

DIN EN 16603-70-32:2014-12 (E)

Space engineering - Test and operations procedure language; English version EN
16603-70-32:2014

Contents	Page
Foreword	5
Introduction.....	6
1 Scope.....	7
2 Normative references.....	8
3 Terms, definitions and abbreviated terms.....	9
3.1 Terms from other standards.....	9
3.2 Terms specific to the present standard	9
3.3 Abbreviated terms.....	11
4 Context of the procedure language	12
4.1 Introduction.....	12
4.1.1 The space system.....	12
4.1.2 Satellite testing.....	13
4.1.3 Mission operations	14
4.2 EGSE and mission control system (EMCS)	14
4.2.1 General	14
4.2.2 Space system model.....	14
5 Requirements to be satisfied by procedures	18
5.1 Procedure structure	18
5.2 Language constructs	19
5.3 Language specification	22
Annex A (informative) The PLUTO language	23
A.1 The structure of a procedure.....	23
A.1.1 Procedure definition	23
A.1.2 Procedure declaration body	24
A.1.3 Procedure preconditions body.....	24
A.1.4 Procedure main body	25
A.1.5 Procedure watchdog body.....	25
A.1.6 Procedure confirmation body	26

A.1.7	Structure of a step	26
A.2	The behaviour of a procedure	28
A.2.1	Procedure execution flow	28
A.2.2	Step execution flow	31
A.2.3	Activity execution flow	33
A.2.4	Execution in parallel	34
A.2.5	Continuation following an “initiate and confirm” statement	35
A.3	PLUTO language definition	37
A.3.1	Conventions	37
A.3.2	Language case sensitivity	38
A.3.3	Comments	38
A.3.4	Keywords	38
A.3.5	Identifiers	39
A.3.6	Constants	40
A.3.7	Types	43
A.3.8	System interfaces	44
A.3.9	Language constructs	45
A.4	Extended Backus-Naur form (EBNF) representation of PLUTO language constructs	103
A.4.1	Conventions	103
A.4.2	PLUTO language constructs	105
A.5	Index of PLUTO language constructs	117
Annex B (informative) Engineering units	120	
B.1	Introduction	120
B.2	Engineering units and symbols	120
B.3	Engineering units railroad diagrams	126
B.4	EBNF representation of the engineering units	129
Annex C (informative) Functions	131	
C.1	Introduction	131
C.2	Mathematical functions	131
C.3	Time functions	134
C.4	String functions	135
Bibliography	137	

Figures

Figure 4-1: Example of space system elements	13
--	----

Figure 4-2: Example of a space system model	16
Figure A-1 : Example of a procedure and its elements	24
Figure A-2 : Execution states and transitions for a procedure.....	31
Figure A-3 : Execution states and transitions for a step.....	33
Figure A-4 : Execution states and transitions for an activity.....	34
Figure A-5 : Confirmation status and continuation action combinations for main body “initiate and confirm” statements	36
Figure A-6 : Confirmation status and continuation action combinations for watchdog “initiate and confirm” statements	36
Figure A-7 : Example railroad diagram	38

Tables

Table A-1 : Predefined types	43
Table A-2 : Activity and step operation requests.....	78
Table A-3 : Reporting data, variable and argument operation requests	78
Table A-4 : Predefined operators.....	97
Table A-5 : Activity and step property requests	101
Table A-6 : Reporting data, variable and argument property requests	102
Table A-7 : Event property requests	102
Table A-8 : EBNF symbols and meanings	104
Table B-1 : Simple engineering units	121
Table B-2 : Acceptable multiple and submultiple of engineering unit	123
Table B-3 : Acceptable multiples of binary engineering units	124
Table B-4 : Standard compound engineering units	124
Table C-1 : Mathematical functions	131
Table C-2 : Time functions	134
Table C-3 : String functions	135