

ISO/TR 15497:2000-11 (E)

Road vehicles - Development guidelines for vehicle based software

Contents

	Page
1.	Introduction..... 1
1.1	Statement of mission and objectives 1
1.2	Benefits to the end customer 1
1.3	The MISRA consortium 1
1.4	Background..... 2
1.5	Scope and uses of the Guidelines 3
1.5.1	Scope 3
1.5.2	Uses 3
1.6	Fundamental concepts 5
2.	Definition of terms..... 7
2.1	Definitions 7
2.2	List of abbreviations 7
3.	Software lifecycle 8
3.1	Project planning 8
3.1.1	Project definition 8
3.1.2	Lifecycle plans 9
3.1.3	Planning for verification and validation 9
3.1.4	Assessment 13
3.1.5	Reuse 14
3.2	Integrity 14
3.2.1	Introduction..... 14
3.2.2	Safety analysis..... 15
3.2.3	Human factors in safety analysis 18
3.2.4	Development approaches..... 19
3.3	Requirements specification 22
3.3.1	Whole vehicle architecture 22
3.3.2	Vehicle control systems 25
3.3.3	Noise and electromagnetic compatibility 28
3.3.4	Verification and validation of software requirements 30
3.3.5	Tools and techniques for requirements specification..... 32
3.4	Design..... 33
3.4.1	Real-time implications 33
3.4.2	Floating point arithmetic 36
3.4.3	Modelling 37
3.4.4	Optimization and adaptive control 38
3.4.5	Communications and multiplexing..... 38
3.4.6	On-board diagnostics 41
3.4.7	System security 43
3.4.8	Fault management..... 43
3.4.9	Design for verification and validation 45
3.4.10	Tools and techniques for design 46
3.5	Programming 47
3.5.1	Codes of practice 47
3.5.2	Verification and validation of code..... 48
3.5.3	Programming tools and techniques 48
3.6	Testing 49
3.6.1	General 49
3.6.2	Dynamic test 49
3.6.3	Integration test..... 49
3.6.4	System test 51
3.6.5	Tools and techniques for testing..... 51
3.7	Product support..... 52
3.7.1	Off-board diagnostics 52

3.7.2	Software maintenance.....	53
4.	Software quality planning	55
4.1	Management responsibilities	55
4.2	Education and experience	56
4.3	Human factors in software development	56
4.3.1	Introduction	56
4.3.2	Teams and organizational structure	57
4.3.3	Individual differences and job design	57
4.3.4	Human error management	58
4.3.5	The physical environment	58
4.4	Quality assurance	59
4.4.1	Standards and accreditation	59
4.4.2	Checklists	59
4.4.3	Assessment of compliance	59
4.4.4	Changes during production.....	60
4.4.5	Software process metrics	60
4.5	Documentation requirements.....	62
4.6	Subcontracting	63
4.6.1	Introduction	63
4.6.2	Definitions	63
4.6.3	Technical considerations.....	65
4.6.4	Commercial considerations.....	67
5.	Emerging technologies	70
5.1	General.....	70
5.2	Neural networks	70
5.3	Object orientation	71
5.4	Fuzzy logic.....	71
5.5	Formal mathematical methods.....	72
6.	References.....	73
7.	Index.....	76