# Urban Tram Forum
# Meeting 10 – 12 / 09 / 2019
# Brussels
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# Minutes
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**Participants :**

- Andreas Berk
- Dominique Bertrand
- Anna Chang
- Graham Fairhurst
- Laetitia Fontaine
- Lars Forsting
- Perceval Gailliard
- Amal Kammachi
- Axel Kühn
- Antony Loui
- Franck Monti
- Reddy Morley
- Margarita Novales
- Liz Parkes
- Robert Jan Roos
- Christian Sautel
- Nicolas Speisser
- Niels Van Oort
- David Walmsley
- Tony Young
- David Zaidel

**Apologized** :

- Camille Estienne
- Carlos Gaivoto
- Michael Rosenberger
- Klara Macsinka
- Dominique Schmitt

## Session 1 (Tuesday 10 PM)

### 1. Opening

Dominique Bertrand and Amal Kammachi open this 2019 UTF session and welcome all the participants in Brussels.
The group starts with a round table for the new members.

### 2. The STIB/MIVB system and network, by Tom Bouckaert (STIB)

"*La Société des Transports Intercommunaux de Bruxelles"* operates an integrated network of around 700 kms, 7 depots, 18 tram lines, 70 % tracks in segregated tracks. STIB's fleet has a large variety of trams. Frequency minimum is 2mns30 – 3mns. The STIB travel repartition is 27 % for the bus, 36 % for the metro and 36 % for the tram.
Tom presents the STIB's Business Unit Tram.
New projects are currently numerous : new tram depot, new tram line 9, extension of line 8, underground modernisation (signalisation), new metro line 3, purchase of 175 new trams (June 2020).
A question on the modal repartition in Brussels is asked. The answer on modal shift comes the day after thanks to Françoise Godart from Bruxelles Mobilités / road safety unit through a chart (see in appendix of STIB presentation). A new study will soon be made again, new modes are appearing and recently, a new and ecological government.

### 3. Pedestrian issues

#### 3.1. Pedestrians versus tramways accidents: current issues and expected solutions - France, by Christian Sautel (Cerema)

Many alerts on pedestrians issues come from PT operators and authorities. The part of pedestrians in crashes is small but increasing, and the severity is higher than for other involved third parties. Distractors (i.e. mobile phones) often are quoted as a cause, however, if their presence appears in 20% of accidents occurred in 2017, we can't be sure about their effective use at the moment of the crash.
Beyond figures, it is a sensitive issue, with direct and indirect impacts on productivity, image and costs, and a big source of stress for tram drivers.
Several local initiatives to improve pedestrians safety have been implemented or are imagined in various networks.
As existing solutions seem not to be efficient enough, new imagined solutions are proposed : flashing lights, horizontal light signage (issues with road regulation in both cases), paintings on the ground, alerts on smartphones, pedestrian (and cyclist) blind spot detection… And other possibilities are rising : smart vigilance to reduce dead man device using, ODAS system…
Most of these devices are experimental, as they need to change the regulation about road signage, and questions raise about their implementation on tram lines, and what happens when it doesn't work (detection, lights).
For all these ideas/experiments, there are pending questions and assessments are needed: visual pollution, maintenance and availability? Impact on non equipped crossings? Efficiency? Impact on tram drivers behaviour? negative side effects?

*Christian's presentation is to be shared between participants and may be published on the UTF webpages.*

### 3.2. Ongoing work after a fatal pedestrian accident on LUAS network, by Reddy Morley (TII)

This fatality occurred at an uncontrolled Luas pedestrian crossing, on the 14th February 2019. Two trams were arriving (one on each side), totally visible. One passed the crossing and then the lady went on. At 60 kph, the tram driver put the Emergency Break but still crossed the pedestrian crossing and hit the lady.
Reddy has read the UK RAIB's report on the pedestrian accident in similar conditions (Edinburgh, 11th September 2018).
A review and an assessment of uncontrolled pedestrian crossings have been implemented: there is a total of 201 uncontrolled pedestrian crossings on the Luas network.
Best practices are studied to find the best solution, from UKTram Guidance, LR/SSB Non motorised Tramway Crossing Guidance and COST Action Analysis and Results.
Recommendations are to reduce speed to 40 kph for 50m on approach, "strail" crossings on ballast track, white surface contrast and hazard fascia plate, relocate / modify obstructive signage, tactile paving and overhead public lighting.
Discussion starts on relevance and efficiency of signage, barriers/gates on pedestrian crossings. And mitigation measures are suggested, as such accidents are quite impossible to totally avoid (there seems to be a part of unconsciousness in pedestrians behaviour, despite they see the tram coming).
Reddy shows us the latest Luas safety campaign.

### 3.3. Ongoing Luas safety work/studies/assessments, by Reddy Morley (TII)

One study concerns 11 pedestrian isolated crossings. To warn pedestrian, active and passive solutions are studied:

- Signals: discussion on what happened when the signal is out,
- Static radar, embarked radar and camera,
- Tram horn (>93db at 7m - from heavy road's regulation).

Door entrapment (ongoing RAIU investigation) poses question on: CCTV range, what elevators do, pressure detection or sensors, BEA-TT recommendations of the 28/04/2013 accident in Nantes.
Luas also works on improving visibility of trams (cf. Los Angeles, UK regulation).
Tram body catcher in Dublin (ramasse-corps from Citadis) has to be improved and raises question about its efficiency at high speed. Other networks have this system such as Lyon.
On embedded track form, added protections are studied.

*Reddy's presentations may be shared with participants, but must not be forwarded outside of this circle, nor be published on the UTF webpages.*

## Session 2 (Wednesday 11 AM)

A round table is made for the 3 new participants : Liz Parkes (North Yorkshire Moors Railway), Niels Van Oort (TU Delft) and Françoise Godart (Bruxelles mobilités). Raf Van Genechten (STIB) is also joining us for the morning.

### 4. Battery power supply, by Anna Chang from Loughborough University, Wolfson School of Mechanical, Electrical and Manufacturing Engineering

Anna presents her University and her previous and current job. Her PhD topic is about energy use to improve light rail development.
There are risks and disadvantages from the OLE (overhead line electrification equipment). But also risks, issues and uncertainty with battery/wireless solutions currently applied on trams. New

technologies are emerging such as supercapacitors and others (new types of batteries, such as lighter material (Cellite 920)).
Challenges for on-board energy are : used space, weight, power output, speed, capacity, charging time.
She presents battery/supercapacitor differences, pro and cons and her work on modelling power use on a realistic route (of Nottingham express transit): which type of technology is best for a given tram or tram-train route, taking into account recyclability and risk mitigation (heat, damage, mishandling).
A model allows to estimate the costs of alternative light rail line systems prior to carrying out a detailed study.
A remark is made that the car industry is strongly improving, discussing, competing on this item, but this good competition is not seen in tram industry. The transport stakeholders seem to focus on buses.
An other remark concerns the wide amount of car's advertisements (on television, on billboards) and none for the trams and collective transports: the communication part for these modes must be improved.

*Anna's presentation must not be shared with participants, nor be published on the UTF webpages. Anna will send us a public version.*

## 5. Light rail on ring 3 in Copenhagen, by Lars Forsting (Metroselskabet and Hovedstadens Letbane, Metro Copenhagen)

Lars presents the project and the history of light rail, metro and commuter trains in Copenhagen.
In 2013, the « anti-congestion commission » recommended to construct light rail systems to reduce traffic congestion.
The project is to build a tram line on one of the ring roads of the city, linking the "fingers" of the "hand scheme" of Copenhagen (the main radial corridors). It will be a 28 km double track line, driven on sight, opening in 2025, with 5 construction work contracts, a new maintenance depot in the Copenhagen suburb. Construction has begun.
Concerning safety, approvals of general and then detailed design are necessary. CSM-RA process is applicable in Denmark also for tram/light rail with assessment body and road authorities.
Discussions occur on the design of pedestrian crossings in stations and in-between.
Bicycles are allowed in tram's multi purpose areas, except in peak hours, Siemens is thinking on a system to secure the bikes.

*Lars's presentation is to be shared between participants and may be published on the UTF webpages.*

## 6. Basel Transport Association, by Andreas Berk (BVB)

Basel city has a long history in light rail with 9 tram lines.
The BVB has a Transport Division, Infrastructure Department, Technology Department...
As the city is close to borders, with suburbs over these ones, extensions have been implemented to Weil am Rein (Germany) and Saint Louis (France), with 3 different supervisory structures and borders interfaces) and new operating rolling stocks (Flexity). New lines are avoiding buildings, with curves up to 12m radius.
The crossing of tracks in the city centre with 7 lines operated there is managed without any signage, which provokes discussions within the group.
The operator ensures safe and smooth running operation and maintenance, and so is facing a lot of interfaces: it was (and still is) a hard work but it is worth it.

*Andreas's presentation is to be shared between participants and may be published on the UTF webpages.*

**7. Light Rail Transit systems - Lessons in 61 sustainable urban development, by Niels Van Oort (TU Delft)**

This is the result of a research led by the smart public transport lab. The question here is to determine what the optimal combination of Public Transports is, with current technology trends and what is the place of light rail? General findings are failures (project conception, project organisation, politics, communication) and successes.
It is important to determine what are the objectives of public transport and the justification of public transport (mobility, equity, economy...).
Niels presents two examples and their approach with calculations of future demand, including tram bonus impacts, costs (infrastructure and operations) and benefits, thanks to the three steps approach (Service dynamics, Passenger impacts, Monetary impacts).

*Niels's presentation is to be shared between participants and may be published on the UTF webpages. Moreover results of the study are available via www.elsevier.com*

## Technical visit (Wednesdau 11 PM)

STIB provided us a dedicated tram to make a tour on the new line 7. Starting from Marconi depot we reached it to finish at Heysel station. During this visit, which was led by Amal, and her colleagues Jean-Marc Vandrooghenbroeck and Alain Van San, we could see in particular:

- crossings of roundabouts without traffic lights
- junctions of tracks managed without signage
- segregated tracks only protected by marks
- new signage of a complex manoeuvre zone (junction of lines with a lack of visibility)
- additional devices (fusible edge) to reduce the gap between rolling stock and platforms at a station

## Session 3 (Thursday 12 AM)

**8. BEA-TT on-going investigation: collision between two trams on the 11th February 2019 in Paris, by L. Fontaine (BEA-TT)**

This collision between two trams raises the subjects of human factors in a constraint environment and driving at sight.
Many questions or suggestions are proposed: the operator knew there was tram traffic jam in this zone, so why not an ATP system? Or an alerting system, as on roads when there is jam?
Some find similarities with Croydon accident, the RAIB report could help.
A change to the location of the station and the addition of a 3rd track in it to stock trams before going to the maintenance site would enable to reduce the interface with other trams.
Some advised to check the health conditions of the tram driver, and a potential use of his smartphone at that time, and to check why it has not happened before, while the frequency has increased.

*Laetitia's presentation may not be shared with participants, nor be published on the UTF webpages. She has sent us a public version.*

**9. UK risk management maturity model – RM3 from ORR, by G. Fairhurst**

This guideline is about management through five maturity levels and criteria. The new 2019 version focuses more on organisational culture. Graham presents us a wheel of themes and criteria: safety policy, organisational control and communication, operation and competence, planning and

implementing, monitoring audit and review. And maturity levels: excellence, predictable, standardised, managed, ad hoc. The RM3 guide is available online.

*Graham's presentation is to be shared between participants and may be published on the UTF webpages.*

**10. Light rail safety and sustainability, by Liz Parkes, Head of Operation and Safety at North Yorkshire Moors Railway**

Liz presents Glasgow subway, Edinburgh Trams, Tyne & Wear Metro and the regulatory framework and standards: ROGS, environmental legislation, BSEN/ISO 14001:2015.
Light rail safety management aims at meeting safety requirements: in organisation (involving workforce, making rules more understandable), in management of change, in risk profile of the organisation during construction phase (operation, maintenance, vigilance devices: with manufacturer and drivers). Common concerns are show stoppers (fire, collision, derailment), platform train/tram interfaces, cab ergonomics, signalling and control systems, pedestrian interfaces, congestion, electricity, pollution avoidance, mobility, accessibility. Liz presents a scheme with risk precursors and mitigations.
Finally, the aim is to share experiences on accidents and on driver possibilities.

*Liz's presentation is to be shared between participants and may be published on the UTF webpages.*

**11. Adjournment**

Dominique closes the meeting: thanks to Laetitia, minutes will be available and shared on the website, with presentations when authors allow…
As he retires, Dominique will no longer be the agitator of the group, but he might keep in touch with us, and Cerema is going to be still present and active with Christian, Franck and Nicolas.
The group thanks Dominique for his involvement in making the UTF going on, and Amal for her warm welcome and all the organisation in Brussels.
Anthony Loui reminds of and supports Carlos Gaivoto's proposal to make a guideline based on UTF shared experiences; the group will mature this idea till next year. There's a consensus about its interest, but the question of means is pending, as we don't have any funding.

Next meeting location could be in Los Angeles or Paris, and perhaps Lisbon (Carlos should have asked to Carris staff, but no answer yet). Discussions per email will start about that; in the meantime the exchanges can go on regarding questions/answers about issues participants might share.