ARTES 4.0 Technology & Product Developments

Agile + Outline Proposal

Part 5

Implementation Proposal for the … Phase

Proposal title

Proposal Reference: reference number

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# Work Breakdown Structure

The figure below presents the work breakdown structure, covering the entire scope of the proposed work.

The structure and number of Work Packages should be tailored depending on the size and complexity of the activity.

Replace the following diagram with an equivalent showing the proposed work breakdown structure.

**Work breakdown structure**



A work package description form (PSS-A20) is presented in Annex 2 and Annex 3 (for Prior Work) herewith for each of the work packages at the lowest level of the work breakdown structure.

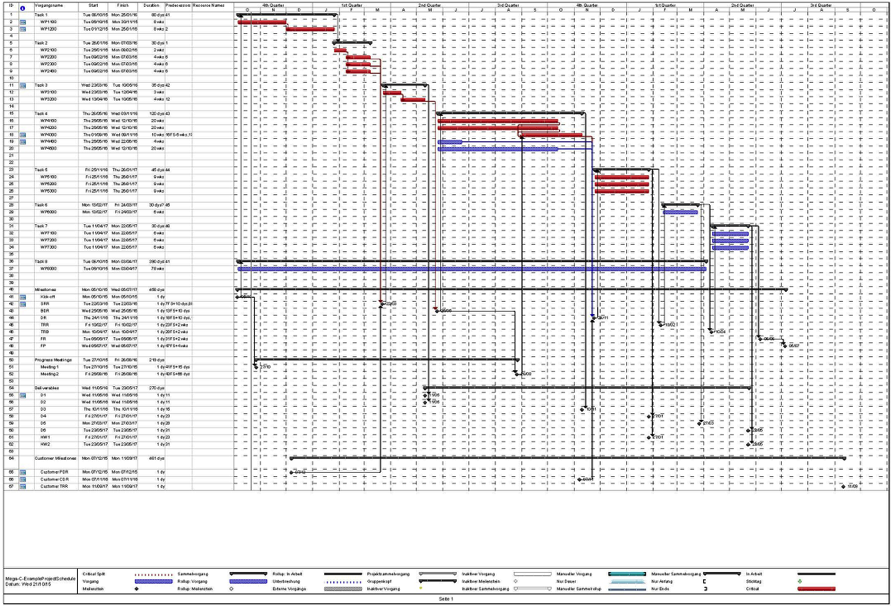
# Project Schedule

The project schedule and critical path is illustrated in a bar chart in reference, attached to the proposal.

or (delete the inapplicable paragraph)

The project schedule is illustrated in the following bar chart.

Replace the example bar chart below with your own. Bar charts embedded in the proposal document should have sufficient resolution, both on screen and in print, for all elements of the bar chart to be easily read.



# Prior Work

This proposal does not include Prior Work.

or

(delete the inapplicable paragraph)

This proposal includes Prior Work, which has its own dedicated set of work packages, work package descriptions and complete work package outputs. The Prior Work is presented separately in Annex 3.

# Review Meeting Plan

## Review Meetings

The proposed review meetings are summarised in the table below. Each review meeting will be attended by the Agency’s representative(s), the project manager, and other members of the project team as required.

For ARTES AGILE + activities, there will nominally be only three milestone reviews per phase: 1) Kick-Off; 2) Mid-term Review; and 3) Final Review. Only the MTR and FR are payment milestones.

The Mid-Term Review should be scheduled at a logical point where the activity is developed to a required level of maturity commensurate with the development strategy.

The objectives and deliverables of the MTR shall encompass appropriate development achievements (e.g. those from PDR, TRR, SRR, etc).

Additional reviews can be added by the bidder as required by their development strategy.

Complete the following table as appropriate for the proposed Development Phase. For guidance, typical review objectives are provided in the Excel® spreadsheet – Review Objectives.xlsx available at: https://connectivity.esa.int/documents (Please note that “ security” is necessary only when applicable).

A list of mandatory reviews is included in Table 1.

**Table 5‑1 Review meetings**

|  |  |  |
| --- | --- | --- |
| **Title** | **Date (months)** | **Objectives** |
| Kick-off Meeting | T0 | 1. Present the project and the company(ies)  2. Present the overall project planning (including verification plan)  3. Review all planned deliverables  4. Present work to be carried out until MTR  5. … |
| MTR… | T0 + … | 1. Present the outcomes of the work packages (WPX.X, WPX.Y,…) 2. … 3. Present work to be carried out until FR 4. Confirm all outputs, deliverables and work have met the success criteria for the MTR to the satisfaction of the Agency and as defined in the contract. |
| Final Review | T0 + … | 1. Present a summary of the outcome of the development phase, including conclusions and recommendations. 2. Present the updated business plan 3. Present the technology risk assessment. 4. Propose an outline of future product development strategies. 5. Present the test or operational data gathered during the phase. 6. Confirm that all outputs, deliverables and work have been successfully completed/delivered to the satisfaction of the Agency and as defined in the contract. 7. …   The following objective applies for a Product or a Demonstration Phase only.   1. Estimate the socioeconomic impact of the product development and the subsequent commercialisation of the product. |

## Progress Meetings

In addition to these review meetings, progress meetings will be held periodically, with no more than eight (8) weeks between consecutive meetings. The right for ESA to call for specific progress meetings is acknowledged.

The objective of each progress meeting will be to present a summary of the current status of the activity and to report on any problems and schedule slippages.

# Deliverable Documents

The contractor confirms that they will deliver all relevant documents to the agency that demonstrate that the contract and review objectives have been achieved as detailed below:

## Generic Deliverable Documents

Generic deliverable documents that are specific to, and mandatory for ARTES 4.0 Technology & Product Developments, are listed in Annex 1.

## Documentation Delivery Plan

Include and complete the following statement if the document delivery plan is detailed in a separate document attached to the Full Proposal (e.g. an Excel® spreadsheet).

The document delivery plan is detailed in a separate document, reference [document reference], which is provided as an attachment to our proposal.

or

(delete the inapplicable paragraph)

The following documents will be delivered to the Agency at the indicated reviews:

Complete the following table as appropriate for the proposed Development Phase. Typical deliverables are provided in the Excel® spreadsheet – Deliverables, available at: https://connectivity.esa.int/documents (Please note that “ security” related deliverables are necessary only when applicable).

**Table 5‑2 Documentation Delivery Plan**

| **Document Reference** | **Deliverable Document** | **Contributing Work Package(s)** | **Review 1**  **(e.g. KO)** | **Review 2**  **(e.g. MTR)** | **Phase Completion Review/ Final Review** |
| --- | --- | --- | --- | --- | --- |
| **Management** | | | | | |
| … | title | WP…, etc. | update | update | final |
| … | title | WP…, etc. | - | - | final |
| … | title | WP…, etc. | update | etc. | … |
| **Engineering** | | | | | |
| … | title | WP…, etc. | … | … | … |
| … | title | WP…, etc. | … | … | … |
| **(Document category)** | | | | | |
| … | Title | WP…, etc. | … | … | … |
| … | Title | WP…, etc. | … | … | … |
| **Generic Deliverable Documents** | | | | | |
|  | Final report |  |  |  | final |
|  | Final Data Package |  |  |  |  |
|  | High resolution Image |  |  |  | final |
|  | Monthly Progress reports |  |  |  | final |
|  | Project WebPage |  |  |  | final |
|  | Socio-Economic Impact Questionnaire |  |  |  | final |
|  | Contract Closure Documentation |  |  |  | final |

## Proprietary Documents

Include this section if, exceptionally, proprietary documents are included in the documentation delivery plan that are proposed to be made available for review by the Agency at Contractor’s premises only.

The table below identifies proprietary documents that will be made available for review by the Agency at our premises only.

**Table 5‑3 Proprietary Documents**

| **Review Meeting** | **Document Reference** | **Document Title** |
| --- | --- | --- |
| … | … | … |
| … | … | … |

# Deliverable Hardware and Software

## Hardware

No hardware will be produced and delivered to the Agency.

or

(delete the inapplicable paragraph)

The hardware items that will be produced and delivered to the Agency under a resulting contract are listed in the table below.

**Table 5‑4 Hardware items to be delivered to the Agency**

|  |  |  |  |
| --- | --- | --- | --- |
| **Deliverable ID** | **Description** | **Completion Review** | **Number of Items Delivered** |
| … | … | … | … |
| … | … | … | … |
| … | … | … | … |
| … | … | … | … |

## Software

No software will be produced and delivered to the Agency.

or

(delete the inapplicable paragraph)

The software items that will be produced and delivered to the Agency under Article 2.1.2 of the resulting contract are listed in the table below.

**Table 5‑5 Software items to be delivered to the Agency 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Deliverable ID** | **Description** | **Completion Review** | **Number Delivered** | **Delivery Format(s)** | **Deliverable Licences** |
| … | … | … | … | … | … |
| … | … | … | … | … | … |
| … | … | … | … | … | … |
| … | … | … | … | … | … |

1. In accordance with Article 3.1.3 of the Draft Contract, if applicable, also include licences to be purchased and delivered to the Agency.
2. Generic Deliverable Documents

**Final Report**

The Final Report shall be prepared in the general form and quality of an item suitable for technical journal publication. It shall be written in a concise yet instructive manner and shall not exceed 20 pages (containing colour photographs, if applicable).

It shall describe the major technical, operational and commercial accomplishments of this contract, especially:

- objective of the activity

- key issues

- results of the work incl. description of the new product/service developed

- main benefits

- perspective (further technical and commercial evolution).

The final report may be made available to all ESA Participating States and Persons and Bodies. Therefore if the Final Report includes commercially sensitive information, two versions of the final report shall be provided.

The version containing commercially sensitive information shall be marked “Proprietary Information”. The version not containing commercially sensitive information shall not be marked “Proprietary Information”.

**High resolution images**

High-Resolution (>2 MB) Photographs shall be delivered, shall be releasable to the public and shall be delivered in a format that can easily be processed electronically (e.g. not in PDF).

**Video**

A video illustrating the results achieved may be delivered using common high-definition video format (e.g. mp4), and shall be releasable to the public.

**Product Data Sheet**

Include the following information if this Part of the Proposal addresses a Ground Segment Product Phase

A Product Data Sheet shall be issued:

* + For each hardware unit which has been developed and tested within the contract, providing the functional performances, budgets and environmental specifications.
  + For each software item which has been developed and tested within the contract, listing the main functions and the demonstrated performance parameters.

**Monthly Progress Reports**

A concise monthly progress report will be provided to the Agency within the first five working days of each month.

A template can be found at the following link: <https://artes.esa.int/documents><https://artes.esa.int/sites/default/files/MPR_ARTES_3-4_v3.1.doc>

**Minutes of Meetings**

Formal written minutes of meetings attended by the Agency will be agreed and, as far as possible, be signed and made available to the Agency at the end of the meeting. If this is not possible the minutes will be provided to the Agency no later than five working days from the date of the meeting. The minutes will, as a minimum, identify all agreements made and actions accepted during the meeting.

The action item list will be included in the minutes and will be updated in accordance with the meeting outcome. Each action item will be assigned a unique identifier in the format X.Y, where X is the meeting number in which it originated and Y is the action number, starting from 1 at each meeting.

**Project Web Page**

As part of the final data package, the Contractor shall produce a Project Web Page which shall be suited for publication by ESA in the Telecommunications and Integrated Applications web site. The Project Web Page shall be produced using the template given under: <http://artes.esa.int/documents>. It shall include a paragraph summarising the most significant achievements of the project.

**Justification for Non-Continuation**

Include this deliverable if this Part of the Proposal addresses a Definition or Technology Phase

In the event that it is no longer proposed to continue with the development at the end of the Definition or Technology Phase, the Contractor shall deliver a Justification Letter to the Agency. The Justification Letter shall set out the reasons (technical and/or commercial) for not continuing the development.

**Socio-Economic Impact Questionnaire**

Include this deliverable if this Part of the Proposal addresses a Technology, Product or Demonstration Phase

A Socio-Economic Impact Questionnaire (SEIQ) shall be delivered in one (1) set of documentation each, to the Agency’s authorised representatives not later than fourteen calendar days before the Final Review Meeting.

The Agency shall issue the questionnaire to the Contractor not later than 30 calendar days before the Final Review Meeting.

The Agency reserves the right to request up to three updates of the SEIQ within a period of three years following the closure of the contract.

**Quarterly Status Reports**

Include this deliverable if this Part of the Proposal addresses an in-orbit activity.

After the delivery of the flight item(s) to the satellite prime manufacturer, or in the case of an Independent Case (standalone) where the flight hardware represents the main purpose of the mission, after the completion of the CRR, a concise status report shall be provided to the agency within the first five working days of the following months: February, May, August, and November, starting from the date of delivery to the satellite prime manufacturer or CRR, as appropriate. After delivery, the quarterly status report will replace the monthly progress report.

**Utilisation Plan**

Include this deliverable if this Part of the Proposal addresses a Ground Segment or End-to-End System Demonstration Phase

The Utilisation Plan shall describe the activities to be carried out during the trial utilisation of the product and define the related evaluation framework. It shall consist of the following sections:

* Users: identifying the actors in terms of organisations and user groups that will be involved in the trial utilisation and describing their roles.
* Utilisation baseline: describing the utilisation of the product (e.g. number of utilisation sessions, volume of data exchanged, duration of interactive sessions) and the associated planning (e.g. duration of the trial utilisation stage, starting date of sites used in the trial utilisation).
* Utilisation assessment: intended approach to evaluate the trail utilisation of the product, including success goals, performance criteria (e.g. quality of the product/service, evolution of the number of users, utilisation time etc.).
* Utilisation preparation: describing the content elements that have to be developed or procured in the course of the project as a prerequisite to start the trail utilisation stage (e.g. products, training of people, statement of commitment from user/stakeholders involved in the trial utilisation of the product, planned approach to promote the commercial uptake of the product).
* Utilisation risks: a risk assessment associated with the trail utilisation of the product and your mitigation plan.

1. Work Package Descriptions

Provide completed work package descriptions for each work package identified in the work breakdown structure

|  |  |
| --- | --- |
| PROJECT: … PHASE: … | WP: … |
| WP Title: …  Company: …  WP Manager: …  Start Event: … Planned Date: …  End Event: … Planned Date: … | Sheet … of …  Issue Ref …  Issue Date … |
| Inputs:  …  Tasks:  …  Outputs:  …  Each work package shall have one or more items as outputs | |

1. Work Package Descriptions (Prior Work)

Include only if Prior Work is proposed

Provide completed work package descriptions for each work package identified in Prior Work

|  |  |
| --- | --- |
| PROJECT: … PHASE: … | WP: … |
| WP Title: …  Company: …  WP Manager: …  Start Event: … Planned Date: …  End Event: … Planned Date: … | Sheet … of …  Issue Ref …  Issue Date … |
| Inputs:  …  Tasks:  …  Outputs:  …  Each work package shall have one or more items as outputs | |

1. Requirements for Proposal Content

| **Requirement** | **Template Section** |
| --- | --- |
| * 1. The Tenderer shall submit a Work Breakdown Structure (WBS) on at least two levels, which shall cover the entire scope of the proposed work. Depending on the size and complexity of the proposed activity, a breakdown to more levels may be necessary. | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. The work shall be broken down into work packages, that are task / outcome oriented rather than personnel function related. An exception will be made for the management and quality work packages. | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. Each work package at the lowest level of the WBS shall be described in a Work Package Description form. (PSS-A20). | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. The WBS/WPD shall be broken down into elements of a value not exceeding 500 KEURO or 2000 man hours, or higher amounts if the nature of the activity so justifies. | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. Work package descriptions shall comply with the following requirements:  1. There shall be a single work package manager for each work package. 2. Work packages shall start and end on review events and not span the entire duration of the activity. An exception may be made for the project management work package and any closely associated management function (e.g. Configuration Management, Contract Management, Financial Control) and Product Assurance / Quality function. 3. Inputs expected from other work packages shall be clearly indicated (i.e. reference shall be made to the contributing work packages). 4. Task descriptions shall describe the work to be performed in sufficient detail for the Agency to be able to judge the value for money (scope of the proposed work versus the associated man-hours). 5. Each task shall be traceable with a corresponding work package output. 6. All deliverable hardware, software and documentation shall be traceable to the identified work packages. | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. If this Part of the Proposal addresses an **In-Orbit Activity** the work breakdown structure shall include:  1. A work package or work packages addressing the period of time from the delivery of the flight item(s) (completion of the Acceptance Review) up to the launch of the host satellite). 2. A work package or work packages addressing the period of time from the launch of the host satellite to the completion of the Commissioning Results Review. 3. A work package or work packages addressing the period of time from the completion of the Commissioning Results Review to the Final Review. 4. A dedicated work package for studies addressing the accommodation of the flight item(s) on the spacecraft, if support is requested for **accommodation studies**. 5. A dedicated work package for all accommodation activities, including assembly, integration and test, if support is requested for **accommodating the flight item(s) on the spacecraft**. | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. If this Part of the Proposal addresses an **In-Orbit Activity Independent Case** the work breakdown structure shall include:  1. A dedicated work package for all launch campaign activities (including testing and early operations phase activities specific to the item, for verification of function and performance, or monitoring), if support is requested for the **launch campaign**. 2. A dedicated work package for in-orbit test and verification of the performance and function of the flight item(s), if support is requested for **in-orbit test and verification**. | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. Whenever a project/activity is considered sensitive, the work breakdown structure shall include a work package addressing Security Management and its integration into the project activities and resulting product. This shall include Security, Security Risk Management and related security certification/accreditation artefacts for the project team and its suppliers and the product during the full system lifecycle in line with the project scope[[1]](#footnote-2).   Whenever a project/activity is considered not sensitive, Risk analysis and security activities may be embedded as a task within the management WP. | [Section 1](#_Work_Breakdown_Structure) Work Breakdown Structure |
| * 1. The Tenderer shall submit a project schedule, which shall cover the entire duration of the proposed work. | [Section 2](#_Project_Schedule) Project Schedule |
| * 1. In establishing the project schedule, the Tenderer shall take account of the need of the Agency to review and/or approve intermediate deliverables and shall allow at least 10 working days for the Agency to do this. | [Section 2](#_Project_Schedule) Project Schedule |
| * 1. All review meetings and lowest-level work packages shall explicitly be indicated on the project schedule. | [Section 2](#_Project_Schedule) Project Schedule |
| * 1. When presenting the project schedule for an **In-Orbit Activity Embedded Case or Independent Case (hosted)**, the Tenderer shall clearly indicate how its project plan relates to the schedule of the flight programme (e.g. alignment of key milestones and decision points). | [Section 2](#_Project_Schedule) Project Schedule |
| * 1. The project schedule for an **In-Orbit Activity** shall include a period of at least one year starting immediately after the start of nominal operation of the flight items, during which time in-orbit operational data shall be gathered for those items. The data shall be analysed and presented at the Final Review meeting for the Demonstration Phase. | [Section 2](#_Project_Schedule) Project Schedule |
| * 1. The total duration of the **Ground Segment Demonstration Phase** shall be between 1 and 2 years. | [Section 2](#_Project_Schedule) Project Schedule |
| * 1. The review meeting plan shall include a Phase Completion Review at the end of each Development Phase, unless the Development Phase is the last Development Phase in the contract, in which case the Phase Completion Review is not required and is replaced by the Final Review. | [Section 4.1](#_Milestones_and_Review) Review Meetings |
| * 1. The review meeting plan for a Development Phase shall include the mandatory reviews specified in [Table 1](#Reviews) for that development phase. | [Section 4.1](#_Milestones_and_Review) Review Meetings |
| * 1. If this Part of the Proposal addresses an **In-Orbit Activity** the objectives of the Phase Completion Review/Final Review shall include the following:  1. Present the operational data gathered during the first year of operation of the flight item(s). 2. Compare the operational data with performance predictions, including a trend analysis. 3. List and assess any anomaly observed during operation. | [Section 4.1](#_Milestones_and_Review) Review Meetings |
| * 1. If this Part of the Proposal addresses a **Ground Segment or End-to-End System Demonstration Phase,** and if the Tenderer is proposing a Product Phase in association with a Demonstration phase, the Baseline Development Review (BDR), Critical Design Review (CDR) and Factory Acceptance Test (FAT) are not required in the Demonstration Phase review meeting plan | [Section 4.1](#_Milestones_and_Review) Review Meetings |
| * 1. If this Part of the Proposal addresses an **In-Orbit Activity**, then the Tenderer shall:  1. Provide a list of hardware items that will be produced and delivered for integration and testing at spacecraft level. 2. Provide, for each hardware item, a unique ID, a description of the item, the number of such items to be developed and the nature of the item (flight or ground element). | [Section 6.1](#_Hardware) Hardware |
| * 1. The Tenderer shall deliver Software Licence Files for third party software. They shall characterise the deliverable software in terms of its constituent elements and the associated licensing schemes (in particular for any commercial off-the-shelf or open source software). Software licence files shall provide the following information for each item of third party software:   + software item name/identifier;   + key features/function of the software item;   + developer name;   + version number;   + license type;   + licensing conditions;   + exportability constraints, if any;   + software dependencies, if any. | [Section 6.2](#_Software) Software |
| * 1. If any existing software is intended to be re-used, the Tender shall provide a Software Reuse File (SRF). This document shall contain an analysis of existing software intended to be reused. The SRF shall be composed of the following two sections: * Section 1, dedicated to present the analysis carried out to decide about the reuse (or not) of existing software taking into account the technical, operational and commercial requirements of the project. Furthermore the analysis shall cover the way the reused software will be embedded and/or integrated with the software to be developed in the project. The reused software shall be described in accordance with the information listed below (SRF List). * Section 2, to characterise the deliverable software in terms of its constituent elements and the associated licensing schemes. The deliverable software (i.e. including developed and existing reused software) shall be described in accordance with the information listed below (SRF List):   + - * software item name and main features;       * developer name;       * considered version and list of components;       * licensing conditions; e.g. industrial property and exportability constraints, if any;       * implementation language;       * development and execution environment (e.g. platform, operating system);       * applicable dispositions for warranty, maintenance, installation and training;       * commercial software necessary for software execution, if any;       * size of the software (e.g. number of source code lines, and size of the executable code). | [Section 6.2](#_Software) Software |

**Table 1** **: Recommended Mid Term Review Meeting Content**

[*Back to Requirement 5-16*](#R18)

|  |  |  |  |
| --- | --- | --- | --- |
| **Development Phase** | **Domain** | | |
| **Space Segment** | **Ground Segment** | **End-to-End System** |
| Definition | Mid Term Review (MTR) | MTR | MTR |
| Technology | Preliminary Design Review (PDR) | PDR | PDR |
| Product | Critical Design Review (CDR),  Test Readiness Review (TRR),  Test Review Board (TRB)\*\* | CDR,  TRR,  Factory Acceptance Test (FAT)\*\* | CDR,  TRR,  Factory Acceptance Test (FAT)\*\* |
| Demonstration  and Technology where an early in-orbit experiment is proposed. | (Embedded and Independent Case as a hosted payload)  Equipment Qualification Status Review (EQSR)\*,  Acceptance Review (AR),  Commissioning Results Review (CRR) | CDR,  FAT,  On-Site Acceptance Test (SAT)\*\* | CDR,  FAT,  On-Site Acceptance Test (SAT)  Final System Acceptance Test (FSAT)\*\* |
| (Independent Case where the flight hardware represents the main purpose of the mission)  Mission Requirements Review (MRR)\*,  Detailed Design Review (DDR),  Payload Acceptance Review (PAR),  Flight Readiness Review (FRR),  Commissioning Results Review (CRR) |
|  |  |  |  |

*\* Content of this review may be part of the Kick-off meeting for the Phase/Activity*

*\*\* Content of this review may be part of the Final Review for the Phase/Activity*

1. The types of content to be expected for the security process includes:

   * 1. Security approach and Risk Analysis for:
        1. the governance model approached within the Information Security Management System (ISMS) framework, SMP, ISMP;
        2. the suppliers systems used to host or manage the development;
        3. supply chain whether upstream or downstream;
        4. the product/technology to be developed;
        5. due diligence & security policies covering Third parties/Business partners liaison;
     2. Controls and measures (procedural, technical, physical, personnel) that will be used to ensure the security of the technology being developed, deployed and maintained.
     3. Nature of the product, level of innovation, possible dual-use or governmental use and what measures will be undertaken to ensure the appropriate protection measures.
     4. Identification of potential regulatory constraints and compliance needs and constraints, taking into account the nature of development, the level of TRL and targeted future use (e.g. national regulations to protect CNI, export controls, Personal Data Protection) as well as potential future use in sensitive systems.
     5. Organizational support for the establishment of a reliable ISMS security programme:
        1. Vertical Support; from the management level all the way down to the individuals that work in your organization that is impacted by the scope of the ISMS;

   Horizontal Support; cross-functional support across the organization by involving different business units to rely on a resilient security posture.” [↑](#footnote-ref-2)