises NERC to explore additional opportunities for co-funding studentships with other learned societies and funding bodies.***

**Management response: Proposal accepted**

20. Potential for additional co-funding of studentships is under active consideration by the Theme Leader, but opportunities are more limited in other sectors. The NERC training review is moving in the direction of supporting more strategic training, and the existing action will enable identification of good-practice implementation.

Action 5	Explore potential new opportunities for co-funding of studentships
Responsibility	Theme Leader
Deliverables	TAP training actions include consideration of co-funding.
Date	Ongoing

***Proposal 6: To optimise its delivery, NERC should consider the benefits of undertaking an ‘environmental data and model interoperability’ scoping action, including an analysis of prerequisite enabling technologies, as a precursor activity to a full New Data Intercomparison Tools theme action. This activity could include partner engagement, including EPSRC and other LWEC partners.***

**Management response: Proposal accepted**

21. Data and model interoperability was identified in TAP 3 as an area for a likely action in TAP 4. This remains the case. The field is very wide, and also fast moving and any proposals based a scoping action must take implementation speed into account. Discussions are ongoing with this community on approaches to developing capability and new technology in this area. Both RP and NC are likely to be required to deliver in this area.

Action 6	Discuss with community key areas for development in data and model interoperability, including determining the need for a scoping study.
Responsibility	Theme Leader
Deliverables	Action considered for prioritisation in TAP4 (possibly informed by a scoping report)
Date	2013 (TAP4)

***Proposal 7: NERC should consider ways of addressing current gaps in delivery of the theme:***

- ***Metrology;***
- ***New Data Intercomparison Tools;***
- ***Technology for Efficiency (robotics and automation).***

**Management response: Proposal accepted**

22. All three topics sit at the interface between RP and NC, so a more joined-up approach across these funding streams is required to support actions and programmes which will deliver new science and capability in these areas.

23. This issue is being addressed by Director Science Delivery and Director NERC Integration Programme, to enable an improved planning process with stronger engagement between Theme Leaders and National Capability leads.

Action 7	Develop an improved planning process between TAP actions and National Capability development.
Responsibility	Director, Science Delivery
Deliverables	A process enabling TAP action development to engage with and with the potential to influence NC planning, evolution and investment.
Date	2012

***Proposal 8. The Panel strongly endorsed a continuation of the Technologies theme in its current format, both as one of the seven science themes, and as one of NERC's key strategic foci.***

**Management response: Proposal noted**

24. This view is shared by the Theme Leader. The Technology Theme TAP3 forward strategy identified that a more joined up approach to the NERC Technologies portfolio

may be required in the future, since many key opportunities lie at the boundaries of NC and RP (see also Action 7).

*Proposal 9. NERC should consider developing a more systematic and sustainable mechanism through which investments that cross different funding streams, particularly NC and RP, can be brought to the attention of the appropriate investment bodies within the organisation.*

**Management response: Proposal accepted (see Action 7)**

**Director, Science Delivery**