|  |
| --- |
| OUTLINE PROPOSAL TEMPLATE - ARTES C&G |
| PROJECT NAME – Company name |
| Date: ……Reference: …… |

|  |
| --- |
| [author][Pick the date] |

**OUTLINE PROPOSAL TEMPLATE - ARTES C&G
FOR GROUND AND APPLICATION SEGMENT**

Ver 1.2

**Notes:**

1. To prepare this OP, please take into consideration the basic information about the ARTES C&G provided in the web site: <https://artes.esa.int/news/evolution-artes-3-4-and-5>
2. An ARTES C&G outline proposal for a development activity shall comprise the following two elements:
	1. A document describing the Product Development Plan and the proposed associated activity(ies) (this template, duly completed as appropriate).
	2. A supporting spreadsheet (“C&G Ground Segment and Applications – Financial Forecast Workbook” can be downloaded at <https://artes.esa.int/documents>) document that provides financial analysis elements of your business plan.
3. Formal authorisation from the National Delegation(s) of the companies involved is required for the proposed activity at the time of submission of the Full Proposal. Therefore the bidder is advised to begin discussions with the relevant National Delegate(s) prior to submitting the outline proposal.
4. To initiate the outline proposal revision process, the two completed documents must be sent to the following email address: artes‑cg@esa.int. An outline proposal will be informally reviewed by the Agency but only if both elements are provided simultaneously. It is preferable that you provide the completed spreadsheet file in Excel format. However, you may include the financial analysis as a PDF attachment to your proposal document.
5. Please ensure that the submitted versions of the two documents are mutually consistent. Failure to do so may lead to feedback delays.
6. The content of this template should be copied into your own corporate template for the purposes of preparing your outline proposal. Please note that the document can bear company-internal protective markings, but to avoid confusion with formal and internationally agreed markings for “Classified Information”, the following terminology shall be avoided:
* Restricted (or Restreint)
* Confidential (or Confidentiel)
* Secret
* Top Secret
1. Parts highlighted in yellow in this template should be modified as appropriate for your proposed activity.
2. Text in blue and in a smaller font size (example) is for guidance and can be removed from the completed outline proposal document.
3. Some tables in this template are placeholders for data contained in the financial analysis spreadsheet file. These placeholder tables are marked as follows:

(Do not edit the above table directly! The above table can be found in the spreadsheet file)

In such cases you should replace the placeholder table with the correct information for your proposed activity. The following procedure is suggested, to be followed once you have finalised the content of the spreadsheet file (business plan assumptions and calculations):

* 1. Select and copy the cells in the spreadsheet that correspond to the placeholder table in question (the table and the table cells to copy are identified in the spreadsheet document).
	2. Select the placeholder image in the corresponding table in this document, delete it, then paste the cell data copied from the spreadsheet using the following option (to avoid formatting issues): “Paste Special… Picture (Enhanced Metafile)”.

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# Overview of the Proposed Activity

## Company Information, Scope and Activity Schedule

|  |  |  |  |
| --- | --- | --- | --- |
| **Company Details** |  | **Contact Point** |  |
| Company Name: | ……… | Name: | ……… |
| Address: | ……… | Function: | ……… |
| Country: | ……… | Telephone: | ……… |
| SME Status: | yes/no | E-Mail: | ……… |
| Key company information (i.e. size, turnover, structure, product portfolio overview): …….. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Activity Scope and Schedule**Please indicate in the table below the development phase(s) (Definition, Technology, Product and Demonstration) for which financial support is being requested in the present proposal. Include/remove table rows as appropriate. Please also indicate, by placing a “X” in the relevant table cell(s), which segment(s) (space and/or ground, and/or Application) are being addressed in each development phase.This proposal addresses the following development phases and segments:Table . Scope of the Proposed Activity

|  |  |  |  |
| --- | --- | --- | --- |
| **Development Phase** | **Space Segment** | **Ground Segment** | **Application Segment** |
| Definition Phase | X | X | X |
| Technology Phase | X | X | X |
| Product Phase | X | X | X |
| Demonstration Phase | X | X | X |

 |
|  |  |
|  |  |
| Activity Planning: | Intended Start Date: | Month Year |
|  | Intended Duration (months): | xx |

To assist ESA in making sure resources are available to review the full proposal in a timely manner please provide the date you are targeting to be in a position to submit the full proposal. The full proposal should not be submitted prior to receiving approval from ESA to submit a full proposal and the date given below will be used by ESA for planning purposes only.

The company is targeting to submit the full proposal on: Day/Month/Year

Background and Motivation for the proposed development: ……..

## Overall Planning and Cost Summary

Estimation of the cost and schedule for all development and follow up activities[[1]](#footnote-1) required before commercial exploitation. [[2]](#footnote-2)

Table . Planning and Costing Summary

|  |
| --- |
| ESA FundingStartConclusion% of CostsMon-YYMon-YYDefinitionTechnologyProductDemonstrationCommercial---Included in proposed activity?PhaseCost kEUR |

Overlapping time between development phases is allowed. However, please note that the model assumes that the commercial phase does not overlap with the development phases. In case of a different assumption, please provide any relevant information.

If appropriate you may break down any of the above development phases into separate work items.

## Cost and Price Breakdown

The following table presents the cost and requested ESA funding for each development phase included in this proposal.

Please note that your National Delegation may only support one Development Phase at a time.

Please note a copy of table 1.2 will be sent to all the relevant national delegates by ESA upon submission of the outline proposal if they are not in copy of the email containing this outline proposal.

Table . Cost and Price Breakdown

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Development Phase** | **Company/ Organisation** | **Country** | **Cost (kEUR)** | **Price (kEUR) (requested from ESA)** | **% Funding from ESA** | **National Delegation Support[[3]](#footnote-3)**  |
| ……… | Prime | ……… | ……… | ……… | ……… | yes/no/under discussion |
|  | Subcontractor 1 | ……… | ……… | ……… | ……… | yes/no/under discussion |
|  | Subcontractor 2 | ……… | ……… | ……… | ……… | yes/no/under discussion |
|  | ……… | ……… | ……… | ……… | ……… | yes/no/under discussion |
| ……… | Prime | ……… | ……… | ……… | ……… | yes/no/under discussion |
|  | Subcontractor 1 | ……… | ……… | ……… | ……… | yes/no/under discussion |
|  | Subcontractor 2 | ……… | ……… | ……… | ……… | yes/no/under discussion |
|  | ……… | ……… | ……… | ……… | ……… | yes/no/under discussion |

## Expenditure Outside of the Countries of the Bidding Consortium

Expenditure above 50 kEUR outside of the countries of the bidding consortium members (i.e. in other ESA Member States and/or outside of the ESA Member States) is/is not foreseen.

Include the text and complete the table below only if expenditure above 50 k€ is foreseen outside of the countries of the bidding consortium members.

The estimated expenditure is detailed in the table below.

Table . Estimated Expenditure Outside of the Bidding Consortium

|  |  |  |  |
| --- | --- | --- | --- |
| Destination of Expenditure | Total Expenditure | Country(ies) | Nature of Expenditure and Justification |
| Other ESA Member States | ……… kEUR | ……… | ……… |
| Outside of the ESA Member States | ……… kEUR | ……… | ……… |

## Deliverables

A list of all key deliverable items from the proposed development is given in the table below.

Table . Key Deliverable Items

|  |  |  |  |
| --- | --- | --- | --- |
| **Type** | **Deliverable Item** | **Phase(s)[[4]](#footnote-4)** | **Notes** |
| hardware/ software/……… | ……… | Technology | ……… |
| hardware/ software/……… | ……… | Product | ……… |
| ……… | ……… | ……… | ……… |

## Dependencies on Other Activities

The proposed activity is/is not a follow-up of a previous activity/previous activities.

Include the text and complete the table below only if the proposed activity is a follow-up of a previous activity or activities.

Further details are provided in the table below.

Table . Previous Activities Followed Up by the Proposed Activity

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Programme[[5]](#footnote-5)** | **Activity Name[[6]](#footnote-6)** | **Completion Date****[[7]](#footnote-7)** | **Brief Description** | **Outcome67** |
| ……… | ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… | ……… |

Include the text and complete the table below only if the proposed activity is a follow-up of a previous activity or activities.

There are/are no dependencies between the proposed activity and other activities falling outside of the scope of the proposed activity.

Include the text and complete the table below only if there are dependencies between the proposed activity and other activities falling outside of the scope of the proposed activity.

Further details are provided in the table below.

Table . Dependencies Between the Proposed Activity and Other Activities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Programme[[8]](#footnote-8)** | **Activity Name** | **Completion Date[[9]](#footnote-9)** | **Brief Description** | **Nature of the Dependency[[10]](#footnote-10)** |
| ……… | ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… | ……… |

Please provide a concise product roadmap, if relevant.

# BUSINESS PLAN

The extent of information provided in this section shall be in line with the maturity of the proposed development phase(s) (e.g. for the initial Development Phases such as Definition and Technology, only preliminary information on the business case is required).

Elements 2.1 to 2.9 below can also be presented using a single page Business Model Canvas (available at <https://artes.esa.int/documents>).

A supporting spreadsheet (“C&G Ground Segment and Applications – Financial Forecast Workbook”) can be downloaded at <https://artes.esa.int/documents>.

Assuming a favourable feedback of your outline proposal by the Agency, the business plan provided here in the outline proposal should be carried forward to form part of your associated Full Proposal (with updated information, as appropriate).

## Customer Segments

The key customers/customer segments targeted by our product(s) are identified and described in the table below.

Table . Key Customers/Customer Segments and their Needs

|  |  |
| --- | --- |
| **Customer/Customer Segment** | **Customer Problems/Needs** |
| ……… | ……… |
| ……… | ……… |
| ……… | ……… |

The term “product” is defined in the Annex 2. The proposed development activities shall increase the competitiveness of the target product(s). Such activities may include all developments necessary to achieve such a goal (e.g. new features, tools, processes, techniques and technologies). Please note that the Business Plan presented in this document shall be related to the target product(s) to be sold on the market. The target product(s) may include other elements or features not covered under the proposed activities. If the product(s) is/are targeting a few important customers, each customer should be clearly identified. Add any supplementary text you feel is necessary to clarify the nature of your intended customers and to explain their main needs.

## Value Propositions

The table below identifies the specific characteristics of our product(s) that will address the previously-identified customer problems/needs. (e.g. performance, cost, new features)

Table . Key Product Characteristics

|  |  |
| --- | --- |
| **Customer Problem/Need** | **Product Characteristics Addressing this Problem/Need** |
| ……… | ……… |
| ……… | ……… |
| ……… | ……… |

Add any supplementary text that you feel is necessary to fully explain your value proposition. For example, you could explain how the proposed development fits into your overall product development strategy to meet the needs of the customers in the longer term. Indicate whether or not the adoption of the product is going to change the way the customers are traditionally running their business, for instance, if the product is bringing a disruptive innovation.

## Channels

In the commercial exploitation stage, our product(s) will be sold to the customers via these channels.

Indicate whether or not the sales channels are already established. If not, explain how they will be created. If customers are new for your company (i.e. your company has not sold products to them in the past) please explain your approach to reaching these customers.

## Customer Relationships

Our relationships with the key customers already exist/must be created/have to be improved.

Provide factual information, for instance, existing contracts with figures. If the product targets only one specific customer, a letter of interest from this customer has to be attached to the outline proposal, confirming the adequacy of the value proposition. Indicate whether or not customer representatives will be involved in the proposed project and, if so, the kind of formal agreement that you intend to set up with them.

## Revenue Streams

In the commercial exploitation stage, our product(s) will be sold to our customers as described in the tables below, based on the market analysis reported in Section 2.11.

For Definition and Technology Phases an estimation (target) shall be provided in line with the maturity of the proposed activity. Provide estimated ROM price including all features, even developed outside the proposed development activities.

Table . Product Pricing

|  |
| --- |
| Customer Segment 1 (CS1)Customer Segment 2 (CS2)Customer Segment 3 (CS3)Churn RateProduct unit priceProduct installation charge per unitService fee per product per yearCustomer Segments |

(Do not edit the above table directly! The above table can be found in the spreadsheet file)

## Key Resources and Dependencies

To realise our product and deliver the value propositions we confirm that all the resources are in place. The critical resources and dependencies are defined in the following table, as applicable..

Table . Key Resources and Dependencies

|  |  |  |  |
| --- | --- | --- | --- |
| **Development Phase** | **Required Resource** | **In Place** | **Potential Issues** |
| ……… | ……… | yes/no | ……… |
| ……… | ……… | yes/no | ……… |
| ……… | ……… | yes/no | ……… |

Resources could include, for example, assets, company competences, key suppliers, consultancy services, and manufacturing, test or other facilities. Indicate whether or not the resources are expected to be in place at the time of need. If not, explain the actions to be taken to secure their availability on time. Indicate potential issues associated with each key resource. These could include, for example, long lead items, software licensing, patent constraints, procurement policies and national/international restrictions (e.g. export restrictions).

## Key Activities

To realise our product and deliver the value propositions we need to perform the key activities identified in the table below for each of the proposed development phases.

Table . Overview of Key Activities

|  |  |  |
| --- | --- | --- |
| **Development Phase** | **Key Activity** | **Description** |
| ……… | ……… | ……… |
| ……… | ……… | ……… |
| ……… | ……… | ……… |

List all of the main activities that are to be performed in each of the proposed development phases (those which are considered critical to the success of that development phase). These could include, for example, evaluating a new technology, developing a new subsystem, interface adaptations, manufacturing process development, materials development, software/firmware development, and qualification and test activities. Briefly explain the criticality of each key activity to the success of the associated development phase and to the overall activity. When compiling this list of key activities, please keep in mind that activities performed in the Technology Phase should target technical risk mitigation and not product qualification or industrialisation (these types of activity belong in the Product Phase).

## Key Partners

The value chain involves the actors defined in the table below.

Table . Key Partners

|  |  |  |  |
| --- | --- | --- | --- |
| **Partner Type**(e.g. Satellite Prime, Operator, Service Provider, Supplier, User, Customer) | **Partner Name**(company name, country, web link) | **Involvement in the Project**(e.g. none, subcontractor, supplier, pilot user, alpha customer, integrator) | **Type of Agreement**(e.g. NDA, partnership agreement, contract) |
| ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… |

## Cost Structure

The key elements of cost for realising the value proposition are presented in the following tables.

Table . Cost of Sales

|  |
| --- |
| Jan-18012345678Commercial Exploitation PhaseSimplified CoS for product unitCost Element N.1Estimated Cost of SalesCost Element N.2Cost Element N.3Cost Element N.4 |

(Do not edit the above table directly! The above table can be found in the spreadsheet file)

Table . Operational Expenditures

|  |
| --- |
|   |

Personnel costs can be also derived from established hourly rates.

 (Do not edit the above table directly! The above table can be found in the spreadsheet file)

Table . Operational Expenditures

|  |
| --- |
|  |

(Do not edit the above table directly! The above table can be found in the spreadsheet file)

 The following assumptions have been used to derive the figures provided in the tables above: ……

## Competitive Landscape

Our product is addressing the sector of …… (e.g. provide few examples) , which has the following characteristics: …. (e.g. geographical reach, trends, sales model).

Our key competitors and the nature of the competition are identified in the table below.

Table . Summary of the Competition

|  |  |  |
| --- | --- | --- |
| **Competitor** | **Nature of Competition** | **References** |
| ……… | ……… | ……… |
| ……… | ……… | ……… |
| ……… | ……… | ……… |

Indicate the nature of the competition for each of the identified competitors. For example, an existing or potential supplier of the same type of product, an established supplier of similar products, a new entrant to the market, an entity known or suspected to have plans to develop the same type of product, a market incumbent. Quantify the nature of the competition as far as possible (e.g. provide estimates of their market share, competitiveness in terms of pricing, etc.). Provide references to substantiate your assessment of the competition (e.g. web links, references to market analyses, data sheets, etc.).

Our key competitive differentiations are summarised in the following table.

Please note that a SWOT analysis and the corresponding strategic options to achieve the commercial goal are only required for the Outline Proposal when the proposed development phase(s) target a **new product** (you can remove the table below if not applicable). However, the Full Proposal shall include the SWOT analysis and the strategic options.

Table . SWOT Analysis

|  |  |
| --- | --- |
| STRENGTHS- List of strengths | WEAKNESSES - List of weaknesses |
| OPPORTUNITIES- List of opportunities | THREATS- List of threats |

Strengths are characteristics that give you an advantage over your competitors. Weaknesses are characteristics that place you at a disadvantage with respect to the competition. Opportunities are (usually external) elements that you could exploit to improve your business prospects. Threats are elements (e.g. external influences) that could threaten your business prospects. Add supplementary material as necessary to fully describe the competitive environment. On the basis of the SWOT analysis, please identify your strategic options to achieve the commercial goals.

## Market Analysis

The position of our product in the market is summarised in the matrix below.

Table . Market positioning

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MARKETS | New | X | X | X |
| Adjacent | X | X | X |
| Existing | X | X | X |
|  | Existing | Incremental | New |
| PRODUCT |

Our projection in terms of the market we aim to capture in the short term for each of the identified customer segments is shown in the following table.

Table . Served Obtainable Market

|  |
| --- |
|  |

(Do not edit the above table directly! The above table can be found in the spreadsheet file)

Present the underlying assumptions that led to the projected sales volumes over time.

The assumptions behind the above sales projection are ….

## Financial Indicators

A profit and loss and cash flow statement is provided in the table below.

Table . Profit & Loss and Cash Flow Statement



(The above is just an example. The above table can be found in the spreadsheet file)

Table . Financial Indicators with and without ESA Support

|  |  |
| --- | --- |
|  |  |
|  |  |

(The above is just an example. The above table can be found in the spreadsheet file)

# PRODUCT DEFINITION, DEVELOPMENT AND VERIFICATION

## Product Description

The product consists of ………… The main components of the product are …….

The product is illustrated in the following high-level block diagram, which identifies the key building blocks and major interfaces.

(Insert a block diagram showing key features/performance/attributes, and highlight key building blocks and major interfaces.)

The main functional modules are described in the table below.

Table . Functional Modules of the Product

|  |  |  |  |
| --- | --- | --- | --- |
| **Module** | **Functions/Features** | **Description** | **Critical Technologies/ Techniques** |
| ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… |
| ……… | ……… | ……… | ……… |

(Include text to describe how the product operates in its host environment (e.g. its parent sub-system, the end-to-end system) if this is not fully described by the above elements, or if some elements need further explanation or clarification.

## Development Approach

The starting point for our project development is …………. (describe the current status of maturity or heritage of the product, e.g. indicating the current TRL/SRL[[11]](#footnote-11) of the key building blocks). The key elements to be developed in the proposed phase are …………..
Our proposed development approach is the following: …… (describe the source of the key building blocks, such as existing elements and/or all items to be developed). This will result in the following hardware / software models to be built, tested and delivered: Partial Prototype/Reduced Scale Prototype/Full prototype/ Product…. .
The overall product development approach is here outlined: …….

Provide supplementary text as necessary to fully explain the development approach.

## Verification and Validation

The proposed development includes verification and (if applicable) validation activities[[12]](#footnote-12) as indicated below. The verification / validation activities will be supported by …… (e.g. test bed, facilities, assets, satellite capacity, pre-operational services).
[Note: The validation performed for the Application Segment in the Demonstration Development Phase shall include the following elements of the envisaged pilot utilisation stage: i) Duration of the validation activities: …….. months
ii) Number of pilot sites to be equipped and geographical locations: ……..
iii) Number/type/name of user organisations involved in / and definition of “Pre-operational Stage”: ……..
iv) Success criteria/goals to be achieved for customer commitment and proposed approach for evaluating the system and the service: …….. ]

## Risks

The major development risks associated with the proposed activity are summarised in the following table.

(Complete the following table as appropriate)

Table . Overview of the Major Development Risks[[13]](#footnote-13) and the Proposed Risk Mitigation Actions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk Identifier** | **Description** | **Likelihood** | **Severity** | **Mitigation Actions** | **Mitigation Phase(s)[[14]](#footnote-14)** |
| ……… | ……… | low/medium/high | low/medium/high | ……… | ……… |
| ……… | ……… | low/medium/high | low/medium/high | ……… | ……… |
| ……… | ……… | low/medium/high | low/medium/high | ……… | ……… |

Include and complete the following text if the proposed activity includes a Technology Phase, explaining why some risks are considered high enough to justify a Technology Phase development as a mandatory step to de-risk a subsequent Product Phase development.

The risks to be addressed in the Technology Phase, as identified in the table above, are considered to be of sufficiently high risk to jeopardise the success of a Product Phase development. The reasons for this assessment are as follows: …….. For these reasons support is requested for the identified Technology Phase activities.

|  |  |  |
| --- | --- | --- |
| **Level** | **TRL****Technology Readiness Level (Space + Ground)** | **SRL****Service Readiness Level (Application)** |
|  | *Space associated model* | *Ground associated model* |
| 1 | Basic principles observed and reported |  | *Idea or concept* | NOT APPLICABLE |
| 2 | Technology concept and/or application formulated |  | *Concept supported by paper study* | Application/service concept formulated, market opportunities not yet addressed |
| 3 | Analytical and experimental critical function and/or characteristic proof-of-concept |  | *Demonstrate feasibility* | Concept analysis performed and target market identified |
| 4 | Component and/or breadboard functional verification in laboratory environment | *bread-board* | *Partial prototype* | Application/service verification in laboratory environment, market segment(s) and customers/users identified |
| 5 | Component and/or breadboard critical function verification in a relevant environment | *scaled EM* | *Reduced scale prototype (for large pieces)* | Application/service verified using operational elements, customers/users not involved |
| 6 | Model demonstrating the critical functions of the element in a relevant environment | *full scale EM* | *Full prototype to demonstrate functionality* | Demonstration of prototype in relevant environment, price policy identified |
| 7 | Model demonstrating the element performance for the operational environment | *QM / EQM / PFM* | *Verified Product with final BOM, layouts, released software, full GUI, certifications, documentation* | Trials with customers/users to validate utilisation and business models |
| 8 | Actual system completed and accepted for flight (“flight qualified”) | *PFM / FM* | *Validated Product in operation, and commercial offer ready* | Application/service completed and validated, commercial offer ready |
| 9 | Actual system “flight proven” through successful mission operations | *PFM / FM* | *Product operationally deployed and used by paying customers* | Application/service operationally deployed and used by paying customers |

ANNE**X 1 - Definition of Readiness Levels**

|  |  |
| --- | --- |
|  |  |

**ANNEX 2 – Definitions used in Competitiveness & Growth**

|  |  |
| --- | --- |
| Application Segment: | Consists of activities related to the utilisation of satellite telecommunications for the provision of downstream applications and pre-operational services with the active participation of users and other relevant stakeholders. |
| Breadboard (BB): | An initial development model for a space product, electrically and functionally representative of the complete end item, or of one or more key elements of the end item. It is used to prototype the intended design and to mitigate technical risks. Verification is typically performed in a laboratory environment. |
| CAPEX: | Capital Expenditure or CAPEX is investment in the long-term, consisting of assets that are bought by the company and go on the balance sheet. The value of those assets is typically depreciated over the years. |
| Customer Segment: | A group of customers identified on the basis of their needs, behaviours, or other traits that they share. |
| Customer: | An individual or an organisation that meets three criteria: 1. they have a problem they want to solve; 2. they have money/budget to spend to solve the problem; 3. they are willing and authorised to execute the buying decision. |
| Definition Phase: | Consists of the set of activities in which system performance requirements are defined, and system level analyses are performed. |
| Demonstration Phase: | Consists of the activities needed to validate the operational effectiveness and capabilities of the final product in its final configuration and within the user utilisation environment. |
| EGSE: | Electrical ground support equipment. |
| Engineering Model (EM): | Flight representative model in terms of form, fit and function used for functional and failure effect verification. The engineering model is usually not equipped with high reliability parts or full redundancy. The engineering model is also used for final validation of test facilities, ground support equipment and associated procedures. See ECSS‑S‑ST‑00‑01C. |
| Engineering Qualification Model (EQM): | Model which fully reflects the design of the flight model except for the parts standard, used for functional performance and EMC verification and possibly for qualification. Military grade or lower-level parts can be used instead of high reliability parts, provided they are procured from the same manufacturer with the same packaging. Functional performance qualification includes verification of procedures for failure detection, isolation and recovery and for redundancy management. The engineering qualification model may also be used for environmental testing if the customer accepts the risk, in which case the qualification model rules apply. See ECSS‑S‑ST‑00‑01C. |
| Flight Model (FM): | End product that is intended for flight. The flight model is subjected to formal functional and environmental acceptance testing. See ECSS-S-ST-00-01C. |
| Ground Segment: | Consists of all the ground-based elements of a satellite communication system. |
| Ground Support Equipment (GSE): | Non flight product (hardware/software) used on ground to assemble, integrate, test, transport, access, handle, maintain, measure, calibrate, verify, protect or service a flight product (hardware/software). See ECSS‑S‑ST‑00‑01C. |
| Market: | A broad landscape of buyers looking to solve different types of problems. A market can comprise many different types of customer segments. |
| MGSE: | Mechanical ground support equipment. |
| Model: | Physical or abstract representation used for calculations, predictions or further assessment. Model can also be used to identify particular instances of the product e.g. flight model. See ECSS‑S‑ST‑00‑01C. |
| OPEX: | Operational costs, or OPEX, are the costs associated with the day-to-day running of the company or the used up expenses. |
| Pre-operational Stage: | Utilisation of a service performed as part of an applications project, used to validate the requirements and assess the success criteria. This corresponds to the pilot stage. |
| Product: | A product is any hardware, software, system or sub-system, service or application item that is ready for commercial exploitation. |
| Product Development Plan: | Is the development logic to develop a product ready for commercial exploitation using the C&G Development Phases as required (Definition, Technology, Product, and Demonstration), but including as a minimum a Product Phase or a Demonstration phase. |
| Product Phase: | Consists of the activities needed to produce a product ready for commercial exploitation. This includes all industrialisation activities needed to manufacture, integrate and qualify the product, as well as the testing needed to verify the final product. |
| Proto Flight Model (PFM): | Flight model on which a partial or complete proto flight qualification test campaign is performed before flight. See ECSS‑S‑ST‑00‑01C. |
| Qualification:(space products) | That part of verification which demonstrates that the product meets specified qualification margins. This can apply to personnel, products, manufacturing and assembly processes. See ECSS‑S‑ST‑00‑01C. |
| Qualification Model (QM): | Model which fully reflects all aspects of the flight model design, used for complete functional and environmental qualification testing. A qualification model is only necessary for newly-designed hardware or when a delta qualification is performed for adaptation to the project. The qualification model is not intended to be used for flight, since it is over-tested. See ECSS‑S‑ST‑00‑01C. |
| Scaled Engineering Model (Scaled EM): | Engineering model that is not fully representative of the end product, but is sufficiently representative to permit the verification of critical functions of the product in a relevant environment. Critical functions are those functions of the product that deserve control and special attention in order to mitigate technical risks. |
| Space Segment: | Part of a space system, placed in space, to fulfil the space mission objectives. Space segment activities relate to any product to be used on a spacecraft. |
| Technology Phase: | Consists of the activities performed to mitigate the technical risks of the product development up to and including the manufacturing and test of a representative model of the product (e.g. an Engineering Model), but excluding qualification or industrialisation. |
| Validation: | Process which demonstrates that the product is able to accomplish its intended use in the intended operational environment. The user shall have a key role in this process. Validation addresses whether a product will satisfy the needs of its users. Validation proves it is the right product. |
| Value Proposition: | This is a statement of the value that a company or solution offers to its customers and/or partners. It is expressed from the perspective of the value to the target customer and addresses the main benefit(s) derived by the use of the product. |
| Verification: | Process which demonstrates through the provision of objective evidence that the product is designed and produced according to its specifications and the agreed deviations and waivers, and is free of defects. Users are not involved in the verification. Verification addresses whether a product satisfies the requirements placed upon it. Verification proves the product is right. |

1. For example, ARTES C&G Development Phases partly funded by ESA, or covered by other programmes/funds. [↑](#footnote-ref-1)
2. Please consider a schedule of maximum 20 years span (within a ±10 year time interval with respect to the commercial launch date of the product). [↑](#footnote-ref-2)
3. yes = The National Delegation has been contacted and is in favour of the proposed activity.
no = The National Delegation has not yet been contacted.
under discussion = The National Delegation has been contacted and discussions are ongoing. [↑](#footnote-ref-3)
4. The item is deliverable during or at the end of the indicated phase(s). [↑](#footnote-ref-4)
5. For example, a National, EU or ESA programme, or an internal project (i.e. company financed). [↑](#footnote-ref-5)
6. In case of ESA activity, please add Contract Number. [↑](#footnote-ref-6)
7. Expected or actual, as appropriate. [↑](#footnote-ref-7)
8. For example, a National, EU or ESA programme, or an internal project (i.e. company financed). [↑](#footnote-ref-8)
9. Expected or actual, as appropriate. [↑](#footnote-ref-9)
10. For example, schedule interdependencies, input/output interdependencies, external influences on key decision points, both for the proposed activity and for other activities (i.e. include the impact of the proposed activity on other activities, if appropriate). [↑](#footnote-ref-10)
11. See Annex 1 for definition of Technology Readiness Level and Service Readiness Level. [↑](#footnote-ref-11)
12. For the definition of the “Verification” and “Validation” terms, please refer to Annex 2. [↑](#footnote-ref-12)
13. Technical and programmatic risks. [↑](#footnote-ref-13)
14. The development phase(s) in which this risk will be mitigated. [↑](#footnote-ref-14)