ECSS–M–70A
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# Space Project Management

## Integrated Logistic Support

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# Foreword

This standard is one of the series of ECSS Standards intended to be applied together for the management, engineering and product assurance in space projects and applications. ECSS is a cooperative effort of the European Space Agency, National Space Agencies and European industry associations for the purpose of developing and maintaining common standards.

Requirements in this standard are defined in terms of what must be accomplished, rather than in terms of how to organise and perform the necessary work. This allows existing organisational structures and methods to be applied where they are effective, and for the structures and methods to evolve as necessary without rewriting the standards.

The formulation of this standard takes into account the existing ISO 9000 family of documents.

This standard has been prepared by the ECSS Management Standards Working Group, reviewed by the ECSS Technical Panel and approved by the ECSS Steering Board.

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# Introduction

The ILS approach is justified in the space context by improvement of current practices in terms of development of material resources and services essential to support operation and maintenance and control of associated operational risks, particularly in terms of utilisation cost and availability.

It is also justified by heightening the awareness of all the actors of the need for cost-effective preparation, transfer and management of information, needed to operate, maintain, resupply and dispose of a Product as well as to ensure the recording of unscheduled events in order to perform essential support analyses.

This approach shall be tailored according to the different types of space projects. Consequently, the following requirements are positioned at management level, with identification of the goals to be achieved, rather than with methods and techniques to be implemented to achieve these objectives.

Logistic support is not a new activity: its integration into the project aims at coordinating, throughout the life cycle, the activities and resources involved in the preparation and optimisation of the Support System, aiming at minimum overall life cycle cost, according to the requirements and operational risks.

The advantages and increased efficiency resulting from integrating the logistic support, requires that the logistic support need be addressed in the project definition. It also requires that coherence be established between the design and development of the Support System and the operational requirements to be fulfilled by the Supported System. The ability of the Support System to deliver on time and in proper quantity, material resources and services to deploy, operate, maintain and upgrade the Supported System throughout its utilisation phase, within cost constraints, in its operational environment of use shall be established. The capability of the organisation and resources dedicated to define, collect, manage and handle the information needed to control the Support System throughout the Supported System life cycle, from phase A to phase F, shall be fully developed (see ECSS–M–30).

This summarises the concept of Integrated Logistic Support.

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# 1

# Scope

The present document, 'Integrated Logistic Support', is part of a collection of ECSS standards belonging to the management branch.

This standard describes the set of management requirements aimed at the identification and provision of logistical support, such that the consumer can operate and maintain a product in its operational conditions, for the expected lifetime.

These requirements also aim, throughout the product life cycle, at implementing everything pertinent to the control of the risks considered as critical regarding the operational objective (See also ECSS–M–00).

The management requirements are applicable to those activities necessary to design, develop, deliver, deploy and manage an organised and structured set of materials and software, services, processes and information dedicated to support the Supported System throughout its life cycle.

Within the project, the satisfaction of the consumer's need in terms of logistic support requires the performance of management, studies, and production activities. Concurrently with the tasks covered by these activities, the information data handled by all the project actors shall be managed. Clauses 5, 6, 7 and 8 of ECSS–M–70 deal with the control requirements of such activities. The following diagram (figure 1) summarises these activities throughout the life cycle:

| | | ILS Elements ⟹ | | |
|---|---|---|---|---|
| | | **Management Activities** | **Study Activities** | **Production Activities** |
| Management Standard Elements ⇓ | **Integrated Logistic Support (ILS) (Clause 5)** | Control of logistic activities (5.1) | System analyses (5.2) | Reports (5.3) |
| | **Logistic Support Analysis (LSA) (Clause 6)** | Control of logistic analysis (6.1) | Support need study and validation (6.2) | TS production (LSA reports) (6.3) |
| | **Support Elements (Clause 7)** | Control of support elements activities (7.1) | Support element definition and development (7.2) | Support element production. Support System integration and Operation and Maintenance support (7.3) |
| | **Logistic Information Data (Clause 8)** | Control of information management activities (8.1) | Definition of data and processing and management procedures (8.2) | Installation and operation of the information system resources (8.3) |

**Figure 1: ILS Life Cycle Activities**

# 2

# References

## 2.1 Normative References

This ECSS standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these apply to this ECSS standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

This ECSS standard belongs to the Space Project Management series called up by the 'Policy and Principles' standard ECSS–M–00. The standards listed below shall be considered in association with this document.

ECSS–E–70 Ground Systems and Operations.

ECSS–M–10 Project Breakdown Structures.

ECSS–M–20 Project Organisation.

ECSS–M–30 Project Phasing and Planning.

ECSS–M–40 Configuration Management.

ECSS–M–50 Information/Documentation Management.

ECSS–M–60 Cost and Schedule Management.

ECSS–Q–00 Product Assurance.

ECSS–Q–10 Product Assurance Management.

ECSS–Q–20 Quality Assurance.

ECSS–Q–30 Reliability, Availability and Maintainability.

ECSS–Q–40 Safety.

ECSS–Q–80 Software Product Assurance.

The applicable revision index shall be that valid at the time the Project Requirements Documents are created.

## 2.2 Informative References

| | |
|---|---|
| RG Aéro 00040 | General Recommendation for the Project Management Specification. |
| CNES IM–80–00 | Soutien Logistique Intégré. |
| MR–P/01 | Management Requirements on Industrial Contracts. (supersedes ESA PC/941904/TD/510) |
| ECSS–M–40–03 | Guidelines for Technical Specification. |
| MIL–STD–1388–1A | Logistic Support Analysis. |
| MIL–STD–1388–2B | DoD Requirements for a Logistic Support Analysis Record. |

‘Logistics Engineering and Management’, ‘4th edition’, Benjamin S. Blanchard, Virginia Polytechnic Institute and State University. Prentice Hall International.

Series in Industrial and Systems Engineering–Englewood Cliffs, NJ 07632–W.J. Fabrycky and J.H. Mize, editors.

# 3

# Definitions and Abbreviations

## 3.1 Definitions

For the purposes of this standard, the definitions given in ECSS–P–001 Issue 1 apply. In particular, it should be noted that the following terms have a specific definition for use in ECSS standards.

**Configuration**
**Cost**
**Customer**
**Data**
**Dependability**
**Document**
**Documentation**
**Function or Functional Tree**
**Implementation Document**
**Industrial Organisation**
**Phase (Project Phase)**
**Process**
**Project**
**Project Requirements Document**
**Resource**
**Safety**
**Space Element**
**Space System**
**Specification**
**Supplier**
**System**
**Task**
**Technical Specification**
**Work Breakdown Structure**
**Work Package**

The following terms and definitions are specific to this standard and shall be applied.

**"Availability: (IEC 50:1991)**

The ability of an item to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval, assuming that the external resources are provided."

**NOTE 1** This ability depends on the combined aspects of the reliability performance, the maintainability performance and the maintenance support performance.

**NOTE 2** Required external resources, other than maintenance resources do not affect the availability performance of the item.

**"Down Time: (IEC 50:1991):** The time interval during which an item is in a down state."

**"Mean Down Time: (IEC 50:1991):** The expectation of the Down Time."

**"Mean Time To Recovery: (IEC 50:1991):** The expectation of the time to restoration."

**"Support System**

The hardware and software products, together with the necessary human resources, which are essential to enable the Supported System to achieve its system functional performance from delivery to the end of the life cycle of the Supported System, at minimum total life cycle (discounted cash flow) cost."

**NOTE** Some items, during different phases of the project, can firstly form part of the Supported System and later, modified if necessary, become part of the Support System. For example Electrical Ground Support Equipment.

**"Supported System:**

The hardware and software products, together with the necessary human resources, which are essential to the system functional performance as expected by the consumer."

## 3.2 Abbreviations

The following abbreviations are defined and used within this standard.

| Abbreviation | Meaning |
|---|---|
| **ECSS**: | European Cooperation for Space Standardization |
| **ILS**: | Integrated Logistic Support |
| **LSA**: | Logistic Support Analysis |
| **PHST**: | Packaging, Handling, Storage, Transport |
| **TS**: | Technical Specification |
| **WBS**: | Work Breakdown Structure |

# 4

# Fundamentals of Integrated Logistic Support

## 4.1 Project Context

Logistic Support shall be provided throughout the utilisation phase and requires, especially throughout the early phases of the project, the management of specific activities of design and development (called logistic activities), in close relation with the other activities such as dependability and safety.

Logistic activities shall be part of the project activities and integrated into its phasing and planning, in order to ensure their consideration in the development of the Supported System. These activities shall be adapted depending on the project organisational and technical effort to tackle the identified critical items (see ECSS–Q–30, ECSS–Q–40).

In particular, the product design activities shall lead to a concurrent definition of a Support System with the Supported System. The definition shall be based on initial operational and maintenance concepts, in order to integrate the consumer's constraints. This definition shall be set up as soon as possible, in order to ensure self-consistency.

The management of logistic activities is therefore integrated into the project management requirements: the present document takes into consideration the existence of a collection of ECSS standards and complements it by developing the ILS requirements.

The management of logistic activities throughout the product life cycle shall notably demonstrate:

- that the dependability and safety criteria are taken into account within the product operational environment of use,
- the suitability, coherence and continuity of the Support System,
- the ability to control the risks specific to the performance of operation and maintenance tasks, as described in ECSS–M–00.

Ensuring and maintaining the product performances through its utilisation phase, into its environment of use and up to its retirement, address one of the main aspects of the operational objective. The purpose of a Support System is to maintain the technical and availability performance levels while respecting safety constraints and optimising overall life cycle cost.

Integrated Logistic Support ensures the operational availability and the project should apply the life cycle cost concept when trading off development costs versus later utilisation phase support costs and disposal costs.

The requirements specified herein shall be included as appropriate in the customer's Project Requirements Document and responded to by the supplier in his Implementation Documents (See ECSS–M–00).

## 4.2 ILS Main Concepts

### 4.2.1 Integration Concept

Integrating the logistic support into a project is achieved by considering four aspects:

- the integration of logistic support in the consumer's needs and his environment,
- the integration of logistic activities in the project management,
- the integration of the Support System design in the Supported System design,
- the integration of the support elements together.

### 4.2.2 Availability, Support Ability and Human factors

The operational availability concept addresses the fact that the required external resources including both maintenance resources and other resources to be provided for the availability (performance) shall be, and are provided in the operational conditions of use.

External resources are provided by the Support System in order to maintain the Supported System in an operational state, under actual conditions of use and expected economic constraints. This ability to provide the external resources is defined as 'support ability'.

The operational availability is derived both from the dependability and safety characteristics and from the support ability characteristics.

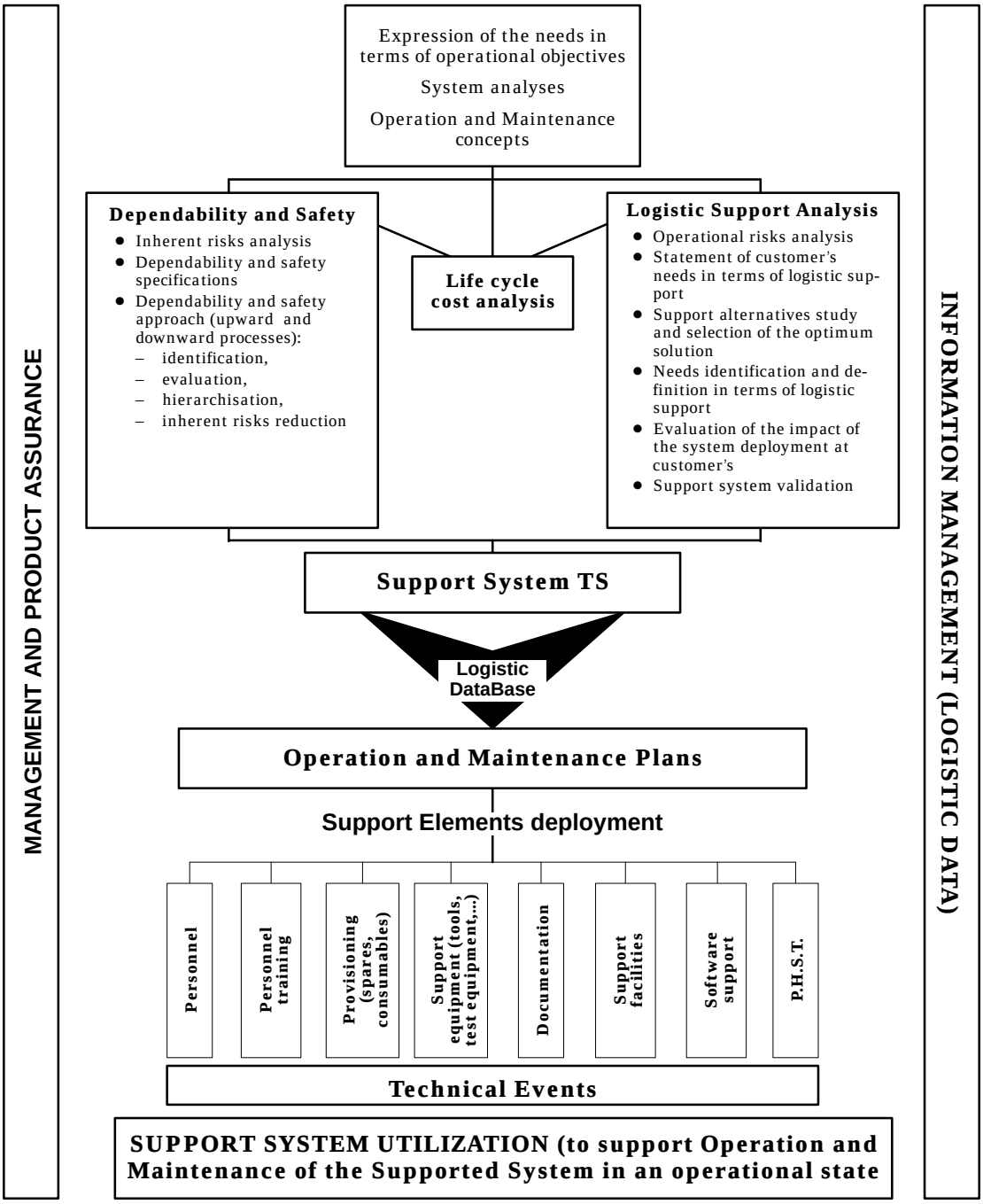
Human factors influence both support ability and the Supported System characteristics directly.

### 4.2.3 Life Cycle Cost and Operational Risk

The life cycle cost concept addresses both the acquisition costs of the Supported System and Support System and the operation and maintenance costs, and disposal costs.

Whatever the area being considered, the achievement of objectives and the guarantee of performances imply operational risks: inherent risks linked to the Supported System; extrinsic risks linked to the Support System and to the technological, natural and human environment. The ILS process includes the management of these risks as part of the overall risk management. From the life cycle cost analysis, the ILS assists the trade-off between the dependability and safety analyses and the selection of an optimised solution for the Support System. The general synopsis shown in figure 2 illustrates the complementarity of the two processes.

ILS is also involved in addressing human factors, through analyses of operation and maintenance tasks. These analyses are notably based on operability (in particular the man/machine interfaces and ergonomics), maintenance ability (qualification, skills, task duration, work load, etc.) and environment (noise, environment aggressiveness, organisation, etc.) criteria.




**NOTE** P.H.S.T. = Packaging, Handling, Storage, Transport
TS = Technical Specification

**Figure 2: ILS Overview**

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# 5

# Management Requirements for ILS

In this ECSS standard, in order to facilitate reading and traceability, the requirements are listed according to numbered topics. Each numbered requirement is composed of a general wording (bold text), and often by an explanatory text attached to the general requirement and an expected output (text in italics).

## 5.1 Requirements for Control of Logistic Activities

### 5.1.1

**The overall project requirements shall clearly state the objectives and constraints in terms of operational availability, life cycle cost and delivery of the product to its operational environment of use up to and including its ultimate disposal.**

AIM: Ensure that all the operational environment constraints are identified.

EXPECTED OUTPUT: *An element of the Project Requirements Document covering operational availability, project life cycle cost, schedule and product operating environment.*

### 5.1.2

**The requirement to control the operational risks related to the Support System shall be included in the overall project requirements. (See also ECSS–M–00).**

AIM: Achieve a balance between the ILS risks and the overall project risks.

EXPECTED OUTPUT: *An overall approach to risk management.*

### 5.1.3

**The Support System shall be developed concurrently with the Supported System.**

AIM: Define the Support System early enough, so that:

– the design and technical solutions selected for the Support System are consistent with the Supported System definition (design integration concept),

– the various identified support elements are actually usable in the operational environment of use, and coherent together (support elements integration concepts),

– the consumer gets the support elements when needed (consumer's need integration concepts).

EXPECTED OUTPUT: *Timely availability of both the Supported and Support Systems with a minimum life cycle cost.*

### 5.1.4

**The Support System shall be validated as part of the overall project verification process.**

AIM: Ensure, early enough, the ability of the Support System to meet the support ability requirements and the ability of both Systems (Supported and Support) to achieve the objectives of operational availability, life cycle cost and delivery schedule.

This validation will be enhanced through the use of feedback data (lessons-learned). (See also ECSS–M–20)

EXPECTED OUTPUT: *A validated Support System.*

### 5.1.5

**The consumer shall participate in the definition and validation of the Support System.**

AIM: Ensure that throughout the development phase the Support System and Supported System designs comply with the consumer's needs in terms of logistic support.

EXPECTED OUTPUT: *An agreed Support System*

### 5.1.6

**The logistic support activities shall be integrated into the project management and synchronised with the project phasing and planning.**

AIM: Synchronised activity.

EXPECTED OUTPUT: *Synchronised planning for the overall project.*

### 5.1.7

**The logistic activities shall be included in the project Work Breakdown Structure (*WBS*) and clearly identifiable.**

AIM: – Ensure a consistent/coherent identification and management of ILS activities,

– Establish roles, responsibilities and authority related to the logistic function,

– Ensure conditions enabling roles and responsibilities to be undertaken in a dynamic and interactive way throughout the project and especially in early phases (A, B, C), see ECSS–M–30,

– Establish close first level customer/supplier communication between the various levels of the project organisation (See also ECSS–M–10).

EXPECTED OUTPUT: *Project WBS containing ILS work packages.*

### 5.1.8

**The logistic activities management in the project shall evolve so as to be appropriate to the logistic function/phase**

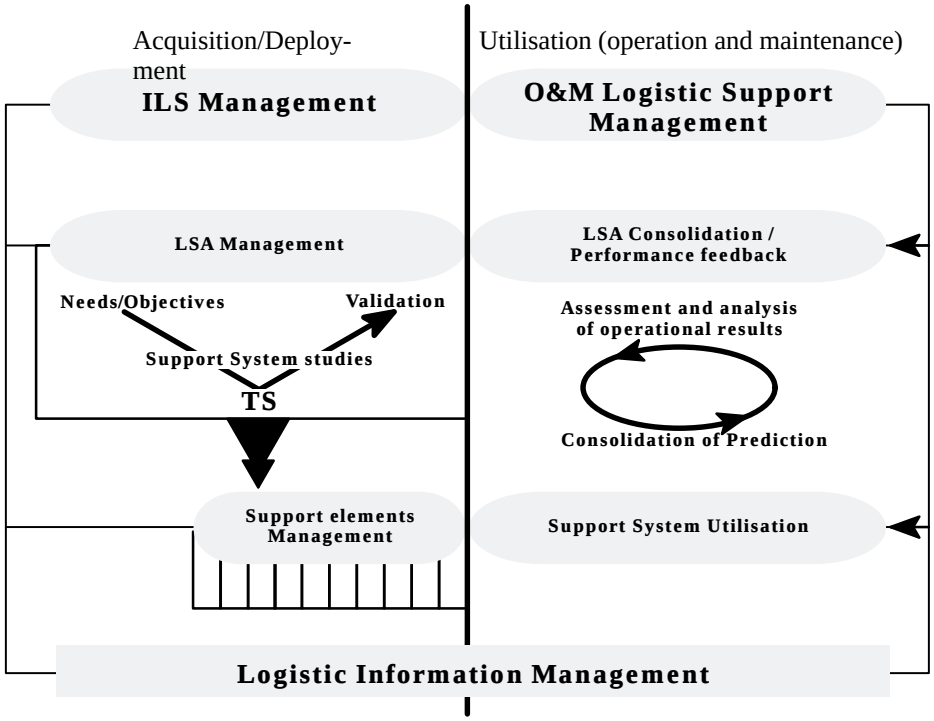
AIM: Consideration of the correct requirements at the appropriate phase of the project.

The project phasing implies consideration of the logistic function according to three management responsibility categories:

- the logistic support management from definition of needs to acquisition phases (A, B, C, D), including :
  - the Integrated Logistic Support (ILS) management (control of the logistic activities during the system acquisition),
  - the Logistic Support Analysis (LSA) management (control of the studies aimed at logistic support specification and validation),
  - the support elements management (control of the acquisition of specified support elements),
- the Operation and Maintenance logistic support management – phase E (control of the Support System use and its support ability),
- the logistic information management (applicable throughout the project life cycle).

The diagram below (figure 3) shows the scope of logistic support management.

EXPECTED OUTPUT: *Balanced definition of ILS activities throughout the project phases.*




**NOTE** ILS = Integrated Logistic Support
LSA = Logistics Support Analysis
O&M = Operation & Maintenance
TS = Technical Specification

**Figure 3: Scope of logistic support management**

### 5.1.9

**Responsibility and authority for ILS activities at each level shall be kept together.**

AIM: A single point of contact for ILS matters within each actor's project team.

EXPECTED OUTPUT: *Well co-ordinated management of project ILS activities (See also ECSS–M–20).*

## 5.2 Requirements for System Analyses

### 5.2.1

**The customer shall summarise the logistic support requirements in the Project Requirements Documents.**

AIM: Identify any customer's constraint on the logistic support solutions to be implemented.

They shall cover:

- a summary of the project objectives to be achieved,
- the delivery, operation and maintenance concepts,
- the requirement for integrating the logistic support into the project.

EXPECTED OUTPUT: *Corresponding elements in the Project Requirements Documents.*

### 5.2.2

**The supplier shall respond to the customer's ILS requirements with appropriate elements of his Implementation Documents.**

AIM: Appropriate response to the ILS requirements.

These elements of the Implementation Documents shall cover:

- identification of the logistic activities, the organisation and the resources implemented to perform the logistic activities, as reflected in the project breakdown structures,
- phasing and planning of the logistic activities,
- a description of the methods to be implemented and the links with the other plans (in particular the Supported System development plan, the configuration management ID, the dependability & safety and Quality plans.

Depending on the project size, objectives and constraints, the response can be split into separate plans.

EXPECTED OUTPUT: *Elements of the Implementation Documents*

### 5.2.3

**The strategies for ILS and logistic activities shall be developed by the supplier in response to the Project Requirements Documents throughout all the phases of the project.**

AIM: Continual evolution of the ILS strategy throughout the project life cycle.

All the analyses, including those conducted during phases A and B, shall address ILS, in particular the determination of the objectives and the functions to be performed by the Supported System, the initial operational and maintenance concepts. (The operational concept addresses the operational environment in which the Supported System will be deployed and used. The maintenance concept addresses the repair policy and the maintenance organisation levels.).

EXPECTED OUTPUT: *ILS elements in the Supplier Implementation Documents.*

## 5.3 Requirements for Reports

### 5.3.1

**The supplier shall periodically report to the customer on the status of the logistic support tasks within the context of the overall project.**

AIM: An integrated approach to project reporting.

EXPECTED OUTPUT: *Project progress reports which include ILS aspects (See ECSS–M–20).*

### 5.3.2

**The supplier shall submit the status of the logistic support tasks during the project reviews.**

AIM: An integrated approach to project review.

EXPECTED OUTPUT: *Project reviews which include ILS aspects (See ECSS–M–30).*

### 5.3.3

**The supplier shall include an element covering logistic support within the context of the overall project, in the project lessons-learned report.**

AIM: An integrated view of the lessons learned during the project.

EXPECTED OUTPUT: *An element of the project lessons-learned report covering logistic support (See ECSS–M–20).*

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# 6

# Management Requirements for Logistic Support Analysis

## 6.1 Requirements for Control of Logistic Analyses

### 6.1.1

**The first level supplier shall define a strategy for the implementation of Logistic Support Analysis (LSA).**

AIM: Size the logistic support analysis effort as early as possible in the project phasing. The LSA tasks have to be tailored to achieve the best method of meeting the requirements.

The strategy can cover:

- management tasks aiming at preparing, managing and co-ordinating the LSA activities,
- tasks for translating the consumer's needs into logistic support,
- tasks aiming at analysing the ability of the system design to be supported,
- tasks aiming at studying the support alternatives and selecting the optimum solution,
- tasks aiming at identifying and defining the needs in terms of support elements,
- validation tasks aiming at ensuring that the deployed Support System is compliant with the support requirements.

EXPECTED OUTPUT: *An Implementation Document element defining the strategy for LSA throughout the project. Its implementation is supported by means of LSA documentation (See ECSS–E–70).*

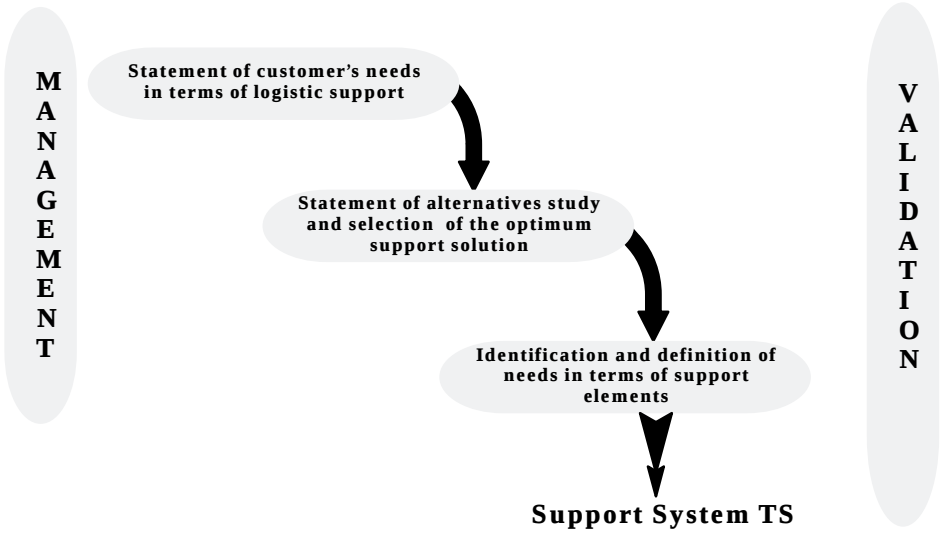
## 6.2 Requirements for Study and Validation of Support Need

The following requirements relate to the identification of the logistic support needs of the Supported System mission and the comparative analyses of the required input data.

The study activities are aimed at defining the needs in terms of logistic support, in order to elaborate all the data required for the development of the support elements. These studies are called Logistic Support Analysis (LSA).

The LSA is a set of tasks iteratively implemented throughout the project, the main part being implemented during phases B, C and D.

The diagram below (figure 4) illustrates the sequence of the groups of tasks for phases B and C. At the end of phase C, the LSA process leads to establishing the applicable Operation and Maintenance Plan and the support elements TS.




**NOTE** TS = Technical Specification

**Figure 4: Sequence of the groups of tasks during phases B and C**

### 6.2.1

**The first level supplier shall perform an analysis aiming at identifying the functional needs in terms of logistic support related to the Supported System mission. (e.g. Quality Function Deployment for logistic support)**

AIM: Complete identification of logistic support elements based upon the Supported System functional needs.

In order to achieve this study, the first level supplier shall perform a detailed analysis of the mission and utilisation profiles on the basis of the mission analysis and system analyses. He will identify and document the manner, location and time of utilisation of the Supported System and will highlight the support functions, the support ability criteria and the levels of these criteria. For each criterion, the list of critical points or unacceptable risks from the operational viewpoint shall be established.

All this information will enable the first level supplier to select and define the support ability criteria, in relation with the first level customer (or the consumer). This information will be updated according to the modifications of the Supported System mission, and its operational environment of use. This information should be baselined during Phase B (See ECSS–M–30).

EXPECTED OUTPUT: *Complete identification of logistic support elements.*

### 6.2.2

**The supplier shall assess the logistic resources, which are available with or being acquired by the customer, and shall identify the ones which could be used to support the Supported System. The supplier shall then establish the resulting standardization and design implications.**

AIM: Take into account existing customer's resources which can have an impact on the Support System solutions.

By expressing the Supported System design recommendations after an analysis of the customer's logistic resources which could improve efficiency and cost, the use of specific elements, which require adapted operation or maintenance can be avoided as far as possible.

EXPECTED OUTPUT: *Optimised Support System, which maximises the use of existing resources.*

### 6.2.3

**The supplier shall identify and evaluate the impact on the Support System of new technologies used for the Supported System definition.**

AIM: Reduce Support System risks deriving from the use of new technologies.

The consequences of these new technologies on the Support System definition in terms of potential improvements or new constraints on the various support elements will be identified. These consequences will be analysed, insofar as they affect the Support System costs or performances.

EXPECTED OUTPUT: *New technology impact evaluation document.*

### 6.2.4

**For each alternative of the Supported System, the first level supplier shall define the potential alternatives for the Support System, evaluate each alternative, then compare them (sensitivity analysis) and determine the Support System best fitted to the operational requirements.**

AIM: Selection of the optimum Support System.

These tasks facilitate the identification of one (or several) best solution(s) to be submitted in order to realise the Support System: the solution to be selected is the one leading to the best trade-off between cost, support ability performances and delivery delays, etc.

The evaluation can cover such aspects as:

- Level of repair analysis,
- Reliability-centred maintenance analysis,
- Technical and availability performances to be maintained,
- Operation and maintenance concepts based on the dependability and safety analysis.

EXPECTED OUTPUT: *A Support System resulting from an informed selection process.*

## 6.3 Requirements for LSA Reports

The requirements are identical with those in clause 5.3.

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# 7

# Management Requirements for Support Elements

The objective of the following requirements is to determine the logistic resources required to perform the identified operation and maintenance tasks.

## 7.1 Requirements for Control of Support Element Activities

### 7.1.1

**The support element activities shall be organised in accordance with ECSS–M–20.**

AIM: Consistent approach to management of all project disciplines.

EXPECTED OUTPUT: *Integrated approach to managing the project.*

## 7.2 Requirements for Support Element Definition and Development

### 7.2.1

**The supplier shall define the support elements required for the performance of each operation, maintenance and support task for the operation of the Supported System in its environment of use.**

AIM: All the operation and maintenance tasks shall be fully supported.

For each task, the following shall be defined:

- an overview and a reminder of:
  - the nature and type of the task,
  - the frequency (or periodicity),
  - the allotted duration for the task,
- the quantified resources requirements, regarding the logistic needs in terms of:
  - support equipment (tools, test equipment, ...),
  - Packaging, Handling, Storage and Transport (PHST),
  - personnel skills and manpower,
  - training,

- software support,
- support facilities,
- provisioning of spares and consumables,
- documentation material (operation, maintenance, re-provisioning data and procedures),
- technical events data feedback.

A synthesis of logistic needs per support element is then performed. This synthesis will be presented as a part of the Operation and Maintenance Plan.

EXPECTED OUTPUT: *Complete identification of all the operation and maintenance tasks and the corresponding support elements.*

### 7.2.2

**The first level supplier shall analyse the impact on the Support System of deploying the Supported System at the consumer-defined location.**

AIM: Ensure a trouble-free delivery, installation and resupply of the Support System at the defined location.

This analysis aims at verifying the adequacy of available logistic resources selected for the Supported System support and establishing, when necessary, the modifications to be applied to these resources, so that they can effectively be used (in particular PHST., support facilities, test equipment, personnel work load and availability, etc.).

EXPECTED OUTPUT: *A Support System impact analysis based upon the Supported System consumer-defined location.*

### 7.2.3

**The supplier shall predict, for the Supported System, the rate of consumption of spares, consumables and other support elements and shall ensure continuity of re-supply.**

AIM: Define the scope of logistic support.

This task facilitates the availability of the required logistic resources throughout the Supported System utilisation phase and before the industrial production phases out.

EXPECTED OUTPUT: *Effective implementation of logistic support.*

### 7.2.4

**The supplier shall establish the actions required to maintain the support ability performance relative to the changes which can affect the Supported System, Support System and their environment.**

AIM: Contribute to operational risk management within support activities.

This task enables the taking of appropriate steps in accordance, for instance, with the customer's personnel turn-over, socio-economic changes, some industrial skills unavailability, products obsolescence, market fluctuations, etc.

EXPECTED OUTPUT: *Logistic support contribution to risk management as part of project Implementation Documents.*

### 7.2.5

**The supplier shall analyse all the unscheduled operational events to determine their cause.**

AIM: Improve resilience of the Supported System.

EXPECTED OUTPUT: *Unscheduled event analysis and proposal for improvement actions.*

## 7.3 Management Requirements for the Production of Support Elements

The objective of the support elements production tasks is to achieve the delivery of hardware and software, services and data complying with the support elements requirements.

The matter of concern is to develop the specified support elements, so that they are available when needed by the Supported System. The coordinated delivery of the Supported System and the associated Support System enables the global acceptance of the Supported System in its 'actual state' in comparison with the requirements 'defined state'.

The delivery can be performed in several steps: an initial delivery composed of the required elements at the Supported System deployment and a recurring delivery composed of replenishment of logistic resources, including human resources, to ensure the support continuity throughout the utilisation phase.

The production tasks will be carried out under general management procedures (statement of work, plans, acceptance, financial resources, etc.).

### 7.3.1

**The supplier shall assess, prior to acquisition of development tooling, test equipment, etc. the desirability and feasibility of having equipment capable of being used during both the development and utilisation phases.**

AIM: Maximise the re-use of existing or development equipment.

This opportunity shall be taken into account only if the resources fit the support ability requirements.

EXPECTED OUTPUT: *All re-usable existing or development equipment identified.*

### 7.3.2

**The supplier shall establish a provisioning plan which identifies initial and recurring spares, repair parts and consumables.**

AIM: Ensure reliable consumables provisioning.

The provisioning plan will address for instance:

- the designation and quantity of hardware items to stock for each maintenance level and use location,
- the acquisition procedures (orders, allotted time, quality survey,...),
- the production means, etc.

EXPECTED OUTPUT: *Consumables provisioning plan as part of the Implementation Document.*

### 7.3.3

**The supplier shall establish a support equipment acquisition plan.**

AIM: Ensure timely acquisition of Support System equipment.

The supplier will specifically consider the Built-In Test Equipment, the support equipment items specifically developed for supporting the Supporting System and the standardized support equipment items.

EXPECTED OUTPUT: *Support System equipment acquisition plan.*

### 7.3.4

**The supplier shall establish a development and construction plan for any support facilities required.**

AIM: Ensure timely acquisition of Support System facilities.

EXPECTED OUTPUT: *Support System equipment facilities plan.*

### 7.3.5

**The supplier shall establish a Packaging, Handling, Storage and Transportation Plan (PHST plan).**

AIM: Ensure adequate transportation related activities.

The PHST plan shall take into account:

- the hardware items to be manufactured (containers, handling systems, storage and transportation means...),
- the PHST services to be implemented during delivery, deployment and utilisation phases,
- the establishment and documentation of procedures required for the PHST services.

EXPECTED OUTPUT: *PHST. plan.*

### 7.3.6

**The supplier shall establish a software support plan.**

AIM: Ensure proper software support.

The software support addresses software packages integrated into the Supported System, software packages used for maintenance tasks, for training, for support administration. The plan covers the hardware and software required for software support services throughout the utilisation phase and documents the applicable procedures.

The need to update software in the space element subsequent to launch shall be considered by the supplier at the beginning of the development cycle (phases C/D).

EXPECTED OUTPUT: *Software support plan.*

### 7.3.7

**The supplier shall establish a technical assistance plan to satisfy the needs in terms of manpower and skills to carry out the operation, maintenance and support tasks which are not carried out by the consumer's personnel.**

AIM: Identify needed resources and skills in terms of manpower.

EXPECTED OUTPUT: *Technical assistance plan.*

### 7.3.8

**The appropriate actor shall make the necessary arrangements for assigning the personnel required to carry out the operation, maintenance and support tasks.**

AIM: Adequate allocation of personnel.

EXPECTED OUTPUT: *Manpower allocation documentation.*

### 7.3.9

**The supplier shall establish an initial and recurring training plan for the operation and maintenance personnel.**

AIM: Ensure up–to–date personnel skills.

The training plan will notably address technical and personnel resources to carry out the recurring training throughout the utilisation phase (See also ECSS–M–00 and ECSS–M–20).

EXPECTED OUTPUT: *Training programme.*

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# 8

# ILS Requirements for Information Management

This clause gives guidelines to implement the ECSS–M–50 requirements into Integrated Logistic Support.

## 8.1 Integration of Logistic Support into Overall Information / Documentation Management

### 8.1.1

**Management of logistic support information and documentation shall comply with ECSS–M–50.**

AIM: Ensure an overall consistent system for information/documentation management.

As an example of logistic support information and documentation, the supplier shall organise the User's documentation and information depending on the nature of the tasks to be carried out during the utilisation phase (e.g. operations, maintenance and support).

EXPECTED OUTPUT: *Project Requirements Document and Implementation Document for Information/Documentation Management covering ILS aspects.*

## 8.2 Requirements for Data Processing

The development and utilisation activities related to a sophisticated product generate and use extensive and varied data. These data shall be sufficiently comprehensive, up-to-date and coherent both together and with the product.

### 8.2.1

**The first level customer shall define his requirements for logistic support data items.**

AIM: Clear expression of consumer's expectations as far as logistic support items are concerned.

The definition and description shall facilitate understanding of the need.

The definition shall be established in close relation with the person responsible for the activity that provides the data item.

EXPECTED OUTPUT: *List of needed logistic support data items.*

### 8.2.2

**The first level customer shall express his requirements in terms of accuracy and precision of the data value in relation to the product life cycle, depending on whether it is in a functional, specified, defined or actual state.**

AIM: Realistic requirements along the product life cycle.

The accuracy can reflect allocated, predicted, measured or consolidated data.

EXPECTED OUTPUT: *Pertinent data.*

### 8.2.3

**The first level customer shall define the performance report requirements for the deployment and utilisation phases.**

AIM: Ensure adequate follow-up of the performance.

The reports can include data related to the Supported System state and activity (anomaly, up-time duration, time to maintenance...) and the Support System state and activity (time to carry out the tasks, anomaly in the support elements use, mean active repair time, Mean Time To Recovery, problem in the support organisation...).

These measurement data are required for management of the Support System in the product operational environment of use.

EXPECTED OUTPUT: *Performance reports.*

### 8.2.4

**The supplier shall establish the procedure enabling logistic support data to be traceable to their origin.**

AIM: Link logistic support data and system performance.

These procedures will be based upon the supplier's internal organisation and the tasks carried out to generate the data.

EXPECTED OUTPUT: *Justified logistic support data.*

### 8.2.5

**The supplier shall establish the procedure to be used to validate the logistic support data prior to use.**

AIM: Use of only validated data.

Any data can be captured in the information system or handled as soon as its content and timing comply with the requirements. Any data handled before verification can introduce risks in the related activities.

EXPECTED OUTPUT: *Data validation procedure.*

### 8.2.6

**The first level customer shall identify the required data flows and authorised users.**

AIM: Apply to ILS data requirements of ECSS–M–50 about information flow.

The data flow shall be described in terms of the expected magnitude and frequency of occurrence. This description shall be developed in co-operation with the consumer/first level supplier.

EXPECTED OUTPUT: *Documented and controlled ILS data flows.*

### 8.2.7

**The customer shall identify data requiring a specific process to be carried out before handling.**

AIM: Avoid use of meaningless raw data.

The process can be:

- updating the data,
- consolidating the data,
- processing the data. e.g. change of format, production of summaries/reports.

EXPECTED OUTPUT: *Meaningful data correctly formatted.*

## 8.3 Requirements for Information System Installation/ Operation

### 8.3.1

**The first level customer shall define the media and interface requirements for logistic support information management.**

AIM: Contribute to a single coherent information system.

The interface requirements can be expressed according to Open System Interchange layers (transfer frame, network, transport...), and the standards and formats in which they shall be delivered.

EXPECTED OUTPUT: *Media and interface definition for logistic support information system.*

### 8.3.2

**The supplier shall implement the means requested to satisfy the interface requirements with the customer's information system.**

AIM: Establish a single coherent information system.

EXPECTED OUTPUT: *Logistic support information system as part of the Information /Documentation Management Implementation Document.*