



Ministerie van Infrastructuur en Milieu

Beter Benutten

**SYNOPSIS OF LESSONS LEARNED DURING THE CONSULTATION ON
LOW LATENCY DATA TRANSFER AND ADVANCED HANDLING
IN SUPPORT OF INNOVATIVE ADDED VALUE SERVICES FOR
TRAFFIC INFORMATION, ROAD USER INFORMATION
AND DRIVING ASSISTANCE SERVICES**

November 1, 2015

BACKGROUND

The Beter Benutten Program of the Dutch Ministry of Infrastructure and Environment (hereinafter IenM) issued the consultation on 'low latency data transfer and advanced handling in support of innovative added value services for traffic information, road user information and driving assistance services' to investigate:

- 1) the interest of private enterprise in providing aforesaid services ;
- 2) which technology or technologies private enterprise prefer and propose to implement;
- 3) and which circumstances and conditions are necessary for such an implementation.

The consultation was published in the Tender Electronic Daily on Wednesday September 2, 2015. Responses were received in both English and Dutch before or on October 2, 2015. After studying the received viewpoints IenM invited a distinct number of private entities to receive clarifications to some of their responses to the consultation document.

IenM is most appreciative of the quality, detail and openness received during this consultation. A lot of time and effort has been allotted by private enterprise to assist IenM in their decision making process on:

- 1) which technologies might be most suitable to achieve the effects the Beter Benutten Program pursues;
- 2) and under which conditions (timeframe, costs, contractual models and so forth);
- 3) and which (future) services are envisioned.

The outcome of this consultation is titled: 'a synopsis and lessons learned'. This title should reflect the fact that a substantial portion of the written and verbal input received during this consultation is confidential and not suitable for disclosure in a public document (for instance the commercial viability of the solutions provided). IenM therefore only presents the anonymized input received on a strategical level (which solutions, constraints and opportunities, which contract type and within what time -frame) and translates the received input to a draft sourcing strategy for the Beter Benutten Program. This draft sourcing strategy will be discussed between the partners in the Beter Benutten Program early November 2015 and once adopted (modified or not), be the basis for the procurement activities the Beter Benutten Program intends to start in November 2015.

PROPOSED SOLUTIONS

The majority of the solutions proposed were tailored towards the goals of the Beter Benutten Program (increasing safety and accessibility of the roads in the area defined in the consultation document as well as the potential role for these solutions in the rest of the Netherlands).

The (technical) solutions presented range from DSRC to 4G/LTE and DAB+ (from cooperative to connected). Each solution having unique capabilities and subsequent effects on the Beter Benutten goals. We therefore present each of them with their advantages and disadvantages based on the input received (written and verbal).

DSRC (Wi-Fi-P)

At this moment, lenM is already testing this technique in the project 'Spookfiles' on the A58. The DSRC technique is, at this time, the only technique that will make it possible to arrange for ultra-low latency data transfer in support of V2X safety related functionalities in various use cases.

At this time, the challenges to deploy this technique are of technical and commercial nature.

The technical challenges are primarily related to the lack of an existing operational and complete set of ETSI standards and the fact that the chipsets and relevant software currently used, need further (research and) development to be able to handle a sufficient amount of messages within a PKI environment, without the need for reduced verification and (graceful) degradation. Current international discussions to achieve widely supported agreements regarding PKI measures and roles are both technical and organizational of nature and is envisaged by private enterprise that it will take another 12-14 months before completion.

The commercial challenges are such that this technique requires new onboard units (aftermarket purchase and installation costs ranging from € 300-800 per unit) and the current uncertainty that automotive industry will allow this technique to actually take over driving functions (liability issues). This commercial challenge can be overcome if and when the automotive industry will deploy Wi-Fi-P based communication between vehicles on a large scale. The consultation has not resulted in a conclusion as to a time frame for such deployment.

Consulted enterprises stipulate their willingness to cooperate with all road management authorities to relay all required public messages (safety related or otherwise necessary messages that are deemed crucial for public authorities) without delay if these messages are standardized. Enterprise also express the desire, notwithstanding their willingness to cooperate with all relevant authorities, to be technically independent from the current publicly owned technical infrastructure. Additional costs, technical complexities and speed of implementation being the stated reasons. Usage of existing dark fiber can be considered if plug and play capabilities are available; this can be decided on a case by case basis.

According to the consulted enterprises, Wi-Fi-P is considered a viable and future-ready technique and as such to be considered to advance further testing and pilot projects, especially for application on city roads and junctions and advancing safety and reduction of incidents. Several consulted enterprises see possibilities for future commercial deployment after 2020 but not before that, because of the mentioned currently existing technical and commercial challenges.

Deployment of this technique in the scope of further pilot projects in the Brabant area described in the consultation document can be implemented as an extension on the existing Shockwave project, starting in the middle of 2016, provided contracts are awarded before the end of 2015. A further roll-out in the Netherlands can ensure in the years thereafter depending on the pilot(s) results and international developments.

Based on the input received (documentation and verbal statements) it is clear that utilizing Wi-Fi-P based technologies will require evolved international standardization, substantial (further) development and testing and therefore public investment before this technique and related services can be procured as a standard service from a private entity.

3G/4G/LTE

Consulted enterprises regard 3G/4G/LTE solutions as very suitable for V2X communication. Implementing these technologies can be done without the need to build a new network or to substantially invest in hardware (for end users). Facilities for V2X communication can be procured as a service from companies that will be using the already existing telecommunication networks in the Netherlands (therefore no installation costs and no roadwork required). Another advantage of these solutions is the fact that the installed base of drivers having a suitable hand-held or current in-car network connection and a 4G subscription with a telecom operator is above 80%, thereby allowing a quick uptake in the dissemination of advanced driver assistance services within the frame work of the use cases formulated by Beter Benutten. A virtually endless range of applications available to consumers in the Apple, Google or Microsoft stores, an ever increasing variety of devices and decreasing data subscription costs has made the smartphone/tablet and availability of a wireless broadband network an indispensable part of most people's lives. The fact that the car manufacturers are expanding on this and equip most (if not all) of their vehicles nowadays standardly with onboard units that can connect to a cellular network will result in less aftermarket installation costs. This integration of automotive, telecommunication and Internet based techniques and services is expected to continue in the next years. Consulted enterprises also indicated that they not only use the Apple, Google or Microsoft platform but are also capable of porting their applications to the OEM's own proprietary factory fit on-board units.

There is however further development needed for using the 4G/LTE techniques to its maximum capability. These developments are technical, commercial, security and privacy related.

The technical developments are primarily related to the network capacity, of telecom providers (for instance the so-called offload in LTE and the actual geographical coverage and availability of a network) and net neutrality requirements. Initial field testing of LTE offload capacity during peak use in rush hours is promising and indicates adequate capacity for the Beter Benutten purposes in the Netherlands. The fact that a new geographical location reference software layer has to be developed and added to the telecom networks in order to provide for geographical based data dissemination capabilities is presented as the most urgent and essential addition. Latency in the 4G/LTE based solutions can be considerably below 1 second, point to point. Enterprises stipulate that even lower latency can be expected in the near future (after 2020) but much of its potential will only become effective if and when the vehicles reach higher levels of autonomous driving. Any further reduction of latency will remain useless as long as the chain involves a vehicle driver, who first needs to see and understand information presented, and then process it and act on it properly.

The commercial challenge lies within the usage costs (data and service subscriptions for the end user) and subsequent usage of this solution. The large installed base of customers and service provisioning will make this at least manageable and requires no extra public investment.

Organizing the use of 4G/LTE based solutions requires a new and clear set of agreements (public-private) as to the ownership and rights of use of the transferred data, also relating to the security and privacy of these solutions and consumer protection. Enterprises stress their willingness to discuss and enter into such agreements and point to current telecom and internet standards and practices relating to privacy and security.

Based on the input received (documentation and verbal statements) it is clear that utilizing cellular technologies for realization of the Beter Benutten use cases within the next two-three years, is possible if public financial assistance is made available and the necessary development steps can be made in close cooperation. It is envisioned that development and deployment of data transfer services based on 4G/LTE shall result in a phased implementation towards a national roll-out (nationwide services anticipated however by the end of 2016).

Further enhancement of cellular technologies is foreseen and will require additional hardware (base stations). This will require evolved international standardization (3GPP) and further development and testing in the near future (2018 and onwards). Deployment of the cellular cooperative technique in the Brabant area described in the consultation document can be achieved by July of 2016 and a further roll-out in the Netherlands by the end of 2016 if contracts are awarded before the end of 2015.

Given the need for further development (geographical based data dissemination, business models and issues like ownership of data and security and privacy) it is clear that utilizing these techniques also require public financial assistance before it can be made available as a standard service by private enterprise to consumers.

DAB+

The proposed suggestion towards the use of DAB+ radio to advance the Beter Benutten use cases were regarded as not fit for purpose, for both commercial and technical reasons. The market uptake of DAB+ is slow and much slower than the current use of 4G/LTE subscriptions and devices. Additional end user costs related to procuring a DAB+ radio unit are such that a speedy uptake is not to be expected in the next years. The V2X opportunities are regarded as being very limited and not competitive to 4G/LTE or Wi-Fi-P solutions. If the DAB+ market uptake should prove to add new opportunities in the next 5 years, new considerations as to opportunities and constraints relating to Traffic Management and/or driver assistance capabilities might be given to this transfer technique.

CONTRACTUAL MODEL(S)

Part of the consultation document was a draft contract developed by the government in the United Kingdom for public private partnership. Responses to the consultation clearly indicate that when applying DSRC solutions no (substantial) revenue from third parties is anticipated within the next 4 to 5 years and that the contractual model(s) IenM could use for DSRC solutions should be tailored for research and development assignments, an innovation partnership or a fixed service contract without transfer of ownership.

Applying 3G/4G/LTE and DAB+ solutions can lead to third party revenues within the first 4 to 5 years and using a contractual concession model is considered acceptable.

CONFIDENTIALLY NECESSARY FOR THE MAJORITY OF THE RECEIVED INPUT

Many of the answers to the questions in the consultation document (for instance on availability or risk management) can easily be tracked back to a specific solution or a specific private entity.

Therefore lessons learned by IenM in this consultation that are not disclosed in this synopsis is related to information provided for by private enterprise on the following questions:

- 4.2 (demonstrating knowledge of user groups);
- 4.4 (comments on geographical area);
- 4.5 (DSRC as a requirement);
- 4.6 (Total Cost of Ownership);
- 4.8 (thin or thick clients);
- 4.9 (access to all service providers);
- 4.10 (interference);
- 4.13 (financial effects on regulatory compliance);
- 4.14 (availability);
- 4.15 (limitations on number of suited devices and penetration rate);
- 4.16 (priority of messages issued by Rijkswaterstaat);
- 4.17 (suggestions on effective KPI's);
- 4.18 (suggestions on reporting and escalation procedures);
- 4.19 (costs related to maintenance window);
- 4.20 (costs related to zero impact on traffic);
- 4.21 (methodology to divide the work packages amongst private entities);
- 4.22 (third party revenue streams);
- 4.23 (risk analysis and risk management);
- 5.1 (various business models);
- 5.2 (suggestions for payment schedules);
- 5.3 (indication of decommissioning costs);
- 5.4 (conformation on ownership of the data);
- 6.1. (suggestions for a contractual model);
- 6.2 (comments on UK P3 contract);
- 7.1 (top 5 security related issues);
- 7.2 (top 5 privacy related issues);
- 7.3. (costs of mitigating measures related to 7.1 and 7.2);
- 8.1 (negative effects of standards and regulations);
- 8.2 (perspective on future market developments).

Again, IenM is most appreciative of the quality, detail and openness received during this consultation. A lot of time and effort was allotted to assist IenM in their decision making process on:

- which technologies might be most suitable to achieve the effects the Beter Benutten Program pursues;
- and under which conditions (timeframe, costs, contractual models and so forth);
- and which (future) services are envisioned by private enterprise.

The viewpoints received and the confidential data offered by enterprises was very helpful and is much appreciated by I&M.

DRAFT SOURCING STRATEGY

Based on the information I&M has received during this consultation, the partners within the Beter Benutten Program will decide on the preferred sourcing strategy. Most likely this will be a combination of a DRSC project or projects to enhance further development and testing with closed user groups , combined with a development and phased deployment of 3G/4G/LTE based technology and services working with private entities that already have a substantial installed base of customers. Decisions on the combination of technologies and the preferred sourcing strategy are expected to be made and subsequently publicized in November, 2015.

End of synopsis