



**INNOVATIVE SMART SOLUTION FOR A
BETTER MOBILITY**

Capacity-building Workshop I: COVID-19 and
mobility - New challenges and solutions?

26 January 2022
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Thetis IT

IT company, based in Venice, Italy, active in the ITS for mobility and transport sector

Solution provider, with ITS system integrator capabilities

Dedicated solutions for public transport players (Authorities, Agencies and Operators)

More than 20 years of international experience

Innovative and open solutions, reliable technology

Research projects in the field of intelligent mobility



ITS - Intelligent Transport Systems

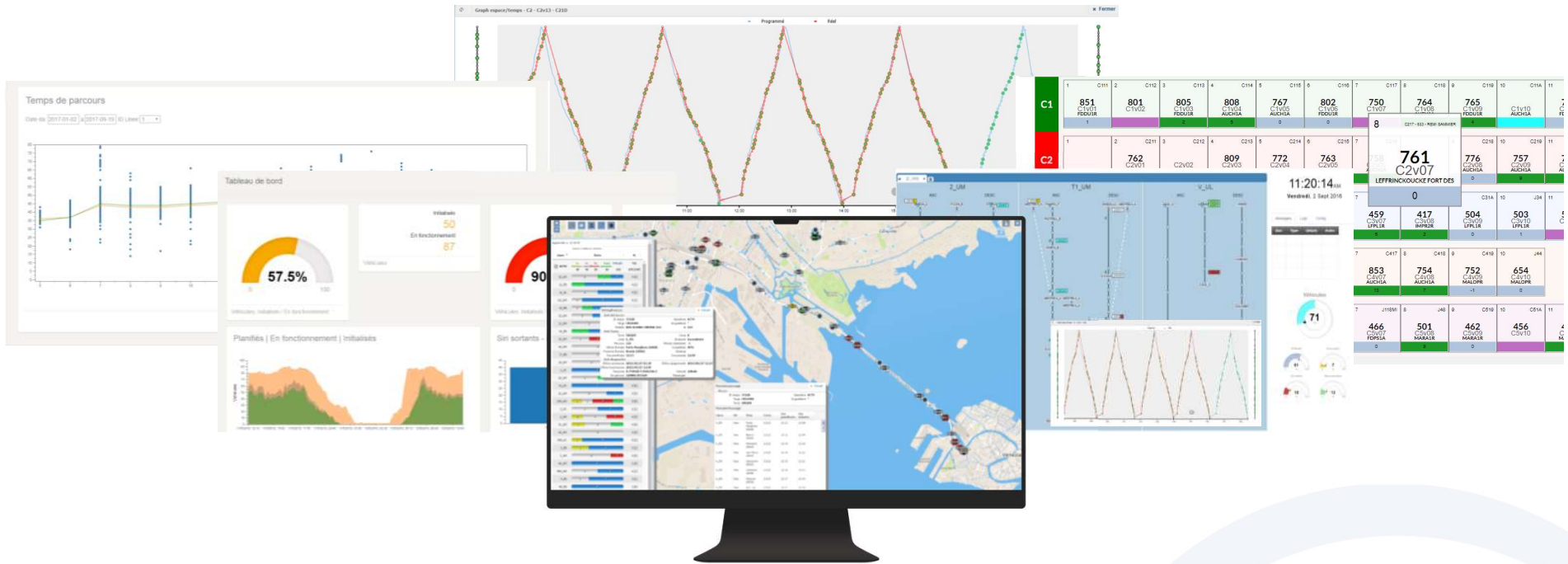


Main projects



Control Centres

ADVANCED FUNCTIONALITIES FOR REAL TIME MONITORING AND SERVICE REGULATION



- Real time monitoring of vehicles and drivers
- Mono / multi operators
- Web based / multi devices
- Service regulation (by time / by frequency)
- Bi-directional communication (voice and text messages)
- Standard interfaces with third party systems (SIRI, GTFS, RTIG, ...)
- Traffic light priority

On board systems

ON BOARD SYSTEMS FOR BUSES, TRAMS AND TRAINS

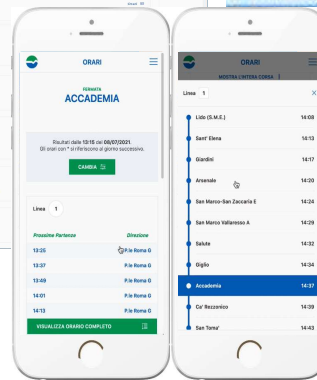
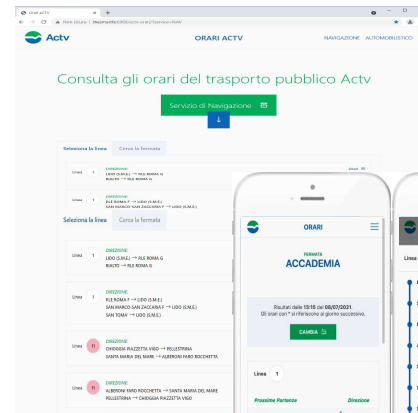
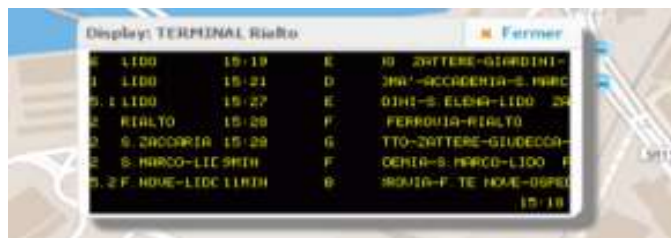


- On board computer
- Driver terminal
- Video surveillance
- Multimedia TFT screens

- Internal / external audio announcements
- Automatic passenger counters
- Interface with ticketing systems
- Telemetry and Eco Driving

Passengers information

REAL-TIME INFORMATION EVERYWHERE, ANYTIME



- Advanced forecast of arrival time
- At stop displays management (LED, LCD, TFT)
- On board multimedia TFT
- Real-time info on disruptions

- Position based information
- SMS and Web services
- Journey planner integration
- Audio announcements (TTS)

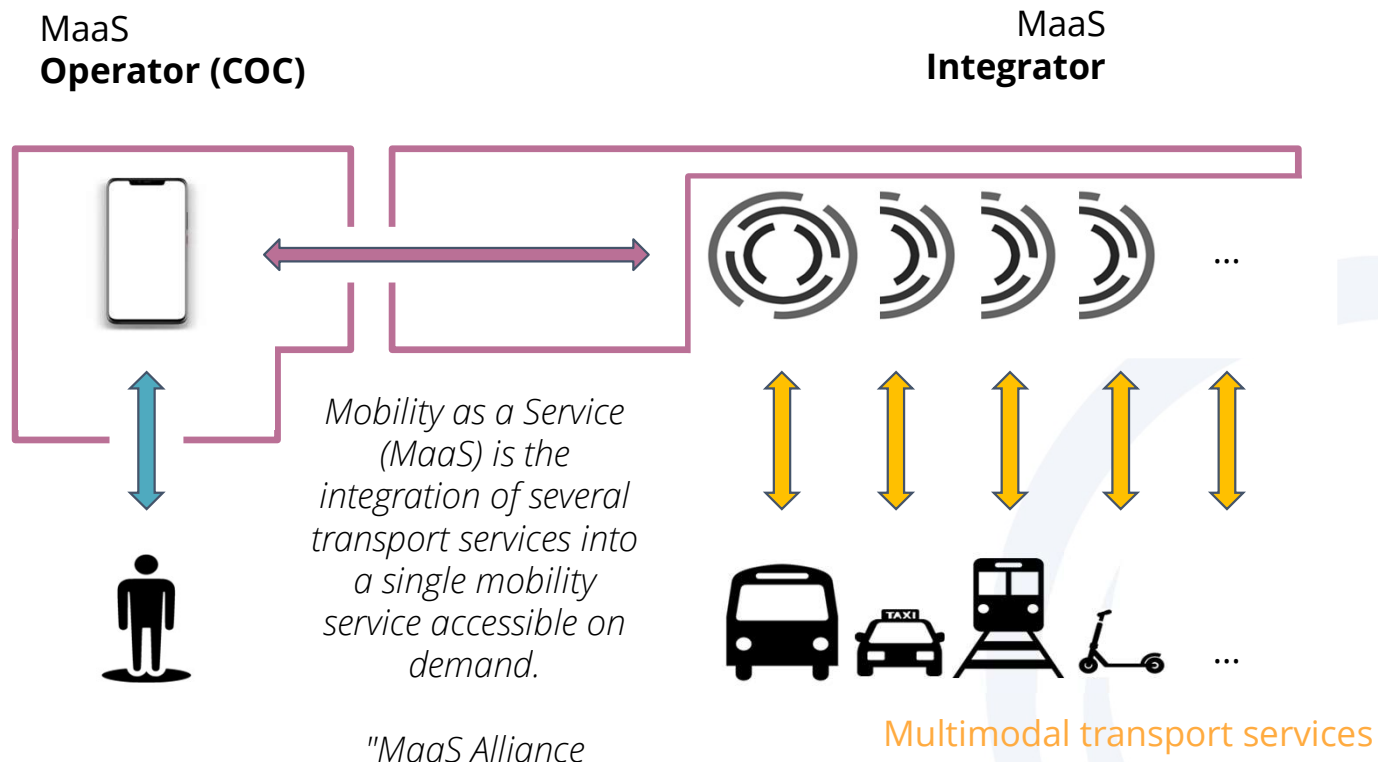
Main challenges

- Transport demand is changing
- Increased expectation by the passengers
- Improved transport service
- Sustainability of the public transport



Main solutions

- MaaS for operators - Integrated monitoring of the public transport at higher level (regional, per transport agency) - Integration of other transport modes
- Increased knowledge of the O/D information



**Use case 1 – Liverpool –
Regional MaaS solution
For public transport
authorities**

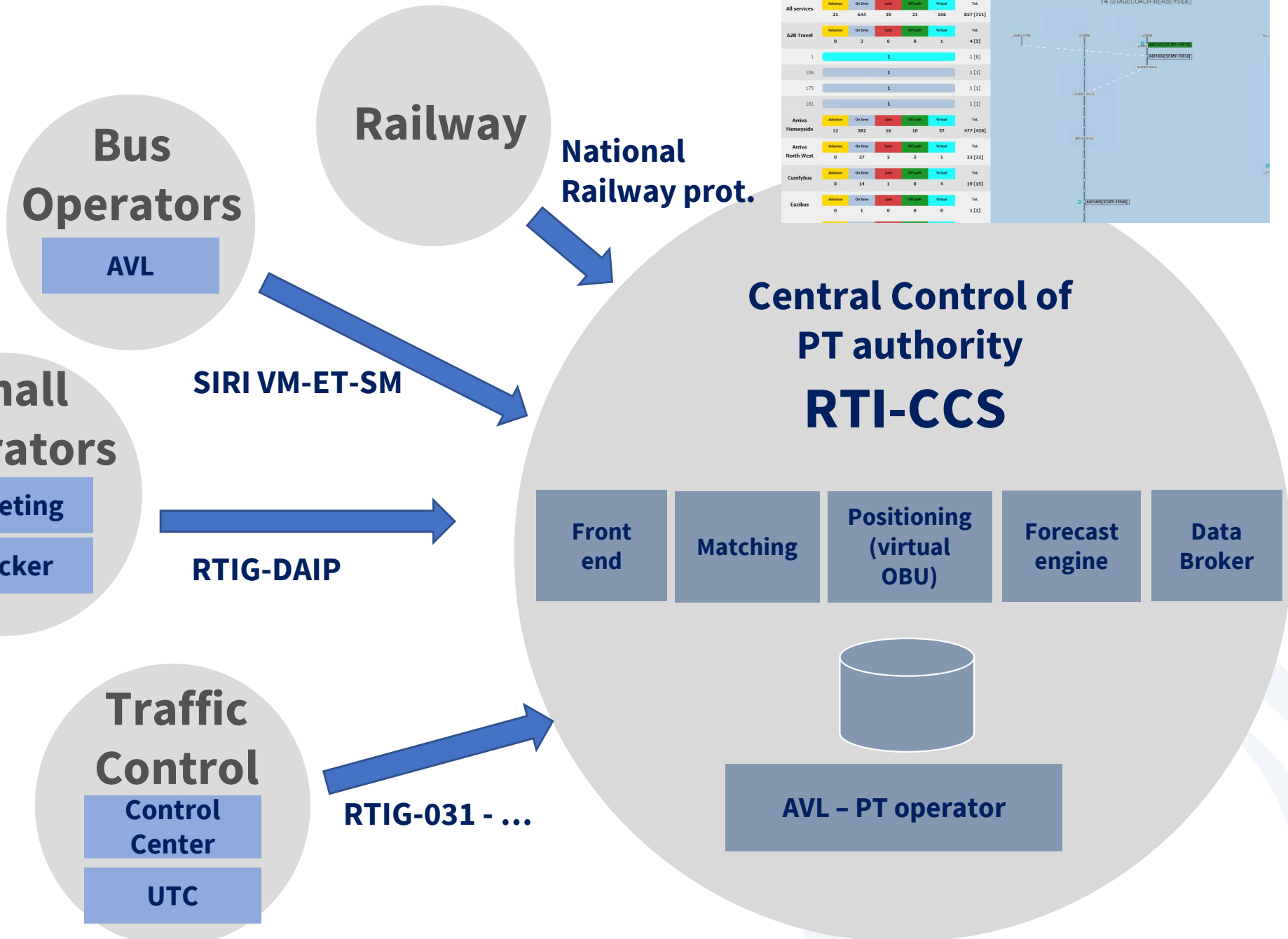


Liverpool



- 1.200 monitored buses
- **multi bus operator**
- real time passenger
- information system
- integration with ticketing system and travel planners

Real-time monitoring



Software interface showing service status and a map view.

Service	Advance	On time	Late	Off path	Virtual	Tot.
All Services	21	644	33	21	106	827 [721]
A2B Travel	0	3	0	0	1	4 [3]
1						1 [0]
106						1 [1]
170						1 [1]
181						1 [1]
Arriva Merseyside	12	382	14	10	57	477 [420]
Arriva North West	0	27	2	3	1	33 [32]
Cumfybus	0	14	1	0	4	19 [15]
Eastbus	0	1	0	0	0	1 [1]

Traffic Monitoring



**Multi operator
for Public Transport Companies & Authorities**

Linear View Main Page

Welcome
Linear View
Cartography
Anomalies
eBus-R
eBus-P

All services	Advance	On time	Late	Off path	Virtual	Tot.
	21	644	35	21	106	827 [721]

A2B Travel	Advance	On time	Late	Off path	Virtual	Tot.
	0	3	0	0	1	4 [3]
1	1					1 [0]
106	1					1 [1]
175	1					1 [1]
181	1					1 [1]

Arriva Merseyside	Advance	On time	Late	Off path	Virtual	Tot.
	12	382	16	10	57	477 [420]

Arriva North West	Advance	On time	Late	Off path	Virtual	Tot.
	0	27	2	3	1	33 [32]

Cumfybus	Advance	On time	Late	Off path	Virtual	Tot.
	0	14	1	0	4	19 [15]

Eazibus	Advance	On time	Late	Off path	Virtual	Tot.
	0	1	0	0	0	1 [1]

Halton Transport	Advance	On time	Late	Off path	Virtual	Tot.
	0	20	0	0	13	33 [20]

Hattons Travel	Advance	On time	Late	Off path	Virtual	Tot.
	0	6	0	0	3	9 [6]

Huyton Travel	Advance	On time	Late	Off path	Virtual	Tot.
	1	17	0	0	9	27 [18]

Maghull Coaches	Advance	On time	Late	Off path	Virtual	Tot.
	0	1	0	0	0	1 [1]
618	1					1 [1]

Peoples Bus	Advance	On time	Late	Off path	Virtual	Tot.
	0	0	0	0	1	1 [0]

Stagecoach Merseyside	Advance	On time	Late	Off path	Virtual	Tot.
	8	173	16	8	17	222 [205]

[14,10A] x

+

14 (STAGECOACH MERSEYSIDE)

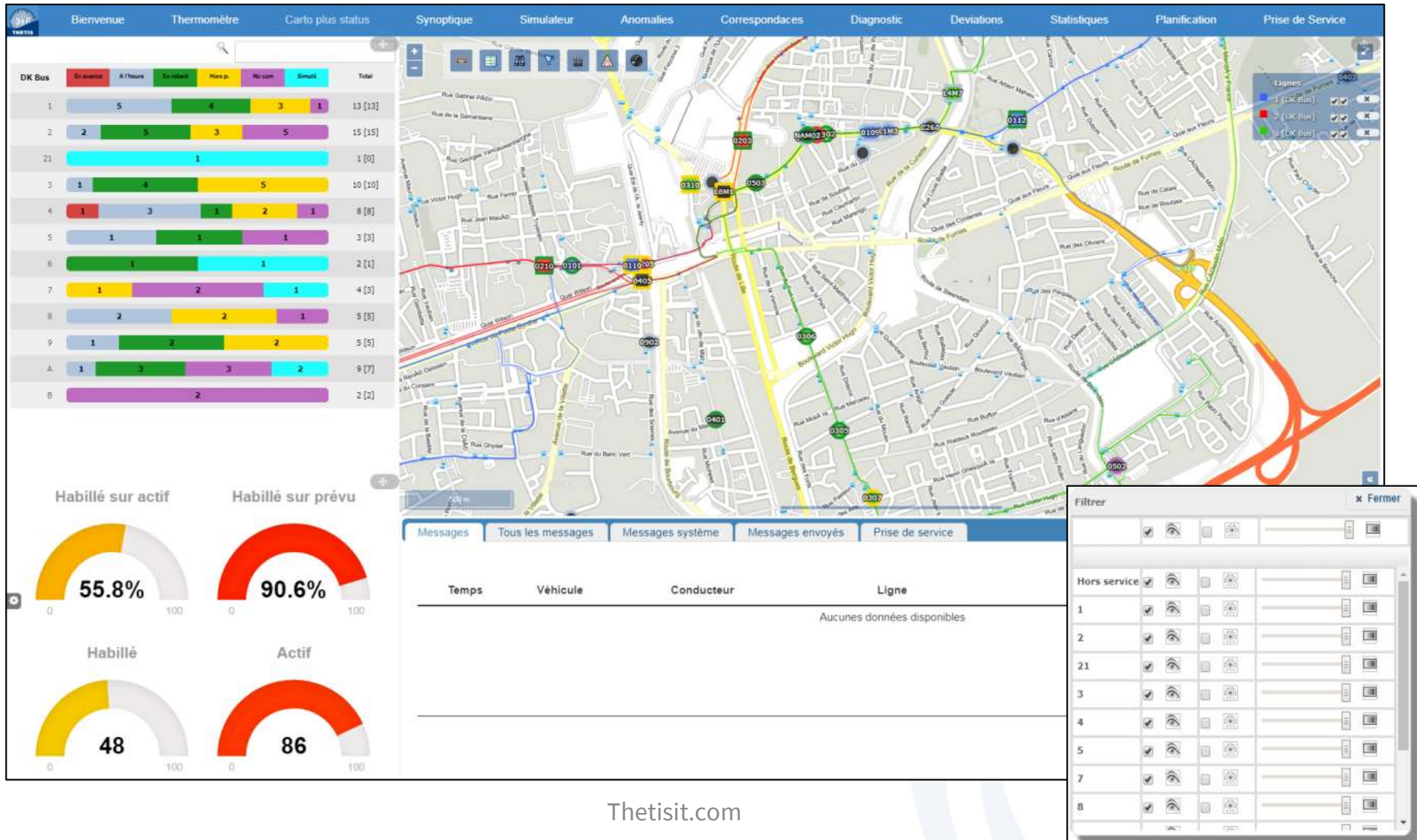
10A (ARRIVA MERSEYSIDE)

Graph espace/temps - C2 - C2x13 - C21D

Cartography functions

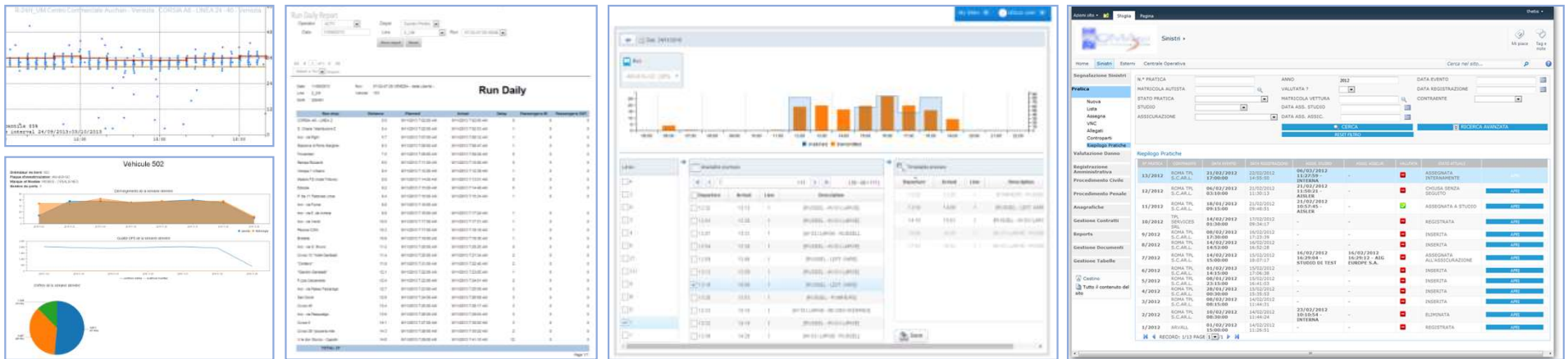
→ Locate vehicles on interactive map (actual location / planned location)

→ GIS functions: search, track and trace vehicles, analyze by geographic area (geo-tracking)



Data analysis, utilities & reporting

PROCESSES SUPERVISION, DIAGNOSTIC, REPORTING AND DATA ANALYSIS



- Tabular and graphic reports
- KPI elaboration
- Complex matching algorithms
- Service certification

- Open data interfaces (DB, API, Web service)
- Data analysis through multi-dimensional array (BI)
- System components diagnostic

Data analysis (tool BI)

Cubi

CUBES_COUNTER

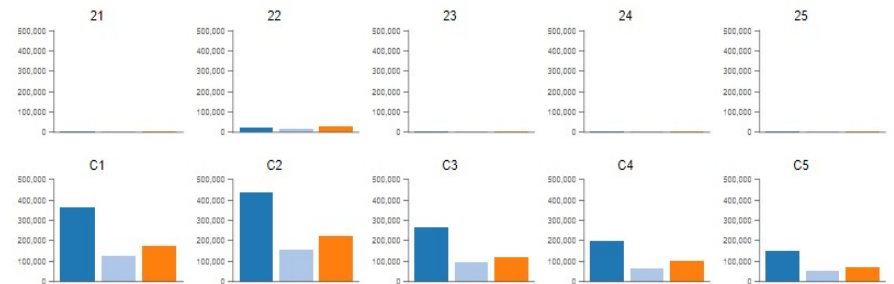
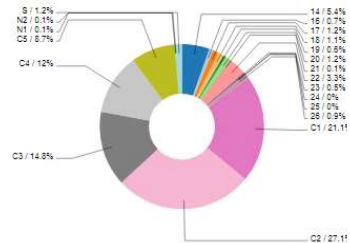
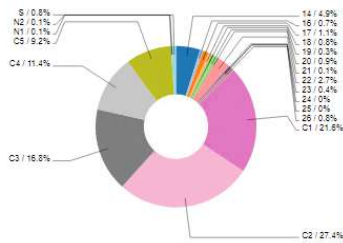
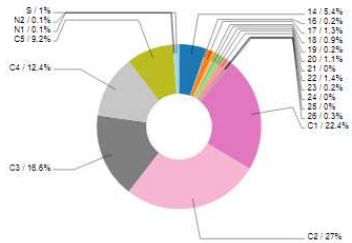
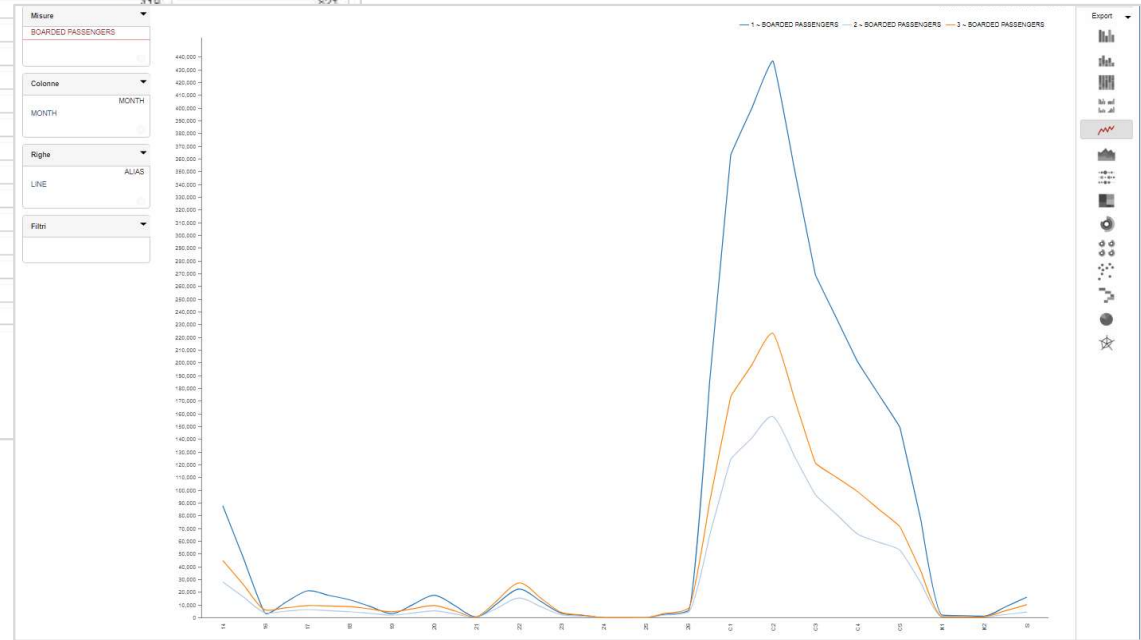
Misure: BOARDED PASSENGERS

Colonne: MONTH

Righe: LINE

Filtri:

MONTH - MONTH	1	2	3
LINE	BOARDED PASSENGERS	BOARDED PASSENGERS	BOARDED PASSENGERS
14	87850	28071	44854
18	3803	3931	8170
17	21071	8385	9541
18	14064	4715	8783
19	3162	1962	4568
20	17681	5434	9548
21	542	821	
22	22590		
23	3589		
24	101		
25	118		
26	5397		
C1	363017		
C2	436953		
C3	269380		
C4	200887		
C5	149283		
N1	1998		
N2	1307		
S	16140		



Public Information...

RTI-CCS

Open Data

API (e.g. TFL format)

SIRI (SM for RSL, ET for MDV)

GTFS
(planning data)

WEB Services

GTFS-RT

Service Provider / integrators

App Developer

Travel Planner

Stop Displays / Terminal displayboards / Mall

WebSite

Official App

Use case 2 – Dunkerque – KPI for O/D analysis



Dunkerque



- automatic passengers counting
- **real time service monitoring**
- service regulation (by timetable / by frequency)
- on board multimedia TFT
- traffic light priority
- tetra radio / 4G integration
- passenger information at stops

Main goals

- Measure passenger flows on board vehicles equipped with counting devices with the highest possible accuracy
- At the level of the central system, record the information collected in a manner consistent with the service actually provided.
- Show the measured data aggregated in different ways (by line / stop / day type / period / etc.)
- Provide extrapolation of the data collected for the non-surveyed runs, i.e. an estimate of the overall passenger flow for the whole fleet (equipped and non-equipped buses).

Statistics : analyze in detail the data

→ Reports are based on the comparison between scheduled and performed services

→ The application includes a standard set of statistical representation

RAPPORT Ligne par jour

Jour 14-06-2018
Ligne 1



Dir	Route	Voiture	Conducteur	Début de la course		Fin de la course		Arrêts	
				Planifié	Réelle	Planifié	Réelle	Planifié	Réelle
A	0521 - 0558 AVENUE DU LARGE - RUSSEL	506	440	05:21	05:21	05:58	05:58	45	38
A	0545 - 0621 AVENUE DU LARGE - RUSSEL	511	502	05:45	05:45	06:21	06:22	40	32
A	0600 - 0637 AVENUE DU LARGE - RUSSEL	510	352	06:00	06:01	06:37	06:40	45	38
A	0611 - 0647 AVENUE DU LARGE - RUSSEL	502	447	06:11	06:12	06:47	06:50	40	34
A	0627 - 0705 AVENUE DU LARGE - RUSSEL	406	139	06:27	06:26	07:05	07:11	45	34
A	0636 - 0714 AVENUE DU LARGE - RUSSEL	458	457	06:36	06:37	07:14	07:11	40	32

RAPPORT Ligne par course

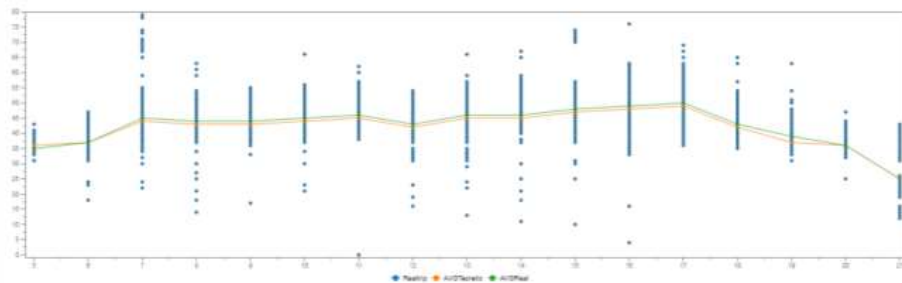
Jour 14-06-2018
Ligne 1
Course 0611 - 0647 AVENUE DU LARGE - RUSSEL
Voiture 502
Conducteur



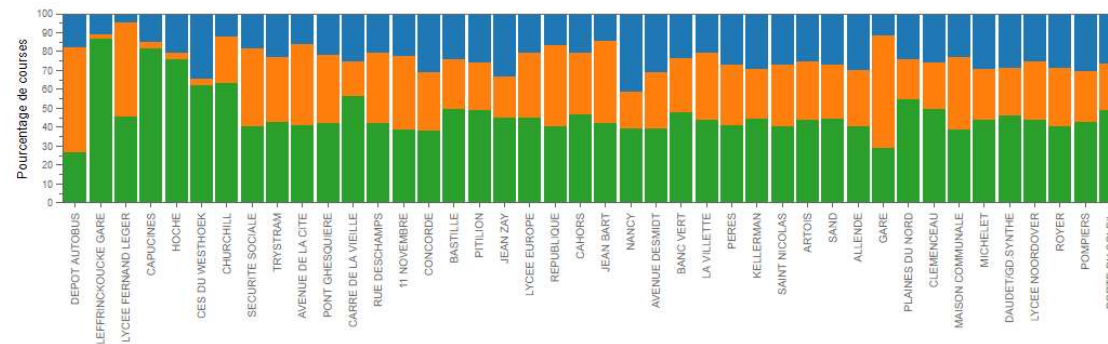
Arrêt	Distance (Km)	Planifié	Réelle	Retard/Avance (minutes)
AVENUE DU LARGE - LARG1A	0	06:11:00	06:12:34	2
LEFFRINCOUCKE GARE - LEFG1A	0,281	06:11:00	06:12:59	2
SALENGRO - SALE1A	0,468	06:12:00	06:13:39	2
VERDUN - VERD1A	0,631	06:12:00		0
LIEUTENANT - LIEU1A	1,063	06:13:00		0
TENTE VERTE - TENT1A	1,582	06:15:00	06:16:46	2
CANIS - CANI1A	1,849	06:15:00	06:17:27	2

Temps de parcours

Date de 2017-01-01 à 2017-06-19 (1) Ligne 1



De 2018-01-01 à 2018-06-12 Ligne 1



Arrêts

[En Retard] [En Avance] [À l'heure]

Details – occupancy level per line



Rapport A1

A1 RAPPORT



De 17-11-2016 A 28-11-2016 Tranche Horaire 00:00:00 - 23:59:59
 Ligne 2 Jour Catégorie Toutes les catégories
 Sens A Jour de la semaine Tous les jours

Qualité extrapolation		73.00%							
Arrêt	Données relevées par arrêt moyenne				Données extrapolées par arrêt moyenne				
	Nombre montees		Nombre descentes		Nombre montees		Nombre descentes		
AV DU LARGE	964	2	222	0	1 320	2	304	0	
AV MER/BD REUBL.	464	0	210	0	635	0	287	0	
BRAY DUNES PLAG	0	0	0	0	0	0	0	0	
FRONTIERE	680	3	19	0	931	4	26	0	
GARE D'ADINKERGUE	176	2	2	0	241	2	2	0	
HOPITAL MARITIME	77	0	6	0	105	0	8	0	
LES DUNES	131	0	17	0	179	0	23	0	
LIBERTE	22	2	0	0	30	2	0	0	
MANET	353	0	48	0	483	0	65	0	
GRANDE MARE	20	0	0	0	27	0	0	0	
DUINHOECK	2	0	1	0	2	0	1	0	
12E DIM.	142	0	6	0	194	0	8	0	
VOLTAIRE	577	1	228	0	790	1	312	0	
TROPIFLORA	9	0	1	0	12	0	1	0	

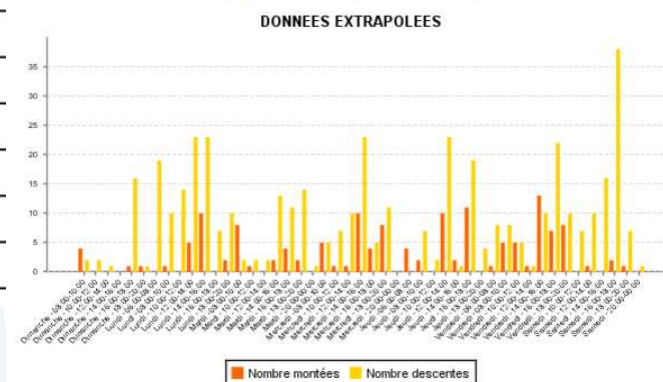
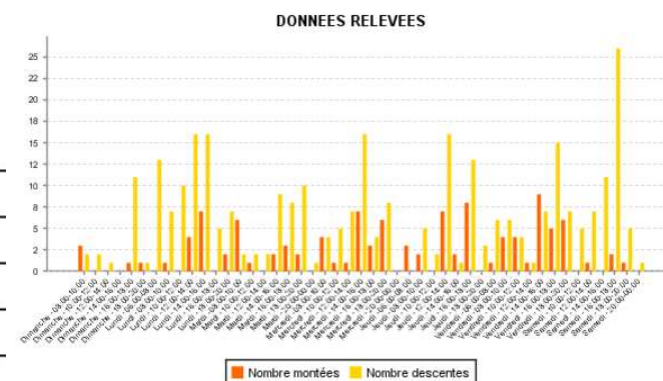
Rapport B1

B1 RAPPORT



De 15-11-2016 A 29-11-2016 Tranche horaire 00:00:00 - 23:59:59
 Ligne 2 Type de période Toutes les catégories
 Sens Ascendant Jour de la semaine Tous les jours

Qualité extrapolation		68.00%							
Jour de la semaine	Tranche horaire	Données relevées moyenne		Données extrapolées moyenne					
		Nombre montées	Nombre descentes	Nombre montées	Nombre descentes				
Dimanche	08:00-10:00	3	1	3	1	4	1	2	1
Dimanche	10:00-12:00	0	0	0	2	0	0	2	2
Dimanche	12:00-14:00	0	0	0	1	0	0	1	1
Dimanche	14:00-16:00	0	0	0	0	0	0	0	0
Dimanche	16:00-18:00	1	0	1	5	1	0	16	7
Dimanche	18:00-20:00	1	1	1	1	1	1	1	1
Lundi	06:00-08:00	0	0	0	6	0	0	19	8
Lundi	08:00-10:00	1	0	1	2	1	0	10	2
Lundi	10:00-12:00	0	0	0	2	0	0	14	2
Lundi	12:00-14:00	4	0	4	2	5	0	23	2
Lundi	14:00-16:00	7	1	7	2	10	1	23	2
Lundi	16:00-18:00	0	0	0	1	0	0	7	1



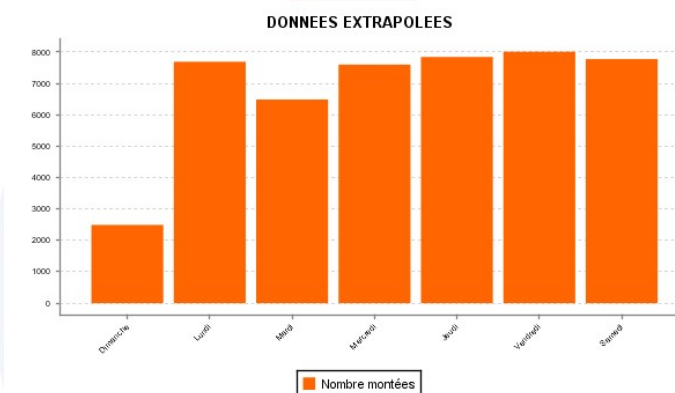
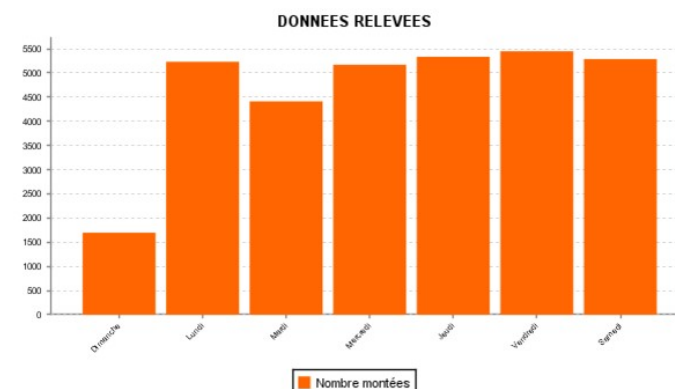
Rapport C1

C1 RAPPORT



De 15-11-2016 A 29-11-2016 Tranche horaire 00:00:00 - 23:59:59
 Ligne 2 Type de période Toutes les catégories
 Sens Ascendant Jour de la semaine Tous les jours

Qualité extrapolation		68.00%			
Jour de la semaine	Type de période	Données relevées moyenne		Données extrapolées moyenne	
		Nombre montées		Nombre montées	
Dimanche	Hors vacances scolaires	1,696	848	2,494	1,247
Lundi	Hors vacances scolaires	5,231	2,615	7,692	3,845
Mardi	Hors vacances scolaires	4,412	2,206	6,488	3,244
Mercredi	Hors vacances scolaires	5,170	2,585	7,602	3,801
Jeudi	Hors vacances scolaires	5,334	2,667	7,844	3,922
Vendredi	Hors vacances scolaires	5,449	2,724	8,013	4,005
Samedi	Hors vacances scolaires	5,288	2,644	7,776	3,888
Total		32,580		47,909	



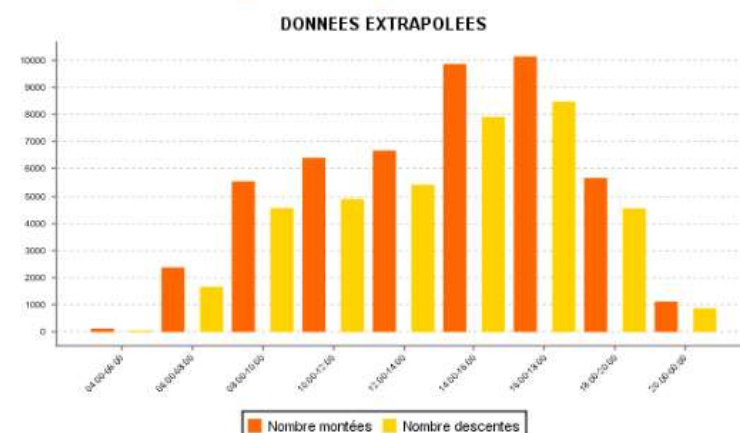
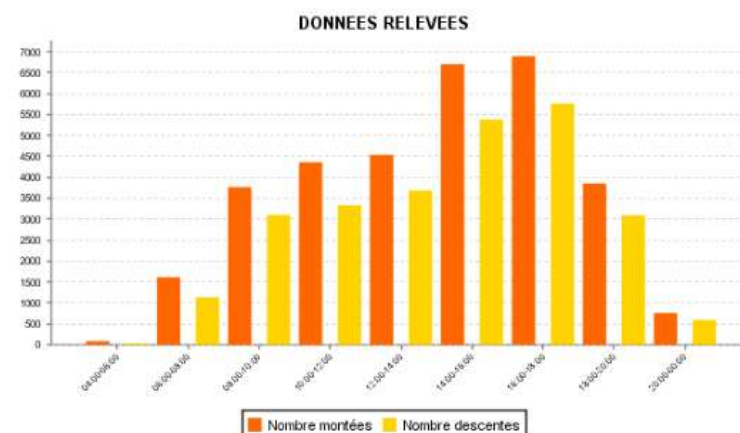
Rapport C2

C2 RAPPORT

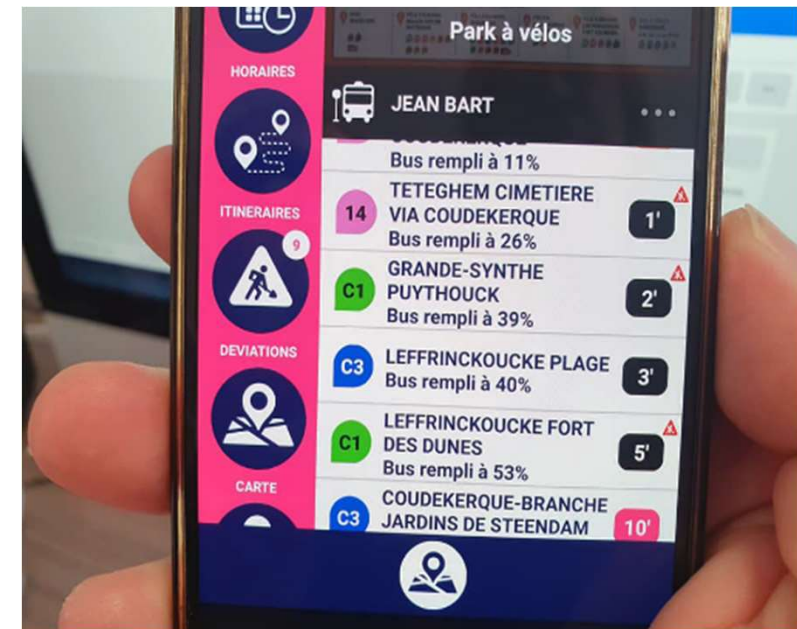
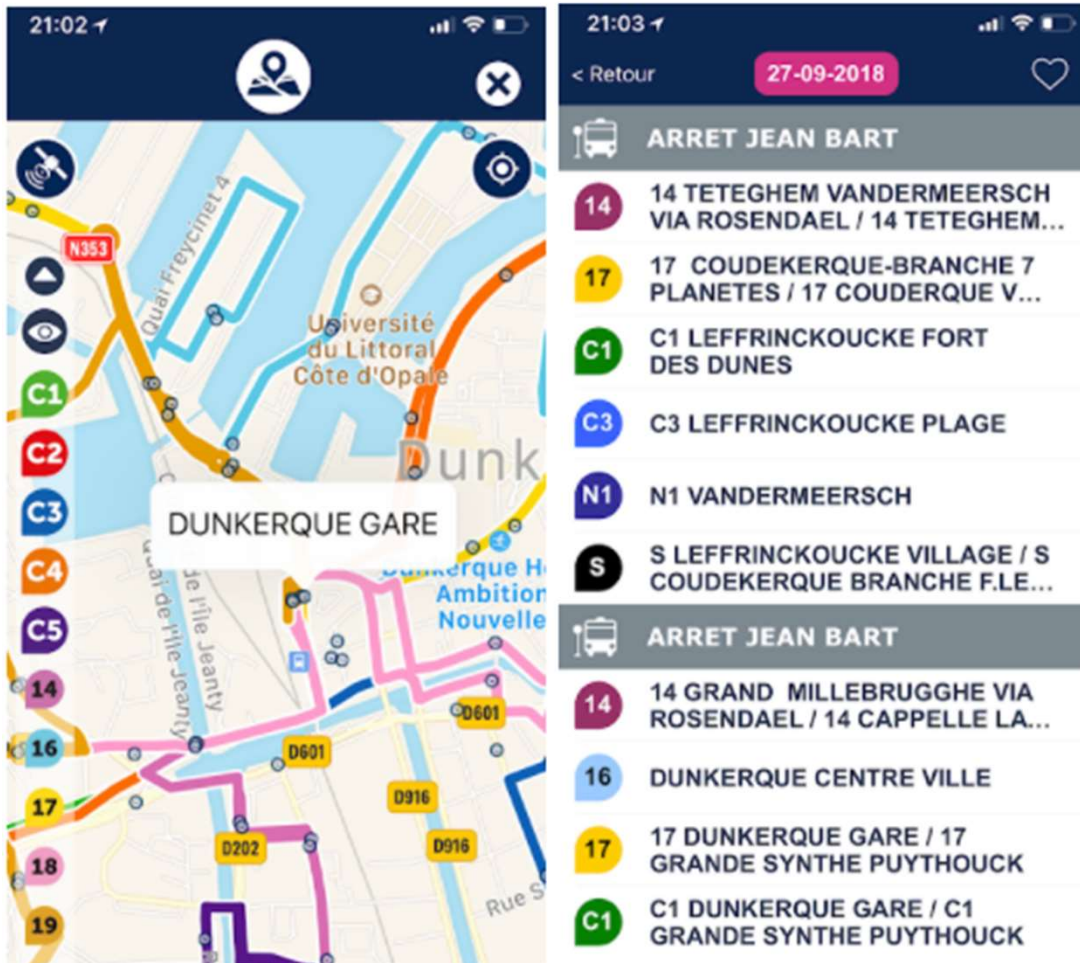


De 15-11-2016 A 29-11-2016 Tranche horaire 00:00:00 - 23:59:59
 Ligne 2 Type de période Toutes les catégories
 Sens Ascendant Jour de la semaine Tous les jours

Qualité extrapolation		68.00%							
Tranche horaire	Données relevées moyenne				Données extrapolées moyenne				
	Nombre montées	Nombre descentes	Nombre montées	Nombre descentes	Nombre montées	Nombre descentes	Nombre montées	Nombre descentes	
04:00-06:00	89	1	35	0	130	1	51	0	
06:00-08:00	1,614	1	1,132	1	2373	1	1664	1	
08:00-10:00	3,767	2	3,101	1	5539	2	4560	1	
10:00-12:00	4,359	2	3,330	2	6410	2	4897	2	
12:00-14:00	4,539	2	3,685	2	6675	2	5419	2	
14:00-16:00	6,703	3	5,380	2	9857	4	7911	2	
16:00-18:00	6,893	3	5,759	2	10136	4	8469	2	
18:00-20:00	3,854	2	3,095	1	5667	2	4551	1	
20:00-00:00	762	1	591	1	1120	1	869	1	
Total	32,580		26,108		19		38,391		



Infomobility on smartphone and level of occupation





Thank you for your consideration

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