EEE Space Component Sovereignty for Europe
Current State and Future Directions
ACCEDE/ESCCON 2025

EEE Initiative Team

27/03/2025

A GSTP Component Initiative

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Introduction

Background

The EEE Space Component Sovereignty for Europe was approved at CMIN22 as a GSTP Component

Objective

The main goal of the EEE Initiative is to facilitate the provision of European Components, through strong & sustainable supply-chains, to ESA and European Space Industry in time, to cost, at the right maturity level and with no restrictions

Achievements

Several high-value activities to develop state-of-the-art European technologies have been initiated as presented at the CMIN22 and subsequent IPCs

Availability of competitive European EEE products in time, at the right maturity level and ESCC qualified.

Through PPP, industry driven sustainable European supply chains.

Capture European and international multi-use markets "not because the products are European but because they are competitive"

Collaboration

With National Agencies

Under the umbrella of the GSTP Component, EEE Initiative activities are closely discussed with Member State delegations, and through strong networks coordination with national programmes are pursued

With EC

Collaboration and coordinate of Critical European Technologies with EC through dedicated technology coordination Tiger Team (i.e. for FPGAs, potentially expandable to other EEE Technologies)

With Industry

Great efforts are excreted to align technology needs and product strategies (e.g. related to volume, performance and multi-usability)

Expectation

Close-knit coordination between Institutional Organisations, Industry and academia is necessary to **achieve strategic goals**

Preparation and Implementation of EEE Initiative GSTP Component

Considerable effort by all stakeholder through bilaterals and extensive discussions
Great thanks to support and contribution/feedback from participating ESA Member States and National Space Agencies

Initiation of activities in some cases,
Very complex

WP/PP Approval

WP/PP update
Letters of Support

ITTs

WP/PP update

ITTs

WP/PP update

ITTs

GTE3-601ED

GTE3-203ED

WP/PP update

GTE3-201ED
GTE3-204ED
GTE3-205ED

GTE3-102ED
GTE3-103ED

Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	Q1 2025	Q2 2025

11 Participating States
90M€

Status of EEE Initiative activities

EEE GSTP Component activities

- Ultra Deep Sub-Micron Foundation and Platform Technology
- Ultra Deep Sub-Micron Interface and System-in-Package Technology
- Development of Serializer and Deserializer IP Core for Ultra Deep Sub Micron Technologies

- Super Scaled Nitride Technology (S2CANT)
- Thermal Heat Reduction techniques for Semiconductor Technology (THRUST) – Phase 1

- European Power SiC supply chain (EPOSIC)
- GaN monolithic IC Pre-Industrialisation development – GaNICp

- Development of a High Energy Ions Beam Testing Capability (>22MeV/n)
- Wafer Level Packaging and Laser Diode Module activities being prepared

Today 55 MEuro supported. These activities are running, under negotiation or early phase of ITT process

Achieving rapid **time-to-market** propels European industry into leading global positions

Cutting-edge European EEE component technologies support **strategic European goals**

Collaboration among European stakeholders is essential

EEE Initiative Main Objectives and proposal for CMIN25

Objective - 1

Ensure continuation of already initiated high-value EEE Initiative Activities to achieve qualified products and address Critical Technologies

Objective - 2

Identification and replacement of non-European EEE Components from ESA/European missions. Developing, commercially attractive European products to capture global market share

Objective - 3

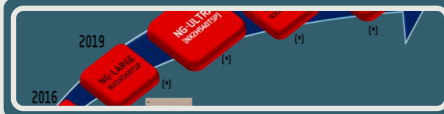
Updating the EEE Initiative technology line portfolio:

- Introduction of the Passive component family

Proposal

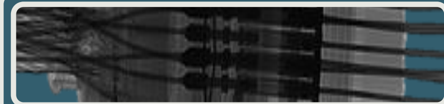
Ensure **time-to-market** of products initiated after **CMIN22**, replace **non-European integrated Circuits** in ESA missions and introduce the **Passive component family**

Technology Lines for European Leadership

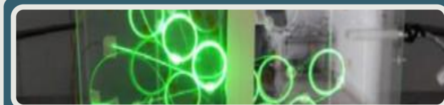


Microelectronics – Ultra Deep Sub-Micron Technology

Wide Band-Gap (RF and Power. GaN/SiC)

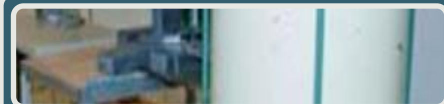


Passive and RF Passive



Photonics

Packaging, PCB and EA



Test Facilities

ESCC Qualification

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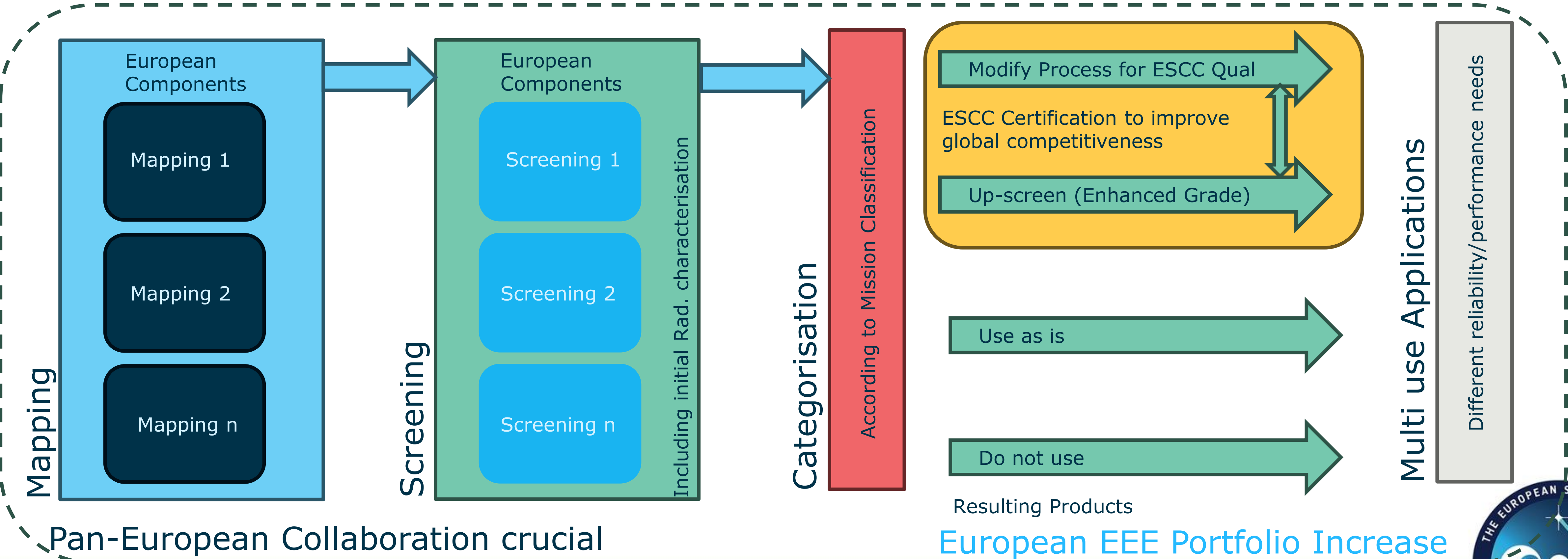
Continuation of running EEE Initiative activities

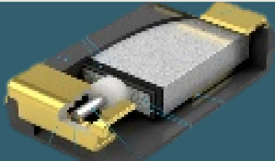
Activity	Funding
Ultra Deep Sub-Micron Foundation and Platform Technology	• Today funded by ~9MEuro (4 countries) • Another ~10MEuro is required to complete the activity
Ultra Deep Sub-Micron Interface and System-in-Package Technology	• Today funded by ~13MEuro (4 countries) • Another ~7MEuro is required to complete the activity
Super Scaled Nitride Technology (S2CANT)	• Today funded by ~9MEuro (6 countries) • Another ~12MEuro is required to complete the activity
Thermal Heat Reduction techniques for Semiconductor Technology (THRUST) – Phase 1	• Today funded by ~8MEuro (2 countries) • Another ~2MEuro is required to complete the activity
European Power SiC supply chain (EPOSIC)	• Today funded by ~3.5MEuro (2 countries) • Another ~2.5MEuro is required to complete the activity
Development of a High Energy Ions Beam Testing Capability (>22MeV/n)	• Today funded by ~4MEuro (1 countries) • Another ~1MEuro is required to complete the activity

"NEW" European EEE Portfolio Increase

To rectify the imbalance of non-European versus European components flown on our mission we propose to: 1) Promote available European components 2) Increase European EEE Component portfolio suitable for space application.



“NEW” European Passive and RF Passive Components



High Current/Voltage/Energy/Power

- Multi-anode Wet Tantalum with high energy and capacitance for GaN technologies
- High current small size inductors and transformers for point of load applications
- High voltage relays (>3kV) for thruster's applications

Miniaturisation/Integration

- Decoupling High capacitance density capacitor for present and future FPGAs
- High Current, Low Voltage Planar Transformers for Auxiliary DC-DC Converters
- SMD Ferrite Beads for EMI applications

Cryogenic and High Temperatures

- Thermal Sensors with High Electrical-Resistance Stability for Cryogenic Applications
- Flexible Heaters for high temperature applications

RF Passive applications

- RF phase stable cable assemblies used for phase sensitive payload systems
- High power RF chip loads and attenuators based on CVD diamond

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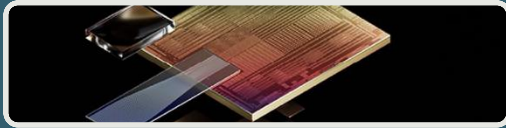
“NEW” Photonic component Technology



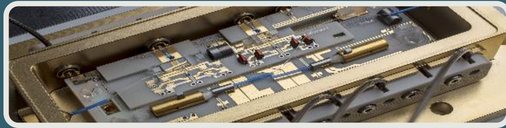
Optical Digital Interconnect

-Empowering the Digital revolution for digital intra-satellite communication

- High-speed, Power-Efficient enabled by Co-Packaged Optics and UDSM

Free Space Optical communication technology

- Maintaining European leadership in inter-satellite links
- Scaling power and bandwidth.

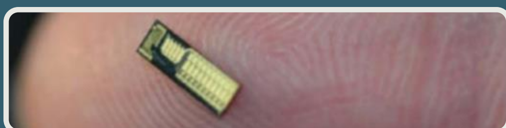


Quantum sensing

- Impact many areas of ultra-precise measurement – atomic clocks, acceleration, magnetic fields, security and frequency
- Custom laser diode developments

Standardization of fiber optic physical layer

- Common design rules, interfaces, and specifications for fiber optic components used in space-based systems
- Ensure that photonic payloads are easily transferable to satellite platforms.



Photonic integrated circuits

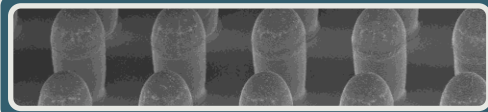
- Building on European capabilities in integrated photonics to reduce the SWaP and Cost of photonic payloads.
- Applications: **laser communications, quantum networks, navigation, remote sensing, and deep-space exploration…**

Advanced Photonic Packaging

Cost-effective, compact, and space-ready Photonic technologies ⇨ Faster, more efficient, and scalable optical communication systems

“NEW” Packaging Technology, EA and PCB

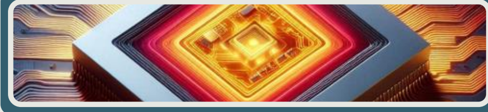
European Supply Chain for System in Package (SiP) services



Flip-Chip assembly capabilities for micro bumps and copper pillar devices

Development of glass interposers for microwave and photonics applications

Development of organic substrates with embedded silicon or glass interposer for ultra fine pitch applications



PCB Chip embedding for advanced thermal dissipation

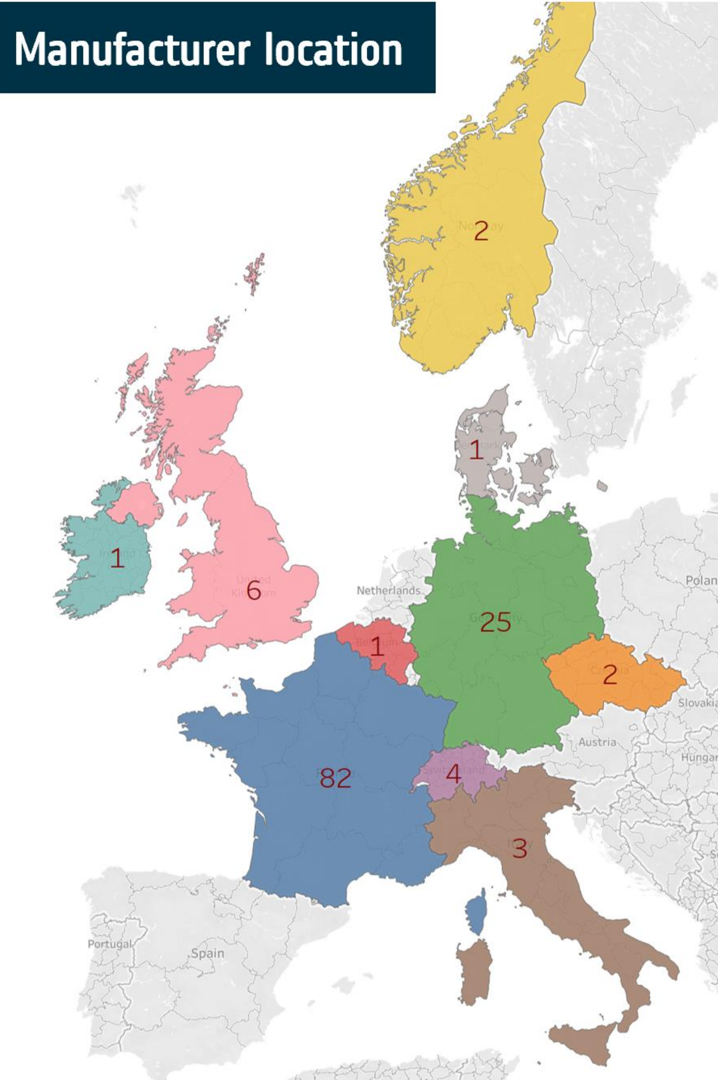
Technologies related to PCB and EA are currently being finalised in preparation for CMIN25

A strong ESCC is crucial for European Sovereignty

- ❑ 123 active certificates
- ❑ 45 certified manufacturers
- ❑ 650 active ESCC specifications

		Rosenberger
		Safran
		SCHURTER AG
3D plus	IRCA - RICA	Smiths Interconnect
Alter Technology	Isabellenhütte	Souriau
Axon' Cable	IST	Space IC
Bizlink	Kongsberg	STMicroelectronics
C&K Components	Kyocera AVX Cz	STPI
COMEPA	Kyocera AVX Fr	TE
Diamond SA	Kyocera AVX UK	TE Connectivity
Draka Fileca	Leach (Sarralbe)	Thales Alenia Space
Exens Solutions	Lewicki	Tyco
Exxelia (Ch. en Brie)	MICROCHIP	UMS
Exxelia (Marmoutier)	NanoXplore	Vishay Selb
Exxelia Magnetics	Radiall	Vishay Sfernice
Flux A/S	RAKON France	W. L. Gore & Co
Infineon	REL STPI	W.L Gore

Manufacturer location



The first ESA certificate has been delivered in 1977

european space agency
agence spatiale européenne
europäische weltraumorganisation

Certificate of Qualification No. 001

This is to certify that SGS-ATES Agrate Brianza (Italy)

has been qualified by ESA for the supply of C-MOS 4000A Series Integrated Circuits

for use in ESA space programmes, according to ESA/SCC QPL Page 1 Issue 1 Rev. - September 77

as recommended by the Space Components Coordination Group.

This certificate is valid until 31rst August 1978

Head of Product Assurance Division | Director Estec | Date 19/9-77

Esa does not incur any liability arising out of the delivery or the use of this certificate.

More information about ESCC

ESCIES www.escies.org

Conclusion

The GSTP EEE Initiative aims to continue its initiated activities, support critical technologies, increase European EEE Portfolio and focus on Microelectronics, EA, PCB, packaging, photonics and passives

Strong collaboration among industry (manufacturers and users), academia, research institutions, ESA participating states, national space agencies, EC, and EDA is essential for success

Extensive bilaterals to align in preparation of EEE Initiative CMIN25 proposal is expected

Together, we will drive innovation and push boundaries in the space sector!

Thank you to:
Support and contribution from ESA participating Member States and National Space Agencies
Highly Competent European industrial partners
The EEE Initiative team

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