



European Space Agency
Agence spatiale européenne



The European Cooperation for Space Standardization (ECSS)

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1. Standardization in ESA



- Value and need for standards to establish and implement Space products and programmes recognised since ESA foundation (first products late Seventies)
- ESA Standardization system PSS (ESA Procedures, Specifications & Standards) on PA extended to the other disciplines from second half of the Eighties
- Early Nineties: ESA, European Space Agencies and Industries recognised advantage to replace the multiplicity of project requirements by a single, coherent, recognized, accepted and committed to be used system of standards



ECSS

(European Cooperation for Space Standardization)



ESA recognise standardization as one of the key factors for its success (standardization is an ESA programme)

2. ECSS presentation



What is ECSS?

- ECSS is an initiative established to develop a single set of consistent space standards recognised and accepted for use by the entire European Space Community.
 - ⇒ supported by ESA Council deliberations since 1994
 - ⇒ ESA Council requests ESA to play a central role in ECSS and to assume the ECSS secretariat task
- ECSS capitalise more than 30 years's experience in the management and implementation of European Space Projects (with due account for the international expertise and experience).
- ECSS has developed through a partnership between the European Space Agency, National Space Agencies and European Industry.

2. ECSS presentation



ECSS Membership

European Space Agency



European Industry,
represented by Eurospace



Some organization have an
Observer role on ECSS
e.g. EUMETSAT, CEN

European National Space Agencies



2. ECSS presentation



ECSS objectives and policy- Summary

Established to:

- increase the effectiveness of all space programmes in Europe through the application of a single, integrated set of Standards and Requirements from which all generic requirements of future space projects can be derived
 - facilitate clear and unambiguous communication between all parties involved, in a form suitable for reference or quotation in legally binding documents,
 - improve the quality and safety of space projects and products,
 - reduce risk and guarantee interoperability and interface compatibility by applying proved and recognized requirements and methods,
 - ensure that space systems do not cause, during their complete life cycle, a hazard to human life, the environment, public and private property, major space and ground investments,
 - allow industry to be ready to meet these requirements.

- Improve the competitiveness of the European Space industry

2. ECSS presentation



ECSS Primary strength

- driven by a partnership of industries and space agencies
- based on consensus amongst its members
 - recognised and accepted by all potential European Customers and equally accepted by Industry
- makes the best use of all available research, know how and expertise
- systematically feed back the experience from past programmes, projects and other appropriate sources into the ECSS System
- defines the requirements rather than the means
- improve industrial efficiency and competitiveness through using an integrated set of management, engineering and product assurance standards which can be tailored to the technical, cost, schedule, programmatic and economic characteristics of the space programmes and projects
- facilitate standardization of contract requirements in customer/provider relations throughout all levels of space activities



**The European Space community recognizes ECSS as:
the single developing body for European Space
standards, and
the source of requirements for its Space
activities**

3. ECSS History



Milestones:

- **1993-1994: ECSS TOR signed, and K.O. meeting**
- **1994: ESA Resolution: “ECSS as the central structure in Europe for generation of space standards”**
- **1996: First documents**
- **1999: First application in Mars Express**
 - *improvement needed in the identification and specification of requirements,*
 - *set of standards incomplete)*
- **2002: Organisational changes at management level- re-structuration (from Gibson report)**
- **2005: Necessary set of standards nearly set up**



Achievements as of 2005/2006

- Catch-up production of standards (mainly in E-branch) has led to an almost complete set of ECSS standards.
(about 150 standards published)
- Recognised and appreciated by all European space entities, non-European space entities and various European and International Organizations for Standards.
Several non-European Space Agencies have expressed their interest for using ECSS Documents.
- Call-up of ECSS as applicable standard in contracts has become a recognized practice in European space business.

2005-2006 Users' feedbacks

Users' feedbacks [from the survey of Users and confirmed at the ECSS Developer day (November 2005) and User Day (April 2006)] :

- Confirmation of approaching the maintenance phase (less development needed):
Necessary set of standards nearly set up and need for
“a stable set of requirements”
- Difficulty /unsuitability of existing Standards to form part of “Contractually binding requirements”:
 - requirements, recommendations & informative material mixed
 - requirements not uniquely identified and verifiable
 - incoherencies and inconsistencies in and across documents

→ Different understanding of “standard” by the development and the user community
- Need to streamline the internal ECSS organisation and processes to be more effective to respond to the Users' needs



ECSS SB actions & deliberations

- **End of 2005 : ECSS Steering Board set up dual task forces**
 - Scope TF1: ECSS organizational aspects
 - Scope TF2: Contents of ECSS standards

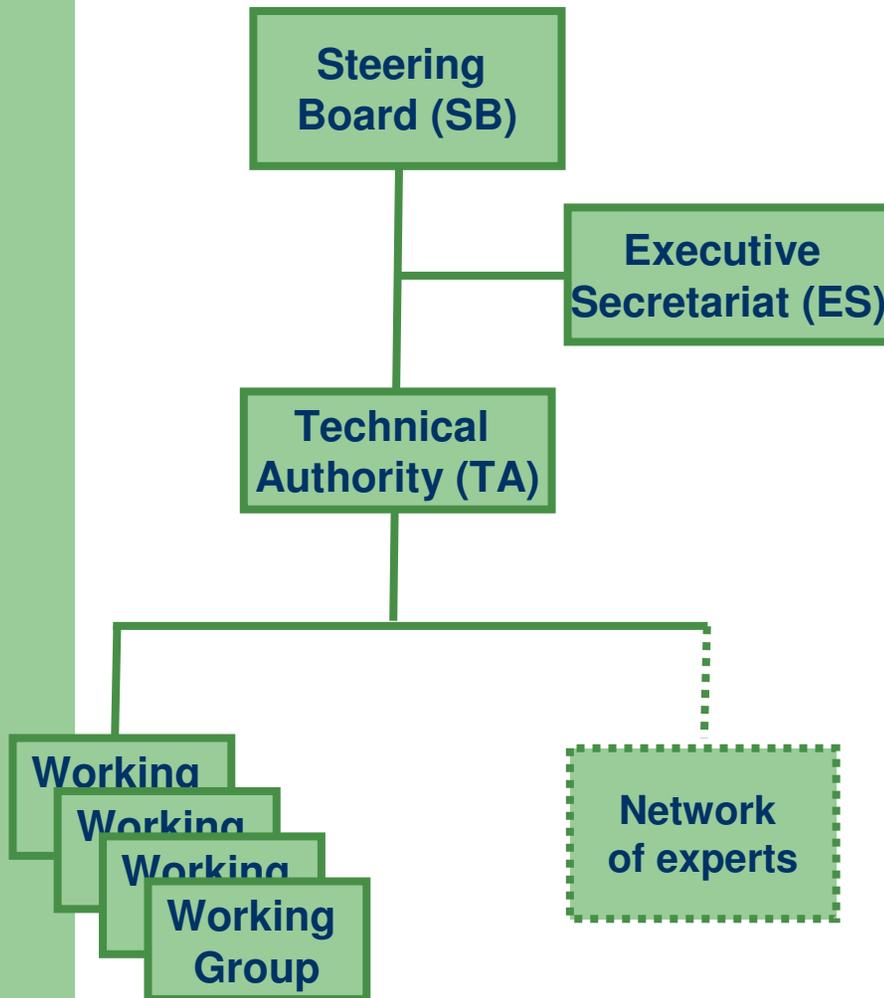
- **June 2006 - SB deliberations based on TF1 & TF2 reports:**
 - **New ECSS Organization:**
 - ❖ More user oriented
 - ❖ For transitional & maintenance phases
 - ❖ With simplified processes and decisional levels
 - ❖ With increase ECSS members ownership of product

 - **ECSS Types and Content:**
 - ❖ 3 Categories of ECSS documents (Standards, Handbook, Technical Memorandum)
 - ❖ Enforcement application of drafting rules
 - ❖ Benchmarking phase to complete and review the set of standards

4. From development to application & maintenance phase



New ECSS Organization



Steering Board (SB):

Delegates from member organisations.

Responsible for policy and strategy issues and for overall supervision.

Does not approve individual Standards.

Technical Authority (TA):

Delegates from members organizations.

Set up and implement Work-plan.

Authorize Public Review & approval of documents.

Executive Secretariat (ES):

 Performed by ESA TEC-QR

Provide support to SB & TA.

Support WGs in drafting documents in accordance with ECSS rules / procedures.

Custodians of ECSS docs. Collect and analyze of Change Requests, New Work Items Proposals, feedback. In charge of the ECSS Website.

Overall Monitoring of schedule and ESA budget

Network of Experts: Pool of experts to support TA on ad-hoc basis (individually or in specific problem solving teams)

ECSS types of documents

ECSS set of documents reorganized according to 3 types of documents

- **Standard**

- Normative document written specifically for direct use in invitation to tender and business agreements for implementing space related activities. Its content strictly limited to the statement of verifiable customer requirements, supported by the minimum descriptive text necessary for understanding their context.

- **Handbook**

- Non-normative document providing background information, e.g. orientation, guidelines, technical data, advice or recommendations, which contains information about how to implement space related activities.
- Two types of handbook are considered:
 - 1) Guidelines and good practices
 - 2) Collection of data

Note: Handbook contains data recognized as valid for use by the ECSS community.

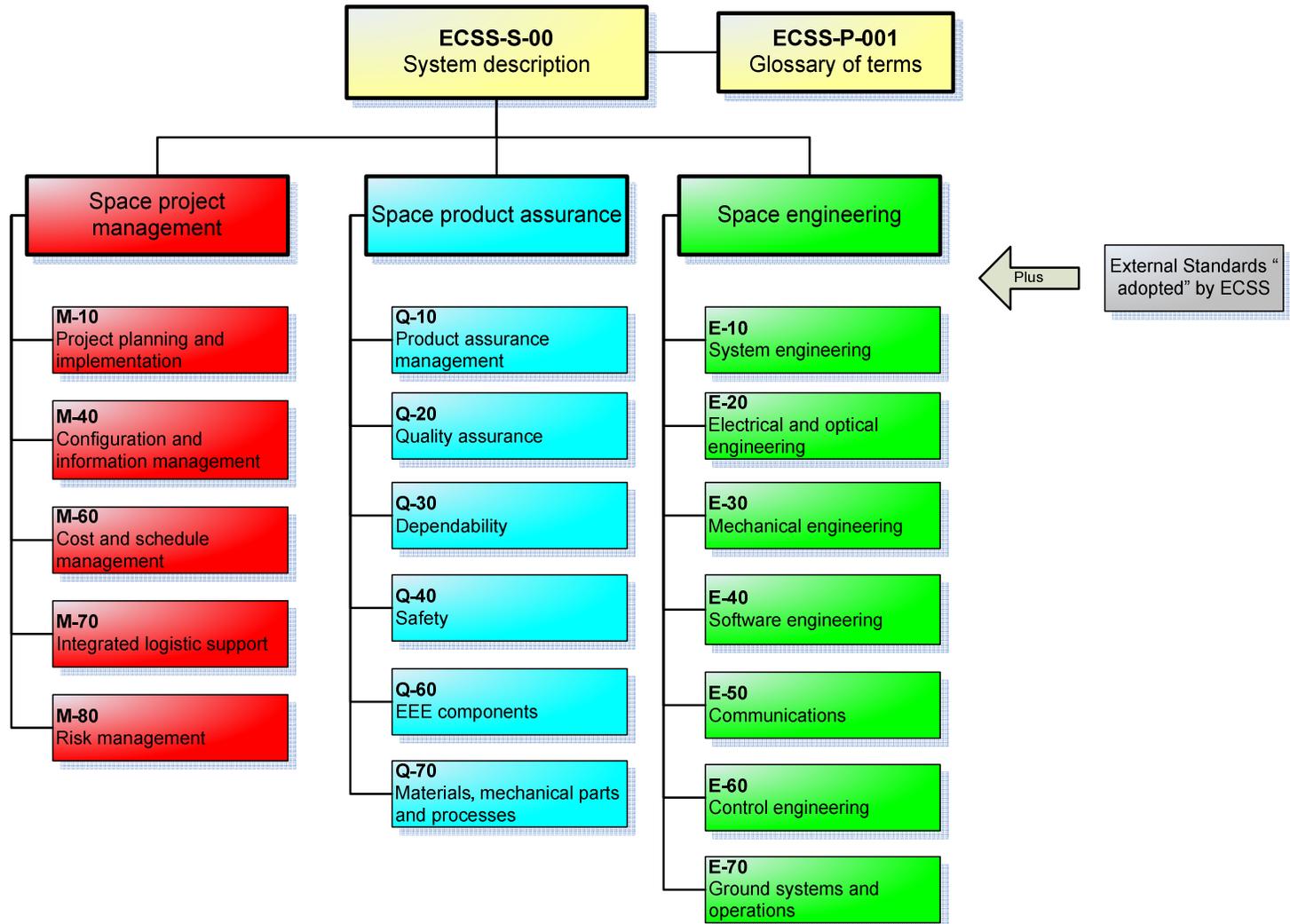
- **Technical Memorandum**

- Non-normative document providing useful information to the space community on a specific subject, prepared to record and present non-normative data, which are not relevant for a Standard or for a handbook, or not yet mature to be published as handbook or standard.

4. From development to application & maintenance phase



ECSS Tree of standards

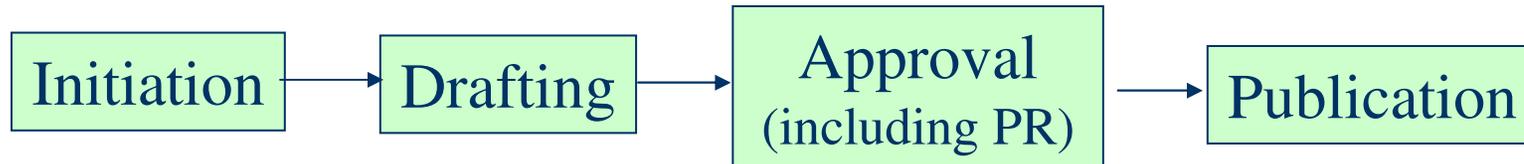




Characteristics of ECSS standards

- Define the requirements rather than the means
- ECSS does not intend to replace the quality system of an organization => Requirements are “product oriented”, not “organization oriented”
- They are **not intended to be used in isolation** => to be applied as a whole (ECSS standards are part of a system where standards are complementary and interconnected)
- No repetition of requirements within a standard or among standards (including external standards endorsed by ECSS)
- If necessary, requirements from other standard are “imported” by x-referring them
- Have flexibility through tailoring

ECSS document production process



- Initiation includes the NWIP approval by the TA
 - Drafting is performed by a WG of experts representing their ECSS organizations
 - Approval process includes a Public Review, where:
 - ECSS partners comment the standard
 - WG disposition the comments and provide feedback to originators
 - Publication is agreed at TA level
- Output is accepted by the whole ECSS community

Benchmarking phase

A benchmarking phase to:

- Implement and validate the new organization and processes
- Review existing documents to ensure adherence to definition of Standard, HB & TM and coherency within and amongst standards (in liaison with Users)
- Complete the core set
- Set up and validate tools for configuration and management control, and for the feedback

Output

=> A consolidated complete set of standards in place and ready to use:

- user friendly
- clear and unambiguous
- really needed
- suited for business agreement

=> ready to enter in a proper maintenance phase focussed on application and maintenance (user driven: feedback and needs)

Benchmarking phase will be completed by the 2nd half of 2008.



Use of standards in a project: Tailoring

- The ECSS System of Standards can be tailored to the technical, cost, schedule, programmatic and economic characteristics of the space programmes and projects
- For a specific project, standards are tailored according to the type and phase of the project, the acceptable risks, the project complexity, cost,...
- Tailoring is the process by which individual requirements are evaluated and made applicable to a specific project:

The list of standards and their content is analysed in order to:

- select the set of standards to be made applicable to the project, taking into account its specificity and constrains.
- identify those requirements in the individual standards which are not applicable to the project,
- modify or exceptionally add requirement for specific needs.

5. Relation with other SDOs



- Liaison with other SDOs (national, European, International) established in the late nineties. (Example of an effective ongoing cooperation is with ISO on Space Debris).
- ECSS is revisiting its policy and approach to other SDOs with the goal to:
 - Establish dialogues with SDOs in order to maintain mutual awareness of respective developments and increase world-wide promotion and recognition of the ECSS objectives and achievements;
 - Establish cooperation with those SDOs where mutual benefits have been identified;
- In addressing relationships with other SDOs the following main objectives are considered:
 - ensure that, where international consensus and recognition is essential in order to allow global interoperability and/or common policies and treaties, standards are developed in conjunction with the relevant SDO;
 - avoid duplication of and conflicts between standards that can be used for space application by the European and international community;
 - take into account information and opinion of interested parties in the preparation of ECSS Standards.

6. Conclusion



- Goal of the ECSS system of space standards is to lower life-costs, while improving the quality, functional integrity and compatibility of all elements of a project, by applying common standards for hardware, software, operations, information and activities in projects.
- ESA, European Space Agencies and Industry are committed to the ECSS system.
- Benchmarking phase, to be completed in the second half of 2008 will provide the European user community with an improved tool for contract establishment and project implementation.

Its result will also facilitate communication and interface with other SDOs and international partners.

Thank you for your attention.



Any Questions?