



STEP – Short TErM Prediction

26 & 27 September 2013

ENR Mobility Final Conference, Vienna

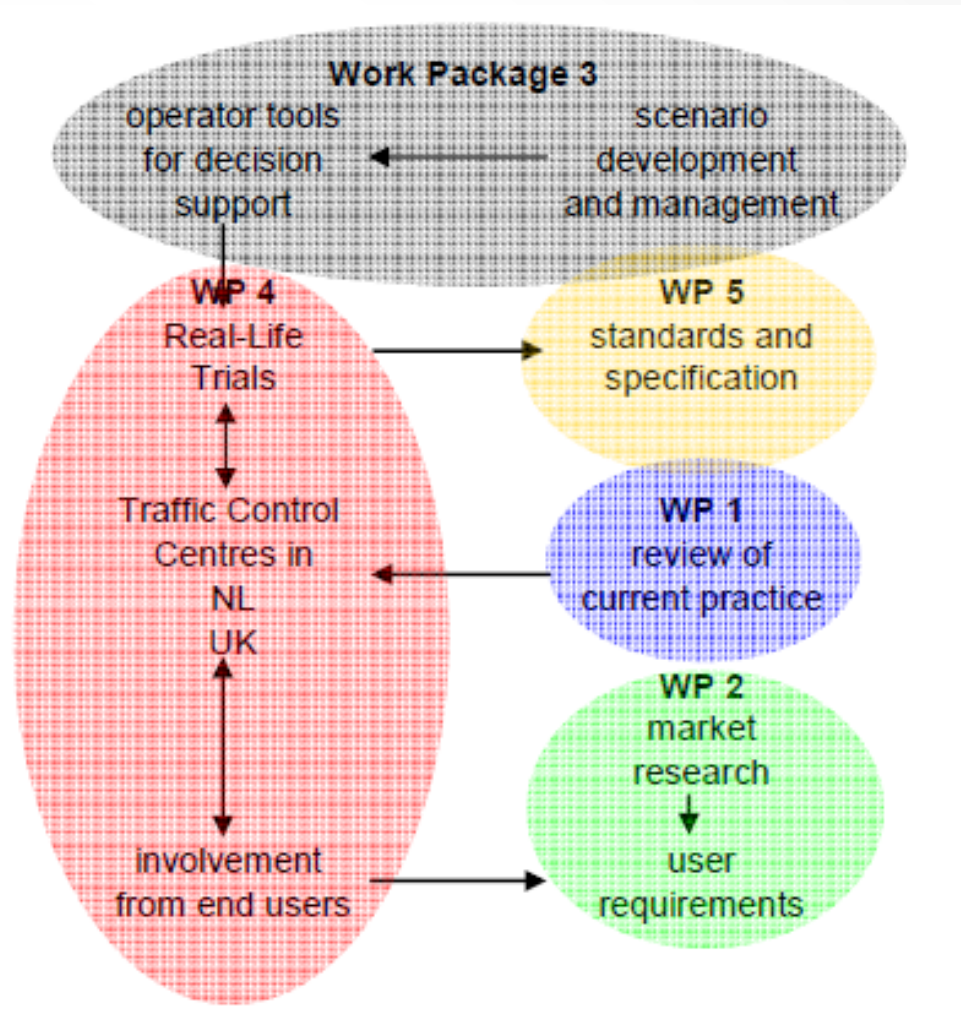
- **Objective:**

- Implementing and testing a representative solution for real-time traffic modelling in an operational environment, using generally available data, leading to generic advice for TCCs Europe-wide

- **Partners:**

- Mott MacDonald (UK) – *Co-ordinator*
- Fileradar (NL)
- Katholieke Universiteit Leuven (BE)
- ETH Zurich (CH)
- Technische Universiteit Delft (NL)

STEP - Work Packages

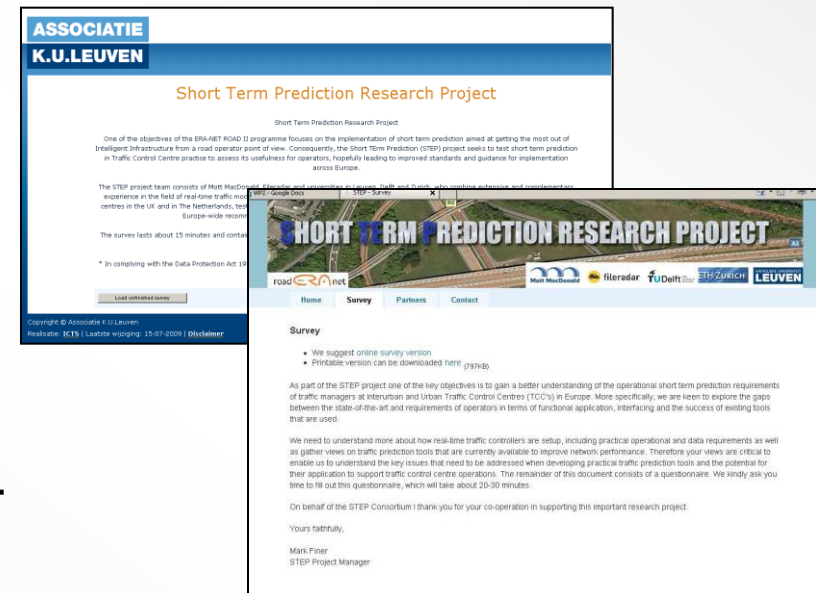


- Project designed to explore barriers to implementing short-term prediction in TCCs
- Number of sequential Work Packages proposed to deliver STEP
- Main aim is implementing and testing a robust solution for real-time traffic modelling in an operational environment
- Project results aim to be transferable through knowledge gained through STEP to support wider needs for European deployment

- **Key aims:**

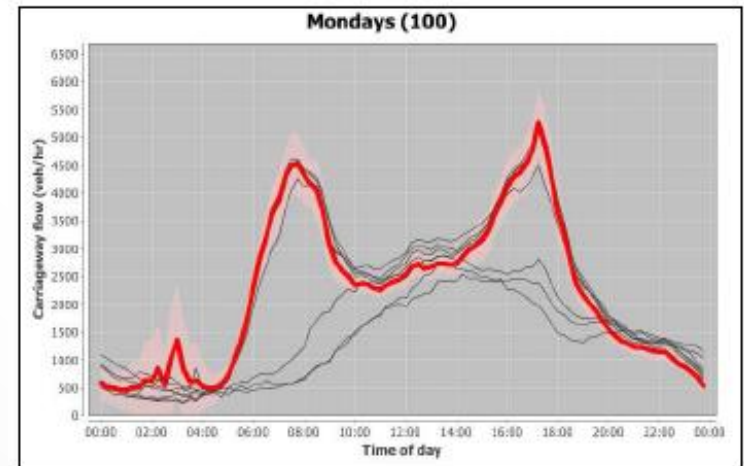
- Establish a better understanding of the operational short-term prediction requirements in Traffic Control Centres
- Exploring the gaps between the state-of-the-art and requirements of operators
- Central to research work was delivery of a real-life trial conducted in an operational traffic management centre environment:
 - testing the prediction tool against user requirements ***while learning valuable practical lessons during implementation.***

- Summary of objectives:
 - Review of state-of-the-art
 - Gain better understanding of the operational short term prediction requirements of traffic managers at TCC's
 - Exploring requirements of operators in terms of functional application, interfacing and the success of existing TCC tools
- During Jan - March 2012 meetings/discussions took place with TCC contacts in the UK, Netherlands and Belgium
- Attempt to secure more views through use of online survey and other media (LinkedIn contacts)
- Total of 15 responses obtained on user perspectives



- TCCs have a positive attitude towards short-term prediction.
 - 80% optimistic about the use of short-term predictors
 - 50% considered ability for scenario generation additional useful,
 - 50% stated that prediction accuracy was a key issue:
 - important to demonstrate successful results initially and then develop predictors with scenario generation at next stage
 - 75% wanted to see evidence of successful application by other TCCs and also experience of real-life trials
 - 75% stated cost of was a key concern, incl the cost of data acquisition

- Summary of objectives:
 - Development of tools
 - Enabling linkages to other data sources than currently used
 - Development of user interface
 - Implementation of control measures
 - Improvement of reporting measures
 - Leading to readiness for STEP field trials
- Included new deliverable - WP3B:
 - Traffic Data Interface



- **Objective:**

- Identify data requirements and interfacing standards
- Assess benefits of short-term traffic prediction availability

- **Keypoints:**

- Software Dante written in Java and accessible via browser
- Dynamic Traffic Flow Model (LWR)
- Maximum time lag in data (2.5mins)
- National TCC,
 - Supervises the 5 Dutch regional TCC,
 - Coordinates regional TCCs in case of large problems
 - Disseminate information to other channels

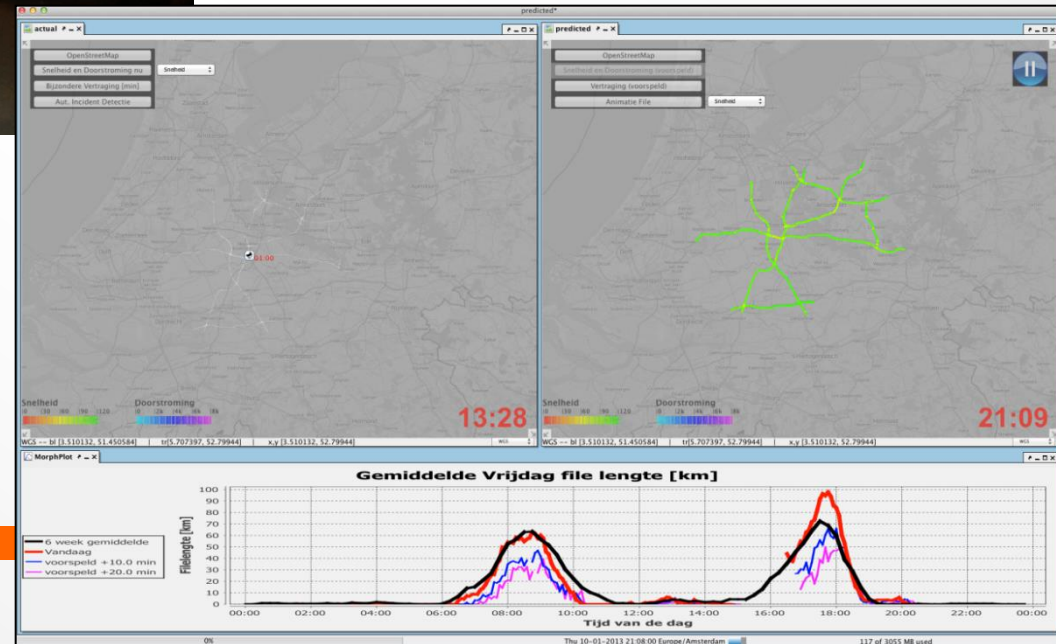




National TCC:

STEP tool is positioned alongside other TCC operational screens and always available to operators

STEP Tool & Interface:



- **Interfacing Aspects:**

- Building on the outcomes of research with TCCs - helped to identify the preferred option for presenting the predictive traffic information that best supported operational requirements.
- A variety of options were considered/tried:
 - presenting the predictions in a split screen showing two maps (current and predicted situation),
 - visualisation of the remaining capacity on corridors and alerts when and where ‘spillback’ are forecast to occur at particular locations.
 - showing predicted travel time delays for non recurrent situations

- **Evolution of predictor during pilot:**
 - Recent history was added to the animation so that a 40-minute history of traffic conditions and 20 minute prediction were shown in one single animation.
 - TCC staff wanted to see a **total network queue lengths plot** being built into the application showing total queue length as a function of the time and comparing it to the historic average queue length over the day.
 - Final interface enabled traffic controllers to have direct access to information on whether current day traffic levels were busier or less busy than average

- **Key findings – 1 (*General*):**

- Operating staff sceptical about new tools (seen it all before); build trust by including management and end users
- By including operating personnel, final interface was in the end well received and actually used in practice:
- Split screen is beneficial:
 - Historic comparator between usual conditions, today's conditions and predictor
- To be useful, accuracy required in both predicted length of queues and speed of traffic
- Show predictions 'as is' before offering scenario solutions when congestion occurs

- **Key findings - 2 (*General*):**

- Current predictor only trusted for first 15 minutes, particularly in case of non-recurrent congestion (due to difficulties in predicting duration and severity of incidents)
- Possible to estimate and operate predictor using routinely collected data
- Delays in obtaining and transmitting detector data critical
- Effective implementation through rich web client, avoiding complex interference with in-house IT protocols

- **Key findings - 3 (*Data Issues*):**

- In the market research TCCs stated that there are concerns over the availability and cost of data
- The Pilot proved that the amount and kind of data that is routinely collected from standard roadside detectors and through existing communication channels is of the kind needed for a short-term predictor to be developed and calibrated.
- Although the accuracy of the prediction was poor, the available data was considered sufficient both in availability and type of information.

- **Key findings – 4 (*TCC's Perspective*):**

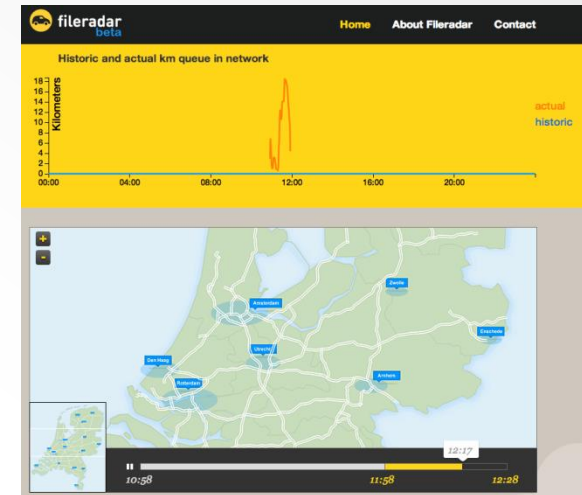
- TCC personnel experienced the start of the pilot as very positive:
- Short-term traffic predictions are a long desired feature in the control centre;
- Operators enjoyed the enthusiasm of the project in terms of speed with which feature requests were implemented in the client.
- Traffic controllers were very happy with the fact that they had a direct influence on the software itself; usually new software is designed by others and presented 'as is' ; and
- The resulting user interface was rated as of a good quality. Especially the dual map feature was experienced as user friendly and provided a good overview.

- **A lack of user acceptance a significant barrier to success:**
 - Involving personnel, managers and actual end users into the entire process from design to rollout can increase the chance of success
 - Important to get users on board with what can be achieved with predictions so that they fully trust the system: decision support tools can be built upon these
 - Authorities have limited resources and cannot accommodate complex configuration and maintenance activities
 - Prompt and effective technical support should be available

- **Technical Performance**

- Data issues: TCC users expectations of data requirements are greater than actually needed. It is possible to utilise what available to support predictions
- Quality: First 15 mins of 'usable' prediction quality - during the pilot the quality increased to a level that was sufficient predictive information for TCCs
- There is a trade off between functionality and accessibility
- Setting up takes time in terms of understanding what works and what doesn't – quality of prediction improved during the pilot.

- **Fileradar build a new lightweight web client (Sept 2013)**
 - Low budget deployment and maintenance,
 - Animated network queue evolution:
 - 60 min historic, and 30 min prediction,
 - “Support ‘mental map’ of TCC personnel by showing the animated recent evolution and let them infer based on experience”
- <http://trafficcontrol.fileradar.nl>
- **Looking for 2 more Interested TCC’s:**
 - Contact: info@fileradar.nl



Thank you for your attention

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