



# Specifications & Standards - Scoping

June 2018

Many practitioners, across industry, local authorities and central government functions, recognise the potential benefits that can be drawn from appropriate use of a specifications and standards-based approach to deployment of technology across several sectors. Transport is one of these. At present knowledge and uptake of existing ITS standards and specifications is limited across Local Authorities. Historically the complexity of the specification and standards landscape, the rapidly emerging nature of technology, external influences and pressures as well as restricted resources and budgets have hampered the adoption and deployment of standards-based solutions. This in turn can create a strengthening of vendor lock-in, barriers to interoperability and potentially more complexity in procurement and fragmentation within the deployed base.

The document lays out preparatory shaping activities to establish a framework for the effective use of relevant specifications and standards to support more effective procurement, great interoperability, greater openness, to the use of technologies to move people, vehicles and freight on the road network – and promote UK solutions as the international benchmark.

Simply providing a maintained registry is insufficient, as insight and understanding needs to be applied to provide means for users to navigate this in a consumable and useful way<sup>1</sup>. Therefore, in conjunction with industry stakeholder groups TTF will develop guides and navigation aids, initially for specific domains – broadening over time; testing these with practitioners.

#### **The framework will contain:**

- Registry of the latest critical specifications and standards.
- Guidance on good practice use of specifications and standards for specific domains of high interest. This will include on-line navigators and guidance notes for specifications and standards for particular application domains for all road network operators (local authorities plus national operators).
- Mechanisms to support improved awareness of specifications and standards and support information sharing/feedback/experience sharing/promote common practice.
- Governance for prioritising UK interest in specification and standards development.
- Outline planning for resource engagement into priority international standards activities.

#### **The strategic objectives of the framework are:**

- To improve network operator awareness and usage of common specifications and standards;
- evolve a preferred baseline of interoperability for local authorities;
- basis for common novel developments (for experimental areas, connected vehicles);
- provide a basis for insight and advice to DfT on the prioritisation of standardisation efforts.

The creation of this framework will be a novel advance as no such framework, governance processes or prioritisation of specifications and standards or collaborative specifications/standards community for the UK currently exist. Success will require stakeholder, user and industry engagement. Initial activities will establish the detailing of the framework and the necessary engagement to promote future success.

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<sup>1</sup>

The Transport System Catapult/BSI report, Connected and Autonomous vehicles – A UK Standards Strategy, in 2017, highlighted amongst other recommendations the need for a standards navigator to improve awareness and understanding.

# Specifications and Standards – Setting the Standards for the new road environment



## Vision

In this vision, we support ITS practitioners and road network operators...

Provide a common framework for effectively using relevant specifications and standards to support more effective procurement, great interoperability, greater openness, to the use of technologies to move people, vehicles and freight on the road network – and promote UK solutions as the international benchmark

This is our “elevator pitch” – where we want to be.

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- Basis for common novel developments (for experimental areas, connected vehicles).
- Provide a basis for insight and advice to DfT on the prioritisation of standardisation efforts.

Effective use of the framework and improved awareness and knowledge sharing are expected to improve the effectiveness of future local authority transport technology procurement and deployment; improve interoperability and access to open data; aiding more focussed UK involvement in standards development; and promoting UK solutions and products in the international marketplace.





# Specifications and Standards – Setting the Standards for the new road environment



New pressures are challenging local authorities use and deployment of ITS technologies – with reducing budgets, challenges to innovative procurement, as well as influencing factors such as vehicle connectivity and automation, disruptive technologies and service offerings, the pervasive presence of the smartphone, etc. It is a challenge for the network operations practitioner have awareness, understanding, the ability to differentiate and efficiently apply technologies and services using available specifications and standards to achieve the best outcome.

A DfT report, “Strategic Review of Deployment of Intelligent Transport Systems by Local Highway Authorities”, published in 2016, undertaken by Atkins, highlighted several challenges for the effective use of specifications and standards within roads-based ITS deployments:

- Poor visibility, little guidance, limited leadership.
- Poor awareness of the terrain (of ever changing) specifications and standards.
- The perception and reality of vendor lock-in.
- Challenges for local authorities to procure effectively, on small budgets, and increasing tendency to seek service performance-based contracts – what requirements should be introduced into these contracts to ensure interoperability and lack of vendor lock in.

Standards and common specifications are seen by authorities as important but are lacking in several areas such as mobile data, the transfer of parking data, and uncertainty in the choice of platform for vehicle-to-vehicle communications.

There is concern that without strong leadership at national level driving engagement with the automotive industry, the opportunity to develop a truly collaborative, standards-based approach could be lost.

These findings are mirrored through other studies and commentary made in many workshops with industry and road network operators.

From the widest perspective, adoption of standards-based approach is seen to be beneficial. The rationale underpinning the creation and use of standards and common specifications in most fields include:

- increased shared and common understanding and related user confidence;
- shared experience communities; collaborative development;
- increased interoperability;
- simplified procurement and opening of marketplaces;
- often, agreed regimes for testing, validation and conformance; and
- in some cases, a defined relationship to use and baselining under regulation, and recognition in public procurement.

Standards and common specifications thus need to be open and freely available to encourage greater competition, consistency and stimulate deployment; whilst taking care to not stifle innovation.

# Specifications and Standards – Setting the Standards for the new road environment



In the UK, stakeholders, road network operators and industry have been successful deploying road transport and ITS technologies and services for many years. However, knowledge and adherence to common specifications and standards are limited, and this impacts the overall coherence of UK deployments, provides barriers to interoperability, creates complexity when extensions to current capabilities are planned, as well as impacting procurement and sustaining issues of vendor lock-in.

Putting a framework for the use of specifications and standards will bring benefits but this has not been done before and therefore care needs to be taken to ensure wider stakeholder engagement, support and collaborative progress. Mechanisms to provide governance on the prioritisation of resource deployment for specification and standards development, have to recognise the contribution of operators and the wider industry, often at their own expense, and the necessity to maintain long term engagement and expertise to support the development, maintenance and evolution of specifications and standards beyond the lifetime of most typical project delivers. Existing standards development organisations and bodies form a critical stakeholder group within the development, progress and success of the use of the framework.

Using strong collaboration with industry stakeholder groups, network operators and central government, TTF will support the creation of an evolving specification and standards framework to achieve progress, through:

- Making sense of a very complex landscape:
  - improve awareness;
  - provide on-line navigators and guidance notes for specifications and standards for particular application domains to local authorities (plus national operators);
  - provide strengthening practical guidance;
  - support information sharing/feedback/experience sharing/promote common practice; and
  - develop common practice – profiling of current specifications and standards.
- Advice to DfT/BEIS and industry on prioritisation of specifications and standards development efforts.

## Scope

The scope of the boundary of domain of these specifications and standards are not clearly defined nor commonly understood. The boundary of ITS standards has strong interactions across to other related domains including communications technologies (wireless and wired communications, IT security and cybersecurity, IOT); road equipment technologies; vehicular technologies – including connected vehicles and automated vehicles; mobility services and systems; public transport operations, fares and ticketing, and customer information; Smart Cities as the most relevant.

Even within the field of ITS there are several potential boundaries that could be defined “ITS”, “road network operations”, “Connected Vehicles”, “public transport”, “Bus data”, “open data”. This requires further clarification, but can evolve as experience and understanding improves.

# Specifications and Standards – Setting the Standards for the new road environment



When practitioners talk of standards they use the term in several ways, referring to a wide range of materials and ways of consuming them.

At the most basic level, a couple of the many definitions of standard are:

- a level of quality or attainment; and
- something used as a measure, norm, or model in comparative evaluations.

But most practitioners in the transport domain would recognise a standard (or common specification) as a defined way to define something, measure something, undertake a process, etc. In this respect road network operators in the UK applying ITS and technology have a wide range of specifications and standards that are considered:

- Formally recognised open standards, generated by organisations such as ISO, CEN, ETSI, IEEE, SAE, and national standards bodies such as BSI, DIN and AFNOR.
- DfT publications including White Papers, the 2010 ITS Toolkit, Circulars<sup>3</sup>, Local Transport Notes and Traffic Advisory Leaflets.
- Highways England - maintain the “Traffic Systems and Signing Plans Registry” on behalf of the DfT, and the DMRB.
- The industry/authority grouping TOPAS has published several specifications replacing some documents from within the Traffic Systems and Signing Plans Registry.

Therefore, if one of the objectives of the specifications and standards framework is to provide an improved resource and source of guidance to road network operators on the use of specifications and standards the scope of the framework should encompass all relevant documents and how they are expected to be used. This is a challenge, as basic tools and building-blocks are missing; there is no maintained registry of all specifications and standards within this scope.

Creation and maintenance of such a registry is a non-trivial exercise in its own right – for the Technical Committee responsible in ISO, the International Standardization Organization, for Intelligent Transport Systems (ISO TC204) there are more than 200 published standards documents in a range of forms – ranging from full International Standards to Technical Reports (Guides). This stock is subject to constant review, revision and augmentation.

However, simply providing a maintained registry is insufficient, as insight and understanding needs to be applied to provide means for users to navigate this in a consumable and useful way<sup>4</sup>. Therefore, in conjunction with industry stakeholder groups TTF will develop guides and navigation aids, initially for specific domains; testing these with practitioners.

<sup>3</sup> <https://www.gov.uk/government/publications/roads-circulars/current-roads-circulars>

<sup>4</sup> The Transport System Catapult/BSI report, Connected and Autonomous vehicles – A UK Standards Strategy, in 2017, highlighted amongst other recommendations the need for a standards navigator to improve awareness and understanding.

# Specifications and Standards – Setting the Standards for the new road environment



Other aspects also need consideration: One challenge is access to documents – the specifications and standards themselves. The different publishing organisations have different business and licencing models and therefore in some cases there are costs associated with accessing some specifications and standards. This is an important barrier to uptake and usage and requires further consideration.

In a similar vein, one barrier to interoperability of common usage and integration of road network operator systems are the costs and licensing restrictions related to the use of specific datasets. One notably example is the restrictions on the re-use and distribution of “derived data” that has been baselined against digital mapping datasets provided by Ordnance Survey. These restrictions and costs often form a barrier to organisations using Ordnance Survey data as a common baseline, which sustains proliferation of a range of digital mapping datasets underpinning technical systems. This is a persistent barrier to integration, reuse and a rationale to limit open data publication. The formation of the Geospatial Commission announced recently may go some way to addressing this challenge, but this practically remains a significant barrier. This is one example.

## Shaping the Framework

Collaboration and consensus development is key to the establishment, progression and success of use of the framework. Given that there is currently no existing framework, no governance or prioritisation mechanism, no shared vision of how this should proceed, no commonly agreed scope of coverage, and some non-aligned commercial drivers there is a need to recognise that the initial activities are focussed on scoping and defining the framework and on establishing engagement and promoting cooperation.

It is foreseen that the framework will contain:

- Registry of the latest critical specifications and standards.
- Guidance on good practice use of specifications and standards for specific domains of high interest. This will include on-line navigators and guidance notes for specifications and standards for particular application domains for all road network operators (local authorities plus national operators).
- Mechanisms to support improved awareness of specifications and standards and support information sharing/feedback/experience sharing/promote common practice.
- Governance for prioritising UK interest in specification and standards development.
- Outline planning for resource engagement into priority international standards activities.

This may be modified as a result of engagement and collaboration.





This section lays out actions to be undertaken in the short and medium term.

## Short term activities

The initial activities are focussed on scoping and defining the framework and on establishing engagement and promoting cooperation. These activities are:

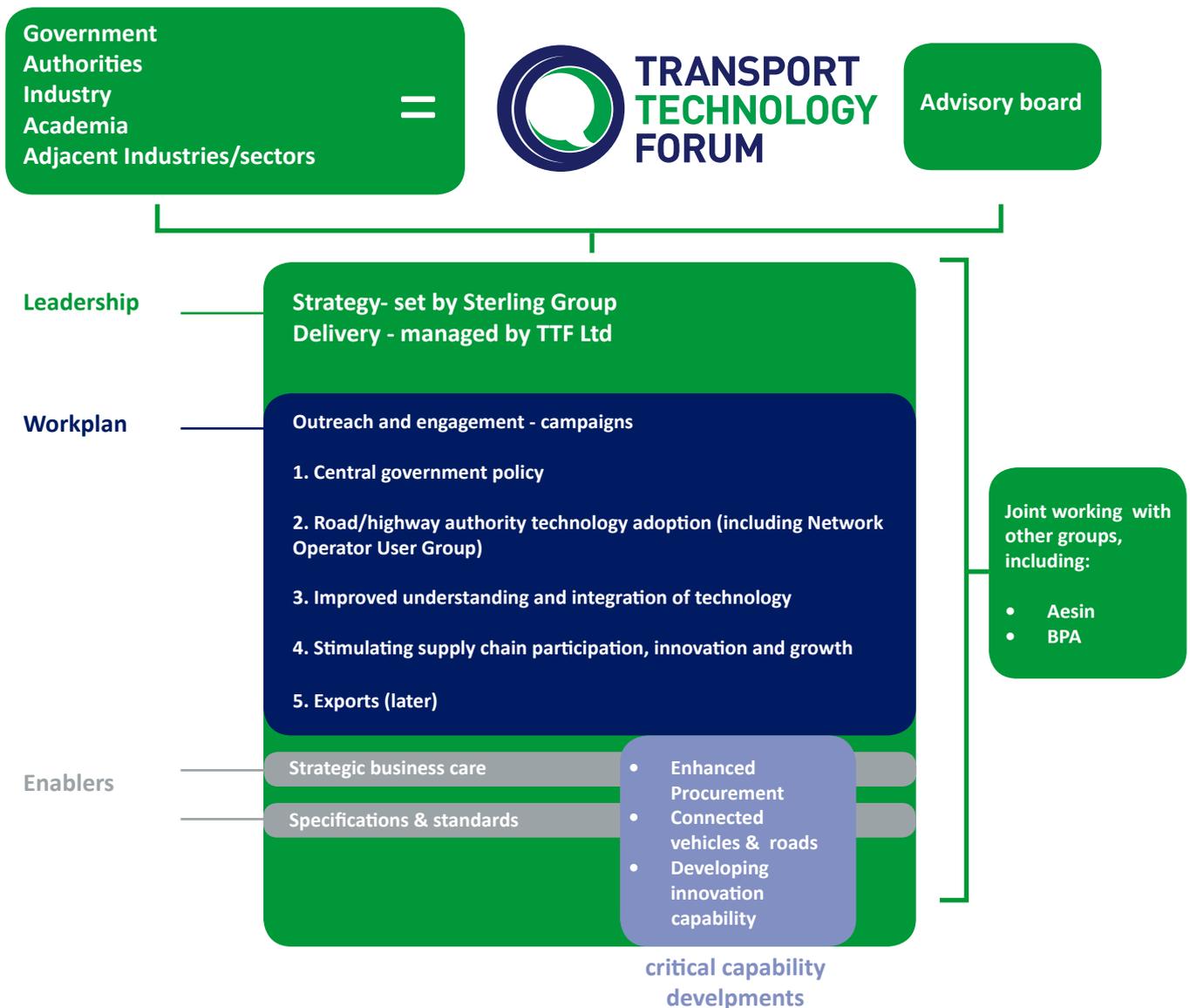
- Strengthening initial outreach - industry groups

We need to continue and strengthen outreach and engagement with the stakeholder community and stakeholder groups (including AESIN, ADEPT, ITS(UK), DfT, CSS, TOPAS, BSI, etc) to promote the development of a specifications and standards framework, raise awareness and foster engagement;

- Initial scoping of a communications plan concerning the standards and specifications activities to industry and network operators

There is a strong engagement need with the other TTF workstreams.

### Sector Investors





**Network Operator User Group** – the TTF shaping of the Network Operator User Group creates a strong platform to interact with representation from local and national road operators to:

- seek to glean additional current state deployment evidence and future priorities;
- test user views on priority topics for focus;
- test user acceptance on proposals for the development of a specifications & standards framework, navigator advice, specific specifications and standards application domain profiles; and
- as a means to spread awareness, and share knowledge.

**Procurement** – Specs and standards have a key role to play in promoting more common collaborative approaches to procurement, supporting procurement of more open systems and systems integration; avoidance of vendor lock-in.

**Connected Vehicles** – ensuring interoperability of connected vehicle solutions is rigorously based on specs and standards, with a rapidly evolving and incomplete standards-based profile, multiple R&D and innovation projects with little shared baseline and ability to interoperate.

**Innovation** – there is a natural tension between the fleet-footed nature of innovative developments and the intention of creation of stable specifications and standards which form a basis to create business cases, support procurement, test conformance, test and evaluate, interoperate etc. A well-defined framework and process for establishing a platform for common use of specifications and standards has to be intelligently managed to support integration of innovation, clear road maps for development and deployment evolution, deprecation, and interoperability between different spec and standards sets. A challenge exists for TTF to define how DfT should manage the tension between innovation and disruption and specification and stability.

## Longer term action plan

Although the details of a longer-term action plan are subject to several of influencing factors it is reasonable to foresee the need for the following actions to be undertaken in 2018-19:

1. A maintained registry of relevant standards and specifications – subject to review by stakeholder groups;
2. Through stakeholder consultation, establish a roadmap and initial test development for the segmented development of a specifications and standards framework:
  - Prioritisation of segmented topic areas to address:  
It is proposed to start with two example domains, to demonstrate the framework in use, learn lessons, and seeking on-going improvement. The two domains are:
  - Connected Vehicles which is a high-interest topic to many network operators – but remains immature and dynamic at present: the framework should offer guidance on latest view on what a C-ITS CV standards profile looks like and are the gaps and challenges we know of; this has the challenge of being a rapidly evolving topic from a specifications and standards perspective;
  - A more stable domain, such as traffic signal control in the UTMC context.
  - Standardisation of traffic data could be another topic;
  - There is also value in linking to the emerging work on parking standards work, as an example of the framework in use with a new specifications and standards domain.



- We need to better understand which specifications and standards are used (across the road network operators, in the automotive sector, through service providers, and by data integrators). This can be achieved through stakeholder consultation, but can also further be informed by investigations and enquiries made by DfT's Local Authority Open Data Discovery Project.

This highlighting of priority topic areas requires activities defining the scope of the topic, identification of critical standards and specifications for inclusion in guidance notes. This requires an establishment of criteria for the basis of the selection and inclusion – which are helpful when applied to other topic areas and further guidance notes. This also includes the need to foresight emerging international and European standards, identify development priorities and seek appropriate leadership and participation;

With stakeholder groups we need to develop clear guidance on the preferred usage of specifications and standards.

- Detail the form and structure of the framework.
- Develop, socialise and agree governance arrangements for maintenance of the framework – this is a challenge, to strike the correct balance between stability and innovation.

This implies establishment of regular stakeholder engagement (through the Network Operator User Group) and a dedicated (possibly virtual) key stakeholder group, which requires further discussion with key stakeholder groups.

#### **Assessment of and promotion of user awareness:**

- Additional work to assess (probably on a topic by topic basis) uptake and use of specifications and standards across road network operators (but also in the wider value chain) – including business rationale for usage/non-usage, capture of business case evidence [successes, failures, issues, opportunities].
- Promotion of greater awareness of guidance notes, specifications and standards navigators, preferred standards profiles.
- Lay out communications messages and communications plan (in conjunction with DfT and stakeholder groups) concerning the objections and the promotion of use of specifications and standards.
- Establish and promote feedback channels, to help evolve and progress it.
- We need to arrange a range of Forum events to test/develop the emerging framework with a wider audience across the sector. Building on the early stakeholder group engagement, and drawing on their views concerning prioritisation as well as outputs from the DfT Local Authority Data Discovery Project, a candidate framework and related prioritisation will be defined and exposed during Network Operator User Group events. At present, it is expected that this can be introduced as a secondary agenda topic consistently across several Network Operator User Group events. Specific details are yet to be defined.



## DfT Commissioning Letter – Definition of Scope

Extract from the TTF Commissioning letter, with respect to specifications and standards:

To provide a context for the current activities, this Annex contains extracts of text drawn from the DfT/IUK commissioning letter for the Specifications and Standards activity:

Support delivery of campaigns and projects that will the TTF to become the focus for collaboration and participation in the traffic technology industry. This will help the sector liberate the potential economic, social and commercial value of technology applied to roads – addressing barriers and de-risking investment to meet critical challenges and to maximise opportunity.

### e) Specifications and standards

There is a need for a clear focus on specification and standards activity relevant to road network operators to ensure efficiency, promote innovation and underpin exports. This work stream will implement a more structured UK approach to the development and promotion of priority specifications and standards, including informed and prioritised engagement with international standards bodies.

### Deliverables - Scoping paper and action plan

Scoping paper and action plan. The scoping paper will present an informed view of key issues for the UK, taking into account future development paths for technology development and recognising UK strengths and weaknesses. The perspective will be international. The action plan will set out this thinking will be developed collectively (through workshops, etc) into a prioritised and streamlined UK approach to specification and standardisation activity.

## 4.2 Innovte UK Commissioning Letter – Definition of Scope

Extract from the TTF Commissioning letter, with respect to specifications and standards:

Specifications and standards - Prioritised and structured UK approach in place to ensure efficiency, promote innovation and underpin exports. Anticipated deliverables include:

- a) Governance structure in place to oversee UK prioritisation of and representation on specification and standards activity.
- b) Priority specification/standards identified with properly resourced engagement UK representation on priority international standards activities (working with TOPAS, UDG, AESIN, etc).



