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Aeronavtika - Vodenje programov - Izražanje potreb - Navodilo in oblika za (potrebe) tehnične specifikacije

Aerospace series - Programme management - Expression of need - Guidance on and format for (Need) Technical Specification

Luft- und Raumfahrt - Programm-Management - Bedarfsbekundung - Anleitung und Format für die (Bedarfs-)Technische Lieferbedingung

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Aerospace series - Programme management - Expression of need - Guidance on and format for (Need) Technical Specification

Luft- und Raumfahrt - Programm-Management - Bedarfsbekundung - Anleitung und Format für die (Bedarfs-)Technische Lieferbedingung

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 9208:2019) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

1 Scope

This document belongs to the documents going along with EN 9200 relating to Project Management Specification.

The aims of this document are as follows:

— to specify/remind the concept of (Need) Technical Specification (N)TS;

— to define the principles and conditions for drawing up, approving, using and updating a (N)TS;

— to propose a template of (N)TS.

The template identifies topics and types of related requirements to be covered in a (N)TS without being completely exhaustive or mandatory. It is due to be analysed like a check-list and tailored according to the type of the product of interest, the context of the bodies involved and the contractual details.

The principle of drawing up a (N)TS applies to both tangible and intangible products (e.g. services).

The customer/supplier relationship addressed by these principles may also apply within a single organization. The concepts of customer and supplier are discussed in this document without distinction between internal or external relationship.

This document implements and adapts EN 16271 to the context, in order to meet the specific needs of the aeronautical field and more generally the needs of other fields.

This document is more explicit about certain aspects of ISO/IEC/IEEE 29148 dedicated to requirements engineering, such as the responsibility for drawing up a (N)TS on a contractual basis and also the process of drawing it up within a programme (stages and milestones). It also supplements the technical specification framework proposed by ISO/IEC/IEEE 29148, in particular with requirements relating to safety of operation and result assurance.

The relationships existing between Functional Performance Specification (FPS) and (N)TS for expression of needs are given in Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 9200, *Aerospace series - Programme management - Guidelines for project management specification*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 9200 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
environmental agent
one of the physical, chemical, biological, etc. phenomena that may have direct or indirect, immediate or delayed, effect on living beings, human activities and systems or their operation

[SOURCE: NF X 50-144-1]

3.2
need
what is necessary for or desired by the user

Note 1 to entry: A need may be explicit or implicit; it may be existing or potential.

Note 2 to entry: "Implicit" means that it is usual or a common practice for all the parties concerned.

[SOURCE: EN 16271:2012, 3.2, modified – Note 1 to entry has been modified, Note 2 to entry has been added.]

3.3
functional performance specification
FPS
document in which the needs are listed in terms of service functions and constraints

Note 1 to entry: Drawing up a FPS implies that a functional analysis has been able to clearly define the users' needs.

Note 2 to entry: Assessment criteria and their performance levels are defined for each of these functions, when relevant and possible. Each performance level is expressed with a certain degree of flexibility.

[SOURCE: EN 16271:2012, 3.16, modified]

3.4
constraint
externally imposed limitation on requirements, design, or implementation or on the process used to develop or modify a product or on any other provision

Note 1 to entry: A constraint is a factor that is imposed on the solution by force or compulsion and may limit or modify the choice of solution.

Note 2 to entry: Constraints may come from authoritative texts (laws, regulations, standards, market demand, etc.).

[SOURCE: ISO/IEC/IEEE 29148:2018, 3.1.7, modified – Definition and Note 1 to entry has been modified, Note 2 to entry has been added.]

3.5
life cycle
set of phases in the life of a product, from the expression of need until disposal

Note 1 to entry: The product can be firstly conceptual then physical.

Note 2 to entry: The life cycle typically includes the following phases:

— Initial expression of need,

— feasibility;

— definition;

— development;

— production;

— operation;

— disposal.

Note 3 to entry: Notion not to be confused with life profile.

3.6
requirement
statement which translates or expresses a need and its associated constraints and conditions

[SOURCE: ISO/IEC/IEEE 29148:2018, 3.1.19]

3.7
special requirements
requirements identified by the customer, or determined by the organization, which have high risks of not being met, thus requiring their inclusion in the operational risk management process; factors used in the determination of special requirements include product or process complexity, past experience, and product or process maturity; examples of special requirements include performance requirements imposed by the customer that are at the limit of the industry's capability or requirements determined by the organization to be at the limit of its technical or process capabilities

[SOURCE: EN 9100:2018, 3.5]

3.8
interface
boundary shared between two products, or two product parts, which has physical and/or functional exchanges

3.9
performance
measurable characteristic(s) of a product

3.10
life profile
chronological description of the use situations in which a physical product is expected to be found, from ex-factory to disposal; by situation, we mean: transport, handling, storage, maintenance, operational use…, with all environmental conditions, durations and respective occurrences

Note 1 to entry: The life profile is described for product/customer or product/job couples. For a given product, there may be several life profiles depending on the considered concepts of use or deployments.

Note 2 to entry: Not to be confused with life cycle.

3.11
operational scenario
description of an imagined sequence of events that includes the interaction of the product or service with its environment and users, as well as interaction among its product or service components

Note 1 to entry: Operational scenarios are used to evaluate the requirements and design of the product and to verify and validate the product.

[SOURCE: ISO/IEC/IEEE 24765:2017, 3.2713]

3.12
(need) technical specification
(N)TS
contractual document drawn up by the customer, intended for the supplier, in which the customer expresses his needs (or the needs he has been instructed to convey) in terms of technical requirements

Note 1 to entry: The (Need) Technical Specification may also establish the conditions to ensure that these requirements are met.

4 List of acronyms

AIS	Analogue Interface Sheet
ARINC	Aeronautical Radio INCorporated
BIT	Built In Test
CMMI	Capability Maturity Model Integration
DIS	Digital Interface Sheet
EBIOS	(*Expression des Besoins et Identification des Objectifs de Sécurité*) — Expression of need and Identification of Safety Objectives
EMST	(*Emballage Manutention Stockage Transport*) — Packaging Handling Storage Transport
FEROS	(*Fiche d'Expression Rationnelle des Objectifs de Sécurité*) — Rational expression of Security Objectives Statement
FPS	Functional Performance Specification
HUMS	Health and Usage Monitoring System
ICD	Interface Control Document
ILS	Integrated Logistics Support
IRS	Interface Requirement Specification
LRU	Line Replaceable Unit
MEHARI	(*Méthode Harmonisée d'Analyse des Risques*) — Harmonized Risk Assessment Methodology
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
NAF	NATO Architecture Framework
NATO	North Atlantic Treaty Organization
(N)TS	(Need) Technical Specification
NRBC	Nuclear, Radiological, Bacteriological, Chemical

PTS	Product Technical Specification
QoS	Quality of Service
RAMS	Reliability, Availability, Maintainability and Safety
REACh	Registration Evaluation and Authorization of Chemicals
RFID	Radio-Frequency IDentification
RoHS	Restrictions of Hazardous Substances
SLA	Service Level Agreement
TRL	Technology Readiness Level
UTD	User Technical Documentation

5 Objectives of the (Need) Technical Specification (N)TS

5.1 Purpose of the customer's expression of need

The (N)TS is drawn up under the customer's responsibility (see 6.2) and its purpose is to formalize the needs in technical terms. A (N)TS attached to a contract results from negotiations between the customer and the supplier. It reflects the compromise between technological feasibility, performance, imposed solutions, total cost, realization duration and risks.

NOTE The total cost includes non-recurring costs (related to design, development, etc.) and recurring costs (related to manufacturing, purchasing, operation, support, etc.) over the entire life cycle of the product.

It expresses the technical requirements over the entire life cycle of the product:

— functional and performance requirements;

— lifetime requirements;

— RAMS requirements (reliability, availability, maintainability, safety);

— product protection requirements including information security;

— human factors requirements;

— requirements relating to logistic support and in-service operations of the product;

— requirements on resistance to the environmental conditions;

— external interfaces requirements;

— design constraints and imposed solutions.

It can also express the requirements regarding result assurance:

— relating to definition justification and qualification pronouncement;

— relating to the conditions of acceptance of specimens of the product.

The expression of need may change according to the phases of the life cycle. It should be considered compared to expected intermediate supplies, which may be a model, prototype, document, etc. up to the operational product. Thus mock-ups, prototypes and different versions of the product, which are to be

supplied under contract and which differ from the operational product due to special requirements or tolerances, may be the subject of a separate (N)TS or a document showing the deviations compared with the (N)TS of the operational product.

The (N)TS requirements are those necessary and sufficient for a supplier to be able to draw up, if necessary, its own Product Technical Specification (PTS) and establish a product definition that fulfils the need.

These requirements are mainly formalized in terms of functions and performance expected from the product to be designed and defined, bearing in mind the identified risks accepted by the parties (see 6.1).

It is recommended to take into account the general requirements expressed in the higher-level (N)TS for each level of the product breakdown structure (see 6.3.4). These general requirements may be: component policy, marking rule, documentation, etc.

To understand the origin of the requirement, and also how the (N)TS of the product can be integrated in a larger system ("Where does this need come from? What about this restriction? Why this requirement?"), the customer should ensure traceability of the requirements from the top-level (including the case where the product belongs to a larger system, as in the case of systems of systems) down to the (N)TS appended to the contract. It may also be wise to establish traceability links between decisions (emails, report, etc.) and the (N)TS requirements, in a requirement justification file for example.

The Aeronautical Quality Management System standards (EN 9100 and EN 9110) introduce the concept of "special requirements" for certain requirements (see definition). This concept emphasizes the high risk of not being able to meet a requirement.

This kind of requirements ("special requirements") may be determined either by the customer (in the (N)TS) or by the supplier (in the PTS) and implies these requirements to be dealt with via the risk management process of the customer and/or supplier.

In order to answer the various questions such as "is this requirement the right one?" it is recommended, where applicable, to ensure validation of the requirements (using ARP 4754A/ED-79A) against the different expressions of need regarding the context where the product will take place.

5.2 Role and contractual nature of the (N)TS

The (N)TS serves as a contractual basis between a customer and its supplier. The (N)TS allows the supplier to design and define the product. This product can be developed, modified or selected from a portfolio of existing products, as long as it fulfils the requirements expressed by the customer.

Based on the customer/supplier relationship, the (N)TS is the reference document that enables the customer to:

— express his need for the supplier in terms of results and not solution,

— pronounce the decision concerning qualification of the product definition and, reciprocally, enables the supplier to justify the product definition by means of analyses or tests,

— process the technical changes in the product definition; the (N)TS is therefore an element of the reference configuration of the product (see EN 9223-100 and its accompanying documents) and

— decide on requests for waivers or deviation (see EN 9223-105) if elements of the Definition Data File are not sufficient to decide on this request.

The (N)TS is a part of the contract; the contract also specifies other types of requirements (means to be implemented, work packages, programme management requirements, etc.).

NOTE For organizations which follow CMMI models, Annex B shows how CMMI models map to the (N)TS.

6 Principles for drawing up a (N)TS

6.1 General

(N)TS requirements are the result of iterative and, as far as possible, collaborative work based among other considerations on risk analysis (see RG.Aéro 000 39), performed by both the customer and the supplier. The goal is to reach a compromise between the customer requirements and industry ability to meet them, via different proposals of candidate suppliers (performance, costs and deadlines).

6.2 Responsibility for drawing up the (N)TS

Within the customer/supplier relationship, (N)TS requirement elaboration is under customer responsibility.

NOTE Even if the customer delegates the task of drawing up the (N)TS to a supplier (often under a specific contract), the document will remain the customer responsibility.

The supplier in turn may translate the customer requirements in a designer (supplier) language and supplement them with derived requirements related to the chosen solution and the supplier constraints (product policy, re-use, etc.). In this case the resulting document is the Product Technical Specification (PTS). This document is the entry point of the product design process which leads to the establishment of its Definition Data File (DDF).

In all cases, the product definition must be justified against the Customer (N)TS.

6.3 (N)TS elaboration process

6.3.1 Preparatory stage

It is recommended that a functional analysis of need, (possibly supplemented by an architecture description, be carried out before drawing up a (N)TS. This is to identify the various expected functions and to express the quantitative and qualitative requirements for each of the functions, for example in a Functional Performance Specification (FPS).

It is also recommended that information from other programmes be considered before drawing up the (N)TS, in order to encourage reuse of proven solutions, lessons learned and technology selection based on readiness levels with regards to the specific programme.

Within a given programme, the preliminary work products (studies results, mock-ups, etc.) resulting from upstream studies (ILS study, RAMS study, operational concept development and experimentation, etc.), must be planned and specified in dedicated (N)TS with the right level of detail, for reuse in the scope of the final product.

In all cases, the reused solution should meet the requirements of the new programme. It should be checked that the features of the reused solution not specified in the (N)TS do not lead to negative consequences (in terms of costs, deadlines, performance, reliability, etc.).

6.3.2 Description of the process

The result of the elaboration process of a (N)TS is a set of technical requirements intended to be included in the development contract.

The essential stages of this process are (see Figure 1):

— the definition of the requirements, with identification of the special requirements (see 3.7 and 5.1),

— their analysis and negotiation with the potential supplier(s) and