SEMINARI INTERDISCIPLINARI DI CULTURA AERONAUTICA
II CICLO – IV INCONTRO
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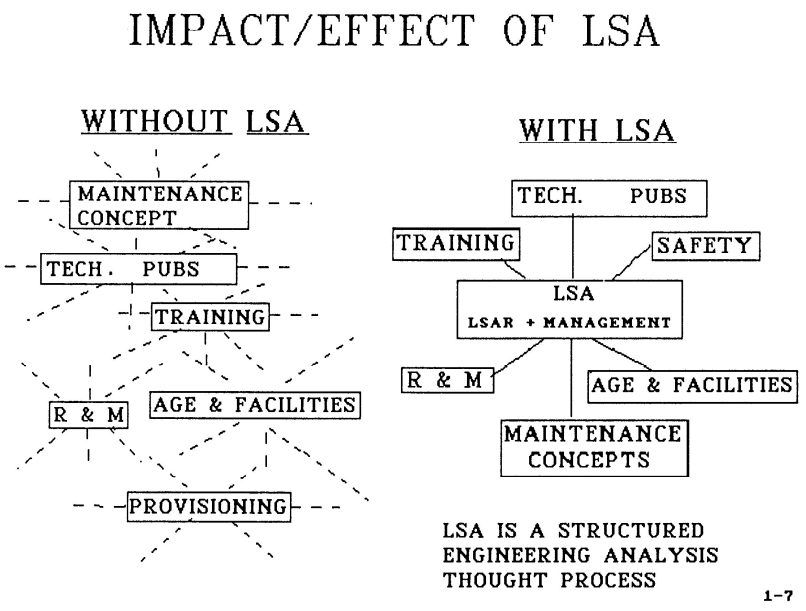
L'impiego e l'esercizio dei velivoli

Introduction to the INTEGRATED LOGISTIC SUPPORT and the LOGISTIC SUPPORT ANALYSIS

Introduction:
The Integrated Logistic Support Concept

Summary:

What is LSA
Why LSA is used in industry
Where LSA is used
When LSA is used



Introduction

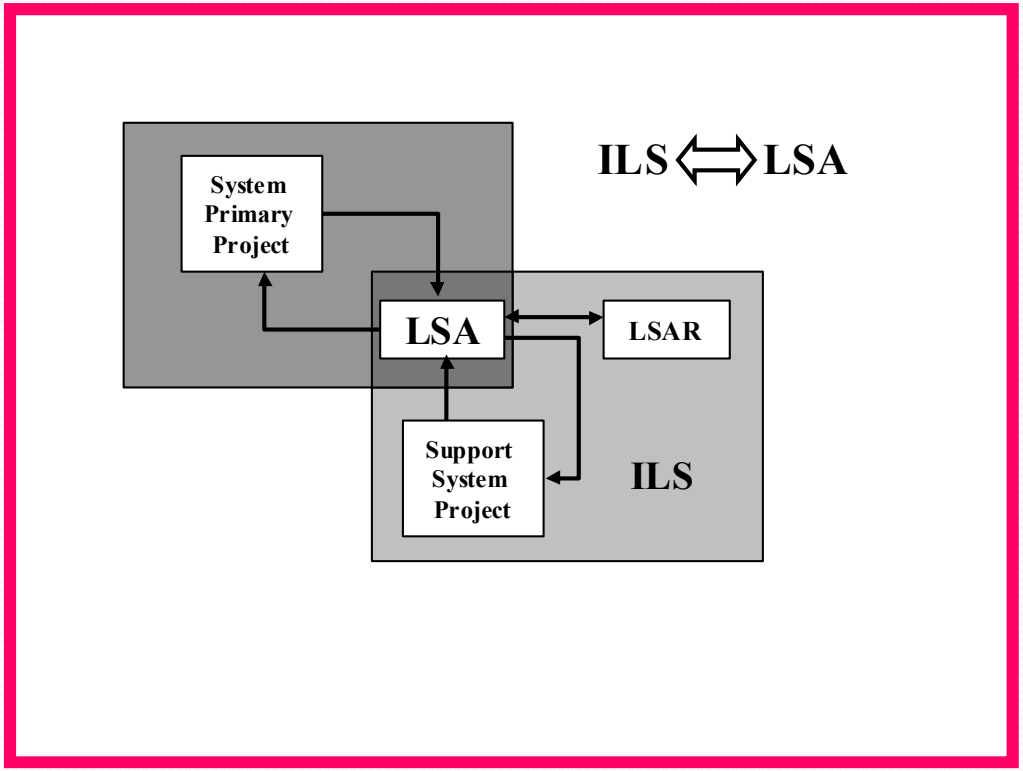
INTEGRATED LOGISTIC SUPPORT

It's a concept whose objectives are:

- Ensure that:
  - supportability is considered during all the project phases and
  - logistic aspects are considered to reach the best supportability level
- Identify and integrate the support elements to obtain the harmonization of disciplines
- Reduce of the item life cycle's cost

Introduction

- The Integrated Logistic Support (ILS) objectives can be achieved through the Logistic Support Analysis (LSA) process



What is Logistic Support Analysis (LSA)

- The process allows, since the a/c (preliminary) design phase, the **definition of the most reliable and effective in service support policy** throughout the build up of the ILS system in each development phase of the product (definition, design, production).
- The LSA process is based on MIL-STD 1388 (-1A, -2B) and DEF STAN 00-60, that consider the design of the logistic support elements in a global mode.

The two documents contain detailed information and application guidance required to tailor the LSA/LSAR effort to a specific acquisition program.

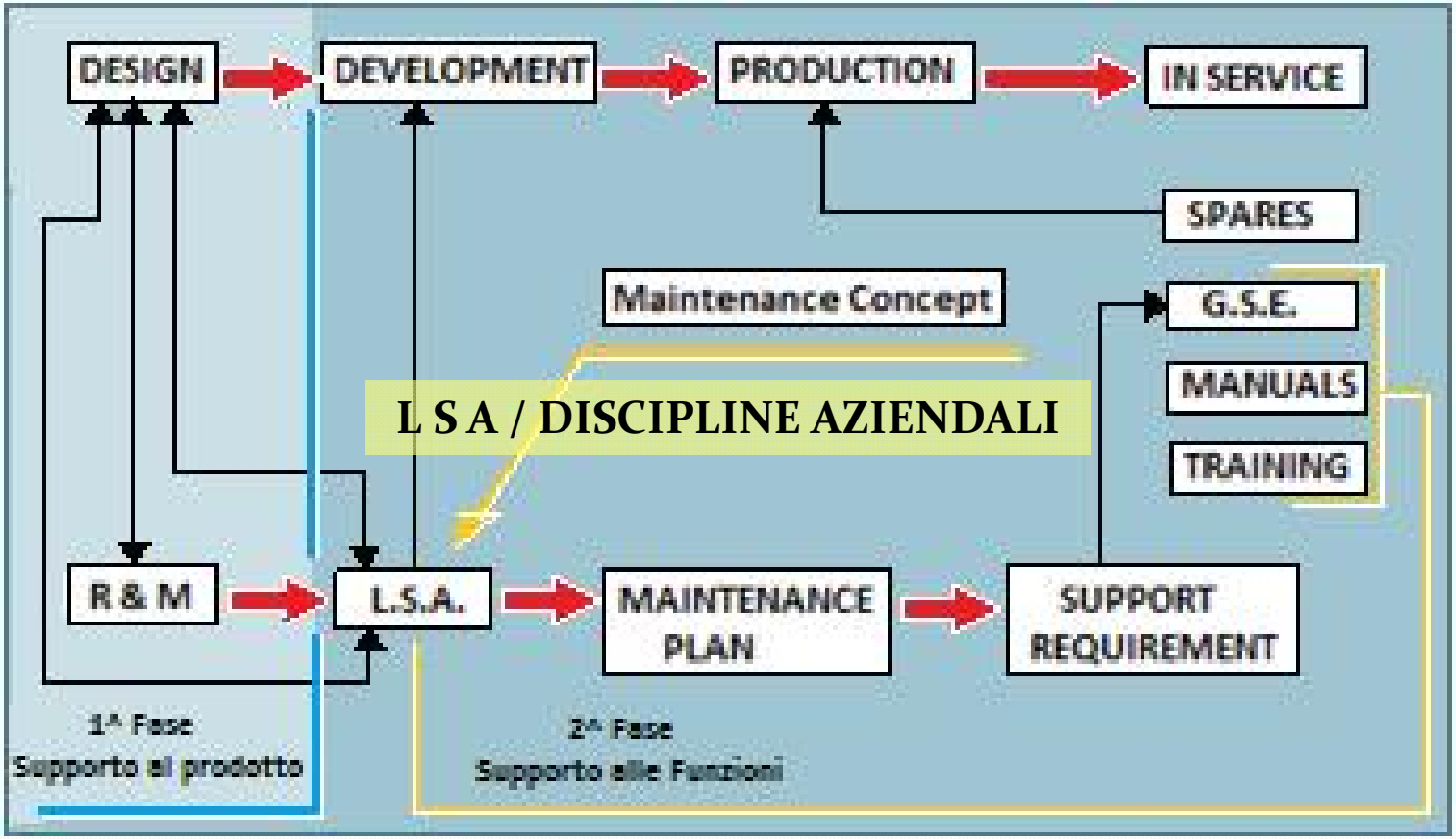
What is LSA

- The LSA provides a single, uniform approach for the A/c Logistic Services to conduct those activities necessary to:
  - ENSURE THAT SUPPORTABILITY REQUIREMENTS ARE AN INTEGRAL PART OF SYSTEM REQUIREMENTS AND SYSTEM DESIGN
  - DEFINE SUPPORT REQUIREMENTS THAT ARE OPTIMALLY RELATED TO THE DESIGN AND TO EACH OTHER
  - DEFINE THE REQUIRED SUPPORT DURING THE OPERATION PHASES
  - PREPARE PRODUCTION DATA

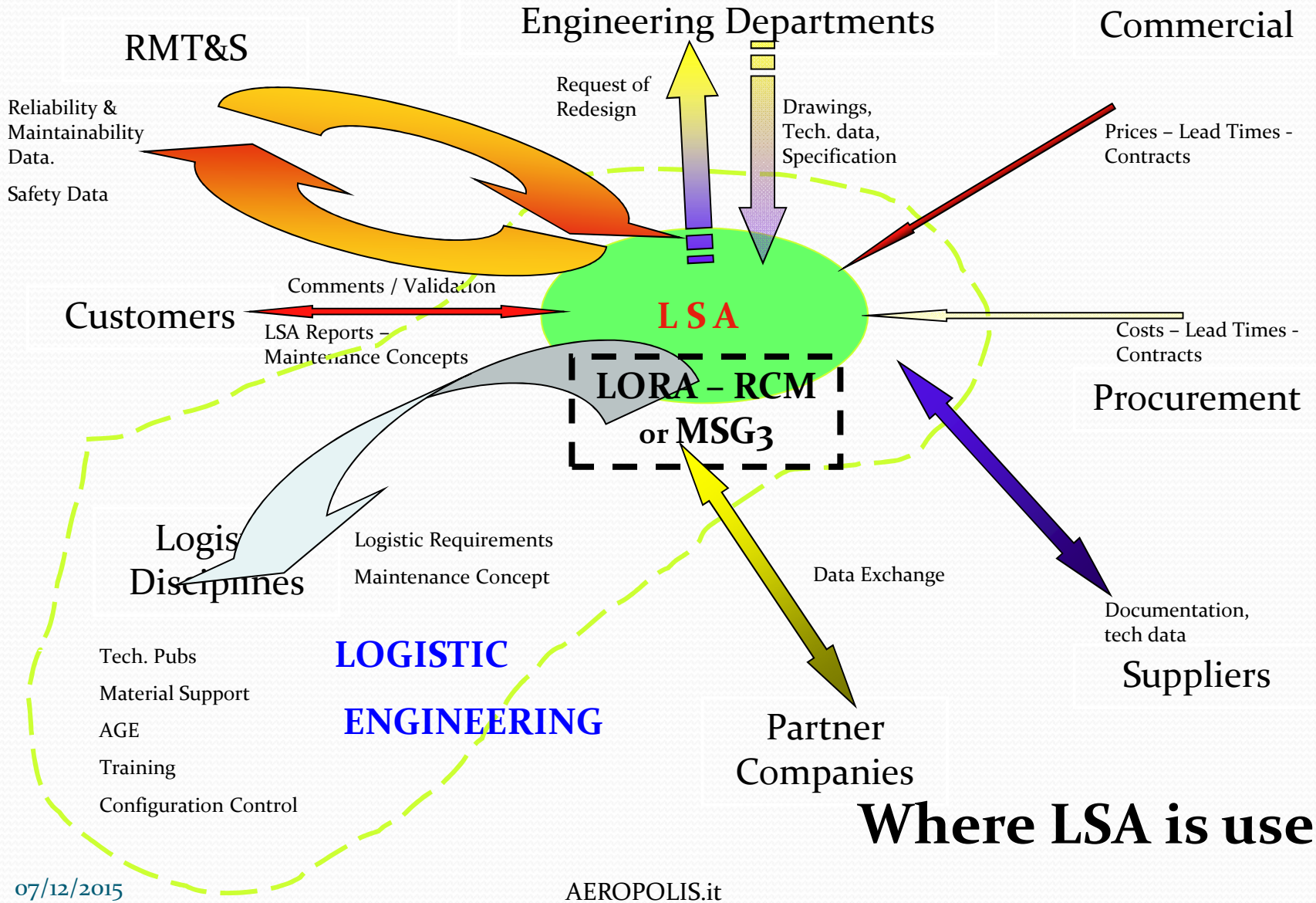
Why LSA is used

- The purposes of the LSA are:
  - DEFINE SUPPORT ELEMENTS THAT ARE OPTIMALLY RELATED TO THE DESIGN AND TO EACH OTHER:
    - the maintenance level
    - the corrective maintenance tasks (FMECA - Failure Mode Effects Criticality Analysis)
    - the scheduled maintenance tasks (MSG3)
    - identify the Support Elements (AGE- Aerospace Ground Equipment and Standard Tools) to perform the maintenance operations
    - the Training requirement
    - the Technical Data required for Tech Pubs

When LSA is used

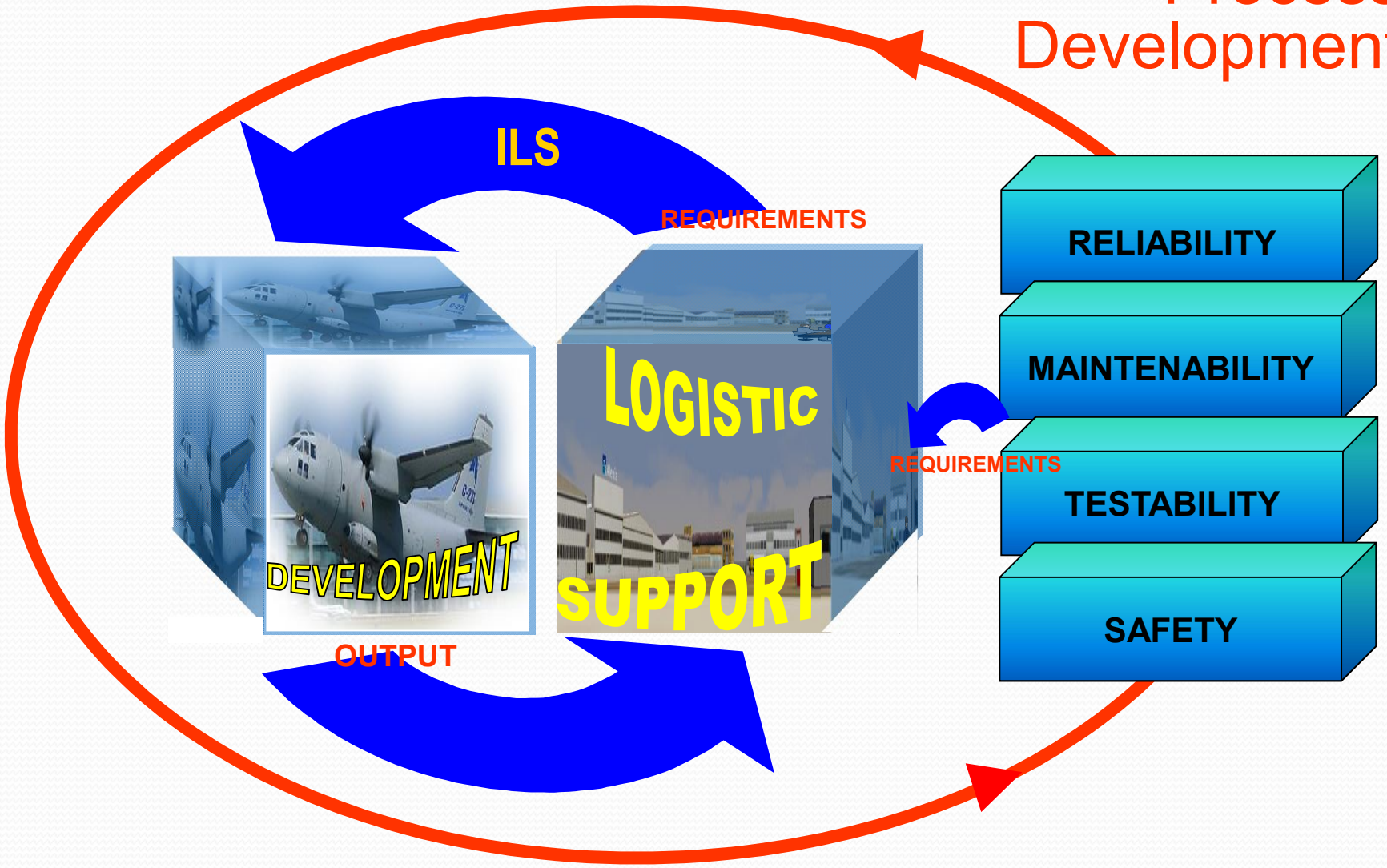


L S A / DISCIPLINE AZIENDALI



Where LSA is used

Process Development



Analysis

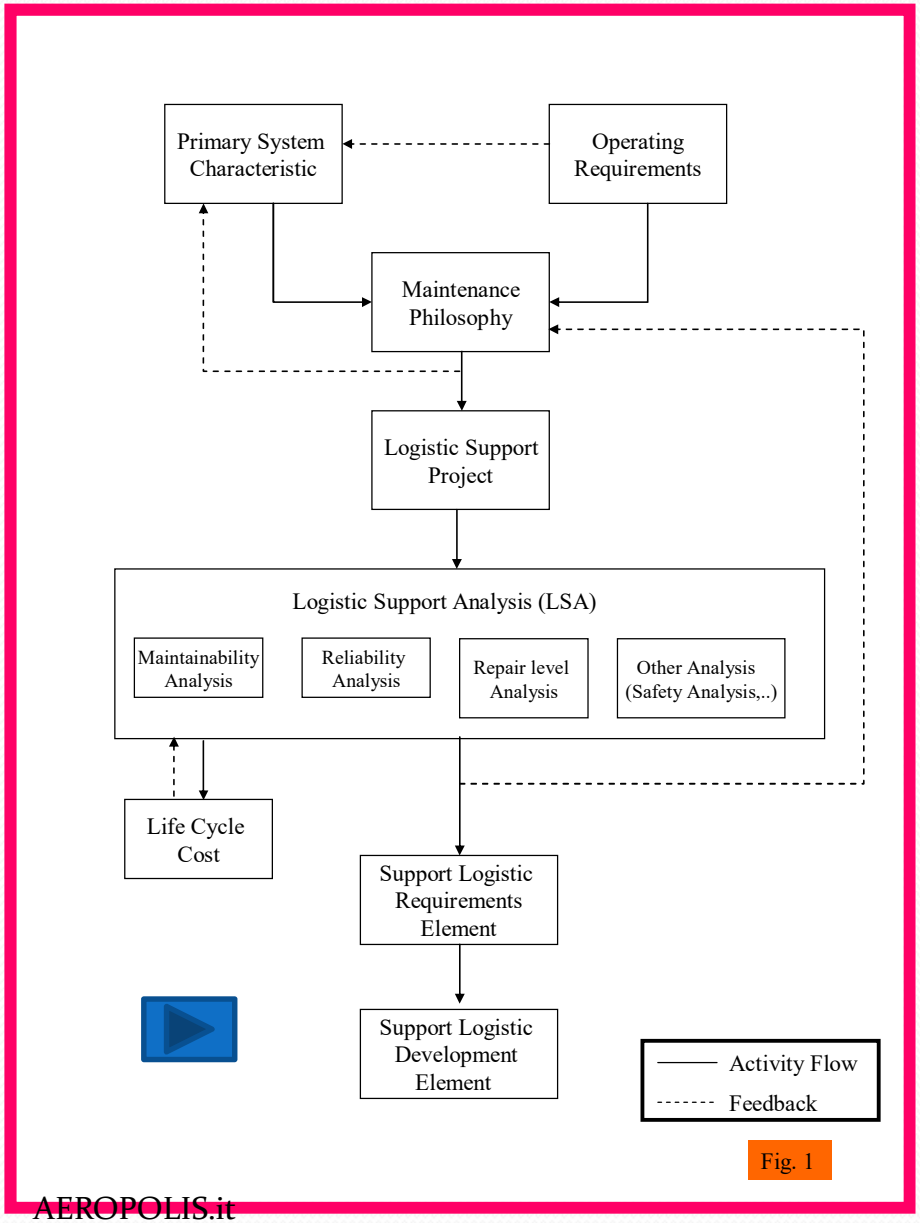
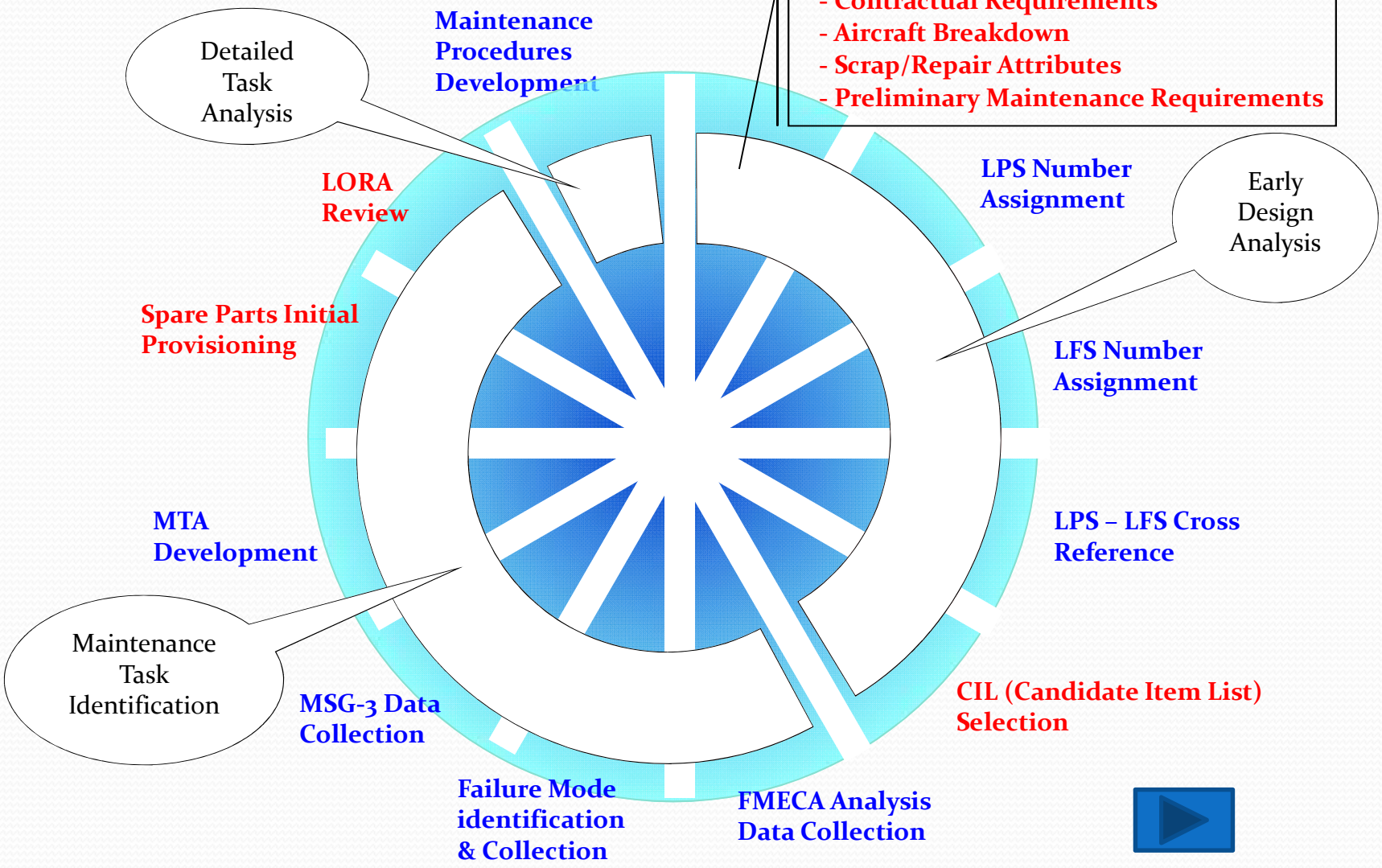


Fig. 1

LSA procedures order for an aircraft system



Analysis

- LSA starts from the Operating Requirements of primary System, defines and analyzes the general issues of logistic support
- The second step is to identify the maintenance concept

  For modern A/c the maintenance concept is level 1 & level 4

  - Remove and Replace 1st level on Aircraft,
  - Repair 4th level off Aircraft for item repairable (The item will be sent to supplier)
  - The item reparability is identified in the Functional LCN code (through the 9th bit)

Analysis

- Subsequent steps are the definition of:
  - Logistic Breakdown
  - Operational / field survey
  - Operations to identify the maintenance function requirements
    - FMECA - Failure Mode Effects Criticality Analysis
    - MSG3 (RCMA) - Reliability Centered Maintenance Analysis
- The results of this analysis are grouped and summarized in the Maintenance Task Analysis (MTA) activity

Analysis

- Identification of the logistic factors
  - Reliability
    - MTBF - Mean Time Between Failure,
    - Failure rate (λ) , it means failures number in the unit of time
      $\lambda = 1 / MTBF$
  - Maintainability
    - MTTR - Mean Time To Repair
    - MMET - Mean Minute Elapsed Time
    - MMH - Mean Man Hour

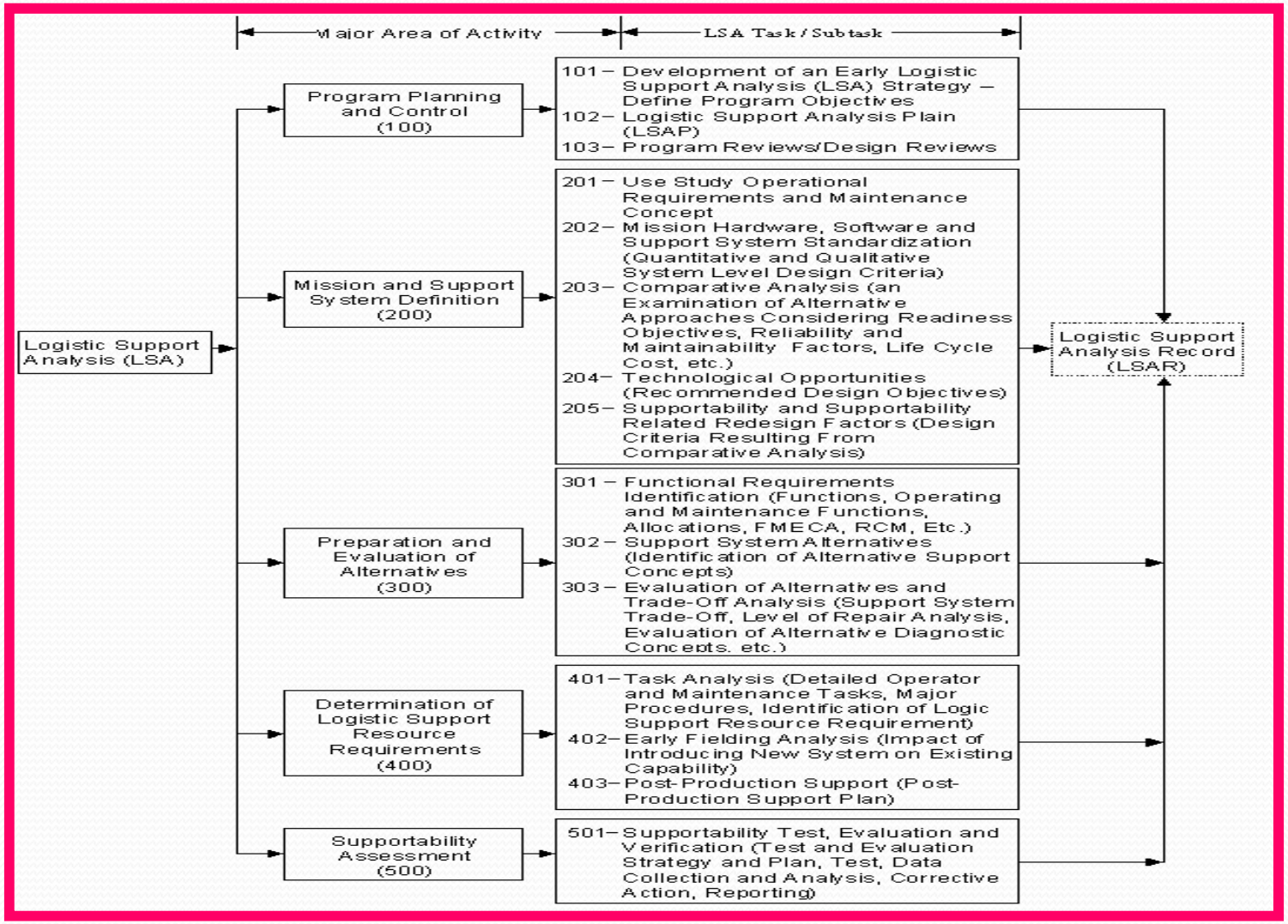
Analysis

- Identification of the logistic factors
  - Support
    - Tool and test equipments
    - Required personnel and associated skill
    - Spare parts
    - Facility
    - AGE - Aerospace Ground Equipment
    - Documents
  - Costs

Analysis

- LSA Output :
  - Maintenance Plan
  - Technical documentation
  - Spare Parts list
  - Technical report of Critical Design Review (CDR)
  - LSAR Output Reports
  - Project Review
  - Support System Review

Analysis


Major Area of Activity
LSA Task / Subtask
Logistic Support Analysis (LSA)
Program Planning and Control (100)
Mission and Support System Definition (200)
Preparation and Evaluation of Alternatives (300)
Determination of Logistic Support Resource Requirements (400)
Supportability Assessment (500)
101 – Development of an Early Logistic Support Analysis (LSA) Strategy – Define Program Objectives
102 – Logistic Support Analysis Plain (LSAP)
103 – Program Reviews/Design Reviews
201 – Use Study Operational Requirements and Maintenance Concept
202 – Mission Hardware, Software and Support System Standardization (Quantitative and Qualitative System Level Design Criteria)
203 – Comparative Analysis (an Examination of Alternative Approaches Considering Readiness Objectives, Reliability and Maintainability Factors, Life Cycle Cost, etc.)
204 – Technological Opportunities (Recommended Design Objectives)
205 – Supportability and Supportability Related Redesign Factors (Design Criteria Resulting From Comparative Analysis)
301 – Functional Requirements Identification (Functions, Operating and Maintenance Functions, Allocations, FMECA, RCM, Etc.)
302 – Support System Alternatives (Identification of Alternative Support Concepts)
303 – Evaluation of Alternatives and Trade-Off Analysis (Support System Trade-Off, Level of Repair Analysis, Evaluation of Alternative Diagnostic Concepts. etc.)
401 – Task Analysis (Detailed Operator and Maintenance Tasks, Major Procedures, Identification of Logic Support Resource Requirement)
402 – Early Fielding Analysis (Impact of Introducing New System on Existing Capability)
403 – Post-Production Support (Post-Production Support Plan)
501 – Supportability Test, Evaluation and Verification (Test and Evaluation Strategy and Plan, Test, Data Collection and Analysis, Corrective Action, Reporting)
Logistic Support Analysis Record (LSAR)

Analysis

- MIL-STD-1388-1A divides the LSA tasks into five general task sections:
  - Task Section 100 - Program Planning and Control
  - Task Section 200 - Mission and Support System Definition
  - Task Section 300 - Preparation and evaluation of alternatives
  - Task Section 400 - Determination of logistic support resource requirements
  - Task Section 500 - Supportability assessment
- The development of these five task sections identifies 15 different tasks described in MIL-STD-1388-1A and DEF STAN 00-60 (PART 2)

Analysis Results

LSAR - LOGISTIC SUPPORT ANALYSIS RECORD (MIL-STD-1388-2B, DEF STAN 00-60 (PART 2))

- The LSAR, as a subset of the LSA documentation, documents the detailed logistic support requirements data generated by the LSA process

- The LSAR data resulting from each iteration of the LSA task is used as input to follow on analyses and as an aid in developing logistic products

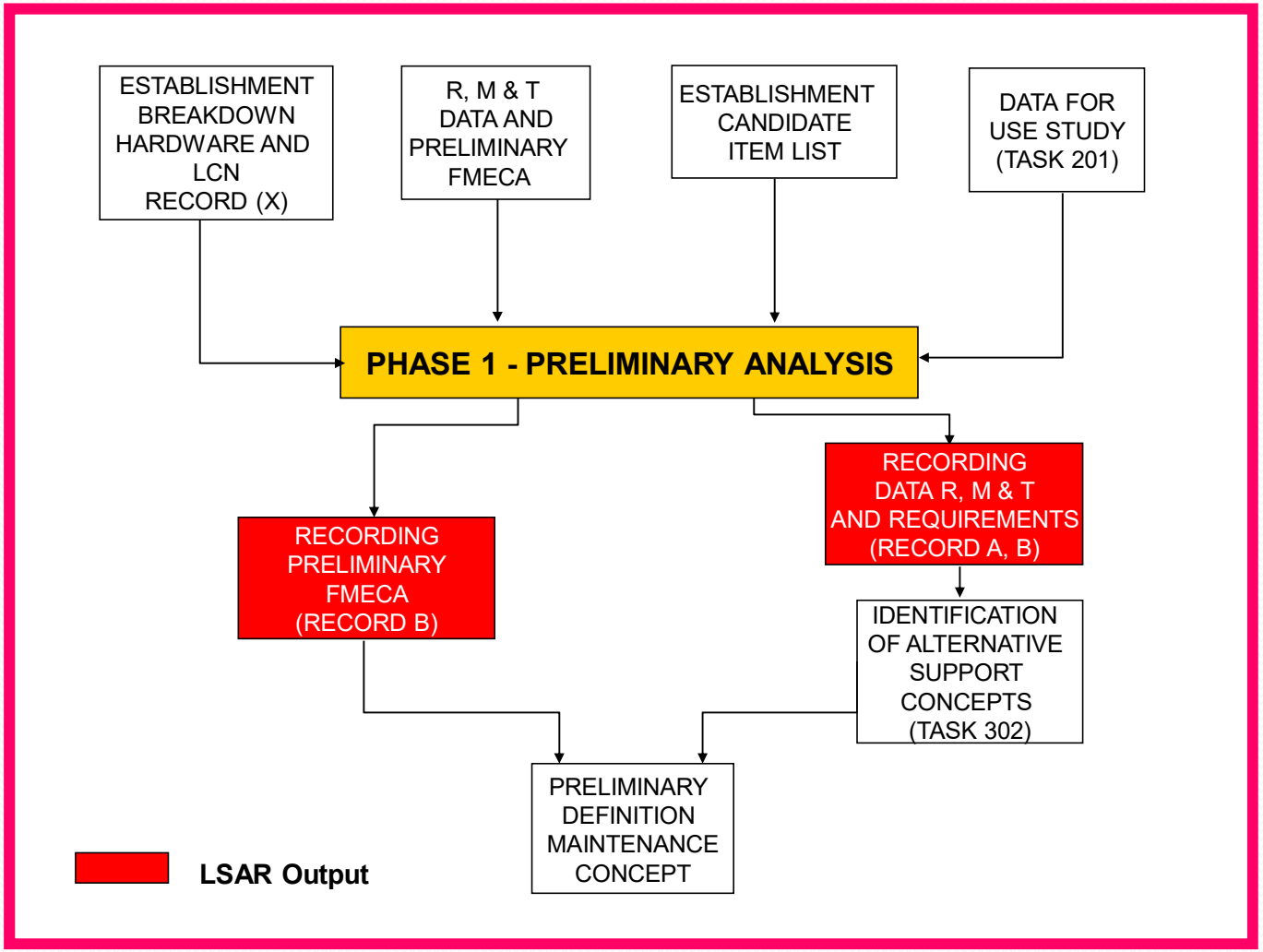
Analysis Results

- The LSAR data forms a database containing the information required to:
  - Determine the impact of design features on logistic support.
  - Determine the impact of the proposed logistics support system on the system/equipment availability and maintainability goals.
  - Provide data for tradeoff studies, life cycle costing, and logistic support modeling.
  - Exchange valid data among functional organizations.
  - Influence the system/equipment design.
  - Provide data for the preparation of logistics products specified by the Contract Data Item Descriptions (DID).
  - Provide the means to assess supportability of the fielded item.
  - Provide the means to evaluate the impact of engineering change, product improvement, major modification or alternative proposals.

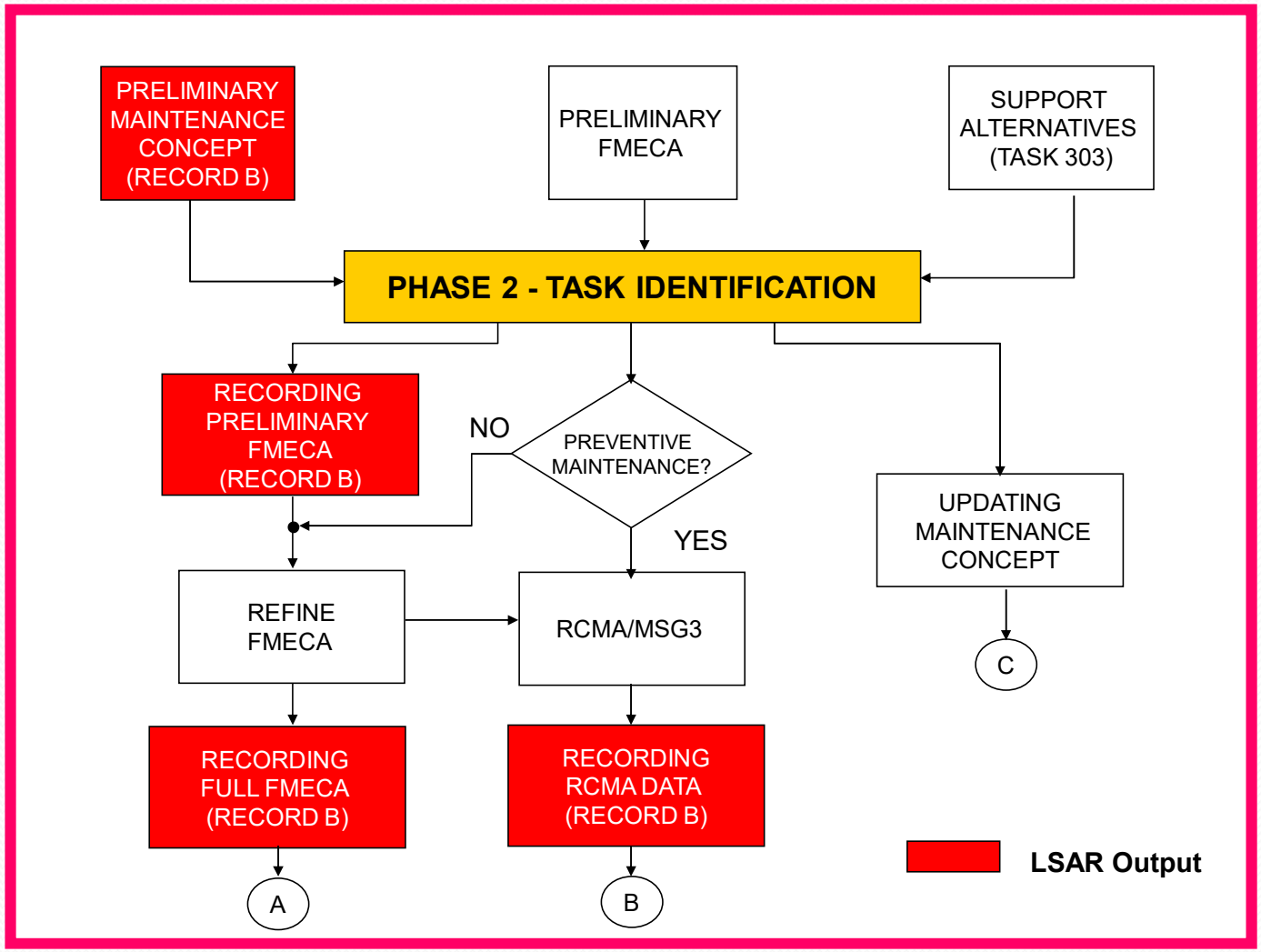
Analysis Results

- The LSAR is a compound of three basic activities
  - Preliminary Analysis
  - Task Identification
  - Task Analysis

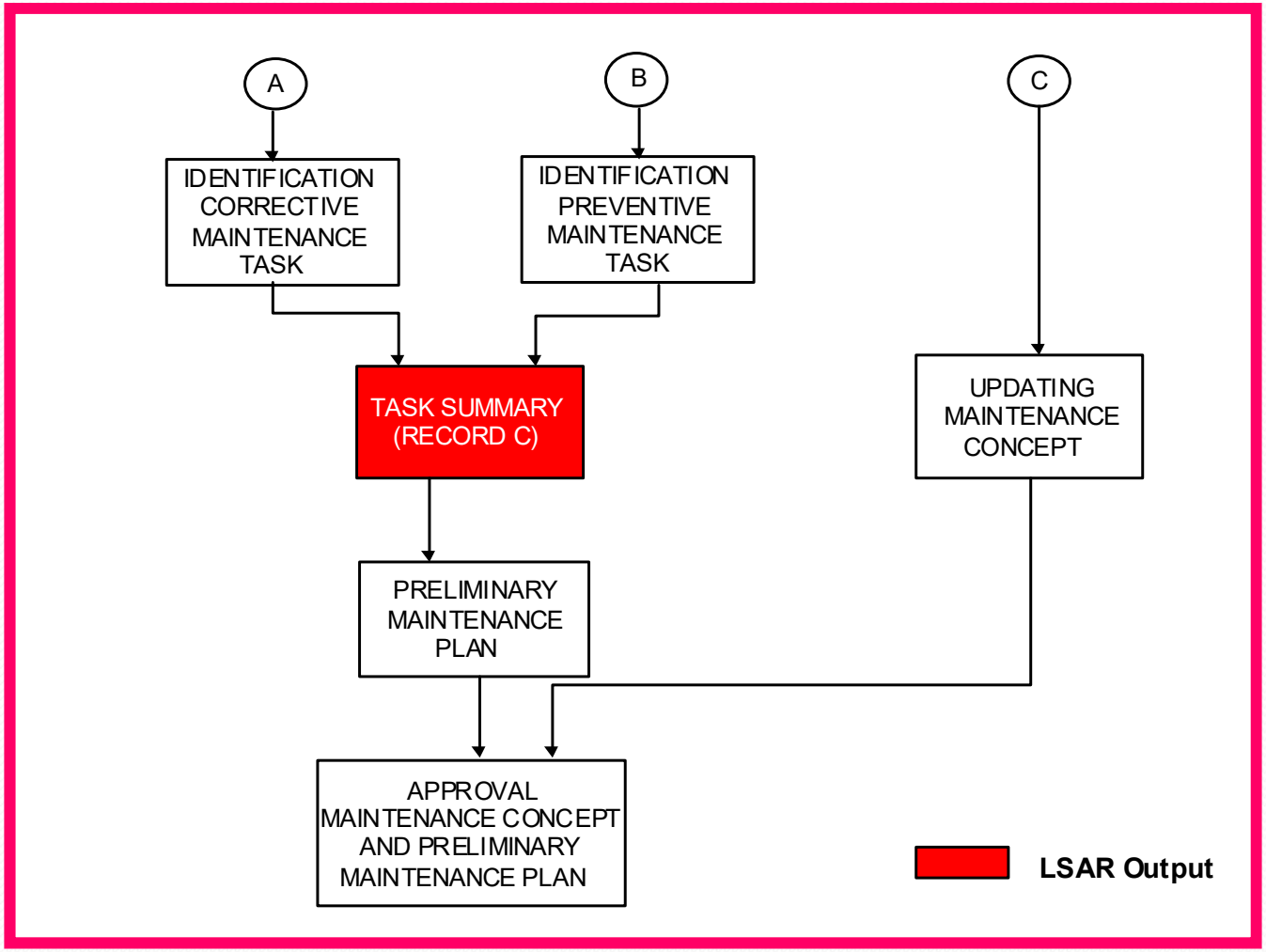
- Preliminary Analysis



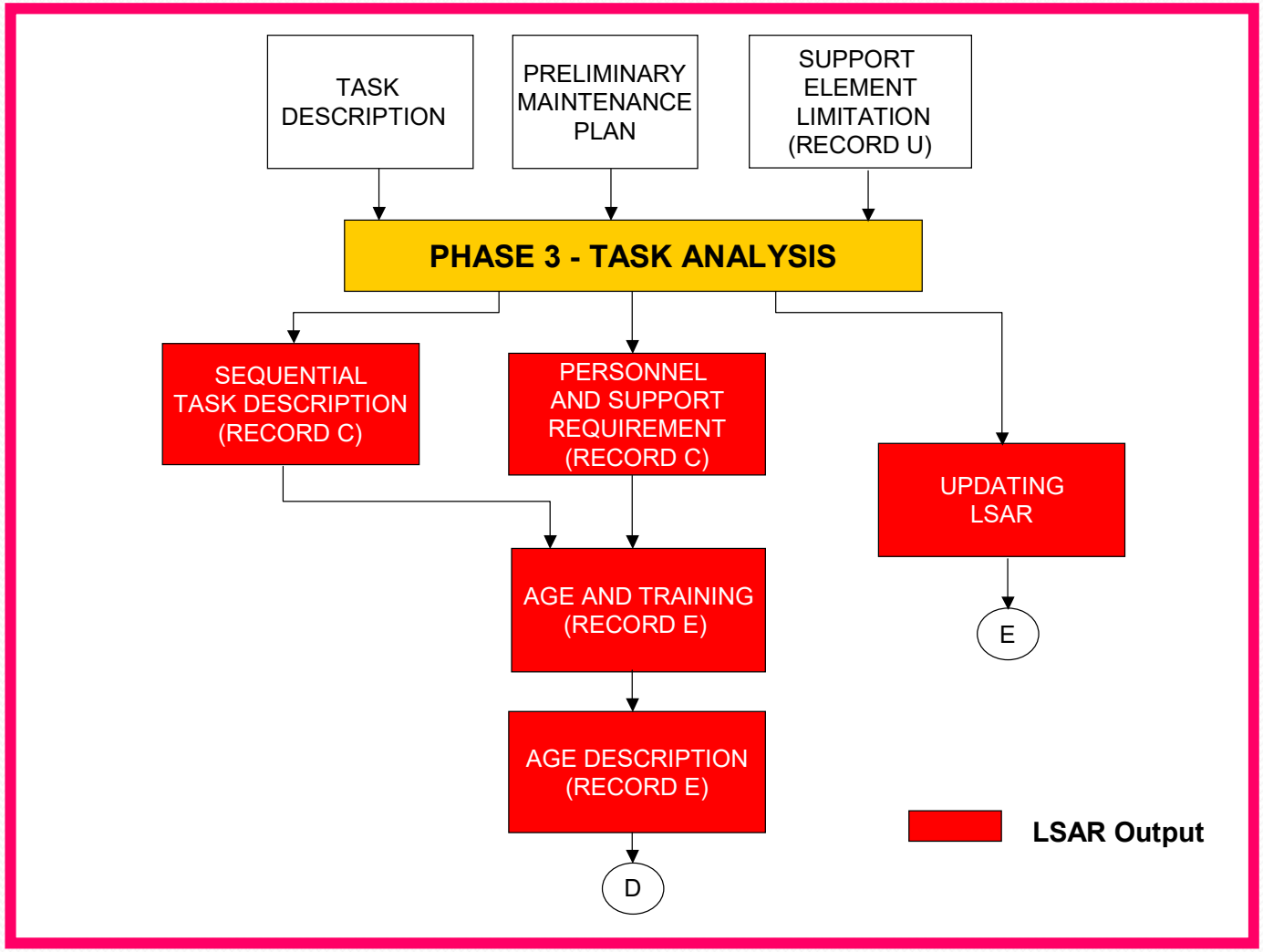
Task Identification - 1



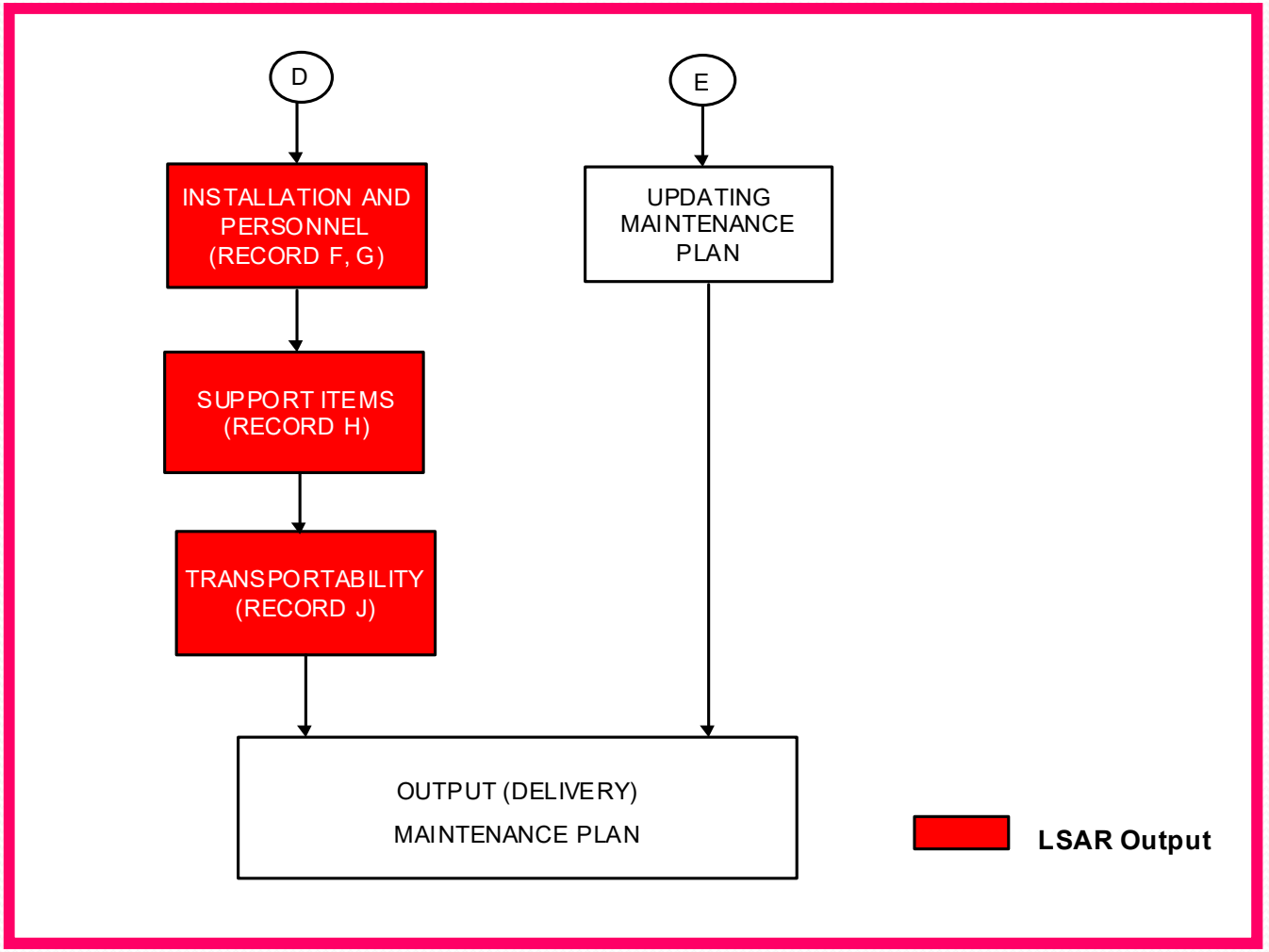
Task Identification - 2



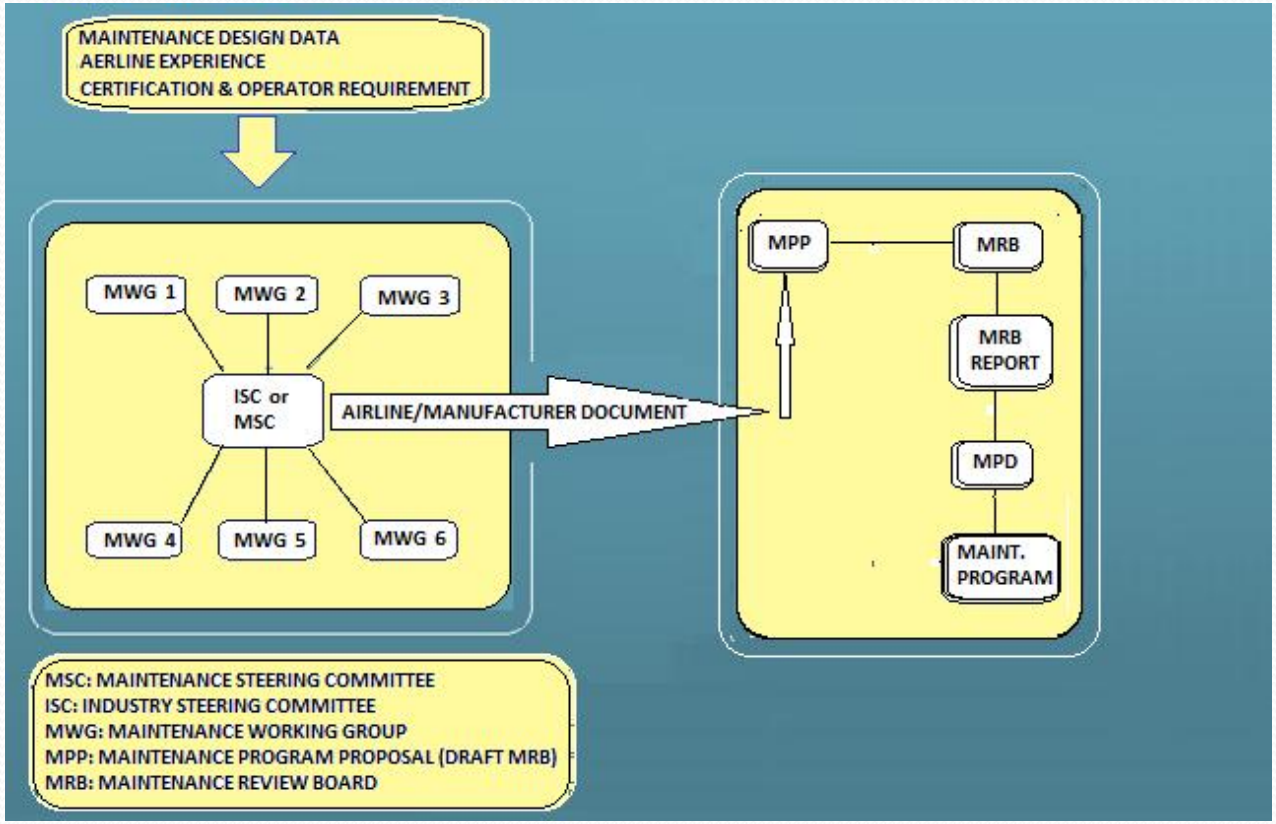
- Task Analysis – 1



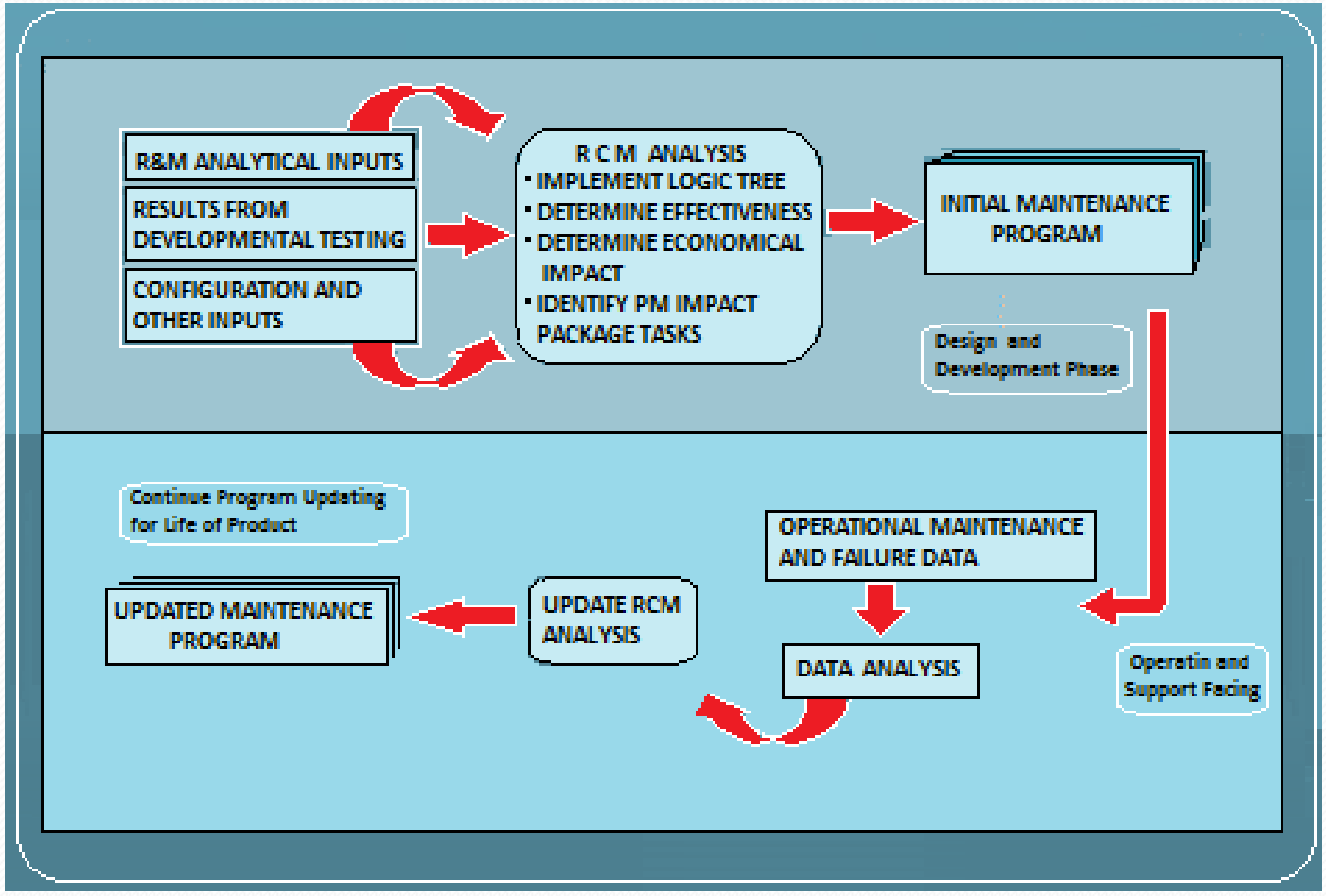
- Task Analysis – 2



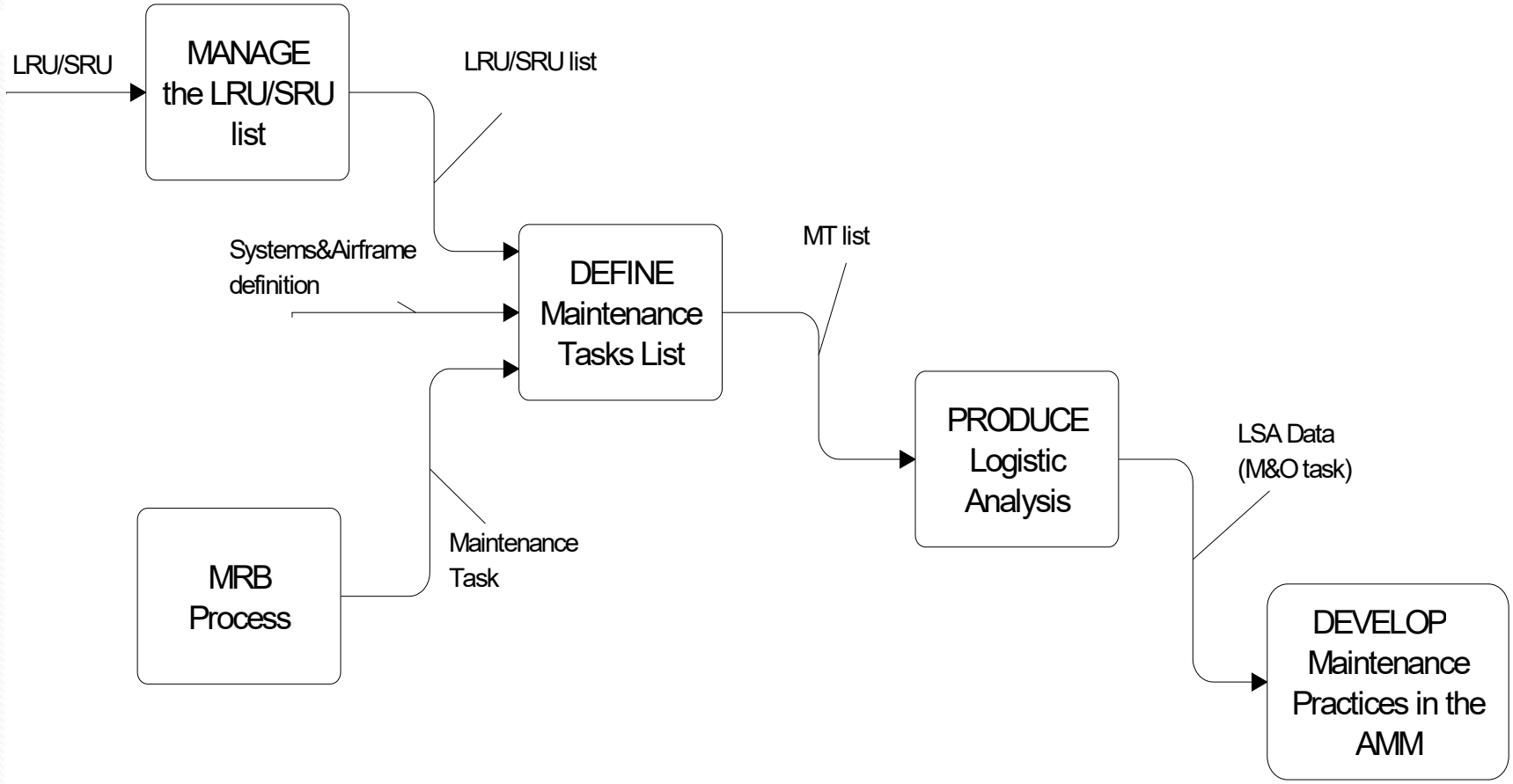
MAINTENANCE STEERING GROUPS
FASI DEL PROCESSO MSG3



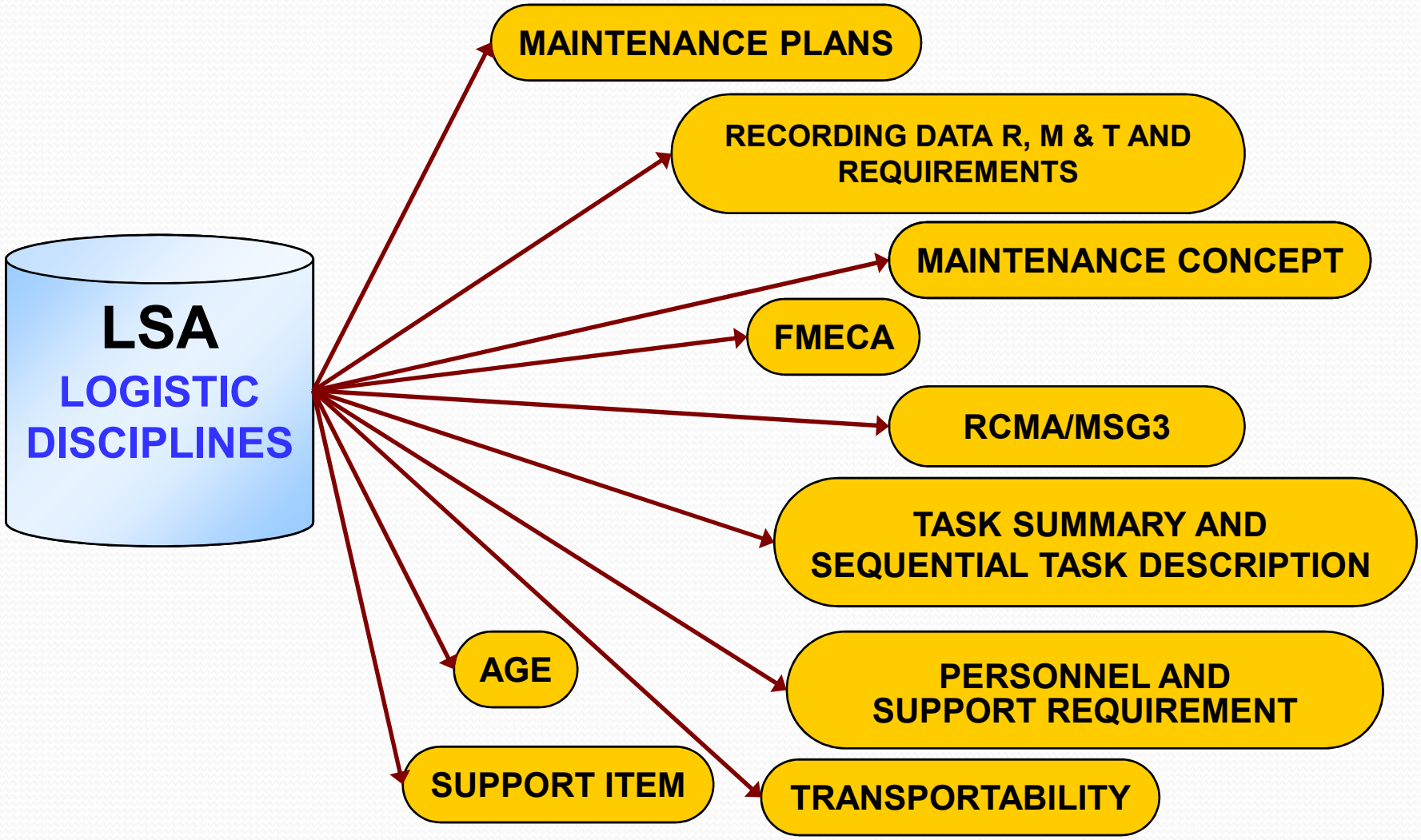
RELIABILITY CENTERED MAINTENANCE
FASI DEL PROCESSO RCM (MSG3)



A global approach from the MSG-3 and LSA activities for the Technical Publication development



- LSAR OUTPUT SUMMARY



LSA TAILORING PROCESS

Logistic Breakdown

- The first activity of LSA process is the identification of the elements of the A/C systems that are candidates for the analysis

- The list of candidates includes each part of the system that is considered significant for further LSA analysis

Logistic Breakdown

- For the current programs, the LSA Candidate List is made of the Line Replaceable Unit (LRU)
- A Line Replaceable Unit (LRU) is any aircraft functional unit which can be removed from the aircraft as part of a single maintenance action
- Conversely, a non-LRU is a part, component, or assembly which is used to repair an LRU (at the shop level of maintenance)

- The LSA process generates a huge amount of data, the method for controlling data records is the LSA Control Number (LSACN or LCN) which is a unique identifier assigned to each maintenance significant item (LRU) within each system

- Two different types of LCN are allowed:
  - Functional
  - Physical

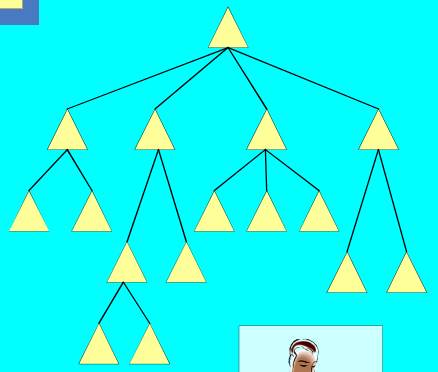
- This division allows to perform the functional analysis (e.g. FMECA, RCMA) before the physical breakdown is developed

LCN Structure

SDN, Schematics, etc..

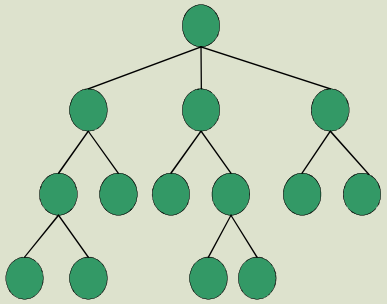
PDM*

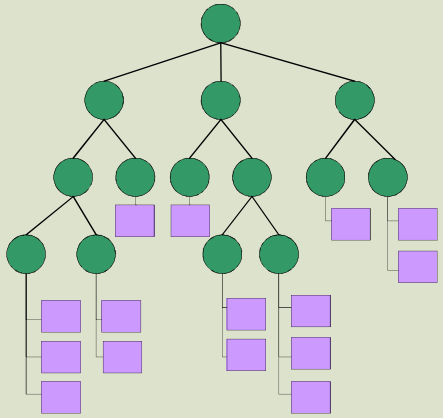
Engineering Breakdown



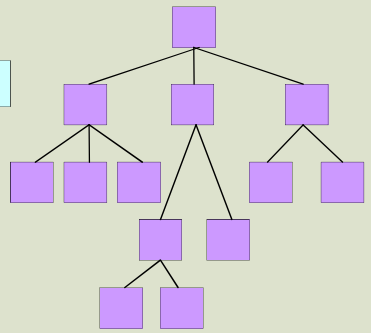
Functional/Physical Mapping

Functional Structure
Functional Logistic Control Number





Physical Structure
Phisical Logistic Control Number



FMECA/R&M

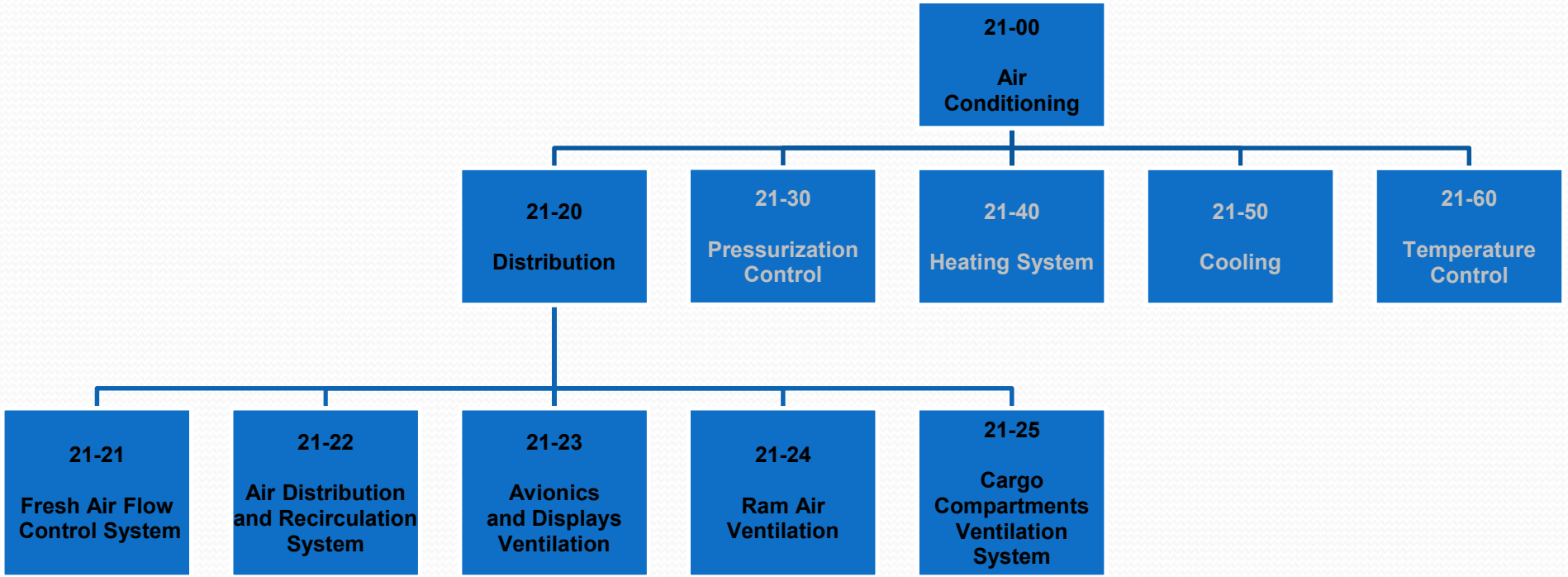
* PDM = Product Data Management System

Functional LCN (FLCN)

- Each LSA candidate, repairable and non-repairable Line Replaceable equipment/item, is identified with a Functional LCN (FLCN) (in accordance with MIL-STD 1808 and ATA2200 INDEX)

- The Functional LCNs (FLCN) are used to:
  - identify the operating system to which LCN applies
  - assign failure rates
  - assign maintainability frequencies
  - carry out reliability analysis

System Functional Breakdown



- The Functional LCN numbering system is a conventional number breakdown which provides a means for dividing into:
  - system
  - subsystem
  - subject number
  - subject item number
- The Functional LCN Structure is in the form 2,2,2,2,1,2 and the LCN character allocation is alternated between alphabetical and numerical characters

- Functional Logistic Control Number Structure

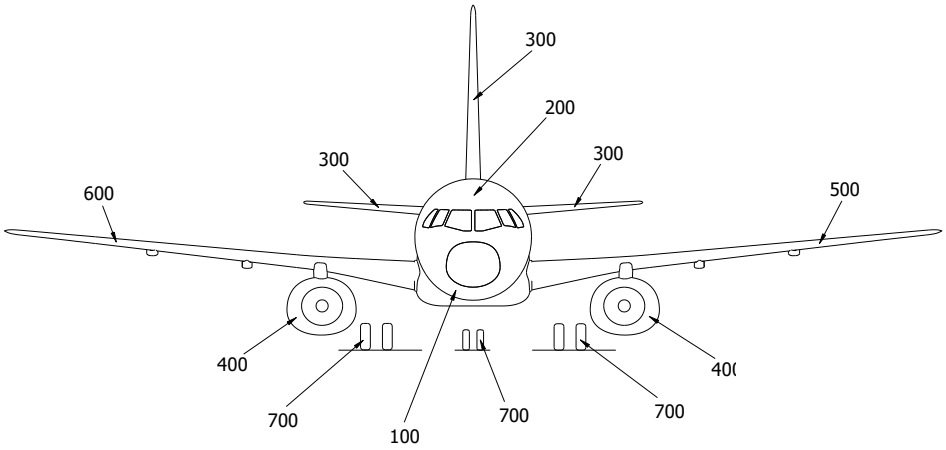
Character Positions	1	2	3	4	5	6	7	8	9	10	11
Type	A	A	N	N	N	N	N	N	A	N	N

  - The form is **AC 11 22 33 A(T) 44** where:
    - the first two characters "AC" are fixed and identify the end item, that is the A/C
    - 11 (Numerical) specifies the System of the aircraft
    - 22 (Numerical) specifies the Subsystem of the aircraft
    - 33 (Numerical) specifies the Subject Number
    - A (Alphabetical) for those items that are deemed repairable
    - T (Alphabetical) for those items that are deemed non-repairable
    - 44 (Numerical) is assigned sequentially and identifies the subject item

Physical LCN (PLCN)

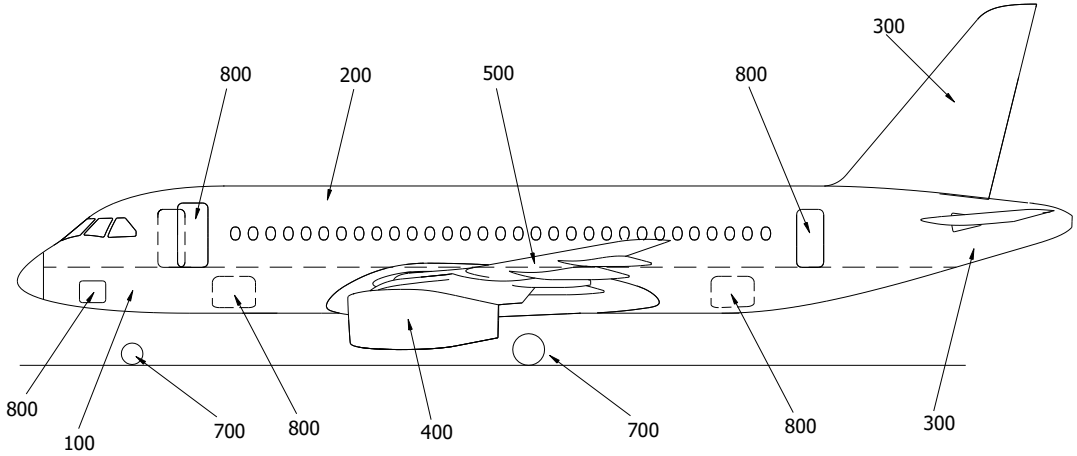
- The Physical LCNs are used to show the hardware breakdown and location of the item within the aircraft
- Each LSA candidates will be identified with a Physical LCN (PLCN) (in accordance with MIL-STD-1388-2B Appendix C)
- The Physical LCN structure is in the form 1,2,2,2,2 and the LCN character allocation is alternated between alphabetical and numerical characters

Aircraft Zoning – Major Zones

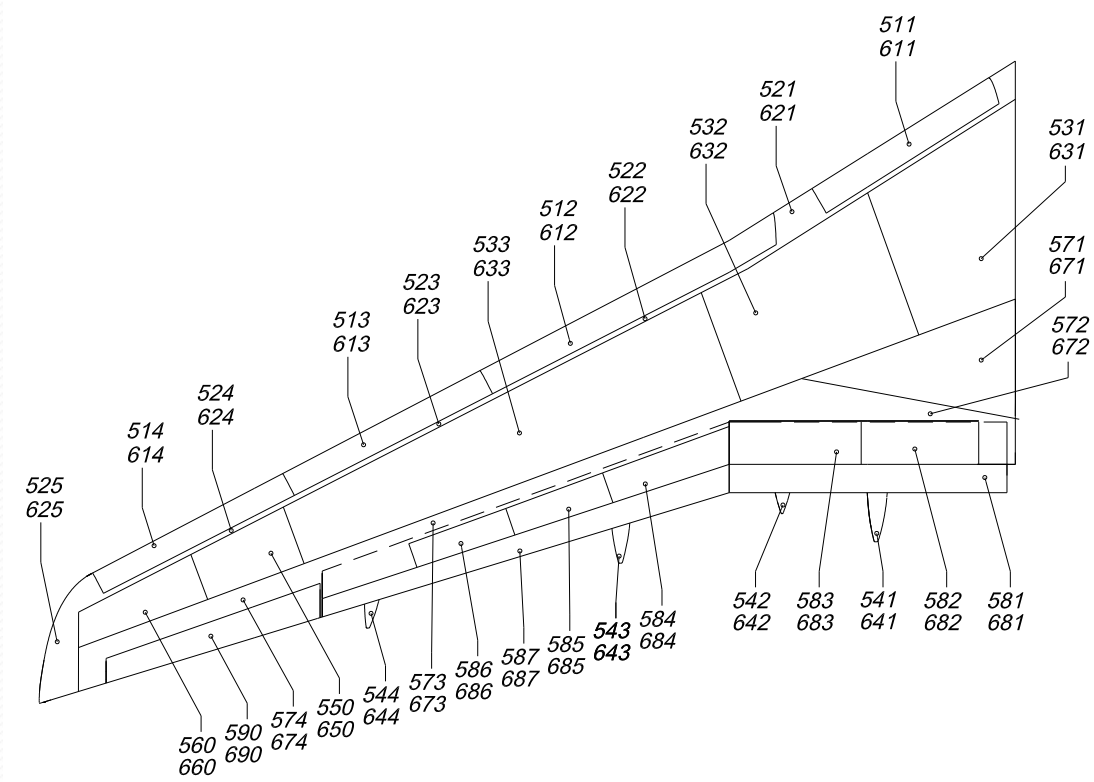


MAJOR ZONE 100 – LOWER HALF OF FUSELAGE (UP TO BACK PRESSURE BULKHEAD)
MAJOR ZONE 200 – UPPER HALF OF FUSELAGE (UP TO BACK PRESSURE BULKHEAD)
MAJOR ZONE 300 – EMPENNAGE
MAJOR ZONE 400 – POWER PLANTS AND NACELLE STRUTS

MAJOR ZONE 500 – LEFT WING
MAJOR ZONE 600 – RIGHT WING
MAJOR ZONE 700 – LANDING GEAR AND LANDING GEAR DOORS
MAJOR ZONE 800 – PASSENGER AND CARGO COMPARTMENT DOORS



Aircraft Zoning – Minor Zones



Zone	Sub zone	Sub-zone, Zone Name
510		Slats
	511	Slats 1st Section
	512	Slats 2nd Section
	513	Slats 3rd Section
	514	Slats 4th Section
520		Wing Leading Edge Up To First Spar From Inboard Rib To Wing Tip Part
	521	Wing Leading Edge Up To First Spar From Inboard Rib To Slats 1st Section
	522	Wing Leading Edge Up To First Spar In Slats 2nd Section Area
	523	Wing Leading Edge Up To First Spar In Slats 3rd Section Area
	524	Wing Leading Edge Up To First Spar In Slats 4th Section Area
	525	Wing Tip
530		Spar Box Part (Between First And Second Spars), Between The Inboard And 16th Ribs
	531	Fuel Tank, Section 1
	532	Fuel Tank, Section 3
	533	Fuel Tank, Section 2
540		Flap track fairings
	541	Fairing № 1
	542	Fairing № 2
	543	Fairing № 3
	544	Fairing № 4
550		Drain tank (Torsion box part between ribs 16 – 18)
560		Dry section (Torsion box part between ribs 18 – 21)
570		Wing tail part from 2nd spar to the wing trailing edge
	571	LG compartment panel
	572	Wing tail part in flaps inboard section area
	573	Wing tail part in flaps outboard section area
	574	Wing tail part in ailerons area

- Phisical Logistic Control Number Structure

Character Positions	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type	A	A	N	N	N	N	N	N	N	N	N	-	N	N

  - The type is **AA 111 22 33 44 – 55** where:
    - the first 2 characters "AA" are fixed (assigned like in the Functional Numbering System) and identifies the end item, that is the A/C;
    - 111 (Numerical) specify the Zone of the aircraft;
    - 22 (Numerical) specify the System of the aircraft, according to A/C SNS;
    - 33 (Numerical) specify the Sub-System according to A/C SNS;
    - 44 (Numberical) specifies the Subject Number
    - 55 (Numerical) is assigned sequentially and identifies the item.

- The main fields included in the Breakdown are:

F LCN:	Functional Logistic Code Number. This field, used to depict the operating system to which the LCN applies, is in agreement with the Functional Breakdown of Configuration Management.
P LCN:	Physical Logistic Code Number. This field reports the hardware and location of the item within the aircraft. It is based on A/c Physical Breakdown zonal map.
Description:	Supplier name of Line Replaceable Unit (LRU).
P/N:	Part Number of Line Replaceable Unit (LRU).
Zone:	Installation Zone of Line Replaceable Unit (LRU).as defined on A/c Physical Breakdown zonal map.
Supplier:	Name of Supplier.
Drawing no:	Number of drawing of assembly where the LRU is identified.
ITEM no:	Identification number of LRU in the drawing sheet.
Note:	Other information about LRU.
DR:	Design Responsability.
SDN:	Identification number of System Description Note document.

- Example

FLCN	PLCN	Description	Part Number	Drawing no	Note	DR	SDN		
							Number	Date	Issue
JA21		ENVIR CONTROL				ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA2110		COMPRESSION				ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211094T01	G00AA21CY	ENG CPRSN DUCT				ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211094T02	G00AA21CZ	EXT CPRSN DUCT				ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211095T01	G00AA21DA	COMPRESSION WRG				ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211096T01	G31AA21AD	ECS PACK CONTR PWR	MS3320-3	T.B.D.	bel: ECS PACK BUS PP2A	ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211096T02	G31AA21AE	ECS PACK IND	MS3320-3		V-HD - Label: ECS PACK IND - BUS PP4A	ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211097T01	G31AA21AG	PACK OV/TEMP LATCH	M83536/2-024M		Shelf 405VE - 8HA	ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211097T02	G31AA21AH	FCV CTRL RLY	M83536	13929211	Shelf 405VE - 9HA	ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211111A01	G32BA21AA	ECS FL RGLTR & SOV	4227B000	G2233610001	Fr 16-17 underfloor sx	ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211112A01	G32BA21AB	ECS MODE SEL VLV	4229B000-001	G2233611001	Fr 15-16 underfloor sx	ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA211121A01	G32BA21AC	ECS SVO PRESS RGLTR	3215754-1	G2233611001	Fr 14-15 underfloor sx	ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA2120		DISTRIBUTION				ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1
JA212094T01	G00AA21DB	DISTR DUCT LH				ALN	G-SDNO-130/070-2100-0001-AL	09/30/99	1

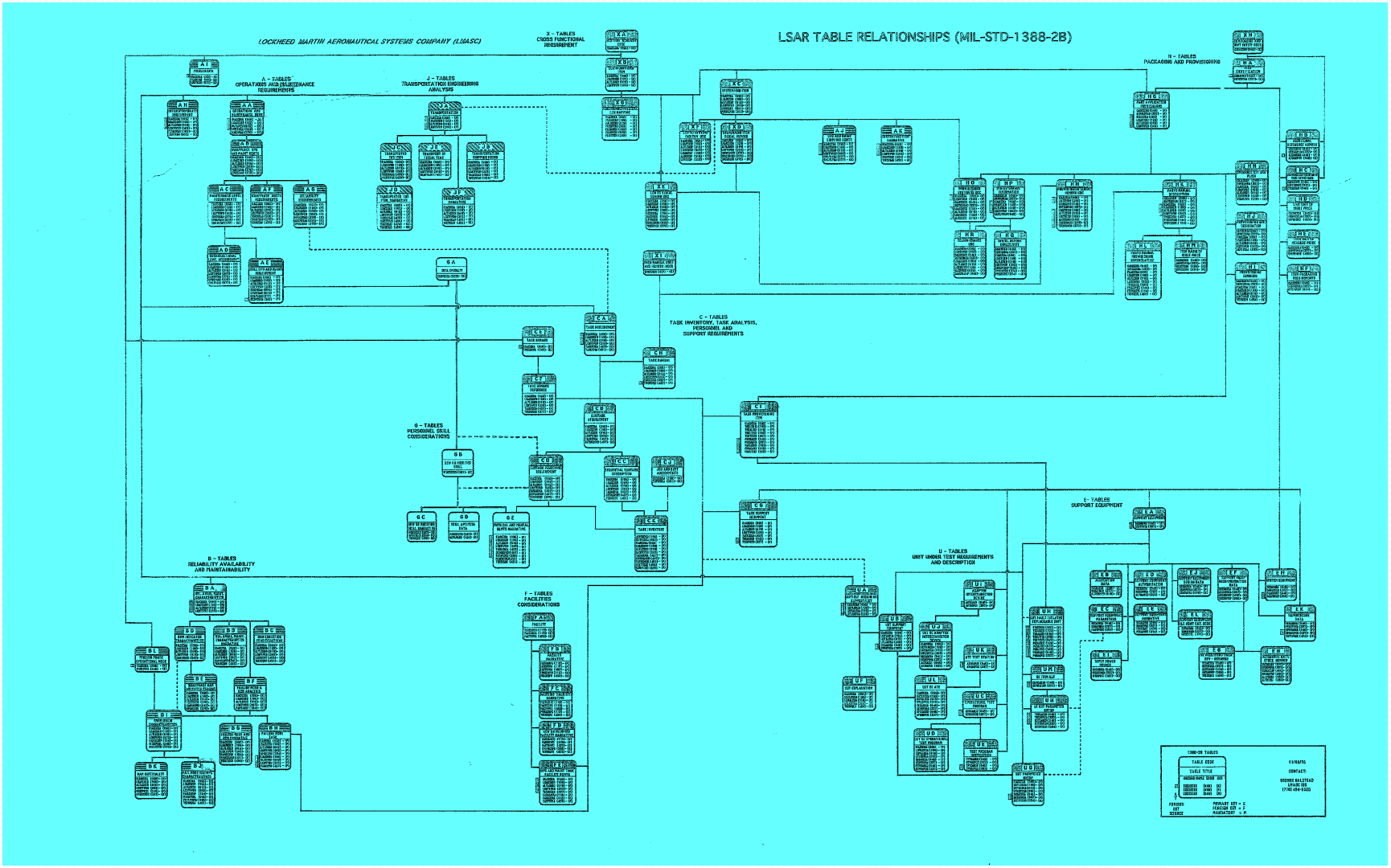
LCN Cross-Mapping (ref. XG table)

- LSAR contains a cross-reference table (named XG), specifically designed to show the relationship of a given Functional LCN to its Physical counterpart
- The purpose of cross-mapping is to link the physical items to their related functions. This process establishes the relationship between the functional breakdown and how the equipment will exist physically.
- The cross-mapping of the physical LCN to the functional LCN should, therefore, be carried out as late as is practicably possible whilst still meeting the needs of the Customers/Operators in terms of data manipulation.

LCN Cross-Mapping (ref. XG table) (cont.)

- When both a physical and functional LCN exist for the same item, the physical LCN structure takes precedence for data storage.
- By creating the physical to functional cross-mapping, any data documented under a functional LCN will be linked to a physical key.
- The two structures are completely independent, and that a 'mixing' of structures (part physical/part functional) for an equipment is **not** permitted within the physical structure.

LSA TAILORING PROCESS - Tables Relationship



Thanks for Your attention

Ulteriori riferimenti per l'approfondimento:
A_BIANCO - GT velivoli 25_11_14 Definitiva.pdf (IV Seminario 2014)

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ATA iSpec 2200 – System breakdown

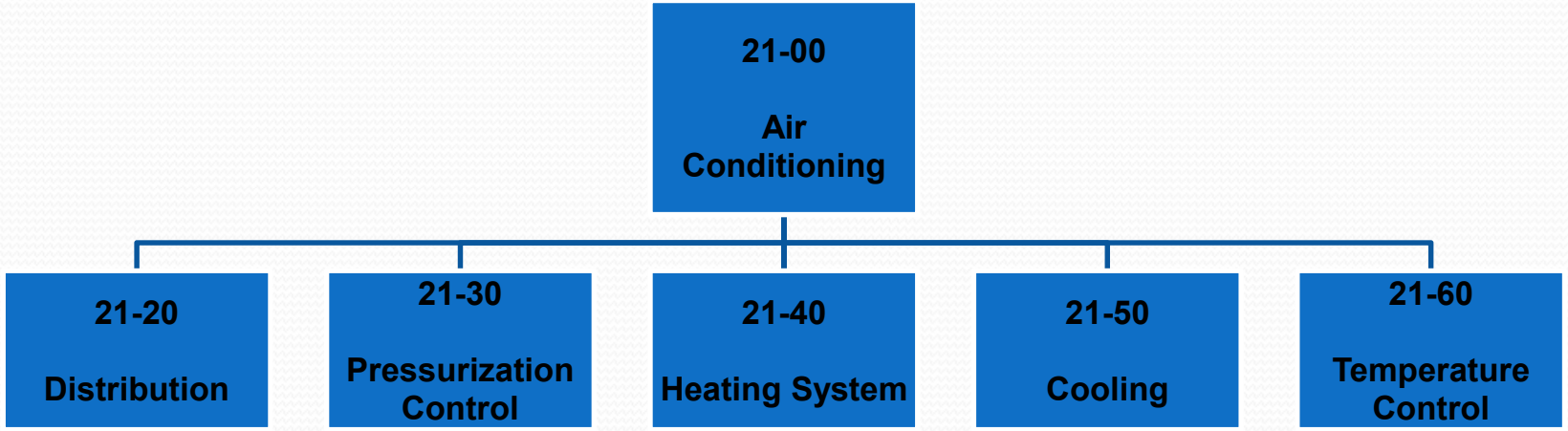
1.8. ATA Standard Number Breakdown

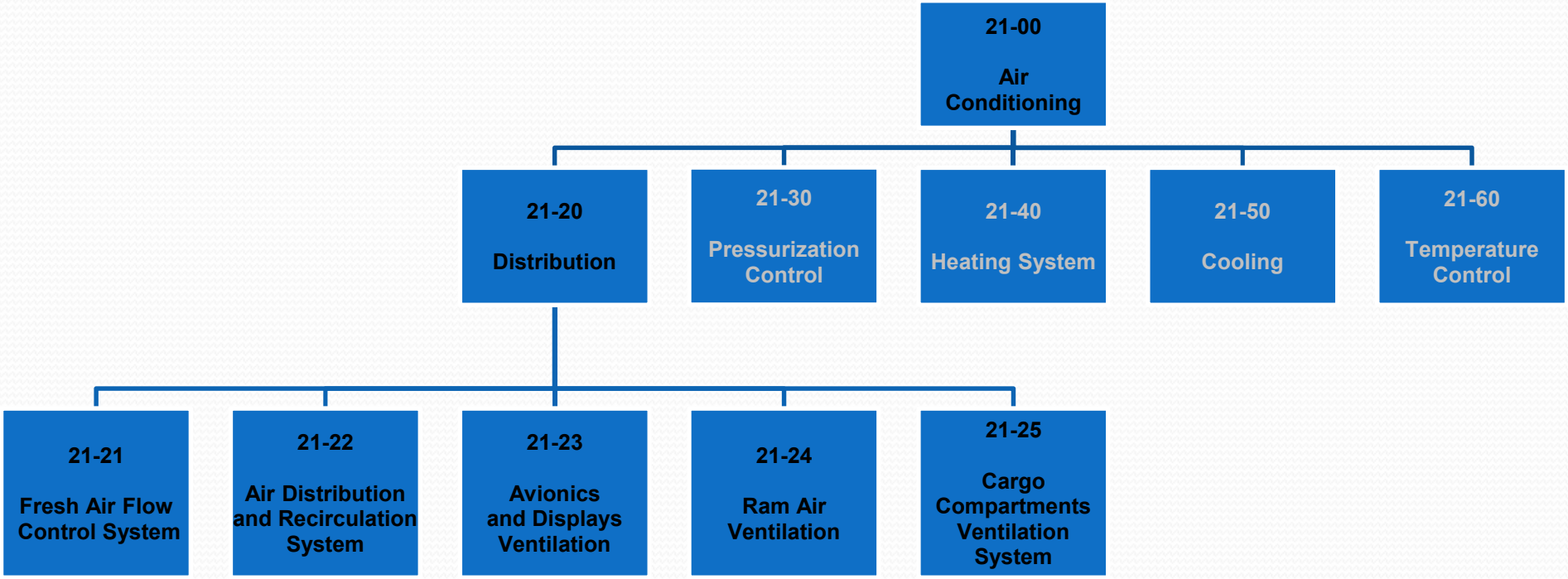
The Listing that follows identifies and defines the system / chapter and subsystem / section breakdown which mus followed in the presentation of technical data:

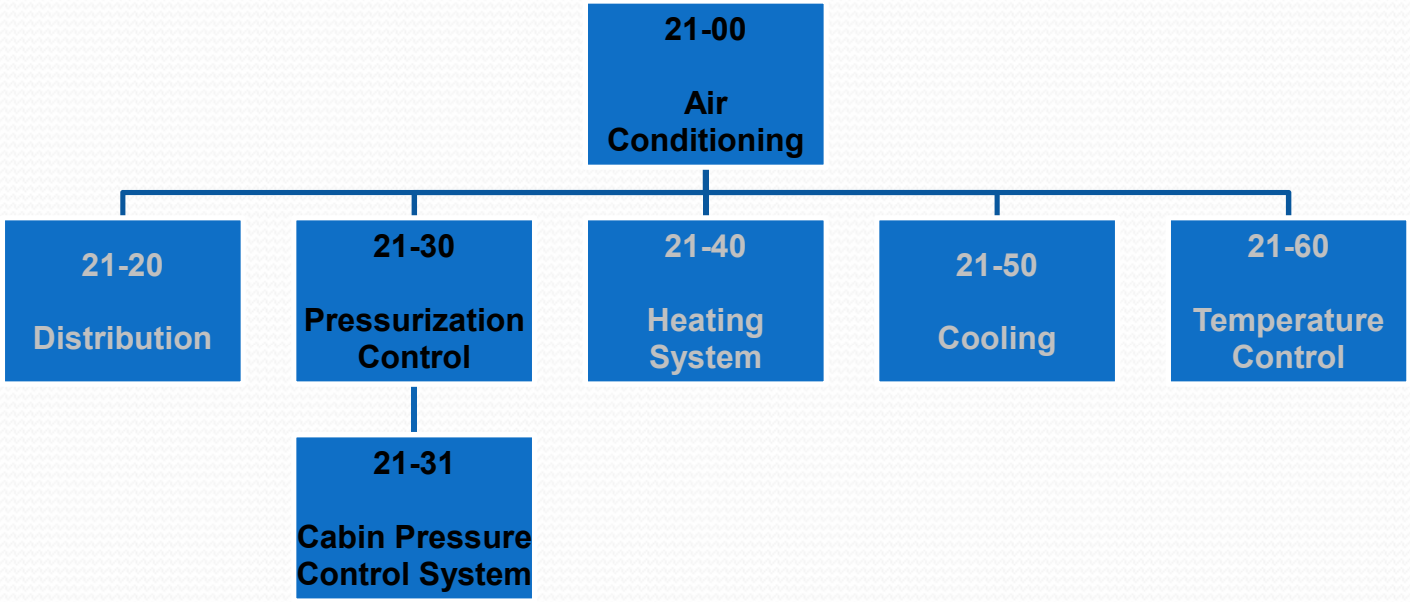
Table 3-1-3.4. Definitions of Aircraft Groups

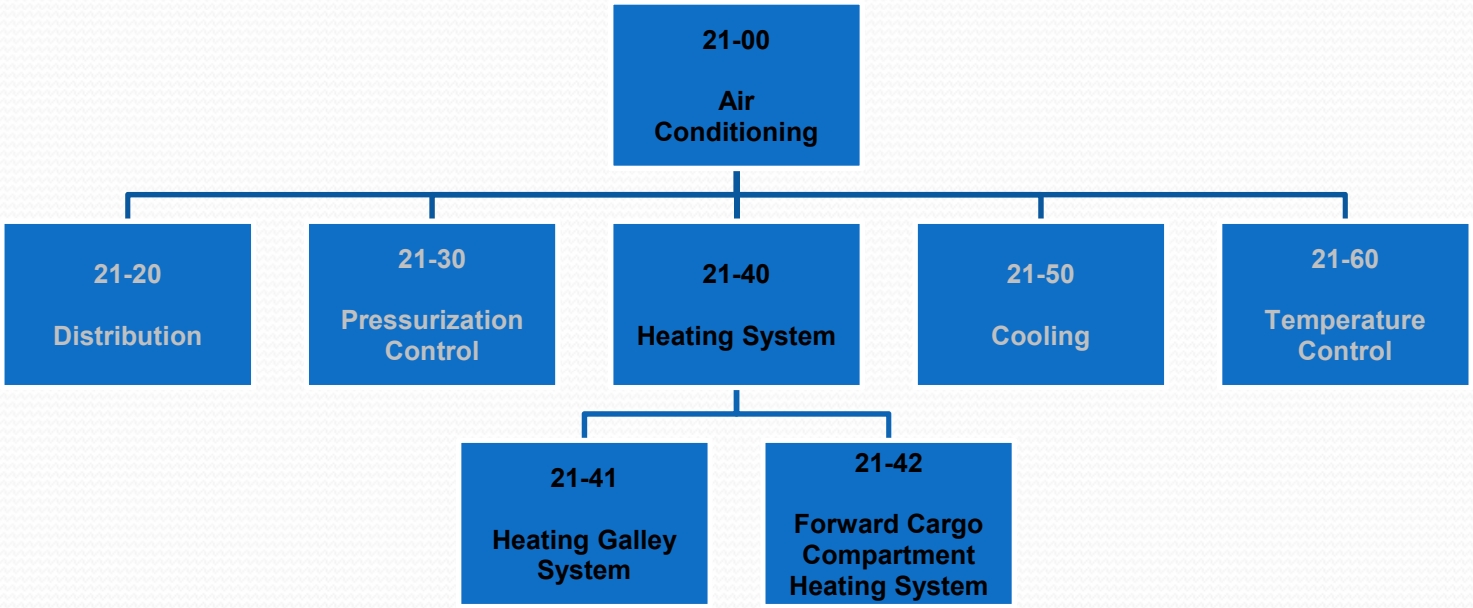
GROUP	SYS/ CHAP RANGE	DEFINITION
AIRCRAFT GENERAL	5 - 12	The complete operational unit. Includes dimensions and areas, lifting and shoring, leveling and weighing, towing and taxiing, parking and mooring, required placards, servicing.
AIRFRAME SYSTEMS	20 - 49	All airframe systems except the Power Plant package.
PROPELLER/ROTOR	60 - 67	Complete propeller/rotor system excluding propeller/rotor anti-icing system.
STANDARD PRACTICES - ENGINES	70	
POWER PLANT	71 - 84	The complete power unit which develops thrust either through the exhaust or through a propeller. Excludes items such as generators, cabin superchargers, etc., which are covered under their respective systems.
OTHER	91	Charts
	115	Flight Simulator Systems
	116	Flight Simulator Cuing Systems

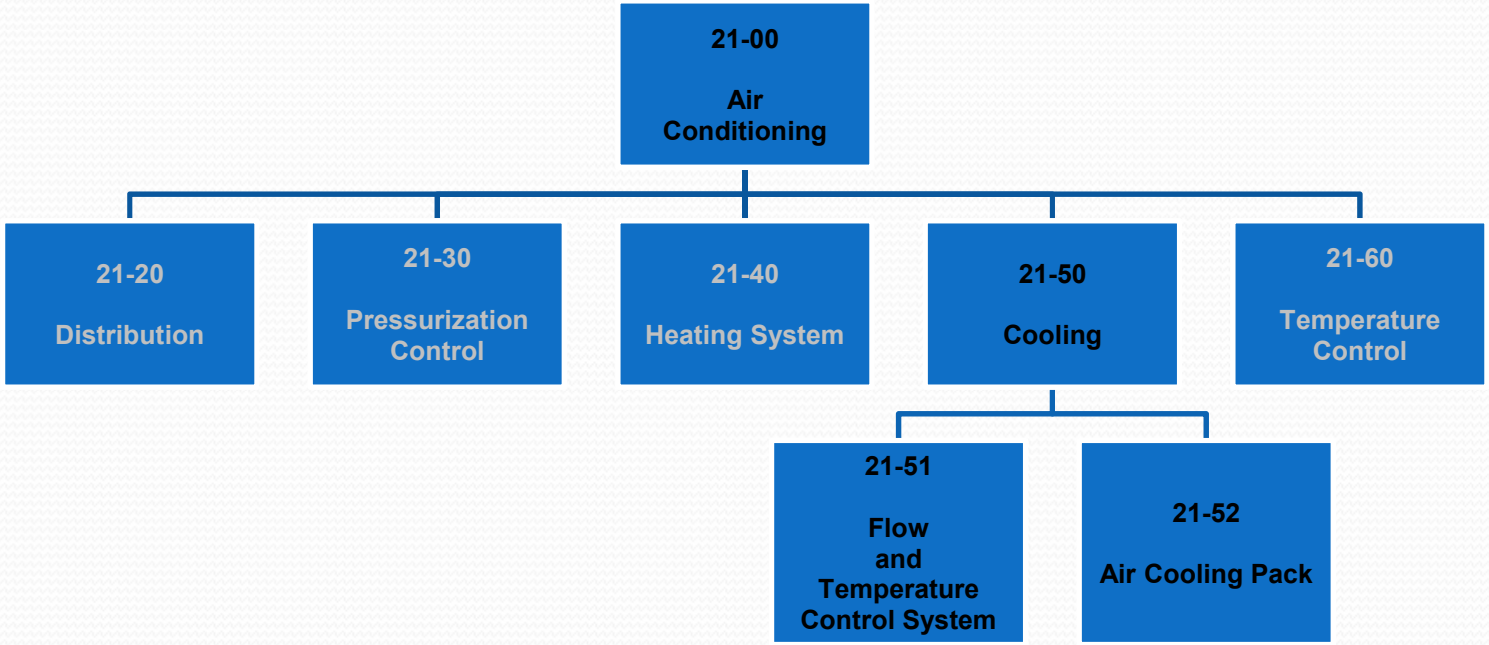
System Functional Breakdown

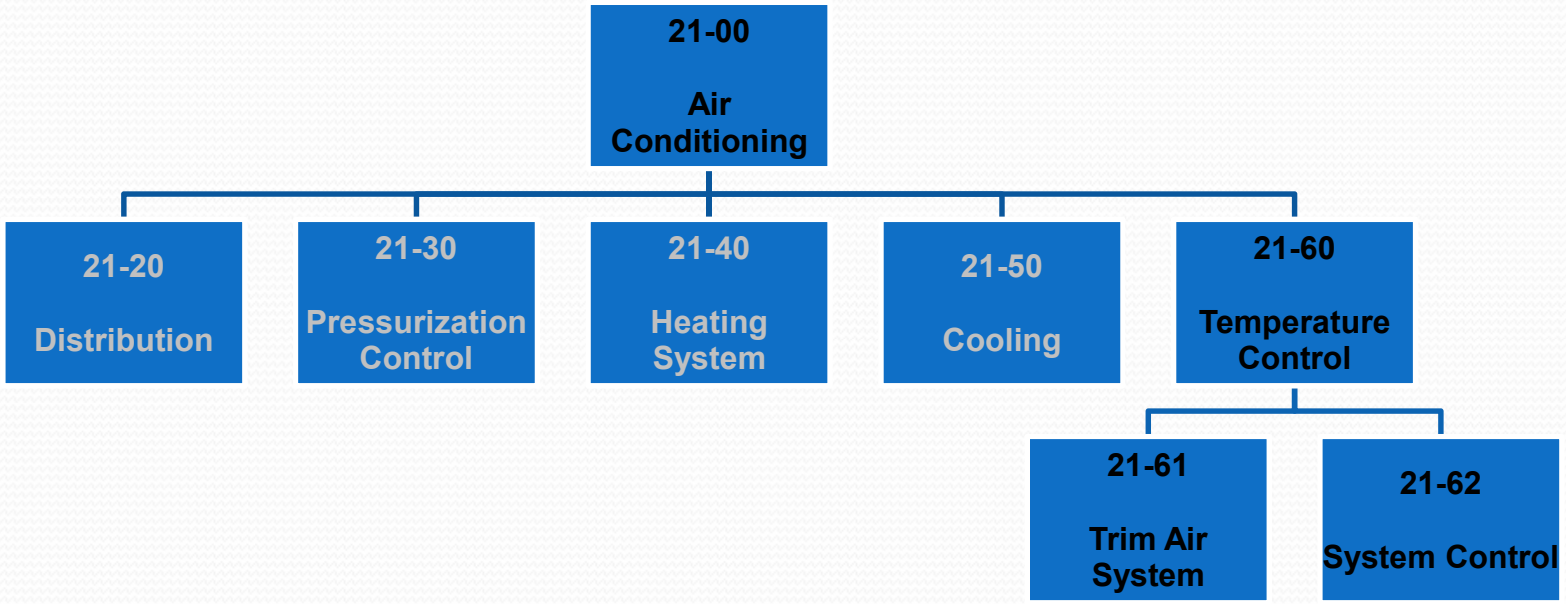



21-00
Air Conditioning
21-20
Distribution
21-30
Pressurization Control
21-40
Heating System
21-50
Cooling
21-60
Temperature Control
21-21
Fresh Air Flow Control System
21-22
Air Distribution and Recirculation System
21-23
Avionics and Displays Ventilation
21-24
Ram Air Ventilation
21-25
Cargo Compartments Ventilation System


21-00
Air Conditioning
21-20
Distribution
21-30
Pressurization Control
21-31
Cabin Pressure Control System
21-40
Heating System
21-50
Cooling
21-60
Temperature Control


21-00
Air Conditioning
21-20
Distribution
21-30
Pressurization Control
21-40
Heating System
21-50
Cooling
21-60
Temperature Control
21-41
Heating Galley System
21-42
Forward Cargo Compartment Heating System


21-00
Air Conditioning
21-20
Distribution
21-30
Pressurization Control
21-40
Heating System
21-50
Cooling
21-60
Temperature Control
21-51
Flow and Temperature Control System
21-52
Air Cooling Pack


21-00
Air Conditioning
21-20
Distribution
21-30
Pressurization Control
21-40
Heating System
21-50
Cooling
21-60
Temperature Control
21-61
Trim Air System
21-62
System Control

LSA Main Tasks Description

LSA Main Tasks Description

- Task 100
  - Development of early LSA Strategy – Define Program Objectives
    - All A/c Manufacturer Depts are involved to answer to Customer Requirements. The requirements/answer of every Depts are issued into the Weapon System Design Performance Specification. Coordination among Depts by means Program Manager, ILS Manager, LSA Manager and Chief Engineering, Project Manager, Specification responsibles.
  - LSA Plan
    - Shows and explains Management Structure, the activity scheduling, the Engineering interfaces, LSA configuration Control, Analysis approach.
  - Program Review – Design Review
    - Describes the internal coordination Meeting/review among Program Manager, ILS Manager, Project Manager

LSA Main Tasks Description

- Task 200
  - Establish supportability objectives and design related goals and constrains through comparison with existing systems and analysis of supportability, cost and readiness requirements.
    - Part of these activities are performed together with the Customer (Use Study);
    - main aspectsto be considered
      - Study intended Use;
      - Determine Impact on Support;
      - Document Quantitative Support Factors;
      - Examination of existing resources;
      - Standardization;

LSA Main Tasks Description

- Task 200
  - Point out design constrains
  - Comparative systems
  - Evaluate available technologies, State of the Art Design
  - Establish design goals, risks, update design goals

These tasks are in concurrence responsibility with Engineering Depts to find the best compromise between the Performance requirements and the Support requirements

LSA Main Tasks Description

- Task 300
  - Analysis of systems and equipments to establish the criticality, how it fails, which failures, the frequency of failure occurrence, maintenance actions (on corrective and Preventive), redesign requirements.
  - Identification of maintenance tasks
  - Point out design constrains;
  - Foreseen Resources required

These task are performed by LSA that receive the input data from Engineering Depts. LSA process evaluate all data and integrate with other sources as Supplier.

LSA Main Tasks Description

- Task 400

  This is the core of the LSA process. This activity is done in concurrence with Engineering Depts, Suppliers, Test Flight Field and is performed at the deeper level.

  The Level Of Repair Analysis is done in this phase to define the most economical maintenance level.

  In this phase the maintenance procedures, the skills, the Special tools, the times, the man power, the transportation requirements, the Facilities, the storage requirements, training devices are identified and described.

  In this phase if the results of analysis point out the necessity of Redesign, a requirement is proposed to the management for discussion and, eventually, definition of a proper recovery action.

- Task 500

  This task is involving the whole Company and consists in the observation of the previous activity to identify the deficiencies and correct them.

  Main phases are:

  - Analyze Test results;
  - Identify corrective actions;
  - Update the LSA;
  - Plan a Field Data Collection;
  - Analyze Field Data Results.

LSAR Data Records – 1 –

- The 10 LSAR data records, in accordance to the reference standards, are defined as follows:

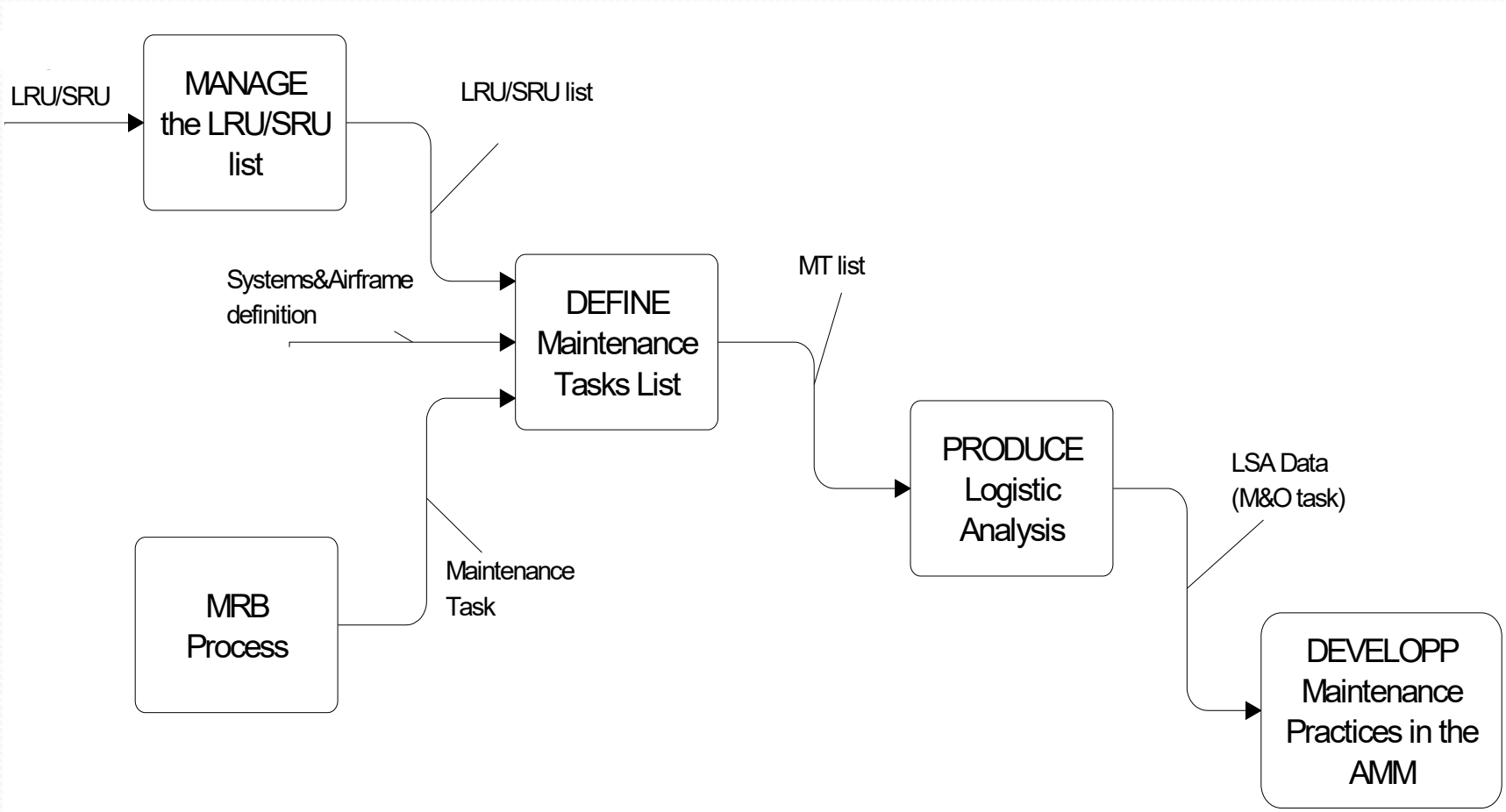
Data Record	Description
A	Operation and Maintenance Requirements
B	Reliability (R) Availability (A) Maintainability (M) Data, Failure Mode and Effects Criticality Analysis FMECA and Maintainability Analysis
C	Task Inventory, Task Analyses, Personnel and Support
E	Support Equipment and Training Material
F	Facility Considerations

LSAR Data Records – 2 –

Data Record	Description
G	Personnel Skill Considerations
H	Packaging and Provisioning Requirement
J	Transportability Engineering Characteristics
U	Unit Under Test Requirement Description
X	Cross Functional Requirement

The LSA process for Tech Pubs development

A global approach from the MSG-3 and LSA activities for the Technical Publication development



A/c Tech Pubs – 1 –

Operating Manuals:

Publication Name	Abbreviation
Airplane Flight Manual	AFM
Flight Crew Operations Manual	FCOM
Quick Reference Handbook	QRH
Flight Crew Training Manual	FCTM
Master Minimum Equipment List	MMEL
Weight and Balance Manual	WBM
Operations Performance Manual	OPM
Fault Reporting Manual	FRM
Airport Planning Manual	APM
Flight Attendant Manual	FAM
Baggage/Cargo Loading Manual	BCLM
Flight Safety Instructions Card	FSIC
Aircraft Performance Monitoring Guide	APMG

A/c Tech Pubs – 2 –

Maintenance Manuals:

- Aircraft Maintenance Manual (AMM)

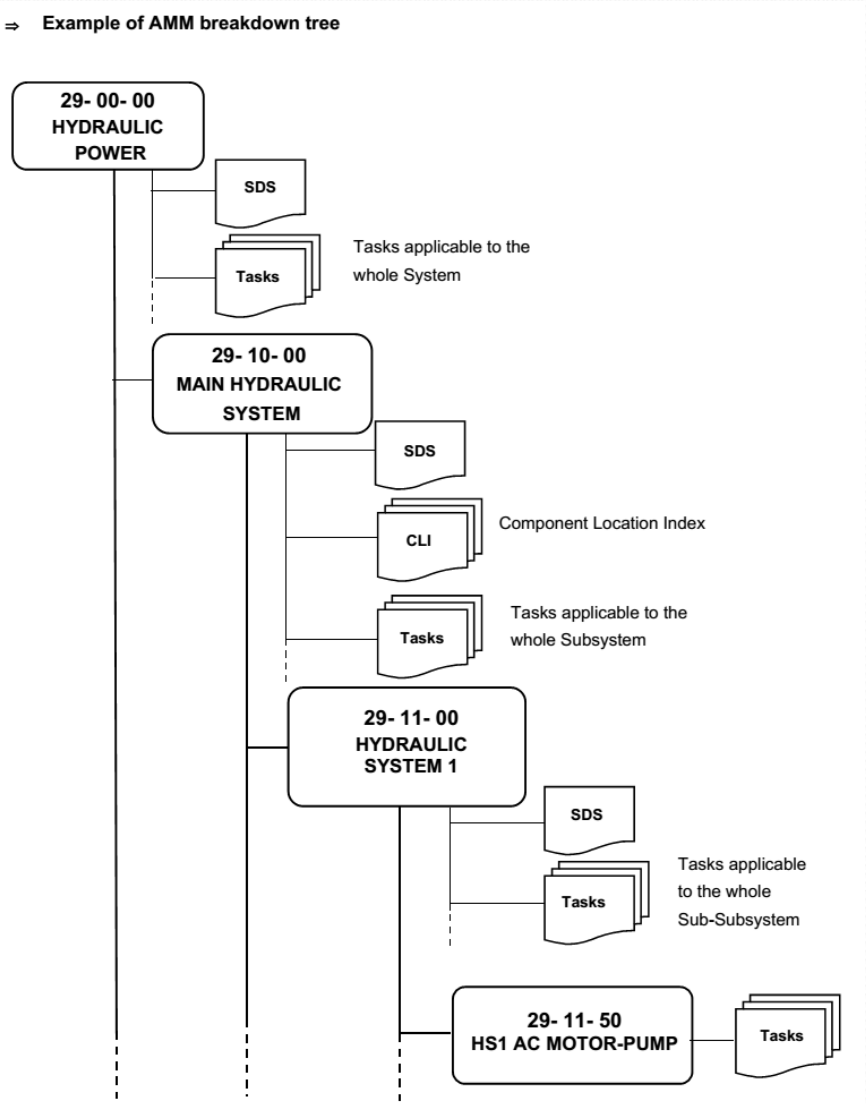
  Three kinds of information are provided in the AMM:

  - ✓ Description of the Systems and the Structure of the Aircraft (SDS),
  - ✓ Fault Isolation Procedures,
  - ✓ Location and References of the Components of the Systems (CL),
  - ✓ Maintenance Tasks (MPP).

  The AMM consists of two parts:

  - ✓ the Systems Description Section (SDS);
  - ✓ the Maintenance Practices and Procedures

Example of AMM breakdown tree



A/c Tech Pubs – 3 –

Maintenance Manuals:

- Structural Repair Manual (SRM)

  Four kinds of information are provided in the SRM:
  - ✓ Description of parts of the airframe,
  - ✓ Standard Practices and Procedures,
  - ✓ Allowable Damage,
  - ✓ Repairs.

  The Structural Repair Manual is divided into two parts:
  - ✓ Chapter 51:
    It contains descriptive information, standard practices and instructions for a set of structural items,
  - ✓ Chapters 52 to 57:
    They contain identification of structural parts, allowable damage, and repair instructions specific to each specific structural item.
    Each subject in Chapters 52 through 57 is further subdivided into topics:
    - Structural identification,
    - Allowable damages,
    - Repairs.

A/c Tech Pubs – 4 –

Maintenance Manuals:

- Other Maintenance Manuals:
  - Maintenance Tasks Cards (MTC)
  - Fault Isolation Manual (FIM),
  - Maintenance Planning Data Document (MPD),
  - Illustrated Tool and Equipment Manual (ITEM),
  - Wiring Manuals (WM),
  - Standard Wiring Practices Manual (Chapter 20) (SWPM)
  - System Schematics Manual (SSM),
  - Consumable Products Manual (CPM),
  - Non-Destructive Testing Manual (NDT),
  - Maintenance Facilities and Equipment Planning Document (MFEP),
  - Power Plant Build-Up Manual (PPBM),
  - Aircraft Recovery Manual (ARM),
  - Airplane Rescue and Fire Fighting (ARFF)
  - Ground Equipment Manual (GEM)

A/c Tech Pubs – 5 –

Maintenance Planning Document:

- The Maintenance Planning Document (MPD) is a repository document which provides reference to most of the repetitive maintenance tasks based on the requirements mandated by the following documents:
  - ✓ ***Maintenance Review Board (MRB)*** *report*
  - ✓ *Certification Maintenance Requirement (CMR) document*
  - ✓ *Airworthiness Limitation Items (ALI) document*
  - ✓ *Airworthiness Directive (AD)*
  - ✓ *Mandatory Service Bulletin (SB) or recommended through other sources like non-mandatory SB's or Service Letters (SL).*
- The main objective of this document is to provide maintenance planning information necessary for each operator to develop a customized scheduled maintenance program.

A/c Tech Pubs – 6 –

Aircraft Illustrated Part Catalog (AIPC):

The AIPC is a complementary document to the Aircraft Maintenance Manual and contains all parts information for which maintenance practices coverage has been provided.

The AIPC shall contain, at least, all those individual line-replaceable units such as light bulbs, sockets, lenses, caps, seals, bearings, screens, screws, filters, electrical connectors, circuit cards, relays, pulleys, fittings, brackets, external lines. Additionally the AIPC includes all components and/or parts where maintenance practices allow replacement of the components rather than replacement of the next higher assembly.

The AIPC shall indicate which parts are selected as spares, based on the Recommended Spare Parts List (RSPL).

SVILUPPO E REALIZZAZIONE DI UN VELIVOLO DA TRASPORTO REGIONALE

... CHE STRESS... LO STRESS!