

6th ESA Micro & Nano Technologies Round Table



The ESA CTB MNT 5 Years Strategic Dossier

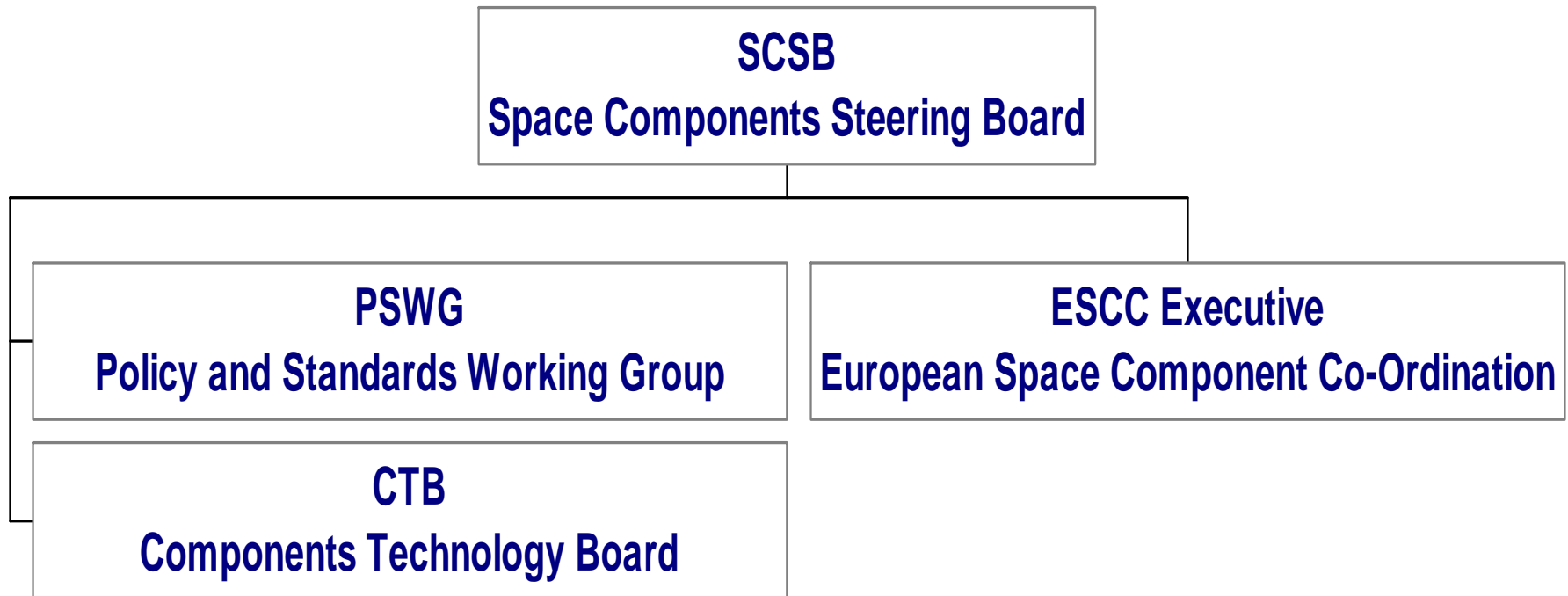
***Laurent Marchand on behalf of the CTB MNT and
ESA-D/TEC MNT Working Groups***



- **The ESCC (European Space Component Coordination)**
- **The CTB (Component Technology Board) within the ESCC**
- **CTB role and responsibilities**
- **CTB Programme of Work**
- **CTB Working Groups and Chairmen**
- **CTB MNT Working Group**
 - **Membership**
 - **Generic terms of reference**
- **CTB MNT strategic dossier**
 - **Structure of the MNT dossier**
 - **Roadmaps**
- **Conclusion and perspectives**

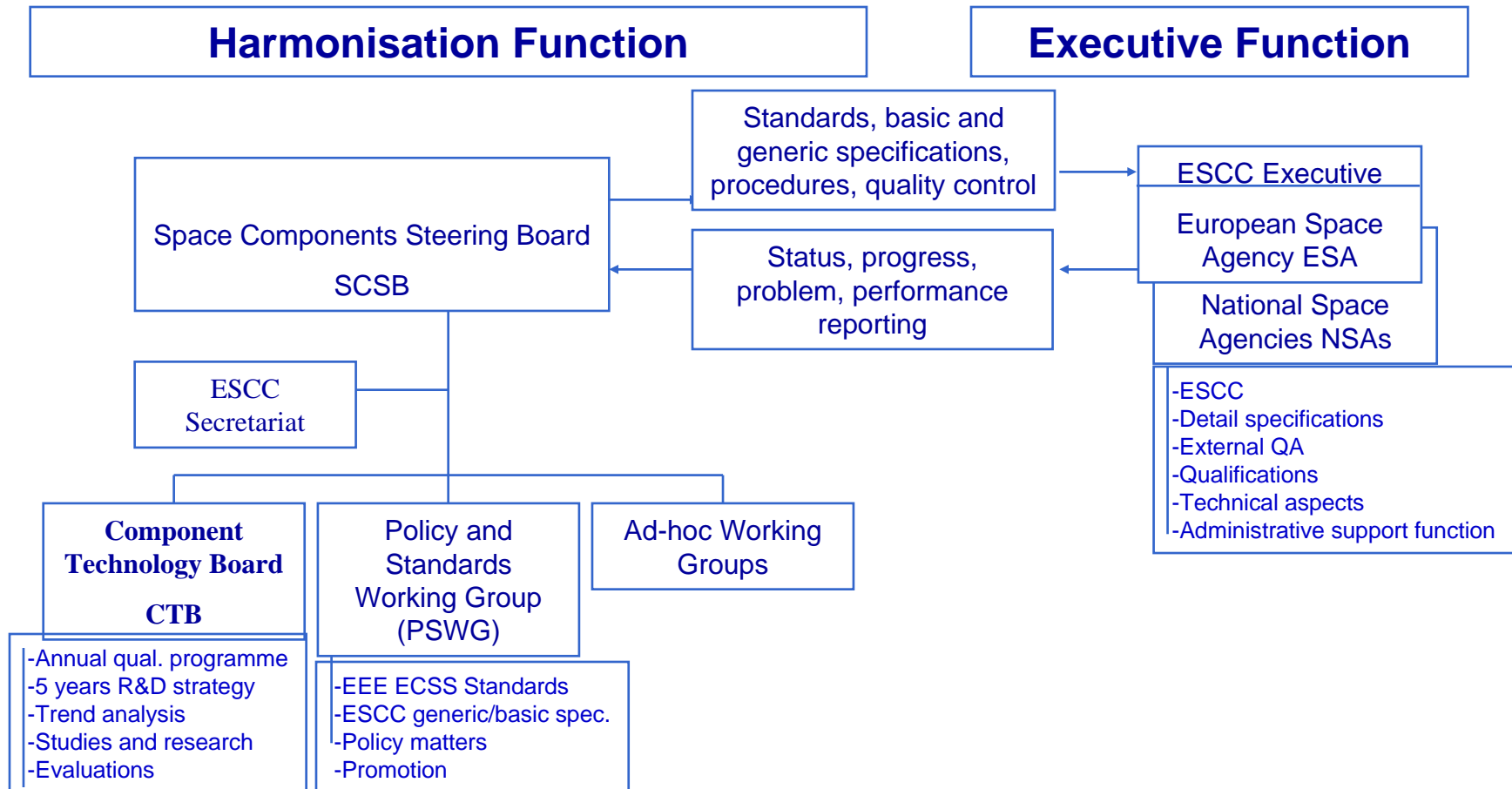
European Space Components Co-ordination - ESCC -Organisation Chart

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**MEMBERS: ESA - NATIONAL SPACE AGENCIES (ASI, BNSC, CNES, DLR, ...)
EUROSPACE (PRIMES, USERS...) - COMPONENT MANUFACTURERS**

ESCC and CTB responsibilities



The **CTB** is a body advising the SCSB on all technical issues and charged with the **formulation of strategic activities and work plans for technology research and development** in the area of European EEE space components.

It supports **the harmonisation** of the collectively funded component research, development, evaluation, qualification, standardisation and quality assurance activities.

The CTB programme of work

- One of the key tasks of the CTB is to propose a **programme of work** addressing both the **short term needs** and the **mid-term objectives**.
- Priority is given to strategic needs.
- The detailed needs and activities are compiled in different dossiers.
- Dossiers are prepared and updated by specialist working group of CTB nominated experts lead by a dossier captain.
- The dossiers describe available and emerging technologies, market situation, space needs, recommendations and activity descriptions ...
- Dossiers are CTB working documents, distributed but **not in public domain**.



CTB Working Groups & chairmen

Microwave: Jean Luc Roux, CNES

Silicon: Anastacia Pesce, ESA

Hybrids: Claude Drevon Thales Alenia Space France

Radiation effects: Robert Ecoffet CNES

Passives: Jean-Paul Bussenot, CNES

Photonics: Mustapha Zahir and Igor Zayer ESA

MNT: Laurent Marchand



CTB MNT Working Group

Membership:

MNT WG members are:

- Olivier Vendier Thales Alenia Space, France
- Alain Bensoussan Thales Alenia Space, France
- Giovanni Mannocchi Thales Alenia Space, Italy
- Steven Eckersley Astrium Satellites, UK
- Werner Hupfer Astrium Satellites, Germany
- Coumar Oudea Astrium Space Transportation, France
- Ulrich Prechtel EADS CRC, Germany
- Laurent Marchand ESA ESTEC
- Fabien Filhol ESA ESTEC
- Laurent Pambaguian ESA ESTEC
- Francis Pressecq CNES
- Frédéric Courtade CNES

Current MNT WG advisors are:

- Francesco Svelto ASI
- John Davey BNSC
- Klaus Steinberg DLR
- Heiki Hannula TEKES
- Christer Nilson SNSB

CTB MNT WG: Generic Terms of References

- Identify MST components considered to be of **strategic importance** for future space applications based on existing or anticipated user requirements
- In coordination with MNT users define / propose the relevant **study, development, evaluation, and research activities**
- Establish a consolidated **multi-year strategic plan** for space MNT devices
- **Assess** technologies / components, manufacturer capabilities, technology trends
- Estimate the necessary resources, funding, time scales and define **priorities** for the various activities
- Determine the necessary prerequisites and conditions to make these MST technologies/components available in line with project schedules

CTB MNT WG: Specific Objectives

- Guaranty **coordination** with eventual and possible users
- Promote ESA / NSAs **AND** Industry **co-funded activities**
- Interface with ESA Tech. **Transfer** and **Harmonisation** responsables
- Perform **mapping** of National/European MNT capabilities
- Organisation of specific MNT topics “**Info-days**” with universities, research centres and SMEs active in MNT
- Act as an active data provider for the European Space Component Information Exchange System – **ESCIES** and use **EUROCOMP NEWSLETTER** for promotion
- Considering the status of the MNT devices and technologies in Europe, the WG should deal rapidly with the best approaches to :
 - Reliability demonstration and qualification, Specifications (Drafting)
 - Industrialisation (Transfer), Procurement (Mapping and procedures)

CTB MNT strategic dossier: Structure

11 main technological domain covered:

- Technology and processing
- RF MEMS
- MOEMS
- MEMS based propulsion systems
- AOCS
- Other sensors (pressure, fluxmeter, gas sensor,...)
- Scientific payloads and instruments
- Power
- Nanotechnology
- Transversal activities (radiation, qualification, packaging, etc)
- Spacecraft concepts with MST

CTB MNT strategic dossier: Roadmaps

9 Roadmaps available: RF MEMS, MOEMS, MEMS based propulsion systems, AOCS, Other sensors (pressure, fluxmeter, gas sensor,...), Scientific payloads and instruments, Power, Nanotechnology, Transversal activities (radiation, qualification, packaging, etc)

ESA Technology Readiness Level Scale	
Instruments and spacecraft sub-systems are classified according to this "Technology Readiness level" (TRL) scale 1-8. Levels 1 to 3 relate to creative innovate technologies pre or during mission assessment phase. Levels 4 to 8 relate to existing technologies and to missions in definition phase. If the TRL is too low, then a mission has a risk to be jeopardized by delays or cost over-runs.	
TRL	Level description
1	Technology concept and/or application formulated
2	Analytical & experimental critical function and/or characteristic proof-of-concept
3	Component and/or breadboard validation in laboratory environment
4	Component and/or breadboard validation in relevant environment
5	System/subsystem model or prototype demonstration in a relevant environment (ground or space)
6	Actual system completed and "Flight qualified" through test and demonstration (ground or space)
7	System prototype demonstration in a space environment
8	Actual system "Flight proven" through successful mission operations

Activity status & priority levels	
OG	On-going
I	Intended
P1	Priority 1
P2	Priority 2
P3	Priority 3

Dossier status:

- 2nd issues of the dossier submitted to ESA D-TEC review
- 3rd issue approved by D-TEC released in July 2007
- Dossier also includes > 70 GADs (General Activity Description)

Perspectives:

- Next stage is selection of **top priorities** for **short term procurement**
- Preparation of procurement roadmaps (extracted from the GADs)
- Preparation of an IPC strategy paper
- Initiation of procurement activities Q3-Q4 2008
- Preparation of system level complementary proposals