

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