

**The Overview brings about the Success:
modern Intermodal Transport Control Systems (ITCS)**

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Demands on Local Public Transport - An Irresolvable Conflict?

From the point of view of the passenger

Punctuality

Reliability

Security

**Ease of usage
(information!)**

Flexibility

Comfort

Guaranteed connections

Favorably priced



From the point of view of the transport authority

Optimum use of vehicle fleet

Effective use of personnel

Efficient service and maintenance program

Flexible fare structures

Optimized, flexible planning

Integration possibilities for multiple operators

How can ITCS help? (1)

Objectives

- Punctuality

- Reliability

- Security



ITCS helps with

- Shorter, more equal journey times through automatic traffic light preemption,
- Display of schedule deviation to the driver
- Immediate detection of operational disturbances in the control centre and computer-based assistance for counter measures
- High-speed voice link (emergency and priority request-to-talk calls)
- Video monitoring in the vehicle



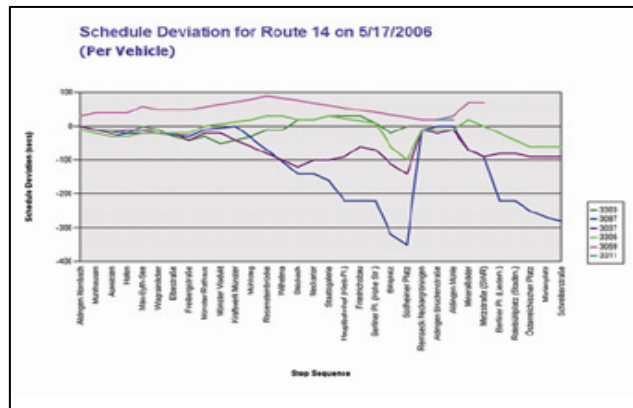
How can ITCS help? (2)

Objectives

- Ease of usage, information

- Flexibility

- Guaranteed connections

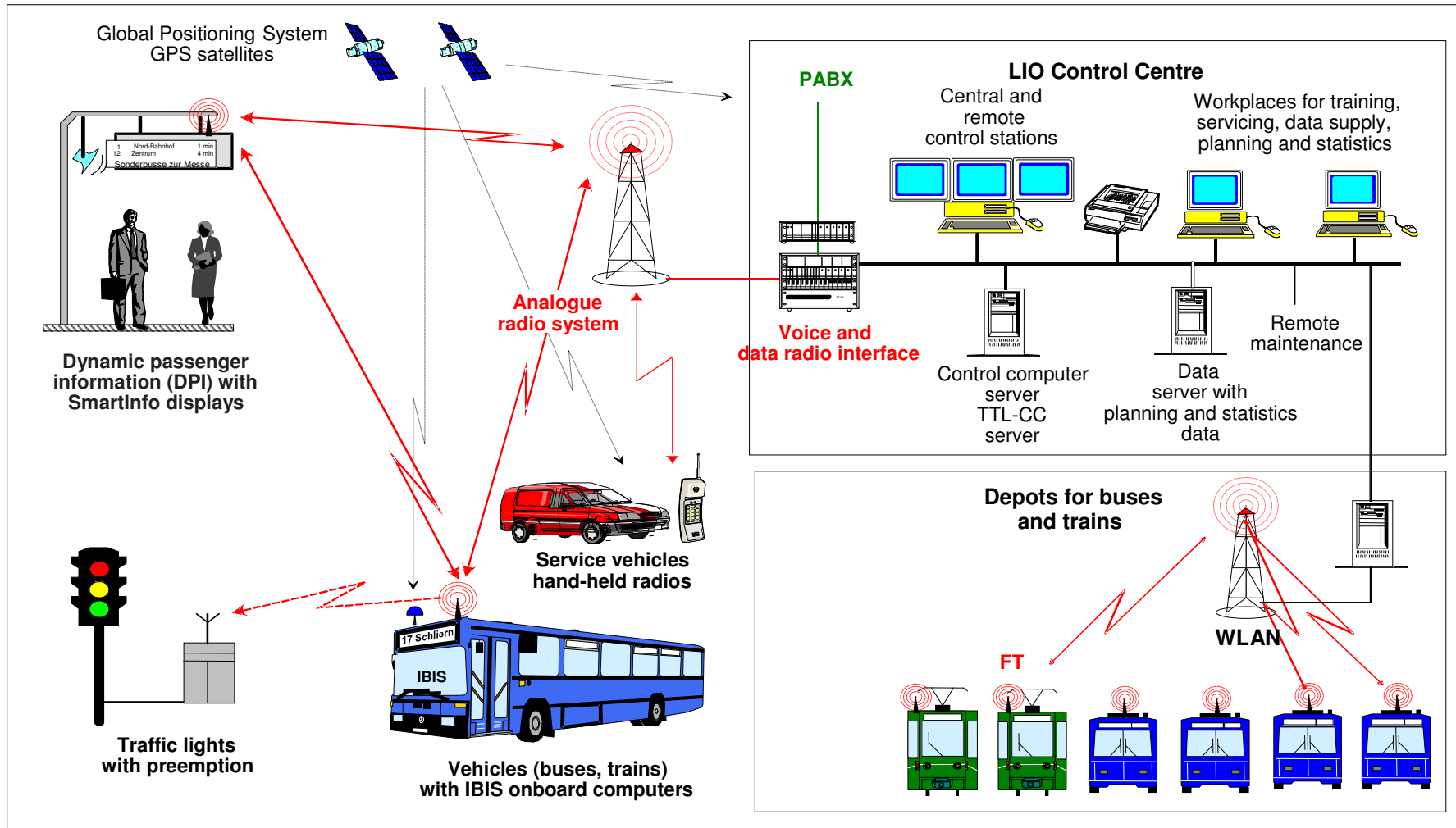


ITCS helps with

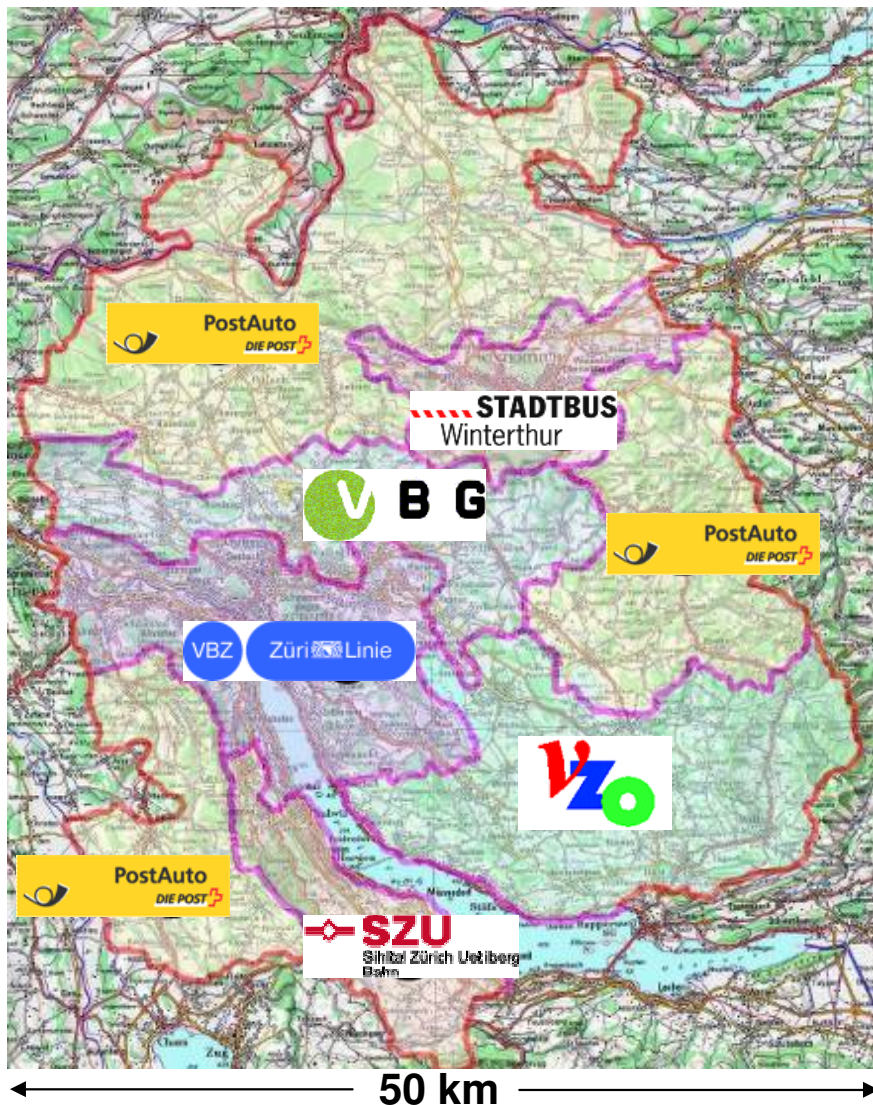
- Schedule information via internet and cell phone
- Real-time information at the stops (DPI) and/or via cell phone
- Improved planning through optimization
- Integrated data system
- Automatic transfer protection with ITCS



Typical ITCS-System: the VICOS-LIO from Continental



Zurich: an ITCS-System for the whole greater Zurich Area



An exemplary solution: the ITCS of the biggest common urban public transport system in Switzerland

- ▶ 1 ITCS-system for all the 46 urban and regional operating public transport companies in the greater Zurich area
- ▶ 6 market-responsible companies are operating 4 control centres
- ▶ about 1'100 vehicles
- ▶ more than 300 displays on stops
- ▶ realtime passenger information in all vehicles, transfer informations included
- ▶ connected with the passenger information system CUS of Swiss Federal Railways

ITCS control center

LIO control center: the heart of VICOS-LIO

- ▶ Dispatchers use the functions of the compound system, e.g. representation of the actual positions of the vehicles, calculation and display of schedule deviations, transmission of instructions from the control center to the vehicles
- ▶ Sustained improvement in the efficiency of control center staff
- ▶ Functionality and user interface of the screen workplaces largely open to customization

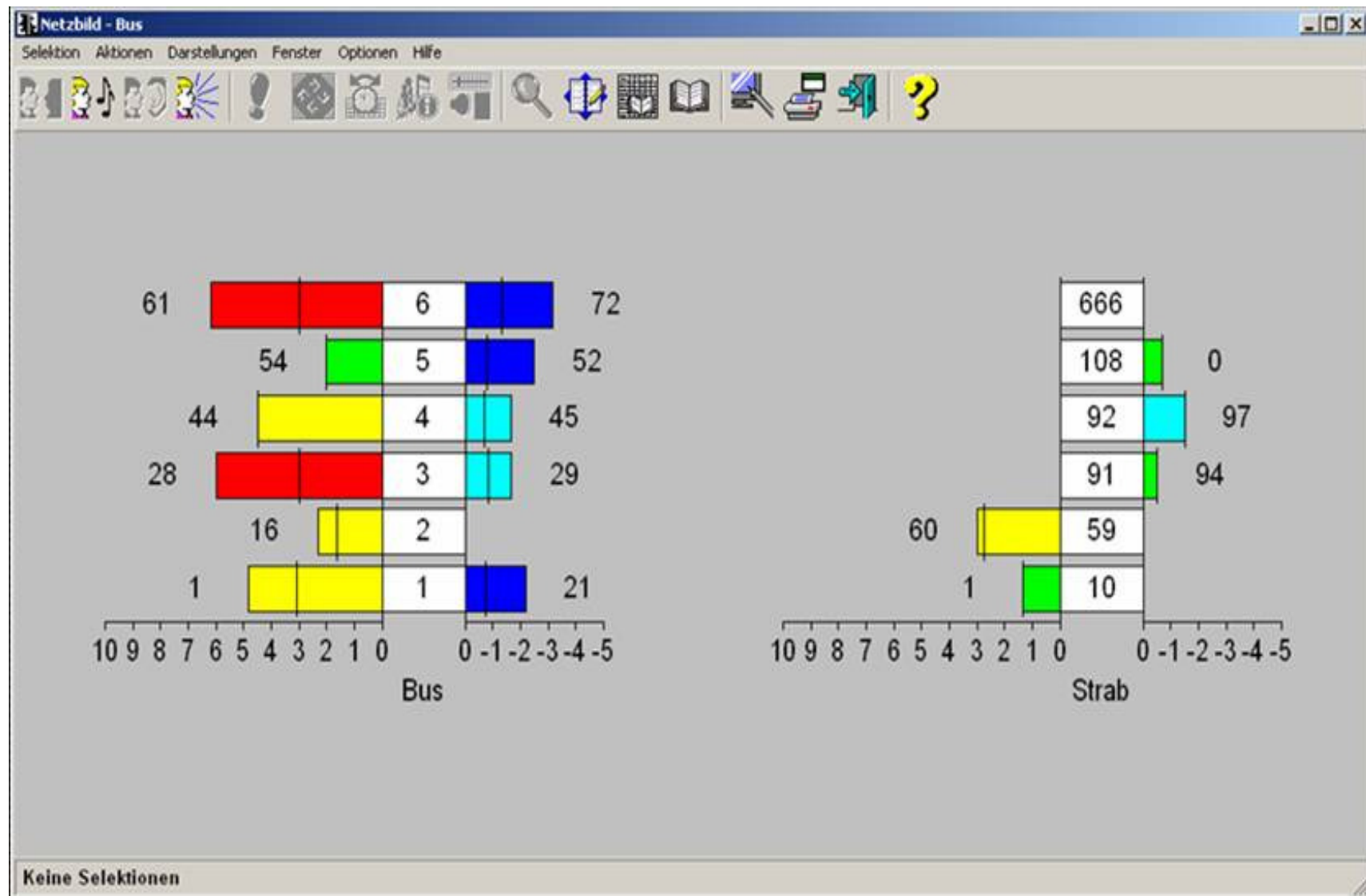


VICOS-LIO Eventtable and Vehicletable

Event Queue									
Selektion Aktionen Darstellungen Fenster Optionen Hilfe									
Vehicle	Event	Action	Status	Position	Direction	BG	TimetabDev.	LayoverTime	
1 2280 (4/4)	Unfall	Gespräch	Ist	Anger + 336m	Rieth	-	+3:10	+9:10	
2 2303 (10/0)	Fz 2303 verspätet	Quittung	Ist	Grubenstraße + 31m	Gispersleben	1	-3:20	+2:40	
3 2259 (10/6)	Fz 2259 verspätet	Quittung	Ist	Grubenstraße + 0m	Gispersleben	-	-2:30	+3:30	
4 2282 (4/4)	Fz 2282 verfrüht	Weisung	Ist	Rieth + 113m	Thüringenhalle	-	+2:00	+6:00	
5 2313 (1/2)	Fz 2313 verfrüht	Weisung	Ist	Anger + 68m	Grubenstraße	-	+0:20	+16:20	
6 2281 (4/43)	Fz 2281 verfrüht	Weisung	Ist	Riethstraße + 45m	Rieth	-	+0:40	+6:40	
7 307 (108/0)	Fz 2307 verfrüht abgefahren	Quittung	Ist	MÜHLENKAMP/HOFWEG + 3	BORGWEG	-	+2:50	+18:50	
8 2273 (6/6)									

Kurstabelle - alle Fahrzeuge											
Selektion Aktionen Darstellungen Fenster Optionen Hilfe											
Fahrzeug	<Linie	Status	Position	Endhaltestelle	Zieltext	Fahrplanabweichung	Fahrplanabweichung effektiv	Wendezeitsald	Anzahl	Letztes Vorkommnis	
1 2314	1/1	Ist	MW + 84m	HAFR		-0:20	-0:20	+3:40		0:48:16 Fz 2314 zu kleines Intervall	
2 2313	1/2	Ist	GE + 129m	HAFR		+0:20	+0:20	+4:20		0:56:10 Fz 2313 zu kleines Intervall	
3 2312	1/3	Ist	GRUS + 0m	GRUS		0:00	-5:40	+10:20		0:22:57 Fz 2312 zu kleines Intervall	
4 2311	1/4	Ist	GRUS + 0m	GRUS		0:00	+3:20	+19:20		0:51:22 Fz 2311 zu kleines Intervall	
5 2310	1/5	Ist	TK + 403m	GRUS		-3:40	-3:40	+12:20		0:56 Fz 2310 verspätet abgefahren	
6 2309	1/6	Ist	GRUS + 0m	GRUS		+2:10	+2:10	+18:10		0:58:59 Fz 2309 verspätet abgefahren	
7 2308	1/7	Ist	HAFR + 0m	HAFR		0:00	-4:00	0:00		0:56:10 Fz 2308 zu grosses Intervall	
8 2304	1/20	Ist	GRUS + 0m	GRUS		0:00	+0:50	+4:20		0:47:56 Fz 2304 zu kleines Intervall	
9 2303	1/21	Ist	DRS + 74m	HAFR		-4:00	-4:00	0:00		0:11:56:10 Fz 2303 verspätet	
10 2300	2/11	Ist	EGA + 0m	EGA		0:00	-1:10	+9:50		0:45:10 Fz 2300 zu kleines Intervall	
11 2299	2/12	Ist	AT + 329m	EGA		-5:50	-5:50	+5:10		0:46 Fz 2299 verspätet abgefahren	

Dispatcher Overview



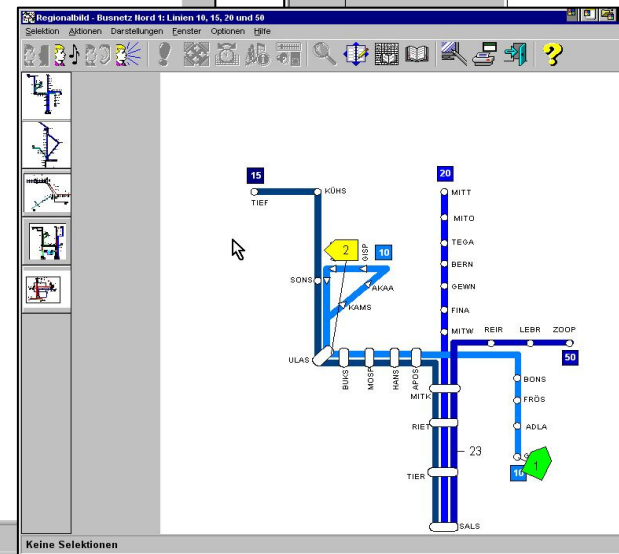
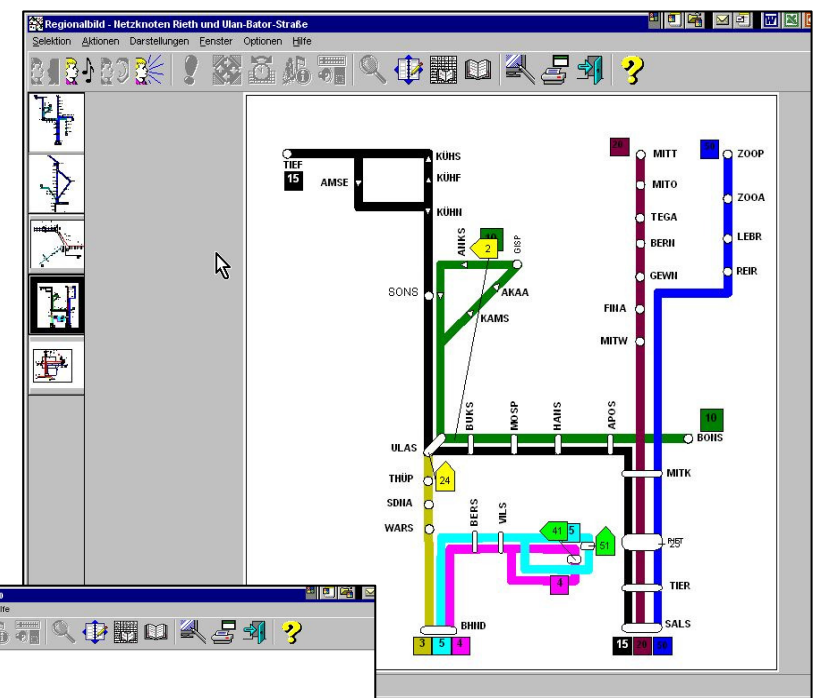
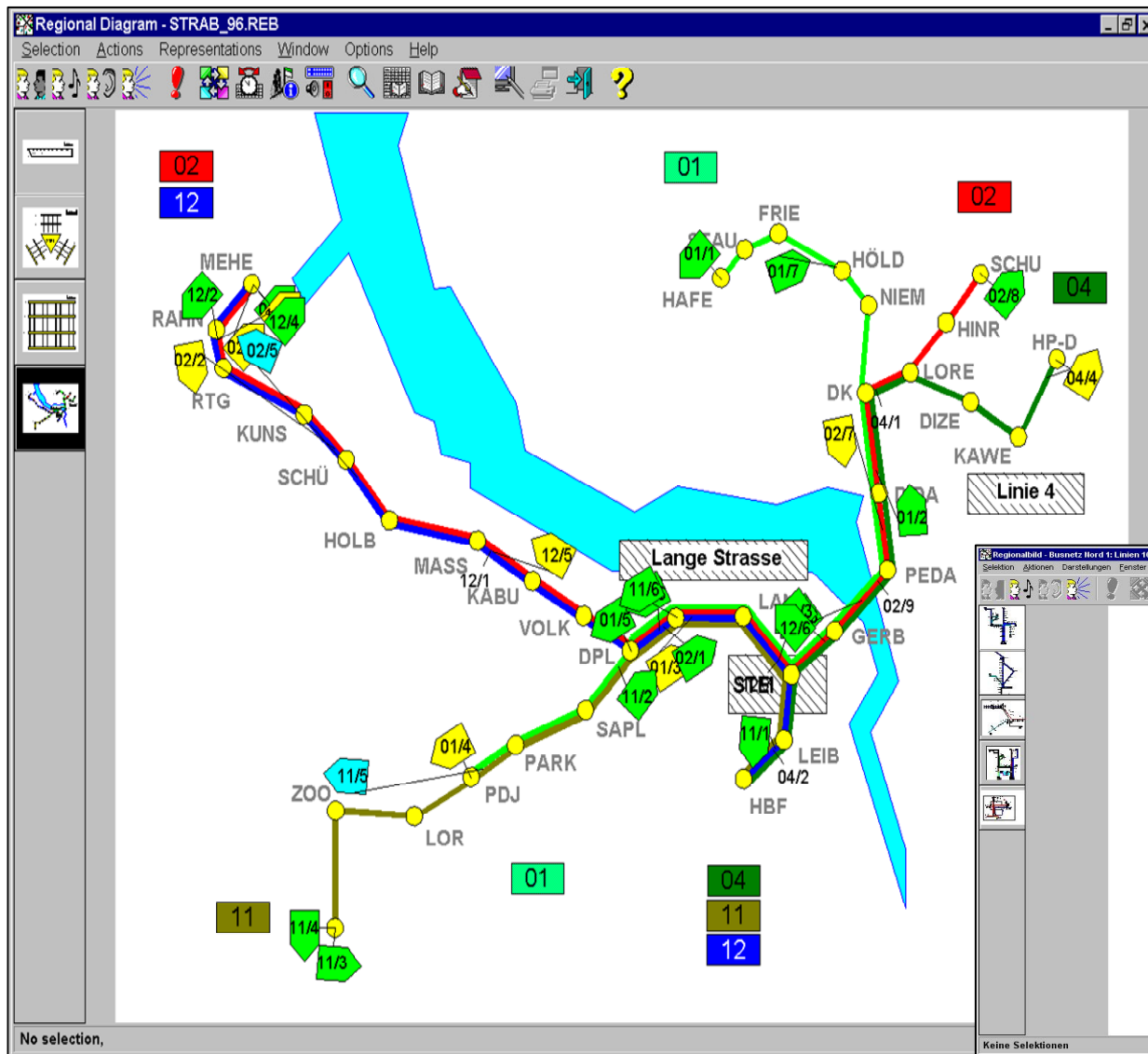
Route Diagram

The screenshot displays the 'Route Diagram General' software interface. The main window shows a route diagram with two vertical lines of stops. The left line includes stops like GRAHA, THENR, BOAR, CHALP, VALP, OLCHI, STPFR, and ETRHC. The right line includes stops like PALM, NORPS, NTRST, LAUDY, CHODD, PARKS, FROCH, STBAR, LIDL, WEGAR, COMCT, STDAY, STCUT, VORER, and BRAND. A pop-up window titled 'Display unit details for Whitehawk Garage (so...)' shows a table of departures:

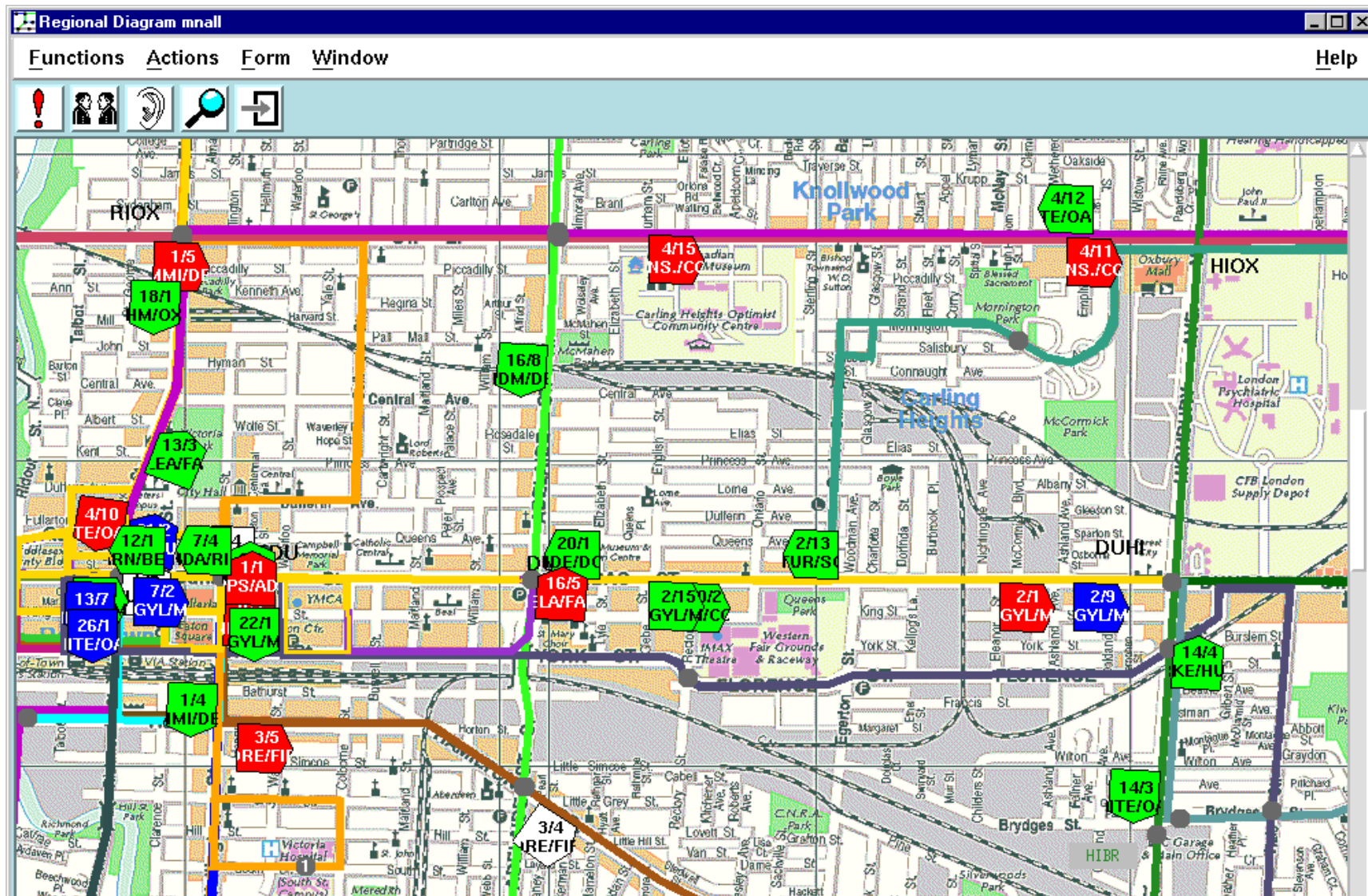
Route	Destination	Departure
1	Graham Avenue	2'
1	Graham Avenue	6'
21	Brighton Marina	17:31

On the right side, the 'Linienbild' window shows a list of lines (1 to 155) and a corresponding list of stops. A yellow box highlights the stops: ULAS, THUP, SDNA, WARS, RIES, DONS, KLIN, BAUS, BEGS, WEBG, DOMP, NISM, ANGE, HABF, KOCS, TSCS, ARBA, KIND, SVZ, BLUS, AWIE, MELD, MELM, DROB, BUCB, INSO, and WIND. A yellow box also highlights the number 24 next to the stop list.

Regional Diagrams

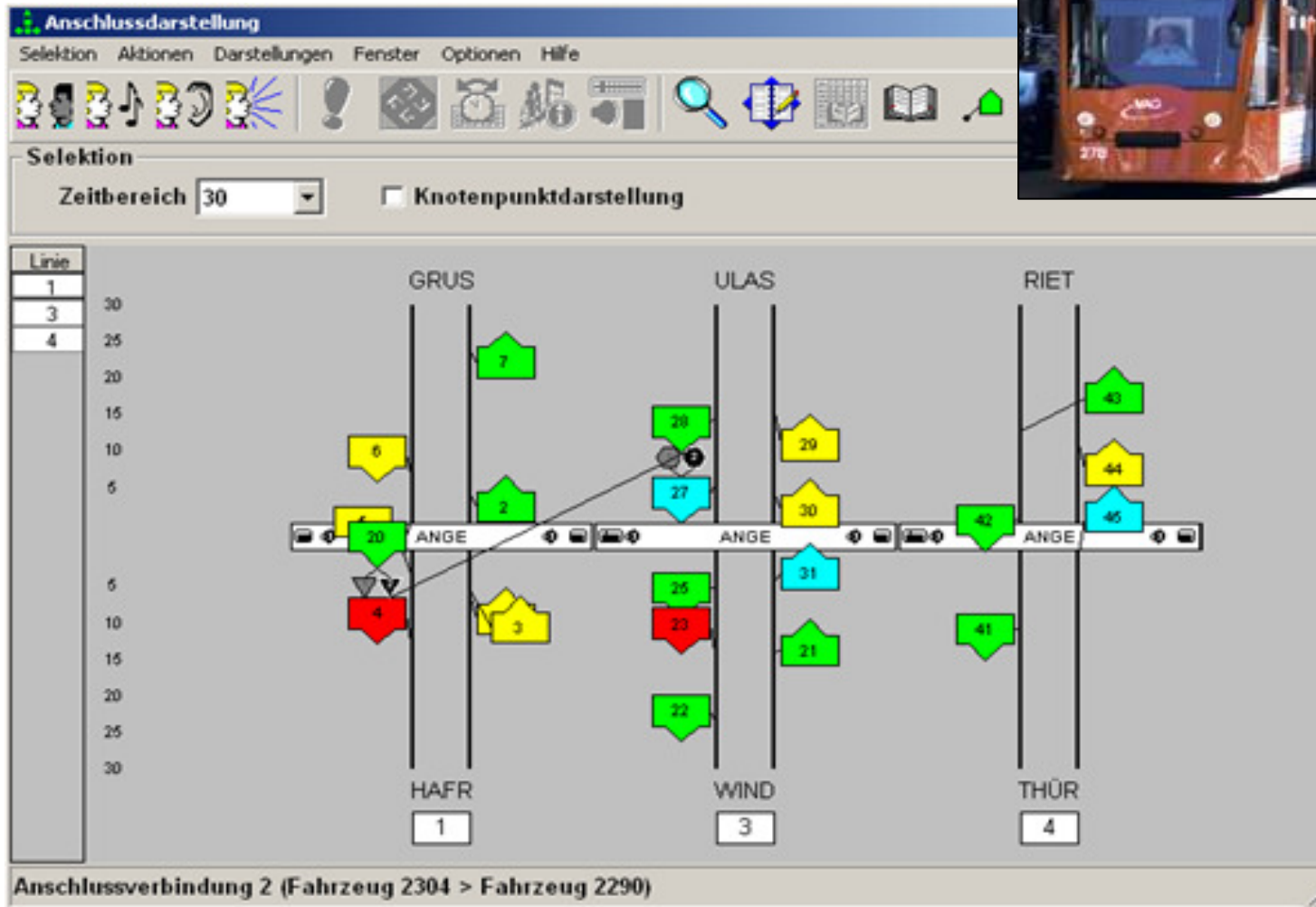


City Map (GIS)



ITCS systems

Transfer visualisation



Transfer Protection in ITCS

Automatically transfer protection:

1. ITCS is continuously watching all data supplied transfer connections
2. ITCS acts, if transfers wouldn't be hold:
3. Driver gets automatically an advice on his on-board-unit to wait for a certain transfer
4. DPI shows the expected departure, included the calculated delay from the waiting time on transfer (here and on all following stations)



Anschlußsicherung

Selektion Aktionen Darstellungen Fenster Optionen Hilfe

Nr.	Überw	Abb. HS	Umlauf	Zu. Linie	Umlauf	Abb. Linie	Abbringer	Abfahrt	Auto	Man.	Min.	Status	Vorgab
3	☒	HAFR	1003531	91/94	100249	1/4	2311 1/4 -2.3	10:14:00 (10:13:00)	1:30	3:00	1:00 (1:00)	gehalten	warten
1	☒	ANGE	2000	1/20	1001129	3/27	2290 3/27 -6	10:17:00 (10:16:00)	2:00	5:00	1:00 (1:00)	gewährleistet	warten
2	☒	ANGE	2000	1/20	1001129	3/27	2290 3/27 -6	10:17:00 (10:16:00)	2:00	5:00	1:00 (17:00)	gewährleistet	warten
4	☒	HAFR	100294	1/5	1003531	91/94	2262 91/94 +	10:23:00 (10:22:00)	2:30	5:00	1:00 (1:00)	gewährleistet	warten
9	☒	ULAS	1001219	3/30	760	10/0	2302 10/0 +1	10:25:00 (10:24:00)	2:00	3:30	0:30 (0:30)	möglich (mar)	warten
5	☒	ULAS	1001219	3/30	7600	10/4		10:28:00 (-)	2:00	3:30	0:30 (-)	unbekannt	warten
8	☒	HAFR	1003606	92/97	100352	1/7		10:44:00 (-)	1:30	3:00	1:00 (-)	unbekannt	warten
7	☒	ULAS	1000923	3/22	1003616	10/1		10:58:00 (-)	2:00	3:30	0:30 (-)	unbekannt	warten
10	☒	HAFR	1003531	91/94	100183	1/3		11:14:00 (-)	1:30	3:00	1:00 (-)	unbekannt	warten

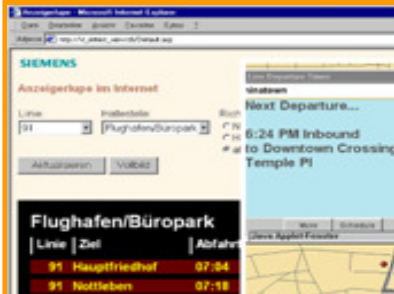
Haltestelle ANGE

Anzahl Zeilen: 9

Comprehensive passenger information

Pre-Trip

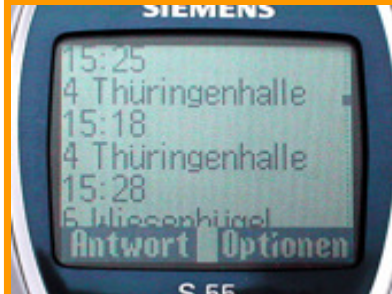
At work or at home



Real-time information via the Internet



On the way to the stop



Real-time information via cellular phone (text messages)



Near-Trip

At the stop



Real-time information on electronic display panel (SmartInfo) and by means of audio announcements



On-Trip

On the bus/ in the tram



Real-time information via a screen (MFD) and by means of audio announcements



Dynamic Passenger Information on Stops

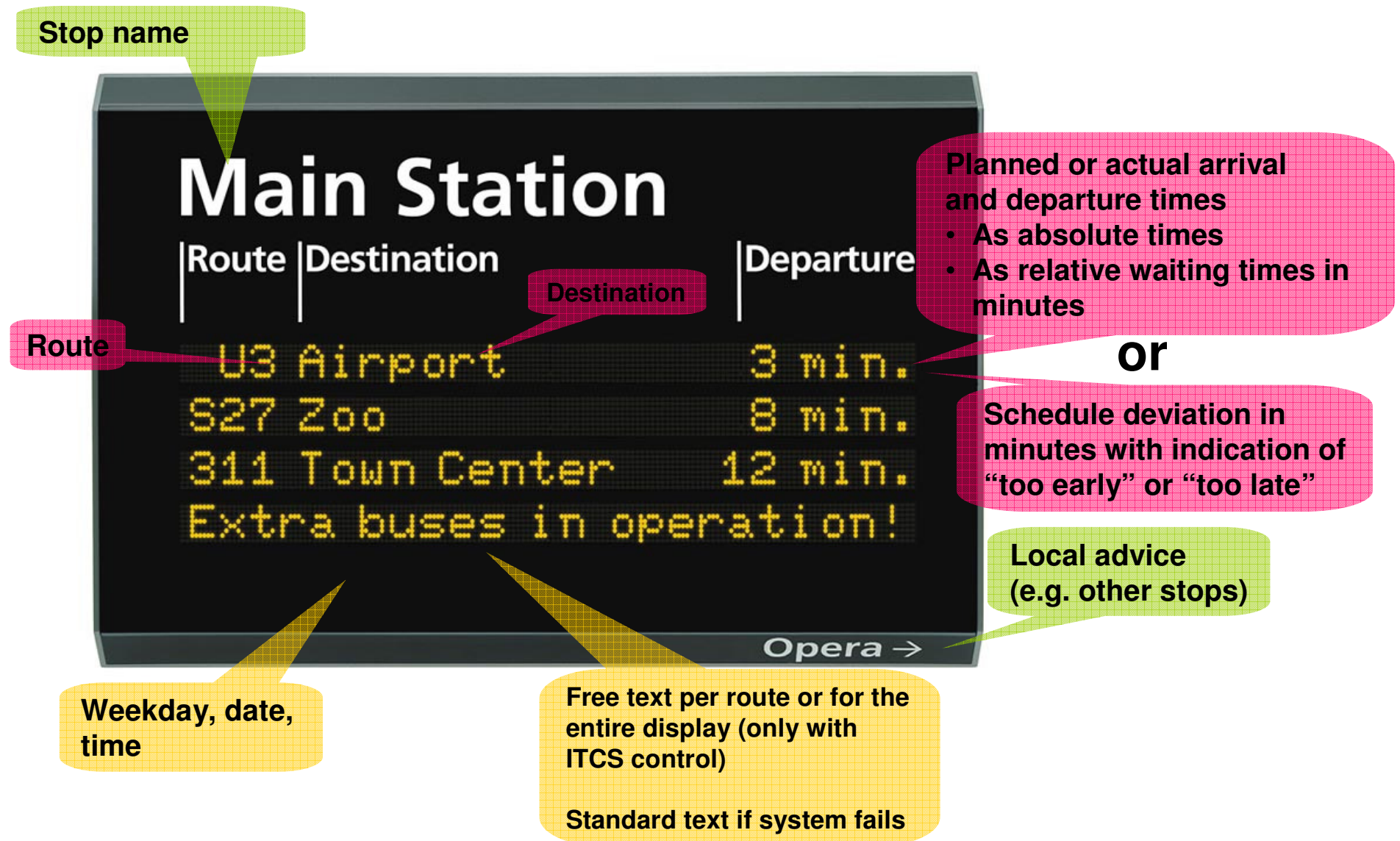


Dynamic passenger information
in real time

- Our solution at the stops: [Smartinfo](#) > standard in many European cities
- Zurich: < new Generation [Smartinfo](#) G4
- [Improving the quality](#) of local public transport with DPI
- [Passengers feel: public transport is always on time](#)



Our Solution at the Stop: Smartinfo



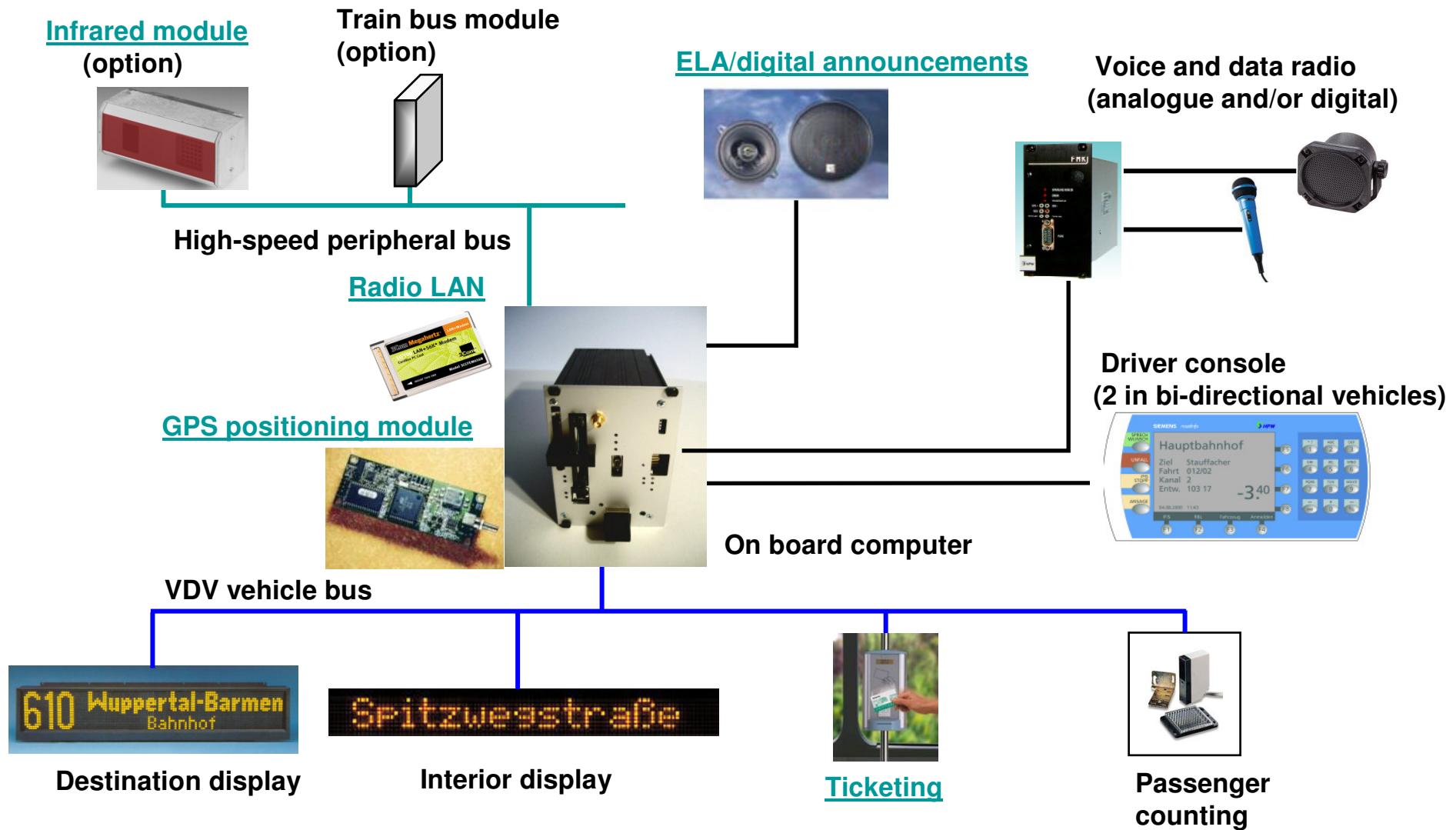
Comprehensive passenger information

MFD: the multi-functional display in the vehicle

- ▶ Representation of all information from the onboard computer, control center and multi-media sources
- ▶ Eye-catching design
- ▶ Opens up the possibility of partnerships with the tourist industry and/or advertising companies



Typical Vehicle Equipment for an ITCS



Driver Terminals for IBISplus

- ▶ Backlit keyboard and display
- ▶ Intuitive, fully graphic user interface
- ▶ Customized key settings
- ▶ Display of schedule deviation, time and date
- ▶ Operation of the announcing device
- ▶ Touch version with customized face design



Traffic Light Priority

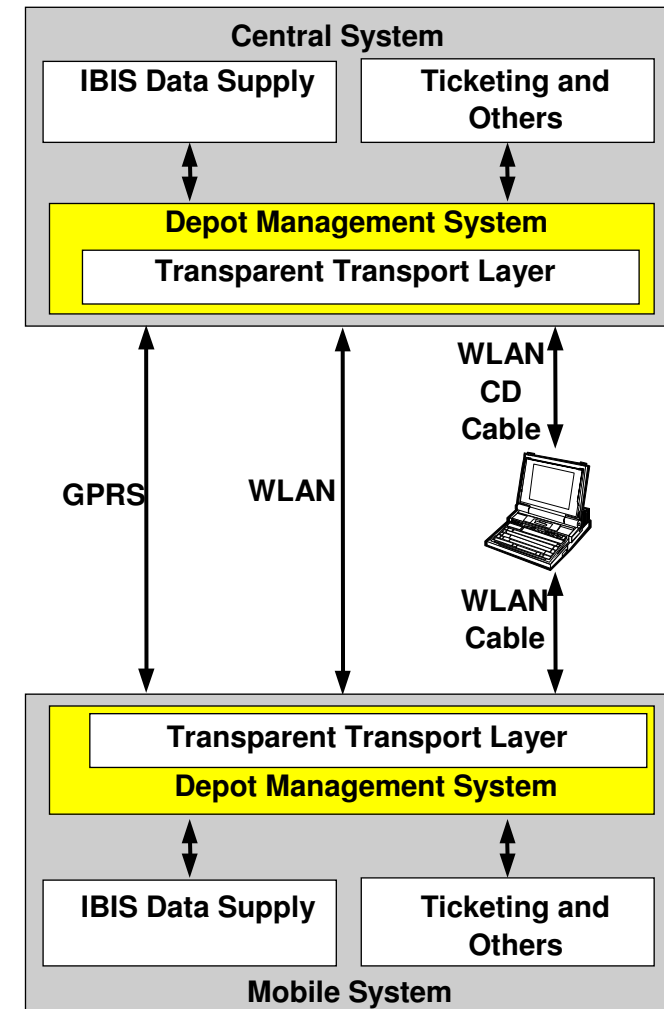
- ▶ Shorter journey times, as there is no longer any need to wait at traffic lights
- ▶ Increases punctuality and regularity
- ▶ Possible reduction in vehicle numbers at peak times by a shortening of the block times



Depot Data Management System



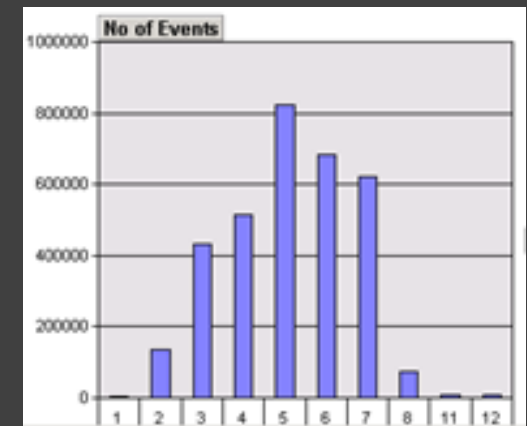
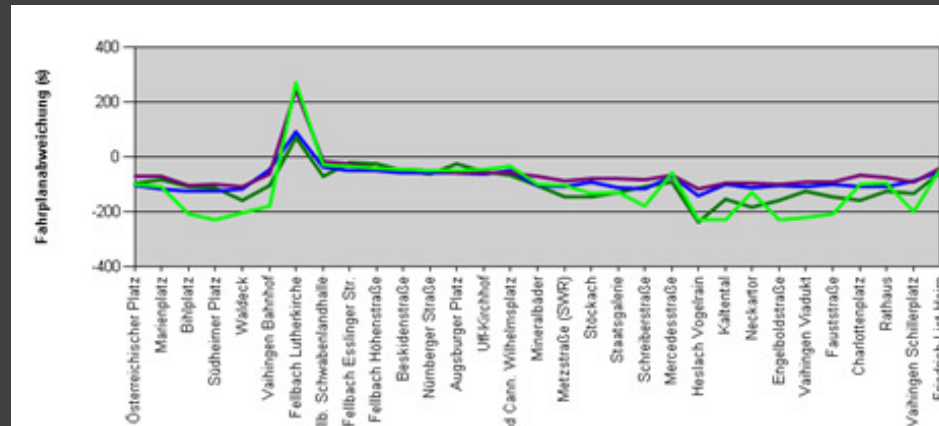
- ▶ Data management:
 - ▶ Data supply
 - ▶ Data monitoring
- ▶ Transparent
Medium changes – function remains
- ▶ Application-independent data,
transmitter and receiver are neutral
- ▶ Parallel use of communication media



ITCS Systems: using the Data for Analysis to improve Quality

VICOS-LIO Business Intelligence

- ▶ Enabling managerial decisions
- ▶ Validation of operational performance
- ▶ Visualisation of data
- ▶ Improvement of planning and processes
- ▶ Converting data into knowledge



We make Public Transport Systems more attractive

- ▶ **ITCS systems**
for improved punctuality, better connection possibilities, greater security
- ▶ **Comprehensive passenger information**
for information in real time at the stop, at home and on route
- ▶ **Seamless integration into fare management**
for comfortable, cashless travel



Public Transport Management by Continental



Congestion

Why Continental?

- ▶ Continental provides innovative technology to seamlessly integrate different transportation modes into one coherent information base, resulting in...

Benefits for the passenger:

- ▶ Better coordinated and more available connections
- ▶ Significant travel time reduction;
- ▶ Topical passenger information available through the Internet, via mobile phones, on signs at stops, on onboard displays.

Positive effects for the urban community:

- ▶ Sustainably more attractive public transport;
- ▶ Increased ridership;
- ▶ Significant reduction of individual traffic in the city center.

Continental reference installations:

- ▶ More than 100 fully equipped systems on three continents.

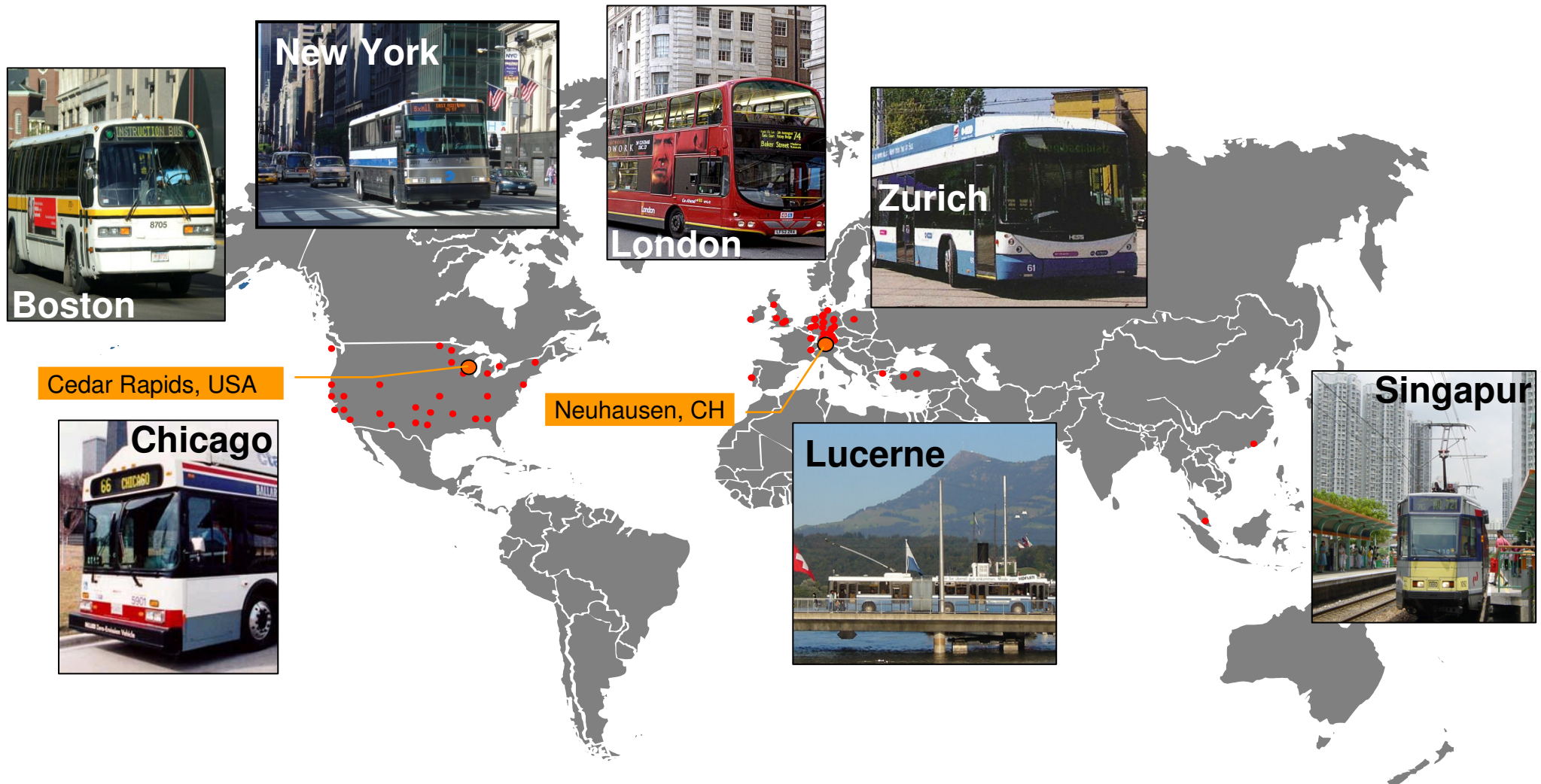


Connection



Coordination

Continental: 100 ITCS Systems in Operation worldwide



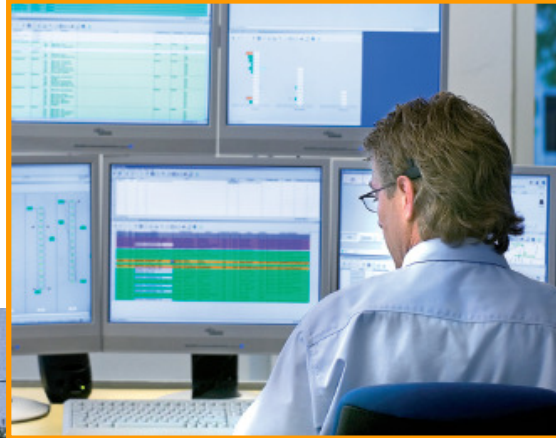
Continental: Comprehensive experience



- ▶ Seamlessly integrating vehicle control, ticketing and passenger information;
- ▶ Delivering highly scalable systems for all fleet sizes ranging from 50 up to 8'000+ vehicles (London);
- ▶ Integrating all current digital radio systems;
- ▶ More than 500 ITCS experts worldwide;
- ▶ Proven track record: more than...
 - 200 customers worldwide;
 - 100 ITCS systems in operation;
 - 35'000 onboard units installed;
 - 3'000 electronic signs at stops.
- ▶ Solutions delivered comprise
 - the most comprehensive ITCS system ever (8'000 buses, 150 workstations);
 - the most accurate vehicle location in a complex urban environment;
 - the most sophisticated passenger information concept in public transport.

ITCS completes the trolleybus system, bringing more excellence

Winning the future together ...



... with our common
passion for mobility