
Irish Standard
I.S. EN 16603-10-11:2014

# Space engineering - Human factors engineering

**I.S. EN 16603-10-11:2014**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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| *This document is based on:* | *Published:* |
|---|---|
| EN 16603-10-11:2014 | 2014-07-09 |

| *This document was published* under the authority of the NSAI and comes into effect on: | ICS number: |
|---|---|
| 2014-07-26 | 49.140 |
| | NOTE: If blank see CEN/CENELEC cover page |


| NSAI | T +353 1 807 3800 | Sales: |
|---|---|---|
| 1 Swift Square, | F +353 1 807 3838 | T +353 1 857 6730 |
| Northwood, Santry | E standards@nsai.ie | F +353 1 857 6729 |
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Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

**EN 16603-10-11**

July 2014

ICS 49.140

English version

# Space engineering - Human factors engineering

Ingéniérie spatiale - Ingénierie des facteurs humains

Raumfahrttechnik - Technik der Humanfaktoren

This European Standard was approved by CEN on 28 December 2013.




**CEN-CENELEC Management Centre:**
**Avenue Marnix 17, B-1000 Brussels**



Ref. No. EN 16603-10-11:2014 E

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# Foreword

This document (EN 16603-10-11:2014) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN.

This standard (EN 16603-10-11:2014) originates from ECSS-E-ST-10-11C.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2015, and conflicting national standards shall be withdrawn at the latest by January 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been developed to cover specifically space systems and has therefore precedence over any EN covering the same scope but with a wider domain of applicability (e.g. : aerospace).

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.”

# Introduction

This Standard defines requirements for the integration of the human in the loop for space system products. Thus it provides all requirements to be applied when the presence of the human is planned on-board, or for the nominal or non-nominal interaction of the human with the system, subsystem or equipment to be designed (e.g. a ground based human-computer interface). This Standard identifies requirements for the equipment for implementing a proper manned system that takes into consideration efficiency, effectiveness and wellbeing of the on-board crew, and ground based operators of human-in-the-loop systems. This Standard also identifies the verification methods and related methodologies to be used to confirm compliance to the above mentioned requirements.

This Standard is applicable to both the flight and the ground segment of the space system and refers to the maximum extent possible to already existing HFE non-space domain standards, deviating only when the specific application environment dictates it.

The application of human factors (that in the space domain includes ergonomics) to systems design enhances effectiveness and efficiency, improves human working conditions, and diminishes possible adverse effects of use on human health, safety and performance. Applying ergonomics to the design of systems involves taking account of human capabilities, skills, limitations and needs.

A space system design will consider human factors and especially the two following main aspects from the very beginning of the conceptual phase. Firstly the human being will be correctly taken into account in the design of the hardware, software and operations products and secondly the corresponding organisation and training will be addressed in parallel to the design of the hardware and software.

This standard provides:

- a set of requirements for a human centred design process applied to a space system compatible with the ISO Standard 13407:1999 - Human-centred design processes for interactive systems.

A planned accompanying Handbook will provide:

- a tailoring guide of the existing standard - ISO STD 17399:2003 previously known as NASA STD 3000 “Space systems - Man-systems integration”.

A key issue of the human centred design approach is the involvement of the stakeholders from the beginning and continuously throughout the project. Benefits of a human centred design include increased productivity, enhanced

quality of work, reductions in support and training costs, and improved user satisfaction. This approach aims to help those responsible for managing hardware and software design processes as well as planning for operations to identify and plan effective and timely human-centred design activities. It complements existing design approaches and methods.

NOTE The customer's total cost of ownership will be dramatically reduced if HFE practices are well integrated into all project phases, from the very beginning.

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# Scope

This Standard forms part of the System engineering branch of the Engineering area of the ECSS system. As such it is intended to assist in the consistent application of human factors engineering to space products by specifying normative provisions for methods, data and models to the problem of ensuring crew safety, well being, best performance, and problem avoidance in space system and payload operations.

This Standard ECSS-E-ST-10-11 belongs to the human factors discipline, as identified in ECSS-E-ST-10, and defines the human factors engineering and ergonomics requirements applicable to elements and processes.

This Standard is applicable to all flight and ground segments for the integration of the human in the loop for space system (this includes hardware and software or a combination of the two) products.

When viewed in a specific project context, the requirements defined in this Standard should be tailored to match the genuine requirements of a particular profile and circumstances of a project.

This standard may be tailored for the specific characteristics and constraints of a space project in conformance with ECSS-S-ST-00.