COOPERATION FRAMEWORK FOR INTERACTIVE TRAFFIC MANAGEMENT

The concept of Interactive Traffic Management (TM2.0) aims to merge the previously divided worlds of centralised traffic management and in-vehicle road user information. The concept should be tested in reality before it can be widely deployed. The European project SOCRATES[2.0] will build on the strategy of TM2.0, elaborate an approach and test actual services in four pilots in the regions of Amsterdam, Antwerp, Copenhagen and Munich.

The pilots take place in 2019 and include motorways, regional roads, urban-interurban interfaces and urban roads. It is expected to lead to more business opportunities for the private partners, a more cost-effective traffic management for the public authorities and better service for the road users.

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V-MODEL APPROACH

The SOCRATES[2.0] project consists of 9 activities, and follows a V-model approach. First, a common framework is defined (Activity 2) and then specified for the four pilots (Activity 3). This is validated in the pilots (Activity 4-7), evaluated (Activity 8) and the results used to update the framework (Activity 9).

WHY A FRAMEWORK FOR COOPERATION?

The needs and interests of stakeholders are in some extent overlapping but are different on other aspects, and it may be a challenge to find a cooperation model that

Figure 1: V-model approach SOCRATES[2.0]
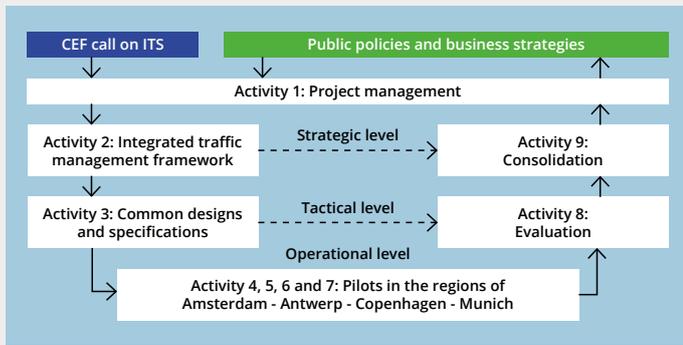

Figure 2: Cooperation Model matrix

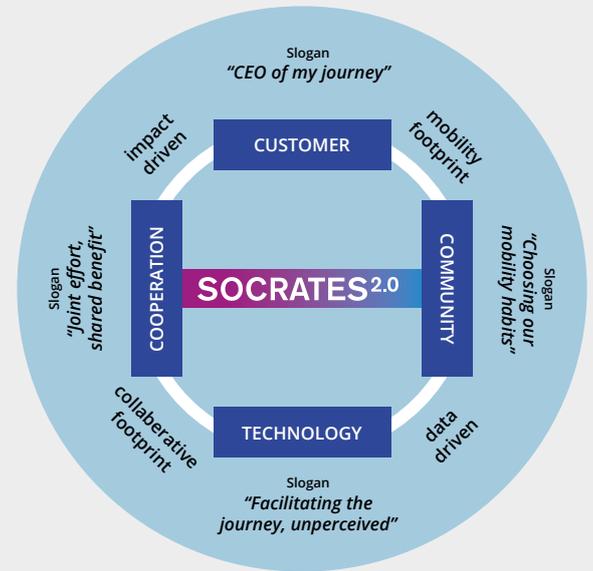
Figure 3: Vision, the four elements of SOCRATES[2.0] and their slogans

is attractive for all. That's why the partners started with defining a common ground for cooperation on a strategic level. The vision describes the desired future state and will guide the definition of the use cases and the functional design of the SOCRATES[2.0] solutions for the pilot sites.

VISION: PARADIGM SHIFT

The partners in SOCRATES[2.0] wanted to establish something new and not just improve an existing concept of cooperation. To do so, they recognised that a paradigm shift should be made from 'managing and influencing traffic' to 'supporting people on their travel from A to B'. To bring the vision to the pilots in the ongoing deployment work, two statements are adopted as the agreed base:

- Active involvement of the customer (road user) and the communities (pre-trip, on-trip and post-trip)
- Move from managing traffic to supporting individuals

As a result, the vision does not just focus on technology or the traffic management process but is elaborated along four elements: customer, community, technology and cooperation. The essence of each element is captured into four 'slogans', especially summarizing what is new behind this concept, compared to contemporary traffic management. See *figure 3*.

FIRST ELABORATION OF USE CASES

One of the elements of the vision is that the road user should be in the centre of attention. A first elaboration of

the 'use cases' to be deployed in the pilot sites are a logical next step in the process. A use case can be described as 'a list of actions or event steps typically defining the interactions between an actor and a system to achieve a goal. The actor can be a human or an other external system.'

The project selected the following (sub) use cases:

1. Smart routing
   - Optimising network traffic flow
   - Individual routing towards public event locations
2. Actual speed and lane advices
   - Lane information
3. Local information and hazardous warnings
   - Road works warning
   - Environmental/areal information and constraints

COOPERATION MODEL MATRIX

The framework introduces and discusses different Cooperation Models. These Cooperation Models were defined in the form of a matrix, looking at two dimensions regarding the exchange of Traffic Management strategies: level of commonality (is there a commonly agreed plan/basis or a so called 'thruth'?) and level of detail (at what level of detail do we want/need a commonly agreed 'thruth'?).

The matrix could be expanded to a third dimension, talking about the level of commitment of the individual actors (are actors free to use the agreed plan/basis or do they

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commit their selves to a set of needed actions to achieve the common goals?).

It is expected that for the different SOCRATES[2.0] pilots there will be no 'one size fits all' Cooperation Model. However, the concept of Cooperation Models should give partners some orientation on the many options and their implications, helping them find the 'right' Cooperation Models when specifying individual deployments.
Even more so, it is recommended, that the upcoming SOCRATES[2.0] pilots experiment with different Cooperation Models, in order to experience more and learn the effects of different options. The results will be used to update the framework.

There is a first consensus towards a set of preferred Cooperation Models. As a tendency, the 'Informing each other' concept is preferred for the situational and the operational levels. The *Co-creating 1 common 'truth'* concept is preferred for the tactical and strategic levels. While a *Common 'truth'* approach could be a threat to the business model of partners at the situational and operational levels, clear benefits are seen at the tactic and strategic levels, when targets and KPIs are shared and aligned with each other. This is seen as a clearly innovative concept to be tested in SOCRATES[2.0].

INTERMEDIARY TYPE PER USE CASE
The various use cases and coordination models each ask for certain roles to be fulfilled by stakeholders. The project

Interactive Traffic Management: TM2.0

In the past, traffic management was mostly directed one way: a road authority informs road users via road side equipment, like Variable Message Sign (VMS) or other dynamic signalling. A road authority can also dose traffic in the network via several (local) traffic control measures. Traffic information service providers inform road users via navigation (embedded in-car or mobile) about the quickest or shortest route to be followed.

The TM2.0 concept aims to merge the previously divided worlds of centralised traffic management and in-vehicle road user information. The TM2.0 concept is based on achieving a 'win-win-win'; there is an added value expected for the involved stakeholders:

- Traffic managers can reduce congestion, reduce emissions, improve traffic management using new data sources, provide consistent road-side information, and possibly reduce existing data collection and road side information systems (VMS) by using new technologies like Floating Car Data (FCD).

- Road users can avoid congestion, receive more relevant and consistent information, have better road safety and get accurate route advice;

- Service providers can not only provide more reliable real-time traffic information services, but also provide the best route advice well in advance, taking expected traffic management measures into account. Thus offering their customers more reliable and consistent information services.

therefor explored the options for an 'intermediary': a facilitator for the interaction between public traffic centres and private back-offices. The framework presents in short the following options for an intermediary:

- No intermediary: Each SP & TMC arranges its own connections
- Multiple intermediaries P&P: Each SP & TMC can decide to which int. service to subscribe to
- 1 intermediary for governments: TMC's align on TM measures SP's operate independently
- 1 intermediary 'trusted party': Each SP &TMC acts as an integrated part of the intermediary
- 1 intermediary: Each SP &TMC connected, intermediary provides instructions to all systems/users

SP= Serviceprovider, TMC= Traffic Management Center, TM=Traffic Management

Depending on the different use cases and stakeholders, combinations of intermediary options may be relevant. The discussion of advantages and disadvantages per option will be done in the next phase of the SOCRATES[2.0] project. This will cover the specific situations in the pilot sites including regional boundary constraints, options and use case specific requirements.

What is SOCRATES[2.0]?

SOCRATES[2.0] is a pan-European project where public and private partners are realising smart traffic services and traffic management in the regions of Amsterdam, Antwerp, Copenhagen and Munich. International service providers, a car manufacturer, ITS companies and road authorities are cooperating and sharing information in order to create new and better services for road users.

Besides realising smarter services for road users, the partners in SOCRATES[2.0] are defining and experiencing public-private cooperation in traffic management. By exchanging and integrating all available information from road authorities, service providers and road users, the creation of a complete and consistent picture of the current and expected traffic situation becomes possible and opens the way to develop common traffic management strategies. This way smarter and consistent traffic management and navigation services can be provided to road users. Cooperation and the use of smart services by road users will thus lead to faster, greener and safer traffic.

The lessons learned are expected to be valuable to all relevant stakeholders. Finally, SOCRATES[2.0] also provides the essential building blocks to prepare Europe for the future of self-driving cars. It is anticipating the integration of traffic information and navigation services in self-driving cars.

This is a summary of the report on the SOCRATES[2.0] common framework for public-private cooperation in traffic management and -information. The full report can be downloaded on our website.

www.SOCRATES2.org

SOCRATES[2.0] is co-funded by the European Commission

SOCRATES[2.0] partners