

TEC-EME / ECSS-E-40 part 1B (28 November 2003) list of requirements

ECSS-E-40 part 1B from 28 November 2003	Appli cable ?	Notes
5.2 System Engineering Processes related to software		
5.2.2.1 System requirements specification		
5.2.2.2 System and functional criticality analysis		
5.2.2.3 MMI software mock up requirements		
5.2.2.4 MMI general requirements and guidelines		
5.2.3.1a System design		
5.2.3.1b System design to system requirements conformance		
5.2.3.1c System requirements to system design traceability		
5.2.3.2a Software-hardware interface requirements		
5.2.3.2b Traceability to system partitioning		
5.2.3.2c System partition with definition of items (HW, SW, human operation)		
5.2.3.2d System configuration items list		
5.2.4.2 qualification engineering requirements (verification & validation process requirements)		
5.2.4.3 Software validation requirements at system level		
5.2.4.4 requirement baseline verification		
5.2.4.5 SRR		
5.2.5.1 Identification of observability requirements		
5.2.5.2 Control and data interfaces for system level integration		
5.2.5.3 Data medium requirements for integration		
5.2.5.4 System database specification (content and use)		
5.2.5.5 Identification of development constraints (to support the software integration into the system)		
5.2.5.6 Definition of constraints for software to be reused		
5.2.5.7 Identification of customer's input for software integration into the system		
5.2.5.8 Identification of customer's output for software integration into the system		
5.2.5.9 Planning of supplier support to system integration		
5.2.6.1 Phasing and management / operational plan		
5.2.6.2 System requirements definition for software operations		
5.2.7.1 Software maintenance requirements		
5.2.7.2 Definition of inflight capabilities for flight software		
5.3 Software Management Process		
5.3.2.1 Definition of software life cycle		
5.3.2.2 Software life cycle identification		
5.3.2.3 Identification of inputs and outputs associated to each phases		

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5.3.2.4 Identification of documentation relevant to each		
5.3.2.5 Identification of interface between the development and the maintenance processes		
5.3.2.6 Requirements baseline at the SRR		
5.3.2.7 Software technical specification phase		
5.3.2.8 PDR (Preliminary Design Review)		
5.3.2.9 DDR (detailed design review for flight software)		
5.3.2.10 CDR (Critical Design Review)		
5.3.2.11 software verification and validation process		
5.3.2.12 QR (Qualification Review)		
5.3.2.13 AR (Acceptance Review)		
5.3.2.14 Validation activities phasing wrt AR		
5.3.2.15 Software procurement process implementation		
5.3.3.2 Support to software reviews		
5.3.3.3 Technical reviews		
5.3.4.1 Interface definition		
5.3.4.2 Interface management procedures		
5.3.5.1 Technical budget and margin philosophy		
5.3.5.2 Technical budget and margin status at each milestone		
5.4 Software requirements & architecture engineering process		
5.2.4.1 Establishment and documentation of software requirements / software requirements specification:		
5.4.2.1-a software requirements – functional and performance		
5.4.2.1-b software requirements – software product quality requirements		
5.4.2.1-c software requirements – security specifications		
5.4.2.1-d software requirements – human factors / ergonomics specifications		
5.4.2.1-e software requirements – data definition and DataBase requirements		
5.4.2.1-f software requirements – Interfaces external to the software item		
5.4.2.2 Definition of functional and performance requirements for inflight modification		
5.4.2.3 Identification of requirements unique identifier		
5.4.2.4 Definition of a software logical model		
5.4.2.5 Definition of a behavioural view		
5.4.2.6a MMI specifications for software		
5.4.2.6b Report on evaluation on MMI specifications using a software mock up		
5.4.2.6c end users participation in the MMI mock up evaluation		
5.4.3.1 Transformation of software requirements into a software architecture		

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5.4.3.2 Software design description		
5.4.3.3 Software design documentation		
5.4.3.4 Software architectural design contents		
5.4.3.5 Software design method		
5.4.3.6a Selection of a computational model for real time software		
5.4.3.6b Selection of a computational model for real time software		
5.4.3.7 Description of software dynamic behaviour		
5.4.3.8 Development and documentation of the software interfaces		
5.4.3.9 Definition of methods and tools for software to be reused		
5.4.3.10 Evaluation of potential reuse of software		
5.4.3.11 Evaluation of reuse of predeveloped software		
5.4.3.12 Analysis of potential reusability		
5.4.3.13 Definition and documentation of the software integration requirements and plan		
5.4.3.14 Conducting a PDR (Preliminary Design Review)		
5.5 Software design & implementation engineering process		
5.5.2.1 Detailed design of each software components		
5.5.2.2 Development and documentation of the software interface detailed design		
5.5.2.3 Production of software items physical model		
5.5.2.4 Utilization of method for software static design		
5.5.2.5a Description of the software dynamic aspects of physical model for real-time software		
5.5.2.5b Description of the software dynamic aspects of physical model for real-time software		
5.5.2.6 Utilization of description techniques for the software behaviour		
5.5.2.7 Determination of design methods consistency for real-time software		
5.5.2.8 Development and documentation of the software user manual		
5.5.2.9 Definition and documentation of the software unit test requirements and plan		
5.5.2.10 Updating of the software integration requirements and plan		
5.5.2.11 Conducting a DDR (Detailed Design Review) for flight software		
5.5.3.1 Development and documentation of the software units, test procedures and test data		
5.5.3.2 Software unit testing		
5.5.3.3 software user manual updating		
5.5.3.4 Updating of the software integration test requirements and plan		
5.5.4.1 Software integration test plan development		

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5.5.4.2 Software units and software components integration and testing		
5.5.4.3 Software user manual updating		
5.6 Software validation process		
5.6.2.1 Determination of the validation effort		
5.6.2.2a Establishment of a validation process		
5.6.2.2b Establishment of a validation process		
5.6.2.3a Selection of an ISVV organization		
5.6.2.4 Development and documentation of a validation plan		
5.6.3 Validation with respect to the technical specification		
5.6.3.1 Development and documentation of a software validation testing specification (SVTS) wrt TS		
5.6.3.2 Conducting the validation wrt TS		
5.6.3.3 Updating the software user manual		
5.6.3.4 Test readiness review		
5.6.3.5 Conducting a CDR (Critical Design Review)		
5.6.4 Validation with respect to the requirement baseline		
5.6.4.1 Development and documentation of a software validation testing specification (SVTS) wrt RB		
5.6.4.2 Conducting the validation wrt RB		
5.6.4.3 Updating the software user manual		
5.6.4.4 Test readiness review		
5.6.4.5 Conducting a QR (Qualification Review)		
5.7 Software delivery and acceptance		
5.7.2 Software delivery and installation		
5.7.2.1 Preparation of the software product		
5.7.2.2 Supplier's provision of training and support		
5.7.2.3 Installation planning		
5.7.2.4 Installation activities reporting		
5.7.3 Software acceptance		
5.7.3.1 Acceptance test planning		
5.7.3.2 Acceptance test execution		
5.7.3.3 Executable code generation and installation		
5.7.3.4a Supplier's support to customer's acceptance		
5.7.3.4b Links with Q		
5.7.3.4c Acceptance testing documentation		
5.7.3.5 Evaluation of acceptance testing		
5.7.3.6 Conducting an AR (Acceptance Review)		
5.8 Software verification process		
5.8.2.1 Determination of the verification effort for the project		
5.8.2.2 Establishment of the verification process, methods and tools		
5.8.2.3 Selection of the organization responsible for		

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conducting the verification		
5.8.2.4 Development and documentation of a verification plan covering the software verification activities		
5.8.3 Verification activities		
5.8.3.1 Verification of software requirements		
5.9.3.2 Verification of software architectural design		
5.8.3.3 Verification of software detailed design		
5.8.3.4 Verification of code		
5.8.3.5 Verification of software integration		
5.8.3.6 Verification of software documentation		
5.8.3.7 Verification of test specifications		
5.8.3.8 verification of software validation with respect to TS and RB		
5.8.3.9 Evaluation of validation: complementary system level validation		
5.8.3.10 problem and non conformance handling		
5.8.3.11 Schedulability analysis for real-time software		
5.8.3.11a /as support for verification of software requirements & architectural design		
5.8.3.11b /as support for verification of software detailed design		
5.8.3.11c /as support for verification of software coding and testing		
5.8.3.12 Technical budget management		
5.8.3.12a / as support for verification of software requirements & architectural design / sizing (memory) and timing (CPU load) estimation		
5.8.3.12b / as support for verification of software detailed design/ sizing (memory) and timing (CPU utilization in WCET) estimation refinement		
5.8.3.12c / as support for verification of software coding and testing / sizing (memory) and timing (CPU utilization in WCET) calculation		
5.8.3.13 Behaviour modelling verification		
5.8.3.13a / as support for verification of software requirements & architectural design / verification of the behavioural view of the logical model		
5.8.3.13b / as support for verification of software detailed design / modelling the software behaviour and verifying by means of the techniques used for its description		
5.8.3.14 Verification of design: feasibility of testing / availability of appropriate verification points, assertions, capability of fault injection		
5.9 Software Operation Process		
5.9.2.1 Operational plans and standards development		
5.9.2.2 Problem handling procedures definition		
5.9.2.3 Operational testing definition		
5.9.3.1 Operational testing execution		

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5.9.3.2 software operational requirements demonstration		
5.9.4 software operation		
5.9.5.1 user's assistance		
5.9.5.2 handling of user's requests		
5.9.5.3 provisions of work-around solutions		
5.10 Software Maintenance Process		
5.10.2.1 Software maintenance process planning		
5.10.2.2 Software maintenance process: procedures, methods and standards		
5.10.2.3 problem reporting and handling		
5.10.2.4 Implementation of configuration management process		
5.10.3.1 Problem analysis		
5.10.3.2 Problem verification		
5.10.3.3 Development of options for modifications		
5.10.3.4 Documentation of problem, analysis and implementation		
5.10.3.5 Customer approval of selected modifications options		
5.10.4.1 Analysis and documentation of product modification		
5.10.4.2 Documentation of software product changes		
5.10.4.3 Invoking of software engineering process for modification implementation		
5.10.5 Conducting maintenance review		
5.10.6.1 Applicability of this standard to software migration		
5.10.6.2 Migration planning and execution		
5.10.6.3 Contribution to the migration plan		
5.10.6.4 Preparation for migration		
5.10.6.5 Notification of transition to migrated system		
5.10.6.6 Post-operation review		
5.10.6.7 Maintenance and accessibility of data of former system		
5.10.7.1 Retirement planning		
5.10.7.2 Notification to the operator of retirement		
5.10.7.3 identification of requirements for software retirement		
5.10.7.4 maintenance and accessibility to data of the retired product		