TESAT SPACECOM

PIONEERING WITH PASSION

Obsolescence Management for ESA Human Spaceflight Programmes

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Content

- Motivation and Scope
- Organsiation and Tasks
- Implementation
- Results
- Summary and Recommendations

(1) Motivation and Scope of Activity

- Obsolescence of EEE parts is a risk for any space programme with electronic equipment
- Obsolescence of even only a single component may require extensive redesign
- For complex systems with numerous equipment the risk is increasing more than proportional to the complexity
- This risk is increasing rapidly over time by 2 factors:
  - Duration from design of equipment to actual manufacture
  - Long mission times including repeated build of identical equipment (for multiple flight sets or replacement purpose)

(1) Motivation and Scope of Activity

- The Obsolescence Management Activity for ESA Human Spaceflight comprises all elements provided by ESA to the ISS, e.g. Columbus Lab, Microgravity Science Glovebox, etc.

- Aim is to assure capability to rebuild equipment as long as the ISS is operational

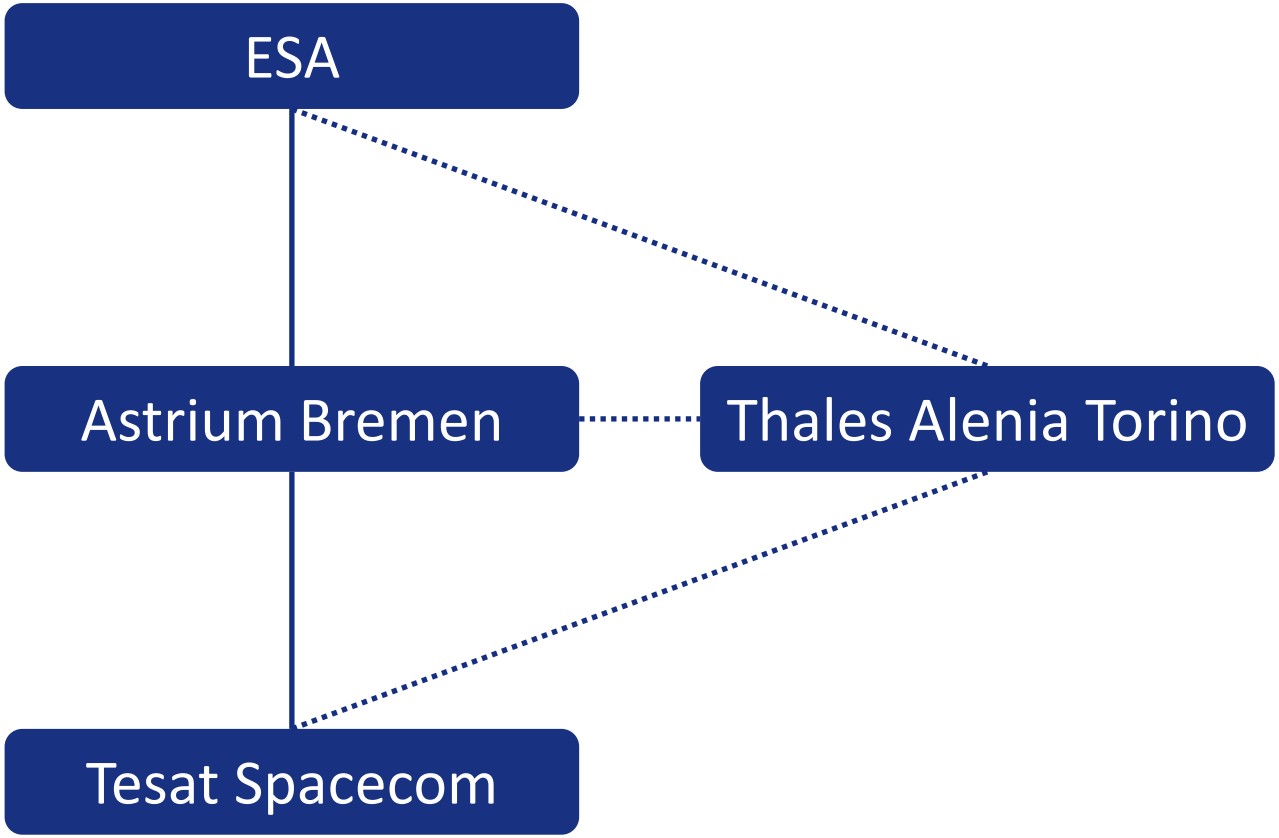
- In total there are

  20 programmes

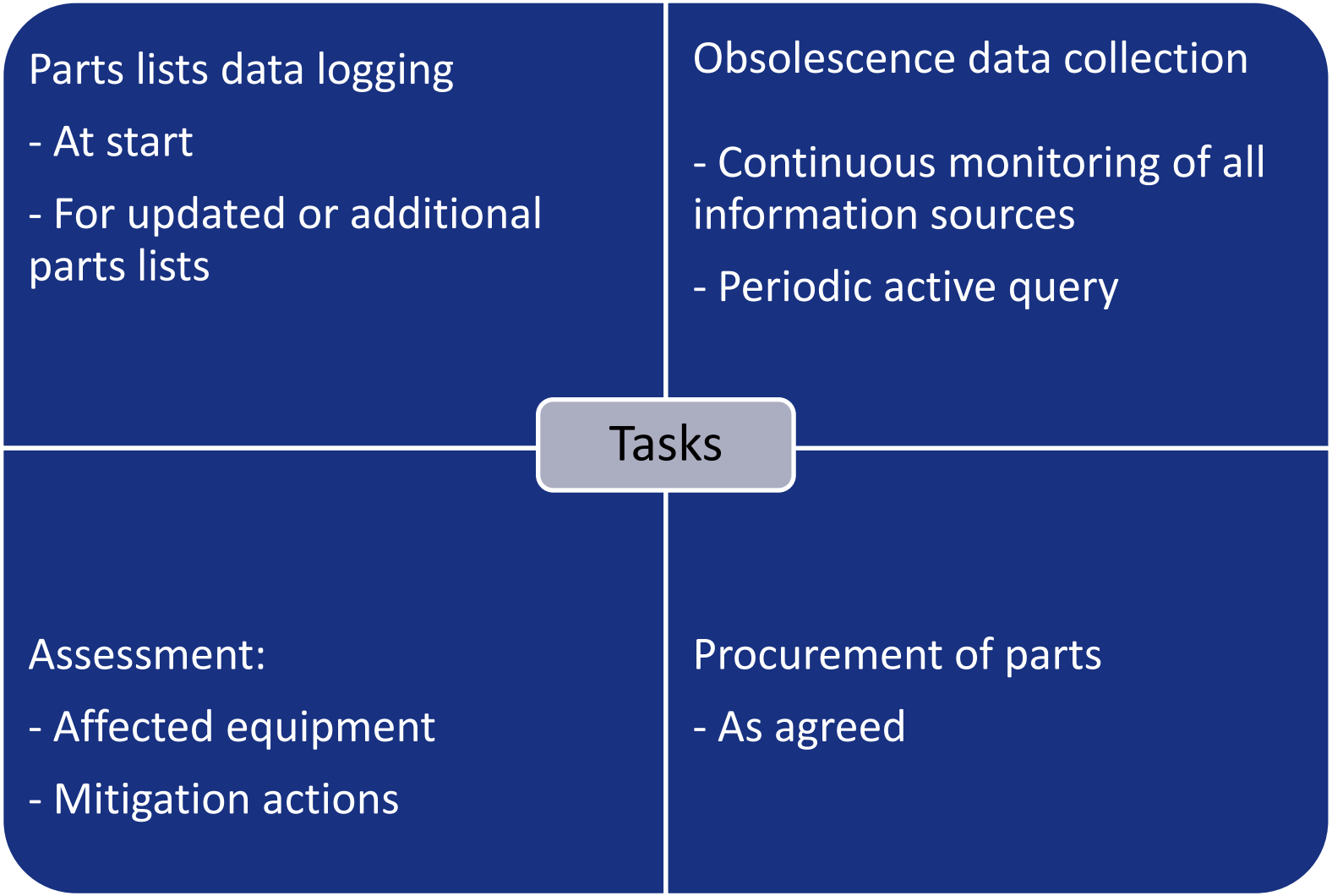
  > 400 equipment and lower level assemblies, with

  > 12.000 part types (25.000 line items)

(2) Organisation and Tasks



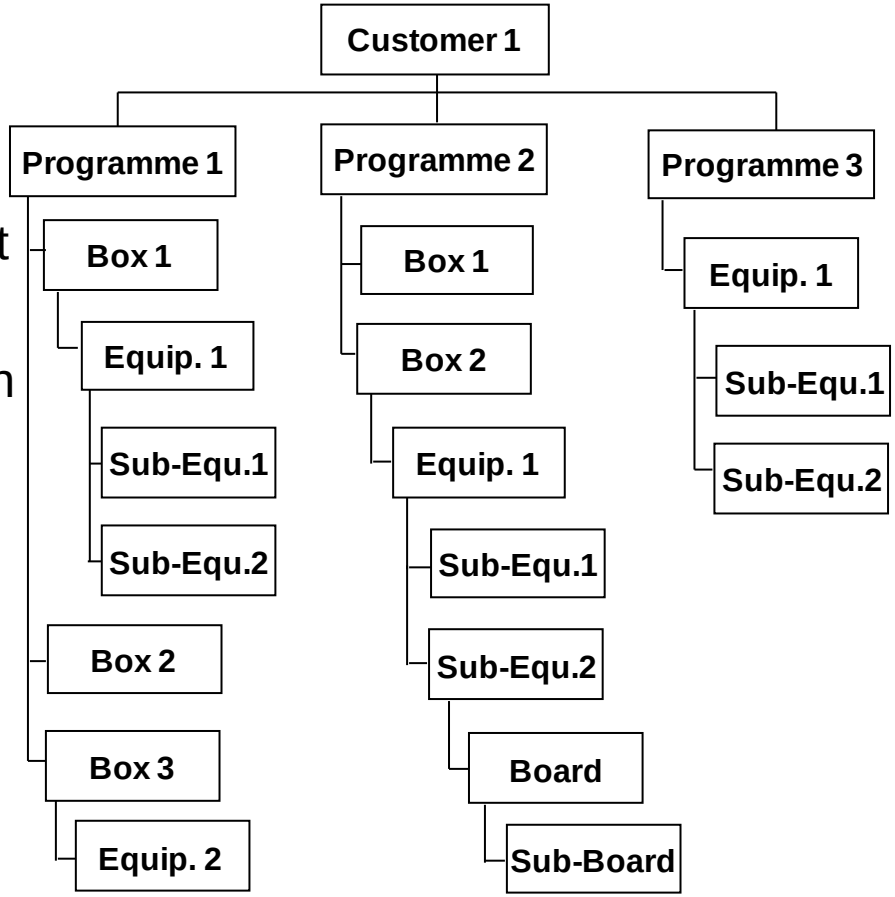
(2) Organisation and Tasks



(3) Implementation - Database

- Data base tool created by Tesat
- Reflects hierarchy of system + equipment
- Controlled and secure access
- Within each level all EEE parts are shown
- Assessments of obsolescence status possible on any level

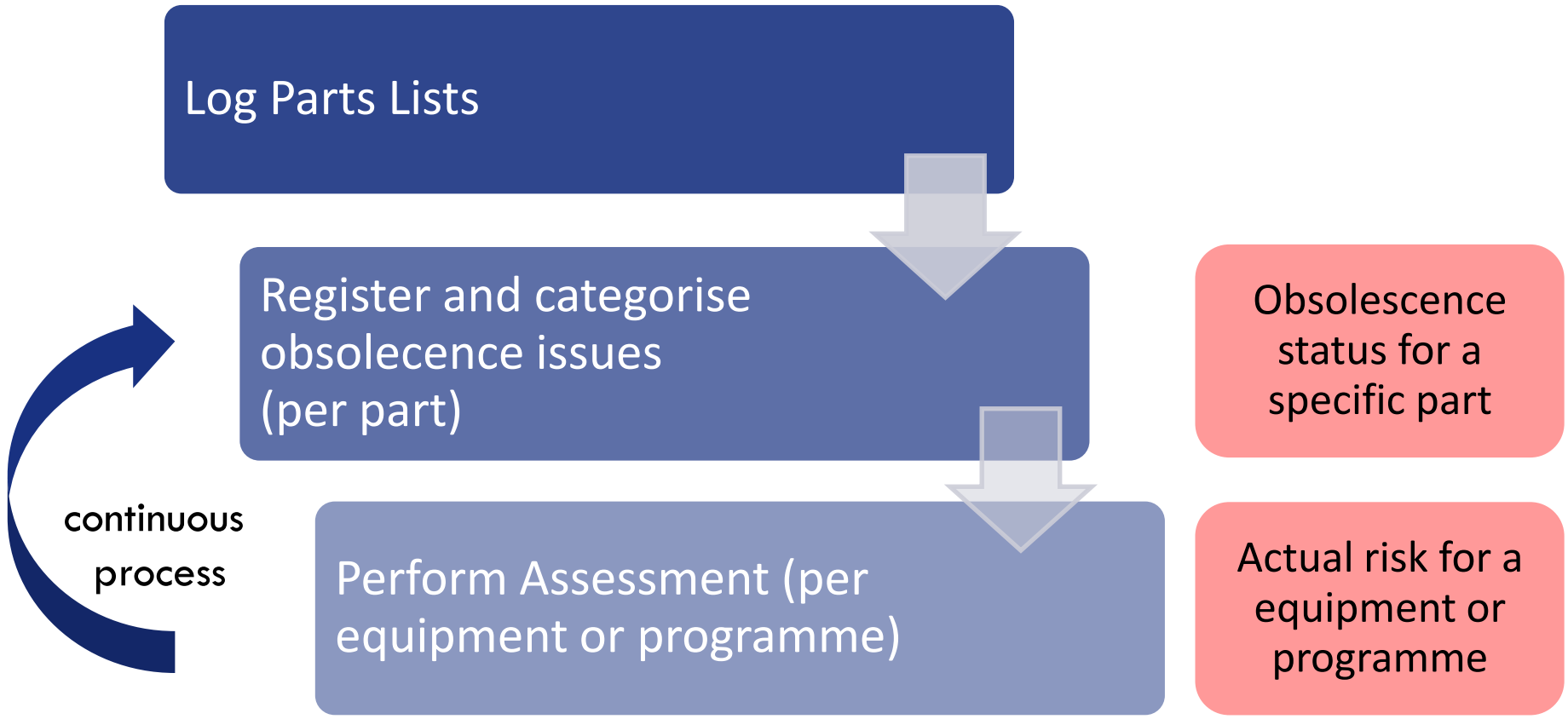
- Used for ESA Manned Spaceflight since 2003
- Since then continuous monitoring



(3) Implementation – Obsolescence Categories

No.	Category	Criticality	Description
1	Obsolete	High	Part can no longer be obtained
2	Obsolescence notified	High	Discontinuation of the production has been notified
3	Manufacturer pulls out of business	High	The manufacturer has decided to pull out of the space parts business, has closed down or gone bankrupt.
4	Alert issued	Medium	An alert regarding the part type has been issued
5	Production problems	Medium	The manufacture cannot fabricate the part because of manufacturing problems or insufficient capacity
6	Technical problems with the part	Medium	Technical problems have been identified at the users, at procurement agencies or in other programmes.
7	Major technical changes	Medium	The part is still available but has undergone major technical changes
8	Other	Medium	Any other event that may restrict the availability of the part type.
9	None	None	No restrictions / former restrictions are no more relevant

(3) Implementation - Process



(3) Implementation – Parts Level

- Example for data on parts level

Components in Database 1 - 25 (of 25 matching records)

Risk	Status	Idnr	Style	Value	Part Designation	Characteristic	Manuf.Code
		M_12_05929	2N2222	Switching transistor	SOC2N2222AHRB	Switching transistor NPN, Chip, QL : SCC-B	STM F
	Obsolete	M_12_06000	2N2222A	NPN Transistor	JANTXV2N2222A	Transistor, Low Power NPN, Case: TO-18, QL : [...]	STM F
		M_12_07222	2N2222A	NPN Power	JANTXV2N2222A	Transistor; Low Power NPN 50V/500mW	NES U

Parameters of selected part type

Style	Part designation	IdNr
2N2222A	JANTXV2N2222A	M_12_06000
Family	**Group**	**Package**
Transistor	Low Power NPN	TO-18
Value Description	**Manufacturer**	**Mat.-Group**
NPN Transistor	ST Microelectronics, France	

Description

Transistor, Low Power NPN, Case: TO-18, QL : JANTXV

Specifications

Type	Spec.No.	Spec.Iss.	Spec.Rev.	Spec.Status
AN				
DN	MIL-PRF-19500/255			
GN	MIL-PRF-19500	M	-	

Identify Programmes and Equipment — Search

Obsolescence Management — Obsolescence

(3) Implementation – Equipment Level

- Example for database output on equipment level

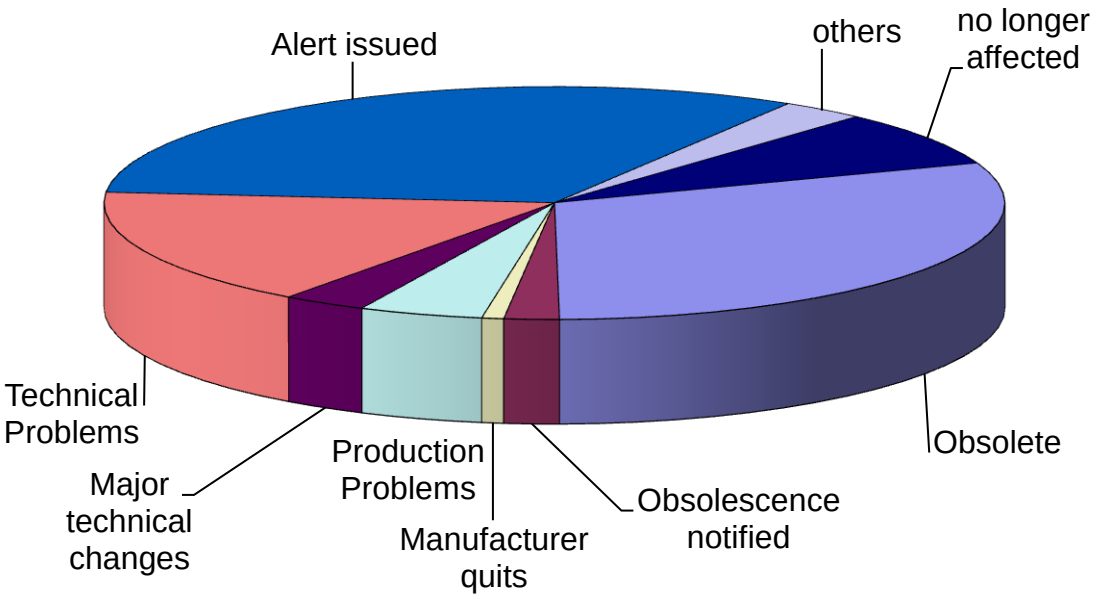
Equipment in Database 1 - 10 (of 73 matching records)

Risk	Equipment Code	Description	Parent Equipment	User	User Qty of Equ
🟡	AAA	Avionics Air Assembly	BIO	BRA	1
🔴	AI	Analyse Instruments	BIO	CGS	1
🟢	ANABO	Analog Board	WVS	ERE	1
🔴	ATCS	Active Therminal Control Subsystem	TE	NTE	2
🟡	Basis	Housing incl. Basic-Structure	RPDA	CGS	1
🔴	BGB	Biological Glovebox	BIO	BRA	1
🔴	BIO	Program		AST	1
🔴	CCB_MS	Board	MS	CGS	1
🔴	CCB_SP	Board	SP	CGS	1
🔴	CE	Control Electronics	TE	NTE	4

next 10 items ▶

🟢	All parts needed to manufacture this unit of equipment are available. Any obsolete parts have been procured and stocked or another recovery solution has been implemented.
🟡	The availability of some parts needed for the manufacture of this equipment is not secure. Near obsolescence or another risk category have been identified and recovery actions have not yet been implemented.
🔴	One or more part types needed for the manufacture of this equipment are no longer available and a recovery solution has not been implemented.

(4) Results: Assessment on Parts Level

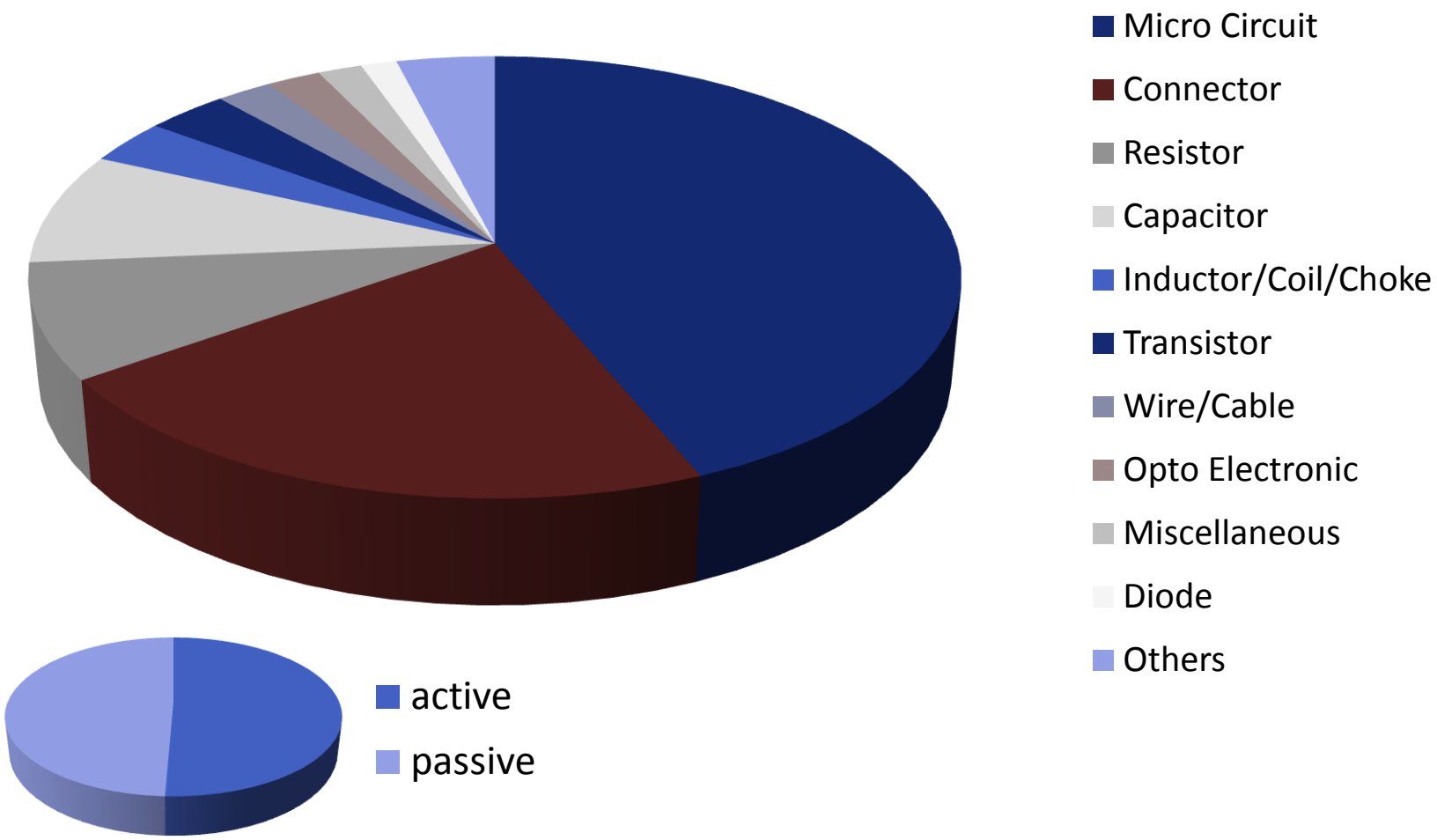


From 12.000 parts:

Obsolescence Issue	
Obsolete	13,2%
Obsolescence notified	0,9%
Manufacturer quits	0,3%
Production Problems	1,9%
Major technical changes	1,3%
Technical Problems	7,1%
Alert issued	14,0%
others	1,3%
no longer affected	3,4%
not affected	56,5%

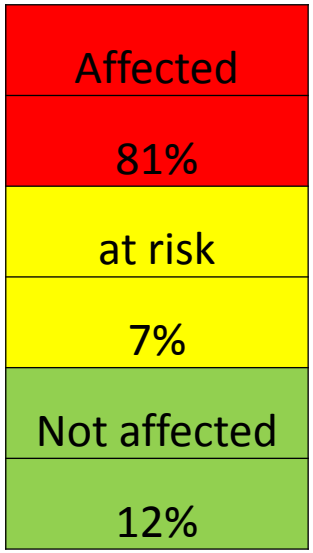
(4) Results – Parts Level

- Obsolete Parts – by Family

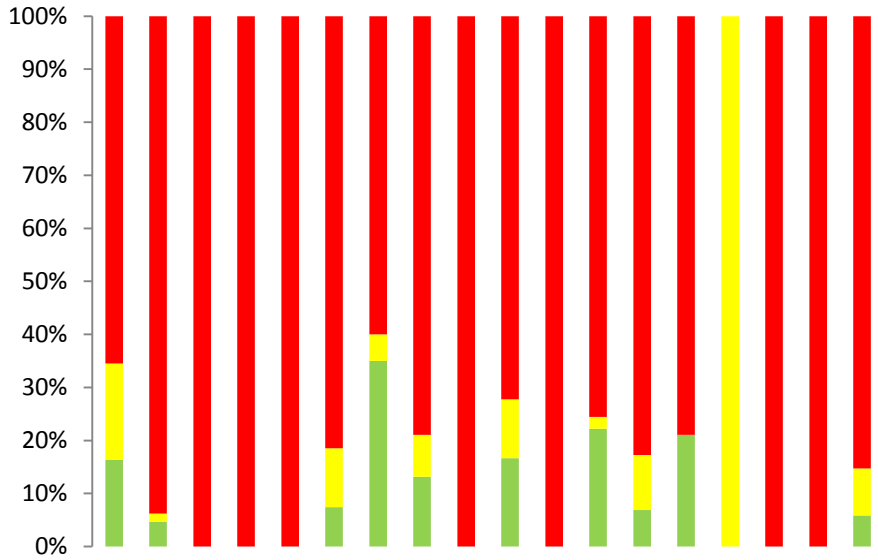


(4) Results: Programme + Equipment Level

- More than 400 equipment and subassemblies considered
- The number of programmes affected by obsolescence is much higher than the actual share of obsolete parts as only one single obsolete item will affect the complete programme
- More than 80% of the equipment is affected by obsolescence.



equipment



Programmes (schematic examples)

Assessement is specific to programme / equipment (example)

Part Identification

ID No.	Style	Value	Part Designation	Manufacturer
AN00115221	54ABT245	54ABT245W-QML	5962-9214801QSA	National Semiconduc

Global Obsolescence Data

Global status: Not available

Reliability of Obs.Data: Very reliable

Added: **Schmitz/TES** (2006-12-21 18:42:49)

Obsolescence Events:

Category: Obsolete

Added: **Schmitz/TES** (2006-12-21 18:42:55)

Manufacturer Inquiry 2006:
- Part obsolete
- Remaining die material sold to Zeus

Added: **Schmitz/TES** (2006-12-21 18:42:55)

Website information on national.com marks this part as "Obsolete". (Checked 4. Feb 2008)

Added: **Schmitz/TES** (2008-02-04 17:11:39)

Assessment information:

Category: Cat.1

Add new assessment info

Cat. 1 replacement available: 54ABT245 from QP Semi (QML38535 listed);

Added (Owner): 2007-08-07 14:15:17 **Gericke/AST**

Last update: 2008-02-26 16:49:12 **Gericke/AST**

Edit client visibility

(5) Summary

- The activity allows to indentify obsolescence issues and risks at an early stage due to
  - Wider definition of obsolescence
  - Periodic active query of actual status
- Obsolescence of Parts is a major issue for long term programmes
- There is always a clear view on all levels of equipment integration on the grade of being affected
- Programme specific measures can be considered and tracked

(5) Recommendations

- Start of Activity:
  should start as early as possible in a programme, ideally after finalisation of parts lists
- Quality of parts lists:
  Should contain complete details of the parts to allow clear identification
- Periodicity of manufacturer queries
  Compromise needed for maximum feedback
- Detail versus efficiency:
  Keep data base lean by using generic part style rather than all exact values where possible (especially for passive components)

THANK YOU VERY MUCH !

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