ESA Standaristion and ECSS

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1. Understanding the ECSS standardization system

1.a - Need of Space standards (1/1)

- **Competitiveness**
  Standards have an important economic and social role for enabling our industry to remain competitive on the market and to conquer new markets.
- **Efficiency**
  Standards contribute to making the development, manufacturing and supply of products and services more efficient, reliable, safer and cleaner.
- **Trading facilitation**
  Standards allow trading between organizations to progress easier and fairer.
- **Knowledge transfer**
  Standards aid in transferring knowledge and enhancing engineering capabilities to smaller or developing organizations.
- **Education**
  Finally, Standards participate to the education of today's and future engineers when conforming to standards is secured, thus, for instance, avoiding designers "reinventing the wheel".

1. Understanding the ECSS standardization system

1.c - ECSS organization (1/2)

ECSS Membership

Voting members | Associate | Observers

European Space Agency

European Industry,

represented by

EUROSPACE – The Association of European Space Industry

Some organization have an **observer** role on ECSS, e.g.

→ **CEN,**

→ **EUMETSAT,**

→ **EDA**

National Space Agencies

Italy

France

Germany

The Netherlands

Norway

United Kingdom

Canada

2 The ECSS standardization documentation model

a. Type of ECSS standardization documents
b. ECSS documentation structure (branches & disciplines)
c. Denomination of ECSS documents
d. ECSS documents available
e. The set of ECSS standards as a system
f. Characteristics of individual ECSS standards and requirements
g. Anatomy of an ECSS standard

2. The ECSS standardization documentation model

2.a – ECSS type of documents (1/2)

ECSS types of documents

	ecss types of documents
standards	for direct use in invitation to tender and business agreements
handbooks	non-normative documents providing guidelines and/or collection of data
technical memoranda	non-normative documents providing useful info or data not yet mature for a standard or handbook

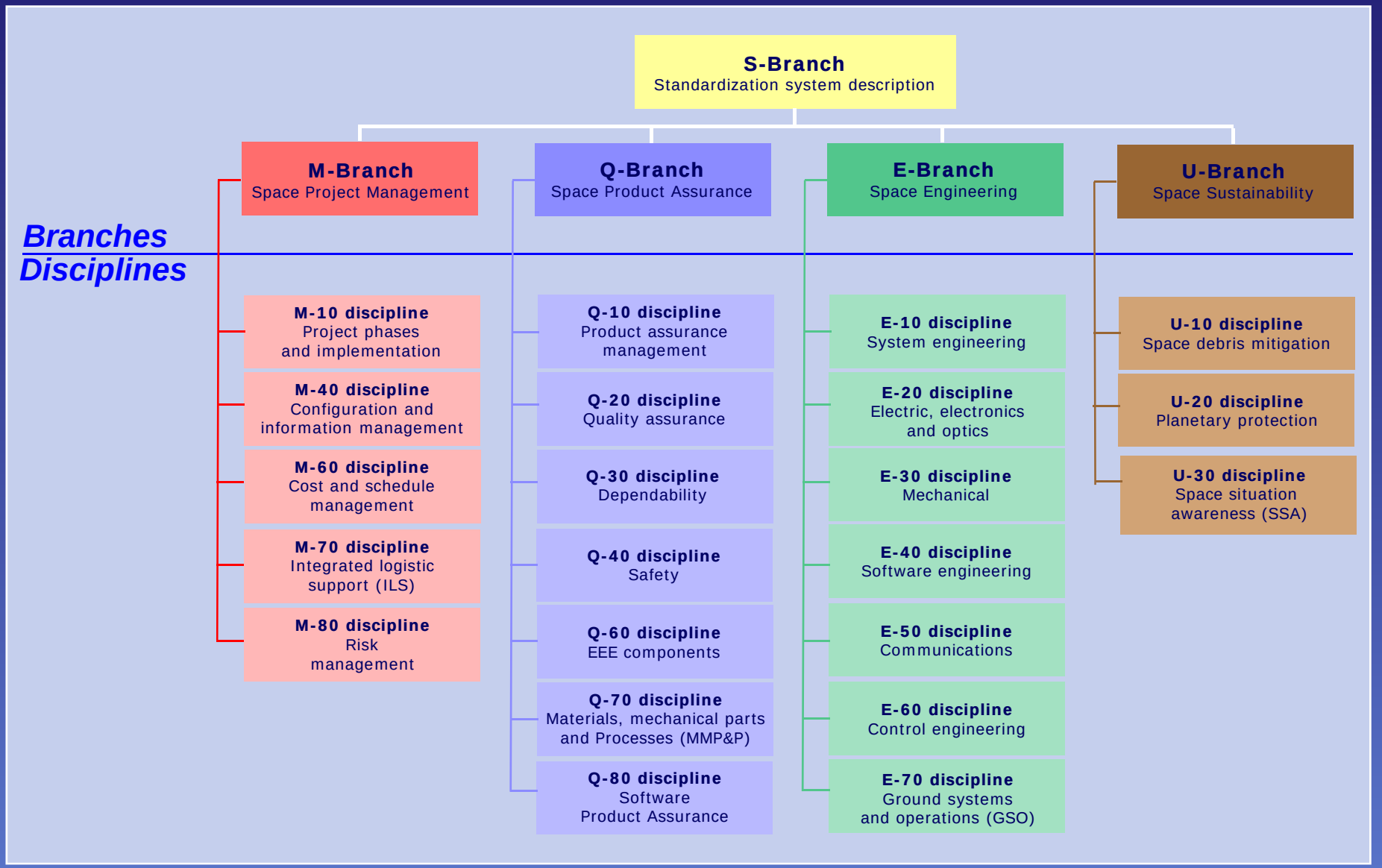
2. The ECSS standardization documentation model

2.b – ECSS documentation structure (1/2)

Branches	
S - System	Define the system of standardization documents, and specifies how to use it in Space projects
M - Management	The project manager is responsible for the achievement of the totality of the project objectives and specifically for quality organization and its timely and cost effective execution
Q - Product assurance	Product assurance is responsible for the implementation of the quality assurance elements of the project and other activities like dependability, safety, parts, material and processes, software, and audits
E - Engineering	Engineering is responsible for the definition of the end product, verification that customer's technical requirements are achieved and in conformance with the regulation and company constraints
U - Sustainability	The U branch is providing requirements and principles for a continuous sustainability of the space environment in order to ensure appropriate and safe present and future of space activities.

2. The ECSS standardization documentation model

2.b – ECSS documentation structure (2/2)



2. The ECSS standardization documentation model

2.c – Denomination of ECSS documents (1/1)

- **ECSS documents are named as**

ECSS - { S / M / Q / E / U } - { ST / AS / HB / AH / TM } - <number><version>

- **<S, M, Q, E or U> represents the branch**
  - S for ECSS system, the top level document that gives a general introduction into ECSS and the use of ECSS documents
  - M for Management, Q for Product assurance, E for engineering, and U for Sustainability

- **<ST, AS, HB, AH or TM> is the type of document**
  - ST for standard, AS for adopted as standard, HB for handbook, AH for adopted as handbook, and TM for technical memo

- **<Number> is one or two groups of two digits each**
  - one group of two digits to identify those documents with more generic requirements
  - two groups of two digits to identify those with more specific requirements
  - the difference is not to indicate higher relevance of some standards with respect to others.

- **<version> is a letter from A onwards, representing the issue. It may include also a Rev index, from 1 onwards.**

Example:

S-ST-00C
ECSS system (standard)

E-ST-50C
Communications (standard)

↓

E-ST-50-05C
Radio frequency and modulation (standard)

E-HB-50A
Communications (handbook)

2. The ECSS standardization documentation model

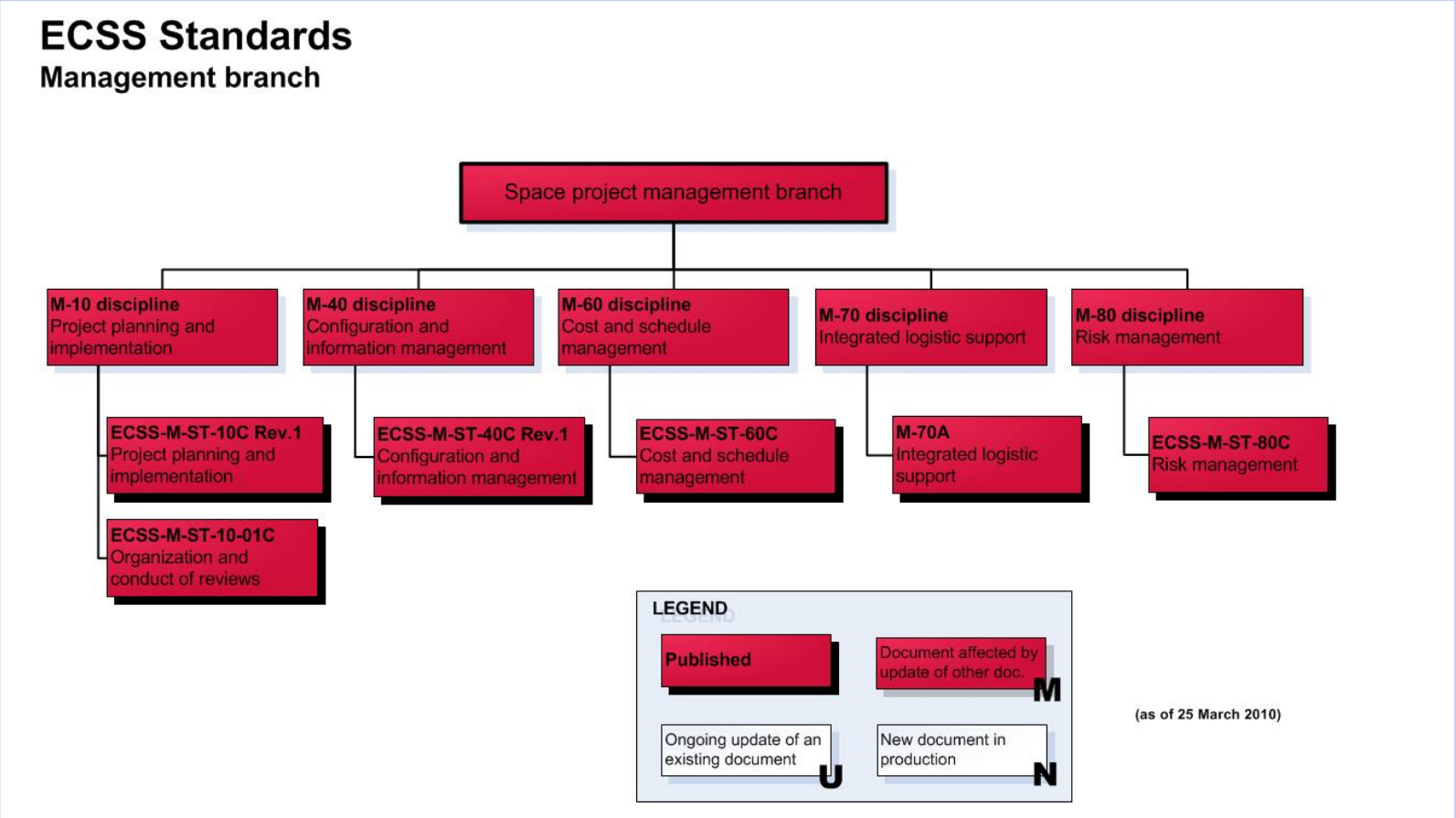
2.d – ECSS available documents at 1 October 2015 (1/9)

	ST/AS	HB/AH	TMs	Total per branch
S branch	2	0	0	2
M branch	6	0	0	6
Q branch	58	7	4	69
E branch	56	17	6	79
U branch	1	0	0	1
Total per type	123	24	10	**157**

2. The ECSS standardization documentation model

2.d – ECSS available documents (2/9)

The M branch – Standards

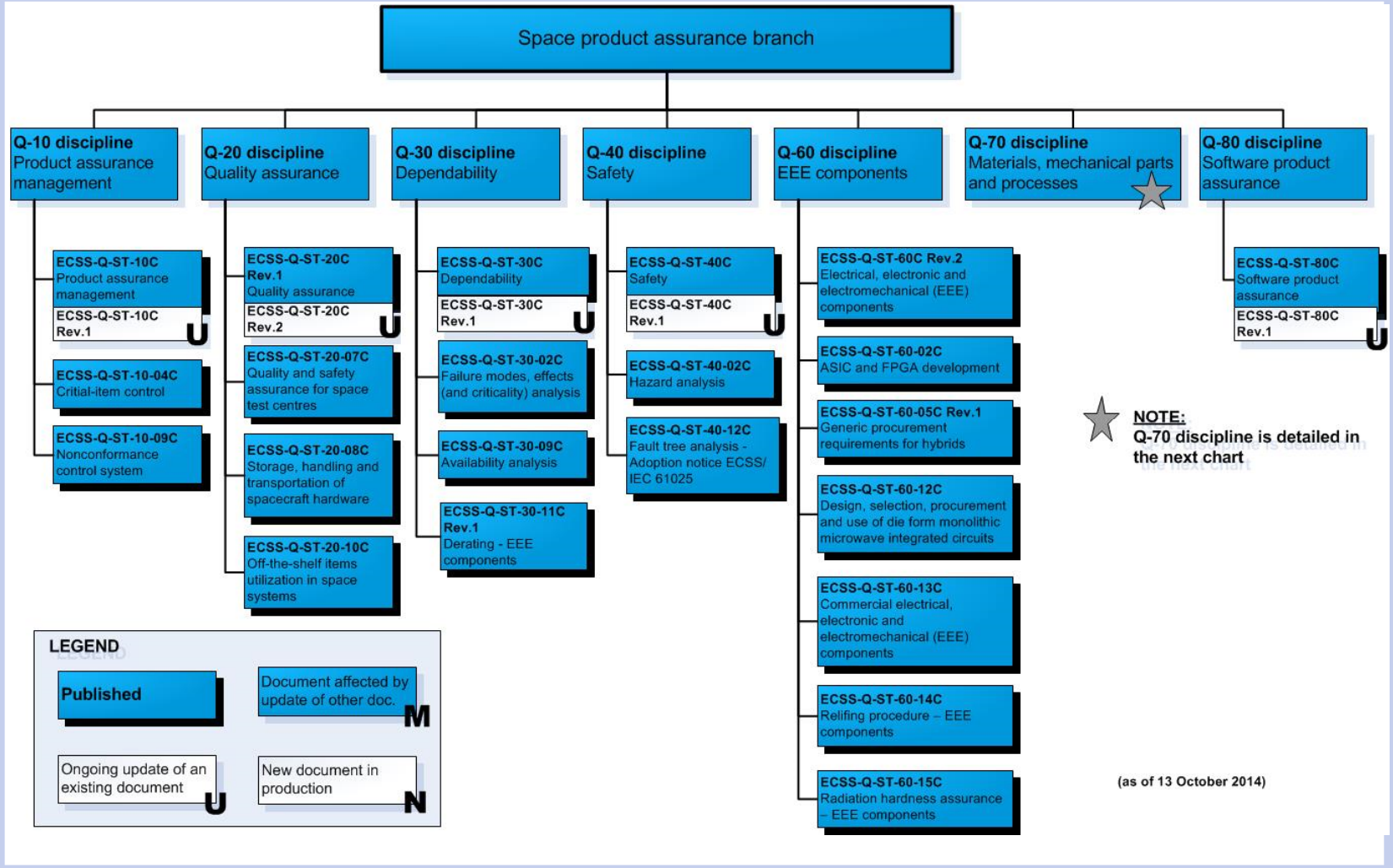


NOTE: There are not HBs and TMs in the M branch

2. The ECSS standardization documentation model

2.d – ECSS available documents (3/9)

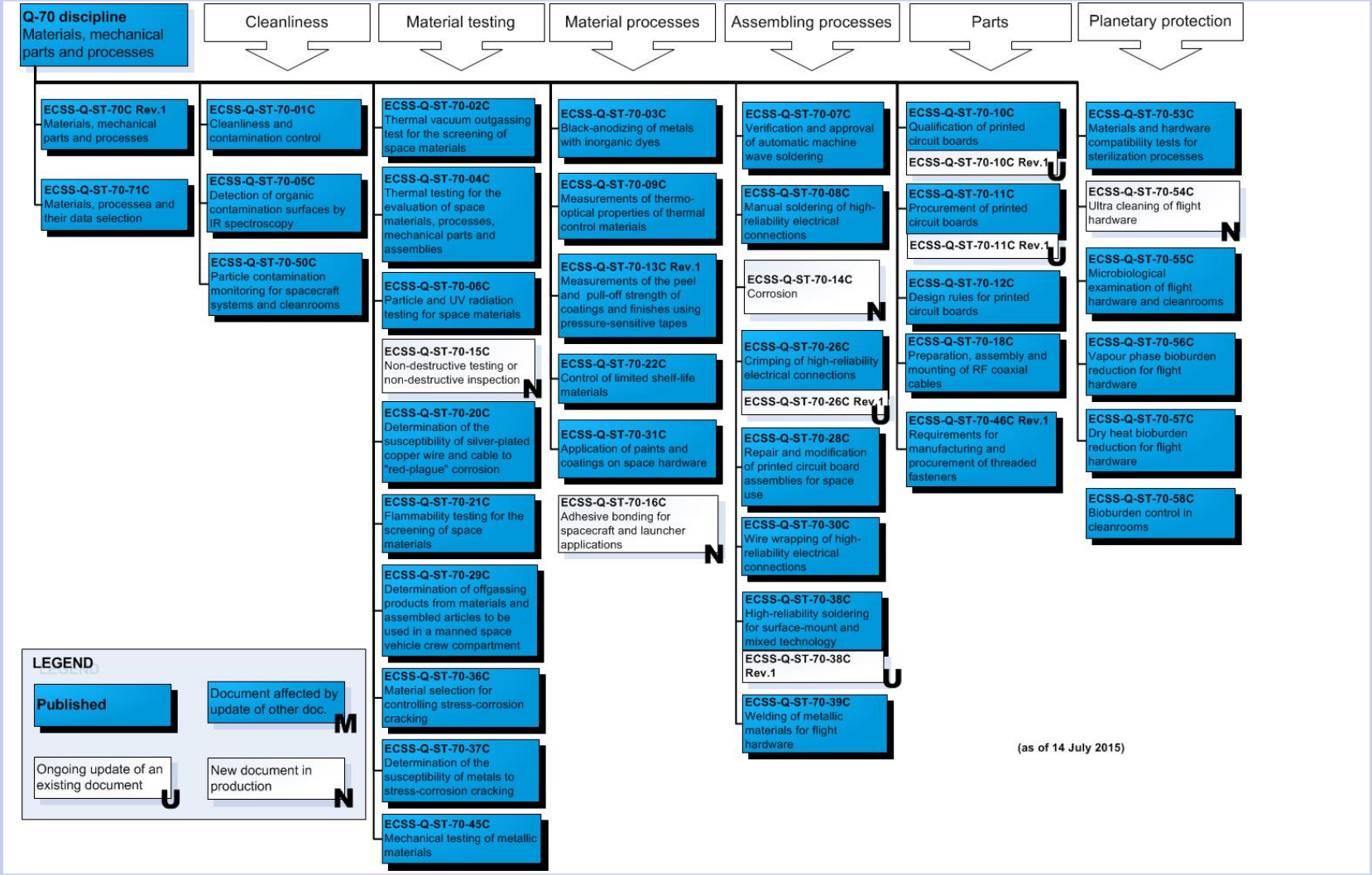
The Q branch – Standards (1/2: General)



2. The ECSS standardization documentation model

2.d – ECSS available documents (4/9)

The Q branch – Standards (2/2: The Q-70 discipline)



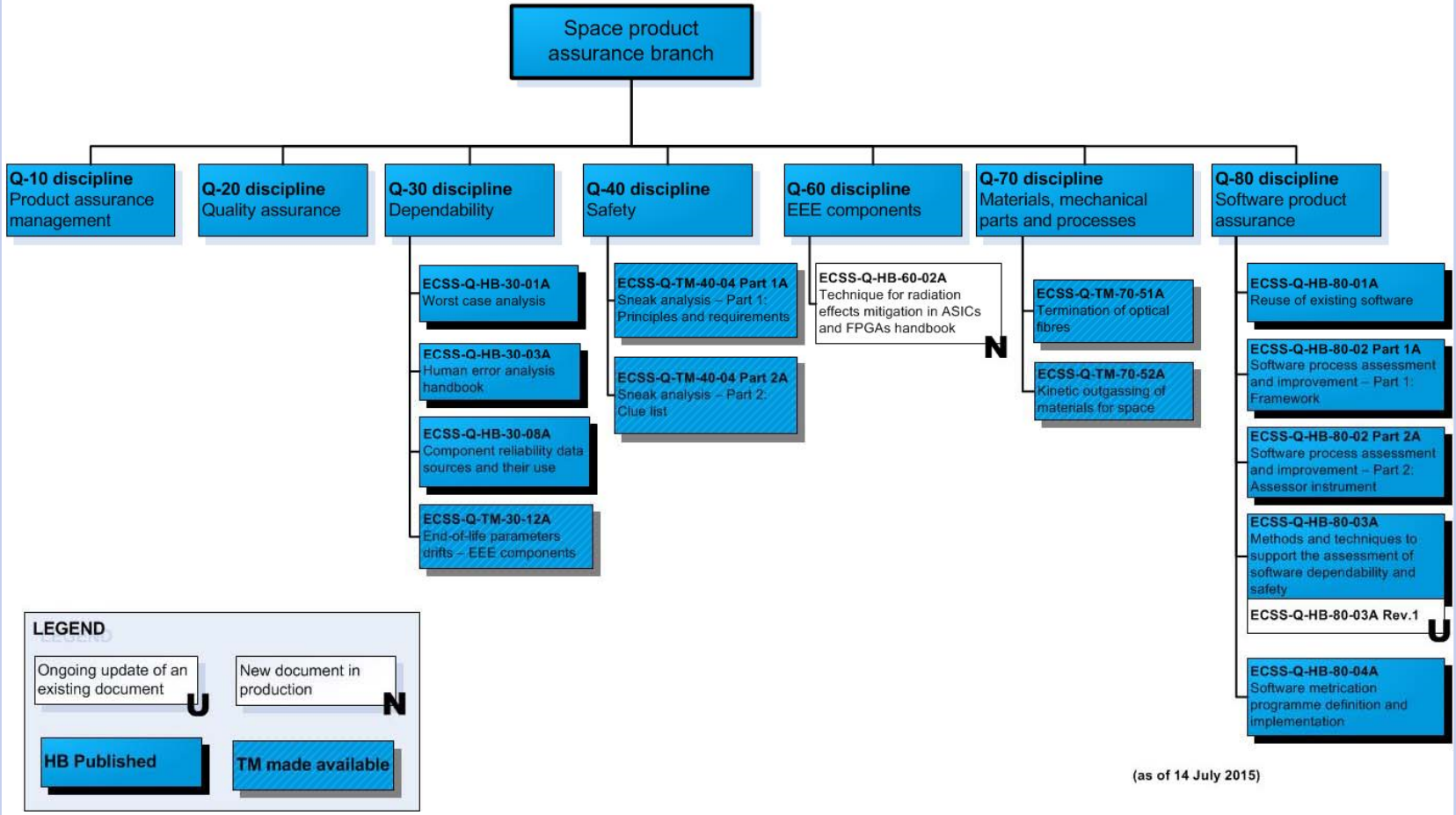
2. The ECSS standardization documentation model

2.d – ECSS available documents (5/9)

The Q branch – HBs & TMs

ECSS Handbooks and Technical memoranda

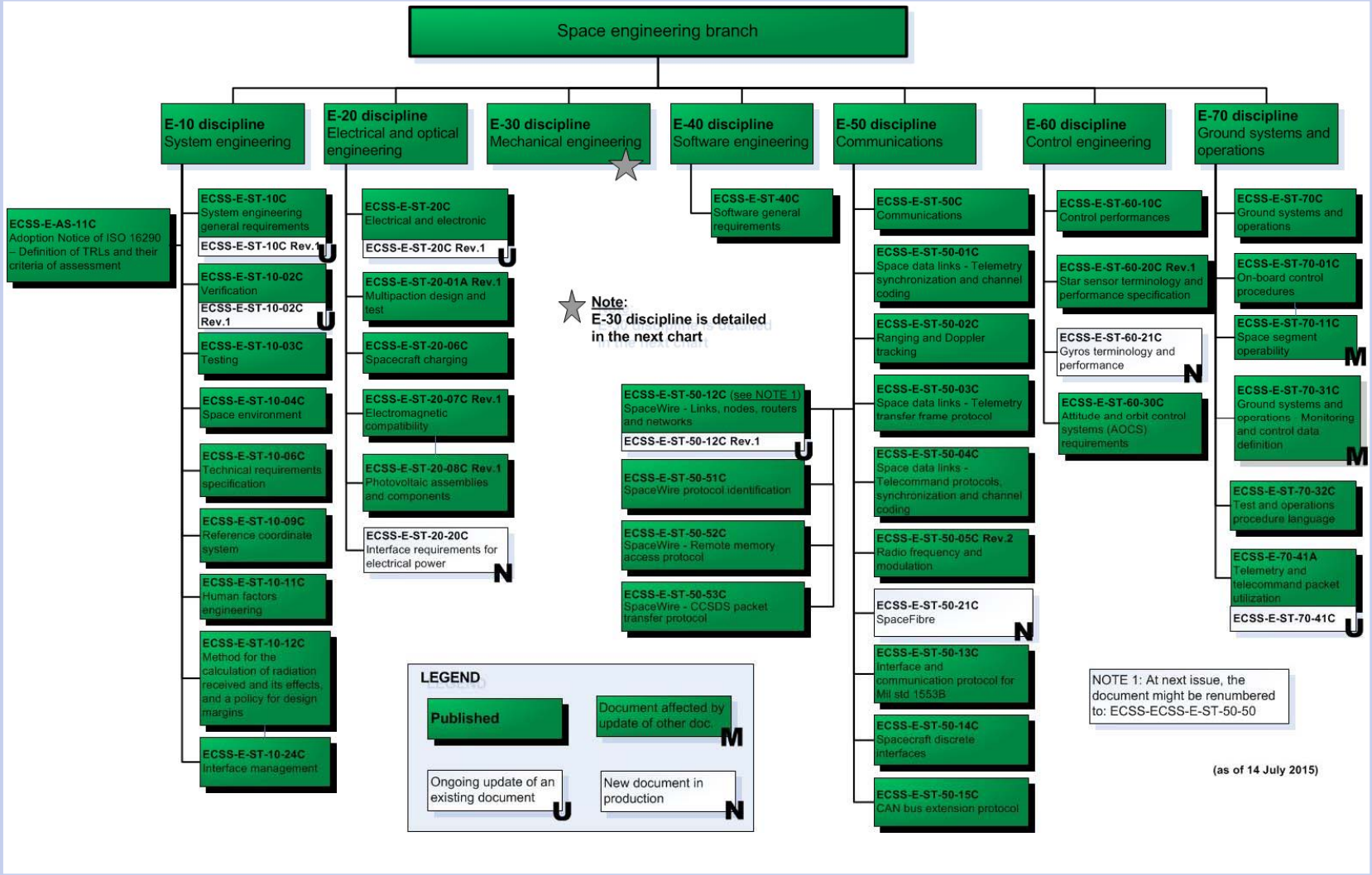
PA branch HBs and TMs



2. The ECSS standardization documentation model

2.d – ECSS available documents (6/9)

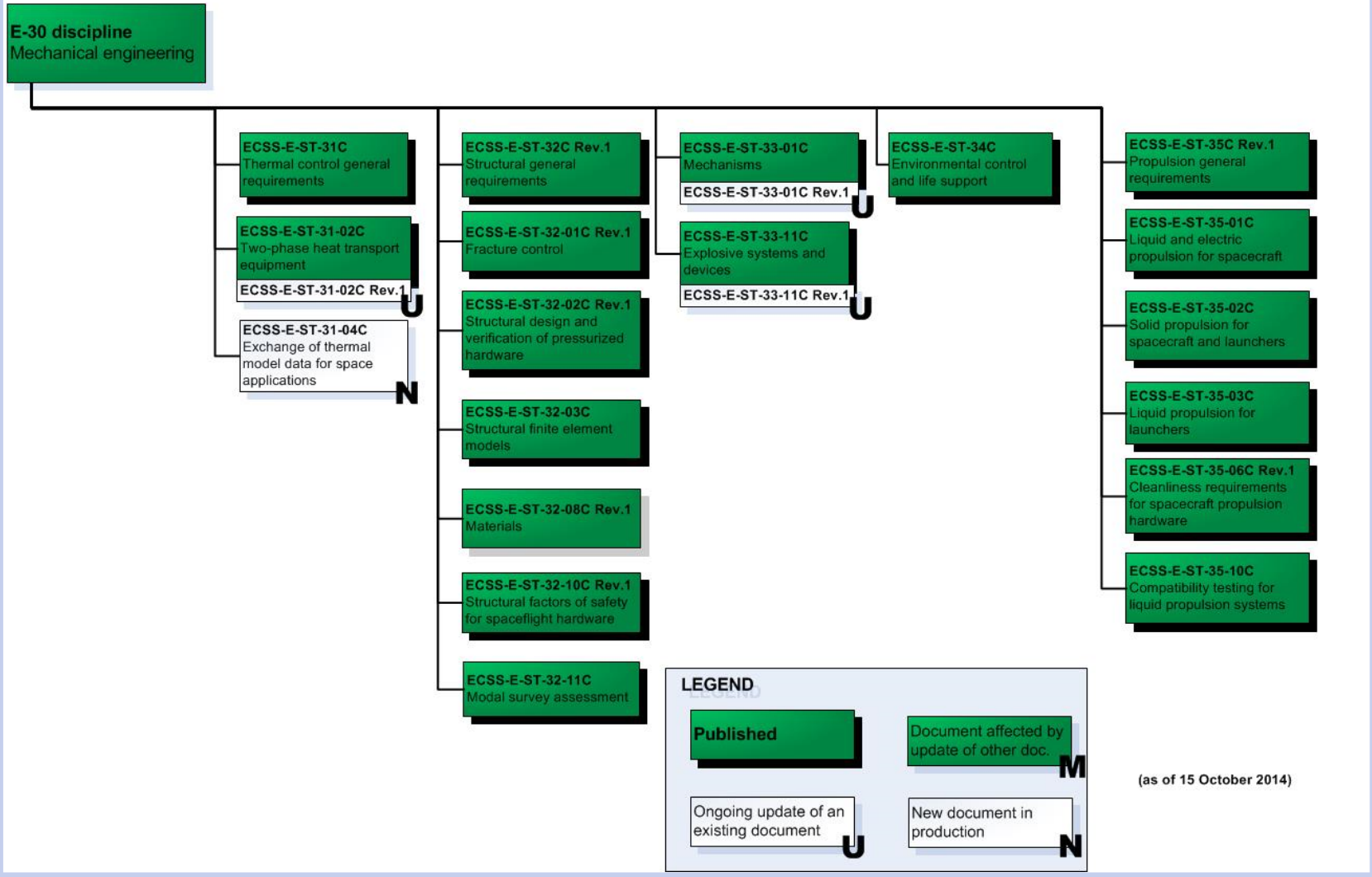
The E branch – Standards (1/2: General)



2. The ECSS standardization documentation model

2.d – ECSS available documents (7/9)

The E branch – Standards (1/2: General)

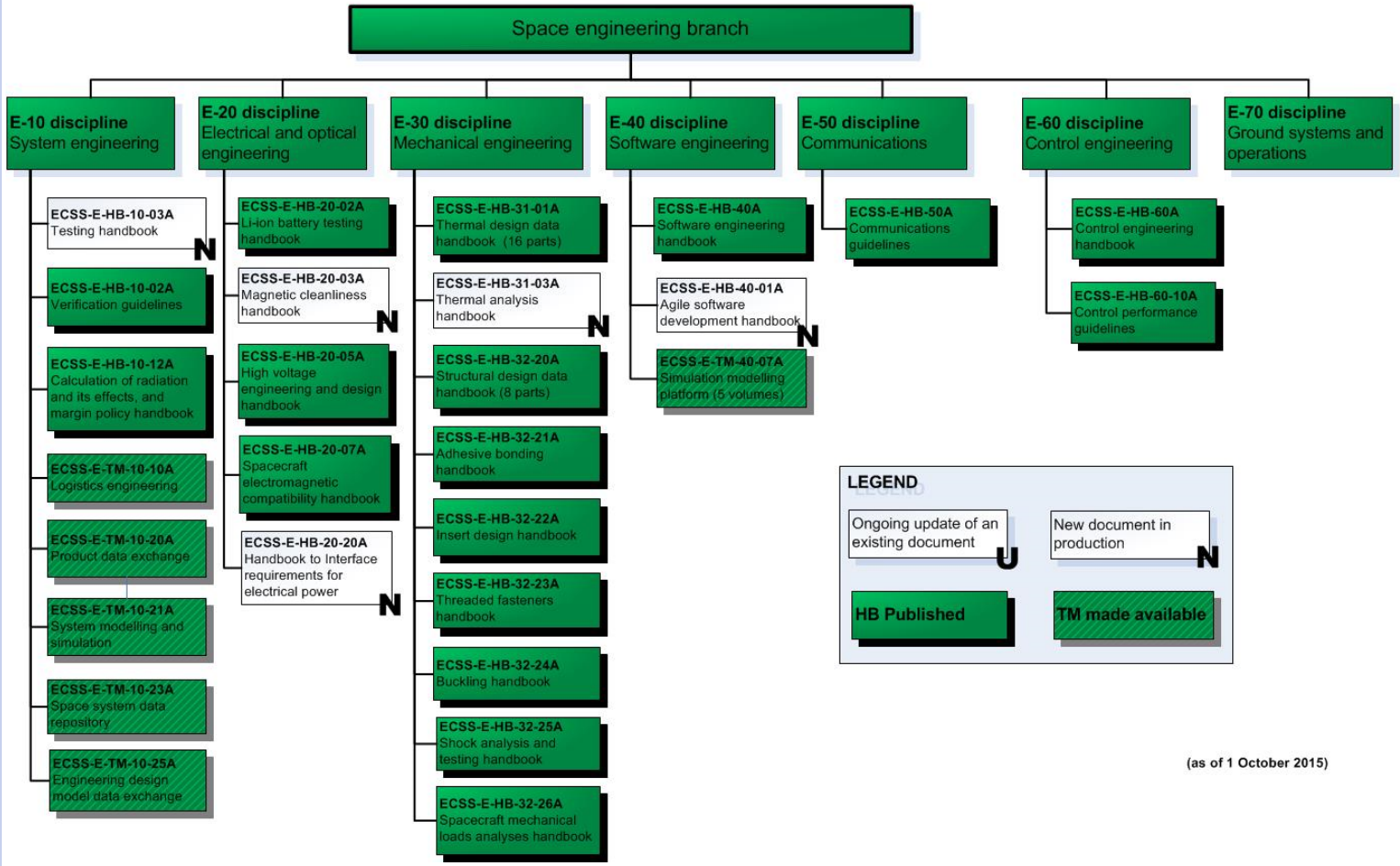


2. The ECSS standardization documentation model

2.d – ECSS available documents (8/9)

The E branch – HBs & TMs

ECSS Handbooks and Technical memoranda
Engineering branch HBs and TMs



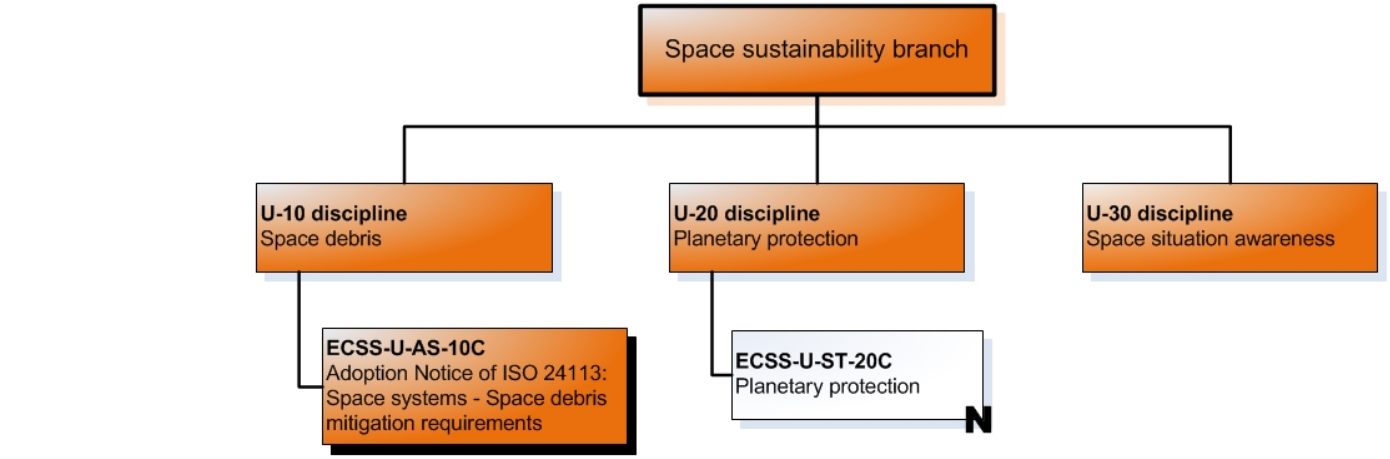
2. The ECSS standardization documentation model

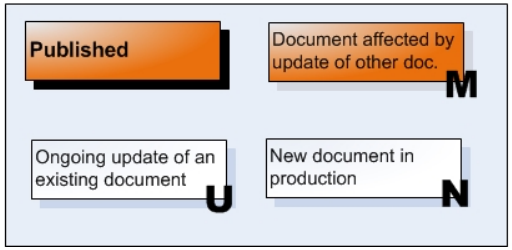
2.d – ECSS available documents (9/9)

The U branch – Standards

ECSS Standards

Sustainability branch





(as of 13 October 2014)

3 Application of ECSS standards in Space projects

a. Tailoring:

- What is tailoring
- The customer-supplier chain
- The tailoring process
- The EAT (ECSS applicability table)
- The EARM (ECSS applicability requirement matrix)

b. Requirement management tools:
DOORS databases

c. Feedback

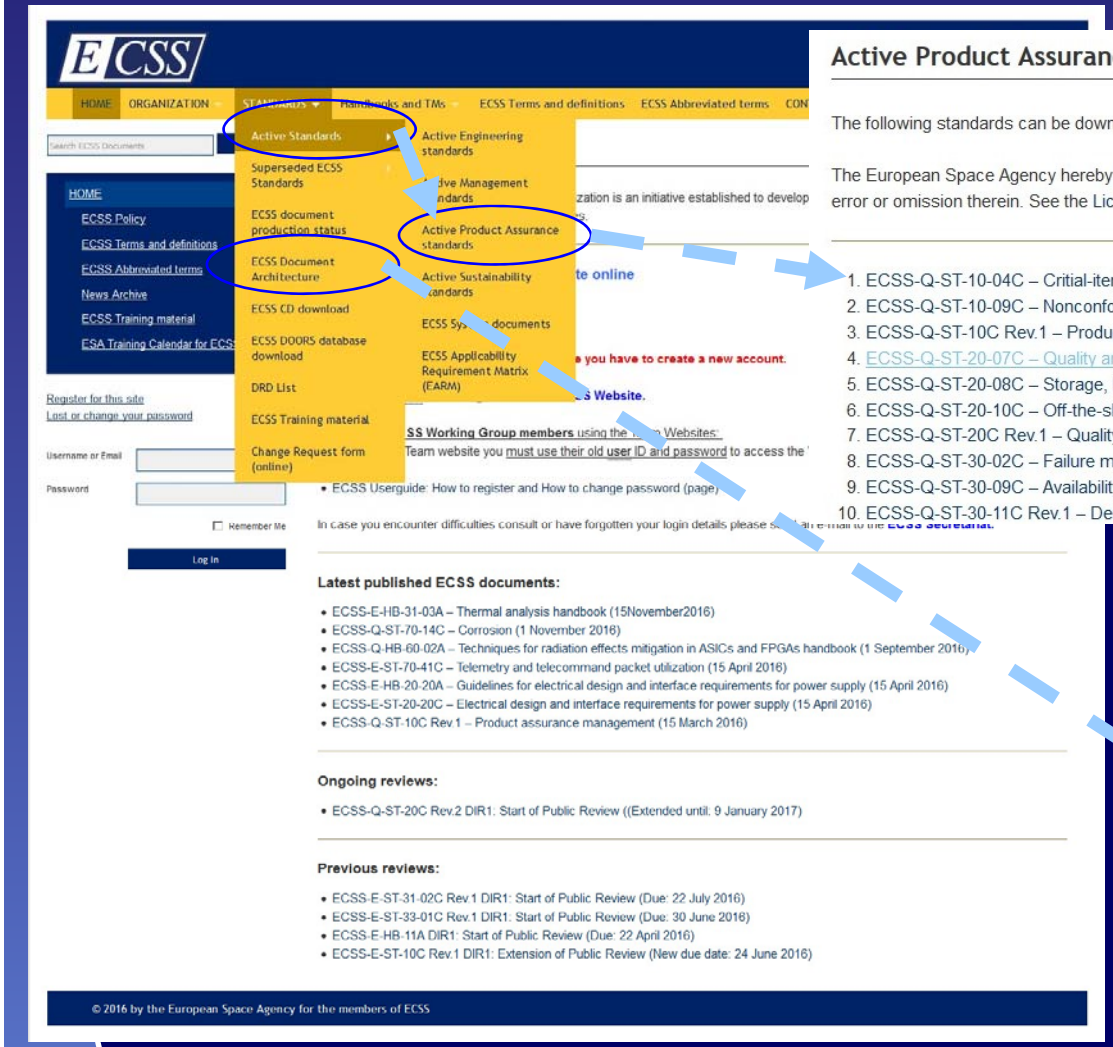
4 Dissemination of ECSS information

a. The ECSS Website
b. ESA standardization contacting information
c. ECSS contacting information

4. Dissemination of ECSS information

4.a Dissemination of standardization documents (1/1)

The ECSS Website: www.ecss.nl



Active Product Assurance standards

The following standards can be downloaded in PDF or MS Word format.

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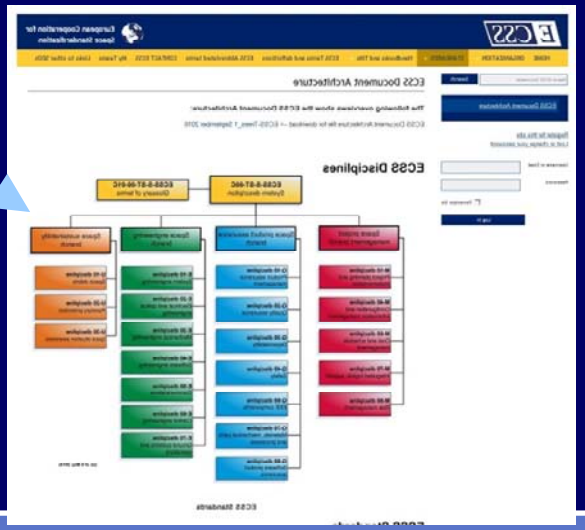
1. ECSS-Q-ST-10-04C – Critial-item control (31 July 2008)
2. ECSS-Q-ST-10-09C – Nonconformance control system (31 July 2008)
3. ECSS-Q-ST-10C Rev.1 – Product assurance management (15 March 2016)
4. ECSS-Q-ST-20-07C – Quality and safety assurance for space test centres (1 October 2014)
5. ECSS-Q-ST-20-08C – Storage, handling and transportation of spacecraft hardware (1 October 2014)
6. ECSS-Q-ST-20-10C – Off-the-shelf items utilization in space systems (8 October2010)
7. ECSS-Q-ST-20C Rev.1 – Quality assurance (1 March 2013)
8. ECSS-Q-ST-30-02C – Failure modes, effects (and criticality) analysis (FMEA/FMECA) – (6 March2009)
9. ECSS-Q-ST-30-09C – Availability analysis (31 July 2008)
10. ECSS-Q-ST-30-11C Rev.1 – Derating – EEE components (4 October 2011)



Thanks for your attention