"A day in the life of the S-Series"

International specification for Logistic Support Analysis LSA

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The Logistic Support Analysis (LSA) is one of the most important processes within the product supportability analysis activities.

It is the principal tool for:

- Design products relevant to **maintainability, reliability, testability** and to **optimize life cycle costs**
- Define **all required resources** to support the product in its intended use during in-service operation

S3000L defines the **processes, general requirements** and related **information exchange** governing the performance of the LSA during the life cycle of complex technical products.
Scope

• Rules for the establishment of the **product breakdown** and for the selection of LSA candidate items

• **Type and methodology** of performance of the specified analyses

• Guidelines on how to process the results of the analysis activities and on how to achieve a **cost-efficient support concept**

• **Interface** between LSA and the support engineering areas (e.g., reliability, maintainability, and testability)

• **Interface** between LSA and the ILS functional areas

• **Interface** between industry (contractor) and the customer
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1</td>
<td>Introduction</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>General requirements</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>LSA business process</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Configuration management in LSA</td>
</tr>
<tr>
<td>Chapter 5</td>
<td>Influence on design</td>
</tr>
<tr>
<td>Chapter 6</td>
<td>Human factors analysis</td>
</tr>
<tr>
<td>Chapter 7</td>
<td>Results of FMEA/FMECA in LSA</td>
</tr>
<tr>
<td>Chapter 8</td>
<td>Damage and special event analysis</td>
</tr>
<tr>
<td>Chapter 9</td>
<td>Logistics related operations analysis</td>
</tr>
<tr>
<td>Chapter 10</td>
<td>Development of a scheduled maintenance program</td>
</tr>
<tr>
<td>Chapter 11</td>
<td>Level of Repair Analysis</td>
</tr>
<tr>
<td>Chapter 12</td>
<td>Maintenance Task Analysis</td>
</tr>
<tr>
<td>Chapter 13</td>
<td>Software support analysis</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Chapter 14</td>
<td>Life cycle costs considerations</td>
</tr>
<tr>
<td>Chapter 15</td>
<td>Obsolescence analysis</td>
</tr>
<tr>
<td>Chapter 16</td>
<td>In-service LSA</td>
</tr>
<tr>
<td>Chapter 17</td>
<td>Disposal</td>
</tr>
<tr>
<td>Chapter 18</td>
<td>Interrelation to other ASD specifications</td>
</tr>
<tr>
<td>Chapter 19</td>
<td>Data model</td>
</tr>
<tr>
<td>Chapter 20</td>
<td>Data exchange</td>
</tr>
<tr>
<td>Chapter 21</td>
<td>Terms, definitions and acronyms</td>
</tr>
<tr>
<td>Chapter 22</td>
<td>Data element list</td>
</tr>
</tbody>
</table>
Analysis activities within the LSA process

- Analysis for identification of general LSA needs
- Comparative Analysis
- Human Factor Analysis
- Product breakdown/configuration and LSA candidate selection
- RAMTS (Reliability, Availability, Maintainability, Testability and Safety Analysis)
- Failure Mode Effects (and Criticality) Analysis (FMEA/FME(C)A)
- Damage Analysis
- Special Event Analysis
- Preventive Maintenance Analysis (S4000P, MSG-3, RCM)
- Operations Analysis (PHST)
- Software Support Analysis (SSA)
- Level of Repair Analysis (LORA)
- Maintenance Task Analysis (MTA) → Task requirements

Additionally, LSA provides information for:
- Simulation of operational scenarios
- Training Needs Analysis (TNA)
Analysis for identification of general LSA needs

To identify the pertinent supportability aspects of a new Product, all relevant information related to the intended use must be collected and documented carefully:

- **General** usage aspects
- Operational requirements document (ORD)
- Customer requirements document (CRD)
- **Site surveys**
- **Qualification** requirements (against requirements of the customer)
- **Certification** requirements (against requirements of official authorities)
A systematical breakdown of the Product which is subject to an LSA process is **essential** with respect to the following aspects:

- To provide a clear understanding of **how the Product is structured** concerning its systems, subsystems, functions, hardware components, etc.

- To provide a **clear relation** of the **Item under Analysis (IuA)** and its hardware components including **software** as far as applicable

- To enable the allocation of **key addresses for IT purposes**

- To enable the establishing of a **variant and configuration management**
RAMTS (Reliability, Availability, Maintainability, Testability and Safety Analysis)

RAMS information needs to be assessed for supportability decisions and incorporated into the LSA process:

- **Reliability and Safety** (i.e. MTBF) analysis are directly linked from the design (FMEA/FMECA) and have crucial influence on product supportability.
- **Maintainability** analysis is strongly needed to decide whether an item is supportable.
- **Testability** analysis is performed to determine supportability capabilities.
- **Availability** figures have to fulfil Customer requirements.
Failure Mode Effects (and Criticality) Analysis (FMEA/FME(C)A)

- **FMEA/FMECA** establishes the methodology and decision logic that is a prerequisite to the identification of **corrective maintenance tasks** to be applied to the Product in case of an inherent failure occurrence.

- **LSA FMEA/FMECA** groups failure modes coming from the Engineering FMEA/FMECA that lead to the same maintenance action.
Damage and Special Event (DSE) analysis

**Maintenance Task requirements** caused by DSE analysis must be correctly identified and taken into consideration as part of the LSA process to complete the Product supportability.

Potential DSE can be identified in **early stages** of Product project, but is the **In-service** phase as result of Product operation the main source for DSE analysis.

Maintenance activities (Task requirements) identified as part of the DSE analysis are included as part of the **Maintenance Task Analysis** for detailed description.

<table>
<thead>
<tr>
<th>Significant Damage Event Identification</th>
<th>Event Description</th>
<th>Event Location</th>
<th>Event Type</th>
<th>Event Frequency</th>
<th>Event Duration</th>
<th>Event Impact</th>
<th>Event Likelihood</th>
<th>Event Probability</th>
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</tr>
</thead>
<tbody>
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</tbody>
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**BIKE DAMAGE MODE ANALYSIS**
Preventive Maintenance Analysis

Preventive Maintenance Task Requirements (PMTR) with intervals result from the application of analysis methodologies like S4000P or other alternatives.

PMTR coming from S4000P analysis are taken and incorporated to LSA process for Product supportability completion. Preventive Tasks can be packaged on a unique interval or documented individually.

Preventive Maintenance activities identified as part of the DSE analysis are included as part of the Maintenance Task Analysis for detailed description.
After Task Requirement identification (preventive or corrective), a **deeper analysis** of the maintenance activities is required regarding its logistic considerations.

Task detailed description is subdivided in work steps or subtasks depending on the depth of information required.

Spare parts and consumables, support equipment, personnel, facilities and task duration information have to be identified. Additional information such as task criticality, task location, training needs, pre- and post-conditions or safety and environmental requirements should also be considered.

S3000L Chapter 12 provides all possible alternatives to document Maintenance Task Analysis for Rectifying (maintenance task that resolves an event) and Supporting Tasks (part of a complete maintenance activity).
More information?

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