ThalesAlenia Space
a Thales / Leonardo company

SPACE REQUIREMENTS AND NEW SPACE SUPPLIERS: WHAT/WHO IN THE MIDDLE?

TAS REX ON ITALIAN “NEW SPACE” PROGRAMS

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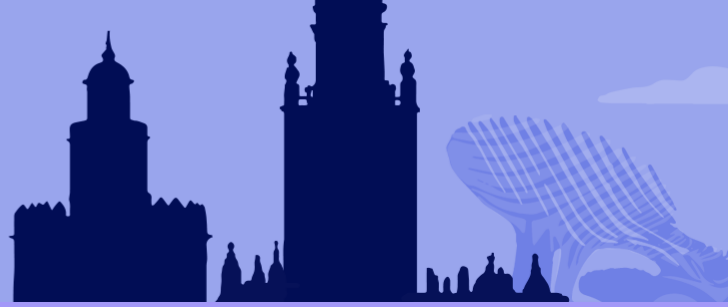
ACCEDE | ESCCON
2025
Seville - Spain
25 to 27th March
ALTER | esa



We cannot solve our problems with the same thinking we used when we created them.

(A. Einstein)

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REQUIREMENTS FOR ITALIAN COTS PROGRAMS

TAS heritage → Iridium Next constellation (66 satellites, 80 launched; LEO orbit)

	PLATiNO 2018; Launch 4Q2025; LEO orbit	IRIDE 2023: Launch 4Q2025; LEO orbit	LEO PNT Pathfinder A 2024. Launch 4Q2025; LEO orbit
Requirements Type of deliverable product	Program (No reference to ECSS for COTS.) Only a platform	Medium End mission issue 2 Small constellation	Low End mission issue 2 Two similar satellites
Type of EEE parts	(AEC-Q, EP) preferred to standard parts (ESA, NASA, MIL, JAXA)..	Hi-Rel grade 1&2, AEC-Q or EP preferred	Critical COTS (No Rel data or good manuf) and non critical COTS
Number of unit	12 (DCL frozen)	18 (waited other 7 contribution)	13
~ number of Part Types	2500	1300 (additional 300 expected)	850
Procurement	CPPA mandatory.	Self	Self (but TAS driven in few cases)
Operative duration	3+2	5	2

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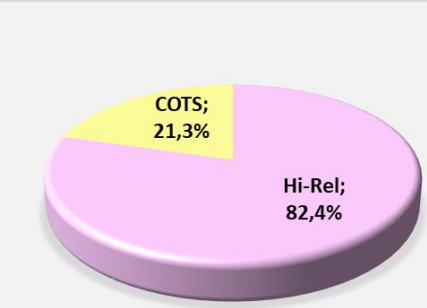
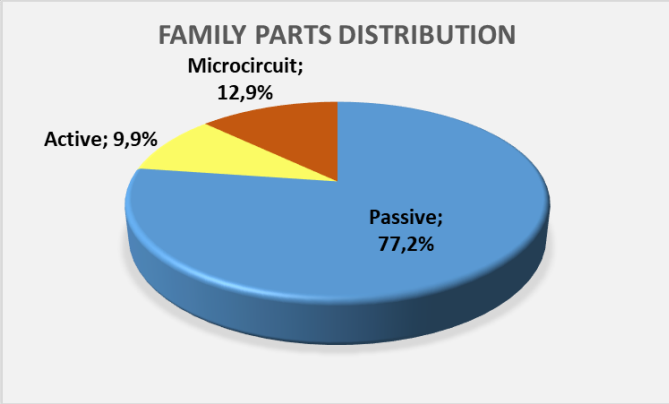
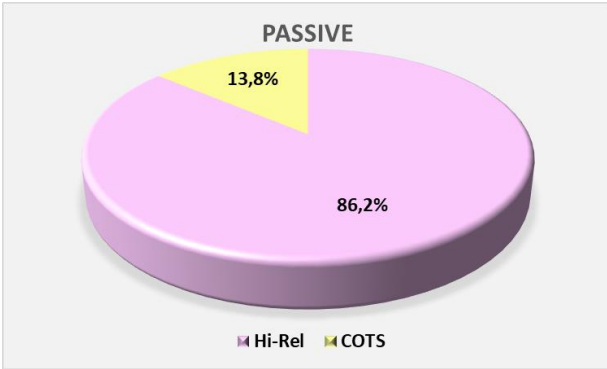
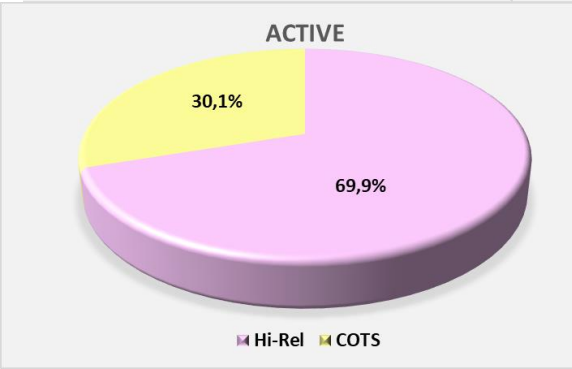
PLATiNO DCL DATA

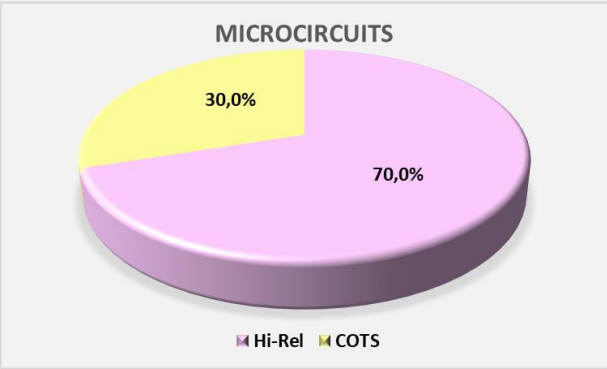
- Program started in 2018, February. Design and component selection until mid of 2019.
- No change in unit design, only more expensive parts (Few exceptions)
- Passive COTS are less because their costs was not valued as critical





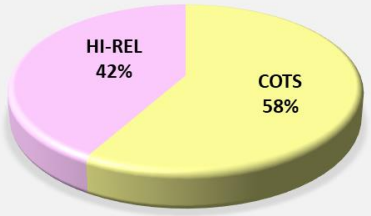


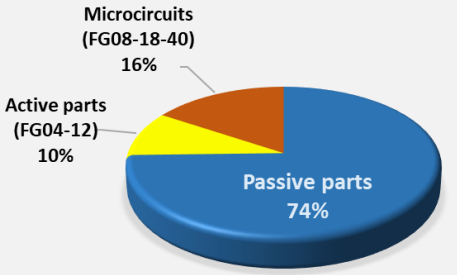


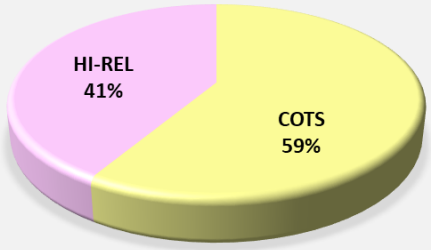


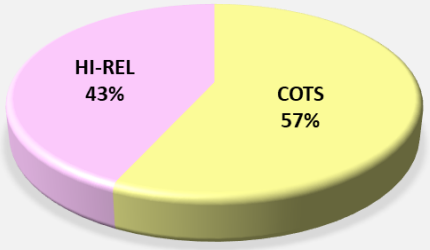
IRIDE DCL DATA

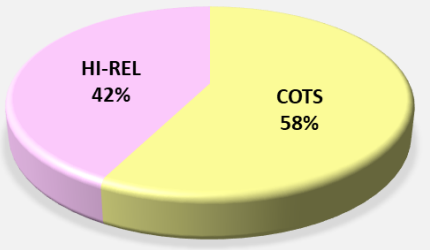
- Design and component selection ended in 3Q24;
- Most units designed for IRIDE, but with «old» internal architecture
- Same percentage of COTS on all families
- Large use of «qualified» parts: 23% of parts have PAD/JD
- More stringent requirements w.r.t. PLATiNO (but same time to CDR)











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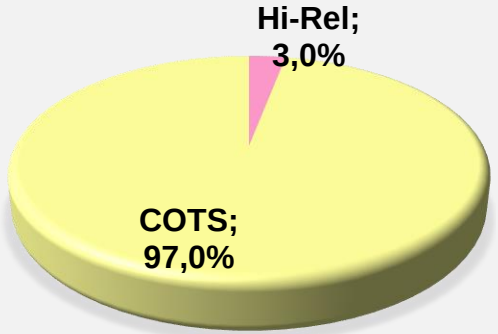
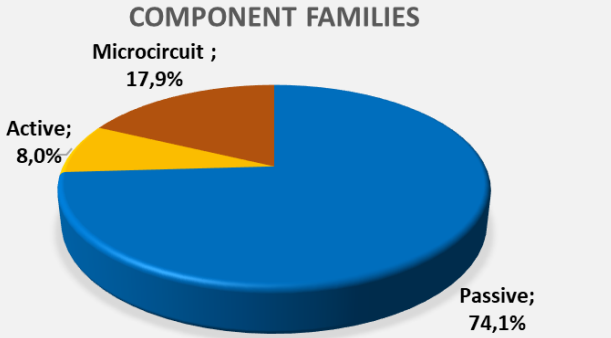
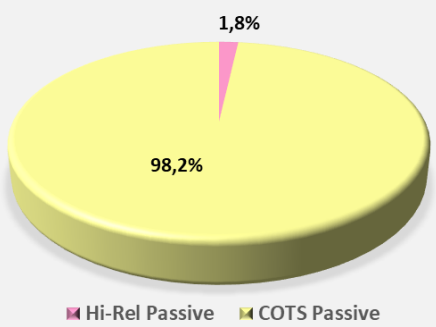
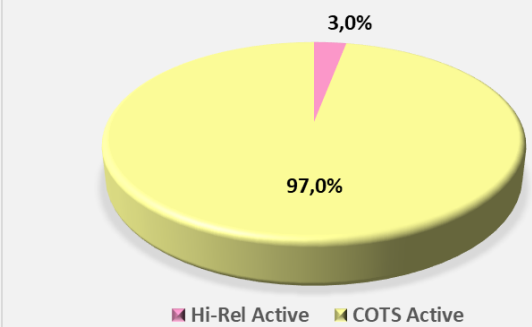
LEO-PNT PATHFINDER A DCL DATA

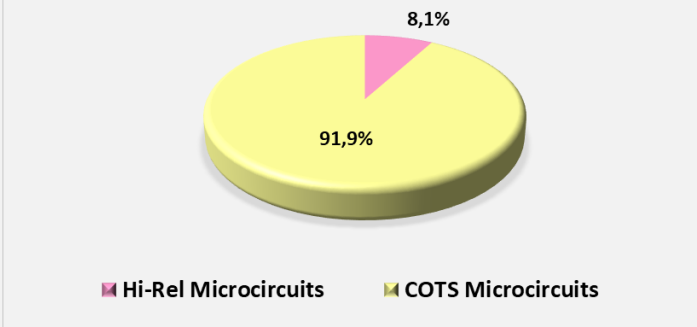
- Design and component selection ended in 4Q24;
- All units are totally new.
- Diffused usage of parts without documentation (PADs & JDs)
- Technical performance upgraded as expected due to COTS usage
- Complex part have a little more Hi-Rel parts in comparison with other components











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Pure Tin	JESD-201 class 2 or conformal coating or others	JESD-201 class or conformal coating or others	Same as ME. All supplier adopt the conformal coating.
Traceability	With C_{pk}, otherwise Construction Analysis	Single lot /DC (or DCs ≤ 1 year)	Single lot /DC preferred (or DCs ≤ 1 year)
JD	Required only for Industrial, MIL EXT range	All COTS not AEC-Q or EP	Only for Critical Parts
Screening	Non-qualified parts screening at board level	On the board (20 TC)	On the board (20TC)
CA	Not required	Required	Only on Critical COTS

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OUR SUPPLIERS

3 types :

1. Small and Medium enterprises (space experience).
   Multidisciplinary approach for COTS selection, warehouse and procurement mainly from manufacturers.
   SoC mainly Compliant but lot of info available only if you pay; reluctance to share data

2. New Space operators first time for “Institutional” Satellites; good component selection but difficulty to comply the Mission quality requirements (technical-qualitative requirements ???.
   Very reduced Quality Structure.

3. New space suppliers: CubeSats designer/manufacturer (less than 2 years);
   different linguistic approach and need to be guided in manufacturer selection.
   Small companies; quality usually 2 or 3 employees each for all disciplines; use commercial distributors (Farnell, Mouser, Digikey, RS, etc.).
   Suppliers followed regularly in component selection of and in documentation production (DCL, PAD, JD).
   No Quality structure (usually Quality is the vice president).

PLATiNO and IRIDE

LEO-PNT and IRIDE

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AN UNEXPECTED BLOCKING ANSWER

We make NewSpace, no paper!

Popular answer by all the supplier on all programs to the request to fill the SoC to our requirements.

The prevailing positions in PA team after this answer were:

- Land the supplier.
- Forcefully demand strict compliance with the requirement
- Ask (always forcefully) for compliance with the requirements considered essential.

For those who have been involved in the traditional space for decades, these NewSpace suppliers might almost seem like "pirates" in their ways.

Idea! What if…

…the code is more what you'd call 'guidelines' than actual rules.

Captain Hector Barbossa (Pirates of the Caribbean)

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MEET THE SUPPLIERS

Understood the language and clarified what is essential and what not…

- Rule 1 in NewSpace: **trust the supplier**
  selecting a good supplier is key.
  A NewSpace supplier don't have the internal quality and design/manufacturing/flight heritage as a qualified space supplier

- Assess the risk associated with a NewSpace supplier
  Risk management, no risk avoidance.

Numbers! No…

- "Essential" "requirements"
  - Part selection:
    - Good Manufacturers
    - Good COTS & SPC
    - Traceability
    - Evaluation/qualification & LAT & Screening
  - Reliability
  - Pure Tin

OLD FASHION AND NEW STYLE

Design

Quality --> Reliability

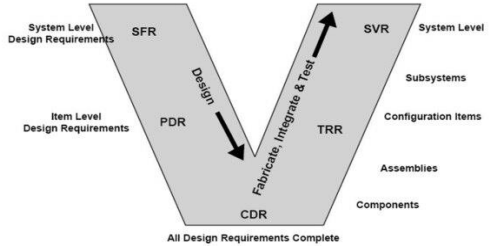
Costs Performances

Test on unit/board

HAST, HALT, TC, Burn-in

Procurement

Management



Integration

Materials

Processes Technologies

ECSS ⇔ IPC

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WHAT HAPPEN LOWERING THE REQUIREMENTS?

TAS support the suppliers having in mind all seen before

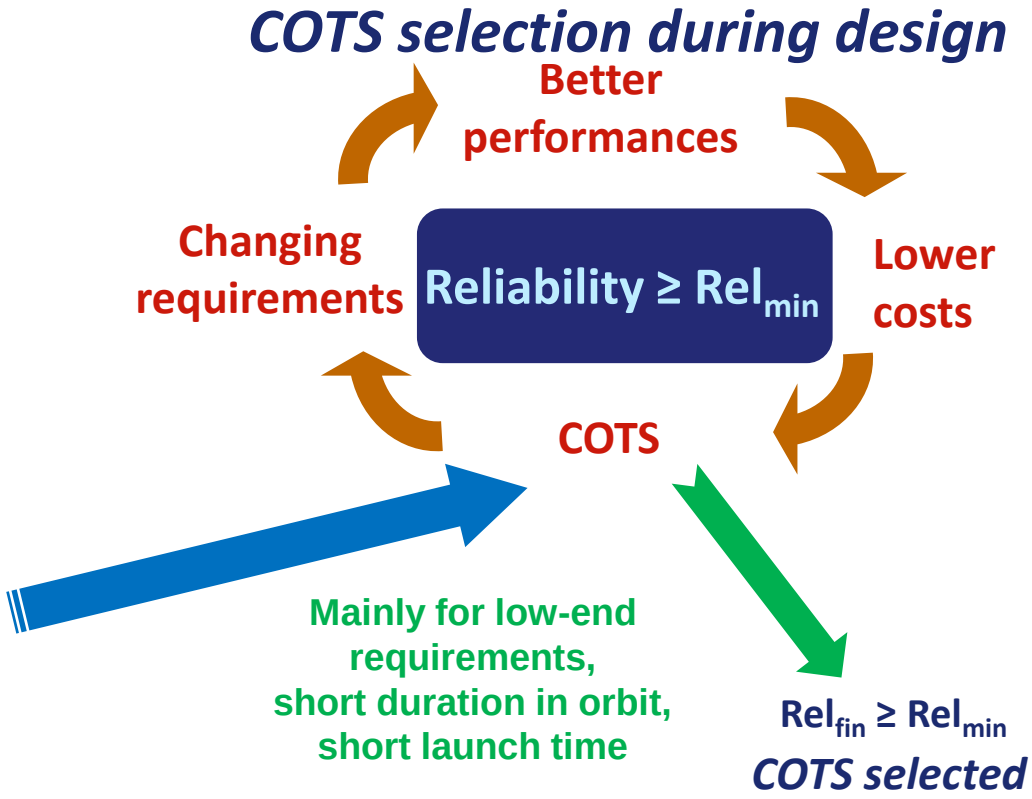
///«good» COTS

///best in class manufacturers

///Risk Management

///lower the requirement

///shorten time



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NEXT STEPS…

No conclusions, only indications

- Tendency is to massive usage of COTS
- COTS selection is based on reliability, costs and performances.
- Traceability is not a focus core to NewSpace suppliers
- Lower quality ⇔better performance, lower costs with the “same” reliability figure.

- COTS often better than the equivalent Hi-Rel
- COTS unit/board → important role in performances and costs.

- Less reviews (time/cost). Trusting the supplier also means not living on its premises.
- Risk management, no risk avoidance
- The V model is incompatible with COTS.
- Workload for quality people in NewSpace is greater than Classic Space.
- As first a supplier is selected as quick will be the program

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THANK YOU

///Questions?

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