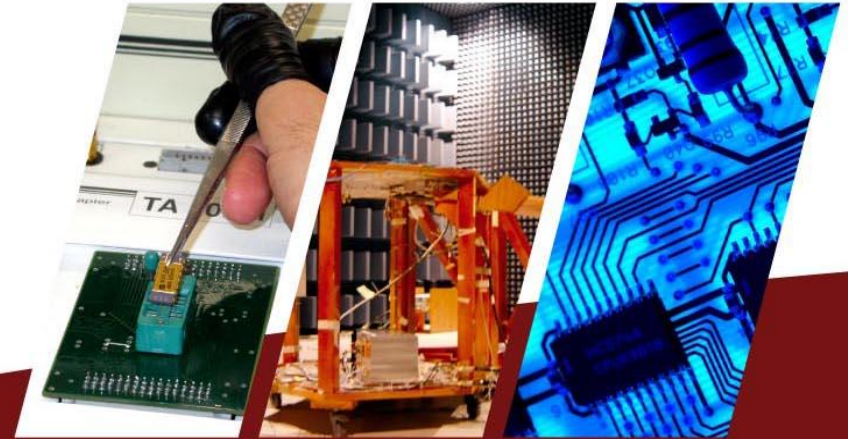


**ESCCON 2011**



# Specialised and Advanced Parts Procurement Services

EUROPEAN SPACE COMPONENTS CONFERENCE  
17th March  
ESA, ESTEC, Noordwijk, The Netherlands

- **EEE Components for Space**
  - ↗ The market
  - ↗ Background
  - ↗ Challenges
- **Parts Procurement Concept.**
- **Specialized & Advanced Parts Procurement**

## ■ EEE Components for Space

- ↗ The market
- ↗ Background
- ↗ Challenges

## ■ Parts Procurement Concept.

## ■ Specialized and Advanced Parts Procurement



Small Geo. Courtesy: ESA

- Use of standard industry practices are being imposed.
- Recurrent equipment and projects.
- New challenges and needs define a new and specialised approach.

■ Driven by competition, pressure on prices reaches all links in the supply chain.

■ Customer demand push up on performance requirements.

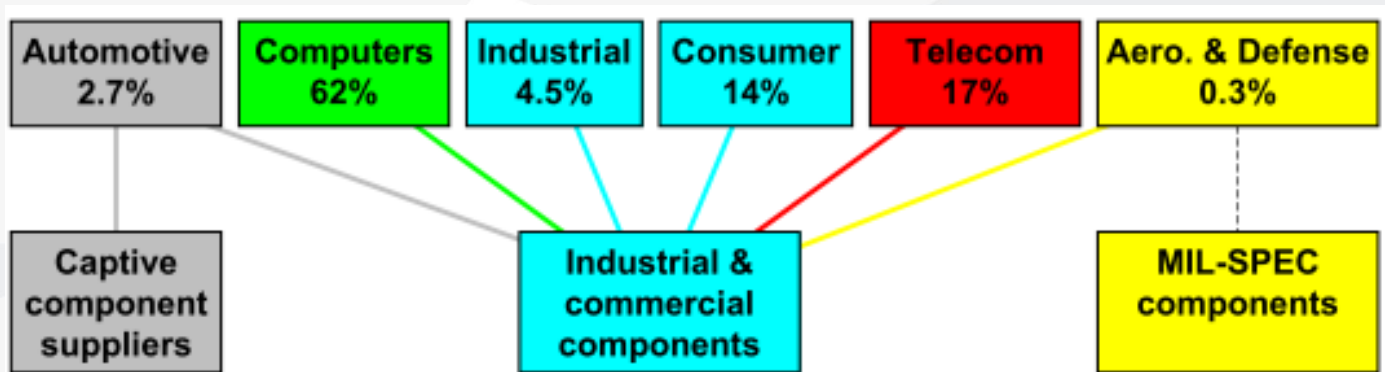


ATV. Courtesy: ESA



HTV. Courtesy JAXA/NASA

- ➡ Operators and scientific community are requiring higher performance systems.
- ➡ Global market demands more services with lower prices while keeping or increasing overall reliability figures.
- ➡ The use of state of the art technologies is needed.
- ➡ In the past most of the EEE parts for Space were specifically produced with specific processes. It is not the case currently!
- ➡ Space market is not a significant player in the global demand for EEE components.



NDIA Paper, Lloyd Condra, Convenor, IECQ-CMC Avionics Working Group. Year 2000 data.



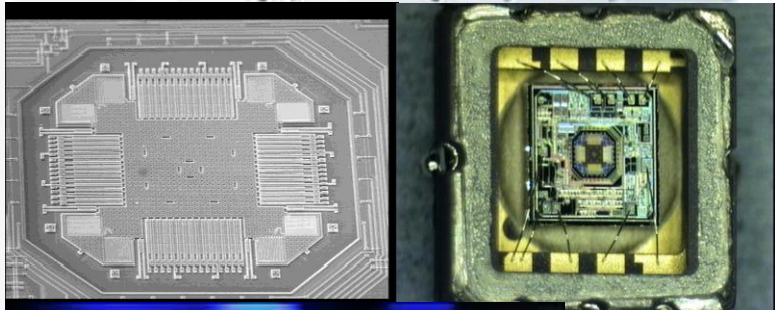
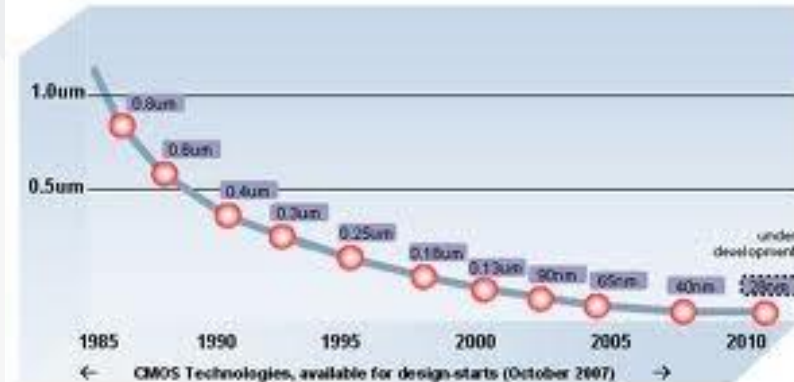
➡ Product availability of high reliability parts is becoming an issue in space projects since:

- ⚡ Market requires shorter lead times.
- ⚡ Space level products storage is not always economically feasible.
- ⚡ Export regulations prevent generation of strategic stocks.
- ⚡ State of the art technologies and functions are not qualified for space on time.

➡ New projects separated from classical approach are demanding low cost practices.



CMOS Technology Roadmap



- Mass market demands impose continuous improvement in performance and cost.
- Technology evolution and short life time cycles prevent long space evaluation and qualification flows.
- Newer technologies may exhibit new failures mechanisms.
- Some important families of products are not manufactured following space rules but are needed:
  - Optoelectronics
  - MEMS
  - Nanotechnology

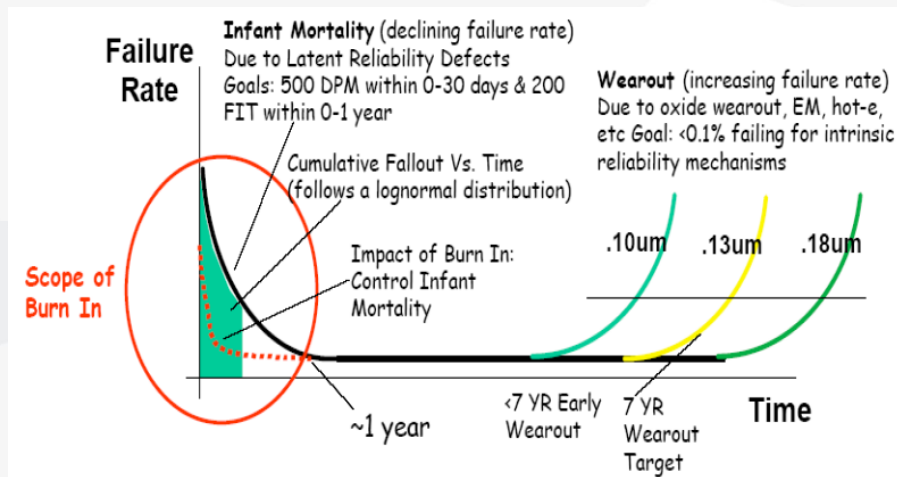




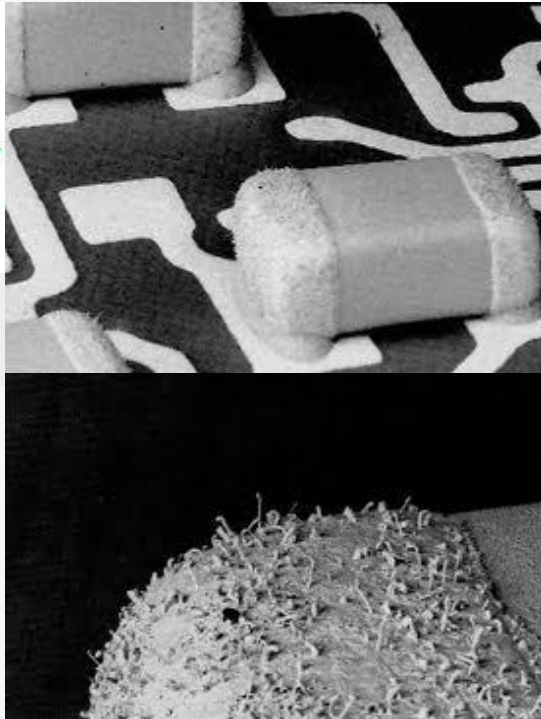
- ▶ EEE Parts manufacturers must be involved in space needs.
- ▶ Investment on new parts and technologies are needed.
- ▶ Growing opportunities in partnership with enhanced relationships.
- ▶ Approaching space needs from a global point of view.
- ▶ Proper communication channels must be established.



- ➡ Required for new technologies, not available at space level yet.
- ➡ The use of COTS parts has inherent risks due to lack of experience and new concerns (RoHS, counterfeit, etc.).
- ➡ A key factor is the identification of reliability concerns based on space environment and needs.
- ➡ Deep technological knowledge and manufacturer involvement is required to evaluate the risk.



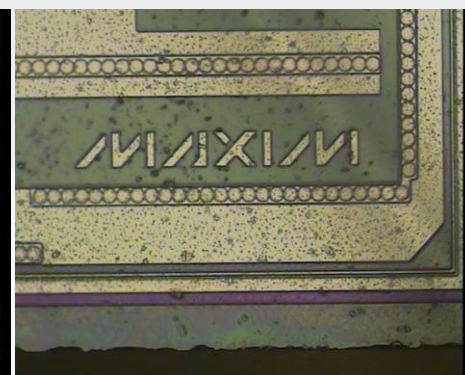
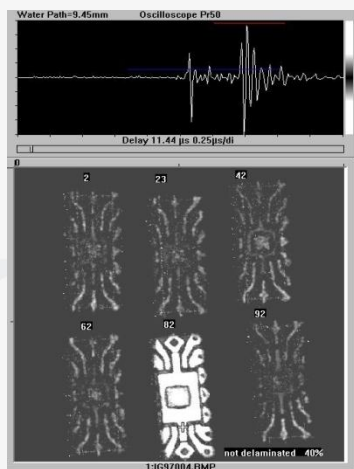
**ENHANCES THE  
NEEDS OF A  
SPECIFIC APPROACH  
AND EXPERIENCE  
CUMMULATION**



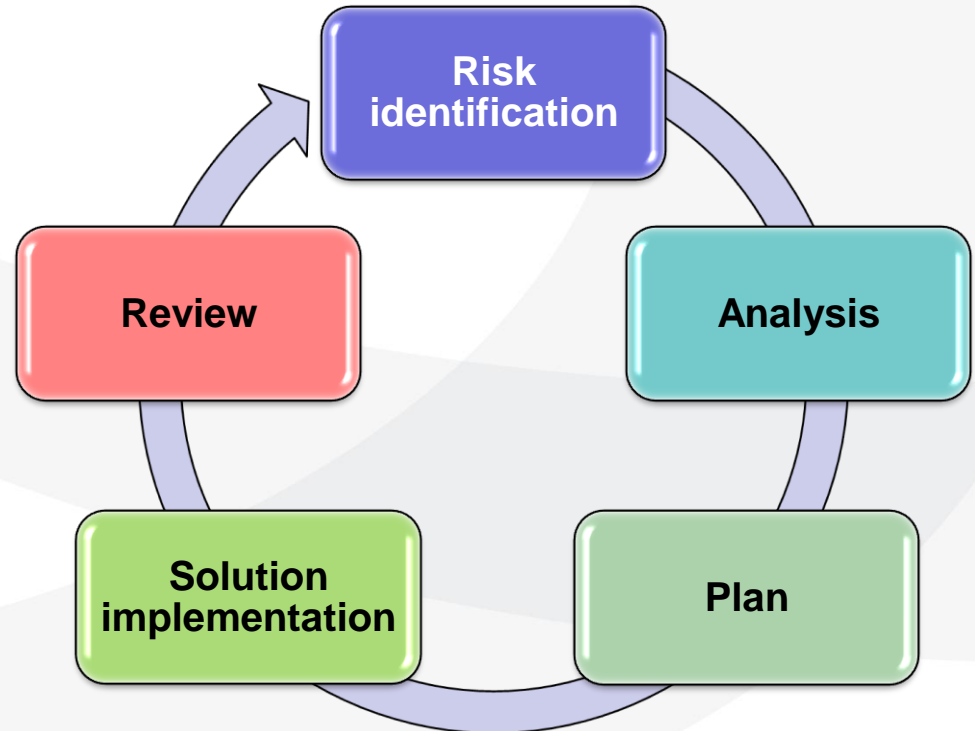
- Mass production tries to adapt the most used approach avoiding singularities.
- RoHS provides a common playground for commercial productions but damages space needs.
- Not only COTS are concerned about RoHS.
- RoHS is not only tin whiskers.
  - ⚡ Long terms storage conditions for new terminations.
  - ⚡ Modification of PCB population and manufacturing process.
- Assessment of different mitigation techniques are required.
  - ⚡ Conformal coating.
  - ⚡ Annealing.
  - ⚡ Others.

- ➡ The use of non qualified and specialized procurement channels may lead to increase the problems derived from counterfeits
- ➡ Counterfeit problems are well known at industrial levels and increasingly affecting high reliability markets.
- ➡ Proactive approach and detection techniques can save enormous amounts of time and money.

Different Plastic  
(CSAM)



- ➡ Space industry must respond to concerns not previously addressed.
- ➡ Risk management tools and proactive problem anticipation techniques are mandatory.
- ➡ Active monitoring and obsolescence mitigation techniques, allowing re-use of cumulated data are required.
- ➡ The use of specialised channels provides a dedicated approach tailored for space needs.





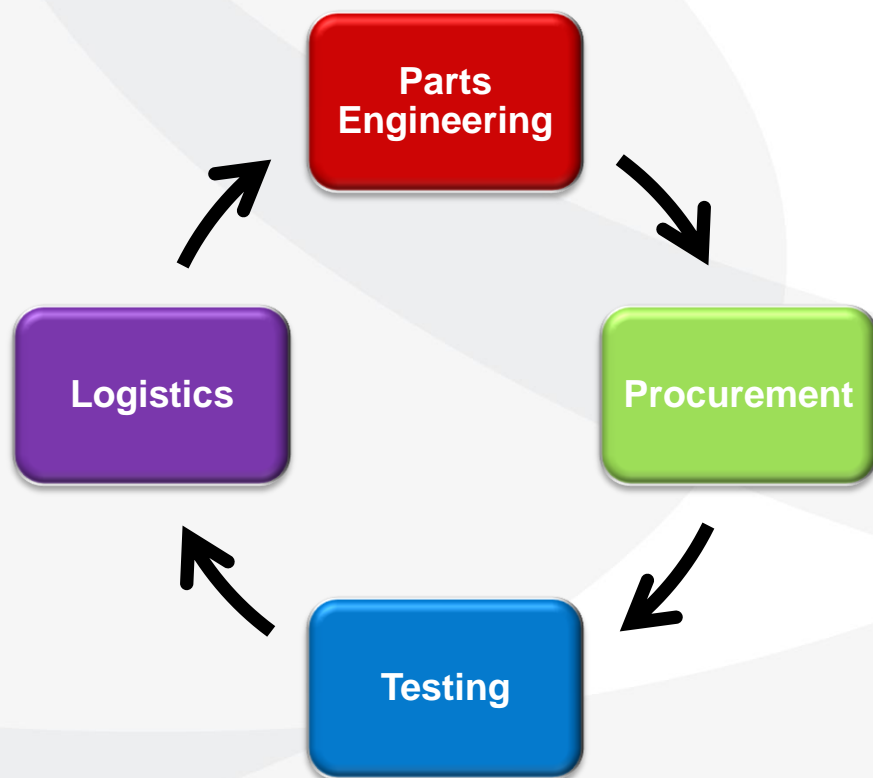
► Space environment presents unique concerns not addressed by mass market industry.

- ⚡ Lead time. Definition of schedule critical item (SCI).
- ⚡ Lot validation failure. What happens if a SCI fails during lot validation?
- ⚡ Radiation performance. Can we wait until complete characterization?
- ⚡ Export restrictions. Jurisdiction modification during procurement.
- ⚡ Production shortages. Can we anticipate problems?
- ⚡ Inability to meet project quality requirements. Which are my alternatives?

► EEE parts are in the critical path of the satellite manufacturing.

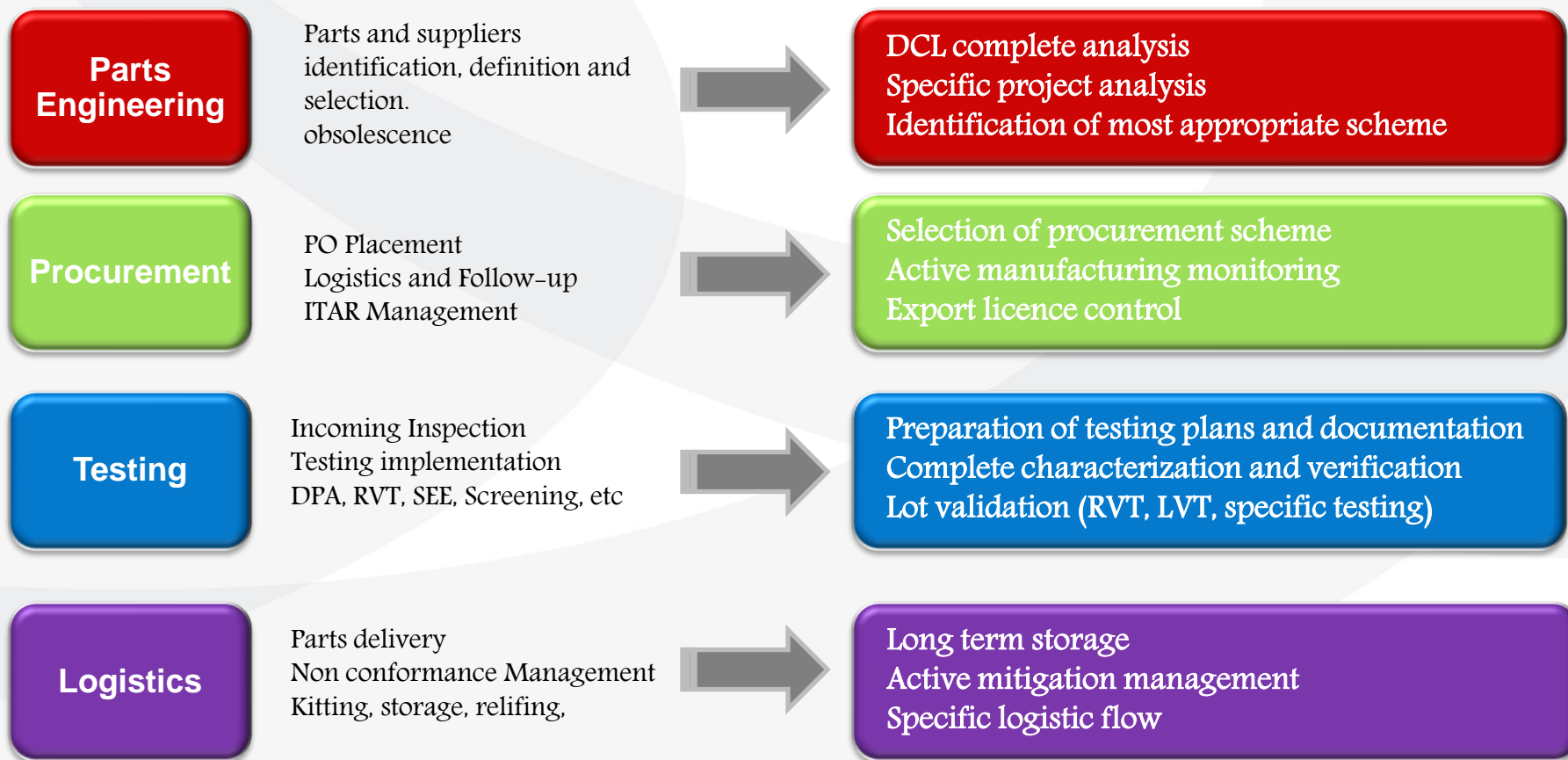
► Failures on a simple component can lead to lose the complete mission.

- EEE Components for Space
  - ↗ The market
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  - ↗ Challenges
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- Specialized and Advanced Parts Procurement



- ▶ EEE parts are the foundations of a satellite.
- ▶ Parts Engineering and Testing is providing the right tools to the proper selection and subsequent use of EEE parts.
- ▶ Parts procurement and testing companies / organizations are giving solutions to the problems derived from the new industrial environment.
- ▶ EEE Parts product assurance, requirements understanding and specific services are key factors in the project success.

## PROCUREMENT AS A COMPLETE CYCLE ACTIVITY





- ➔ Proper product selection requires access to key information and continuous monitoring.
- ➔ Integration of experience from other market segments.
- ➔ Appropriate reporting systems allows a right decision taking process.

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## Catálogo de componentes

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CATALOGUE: *Microcircuits*

1914 Matches

fore Info

[Refresh] 10 Regs/Pag

[1] [2] [3] [4] [5] [More...] of 192


view

ALERTAS

add		General Data					ALS	OBS	PPL	RAD	QAD	TST
All	None											
		Component Number	Manufacturer	Part Type	Specification	Quality	AL	OBS	PPL	RAD	QAD	TST
		5962-0150801QYC	Adtel	RT54SX32S-CQ208B	5962-01508	QML Q						
		5962-0150802QXC	Adtel	RT54SX32S-1CQ256B	5962-01508	QML Q						
		5962-0150802QYC	Adtel	RT54SX32S-1CQ208B	5962-01508	QML Q						
		5962-0150803QXC	Adtel	RT54SX32S-CQ256E (E-FLOW)	5962-01508	QML Q						
		5962-0150803QYC	Adtel	RT54SX32S-CQ208E (E-FLOW)	5962-01508	QML Q						
		5962-0150804QXC	Adtel	RT54SX32S-1CQ256E (E-FLOW)	5962-01508	QML Q						
		5962-0150804QYC	Adtel	RT54SX32S-1CQ208E (E-FLOW)	5962-01508	QML Q						
		5962-0151501QXC	Adtel	RT54SX72S-CQ256B	5962-01515	QML Q						
		5962-0151501QYC	Adtel	RT54SX72S-CQ208B	5962-01515	QML Q						
		5962-0151502QXC	Adtel	RT54SX72S-1CQ256B	5962-01515	QML Q						

Alter EEE Parts Catalogue

- ➔ Detailed controls and risk mitigation analysis and plans must include actions for:
  - ⚡ Obsolescence
  - ⚡ Alerts monitoring
  - ⚡ Export control needs
  - ⚡ Long lead and critical schedule items
  - ⚡ Manufacturers and products evaluation
  - ⚡ Counterfeit detection



COMPONENTS ELECTRONICOS S.A.

Web Project Office Log Out

David Nuñez

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Reports Centre

Components

Catalogue

- Families
- Capacitors
- Connectors
- Crystals
- Discretes
- Filters
- Inductors
- Inductors / Coil / Choke
- Microcircuits
- Resistors
- Relays
- Switches
- Thermistors
- Transformers
- Wire & Cables

Utilities

**General Data**

Component Number	Manufacturer	Part Type	Specification	Quality
5962H9861501VXC	BAE Systems	LM1M8C3VRH-V30X	5962-98615	QML V
5962H9861502VXC	BAE Systems	LM1M8C3VRH-V35X	5962-98615	QML V
5962R0260101VXC	Atmel	SMDJ-65609EV-40SR	5962-02501	QML V
930104702	Atmel	DJ-65608EV-45	9301/047	ESCC
930104704	Atmel	DJ-65608EV-30	9301/047	ESCC
HLX6228TSE	Honeywell	HLX6228TSF	HLX6228 HON_DS	JAN S EQ
HLX6228TSH	Honeywell	HLX6228TSH	HLX6228 HON_DS	JAN S EQ
HLX6228TSN	Honeywell	HLX6228TSN	HLX6228 HON_DS	JAN S EQ
HLX6228TSR	Honeywell	HLX6228TSR	HLX6228 HON_DS	JAN S EQ
HX6228ASF	Honeywell	HX6228ASF	HX6228 HON_DS	JAN S EQ

**Qualification Status**

Qualified Part: Y

Rad. Level: 1000Krad(Si)

Package: FP-40

Finish: Gold Plate

Capacity: 1M

Organization: 128K x 8

Access Time: 30ns

**Application**

Microcircuit, Linear, High-Speed, Fast-Setting, Precision Operational Amplifier, Monolithic Silicon

**Mechanical Data**

Package: FP-40

Finish: Gold Plate

Capacity: 1M

Organization: 128K x 8

Access Time: 30ns

**Functional & Electrical**

Finish: Gold Plate

Capacity: 1M

Organization: 128K x 8

Access Time: 30ns

**ALS**

AL

**OBS**

RISK

**PPL**

PPL E P1

**RAD**

RAD

**BASIC SEARCH**

Quality System / Level: All / All ?

Manufacturer: Detailed Specification

Click here to set Detailed Specification

Style

Click here to set Style

Multiselect 'Ctrl + Click'. Max Selection: 3 Mnfrs.

**SPECIFICATIONS SUMMARY**

Generic Specification: MIL-PRF-38535

Detailed Specification: 5962-88513

Applicable Documents: [VIEW](#)

**APPROVAL STATUS**

Qualified Part: Y

Certificate Number: QPDSIS-38535 13-Oct-2010

Valid Until:

**DIRECT SEARCH**

Component Number: Exact

Part Type:

Note: Advanced parametric and additional search will not apply

**ADVANCED PARAMETRIC SEARCH**

Qualification Status: Qualified Part: All

Mechanical Data: Package: All, Package Class: All

Application: Rad. Level: All

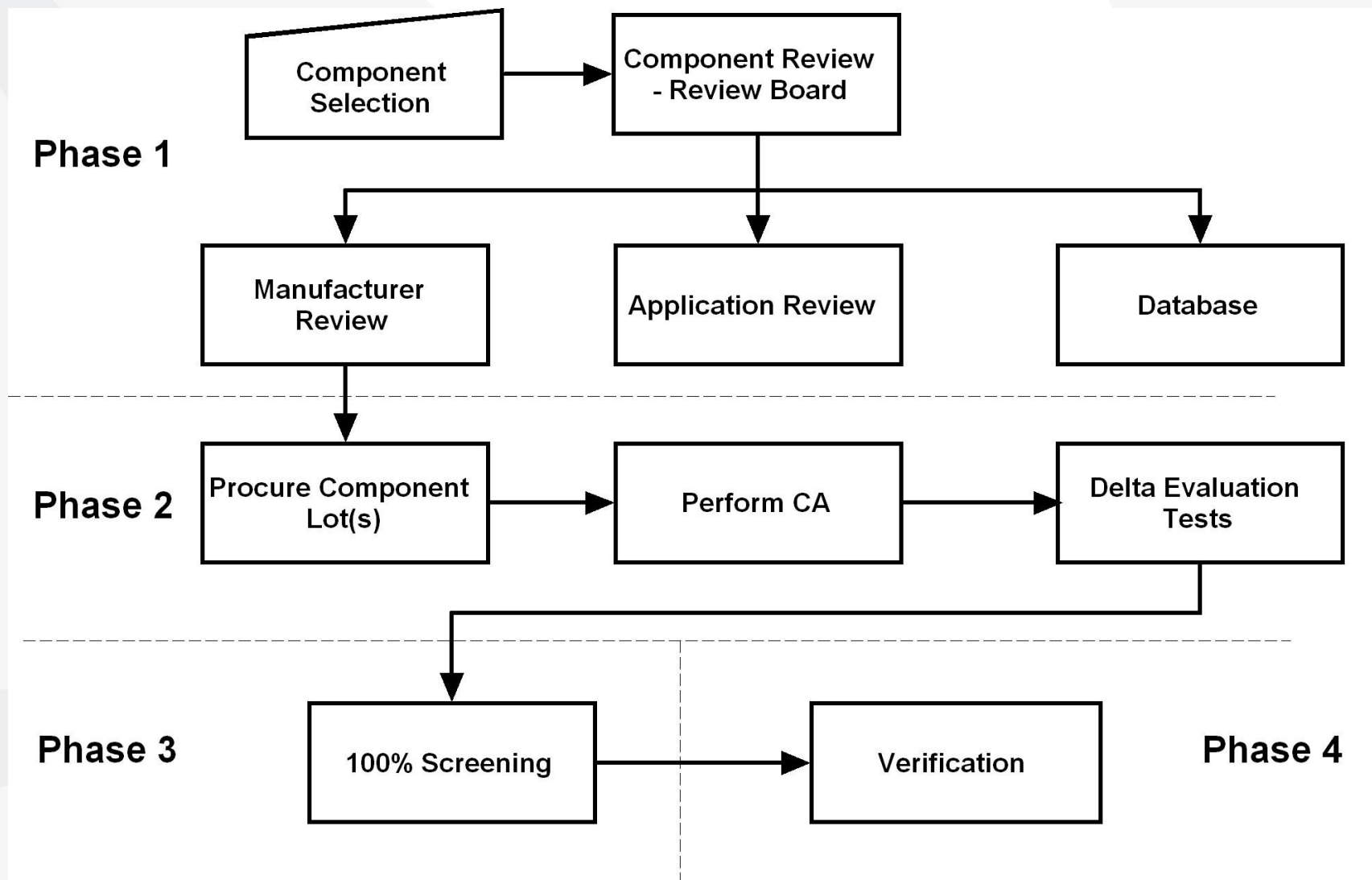
Functional & Electrical: Number of Channels: All, Resolution: All, Sample Rate: Apply, Finish: All

**Characteristics**

Qualification Status: Qualified Part: Y

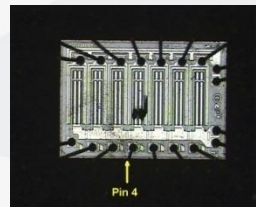
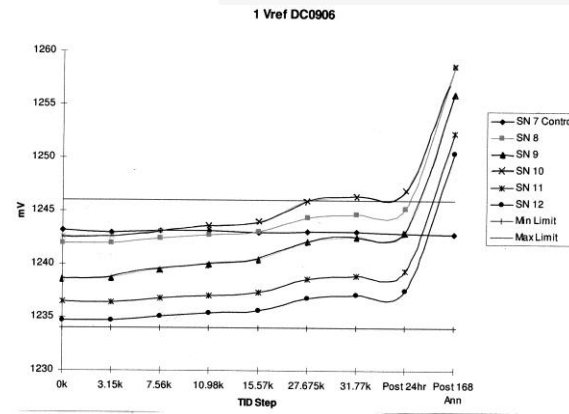
Mechanical Data: Package: CAN-8

Functional & Electrical: Finish: Hot Solder Dip, Bandwidth: 10MHz, Number of Amplifiers: MONO, Gain (Minimum): 114dB

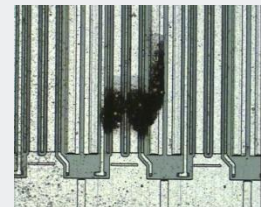


- ➡ Parts neither designed nor manufactured to consider space environments.
- ➡ Specific knowledge on the space environment and characteristics are required in order to generate proper testing scheme and results validation.
- ➡ Radiation characterization versus radiation testing.
- ➡ Specific analysis per component, radiation effects and application.
- ➡ Accelerated testing is a valid tool to obtain confidence.
- ➡ Many factors involved in the analysis of the results.
- ➡ Not skilled analysis may lead to inconclusive results.

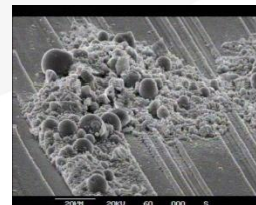
## ELDRS – Results for a COTS Low Voltage (1.24V) Adjustable Precision Shunt Regulator



Die Surface



Failure Site



Pyrolysed Plastic



PROBLEM	SOLUTION			
	COTS (Evaluation + Upscreening)	ECI programme	ASICS development	OTHER
Availability of Space Qualified Parts is reduced and decreasing	X	X	X*	
ITAR/ European dependence	X	X	X*	
OBSOLESCENCE/ Technology life-cycle	X	X	X*	Obsolescence management programmes
COMPETENCE •Power reduction needs •Mass reduction needs •Performance increase needs.	X	X	XX*	

\* Depending on the function

Mixed signal ASICs can be an alternative solution to procurement issues.



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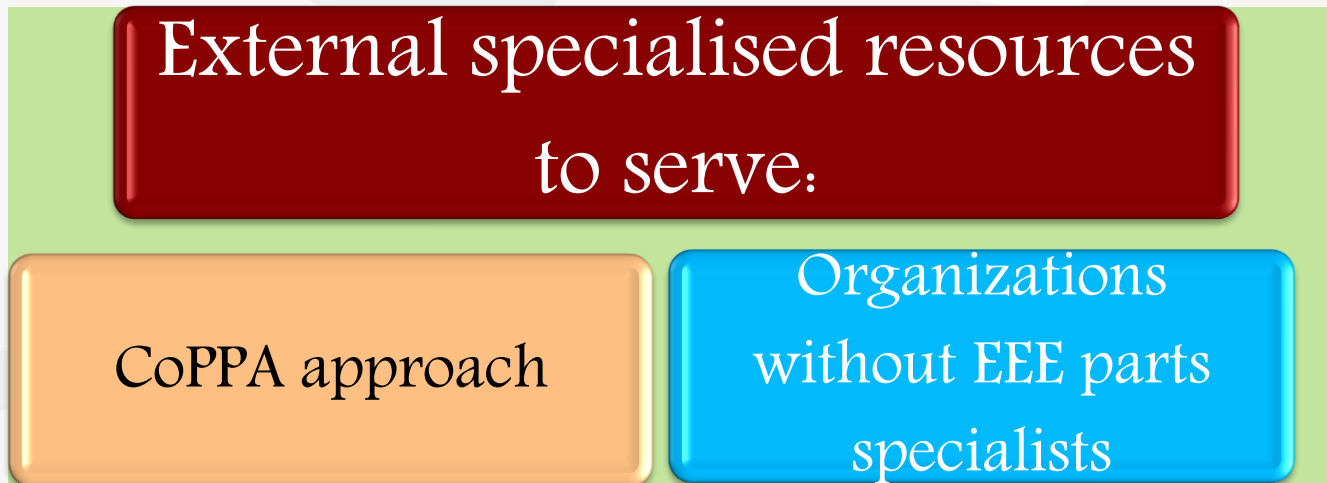
➡ To face these challenges, procurement will move towards to:

- + technical approach (deeper knowledge on parts)
- + topics to control (life cycles, technology changes, terminations)
- + integrated (design, engineering, logistics, manufacturing)



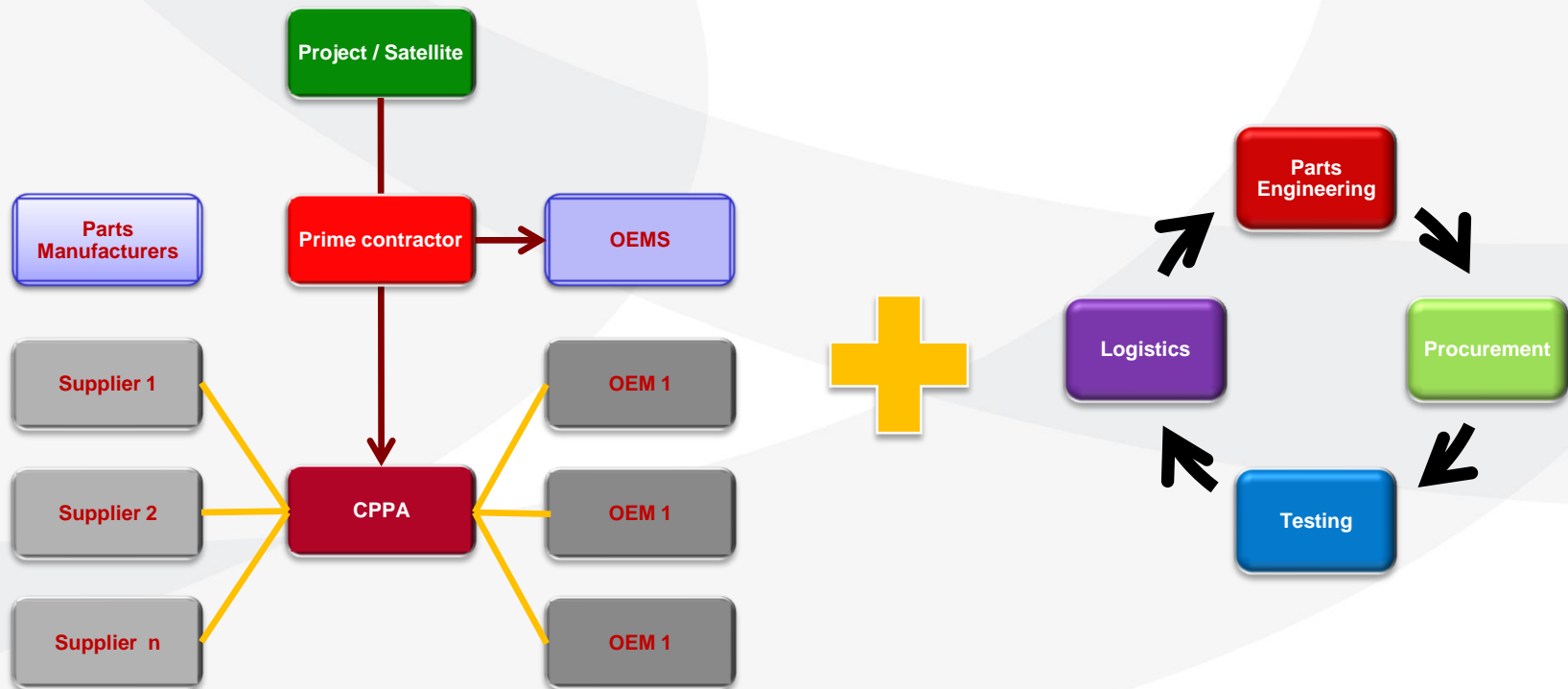
**SPECIALISATION**

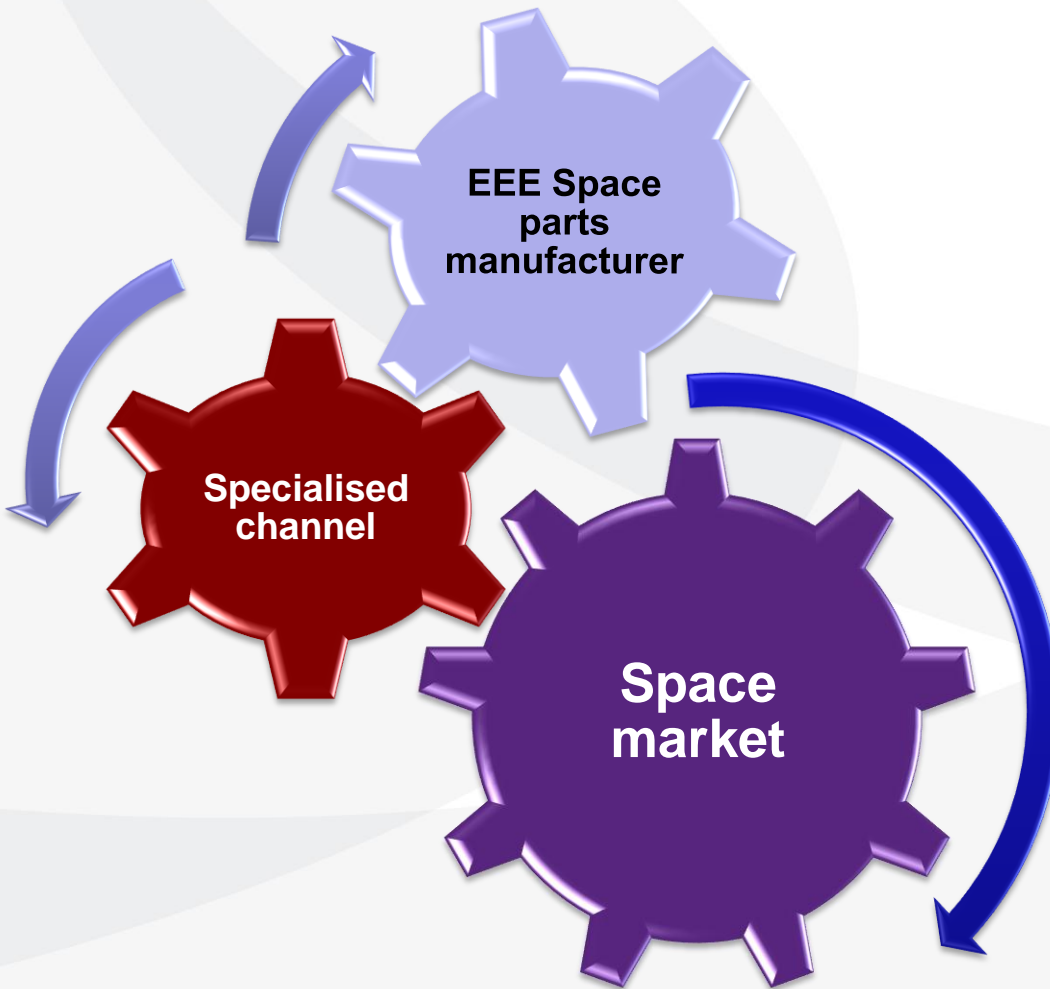
- ➡ Different approach based on organization type and project:





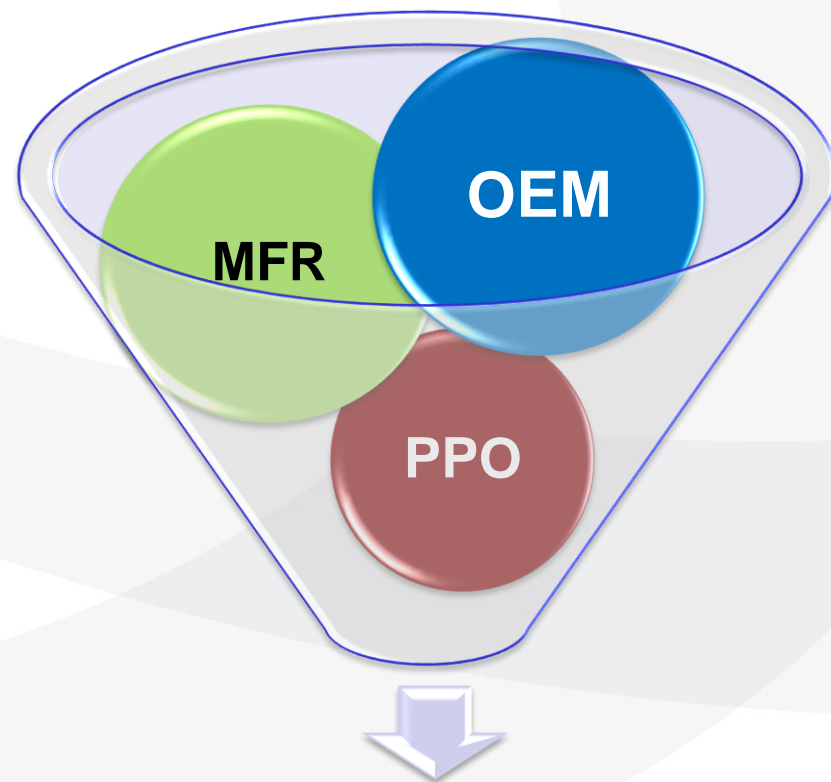
- ➡ CoPPA concept is evolved to a specialized approach.
- ➡ Classical advantages are kept while increasing the level of service and support to new activities.





- Simplification of supply chain increases visibility of space level manufacturers.
- Extensive use of specialised channels provides more efficient bi-directional information flow, ensuring the right feedback is provided.
- Orientation on global market demands helps to focus developments allowing required return on investments and coverage of key functions.

- ➡ Each actor is focused in their core activity.
- ➡ Results are optimized combining resources and common needs (i.e. advanced testing requirements).
- ➡ Knowledge accumulation accessible to all actors.
- ➡ Parts procurement organizations (PPO) are the evolution towards a specialized approach.



**RESOURCES OPTIMIZATION**

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