ISO/TR 17427-3:2015-11 (E)

Intelligent transport systems - Cooperative ITS - Part 3: Concept of operations (ConOps) for 'core' systems

Contents

Page

Foreword vi

Introduction viii

1 Scope 1

2 Normative references 1

3 Termsanddefinitions 1

4 Abbreviated terms 4

5 Using this Technical Report 5

6 Overview of the role of a `Core System' in C-ITS 5
6.1 What is a Concept of operations? 5
6.2 What are the core functions? 6
6.3 Functional subsystems 6
6.4 Institutional context 7
6.5 Specific service features characterizing C-ITS service provision 8
6.6 C-ITS and communication technologies 10
6.6.1 General 10
6.6.2 VANETs, MANETs and `latency' 10
6.6.3 Hybrid communications 13
6.6.4 Short and medium range communication 15
6.6.5 Long range communication 16
6.6.6 Wide area broadcast 16
6.6.7 Positioning services 16
6.6.8 Digital road map data 17
6.7 Actors involved in C-ITS service provision 17
6.8 C-ITS enabling data 20
6.9 Cooperative ITS applications and services 22
6.9.1 System of systems 23
6.10 C-ITS Privacy and anonymity 23
6.10.1 Privacy overview 23
6.10.2 Data messages and privacy 24
6.10.3 Security 25
6.10.4 Data management (including capture, storage and access) 25

7 `Core' systems 26
7.1 Core system overview 26
7.1.1 General 26
7.1.2 Single core systems 27
7.1.3 Multiple core systems 27
7.1.4 Other `Central' systems 27
7.1.5 Facilitate a platform for sharing of information and efficient use of resources 28
7.2 Justification for `Core Systems' 28
7.2.1 Vision, drivers and objectives 28
7.2.2 Key strategic objectives for the deployment of core system support 29
7.2.3 Key technical objectives for the deployment of core system support 29
7.2.4 Principal elements of a core system 30

7.2.5 Proposed features of C-ITS core systems ... 31
7.2.6 Main mission of the `Core System' ... 35
7.2.7 Scope of `Core System' services ... 36
7.2.8 Exclusions from CorSys ... 36
7.2.9 Probe data storage ... 36
7.2.10 Roadside equipment (RSE) ... 37
7.2.11 External support systems (ESS) ... 37
7.2.12 Communications options ... 37
7.2.13 Authority/jurisdiction databases ... 38

7.2.14 Core system stakeholders ... 39
7.2.15 Core system communications ... 39
7.2.16 Applications ... 42
7.2.17 Core system interactions ... 42
7.2.18 Core system operational goals ... 43
7.3 `Core system' overview of requirements ... 44
7.3.1 Definition of a requirement ... 44
7.3.2 `Core System' requirements identification process ... 44
7.3.3 Functional components ... 49
7.4 Background, objectives and scope of a `Core System' ... 50
7.5 Operational policies and constraints ... 51
7.5.1 Certification ... 51
7.5.2 Operations and maintenance ... 52
7.5.3 Security management ... 52
7.5.4 Data provision/ownership ... 52
7.5.5 System performance management ... 52
7.5.6 Flexibility ... 53
7.5.7 Core system characteristics and environment ... 53
7.5.8 Deployment configurations ... 54
7.5.9 Deployment footprint ... 54
7.5.10 Subsystems ... 57
7.5.11 Subsystem descriptions ... 57
7.6 Modes of operation ... 62
7.7 User types and other involved personnel ... 64
7.8 Operational scenarios ... 65
7.9 Vehicle-originated broadcast ... 66
7.10 Infrastructure-vehicle-unicast ... 69
7.11 Support environment ... 71
7.11.1 Subsystems ... 72
7.11.2 Personnel ... 72
7.11.3 Processes ... 72
7.12 Disadvantages and limitations ... 72

8 Example use cases ... 73
8.1 General ... 73
8.2 Example Use Case (1): User data exchange ... 74
8.3 Example Use Case (2): Certificate distribution ... 75
8.4 Example Use Case (3): Certificate revocation list distribution ... 75
8.5 Example Use Case (4): Misbehaviour action: Certificate revocation list addition ... 76
8.6 Example Use Case (5): Data subscription ... 77
8.7 Example Use Case (6): Remote services ... 78
8.8 Example Use Case (7): Core service status distribution ... 79
8.9 Example Use Case (8): `Core System' operations ... 80
8.10 Example Use Case (9): System expansion ... 80
8.11 Example Use Case (10): Core discovery ... 81
8.12 Example Use Case (11): Service data backup ... 82
8.13 Example Use Case (12): Service takeover ... 82

9 Summary of impacts ... 83
9.1 Operational impacts ... 83
9.1.1 Policy ... 83
9.1.2 System management ... 84

9.1.3 System operation 85
9.1.4 Service receipt 85
9.2 Organizational impacts 87
9.2.1 Policy 87
9.2.2 System management 88
9.2.3 System operation 89
9.3 Impacts during the deployment phases 89
9.3.1 System management 90
9.4 Measuring the impacts 90

10 Cooperative vehicle and highway systems policy and institutional issues 91

11 Funding and governance 91

Bibliography 94