European and International Standards for Space Industry

Joseph Karis (CYS)   Cleopatra Hotel - Nicosia 20/09/2022

Cyprus Organization for Standardization (CYS)

➔ **1975**

Estabishment of Cyprus Organization for Standardization

➔ **1977**

Member of ISO & IEC of

➔ **2002**

Member of CEN, CENELEC & ETSI

➔ **2018** Member of ITU

➔ **2005 - Independent Standards Body (under Private Law)**

European and International Standards Organizations

European Committee for Standardization

European Committee for Electrotechnical Standardization

European Telecommunication Standards Institute

International Standards Organization

International Electrotechnical Committee

International Telecommunications Union

Observation of Standardization Work
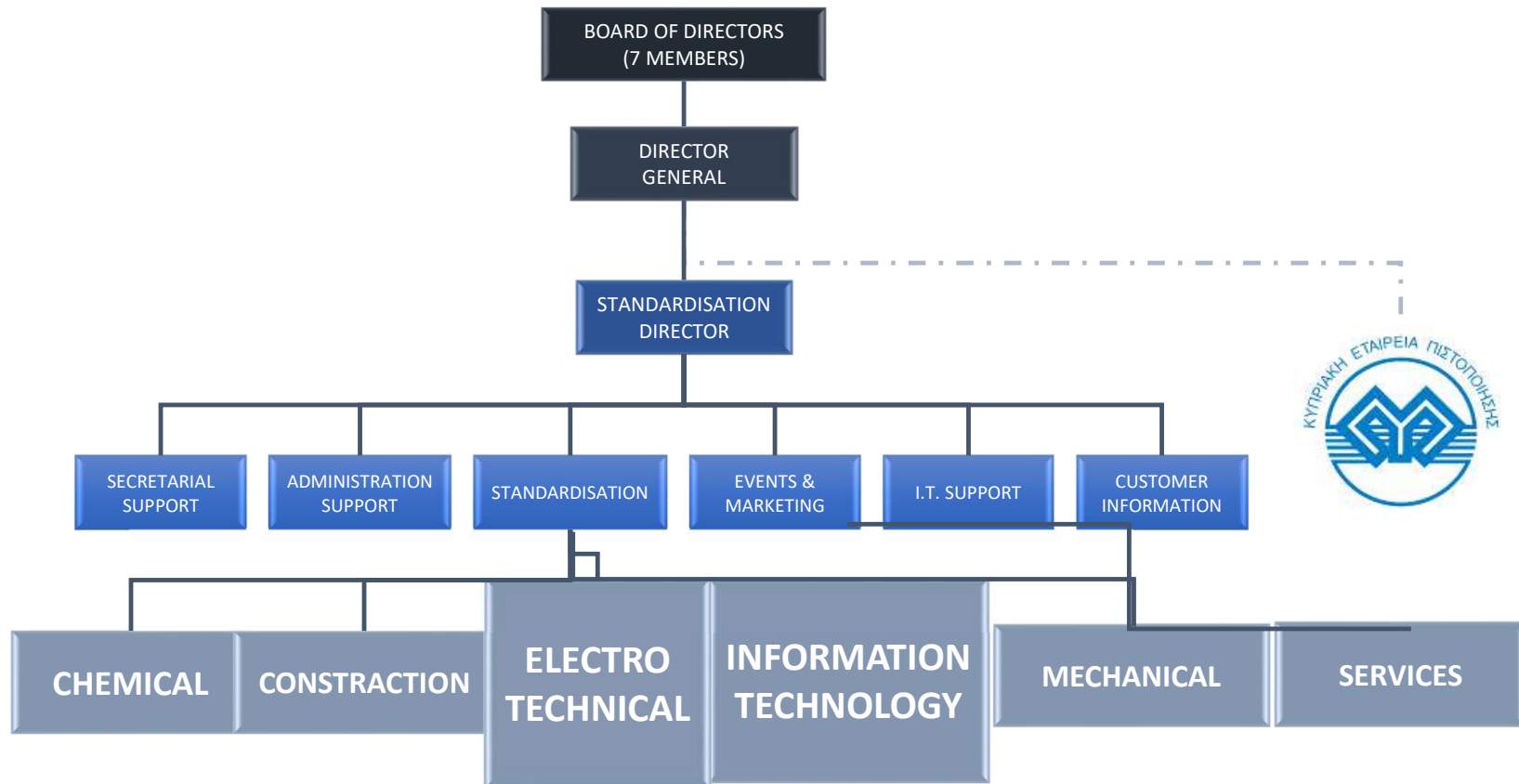
➔ 756 European Technical Committees   (TC, SC, WG, etc)

- **CEN**   429
- **CENELEC**   199
- **ETSI**   **50**

➔ 50 International Technical Committees (ISO/IEC *ITU TC's)

- **ISO & IEC**   **National Interest with Experts**

Organizational chart

- BOARD OF DIRECTORS (7 MEMBERS)
  - DIRECTOR GENERAL
    - STANDARDISATION DIRECTOR
      - SECRETARIAL SUPPORT
      - ADMINISTRATION SUPPORT
      - STANDARDISATION
        - CHEMICAL
        - CONSTRACTION
        - ELECTRO TECHNICAL
        - INFORMATION TECHNOLOGY
        - MECHANICAL
        - SERVICES
      - EVENTS & MARKETING
      - I.T. SUPPORT
      - CUSTOMER INFORMATION

Main Activities of CYS

- Managing the Standardisation System in Cyprus

- Informative lectures & seminars

- Training seminars/courses

- Visits/meetings with the industry

- Publications

- Articles (Mass Media)

Managing the Standardization System….

Technical Experts in European and International Committees

National Technical Committees

National Mirror Committees

CYS

Observers in European or International Committees

> 400
Experts in Technical and Mirror Committees

Types of Standards

➔ **National Standard (CYS):** has been developed at national level and approved by a recognized national standardization body
(CYS, DIN, BSI κτλ)

➔ **European Standard (EN):** has been developed at European level and approved by a European standardization body (CEN, CENELEC, ETSI)

➔ **International Standards (ISO/IEC /ITU):**
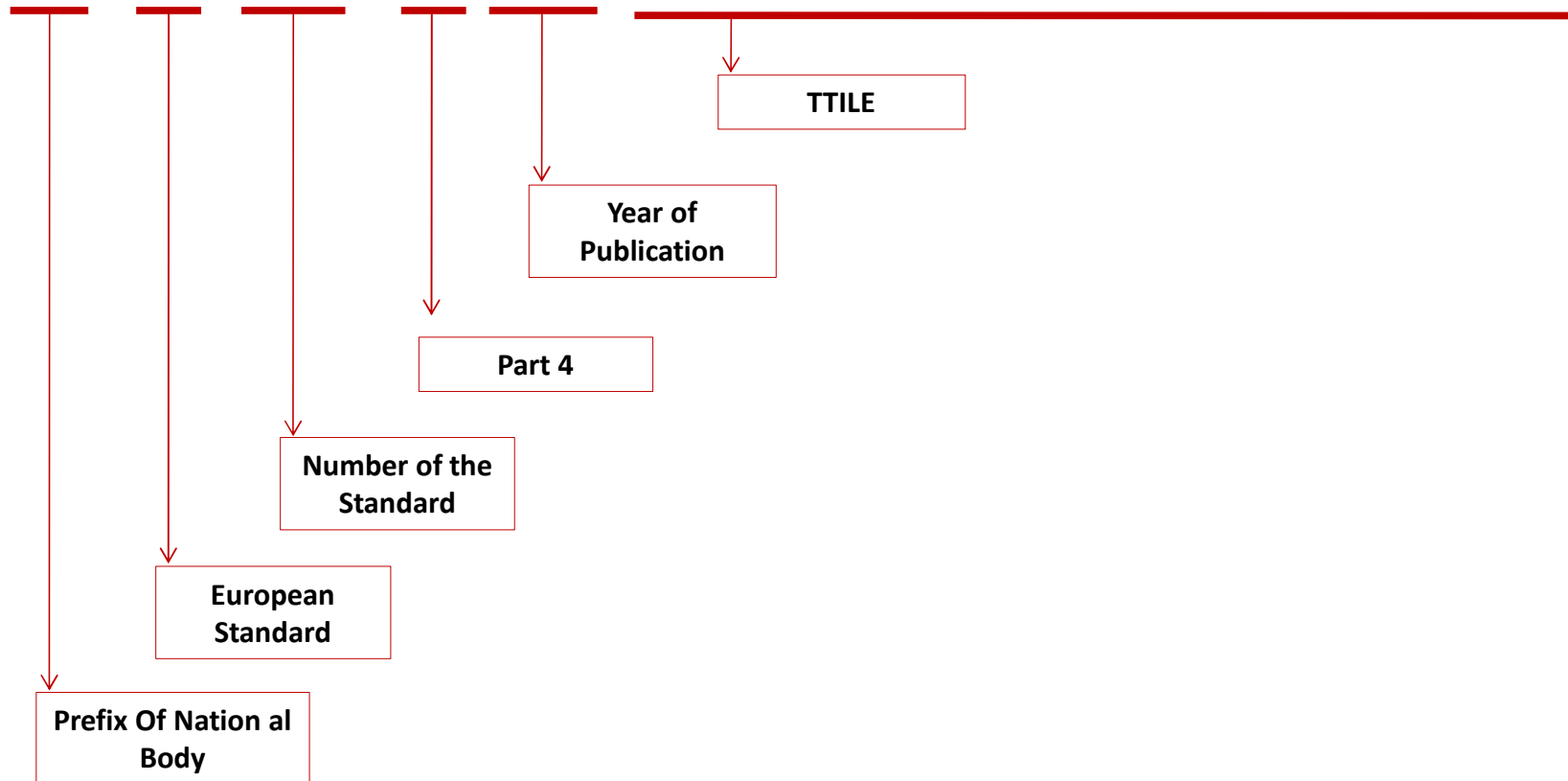has been developed internationally and approved by the International Organization for Standardization (ISO, IEC. ITU)

Standards for Space and ICT

ICT Standards Consist Series of Requirements :

- Equipment Behavior: Can be observed at a defined, accessible interface, such as protocol or service.

- Architectures: Communication and network architectures specifying the functional or logical environment.

- Physical Characteristics: Dimensions, voltage, coulour.

- Policy Requirements on operations and Management Practices : Related to the Process of Issuing on qualified Certificates

- Test Specifications: test demonstrating implementation conforms to a standard or interoperability tests.

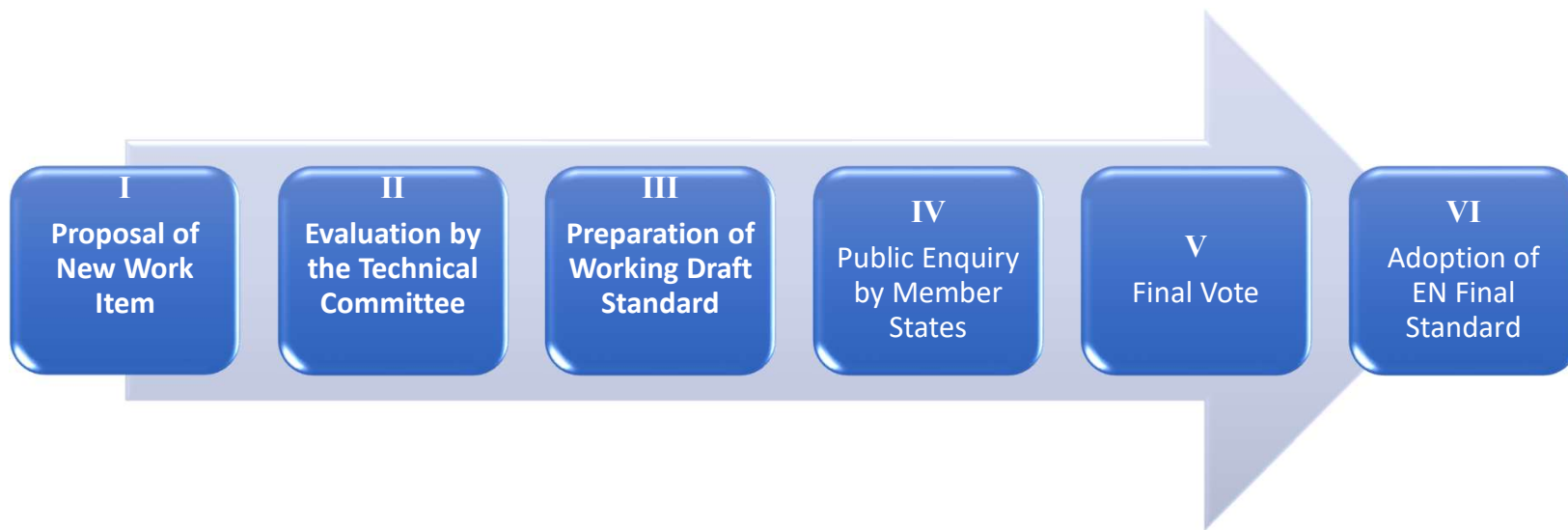# *Standard Marking & Numbering*

CYS   EN   13480 – 4   :2002   Metallic industrial piping – Fabrication & Installation

TTILE

Year of Publication

Part 4

Number of the Standard

European Standard

Prefix Of Nation al Body

Standards production

I	II	III	IV	V	VI
Proposal of New Work Item	Evaluation by the Technical Committee	Preparation of Working Draft Standard	Public Enquiry by Member States	Final Vote	Adoption of EN Final Standard

2.5 / 3 years

Cyprus Engagement in International and European Standardization

Cyprus Engagement through local Technical Experts in the following Sub Committees JTC 1:

- Blockchain and Distribute Ledger Technologies – ISO TC 307

- IT Security techniques - ISO/IEC JTC 1/SC 27

- Intelligent Transport Systems – ISO TC 204 , CEN TC 278

- Cybersecurity and Data Protection - CEN/CLC/JTC 013

- Artificial Intelligence - ISO JTC 1 SC 42

- Coding of Audio, picture & Multimedia – ISO/IEC JTC 1 SC 29

National Mirror Committees CYS

4.03	Electrical Components
10.02	Mechanical Engineering
4.07	Electrical Safety Equipment
4.10	Electromagnetic Compatibility
6.01	Environmental Management & Climate Change
6.03	Waste Management
11.10	Explosive Atmospheres
8.02	Telecommunication Technologies
8.01	Telecommunication Equipment
15.04	Intelligent Transport Systems
8.06	Cybersecurity and Data Protection
8.04	Artificial Intelligence

National Mirror Committees under CYS

➢ NSBs set up Mirror Committees that monitor the work of European and International Technical Committees.

➢ The National experts inside 'mirror committees' in CYS represent and develop the National position on European and International DRAFT Standards.
(Professional associations, Telecom Companies, Departments of Electronic Communications, Ministries, Individual Experts).
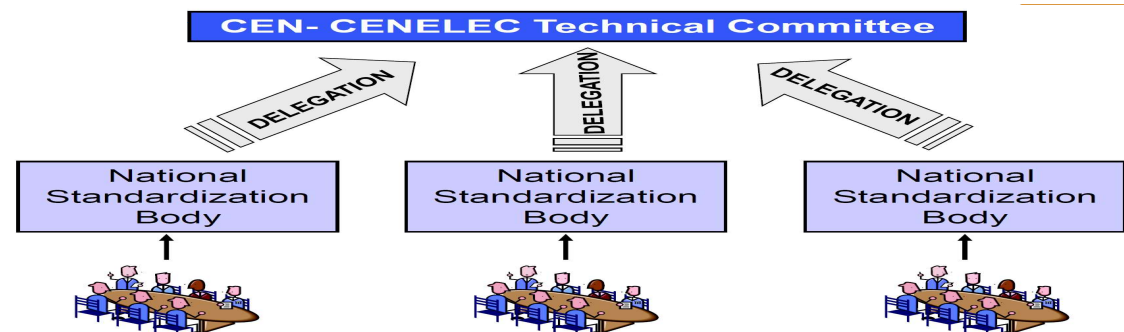
MIRROR COMMITTEES

National Mirror Committees observe the International and European Draft Standards for:

- Telecommunications Technologies

- Blockchain and Distribute Ledger Technologies

- Intelligent Transport Systems

- Artificial Intelligence

- Cybersecurity and Date Protection

Standardisation/
Certification (ii)

- The European Union and standards

- The standardization in the field of space

- The role of standards in the new Space Regulation

- The potential needs for evolution

❑ **REGULATION (EU) 2021/696 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 28 April 2021**

establishing the Union Space Programme and the European Union Agency for the Space Programme and repealing Regulations (EU) No 912/2010, (EU) No 1285/2013 and (EU) No 377/2014 and Decision No 541/2014/EU
THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Mandate M/496
to CEN, CENELEC and ETSI

SCOPE:
ESTABLISHES A PROGRAMME FOR SPACE RELATED STANDARDS

- Ensure an adequate assurance and resilience of space hardware and services in Europe

- Foster the European projects: national, ESA and European Union ones

- Stimulate the emergence of European new markets, services and end-user terminals

- Increase the synergy between civil and military applications and programmes

- Mitigate space related threats in the framework of European SSA activities

- Support the international competitiveness of the European space industry

- Expand international cooperation.

Mandate M/496 to CEN, CENELEC and ETSI

10 sectorial dossiers covering upstream and downstream

- The Galileo satellite navigation system,

- The GMES programme and other satellite applications for the environment, safety & security,

- The activities related to European Space Situational Awareness,

- Other space application fields such as telecommunications and Earth observation,

- Dual use (civil and military purposes) space programmes,

- Launch systems at the Europe's Spaceport in Kourou,

- The "value chain" of commercial space systems,

- Downstream activities to facilitate users needs developments,

- The International Space Station and other international co-operative programmes

Why Space Standardisation?

❖ Competitiveness
enabling our industry to remain competitive and enter into new markets.

❖ Interoperability
allowing inter organization satellites manufacturing, operation and in-orbit servicing.

❖ Ease of Trade
allowing easy and fair trade between organizations.

❖ Efficiency
making the development, manufacturing and supply of products/services more efficient, reliable, safer and sustainable.

❖ Knowledge transfer & Education
aiding in transferring knowledge and the education of today's engineers, and those of the future.

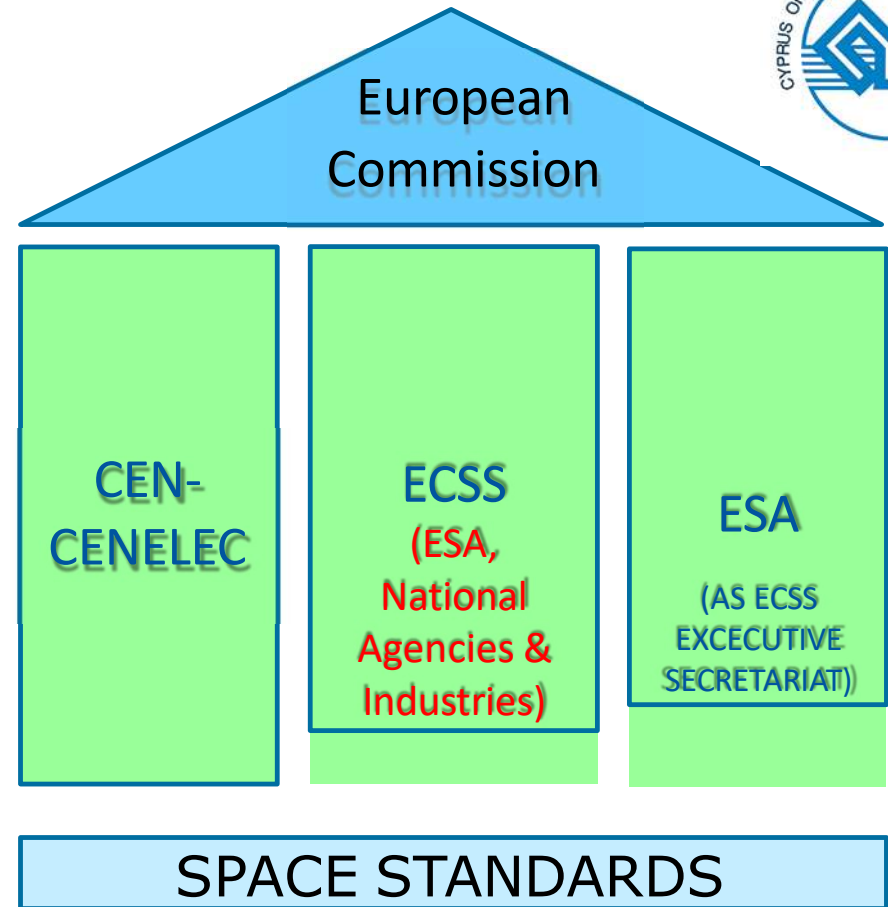# Upstream Standards: KEY PLAYERS

- European Commission

- CEN-CENELEC

- European Cooperation for Space Standards (ECSS)

- European Space Agency

European Commission

| CEN-CENELEC | ECSS (ESA, National Agencies & Industries) | ESA (AS ECSS EXECUTIVE SECRETARIAT)) |

SPACE STANDARDS

126 EUROPEAN NORMS (EN) PUBLISHED SO FAR FROM ECSS STANDARDS

European Space Standardization
How standards support space applications for Europe

CEN-CENELEC/JTC 5 'Space'

European Space Standardization
How standards support space applications for Europe

- Covers all standardisation activities in CEN and CENELEC related to "Space", including dual-use aspects, systems of systems, as well as upstream and downstream applications.

- Develops European Standards to support the implementation of EU-level space projects.

- It is supported by 6 Working Groups who are in charge of drafting standards.

- 76 Committee Members, Document Monitors and Observers.
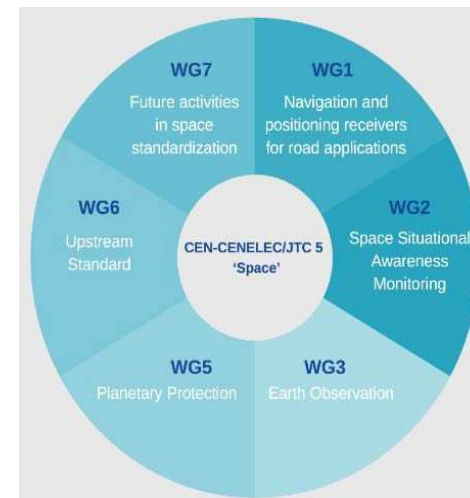
Upstream and Downstream Standards

Upstream Standards: design, development, testing, launching and operation of space and on-ground associated systems and products
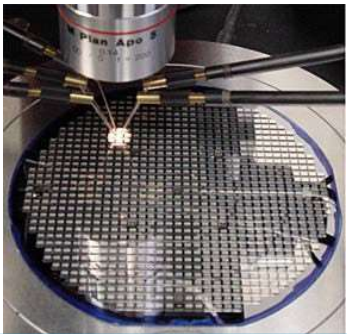
- ECSS started in 1993
- Driven by a partnership of industries and space agencies
- Consensus of industry and agency experts
- State-of-the-art, best engineering practices
- A total of nearly 33000 requirements

Downstream Standards: exchange, processing and utilization of space mission data in support of end user applications
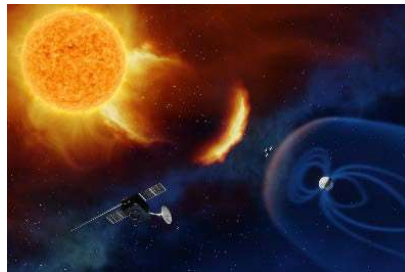
- **Earth Observation (EO):** Disaster-management, Meteorology, and Climate-monitoring/change.
- **Navigation:** GNSS for Automobile, Maritime and Aircraft management.
- **Space Situation awareness:** Meteoroid, Radiation and Space debris

CEN/CENELEC JTC 5 - Space

Working group	Title
CEN/CLC/JTC 5/WG 1	Navigation and positioning receivers for road applications
CEN/CLC/JTC 5/WG 2	Space Situational Awareness Monitoring
CEN/CLC/JTC 5/WG 6	Upstream standards
CEN/CLC/JTC 5/WG 7	Future activities in space standardization
CEN/CLC/JTC 5/WG 8	SBAS receivers performances for Maritime applications

ETSI TC SES   ''Satellite Earth Stations and Systems

Standardization in

o All types of satellite communication systems, services and applications including fixed, mobile and broadcasting.

o Satellite navigation systems and services.

o All types of earth stations and earth station equipment, especially the radio frequency interfaces and network and/or user interfaces,

o Protocols implemented in earth stations and satellite systems.

ETSI TC "Satellite Earth Stations and Systems (SES)

Working Group SCN (Satellite Communications and Navigation)

❑ This group covers radio and transmission aspects related to Fixed, Mobile and Global Navigation Satellite Systems operating in any bands

In particular TC SES

- produce and maintain harmonised standards for satellite earth stations;
- produce and maintain technical specifications for satellite radio interfaces;
- encourage spectral efficiency on satellite links and harmonisation of satellite radio interfaces;
- produce specifications that promote integration and inter-working between satellite and terrestrial networks.

ETSI TC ''Satellite Earth Stations and Systems (SES)

WORKING GROUP ON HARMONIZATION under Radio Equipment Directive 2014/53/EU

❑ Responsible for the maintenance and preparation if needed of Harmonized Standards under the Radio Equipment Directive 2014/53/EU (replacing R&TTE Directive 99/5 EC).

Standards for Telecommunications and ICT

Harmonized Standards are European Standards with a special status.

In Europe, Harmonized Standards, essentially published by CEN, CENELEC and ETSI, allow manufacturers to place their products on the market with a presumption of conformity. This process requires that the Harmonized Standards are published in the Official Journal of the European Union (OJEU)

❑ Example : Radio Equipment Directive (RED), applicable from 13 June 2016

Any provider that wants to place a transmitting or receiving radio equipment on the European market and operate it by using the radio spectrum must meet the requirements of the relevant directives and regulations. (ETSI Standards are supporting the RED Directive).

Standards for Telecommunications and ICT

Harmonized Standards for :

❑ **On the accessibility of the websites** and mobile applications of public sector bodies. Directive (EU) 2016/2102

❑ **Intelligent Transport Systems** (ITS) in urban areas in support of Directive 2010/40/EU

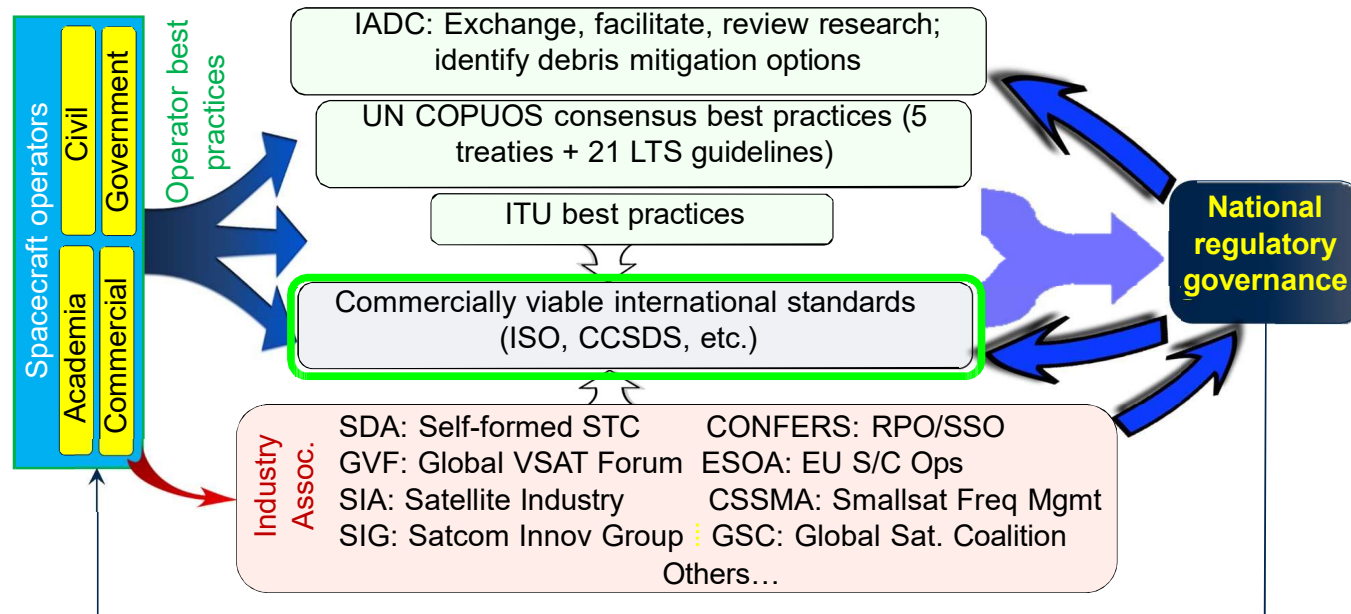❑ **For privacy and personal data protection management** . Directive 95/46/EC

❑ Production of EN's under the **Single European Sky Interoperability Regulation** (i.e. in civil aviation). These Ens are produced in co-operation with EUROCAE (the European Organization for Civil Aviation Equipment)

Space Standards at the ISO Level

Today's complex space governance framework

Globally, international standards …

… provide a reference framework and a common language to facilitate trade and technology transfer

… prioritize describing performance requirements and interfaces

… are verifiable and well-suited for contractual mechanisms

… ensure shared technical knowledge and compatibility

… provide scientific basis for health, safety and environmental legislation

Voluntary, consensus international standards can overcome political barriers, diplomatic objectives, and competitive rivalries.

ISO air and space standards developed in ISO TC20

- ISO/TC 20 develops and maintains standards for aircraft and space vehicles, including:
  - materials, components and equipment for construction and operation of aircraft and space vehicles
  - equipment used in the servicing and maintenance of these vehicles
- Over 600 published standards

ISO TC 20/SC 1 Aerospace electrical requirements
ISO TC 20/SC 4 Aerospace fastener systems
ISO TC 20/SC 6 Standard atmosphere
ISO TC 20/SC 8 Aerospace terminology
ISO TC 20/SC 9 Air cargo and ground equipment
ISO TC 20/SC 10 Aerospace fluid systems and components
ISO TC 20/SC 13 Space data and information transfer systems
ISO TC 20/SC 14 Space systems and operations
ISO TC 20/SC 15 Airframe bearings
ISO TC 20/SC 16 Unmanned Aircraft Systems
ISO TC 20/SC 17 Airport Infrastructure

ISO TC 20/SC13 develops international space data standards

- SC13 is operated by the Consultative Committee for Space Data Systems (CCSDS)

  - Comprised of 11 space agencies
  - Standards available through ISO and also at:
    https://public.ccsds.org/default.aspx

- LTS-relevant CCSDS navigation data exchange messages:
  - Orbit Data Message (ODM)
  - Conjunction Data Message (CDM)
  - Tracking Data Message (TDM)
  - Attitude Data Message (ADM)
  - Events Data Message (EDM)
  - Reentry Data Message (RDM)

The ODM is the most popular SC13 standard today

SC14 develops best practices for space

- Space Systems & Operations
  - SC14/WG3: Space operations international standards.
  - SC14/WG7: Orbital debris mitigation international standards.

Working Group	Convener
WG 1 Earth Observation (Downstream Space Applications)	Japan
WG 2 Interfaces, integration and test	United States
WG 3 Operations and ground support	Germany
WG 4 Space environment (natural and artificial)	Russia
WG 5 Space system programme management and quality	France
WG 6 Materials and processes	Japan
WG 7 Orbital debris	United Kingdom

8

Ways of Engagement in Standardization !!!!

1) Through the Cyprus Organization for Standardization (CYS), we automatically register you on the electronic platforms of the related committees and you can monitor the standardization work online.

2) Face to Face participation at the Plenary meetings or Working Groups of the International and European Technical Committees with responsibilities that vary according to which Organization you will decide to participate.

3) Engaged in National Technical Committees

Thank for your Attention!!!