PLCS for data sharing between French MoD and Industry

Initial and In-Service Support data

French MoD Organization

DGA

Modernisation and Quality (SMQ)

Operations Directorate (DO)

Technical Directorate (DT)

Information systems

UM AERO

UM TER

UM NAV

SMCO

Partners Area Team

DTE

Documentation Technique Électronique

EMA

EMA/MCO

Air Force

Army

Navy

EMAA

EMAT

EMM

ARMÉE DE L'AIR

ARMÉE DE TERRE

MARINE NATIONALE

SIMMAD

SIMMT

SSF

DIRISI

Air systems Support

Land systems Support

Sea systems Support

Information systems Support

1. Introduction

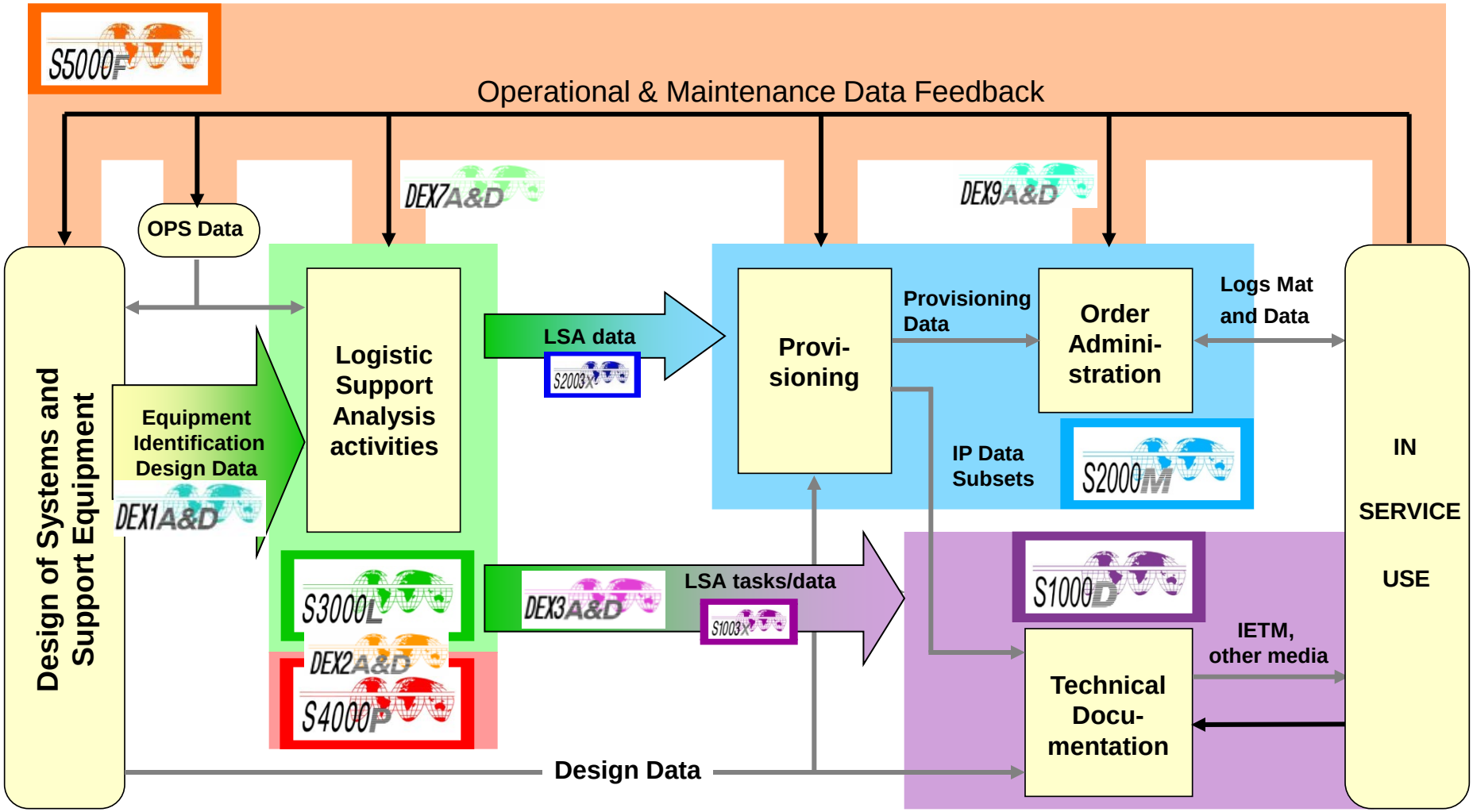
2. PLCS for In-Service Support data : 2 projects

- **PENCIL** (Plateforme d'Echange Normalisée et Centralisée d'Information Logistique)
- **MAPS** (Marchés avec Achat de Prestations de Soutien)

3. Implementation of S3000L

4. Prospects

The ILS (Integrated Logistic Support) process



Acquisition Logistics Management - OTAN (1993)

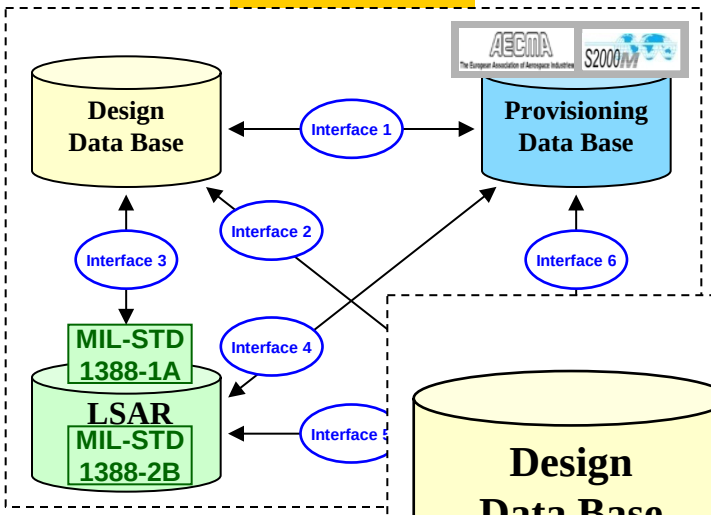
Suite of ILS specifications ASD / AIA / ATA

ASD : Aero**S**pace and **D**efence industries association of Europe **/ AIA : A**erospace **I**ndustries **A**ssociation of America **/ ATA : A**ir **T**ransport **A**ssociation of America

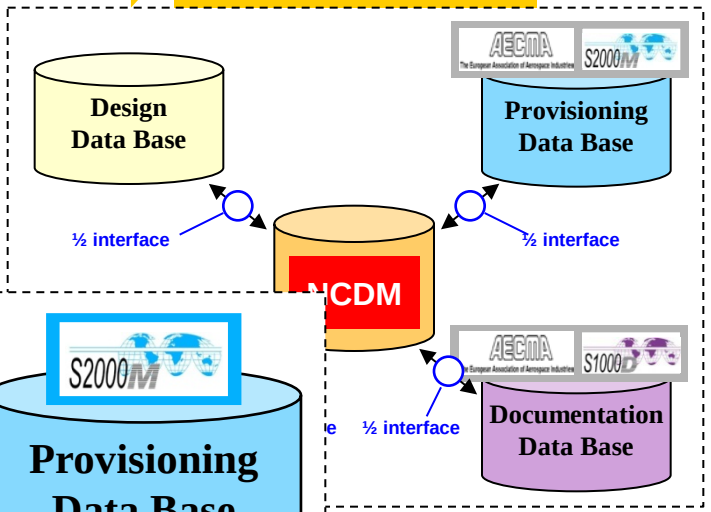
Specification		Applicability	Origin	Issue	Date	Domain
SX000i		Land, Air, Sea	ASD/AIA	1.1	*15/07/16*	**I**ntegrated Logistic Support (ILS)
	SX001G			1.1	*01/08/15*	**G**lossary
	SX002D			1.1	*01/08/15*	Common **D**ata Model
1st generation	S1000D	Land, Air, Sea	ASD/AIA/ATA	4.2	*31/12/16*	**D**ocumentation
	S2000M	Land, Air, Sea	ASD/AIA	6.0	*16/12/15*	**M**aterial Management
2nd generation	S3000L	Land, Air, Sea	ASD/AIA	1.1	*01/07/14*	**L**ogistics Support Analysis (LSA)
	S4000P	Land, Air, Sea	ASD/AIA	1.0	*23/05/14*	**P**reventive maintenance
3rd generation	S5000F	Land, Air, Sea	ASD/AIA	1.0	*23/09/16*	**F**eedback

ASD specifications and PLCS

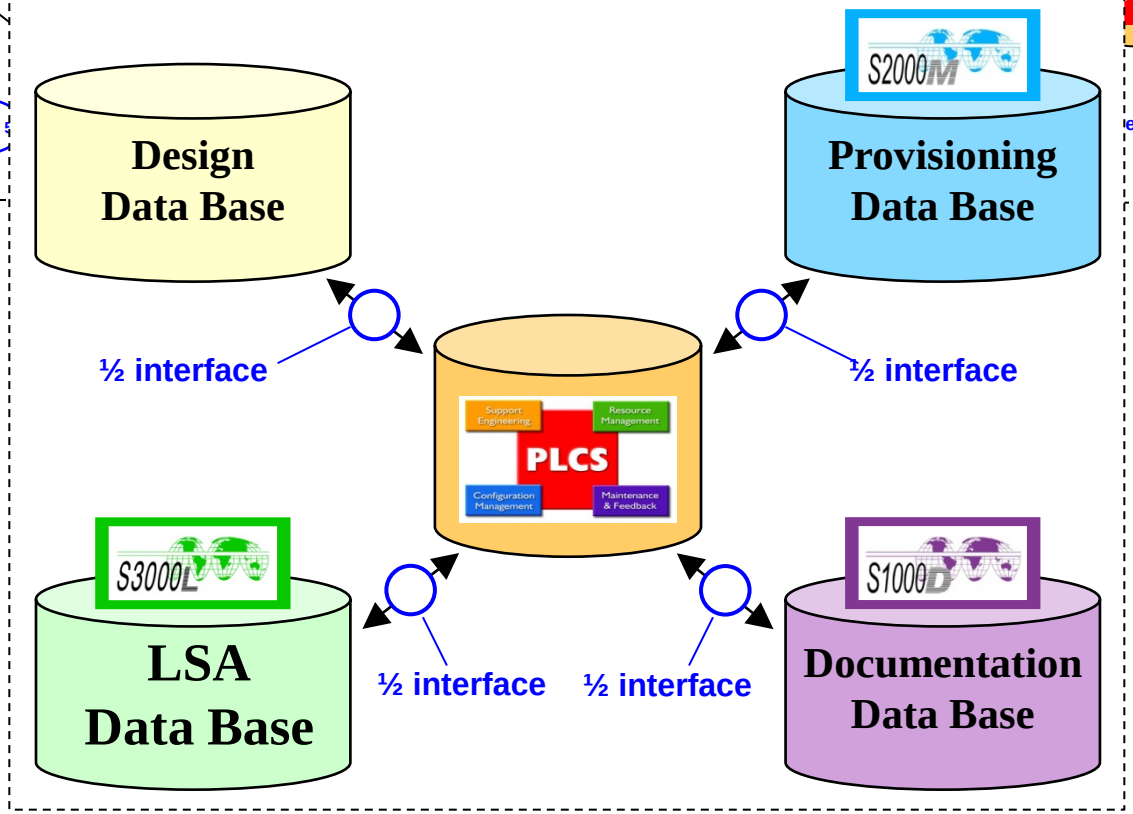
Before CALS



1996 : NATO CALS



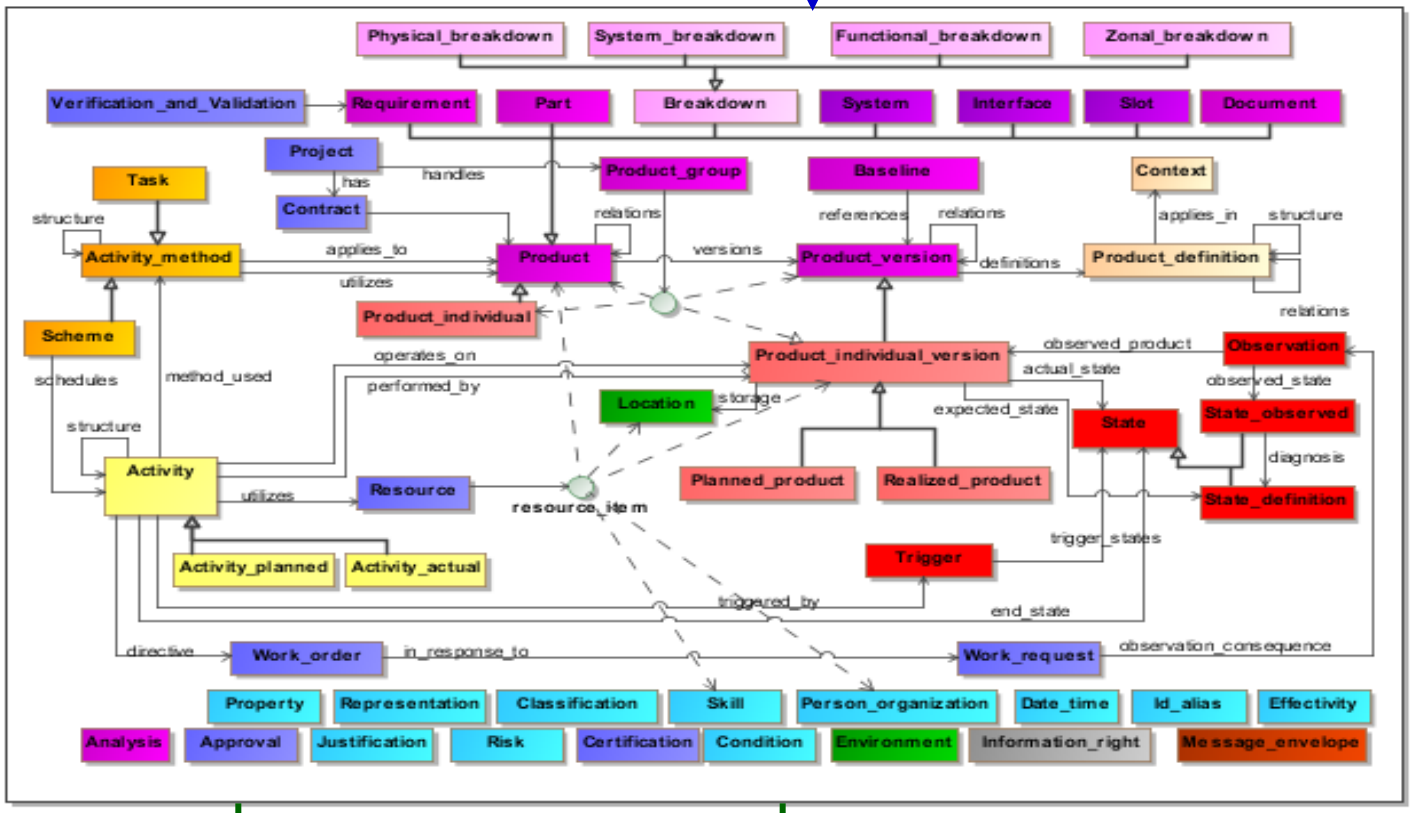
Today



ISO 10303 : STEP (STandard for the Exchange of Product model data)

AP233

AP242



- Product Designs
- Individual Products
- Product Breakdown
- Product Descriptions
- States
- Activity Specifications
- Activity History
- Product Environment
- Management Process
- Details

DEX1A&D

Product breakdown for support

DEX3A&D

Task specification

S3000L

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SIM@T : The LIS for Land systems Support

CHORUS

MINEFI

NSPA — COMMIT

Financial information

WAREHOUSE — WMS

Available parts

Warehousing orders

CIMD — SACRAL, SOPRANO

NSN

Localization
Fleet optimization

CFT — SILRIA, SAGEE

SiM@T

EMA — CHEOPS

Availability
Life records update

Staff repository

DRHAT — CONCERTO

SIOC — SICS

Reference data

Organization

EMAT — CREDO

PENCIL

Order

.dat

LECLERC

Event report, Order
Life records update

.xls

VBCI

CAESAR

Event report, Order
Life records update
Technical assistance

.doc

VHM

Event report, Order
Life records update
Technical assistance

.doc

PPT

PENCIL : Plateforme d'Echange Normalisée et Centralisée d'Information Logistique

Benefits of PENCIL

On data to be exchanged

- Today
  - No global vision of exchanged data
  - Differences between visions (manufacturers / Administration)
- PLCS :
  - forces to define in a clarified way all exchanged data
  - offers a generic and precise frame for data identification
  - quickly allows to identify the missing data and to converge on a common definition for all the actors

On contracts

- Nowadays, every contract is specific
- PLCS allows to manage programs uniformly :
  - by using generic business processes
  - by handling contracts specificities

History of PENCIL

12 january
Ratification of STANAG 4661 (PLCS)

27 november : CCSI MCO-T
Decision : Priority application of PLCS (PENCIL) for data exchange between Administration and manufacturers

29 january
9th Life Cycle Management in NATO

6 december : CCSI MCO-T
Decision : Replace LIS OASIS (NEXTER) by a PLCS interface

25 september
PDT Europe 2012

19 june
PLM lab

27 january
11th Life Cycle Management in NATO

24 september
Mardi 24 septembre 2013 LGM DAYS Conférences et ateliers pratiques

MAPS Study

Step 1 : Experimentation of PLCS

Step 2 : Implementation of PENCIL on pilot program : CAESAR

22 july
Meeting SIMMT - EMA - DGA about experimentation of PLCS

2010 | 2011 | 2012 | 2013 | 2014

eurostep | CS | eurostep | Capgemini | steria | sopra

ISS integrated support systems

nexter

DCNS

15 october
PDT Europe 2014

IT companies
Lascom | PTC | axway | logica

GICAT
GROUPEMENT DES INDUSTRIES DE DÉFENSE ET DE SÉCURITÉ TERRESTRES ET AÉROTERRESTRES
RENAULT TRUCKS DEFENSE | THALES | SAFRAN Sagem | LGM | CASSIDIAN

GIFAS
DASSAULT AVIATION | DAHER | eurocopter | SAFRAN Snecma | MBDA | ZODIAC AEROSPACE

Recommendations for realization of DEXs

Define the WHAT ?

Requirements for data exchange → Handbook « SIM@T et les marchés innovants »

- Initial Support data
  - Data stream 1 → LSAR data : 60 DED (1388-2B) or S3000L data
  - Data stream 2 → Provisioning data : 50 TEI (S2000M)
- In-Service Support data
  - Data stream 3 → 100 feedback data

Answer to the HOW ?

- Development of DEX interfaces based on PLCS
- Network architecture → Connection between manufacturers Logistic Information System and SIM@T via Partners Area (= secure ENX connection)
- Software components : WebDav server, ESB, Transactions handler, Share-A-Space (= PLCS Data Base)

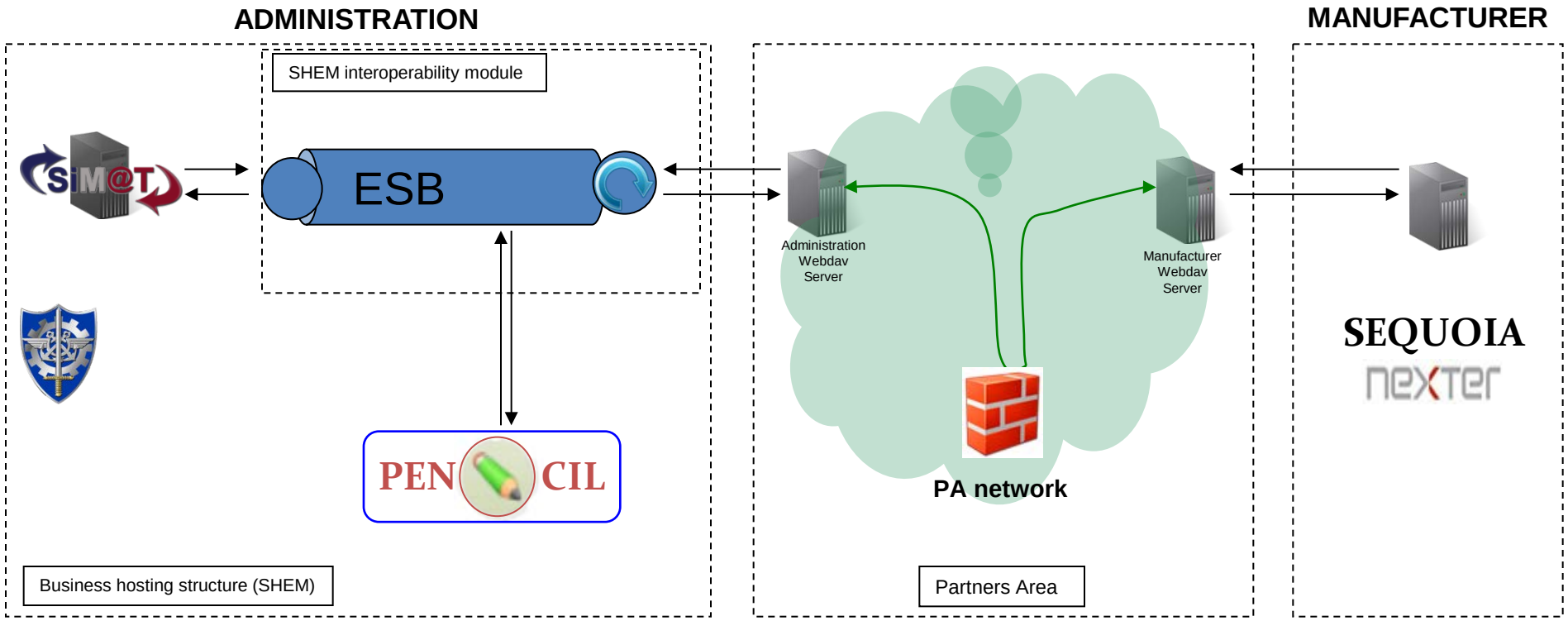
Find the WHO ?

Update of contract (CAESAR program) or new contract (EBMR program)

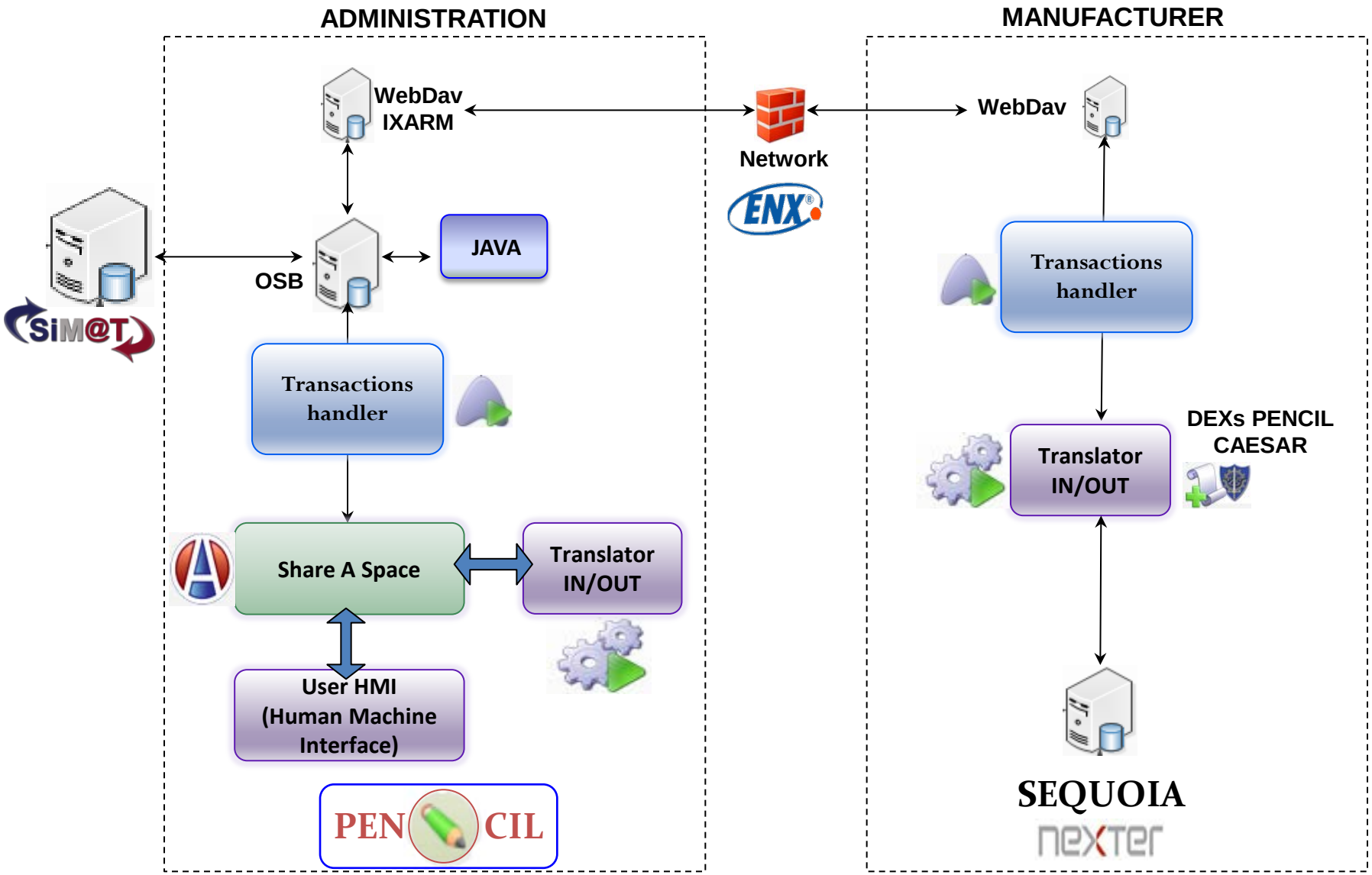
PENCIL CAESAR : DEXs, messages and associated workflow

DEX		Message		OEM	SIMMT
N°	Title	N°	Title		
1	ProductConfigurationDelivery	Composed by 5 messages		→	
2	InServiceProductStructureUpdate	1	InServiceProductStructureUpdate	←	→
3	ProductLifeRecordUpdate	1	LifeRecordUpdate	←	→
4	SparePartOrder	1	SparePartOrder	←	→
		2	OrderReceiptAcknowledgement	→	
		3	SparePartDeliverySlip	→	
		4	ProofOfDelivery	←	→
5	TechnicalEvent	1	TechnicalEventInit	←	→
		2	TechnicalEventUpdate	←	→
		3	TechnicalEventApproval	→	
		4	TechnicalEventClosure	←	→
6	MissionStock	1	MissionStockDelivery	→	
		2	MissionStockReturn	←	→

Architecture of the project



Software components



PENCIL CAESAR Feedback

Technical elements

- Data exchange scope : In-Service Support data (Event report, Order, Life records)
- PLCS standard used : PLCS PSM (Platform Specific Model) Ed. 2
- Development of 6 DEXs PENCIL CAESAR :
  - use of OASIS templates
  - creation of SIMMT templates
- Exchanged files : P21 files

Innovative solution → some difficulties

- Many actors : manufacturer (NEXTER), Administration (SIMMT, CEDIMAT, DIRISI, DGA)
- First EDI for technical data exchange
- Hosting of new systems (PENCIL, WebDav)
- Adaptation of DIRISI environment (OSB)
- Exploitation of specific resources for every component
- High level of expertise (configuration)
- New concept of flows management

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MAPS (Marchés avec Achat de Prestations de Soutien)

Definition

MAPS are procurement contracts for buying In-Service Support services.

They consist of at least one service of **storage**, **distribution**, **maintenance** or **elimination** made by a manufacturer for the benefit of Administration.

Objectives

Improve the management of manufacturer services with SIM@T by centralizing informations.

- Improve Administration technical control of materials
- Implement automated data exchange with manufacturers
- Feed SIM@T with necessary informations for monitoring services
- Automate data exchange used to follow maintenance & configuration of equipments
- Systematize resources order with SIM@T input for transfering automatically in manufacturers LIS (Logistic Information System)

→ MAPS = Generalization of PENCIL and integration in SIM@T

MAPS Study phases

April 2014 — June 2014 — October 2014 — December 2014

IDENTIFY THE NEEDS

- Map creation of different MAPS contracts
- Needs by business domain
- Feedback of PENCIL for CAESAR program and needs of new ILS standards

DEFINE THE TARGET

- Repository standardization
- Logistic Description of Markets (LDM)
- Impacts on Provisioning, Maintenance, Finances
- Technical architecture
- Data mapping
- Exchange management

BUILD THE TRAJECTORY

- Roadmap of SIM@T - PENCIL implementation
- Convergence plan SIM@T - PENCIL

Business needs and impacts

SiM@T

- Data model modifications
- Creation or modification of use cases
- Data integration

Logistic Description of Markets (LDM)

Automated data exchange with r

Other repositories

ons exchange

Maintenance

Technical event transaction with manufacturer

Technical repositories

ILS (Integrated Logistic Support) informations exchange

Logistic Management

Follow-up of Administration stock
(stored at manufacturer)

Supply

Automatical orientation of needs
(manufacturer or Administration)

- Creation, suppression or modification of data flows
- Business class model mapping between SIM@T and PLCS

PLCS

- DEXs creation
- DEXs implementation : extension of PENCIL for data hosting of new DEXs

PLCS DEX1A&D PENCIL DEX3A&D PLCS

MAPS Implementation (1 / 2)

Launching of MAPS realization in 5 batches (*April 2015*)

N°	Scope	Deadline	Eligible programs
Batch 1	• Logistic Description of Markets (LDM) • Applicable configuration	*March 2016*	
Batch 2	• Spare part distribution • Stocks management	*October 2016*	PPB
Batch 3	• In-service configuration • Product life record	*March 2017*	FELIN
Batch 4	• Technical event • Mission stock	*November 2017*	VBCI, CAESAR, RTD, COHORTE
Batch 5	• Operational cards • Maintenance repositories	*June 2018*	**SCORPION :** EBMR, VBMR Léger

MAPS contributors

- Administration :
  - SIMMT
  - SOPRA/STERIA and Eurostep
- Manufacturers : Boost-Conseil, CIMPA, Connectiv-IT, INEO, MBDA, NEXTER, NSE, RTD, THALES

MAPS Implementation (2/2)

Development of each batch in 5 steps

N°	Action	Administration	Manufacturers
Step 1	Definition of general functional specifications	**X**	**X**
Step 2	• Realization of associated DEXs • Update of SIMMT PLCSlib	**X**	
Step 3	Test and validation of DEXs	**X**	**X**
Step 4	Update of the Handbook MAPS	**X**	
Step 5	Deployment of DEXs	**X**	

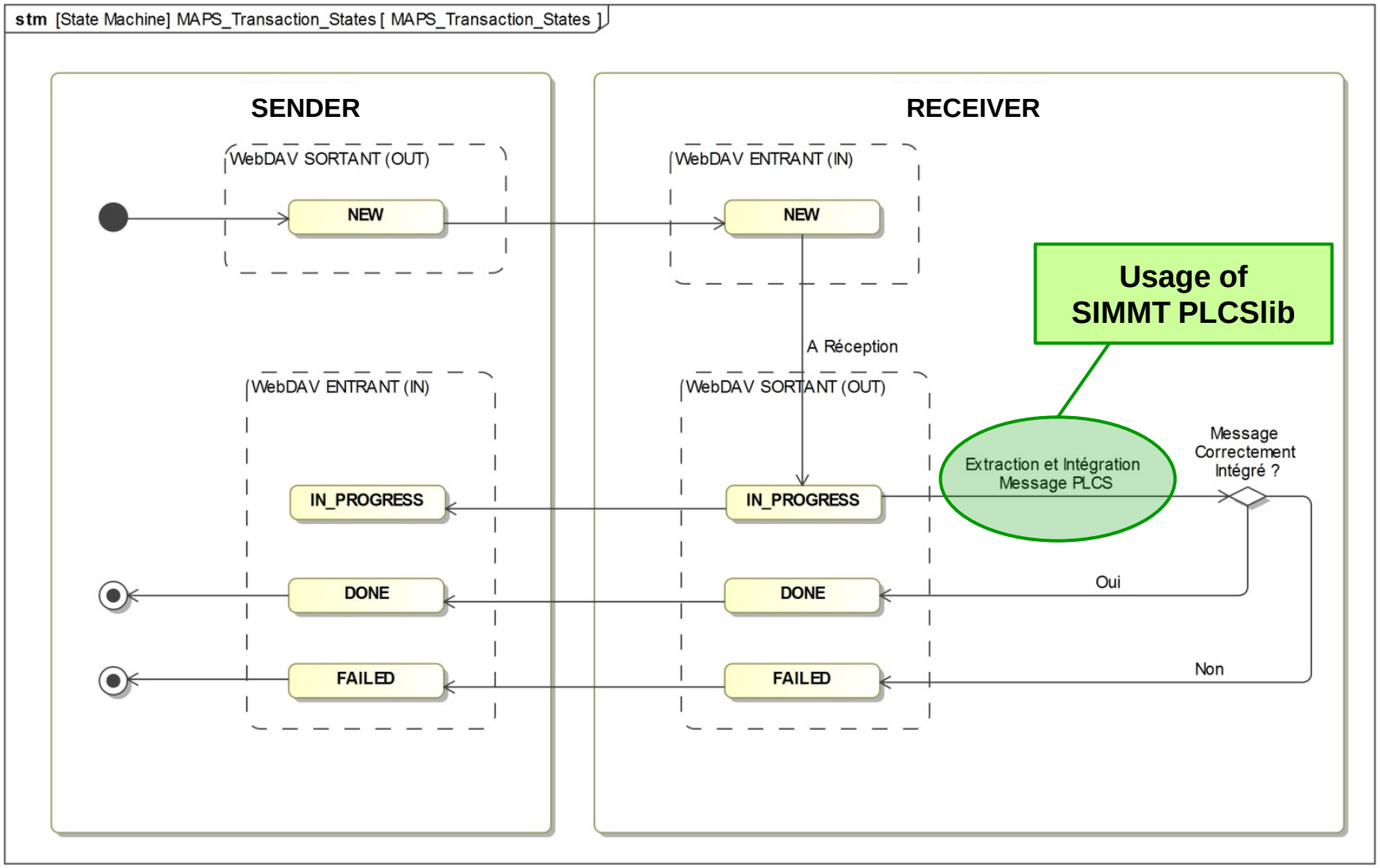
Suite of DEXs at the end of MAPS realization

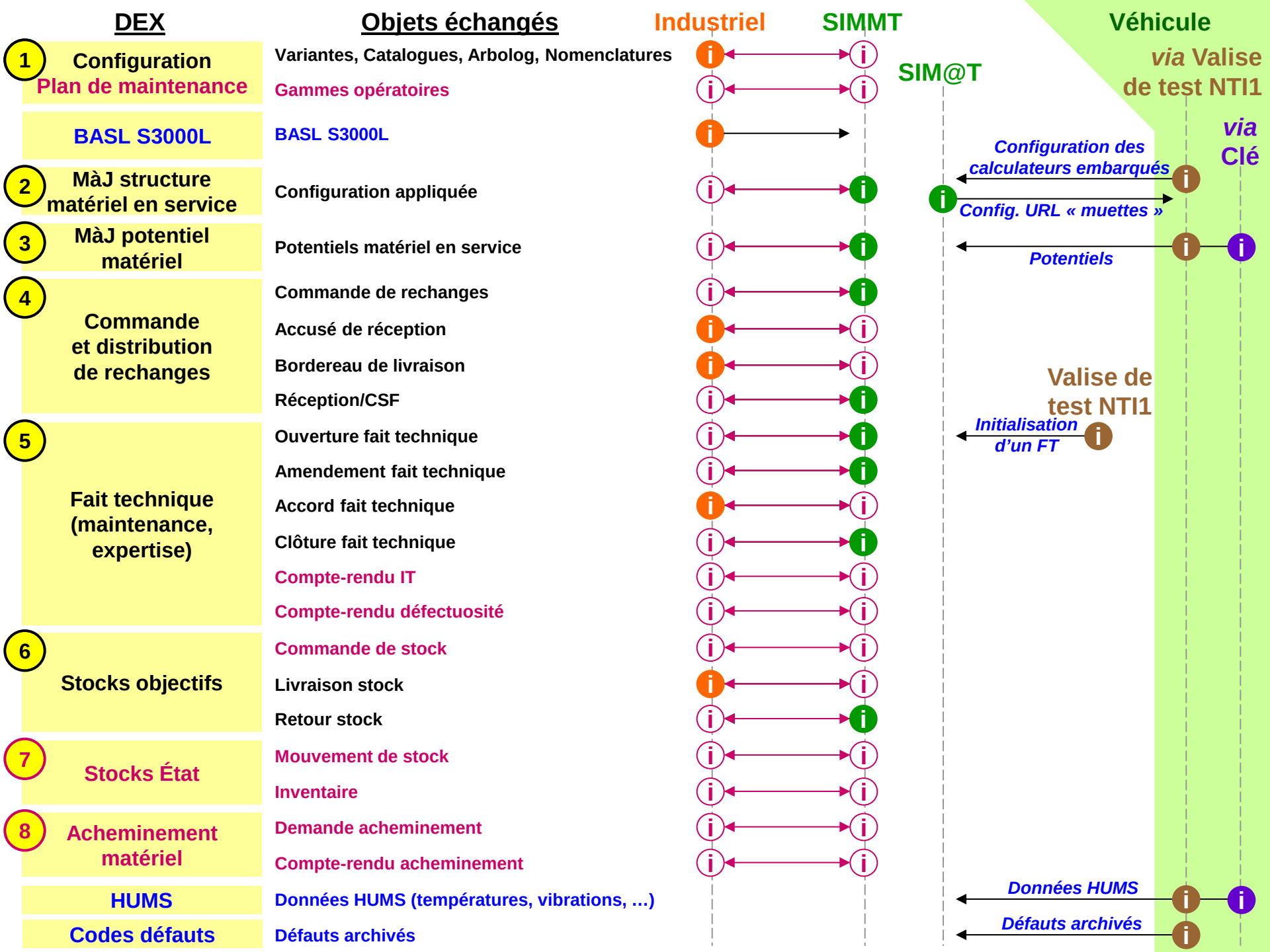
- DEX : Product breakdown for support
- DEXs : Distribution and stocks
- DEXs : In-service material
- DEXs : Maintenance
- DEXs : Repositories

Specification of data exchange in contract

- Usage of Logistic Description of Markets (LDM)
- Usage of the Handbook MAPS

Message transactions with 2 WebDAVs




DEX
Objets échangés
Industriel
SIMMT
SIM@T
Véhicule
via Valise de test NTI1
via Clé
1
Configuration
Plan de maintenance
Variantes, Catalogues, Arbolog, Nomenclatures
Gammes opératoires
BASL S3000L
BASL S3000L
2
MàJ structure matériel en service
Configuration appliquée
Configuration des calculateurs embarqués
Config. URL « muettes »
3
MàJ potentiel matériel
Potentiels matériel en service
Potentiels
4
Commande et distribution de rechanges
Commande de rechanges
Accusé de réception
Bordereau de livraison
Réception/CSF
Valise de test NTI1
5
Fait technique (maintenance, expertise)
Ouverture fait technique
Initialisation d'un FT
Amendement fait technique
Accord fait technique
Clôture fait technique
Compte-rendu IT
Compte-rendu défectuosité
6
Stocks objectifs
Commande de stock
Livraison stock
Retour stock
7
Stocks État
Mouvement de stock
Inventaire
8
Acheminement matériel
Demande acheminement
Compte-rendu acheminement
HUMS
Données HUMS (températures, vibrations, …)
Données HUMS
Codes défauts
Défauts archivés
Défauts archivés

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Elements of context

EBMR program

- First program of SCORPION operation, composed by 2 materials :
  - EBRC (Engin Blindé de Reconnaissance et Combat) named Jaguar
  - VBMR (Véhicule Blindé Multi-Rôles) named Griffon
- Contracted in *December 2014* to 3 manufacturers : NEXTER, RTD, THALES

ILS requirements

- Application of S3000L for LSA (methodology and data) [S3000L Issue 1.1]
- Application of S2000M for provisioning [S2000M Issue 3.0 - Chapter 1]
- ETD (Electronic Technical Documentation) according to S1000D [S1000D Issue 4.1]
- Application of PLCS for In-Service Support data

Elaboration of several documents

- ILS plan
- LSA plan → LSA process, system breakdown, candidate item list selection, logistic analysis activities selection
- GCD (Guidance Conference Document) S3000L → Data element list, reporting process, required reports, data exchange process

Analysis activities and associated plans

WP01	Introduction to the specification	
WP02	General requirements	
WP03	**LSA Business Process**	
WP04	Configuration management in LSA	← Configuration management plan
WP05	Influence on design Availability / Reliability / Maintainability / Testability interface	← Safety plan
WP06	Human factors analysis	← Human factors integration plan
WP07	Results of FMEA/FMECA in LSA	
WP08	Damage and special event analysis	*WP not implemented*
WP09	Logistics related operations analysis	← PHST plan
WP10	Development of a scheduled maintenance program	← Preventive maintenance report
WP11	Level of Repair Analysis (LORA)	← Support justification document
WP12	Maintenance Task Analysis (MTA)	
WP13	Software support analysis	← Software quality plan
WP14	Life Cycle Cost (LCC) Considerations	*WP not implemented*
WP15	Obsolescence analysis	
WP16	In-service LSA	
WP17	Disposal	← Environmental aspects plan
WP18	Interrelations to other ASD specifications	
WP19	Data model	
WP20	Data exchange	← Logistic Data plan
WP21	Terms, abbreviations and acronyms	
WP22	Data element List	

Subprocess General Analysis	Subprocess Task Identifying Analysis	Subprocess Task Resource Analysis	General WP	Interfaces WP	Data WP

Selection of data element

Total number of S3000L data : 262

Number of S3000L data for EBMR : 127

Ajout de 1 donnée au modèle S3000L :
Compteur de rattachement pour le suivi des coûts du soutien constructeur forfaitaire

4.8 UoF Product Design Configuration — 6 / 1

4.1 UoF Product and Project — 12 / 8

4.2 UoF Product Usage Context — 17 / 5

4.16 - 4.17 UoF Task Usage (Part 1 & 2) — 9 / 5

4.11 UoF LSA FMEA — 18 / 8

4.12 UoF Special Events and Damage — 10 / 0

4.6 UoF Breakdown Zone Element — 2 / 0

4.3 UoF Breakdown Structure — 15 / 12

4.13 UoF LSA Candidate Task Requirement — 13 / 0

4.7 UoF Breakdown Aggregated Element — 2 / 1

4.5 UoF Breakdown Element Realization — 9 / 6

4.10 UoF LSA Candidate Analysis Activity — 4 / 4

4.14 UoF Task — 31 / 21

4.4 UoF Part Definition — 42 / 26

4.9 UoF LSA Candidate — 24 / 7

4.15 UoF Task Resources — 18 / 15

4.18 UoF Security Classification — 1 / 0

4.19 UoF Organization Assignment — 1 / 1

4.20 UoF Document — 14 / 3

4.21 UoF Remark — 2 / 2

4.22 UoF Applicability Statement — 12 / 2

Searching for a S3000L software

- **SIMMT current software : SLICwave (ISS)**
  - Used to control LSAR data prior to SIM@T loading
  - Compatible with MIL-STD 1388-2B
  - But, not compatible with ASD S3000L

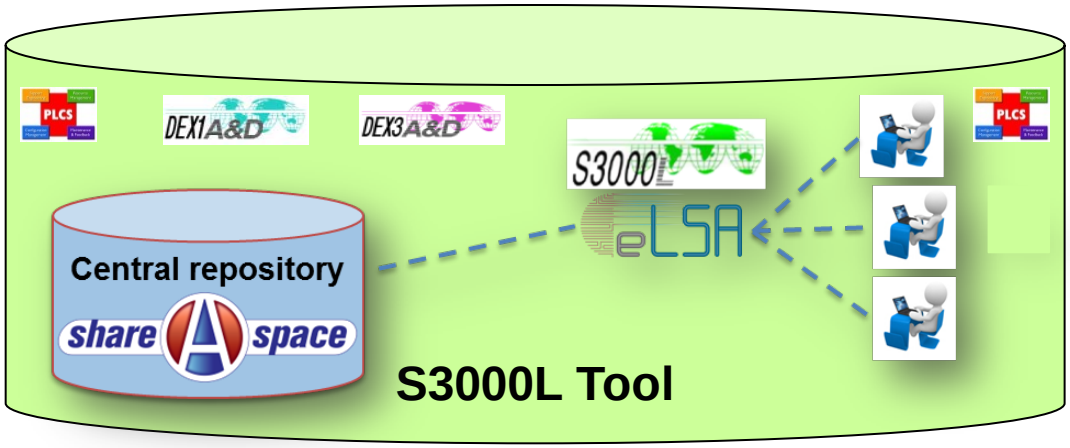
- **Study to find a S3000L tool (*from march to june 2016)***
  - Two main SIMMT requirements :
    - The S3000L tool must be based natively on PLCS.
    - S3000L data must be exchanged via DEX (PENCIL architecture re-use).
  - 7 softwares have been analysed

Software publisher	Software
ENGISIS	SDK PLCS and S3000L solution
ISS	SLICwave Life Cycle
LGM / Eurostep collaboration	eLSA / Share-A-Space
Philotech	PhiloASSET
PTC	S3000L PTC solution
RAYTHEON	Eagle S3000L
Reliability Software	LSA Commander

Implementation of the S3000L software

- **Architecture of the S3000L software based on**
  - eLSA (LGM) for S3000L business part
  - Share-A-Space (Eurostep) for data management and data exchange in PLCS

- **2 complementary partners**
  - LGM (ILS expertise) will achieve :
    - Integration of S3000L data model
    - HMI development to create and manage LSA Data Base content
  - Eurostep (PLCS expertise) will realize DEX S3000L by using :
    - 2 DEX ASD (DEX1A&D and DEX3A&D)
    - OASIS and SIMMT templates



→ **This S3000L Tool will be connected with PENCIL**

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PLCS

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PEN CIL

DEX3A&D

S3000L

S3000L Tool

LECLERC

VBCI

CAESAR

VHM

EBRC

VBMR

nexter

RENAULT TRUCKS DEFENSE

THALES

- **1st meeting** : *15th & 16th September 2016* - Paris (DGA)
- **Participation** : Administrations and companies specialised in Standards

Organisation	Name	Presence in 1st meeting
French MoD (Chairmen)	Cyril FREMAUX	Yes
	Sébastien OLIVIER	Yes
Belgium Air Force	Filip MUES	Yes
Canadian MoD	Roger CHOUINARD	No (excused)
German MoD	Pierre OBERLIES	No (excused)
FMV	Mats NILSSON	Yes
Turkish Air Force	Yener AKUS	Yes
UKCeB	Phil WILLIAMS	Yes
UTRS	Geza PAP	Yes
NSPA	Paul STEVENS	Yes
	Lampros KARANASIOS	Yes
Allan Webb	Ian SMITH	Yes
ASD SSG	Yves BAUDIER	Yes
Eurostep	Christian GIRAUD	Yes
Jotne Company	Kjell BENGTSSON	No (excused)

- **2nd meeting** : *8th & 9th February 2017* - Paris (DGA)