# ISO 34502:2022-11 (E)

## Road vehicles - Test scenarios for automated driving systems - Scenario based safety evaluation framework

## Contents

Page


Foreword ..... v

Introduction ..... vi

1 Scope ..... 1

2 Normative references ..... 1

3 Termsanddefinitions ..... 1

4 Test scenario-based safety evaluation process ..... 2
4.1 Integration into the overall development process ..... 2
4.1.1 Objectives ..... 2
4.1.2 General ..... 2
4.1.3 Requirements and recommendations ..... 8
4.1.4 Requirements for conformity ..... 9
4.2 Safety test objectives ..... 9
4.2.1 Objectives ..... 9
4.2.2 General ..... 9
4.2.3 Input to this clause ..... 9
4.2.4 Requirements and recommendations ..... 10
4.2.5 Work products ..... 10
4.3 Specification of the relevant scenario space ..... 10
4.3.1 Objectives ..... 10
4.3.2 General ..... 10
4.3.3 Input to this clause ..... 10
4.3.4 Requirements and recommendations ..... 11
4.3.5 Work products ..... 11
4.4 Derivation of critical scenarios based on risk factors ..... 11
4.4.1 Objectives ..... 11
4.4.2 General ..... 11
4.4.3 Input to this clause ..... 11
4.4.4 Requirements and recommendations ..... 12
4.4.5 Work products ..... 12
4.5 Derivation of test scenarios based on covering the relevant scenario space ..... 12
4.5.1 Objectives ..... 12
4.5.2 General ..... 12
4.5.3 Input to this clause ..... 13
4.5.4 Requirements and recommendations ..... 13
4.5.5 Work products ..... 13
4.6 Derivation of concrete test scenarios and test scenario allocation ..... 13
4.6.1 Objectives ..... 13
4.6.2 General ..... 13
4.6.3 Input to this clause ..... 13
4.6.4 Requirements and recommendations ..... 14
4.6.5 Work products ..... 15
4.7 Test execution ..... 15
4.7.1 Objectives ..... 15
4.7.2 Input to this clause ..... 16
4.7.3 Requirements and recommendations ..... 16
4.7.4 Work products ..... 17

4.8 Safety evaluation ..... 17
4.8.1 Objectives ..... 17
4.8.2 General ..... 17
4.8.3 Input to this clause ..... 17
4.8.4 Requirements and recommendations ..... 18
4.8.5 Work products ..... 18

ISO 34502:2022(E) Annex A (informative) Physics principles scenario-based approach ..... 19

Annex B (informative)Traffic-relatedcriticalscenarios ..... 22

Annex C (informative) Perception-related critical scenarios ..... 28

Annex D (informative) Vehicle control related critical scenarios ..... 49

Annex E (informative) Derivation and structuring of scenarios using criticality analysis ..... 53

Annex F (informative)Qualificationofvirtualtestplatforms ..... 62

Annex G (informative) Scenario database and parameter variation methods ..... 66

Annex H (informative) Segmentation of test space ..... 69

Annex I (informative) Evaluation of test scenarios based on behavioural safety assessment ..... 71

Annex J (informative) Risk evaluation based on positive risk balance ..... 75

Annex K (informative) Constrained random testing to identify unknown critical scenarios ..... 77

Annex L (informative)Sufficiencyoftrafficdatatodevelopparameterranges ..... 79

Bibliography ..... 80