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Vodenje zagotovitljivosti - 3-14. del: Vodilo za uporabo - Podpornost in podpora

Dependability management - Part 3-14: Application guide - Supportability and support

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ICS:

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21.020	Značilnosti in načrtovanje strojev, aparatov, opreme	Characteristics and design of machines, apparatus, equipment

oSIST prEN IEC 60300-3-14:2023 **en**



56/1992/CDV

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OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING
<p>Attention IEC-CENELEC parallel voting</p> <p>The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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TITLE:

Dependability management - Part 3-14: Application guide - Supportability and support

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DEPENDABILITY MANAGEMENT

Part 3-14: Application guide – Supportability and support

FOREWORD

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IEC 60300-3-14 has been prepared by subcommittee MT23: Supportability and support, of IEC technical committee TC56: Dependability. It is an International Standard.

This second edition cancels and replaces the first edition published in 24 March 2004, This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) consistency with the other core dependability standards
- b) greater expansion of supportability and support principles and activities in dependability

The text of this International Standard is based on the following documents:

Draft	Report on voting
56/XX/FDIS	56/XX/RVD

182
183 Full information on the voting for its approval can be found in the report on voting indicated in
184 the above table.

185 The language used for the development of this International Standard is English.

186 This document was drafted in accordance with ISO/IEC Directives, Part 2 and developed in
187 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
188 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
189 described in greater detail at www.iec.ch/standardsdev/publications.

190 The committee has decided that the contents of this document will remain unchanged until the
191 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
192 specific document. At this date, the document will be

- 193 • reconfirmed,
194 • withdrawn,
195 • replaced by a revised edition, or
196 • amended.

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INTRODUCTION

199 This document provides guidance on how to identify and apply appropriate analysis and
200 assurance techniques for supportability and support. This document includes good practice, the
201 measures appropriate for requirements and how to evaluate them and the relationship with
202 other dependability attributes. Supportability is concerned with:

- 203 • identifying and quantifying:
 - 204 • support required for a defined item in a given context of use;
 - 205 • time to provide that support;
 - 206 • resourcing, cost and quality of that support;
 - 207 • quality of the delivered support.
- 208 • influencing the design of an item and support arrangements to achieve value over the item's
209 life.

210 A primary objective of 'designing for item supportability' is to influence the support activity
211 during operations and maintenance. However, supportability is not just an attribute of the design
212 as it is also dependent on the conditions of use and the organization providing the support
213 arrangements. Achieving the desired capabilities inherent in an item design requires that the
214 necessary support capability is also designed, implemented and continuously evolved to align
215 with changes to the item's configuration and its conditions of use including the capability of the
216 managing organization and its suppliers. Supportability of an item ensures that:

- 217 • support requirements to achieve a desired item capability are balanced and known;
- 218 • financial capability required to deliver that support is known for the short and long term;
- 219 • there is a desired balance between item design, the design of the support and the design of
220 the organization delivering that support in order to achieve technical and financial
221 requirements.

222 Support is a major contributor to the overall costs for an item to operate smoothly throughout
223 its life for a given life profile. The current trend is to extend the life of an item by ensuring spares
224 and other support resources are readily available over a longer period of time (which will have
225 problems such as obsolescence) and also ensuring that parts are disposed/re-cycled in a
226 sustainable manner. Supportability will require innovative solutions if it is to meet these future
227 sustainability and circularity demands.

228 An item which is easily supported is better able to withstand adversity and recover from it. The
229 item is more resilient and less reliant on the people and systems that may be affected by serious
230 adverse events and situations

231 An effective supportability and support programme ensures that the customer will have
232 increased confidence in the support organization, with lower life cycle costs, improved
233 availability and fewer modifications due to supportability deficiencies. In turn, this will result in
234 improved customer confidence in the item leading to improved sales as well as improved sales
235 for future items from the same company.

236 This document is one of the 'top-level' interrelated dependability standards that provides
237 managers and technical personnel with guidance on how to effectively plan and implement
238 dependability activities. Other documents in the suite are:

- 239 • IEC 60300-1 which highlights the importance and benefits of managing dependability. It
240 gives guidance on dependability activities and how to integrate them into an existing
241 management system and life cycle processes;
- 242 • IEC 60300-3-4 which provides guidance for writing dependability requirements in
243 specifications, together with the means of assuring the achievement of those requirements;

- 244 • IEC 60300-3-10 which provide guidance on how to identify and apply appropriate analysis
245 and assurance techniques for maintainability (and maintenance);
246 • Standards to cover reliability and availability which are planned.
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DEPENDABILITY MANAGEMENT

Part 3-14: Application guide – Supportability and support

251 1 Scope

252 This document introduces the dependability attribute of supportability (and support) and the
253 relationship with related dependability attributes of reliability, maintainability and availability.

254 This standard can be used at any time during an item's life to guide the planning and
255 implementing of supportability and support activities focused on achieving an intended balance
256 of performance, cost and risk. These capabilities can be explicit in contractual agreements and
257 statutory obligations or implicit in commitments to stakeholders. All such activities can be
258 tailored to the nature of the item and its conditions of use.

259 Guidance is offered on how supportability and support activities can be applied at any life cycle
260 stage for newly designed items, existing items available for commercial procurement, or for
261 items during their operational life.

262 This standard considers the life cycle implications by formally managing risks associated with
263 the management and delivery of activities to create, operate, maintain and evolve an item to
264 achieve its stated purpose.

265 This document describes the:

- 266 • nature of supportability and support;
- 267 • role of supportability and support in achieving item value over its life;
- 268 • trade-offs associated with supportability and support to achieve desired balance of cost,
269 performance and risk during the life of an item;
- 270 • importance of aligning the structure of an organization with its objectives, with the ultimate
271 aim of improving efficiency and effectiveness in order to deliver the required supportability
272 and support.

273 2 Normative references

274 There are no normative references in this document.

275 3 Terms and definitions

276 For the purposes of this document, the following terms and definitions apply.

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

- 279 • IEC Electropedia: available at <https://www.electropedia.org/>
- 280 • ISO Online browsing platform: available at <https://www.iso.org/obp>

281 3.1

282 **availability**

283 ability to be in a state to perform as required under given conditions

284 Note 1 to entry: Availability depends upon the combined attributes of the reliability (IEV 192-01-24), maintainability
285 (IEV 192-01-27), supportability (IEV 192-01-31) and the maintenance and support provided.

286 Note 2 to entry: Given conditions include aspects that affect availability, such as: mode of operation, stress levels,
287 environmental conditions and maintenance defined in the life profile

288 Note 3 to entry: Availability may be quantified using measures defined in Section 192-08, Availability related
289 measures

290 [SOURCE: IEC 60050-192:2015, 192-01-23, modified – Definition is no longer specific and has
291 been extended with Note 2 added]

292 3.2

293 **built-in test**

294 BIT

295 integrated capability of a test item enabling automatic fault recognition and fault localisation

296 [SOURCE: IEC 60705-5:2007, 3.1.1]

297 3.3

298 **built-in test equipment**

299 BITE

300 hardware assigned to the built-in test

301 [SOURCE: IEC 60705-5:2007, 3.1.2]

302 3.4

303 **corrective maintenance**

304 maintenance carried out after fault detection to effect restoration

305 Note 1 to entry: Corrective maintenance of software invariably involves some modification.

306 [SOURCE: IEC Electropedia 192-06-06]

307 3.5

308 **dependability**

309 ability to perform as and when required

310 Note 1 to entry: A dependable item or service is one where there is justified confidence that it operates as desired
311 and satisfies agreed stakeholder expectations.

312 Note 2 to entry: In most cases, the term dependability is used as an umbrella term to express its core attributes of
313 reliability, maintainability and supportability and the attribute of availability derived therefrom. In some cases,
314 attributes such as resilience, recoverability, durability, integrity, safety, security, and trustworthiness are included in
315 or overlap with dependability.

316 Note 3 to entry: In order to express the ability to perform, requirements in terms of functions to be performed, when
317 the performance is to be achieved and the life profile conditions are specified by the customers/ users/ stakeholders.

318 Note 4 to entry: The attributes of dependability can be expressed qualitatively or quantitatively.

319 Note 5 to entry: It is also a common practice to use the term dependability in the context of a subject of study or
320 discipline.

321 [SOURCE: IEC 60050-192:2015, 192-01-22, modified – Definition is generalised and Notes to
322 entry have been reworded and additional Notes added]

323 3.6

324 **item**

325 subject being considered

326 Note 1 to entry: The item can be an individual part, component, device, functional unit, equipment, subsystem, or
327 system, or even service or process.

328 Note 2 to entry: The item can consist of hardware, software, people or any combination thereof.

329 Note 3 to entry: The item is often comprised of elements that may each be individually considered. See sub item
330 (IEV 192-01-02) and indenture level (IEV 192-01-05).

331 [SOURCE: IEC 60050-192:2015, 192-01-01, modified – Notes referring to IEC 60050-191
332 removed]

333 3.7

334 life cycle

335 series of identifiable stages through which an item goes, from its conception to disposal

336 EXAMPLE A typical system life cycle consists of: concept and definition; design and development; construction,
337 installation and commissioning; operation and maintenance; mid-life upgrading, or life extension; and
338 decommissioning and disposal.

339 Note 1 to entry: The stages identified vary with application.

340 [SOURCE: IEC Electropedia 192-01-09]

341 3.8

342 life profile

343 stresses on an item, their levels, content, duration and sequence encountered during the life
344 cycle

345 Note 1 to entry: Stresses may be internal (such as operating cycles) or external (such as environmental stress,
346 input power level and rate of service requests over the network).

347 Note 2 to entry: Life profile can be actual, expected or predicted.

348 3.9

349 maintainability

350 ability to be retained in, or restored to a state to perform as required, under given conditions

351 Note 1 to entry: Given conditions include location for maintenance, accessibility, maintenance procedures and
352 maintenance resources as well as those defined in the life profile.

353 Note 1 to entry: Maintainability can be quantified using appropriate measures. See IEC 60050-192:2015, Section
354 192-07, Maintainability and maintenance support measures.

355 [SOURCE: IEC 60050-192:2015, 192-06-02 – modified - Definition is generalised and reworded
356 with Note 1 added]

357 3.10

358 maintenance concept

359 definition of the maintenance objectives, line of maintenance, indenture levels, maintenance
360 levels, maintenance support and their interrelationships

361 Note 1 to entry: The maintenance concept provides the basis for maintenance planning, determining supportability
362 requirements and developing logistic support.

363 [SOURCE: IEC 60050-192:2015, 192-06-02 – modified – term ‘maintenance policy’ removed
364 and ‘policy’ changed to ‘concept’ in note]

365 3.11

366 off-the-shelf

367 OTS

368 non-developmental item of supply that is both commercial and sold in substantial quantities in
369 the commercial marketplace

370 Note 1 to entry: Sometimes referred to as COTS (commercial off-the-shelf) or MOTS (modified off-the-shelf).

371 [SOURCE: IEC 62741:2015, 3.1.3]

372 **3.12**373 **preventive maintenance**

374 maintenance carried out to mitigate degradation and reduce the probability of failure

375 Note 1 to entry: See also condition-based maintenance (192-06-07) and scheduled maintenance (192-06-12).

376 [SOURCE: IEC Electropedia 192-06-05]

377 **3.13**378 **repair turn-around time**

379 RTRT

380 time taken for a failed part to be repaired and returned to store (including transportation)

381 **3.14**382 **replacement rate**383 the rate at which an item is replaced to meet specified operational requirements over a period
384 of time385 Note 1 to entry: The likelihood of failures detected but no fault is found has to be included in the calculation of the
386 replacement rate. Some failures (secondary failures) are induced by external events, such as inappropriate repair,
387 failure of other items. For these reasons the replacement rate and not the failure rate has to be applied in spare parts
388 quantification. The replacement rate includes all internal and external factors, which are influencing the number of
389 replacements of an item.390 **3.15**391 **special type equipment**

392 STE

393 equipment which is required for performing a specific task for a specific item

394 EXAMPLE Tools, jigs and test equipment.

395 **3.16**396 **support**

397 provision of resources to enable an item to continue to function as required

398 Note 1 to entry: Examples of resources are human effort, training, tools, jigs, test equipment, lifting equipment,
399 materials, spare parts, facilities, documentation, information and information systems.400 Note 2 to entry: Support is concerned with providing a quality resource to the correct location at the best time for
401 the optimum cost, taking into account environmental, social and economic impacts.402 **3.17**403 **supportability**404 ability of an item to be supported to perform as required with a defined life profile and given
405 resources406 [SOURCE: IEC 60050-192:2015, 192-01-31, modified – Definition has been generalised and
407 extended]408 **3.18**409 **System**

410 <in dependability> combination of interacting parts that achieve one or more purposes

411 Note 1 to entry: A system is sometimes considered as a product or as the service it provides

412 Note 2 to entry: Parts can include the associated equipment, facilities, material, computer programs, firmware,
413 technical documentation, other systems, services and personnel required

414 [SOURCE: IEC 60050-192:2015, 192-01-03, modified – Definition is specific and reworded.
415 Notes have been reworded]

416 **4 Overview of supportability and support**

417 **4.1 Description of supportability and support**

418 Supportability is the ability for an item to be supported so that it can perform as required
419 throughout its life for a given life profile. Specifically, supportability is concerned with 'what is
420 required' for an item to continue to function as well as 'how to implement' this requirement. The
421 'what is required' element is inherent within the item design, but the way in which it is
422 implemented is determined by the organization undertaking the support. Hence the
423 organizational aspects can heavily influence supportability and therefore supportability should
424 be an integral part of the design and development of an item. Supportability can change during
425 the life of an item. For example, it is influenced by the number of items requiring support. If the
426 number increases or decreases, then the supportability aspects are also likely to change.

427 Support is the provision of resources to enable an item to continue to function as required
428 throughout its life for a given life profile. Examples of resources are human effort, training, tools,
429 jigs, test equipment, lifting equipment, materials, spare parts, facilities, documentation,
430 information and information systems including the maintenance and calibration of these
431 resources. In essence, support is concerned with providing a quality resource (including
432 quantity) to the correct location at the best time for the optimum cost, taking into account
433 environmental, social and economic impacts.

434 In order to clarify the difference between supportability and support: supportability establishes
435 the required support and manages changes (improvements) within the area of support which
436 can involve changes to the item design as well as changes in the organisational structure;
437 support addresses the day to day management and operation for the provision of the specified
438 support resources in order to ensure that the quality of these resources and their timeliness of
439 delivery is always maintained.

440 There are two types of supportability and support that can be considered – operational and
441 maintenance. Operational support examples can be providing accommodation and sustenance
442 for an aircrew that has landed in a foreign country or providing a helpdesk service. However,
443 the boundaries of support have to be clearly understood. The above examples are support, but
444 may not necessarily be within a support organization. For example, they may form part of the
445 duties conducted by customer services which the company has classified as a separate cost
446 centre involving support and non-support activities and therefore excluded from support
447 accountability. Measurement of specific support activities for quality, timeliness and cost
448 effectiveness may not be easily obtained from the data if the organization has other non-support
449 duties and the effectiveness and efficiency of the organization is measured collectively. As
450 mentioned in clause 5.4, measures for cost centres and profit centres are outside the scope of
451 this document.

452 Interface boundaries are also an important consideration. For example, the maintenance
453 support organization is responsible for ordering spare parts, but the purchasing of these spare
454 parts may be conducted by a procurement department. Procurement may be responsible for
455 determining the financial viability of a company and also conducting competitive bidding. These
456 would be outside the responsibilities of support, but the support organization has to clearly
457 understand this interface if any undue delay is to be pre-empted for the timely delivery of the
458 spare part.

459 **4.2 Principles**

460 Supportability and support is founded on a set of principles. Applying these principles will
461 ensure that the support organisation is economically viable and that the reliability,
462 maintainability and availability measures established during design and development are
463 achieved