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ESA BASS Application Activities – Guidelines for obtaining NL delegation support

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Summary

The purpose of this document is to summarize the objectives, set-up and implementation of the Business Application component of the ESA Business Applications and Space Solutions (BASS) Generic Programme Line. It also explains the specifics of the participation of the Netherlands in this programme including the particularities on activity support.

Introduction

For execution and implementation of the space policy the Netherlands uses various programmatic frameworks of ESA. Each of these frameworks have their specific focus and implementing rules.

For the promotion of the use of space assets and technologies the ESA ARTES BASS (Business Applications and Space Solutions) Generic Programme Line is key in commercialisation of space based services and creating and supporting sustainable business.

The BASS Generic Programme Line is one of the programme lines of the ARTES 4.0 programmatic framework. This programmatic framework is set-up under the joint responsibility of ESA and the JCB (Joint Board on Communication). Implementation and execution of the programme is under the responsibility of ESA. Within the JCB all ESA Member states are represented and together decide on the objectives, content, financial envelope and specific rules for implementation of the ARTES programme lines. This programme line is set-up on the basis of consensus among the member states.
As a consequence the scope or implementation of a programme line could be broader than what National policy of certain Member State calls for.

The overall budget available for activities is made up of individual subscriptions of Member States participating in the BASS programme line. In line with a number of other ESA programmes, BASS rules require Member States delegation to explicitly authorise ESA to use the funds for specific contract activities. Each activity proposal submitted to ESA therefor has to be accompanied by a "Letter of Authorisation" or "Letter of Support" from the National delegate.

Within this document NSO sets out the guidelines, based on National policy, that apply to acquire support for the ESA BASS activity proposals, specifically the Application Activities.

1 NSO objectives within the framework of the National Space Policy

Two of the objectives of the space policy of the Netherlands are strongly related to applications and services;

1. To contribute to the development of a healthy space sector, including marketable products and services related to space.
2. To promote the use of satellite data for new applications and services that meet societal needs, and contribute to developments elsewhere, particularly in developing countries and emerging markets.

The National Space Policy is centred on the *use of space* and thus it is essential that user needs are a driver for future developments. In this way, the Space Policy objectives should lead to an increase in the use of satellite data through the development of applications and implementation of commercial exploitation of services for which a (potential) societal and market demand actually exists. This increase is foreseen for governmental, institutional and commercial end-users. NSO actively supports the promotion of applications and services specifically based on the use of Earth Observation (EO) data. Compared to the navigation and satellite communication sectors the Dutch EO-sector has a relative lag in maturity and therefore requires special support and attention in the coming years. There is no focus on specific elements within the value chain, everything from data source to value adder to service provider up to the (potential) end-user should contribute to a user centric solution.

2 ESA ARTES 4.0 BASS Generic Programme Line Objectives

The declaration of the ESA ARTES 4.0 BASS programme line to which the Netherlands has subscribed states;
The Business Applications - Space Solutions (BASS) Generic Programme Line aims at reaching commercial exploitation of space assets, data and capabilities addressing technical feasibility and business development. This includes the development of operational services for a wide range of users through the combination of different systems, and support in creating viable companies as well as to existing companies."
Within these objectives key elements for NSO are "commercial exploitation", "space assets" and "operational services".

BASS is structured among 2 different components.
Component A: "Application Activities" aim at developing commercial sustainable space based applications by linking user needs to corresponding solutions incorporating space assets requesting only limited technology adaptations
Component B: "Space Solutions" activities aim to develop the economies of Participating States by generating jobs, encouraging investment in start-ups and supporting sustainable businesses.

This next chapters of this document solely focus on the "Application Activities" as these are within reach and of interest for individual entities. "Space Solutions" are a limited set of specific activities driven by strategic decisions of the Member States like instalment and operation of an ESA-BIC.

3 Implementation of ARTES 4.0 BASS Generic Programme Line

Application Activities defines a number of activities to support the overall objectives of the programme and specific objective of Component A; Application Activities. Of these activities the feasibility and demonstration studies form the larger part and are the most relevant for getting to a viable commercial service. Initiation of feasibility studies is through an ESA competitive tender procedure focusing on a specific topic or end-user community. There is also a specific procedure for kick-start studies, which address a specific theme and have a limited extent.
A second option is the open call for proposals where the initiative lies with the proposing consortium. For demonstration activities this open call is the only way to start even when they follow a feasibility study.
In each case a support letter from the national delegation to ESA is requested to authorize ESA to pay to cost of the activities within the relevant member states. For activities bearing costs within the Netherlands NSO is responsible for providing this letter of support.

4 NSO specific framework

One of the tools at hand for NSO to fulfil the space policy objectives of the Netherlands is the BASS "Application Activities". This is considered to be the last step with support (from the space budget) before reaching a mature commercial service. As such the main focus points of the activities should be the implementation of the business case and the potential end-users/markets.
The potential to become a commercial service also determines the starting point of the activity. Services can be composed of different assets or building blocks, being H/W, S/W, data, system or application oriented, with a very high level of maturity in relation to the commercial service foreseen. As a consequence no technical development will be supported other than limited adaptations necessary to cover end-user specific requirements. An activity should only be proposed when it is confirmed that all building blocks are available and ready for use. At the same time, the real user demands/needs should have been identified on the basis of a market assessment and these should lead to clearly defined requirements for the service.
BASS "Application Activities" is organized in 2 steps, feasibility and demonstration, each with its own specific purposes.

4.1 Feasibility study

A feasibility study should focus on the evaluation of the technical feasibility and commercial viability.
1. Technical feasibility: The goal is to determine how to set up a sustainable, integrated solution in terms of hardware (assets) and software (data & systems) and also to understand the needs and specifications, both functional and non-functional, of a typical user. The technical feasibility can be evaluated in a proof of concept in collaboration with stakeholders.
2. Commercial viability: The costs of the proposed system, both Capex and Opex, need to be assessed, including Return on Investment and Break-even, leading to a viable business case for the service provider. The commercial viability based on an economic analysis of the customer's business case, e.g. how much additional margin can be earned with the proposed solution, needs to be investigated together with a typical customer.

4.2 Demonstration activity

The demonstration activity should focus on the validation of the service within the operational environment of the customer/end-user and provide confidence in the financial sustainability of the service.
1. Service validation: Demonstrate that the service can be integrated in the operational processes of the user, and that the added value for the customer is achieved. For services dependant on seasonal effects at least one full production cycle must be included in the demonstration.
2. Financial sustainability: Establish that he business model selected for the service is sustainable and the minimal number of customers required is within reach. The selected price point of the service is validated within the market and (potential) customers are willing to pay. Predicted cost and income are realistic and break even is achievable within 3 to 4 years.
Following the demonstration phase a full commercial service should be possible without any interruption of service from either an operational or a business perspective.

5 NSO considerations and criteria for support request evaluation

Although any company can apply for support the following restrictions apply.
- Start-ups must at least have a MVP (Minimal Viable Product) and business maturity before support will be granted.
- Only companies without prior ESA BASS (or its forerunner ESA IAP) contracts can apply for support in the frame of the Kick-start activities.

When evaluating a request for support for BASS "Application Activities", NSO checks against a number of criteria. None of these are determinative but an assessment on the outcome of the combined requirements will lead to a final conclusion and decision. One non-negotiable criterion is end-user commitment in the activity and willingness to implement and pay for the service when its technical and commercial objectives are achieved. Proof should be provide by means of a "Letter of Intent" or "Letter of Support".
- Market: What are the market needs in terms of geo-spatial and/or environmental information? How are these needs articulated? In what way will a service based on satellite data contribute to the fulfilment of these needs? What is the extent of the market for this application or service? What competition is already in place? Is the focus on a regional, national or international market?
  - The market should be identified in terms of type and number of users.
  - The market should be clearly defined in terms of added value of space assets.
  - The market should be quantified.
- Business model: How is the value chain organised and what value is added by each of the actors therein? How will turnover be achieved?
  - There should be a positive cash-flow after the "Application Activity" is finished.
  - The break-even of the service should be achievable within 3 – 4 years after closure of the "Application Activity".
- Customers/End-users: Who are the key customers for the commercial service? Are these customers directly involved in the activity? Do they contribute to the activity and in what manner? Are there already solid intentions/promises to procure the service?
  - At least one customer should contribute in-kind or cash to the activity.
  - The customer must show its willingness to pay a commercial rate for the service after finishing the "Application Activity".

- User added values: Has there been end-user involvement in the drafting of the user requirements? Will the service cover these requirements to the full extent?
  - The customers/users pains (e.g. problems) and gains (e.g. benefits) should be clear.
  - The commercial customer should define the end-user requirements.
- Space asset integration: Which space assets are integral parts of the service? How do they contribute? Which non-space assets contribute to the service?
  - The space assets should be a crucial element of the service.
  - Services that make use of a single commodity space asset will not be supported.
  - A service promoting the use of EO will be preferred.
- Technology maturity: Is the service a combination or composition of proven technologies or are further developments still foreseen and if so, to what extent?
  - No technical development below TRL 7 is allowed.
- Involvement of Dutch actors: Which companies from the Netherlands are directly involved in the service? Are there specific end-users/customers from the Netherlands?
  - The commercial service should lead to economic and/or societal benefit within the Netherlands.
- Use of ESA resources: Is BASS Generic Programme Line the only funding source available? Has it been made reasonably plausible that other NL supporting policy instruments are not accessible?
  - The non-ESA part of the funding has to be secured.

6 NSO financial support

Within BASS Generic Programme Line rules have been set concerning the amount of support to be granted. Feasibility studies in open competition are funded at 100% except for kick-start activities. The latter are funded at 75% up to a maximum of 60k€ for non-SME's and at 80% for SME's.
Feasibility studies initiated by a consortium are funded up to 50%. In this case universities and research institutes without commercial interest in the product may be funded up to 100% when involved as (sub-) contractor.
Demonstration activities are always funded up to 50%. SMEs are eligible for funding up to 75% in any consortium-initiated activity.

NSO uses a more stringent approach to the funding levels possible within BASS Generic Programme Line.
The Dutch budget available for BASS activities is limited. Therefore a maximum amount has been set for any granted support. These figures are to cover the total ESA cost of all Dutch participation within a consortium.
The general rule of thumb is that feasibility activities are supported up to a maximum of 250 k€ ESA price. As for the 100% funding of universities and research organizations, there is limitation of their participation to a maximum of 15% of the total cost.
For demonstration activities the maximum amount supported is up to 500 k€ ESA price.
Due to the commercial and market driven nature of the "Applications Activities" NSO will not support SMEs to the maximum extent allowed. No differentiation will be made between non-SME's and SME's. SME's will receive the same level of support as is applied for non-SME's.

Not all activities are eligible for support. Ordinary commercial efforts like Business Development, Marketing, Proposal Preparation will not be supported.

7 Support request procedure

In order to obtain a letter of support authorizing ESA to use part of the Dutch subscription for a specific activity, a formal request for such a letter needs to be made to NSO.
The application process will kick-off with a mandatory meeting at NSO with a first presentation of the proposed activity. It is advised to have this meeting as early as possible in the proposal phase. At the meeting NSO will provide a preliminary position with respect to supporting a request. To initiate formal evaluation of the request a "support request form" needs to be submitted including all relevant information. The procedure at NSO will take up to 4 weeks after which the decision will be communicated. The final version of the proposal needs to be submitted to NSO at least 3 days before submission to ESA. NSO will do a content consistency check with previously supplied information. Only then the formal "letter of authorisation" will be sent to be included in the proposal for ESA.

Annex 1 Background information on space assets

Of the three types of space assets; Earth Observation, Navigation and Satellite Communication (SatCom), only the latter has evolved over time into a mature commercial ecosystem. Although military SatCom is still partly institutionalized, SatCom supply and demand largely operates within a purely commercial market.

Navigation is a unique case. Since the once pure military system became available for everybody, the PNT signals from GPS have been used as a commodity; use of these signals is free of cost and has led to a large commercial market for navigation and location based applications, services and products. With the introduction of the Russian Glasnost and European Galileo system additional signals have become available at no cost. For European governmental users a regulated and authenticated services will also become available from the Galileo system.

For Earth Observation the situation is completely different. At the beginning of the 1960s satellites were already being launched to observe the earth's cloud cover for weather prediction purposes. In 1972 Landsat-1 was launched, the first satellite dedicated to observing the surface of the earth. Over the course of the last decades, different satellites carrying a variety of sensors were launched. Making use of the data obtained from these sensors and transforming it into useful information required substantial effort and was time-consuming. Earth Observation satellites have mostly been designed and built for scientific and institutional purposes. These satellites have been financed by governments, and their data was not made freely available. Over the last decade only a small number of commercially operated satellites have been launched, mostly optical and radar. The cost of the data was high and the temporal resolution was limited.
With the launch of the Sentinels and the European Copernicus programme revisit times have become much more frequent and most of the data is free of charge and processed. This has enhanced the development and availability of services and applications, and increase the market in terms of size and economic value.

In relation to BASS the consequence is that only a certain amount of development will be financially supported. As the use of SatCom is mature and SatCom is available from a large number of suppliers in different service types and levels, an activities that solely relies on an existing SatCom offer is not supported within BASS. The same is true for the PNT signals although in very specific cases, e.g. with PRS, support can be considered.
Earth observation requires dedicated development in order to extract correct information from the data. Algorithm adaptation or new algorithms could be necessary for specific novel services. These kinds of development may be supported within BASS when they form an explicit part of the new service and take place in conjunction with other data sources.

For specific technical developments within SatCom, Navigation and Earth Observation, support frameworks exist within ESA. Only after these developments are finalized and deployable should an BASS submission be considered.