# Evaluation strategy

August 2015

## Introduction

The UK Space Agency is committed to ensuring that our funding is spent on activities that provide the greatest possible economic and social return. We recognise that high quality evaluation is vital to this, to ensure that decisions are based on reliable and robust evidence.

We collect a wide range of information to assess the impact of the Agency's funding, and are committed to strengthening our evaluation evidence base. To reflect this commitment, this Strategy sets out the processes we follow when evaluating our activities and programmes. We will seek to strengthen our existing body of evidence on the outcomes of past programmes by ensuring that evaluation is strongly built into new programmes and activities from their inception.

Building off the HM Treasury Magenta Book, which sets out best practice on evaluation for government officials to follow, it sets out how we will apply its principles within the Agency. It covers our broad approach to planning and undertaking an evaluation, and provides an outline of key questions to be considered at each step. We recognise that improving evaluation is an ongoing process, and we will review this Strategy annually to ensure that the processes are best tailored to the Agency's activities, so that we can then use the evidence generated to help inform our decisions on funding prioritisation.

## Context

Evaluation is the robust analysis of how a policy or programme has been delivered in practice and whether its objectives were met including what impact those objectives had. Evaluation can provide an understanding of the actual economic, financial, social and environmental impacts of a policy or programme, and can provide an assessment of how well the policy was implemented, why it did (or did not) deliver as expected, and whether it represents value for money. We recognise that good evaluation is multi-faceted, looking at all aspects of the policy or programme, and should look for any evidence that a policy does not work or that a programme has not delivered, as well as evidence to show that it does or has.

The Agency carries out a range of activities aimed at ensuring that the UK retains and grows a strategic capability in space-based systems, technologies, science and applications. Understanding the outcomes of our interventions and learning lessons for the future is therefore essential to ensure that policy making is evidence-based and ensures programmes meet value for money. We need to understand how and why policies work, both to inform the development of new policies and to improve the effectiveness of existing ones.  To this end, we collect a range of information and monitoring data to enable us to understand the impact of our programmes.

A strong evaluation evidence base will contribute to the setting of policy and programme objectives, and can be used to demonstrate how those objectives are being met. In this way, good evaluation evidence provides accountability, by demonstrating how funding has been spent, what benefits were achieved, and assessing the return from our activities. As well as providing public accountability, good evidence can help demonstrate that the Agency's funding is providing sufficient impact to the UK and its people to justify future investment in our programmes. Good monitoring and evaluation processes also assist in benefits realisation, helping us to better understand whether the expected benefits from a given programme are going to be achieved, and in understanding what we can do to make sure we achieve them.
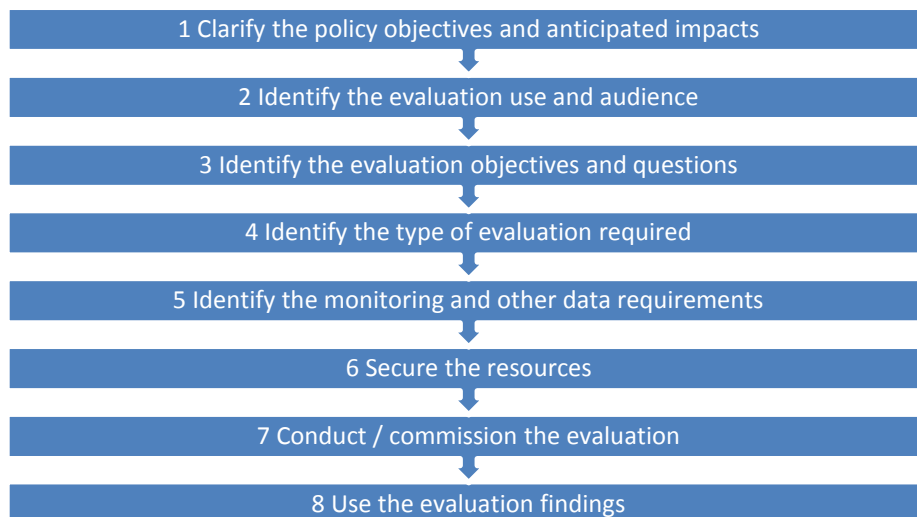
As an executive agency of the Department for Business, Innovation and Skills (BIS), this Strategy is closely linked to the BIS Evaluation Strategy[1]. We recognise that close collaboration is important to achieve both BIS and the Agency's strategic aims here, and will continue to work together to share knowledge and best practice.

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[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387507/bis-14-1295-evaluation-strategy-2015-16-accountability-and-learning-at-the-heart-of-bis.pdf

## UK Space Agency's approach to evaluation

The Agency's evaluation processes for its projects and programmes are based on the processes set out in HMT's Magenta Book.[2] Core to this strategy is an understanding that failure to consider evaluation early enough can limit evaluation options and the reliability of evidence obtained.

Figure 1: Our approach to planning and undertaking evaluations (based on HMT Magenta Book)

| 1 Clarify the policy objectives and anticipated impacts |
| :---: |
| 2 Identify the evaluation use and audience |
| 3 Identify the evaluation objectives and questions |
| 4 Identify the type of evaluation required |
| 5 Identify the monitoring and other data requirements |
| 6 Secure the resources |
| 7 Conduct / commission the evaluation |
| 8 Use the evaluation findings |

In putting together this information, we will work with others, reflecting the UK Space Agency's frequently partner-based approach to delivering our programmes and working towards our strategic objectives. Examples of partners we will work with to evaluate our policies include Research Councils, academics, the satellite applications catapult, industry and international partners (e.g. ESA, European Commission and OECD) to bring together evidence on the effectiveness and impact of our activities.

For all new programmes and regulatory proposals, we propose articulating each of the above eight steps in an Evaluation Plan, developed as part of policy and programme business case development. Decisions on the scale/type of evaluation needed will from part of the project initiation process, and will be recorded in the Project Inception Document. This is because the design of a policy or programme will affect how rigorously it can be evaluated, and it will almost always be necessary to collect some data for the evaluation before the policy is implemented or the programme has finished and throughout its delivery. While we will develop evaluation plans early on in the project initiation process, we recognise that this will undoubtedly be an iterative process: for example, it is likely to be necessary to review the evaluation objectives and questions once the resources available for the evaluation and the intended use / audience of the results have been clarified.

In all evaluations (and indeed in policy/programme design more generally), all objectives and anticipated outcomes will be linked to the Agency's strategic objectives. To improve the design of our evaluations, activities will also (where feasible and proportionate) be piloted before rolling out on a wider scale, to allow for experimentation and process evaluation before scaling up.

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[2] Communications and PR activities are evaluated separately in line with Government Communications Service guidelines and are not explicitly covered by this strategy, though many principles will be the same

*European Space Agency programmes*

Much of the below is most directly relevant to UK programmes. However, as much of the UK Space Agency's budget is delivered through the European Space Agency (ESA), we recognise the importance of working with them to ensure that appropriate and proportionate evaluation takes place. The same best practice principles set out below still apply, e.g. on independence, proportionality and quality assurance.

We will work towards strong ESA evaluation by working together with the relevant teams to cooperate on evaluation planning, to share knowledge and best practice, and to collect information on their evaluation coverage and quality on an ongoing basis. To date, ESA evaluations have largely focused on whether the technical objectives of a given project or programme have been met. While the UK is one of 22 ESA Member States, and so we cannot by ourselves set evaluation processes for missions with multiple international partners, we will continue to push for the assessment of economic impacts to be fundamentally built into evaluation design in line with the principles set out in this Strategy.

*Type of evaluation*

When considering the type of evaluation required, we will take the general approach that high risk or high uncertainty policies or programmes are likely to require more comprehensive evaluations to understand how they are working in practice, and whether they are delivering the predicted impacts. Similarly, large-scale and high-profile policies are likely to require robust evaluations to build the evidence based and to demonstrate that public money has been well spent, and to argue for extensions of funding or for similar future policies or programmes. Small or routine policies, for which evaluation is unlikely to generate as many learning benefits, may only need light touch monitoring and evaluation to confirm they have been delivered as intended and to ensure money has been correctly spent. We will include consideration of what type and depth of evaluation is appropriate during the planning phase of *all* policies and programmes. Figure 2 provides a rule-of-thumb guide that UK Space Agency staff will follow to help choose the appropriate scale of an evaluation.

*Figure 2: Choosing proportionate evaluation*

| Budget* & Profile | | | Risk & uncertainty | | |
|---|---|---|---|---|---|
| High | Large programme with significant budget, and/or high profile with media and public interest, and potentially high impact | Level 2 | Level 3 | Level 3 |
| Medium | Medium-sized programme with moderate budget, and/or some media and public interest, expected to have a sizeable impact | Level 2 | Level 2 | Level 3 |
| Low | Small budget and/or limited public or media interest, with relatively low impact | Level 1 | Level 2 | Level 2 |
| • Level 1: light-touch, internal evaluation recommended, including before/after monitoring<br>• Level 2: consider commissioning externally, with appropriate budget allocation<br>• Level 3: detailed, externally commissioned evaluation with budget of 1-5% of total programme recommended | | | Straightforward low-risk programme with low uncertainty around the outcomes | Programme not especially complex or risky, but some uncertainty around outcomes | Complex programme design, and/or significant risk and uncertainty around programme outcomes |
| | | | Low | Medium | High |
| | | | Risk & uncertainty | | |

*Budget thresholds: ‹£1m low, £1-10m medium, £10m+ high

We also recognise that the particular nature and wide range of UK Space Agency programmes, and in some cases involvement of multiple delivery partners, will also necessitate a tailored approach to evaluation. For example, innovation type projects with predefined medium-term market outcomes involving particular companies (e.g. National Space Technology Programme, or the International Partnership Space Programme) will require a different approach to a space science mission where the Agency may have intervened at different points of the programme - for example, funding the R&D for a mission instrument, then partnering with the European Space Agency to fund the mission itself and then finally enabling research council partners to exploit the data from this mission.

In many cases, follow-on activities following a particularly programme will be taken forward by others such as the Science and Facilities Technology Council, or Innovate UK. In these cases we will work together with these organisations to ensure that evaluation is properly planned for and carried out in accordance with the principles set out here, that we join up appropriately, and that we share all relevant data, planning ahead to ensure that good evaluation takes place and that we develop a good understanding of the bigger picture programme impacts.

Although a comprehensive evaluation may not always be called for, we recognise that it will always be important to assess some aspects of the delivery process. This will, at the very least, include some degree of monitoring, to track the inputs and outputs that are actually delivered. Through the evaluation of current and past programmes we are already collecting a range of information and will build on this for future evaluations. At a minimum we need to collect monitoring data for all programmes, following firms and ensuring we collect long term data, including on who participated in programmes and how it was delivered, to enable robust evaluation, though in general we will seek

to go beyond this. When collecting this data, we will strive to ensure this is done in a minimally burdensome way.

More detail on UK Space Agency evaluation design and the suggested questions that will be asked by project managers when planning and undertaking evaluations is provided in Annex A. As above, evaluation planning will be considered when project planning, including in the project inception document. Where evaluation plans need to be more detailed, a template for project managers to use is provided in Annex B.

*Funding*

We will allocate appropriate funding for evaluations – while the scale of the resource required will depend on the relative importance and riskiness of a given programme, as a rule of thumb this will often be in the region of 1-5% of the total programme budget for externally-commissioned evaluations, e.g. up to £5m for a £100m programme.

This should be thought of as a rough guide rather a firm prescription. For example, the European Commission[3] have recommended that for interventions that are relatively innovative and pilot in character and where evaluation has a strong learning and participatory aspect the costs are likely to be a relatively high proportion of programme - up to 10%.

*Quality Assurance*

To ensure that our evaluations deliver robust evidence, as a general rule the UK Space Agency will work to ensure that evaluations are independent so as to avoid any bias from 'marking your own homework' effects. Within the Agency we seek to achieve this through the frequent use of independent panels such as project steering boards and strategic review panels / advisory bodies with largely non-Agency membership.[4] In general we will start from the position that most major evaluations will be externally commissioned, although less high profile or smaller projects or programmes could be evaluated in-house. For all evaluations we recommend there will be a dedicated internal project manager that will collect milestone and delivery information. This decision will come down to the resources available and the profile/risk surrounding a particular programme.

We commit to ensuring that our evaluations are sufficiently multi-disciplinary, involving as relevant experts from different disciplines such as engineering, science, economics, statistics and social research. As part of this, we will also ensure that all relevant stakeholders are engaged and feed into evaluations, including international partners.

We recognise that evaluation is not something to be left just to evaluation specialists. Agency programme staff can and must play an active role in collecting data and recording their observations and experiences, which can help ensure that our evaluations are addressing the right questions and accurately reflect what programs are doing. In some cases (e.g. space science/exploration) it will be

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[3] EVALSED: The resource for the evaluation of Socio-Economic Development, September 2013. Link: http://ec.europa.eu/regional_policy/sources/docgener/evaluation/guide/guide_evalsed.pdf

[4] For example, see the review and evaluation of the National Space Technology Programme. Link: https://www.gov.uk/government/publications/review-and-evaluation-the-national-space-technology-programme

necessary for the Agency project manager to take ownership for gathering or enabling external organisations to gather programme date from third party organisations (e.g. Research Councils) who will be exploiting the data. This does necessitate both evaluating intermediate benefits and longer-term benefits from investment.

When completing evaluation plans, UK Space Agency project managers should also set out quality assurance processes to ensure that time and resource is built into project plans to ensure that evaluation findings are robust. This will include details on who will (independently) review evaluation findings and when, including from which disciplines, and clearance and governance processes. We recognise that adequate resourcing (programme funding, management and ownership – including suitable analytical support) is essential to produce robust evaluation evidence. Guidance will be provided to project managers, including a template for them to use in the planning phase (see Annex A and B). The Agency's Executive Board will play an important role in scrutinising and clearing evaluation plans.

As set out in figure 2 above, there will often be a role for involving external experts on evaluation methodologies and for peer review purposes. Independent advice and scrutiny forms a core part of the Agency approach to evaluation, and we will continue to seek the advice of external experts on complex evaluations, to be determined on a case-by-case basis.

BIS has established an external peer review panel of independent experts on evaluation. The experts contribute at key stages of evaluation projects, especially at the earliest stages, and help promote good practice, provide assurance of quality and increase the credibility and use of our work. As an Executive Agency of BIS, we will give consideration to using this panel as and when relevant.

In line with our commitment to transparency, we will also seek to publish all completed evaluation reports as and when they are produced.
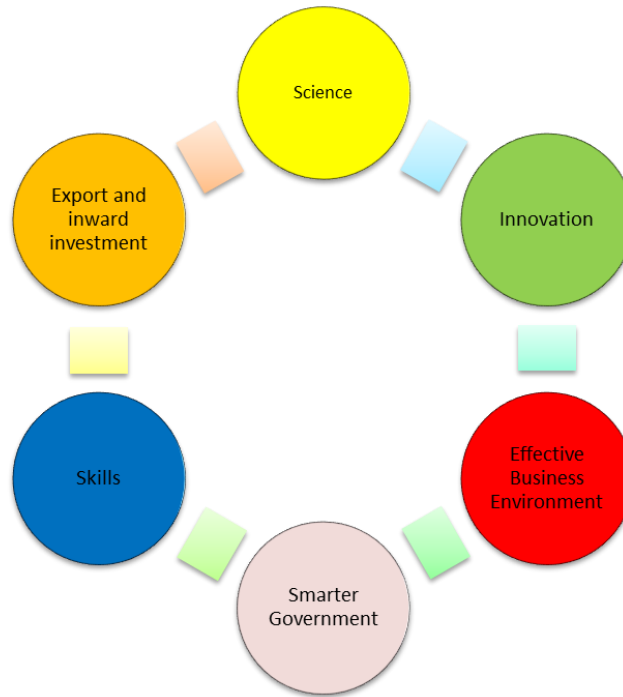
*Process and Impact evaluations*

The two main types of evaluation are process and impact evaluations.

Process evaluations cover questions relating to how a policy or programme was delivered, e.g. how did it work, for whom, why, and were there any unforeseen effects? Through seeking to answer these questions in our evaluations, we will continue to build our understanding of how policies and programmes can be best designed. In general, process-related questions are intentionally descriptive and as such we will employ a wide range of data collection and analysis techniques. As relevant, the Agency project manager and/or independent evaluators will collect qualitative and quantitative data from different stakeholders using, for example, interviews and surveys. Within the Agency we collect a range of information through independent panels such project steering boards, review panels and advisory bodies, and build lessons from post-project reviews into the design of new programmes.

Impact evaluations cover questions related to the difference that a policy / programme has made, and involve a focus on the outcomes of the policy. Outcomes are those measurable achievements which either are themselves the objectives of the policy – or at least contribute to them – and the benefits they generate. These evaluations are all about systematically and empirically identifying the effects resulting from an intervention, be they intended or unintended, direct or indirect.

Impacts are usually understood to occur later than, and as a result of, intermediate outcomes. Broadly speaking, this type of evaluation addresses the questions 'what difference did the policy make' and 'were the outcomes achieved because of the intervention'? Figure 3 sets out 6 pathways to growth that may occur as a result of space investments.

Figure 3: UK Space Agency pathways to growth



A key objective of an impact evaluation is to assess whether any changes occurred after the policy was implemented (the observed outcomes) and whether these were a result of the policy or would have happened anyway. Impact evaluations are typically undertaken to account for use of resources, to demonstrate and quantify the benefits achieved by a policy, and to aid decision making about future resource allocation. Figure 4 illustrates potential impacts from an innovation-focused programme aimed at getting near-market technology to commercial readiness.

*Figure 4: Examples of economic impacts of an innovation programme*
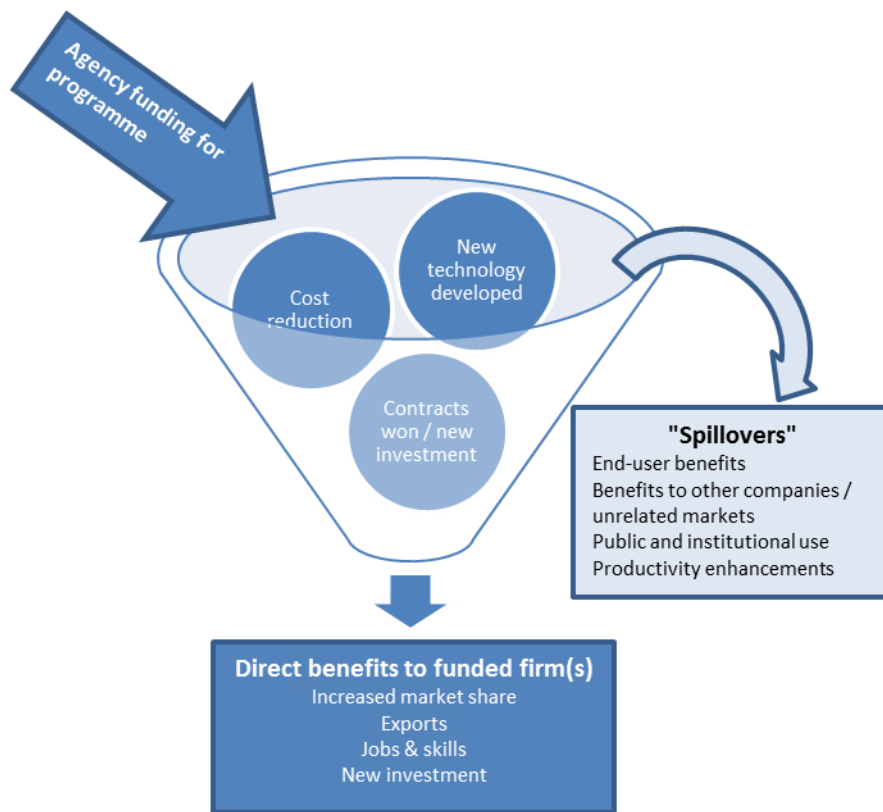
For more science-based programmes, the pathways to impact will be slightly different. Here, there will be direct benefits from contracts awarded and technologies / products developed for a given mission, and associated benefits along the lines of the above. However, the value of the science generated also needs to be considered – here, benefits could be in terms of productivity enhancements from new techniques, new markets for products developed, or better policy making from improved information. In many cases these benefits may not occur until several years after project/programme funding is awarded, so evaluations will also need to consider intermediate outputs such as patents awarded or the number of new publications.

 When assessing the impact of a programme, to get a robust answer is it not sufficient to simply compare the 'before' to the 'after' scenario. Rather, it is necessary to understand what would have happened in the absence of the policy – known as the 'counterfactual', or baseline. Establishing the counterfactual is not easy, since by definition it cannot be observed – it is what would have happened if the policy had not gone ahead. For this reason it has to be estimated or constructed. The strength of an evaluation design and the quality and availability of data will determine the extent to which the counterfactual can be robustly established. The most robust counterfactual is typically achieved through random allocation, where it is by chance whether an individual or group is assigned to either the 'treatment' (i.e. receives or is affected by the programme, such as by receiving funding) or counterfactual group. However, this is not always possible. Conceptually:

$$\textit{Impact metrics after completion of the project} - \textit{Impact metrics in baseline projection} = \textit{Impacts attributable to the project}$$

Where the counterfactual cannot be, or has not been identified, evaluations are likely to be a lighter-touch before/after assessment of programme impact. While this will not be the 'true' impact (to answer this we need to know what would have happened in the absence of the intervention), it can still be useful to assess the direction of travel and whether the policy is achieving what it originally intended to achieve. This is frequently referred to as an outcome evaluation. Example questions might be how many grants were awarded, how many businesses ran projects to plan, or how were targeted technologies developed?

When planning evaluations, we will give consideration to the best way to approach this issue, which will always include an important role for collecting monitoring data. We will tailor evaluations to the type of programme being considered. We anticipate that most will combine both impact and process elements, helping us to improve our understanding of what works, by how much, and why. In turn, this will inform better future programme design, as well as allowing us to better fulfil our transparency obligations.

A useful NASA primer on measuring socioeconomic impacts, which is nominally focused on Earth Observation missions but that in practice is more widely useful (it is written in general terms), is available here: http://www.nasa.gov/sites/default/files/files/SocioeconomicImpactsPrimer.pdf

*Links to programme and project management (PPM) processes*

To deliver successful policies and programmes we need to know how they are being implemented, how they are working in practice, their impact, and why they are or are not achieving the outcomes and benefits expected. We can then use this evidence to modify policy and programmes to better achieve benefits.

The processes set out here are designed to be fully consistent with – and part of - the UK Space Agency's wider programme and project management (PPM) processes. As set out above, Agency programme managers will set out the proposed approach to evaluation in an Evaluation Plan, to be scrutinised and cleared alongside the programme/project business case. We will also set out clear roles and responsibilities for evaluation, with a nominated Senior Responsible Owner, project manager, and project team. Starting the collection of baseline data at this early stage can ultimately help deliver the programme in a way that will make evaluation easier and more robust further down the line.

Work on the Project Inception Document and Business Case will help establish risk, uncertainty, and profile of a given project or programme, in turn helping establish the appropriate scale of an evaluation (see figure 2 above). Planning for an evaluation is also very much part of more general project planning, with work needed to establish (for example) the resources required, timescales and expenditure. Where it is established at project inception that an evaluation that goes beyond light-touch monitoring is needed, which will frequently be the case, the template attached at Annex B will help Agency project managers to design the evaluation.

There are various banners and processes that are often referred to within PPM processes – monitoring, quality management, benefits realisation and evaluation. At their core, all are collecting evidence on performance and delivery. In seeking to undertake good evaluation in the agency, we will seek to make best use of resources by aligning these processes to collect data once and use it often, and to ensure we have the right evidence at the right time. So, for example, linking the evaluation questions of "did the policy cause any measured change, and to what extent" and "what delivery models work best, in which contexts, and why (not)?" to performance management questions such as "is the delivery on track, why or why not, and what can we do to get it on track" and benefits realisation questions such as "are we going to achieve our expected benefits, and what can we do to make sure we achieve them". Establishing early on what monitoring data needs to be collected is particularly important here.

Similarly, there are also links between the information collected for these purposes, and the information collected for annual reporting in our Corporate Plan, including on Key Performance Indicators. We recognise these links and will work to ensure that evaluation data forms an important part of annual reporting, so improving transparency.

Most of our programmes are also long term, and will continue to have impacts over many years. This has to be taken into account in any evaluation design, and monitoring data will therefore generally need to be collected over a period of many years. While the final impact of a given programme may not be known for many years, we will focus on designing appropriate interim metrics, collecting the necessary information to be able to monitor progress and the impact of the policy or programme over shorter timeframes.

*Using findings*

As above, robust evaluation data will enable the UK Space Agency to more effectively meet transparency commitments. Beyond this, though, the main use of the evaluation data will be to provide a sound scientific and evidence-based basis for policy making and funding decisions, by providing a reliable understanding of which interventions work and are effective. An understanding of how and why our policies and programmes work will help inform the development of new policies and programmes and to improve the effectiveness of existing ones.

There are also close links with evidence planning. At its heart, evidence planning seeks to build our understanding of what we know, what we don't know, and what we want to find out. Good evaluation is central to this, and we will actively seek to formalise this link through good knowledge management and ensuring that evaluation findings are disseminated widely.

Building up evaluation data will also improve the Agency's ability to demonstrate clear evidence on the overarching impact of our activities. We recognise that producing credible evidence of our impact is a key factor in achieving good funding settlements in fiscal events. Being able to demonstrate that we have a coherent plan for demonstrating that each and every programme delivers or is on track to deliver value for money will stand us in good stead for future fiscal events.

## Issues

Most of the UK Space Agency's activities (whether domestic or delivered through the European Space Agency) are science and innovation programmes. Evaluating the return of these programmes is recognised as being particularly difficult, due to a range of measurement issues. This section summarises the major issues, and the Agency's approach to addressing these or taking them into account.

### Control Group

We will collect data from companies supported by the Agency. Good practice for evaluation, as set out in the Magenta Book and elsewhere, is then to collect similar data from a control group. However, this is difficult when dealing with a relatively small sector such as space, which has a limited number of industry participants. Adding to this, there are inherent difficulties in regular data collection from firms whose applications for funding have been rejected. In general, though, we anticipate that the challenges of selecting and engaging a control group will differ from programme to programme, and so the approach will be designed on a case-by-case basis.

This approach – the collection of data over time and, where possible, from a control group as well as the treatment group - will enable the estimation of longer-term economic impacts whilst being able to report in a timely manner on short- and medium-term outputs (such as leveraged investment, firm survival, immediate employment impacts, and behavioural and attitudinal changes). For more science-based programmes, impact will often be measured through outputs in terms of academic publications, citations and spin-offs. For longer-running programmes, this could be combined with retrospective data from earlier projects to provide more immediate insight to longer-term impacts, together with ensuring that data collection is in place to allow full, robust impact analysis over time.

### Gross Impacts

For innovation and science investments, benefits are often fluid and unpredictable, accruing over long timeframes. UK Space Agency evaluations therefore generally need to collect data over several years. To ensure our long-term evidence base is robust and complete we will be, and in many cases already are, collecting the data necessary to measure these impacts in the future. In the meantime, we will focus on intermediate outcomes such as those on investment, knowledge and skills.

As well as long timeframes, measuring returns is also complicated by the involvement of multiple players and, in particular, 'spillover' effects that can benefit non–participating industry players, consumers and even unrelated industries. These spillover effects can often make up the majority of programme benefits, particularly where the Agency is funding public good projects such as climate protection, weather forecasting or navigational services - although they are often difficult to measure with any accuracy. We will continue to give consideration to these, for example by undertaking bespoke research programmes. Where appropriate, we will also consider the wider impact that Agency programmes have on inward investment and global competitiveness, reflecting the international nature of the space industry and supply chains.

*Additionality*

For any evaluation, measured impacts need to be compared against the counterfactual, i.e. the baseline of what would have happened in the absence of the intervention. So, for example, jobs created and new investment does not necessarily translate into net positive impacts. Consideration need to be given to issues such as displacement, crowding out, and leakages. This is often tricky to accurately measure, though we will recognise and address these issues in evaluations as they are developed.

We recognise that there will often be other issues such as poor data availability (e.g. few companies being funded, within a small industry), heterogeneity (big differences in company size, structure, and objectives within the industry), fluidity (a rapidly-changing market, where change is unrelated to UK Space Agency programmes), and low observability (data not publically available, and reliance on self-reported information as firms may be unwilling to disclose potentially sensitive data).

All of these factors are potentially relevant to the Agency's evaluations and will be considered. However, for any given evaluation not all these issues will be relevant and their severity will vary. We will therefore assess them on a case-by-case basis. More generally we will continue to work with evaluation practitioners in other organisations (e.g. other government departments and agencies such as Innovate UK) to ensure that we follow best practice methodology. Importantly, given that much of the Agency's funding is delivered through the European Space Agency, we will also need to work with them and others to ensure good quality evaluation data.

*Isolating the impact of UK Space Agency funding*

As noted above the UK Space Agency frequently works with partner organisations to deliver our programmes. These partners may be within the UK, such as Research Councils, universities, the Satellite Applications Catapult, or in industry. For other programmes we work with international organisations such as ESA, the European Commission or the OECD.

In many cases isolating the impact of UK Space Agency funding can be difficult. Examples are programmes where the Agency funds the design of instruments, their launch, and subsequent data collection, but then Research Councils such as the Science & Technology Facilities Council or the Natural Environment Research Council provide grants to universities to undertake research using the data collected. This research will lead to many of the longer term benefits in terms of scientific advancement or commercialisation of new technologies. However, while funded by the Research Councils, this research could clearly only have taken place as a (indirect) result of Agency funding. In our evaluations, we therefore need to look at the whole lifecycle as well as the immediate outcomes, while recognising that this implies monitoring over a longer time period. In some cases a broad indication of Agency funding impact could be developed through, for example, considering the proportion of total lifecycle funding that the Agency is responsible for. We recognise that these issues are complex, though the evaluation processes set out here will help strengthen the Agency's approach and will help us to better understand the impact of Agency funding

# Annex A – identifying objectives, effects and appropriate questions

1. Questions to use to help identify SMART objectives and anticipated effects:

| **context and issues** | • What are the stated objectives of the policy / programme?<br>• What contextual ( delivery environment) factors may influence the ability of the policy to achieve its outcomes and impacts?<br>• Who will the policy affect, both directly and indirectly?<br>• What is the existing knowledge base?<br>• What other existing programmes could affect the expected outcomes? |
|---|---|
| **impacts** | • What is the overall goal of the policyor programme?<br>• What is the policy aiming to achieve in the **long term**? (e.g. market growth, technology developmeent, knowledge, improving skills)<br>• What policy objectives will it address? |
| **outcomes** | • What is the policy / programme expected to achieve in the **short to medium term**?<br>• What kind of changes would you expect to see as a result of activities? (e.g. new space-related technology or knowledge produced faster) |
| **outputs** | • What will be **delivered as a direct result** of the policyor programme? (e.g. grants)<br>• What activities will directly result from the policy or programme ?<br>• What participation will directly result from the policy ? |
| **inputs** | • What **financial resources** are being invested by UKSA and/or other partners?<br>• What **activities** will be aken to deliver the policy by UKSA and delivery partners?<br>• What **other resources** are being invested? (e.g. people, skills, research, etc.) |
| **assumptions** | • What is assumed about how inputs will feed into outputs? (e.g.loans are taken up; investors can be identified)<br>• What is assumed about how outputs will feed into outcomes? (e.g. training exists to increase skills; new product components can be sourced)<br>• What is assumed about how outcomes feed into impacts? (e.g. new technology is used, knowledge generated, alternate technologies are not devloped overseas) |

2. Issues for project managers to think about when developing evaluation questions:

| **What difference did the policy or programme make? (outcomes & impacts)** | • How will you know if the policy or programme is a success?<br>• What does "good" look like?<br>• Who is expected to benefit from the policy or programme?<br>• Which anticipated impacts / outcomes are most important to assess?<br>• What longer term impacts should be assessed?<br>• Can you quantify impacts, as well as describe them?<br>• Do you need to assess the actual cost-benefit of the policy or programme?<br>• Are you expecting the policy to deliver wider knock-on effects? |
|---|---|
| **What was delivered? (inputs &outputs)** | • How will you know if the policy or programme is on track?<br>• Are there interim steps in delivery which can be identified?<br>• What is being delivered by external organisations / supply chains? |
| **How was the policy or programme delivered? (processes)** | • What do you need to learn about the delivery process?<br>• Will you understand why the policy or programme does/does not achieve anticipated outcomes?<br>• Which aspects of the delivery process are innovative or untested?<br>• Is it important to learn about uptake and customer attitudes ?<br>• What contextual factors might affect delivery (e.g. economic climate, other policy measures, innovation developments, etc)? |

## Annex B – Evaluation Plan template for project/programme managers

*What is the policy context?*

*Why is an evaluation needed?*

*How will the findings be used?*

*How and when will the evaluation take place?*

*What are the limitations for the evaluation?*

### 1. Project/programme objectives and anticipated effects

*What are the issues being addressed and the context within which the project or programme is taking place?*

| *What are the inputs i.e. resources and activities?* | *What are the outputs, i.e. what is being delivered?* | *What are the outcomes, i.e. short / medium-term results?* | *What are the impacts, i.e. long-term results?* |
|---|---|---|---|
| | | | |

*What are the assumptions i.e. what factors and processes need to be in place to link the inputs, outputs, outcomes and impacts?*

### 2. Evaluation use and audience

*Who will be the main users of the findings?*

*What will the findings be used for, and what decisions will they feed into?*

### 3. Evaluation objectives and questions

*What do you need to know about what difference the policy made, and/or how it was delivered?*

*Is it clear what will constitute success and how this will be measured?*

The evaluation questions are as follows:

| 4.    Type of evaluation required |
|---|

*Is an impact, process, combined or light touch evaluation required? Why?*

*Who will be affected, and what are the main anticipated outcomes?*

*Does the project/programme design allow for a control group to be identified?*

*How will learning from what worked and did not work be identified and measured?*

| 5.    Monitoring and other data requirements |
|---|

*What data is required?*

*When is this data required?*

*What is already being collected / available? What additional data needs to be collected to measure the baseline and monitor progress?*

*If there is no valid and comprehensive data, is there provision to run primary data collection?*

*Who will be responsible for data collection and what processes need to be set up?*

Information is required about:

These information requirements are being met through the following work-streams:

| 6.    Resource Requirements |
|---|

*What budget is available for the evaluation?*

*Who will be the project manager?*

*Who will be on the steering group?*

*Who are the key delivery and wider stakeholders?*

| 7.    Conducting and commissioning the evaluation |
|---|

*Who will be involved in developing the specification and when will it be developed?*

*How will the evaluation be commissioned? When will the evaluation start?*

| 8.    Using the evaluation findings |
|---|

*How will the findings be shared and disseminated? Who else should be made aware of the findings?*

# Annex C – Evaluation in the Agency: examples

Approximately 80% of the UK Space Agency funding goes through the European Space Agency (ESA). All ESA programmes go through a rigorous selection process at ESA that considers technical feasibility, science quality, and affordability. The Agency carries out a similar detailed review to decide whether the programme aligns with its priorities and the Science & Technology Facilities Council science priorities and then decides on the level of funding that will deliver the maximum return for minimum cost. The Agency also receives detailed status reports that provide information concerning the technical, cooperation and programmatic aspects for each programme.

For national programmes, to date the UK Space Agency has conducted a range of largely process evaluations to assess whether programmes delivered the expected outputs, whether technical objectives were met, and lessons for future programmes. In line with the principles set out in this strategy, the Agency is committed to strengthening evidence on the economic and social impact of its activities. In-depth impact evaluation will be built into the design of future programmes. As the Agency was formed in 2010 and given that space programmes are frequently characterised by long lag times before benefits are realised, the following examples are generally more focused on process rather than impact evaluation.

| Policy intervention and summary | Evaluation | Description of monitoring system | Final findings |
|---|---|---|---|
| **Planck**<br><br>ESA's Planck space observatory was launched in 2009 with the objective to analyse the remnants of the radiation that filled the Universe immediately after the Big Bang. The UK Space Agency has inherited this project from STFC towards the end of the build phase. | Largely a process evaluation. A panel composed of experts from academia and industry met with key Planck UK participants to review the mission and generate a **lessons learned review**. | The evaluation objectives were to:<br>- Evaluate the success of the Planck project hardware build (HFI focal plane, LFI components, 4K Cooler) and data processing associated software development;<br>- Assess whether the UK project elements were cost effective and well managed;<br>- Identify working practices within the UK teams and relations with ESA and other international partners that could be improved upon in future programmes;<br>- Identify areas throughout the UK contribution which were effective, so that they could be emphasised in future (similar-sized) programmes where applicable. | - The hardware build and software development regarded as highly successful.<br>- Elements of Planck have become standards throughout the CMB field.<br>- The science objectives have been largely achieved.<br>- For the technology delivered, the project elements can be regarded as cost effective, though original cost estimates were significantly unrealistic from the beginning of the programme (these costs were not approved by UKSA). |

**UKUBE-1**

UK Space Agency pilot programme to design and launch a CubeSat – a miniature cube-shaped satellite that will allow the UK to test cutting-edge new technologies in space. One of the goals was to help a UK company develop a new spacecraft build capability.

Largely focussed on process. A Panel composed of experts from industry and academia met to examine the goals of the programme and generate a **lessons learned** review.

The review determined whether the goals of the programme had been reached and could be used in the future.
It evaluated the success of the UKube-1 hardware build, integration, and associated software and ground segment development.
It assessed whether the project was cost effective and well managed.
It identified project wide working practices and interfaces that could be improved upon in the future.
It ensured review findings are recorded and assimilated to inform future Agency Cubesat initiatives.

The goals of the programme were generally well met. The main deviations were: The programme ran very significantly over schedule largely due to a launch delay (outside of the UK's control) and in part due to the steep learning curve for the spacecraft manufacturers building their first ever CubeSat.
The engagement with non-space industry was relatively weak.
Other conclusions are in the written report which has not been published for reasons of commercial confidentiality.

**Aurora programme**

Funds both industry and academia in the fields of planetary science, astrobiology, space instrumentation and the development of new technologies to exploit the opportunities of space missions.

Formerly STFC, and now the UK Space Agency carried out evaluation activities up until 2010.

Indicators monitored included:
- No. of proposals involving the UK submitted to a NASA AO (announcement of opportunity) compared to European competitors;
- No. of PhDs as a proportion of the total no. of STFC-funded PhDs;
- Comparison of no. and quality of publications compared to European competitors.

No conclusion could be drawn by the report as the programme has not finished yet.

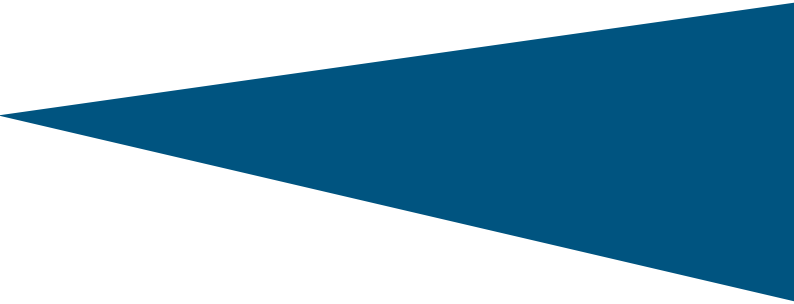**NSTP (National Space Technology Programme)**

To complement existing funding streams to progress products up the technology readiness.

Process evaluation. NSTP1 was carried out by panel review comprising of members from the UKSA Steering Board, Industry, SME and UKSA staff.

The evidence was gathered through questionnaires sent to project leads and follow up individual interviews on specific issues. Aims were to evaluate all aspects of NSTP run by the UKSA between 2011 and 2014; to inform the design of future NSTPs and to provide evidence that can be used in requesting funding for future programmes.

NSTP1 review was Published in November 2014, available **here**

No conclusion can be drawn for NSTP2 at present as the programme has not finished yet.