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Solutions for Freight Transit Transport through Switzerland

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AIPCR VIA VITA PIARC
World Road Association

Rapp Trans

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- Starting Point
- Main Problems in Freight Transit Transport
- Implemented Solutions and Experiences
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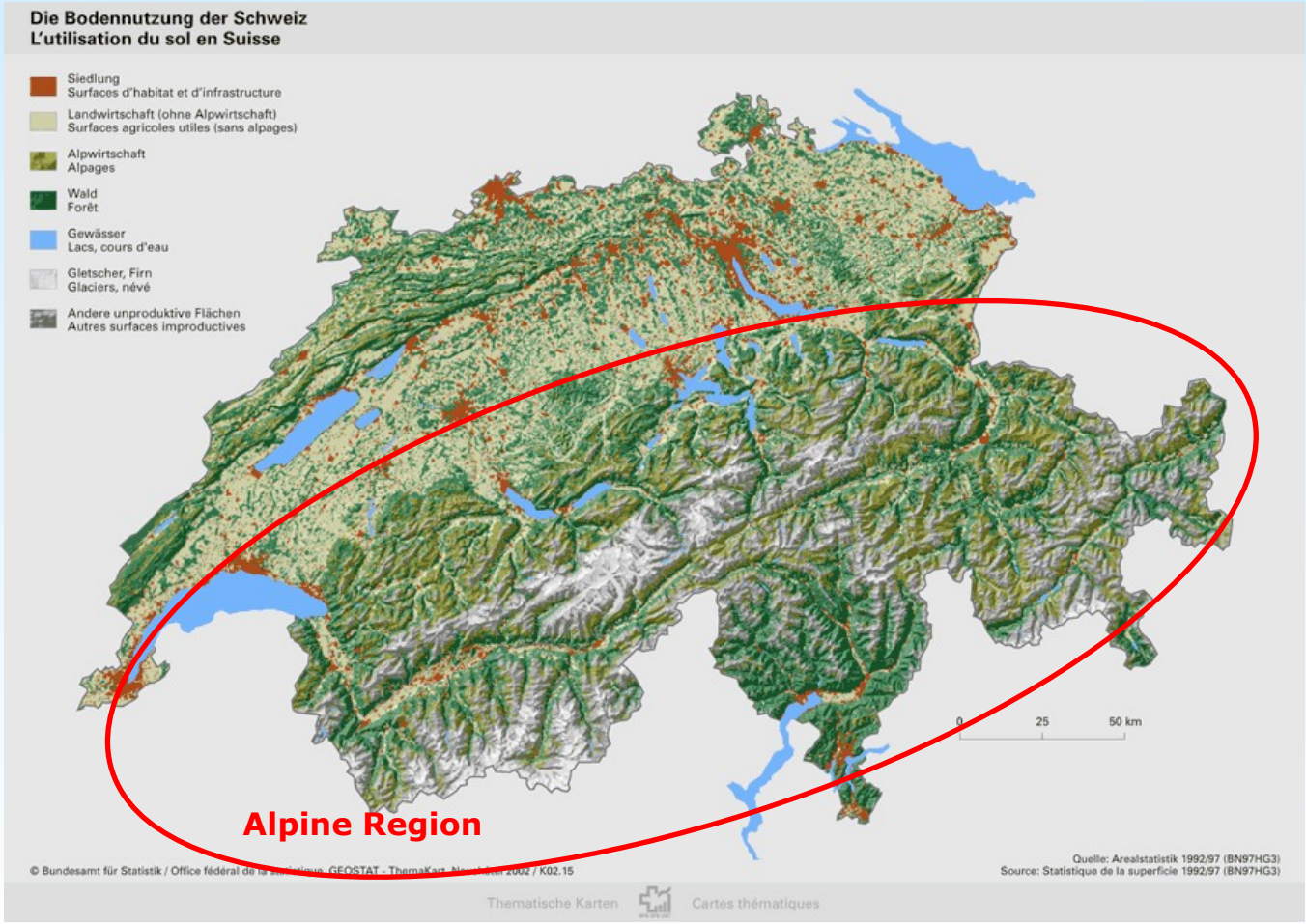
- Conclusions

Key figures of Switzerland

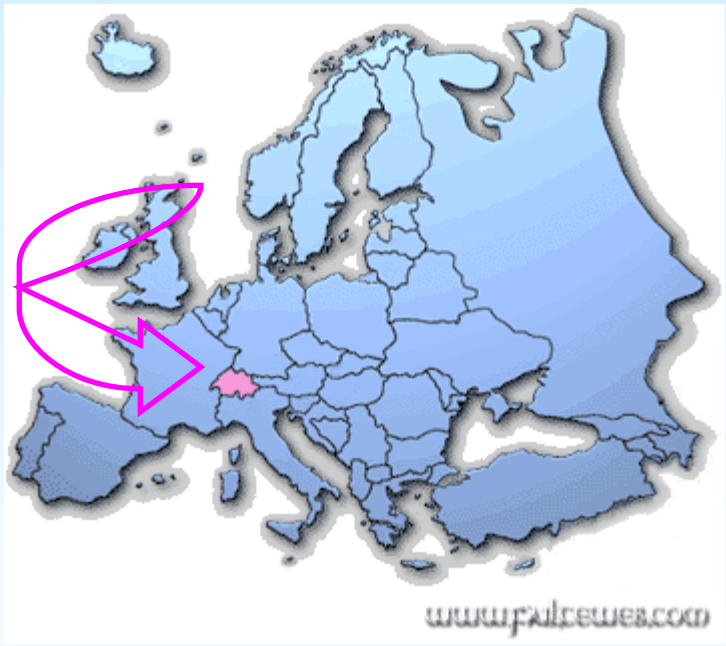
- **7.41 Million inhabitants (2004)**
- **Surface: 40‘000 km2**

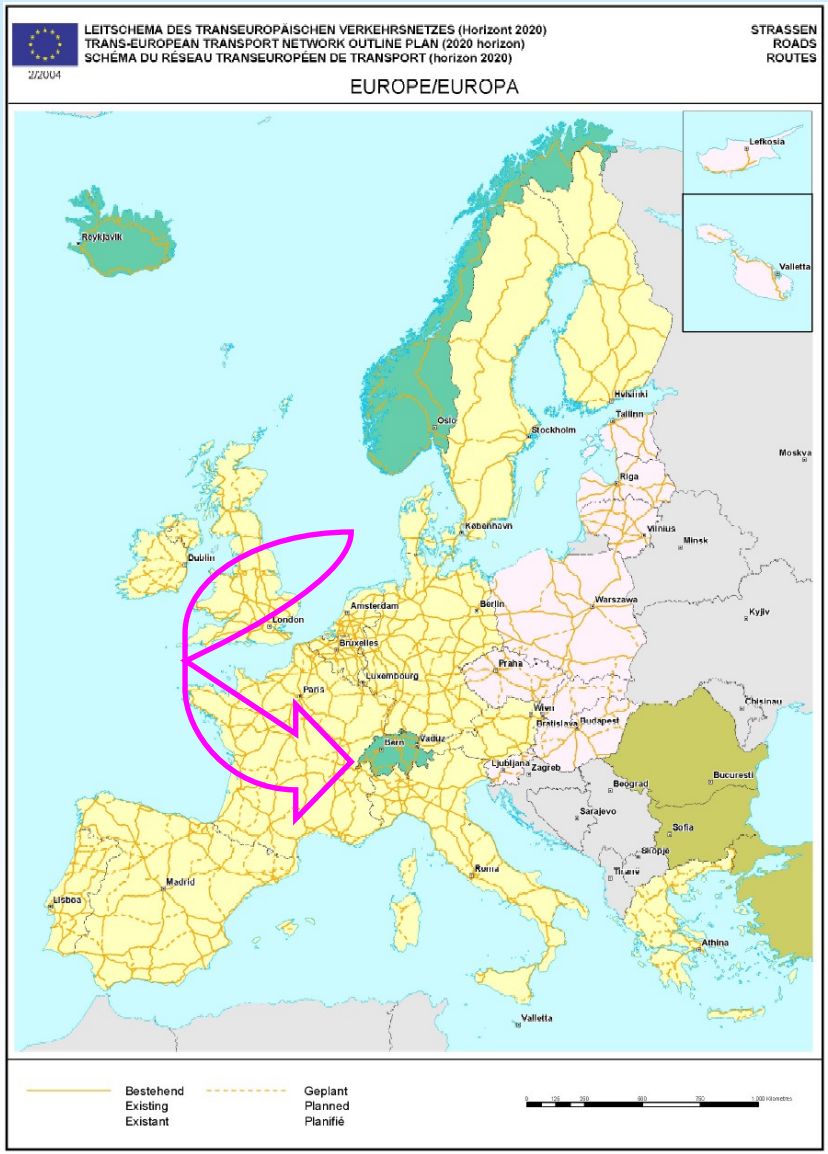
  (175 Inh./km2)
- **3.1 Million persons employed (2005)**
  - 2.0 Mio Services
  - 0.9 Mio Industry
  - 0.2 Mio Agriculture
- **Gross National Product**
  - 445‘931 Mio CHF (2004)

  (1 USD = 1.29 CHF)



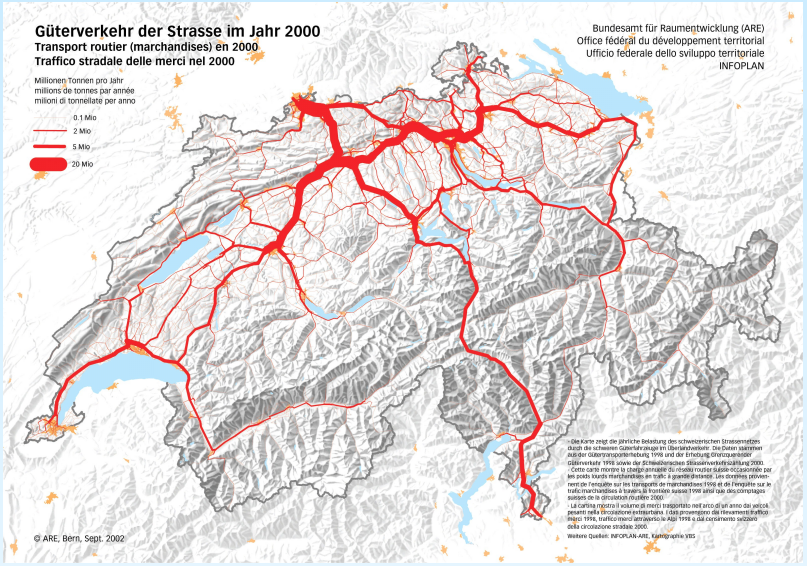
Central location within Europe

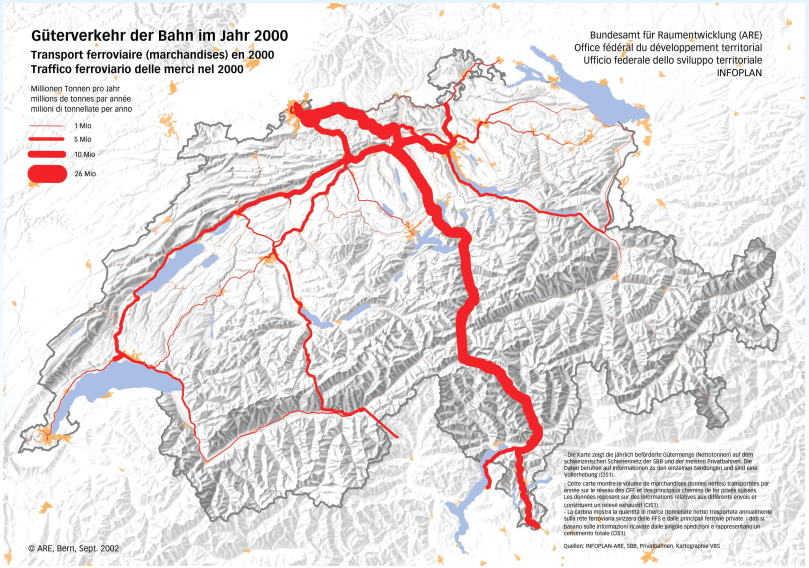




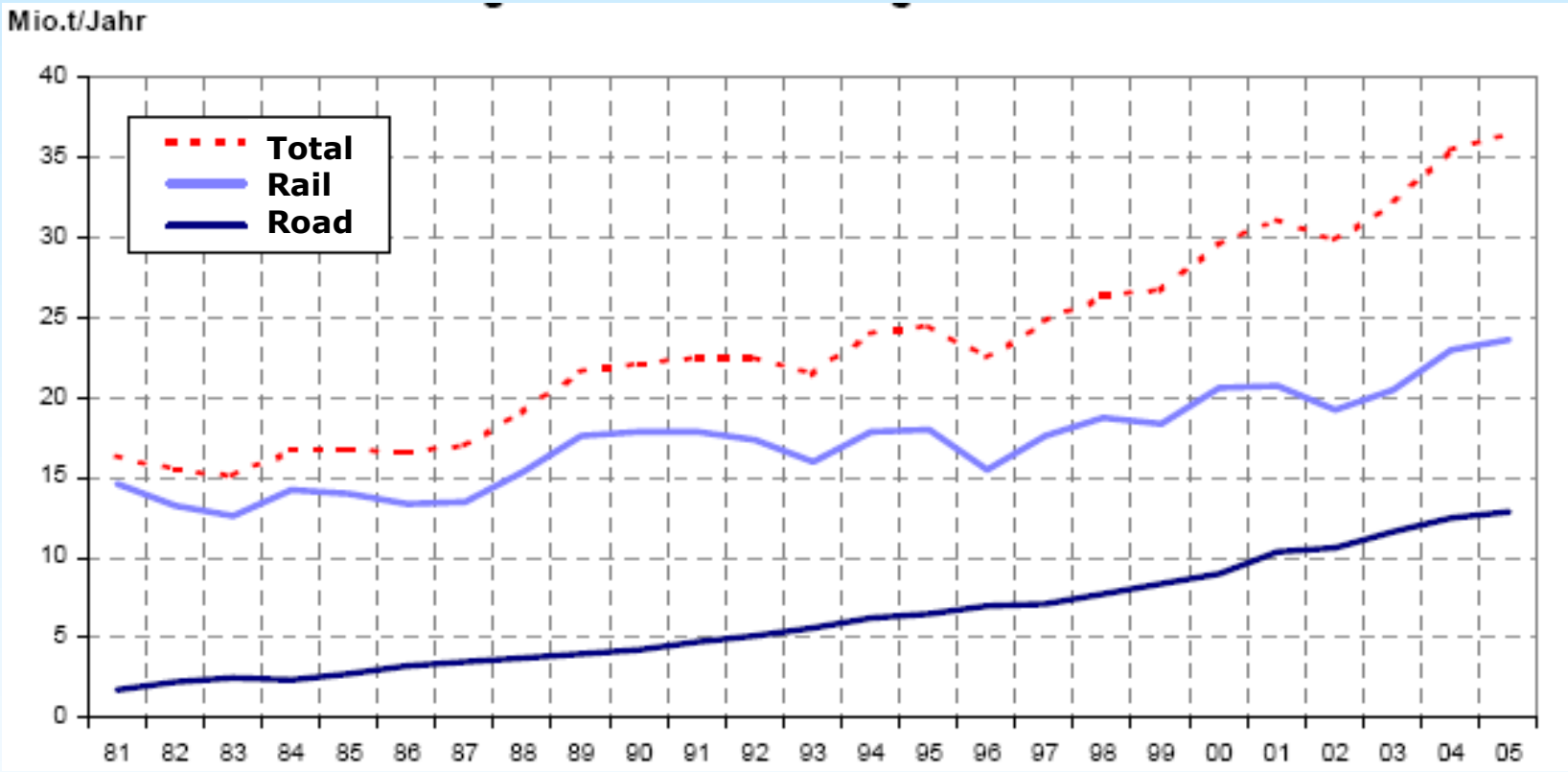
Road and Railway Freight network and volumes

- **Road Freight**
  - **Network**
    - Motorways: 1‘759 km (2003)
    - Highways: 18‘088 km (2003)
    - Communal Roads: 51‘446 km (2003)
  - **Volumes:**
    - approx. 370 Million tons per year
- **Railway and Intermodal Freight**
  - **Network:**
    - approx. 5‘200 km
    - 6 Important shunting yards
    - approx. 590 public goods stations
    - approx. 2500 private sidings
    - approx. 18 intermodal terminals
  - **Volumes:**
    - Approx. 62 Million tons per year





Development of Transalpine Freight Transport Volumes 1981 to 2004 (road and rail)



- **Strong increase of road freight transport trough the alps**
- **Still a high share of rail/intermodal freight**

Key problems relating to Freight Transit Transport

- **Increasing freight transit traffic on alpine crossings and increasing share of road freight transport**
- **Capacity problems on road network (also affecting accessibility and reliability of road freight transport)**
- **Limited capacity of the railway and intermodal network (incl. priority conflicts between freight and passenger transport)**
- **Safety problems in road freight transport (especially road tunnels)**
- **Increasing share of environmental burdens of road freight (e.g. NOx, particles, CO2-emissions, noise)**

Political Framework Conditions

- **General freight transport Objectives :**
  - The single modes should be used to their comparative advantages and combined in a suitable way.
  - The (public) land transport relieve the roads from road freight transport.
  - The high share in rail freight should be kept.
  - Modal shift from road freight transport to rail and intermodal transport
  - Improving attractivity and capacity for alpine crossing rail freight transport (including intermodal transport).

- **Alpine Crossing Specific Objectives**
  - Limitation of road freight vehicles through the alps to 650‘000 trucks until 2009 (2004: 1‘255‘000) (public voting)
  - Modal Shift to rail/intermodal transport
  - Improving safety on alpine crossings

- **Changeing framework conditions**
  - 40 t limit for trucks (since 2005)
  - Distance related Heavy Vehicles Fee for trucks > 3.5 t (approx. 0.65 € / km)

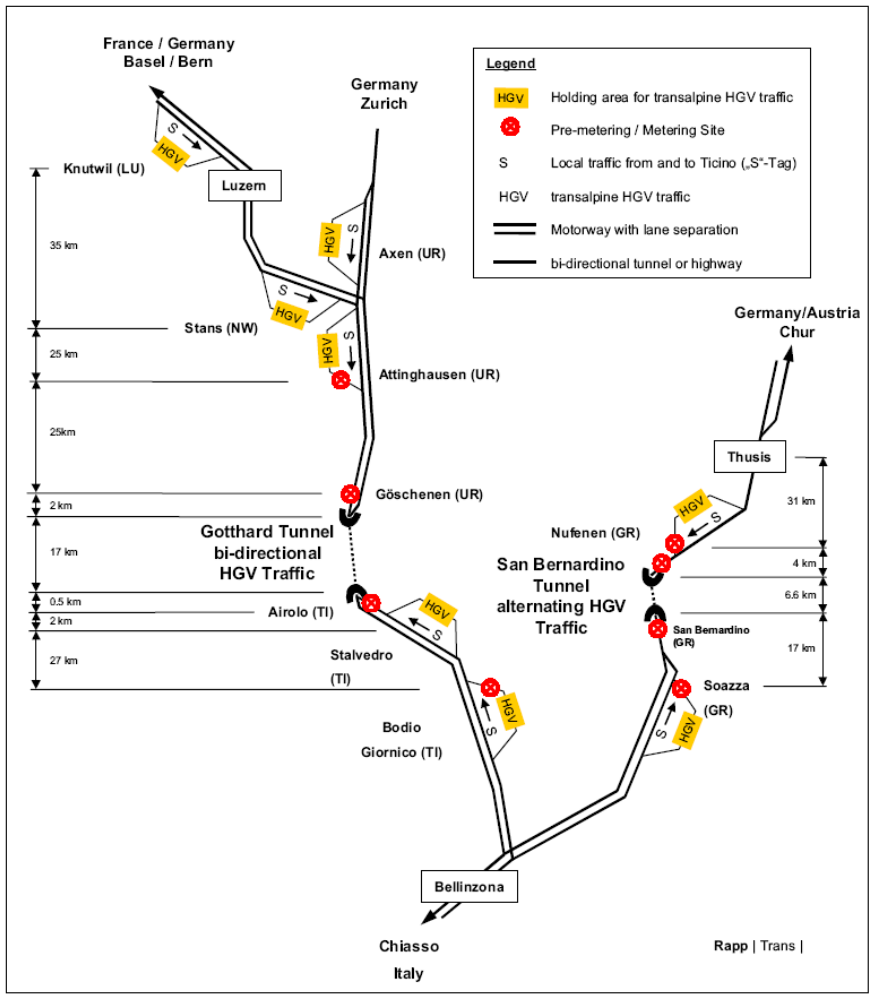
Implemented Solutions relating to Freight Transit Transport

- **Metering system for Heavy Vehicles using alpine crossings**
- **Intermodal Cross-Border Truck Information System**
- **Control and Enforcement of regulation relating to working and driving hours in road transport**
- **New railway tunnels through the alps (in realisation)**
- **Supporting measures for rail and intermodal transport**
  - subsidies for intermodal transport trough the alps
  - terminal financing
  - reimbursement of heavy vehicles for vehicles used in pre- and endhaulage)
  - Co-funding for private sidings

Heavy Trucks Metering System on Alpine Crossings (Gotthard/San Bernardino) (1)

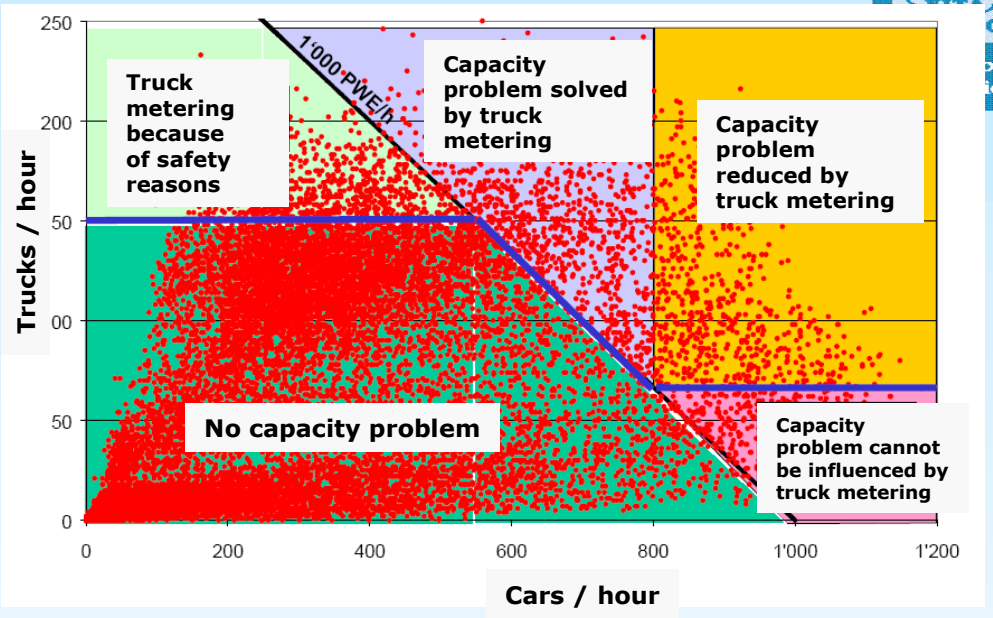
- **Objectives**
  - Minimisation of accidents risks in tunnels
  - Improving safety
  - Homogenisation of traffic flows

- **Concept**
  - Capacity Management with metering of heavy truck traffic at tunnel enttrance
    - Minimum 60 trucks/h and direction (high car volumes)
    - Maximum 150 trucks/h per direction (low car volumes)
  - Parking areas for the waiting trucks (rough metering)



Heavy Trucks Metering System on Alpine Crossings (Gotthard/San Bernardino) (2)

- **Priority for vehicles with loads from/to Ticino (marked with S)**
- **Phase Red: Ban to use the Gotthard/Bernardino tunnels if the daily capacity of the tunnel is overstepped)**



Infrastructure

- **Using of emergency lanes at metering points at tunnel portals**
- **HGV Service Centers with waiting and departure areas (rough metering)**

Heavy Trucks Metering System on Alpine Crossings (Gotthard/San Bernardino) (3)

- **Effects and Experiences**
  - Positive effects on flows
  - Shifts from other alpine crossings to Gotthard
  - Safety could be improved
  - Acceptable capacity for trucks
  - System reacts still slow

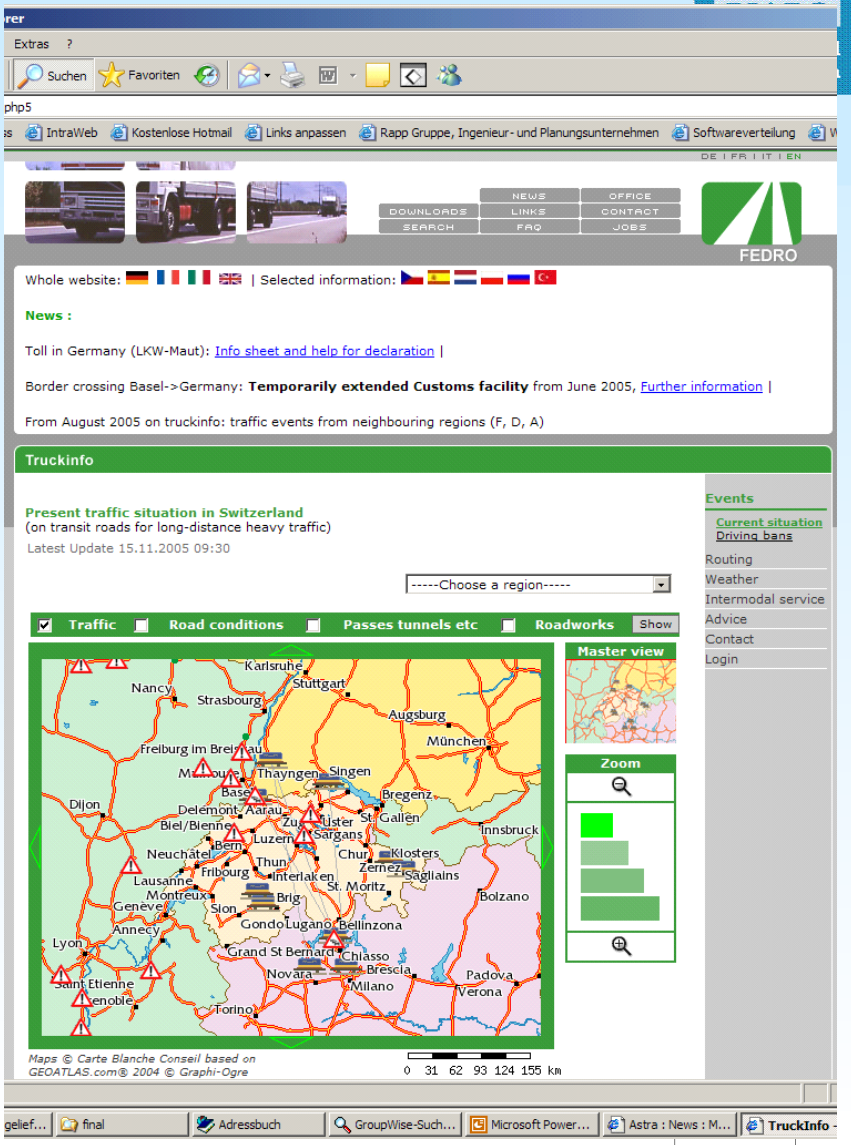
- **Conclusion**
  - System works well in general
  - System should be operated real time (with this the system efficiency could be improved)

Intermodal Cross-Border Truck Information System (1)

- **The Swiss Federal Roads Authority (FEDRO) has set up a dedicated information system for trucks in 2001**
  → www.truckinfo.ch

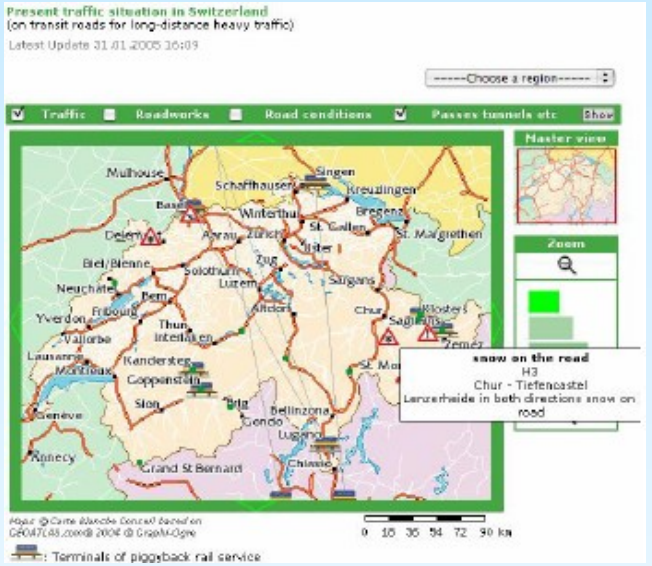
- **Focus on transalpine freight traffic**

- **Background**
  - Traffic management measures need to be explained to the truck industry
  - Dynamic information on traffic conditions had to be enhanced in order to limit the impacts of temporary closures (snow, accidents, etc.)
  - The Swiss policy of shifting goods from road to rail needed and needs to be actively promoted



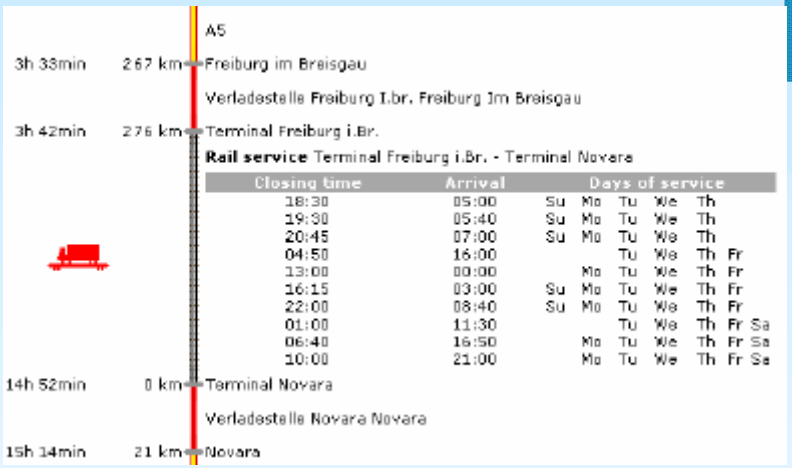
Intermodal Cross-Border Truck Information System (2)

- **Main features of the service**
  - Real time traffic situation on road and rail
  - Weather forecasts and related road conditions
  - Explanation of permanent traffic management measures, intermodal supply, policy and legal background
  - Intermodal routing (introduced in 2002)

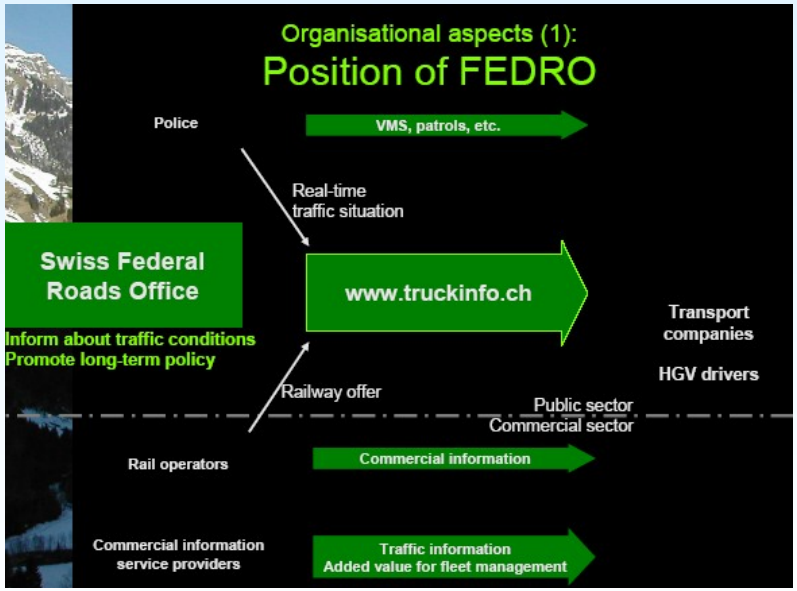


Intermodal Cross-Border Truck Information System (3)

- **Further features**
  - Timetables for intermodal services
  - General driving restrictions for heavy vehicles
  - Recommendations regarding impact of German LKW-Maut at Swiss borders
  - etc.



- **Organisational aspects**
  - Public Private Partnership
  - Part of FEDRO homepage
  - Specific contractual arrangements for data and system supply



Intermodal Cross-Border Truck Information System (4)

- **Experiences**
  - Very positive
  - Used by transport companies
- **Success factors**
  - Political support
  - Co-operation between public and private parties (data, systems, services supply)
  - High efficiency by combining public and private activities
- **Further developments**
  - Integration of dynamic routing function
- **www.truckinfo.ch**

Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (1)

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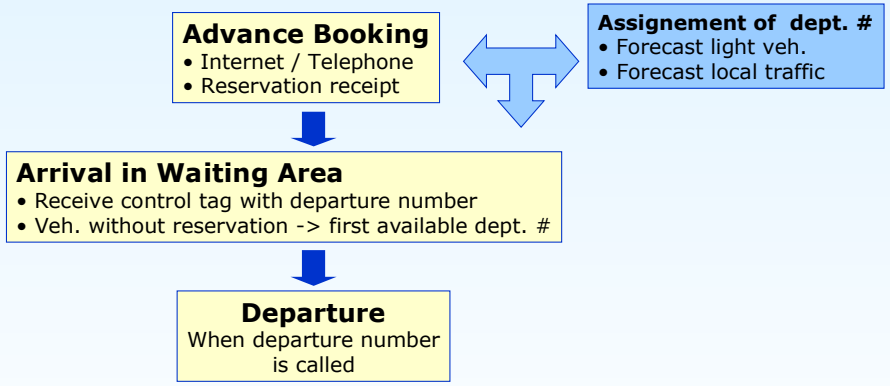
Background

- Management of road freight transport on motorways to reach a better use of capacity
- Support of metering system for trucks on alpine road crossings

Pass	Tunnel Length	Altitude	Number of lanes		Average daily HGV traffic (oct/nov 02)
			Tunnel	Access	
Gd. St. Bernard	5 km	1900 m	2x1	2x1	350
Simplon	---	2100 m	---	2x1	270
St. Gotthard	**16.9 km**	**1200 m**	**2x1**	**2x2**	**3'430**
San Bernardino	**6.6 km**	**1600 m**	**2x1**	**2x1**	**530**

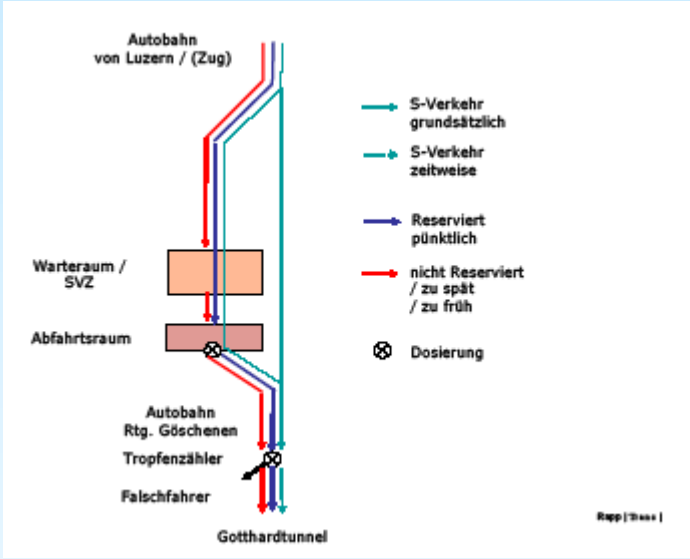
Basic Idea

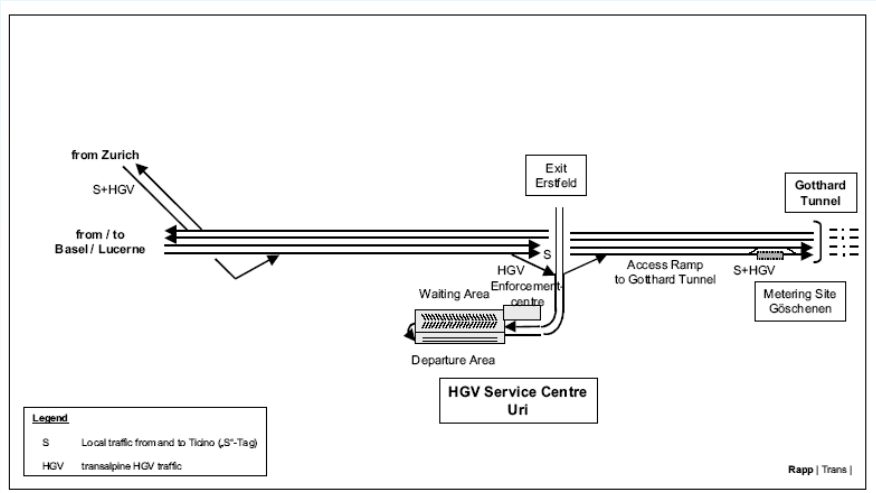
- Depending on the the available capacity a number of slots for trucks are defined (considering also safety)
- Transport companies can book a slot for alpine road crossing at no cost (on first come first served basis, voluntary)
- Trucks with valid reservation are privileged against trucks without reservation



Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (2)

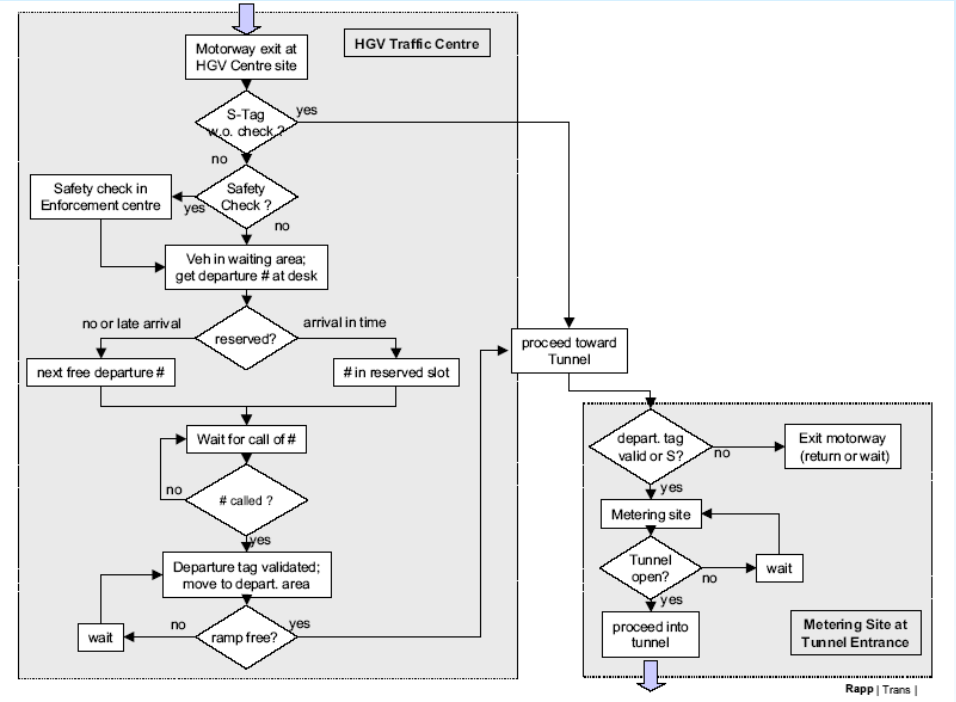
- **System description**
  - 120 to 300 trucks per hour depending on car traffic
  - Slot duration 2 hours
  - Registration by the transport company
  - Reservation by Internet (connection to truckinfo)
  - Security to be paid for the reservation and reimbursed afterwards (to avoid overbooking)
  - Control of transit passess at HGV service centers
- **Roadside Infrastructure**
  - Metering Site at tunnels (metering system)
  - HGV service centers with waiting and departure areas





Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (3)

- **Operation (low traffic)**
  - Free flow for all vehicles (departure metering is not in operation)
  - Slot management without importance
- **Operation (heavy traffic)**
  - Departure metering is in operation
  - Reservation systems regulate the priorities of truck departures in HGV centers
  - Vehicles without reservation are „Stand by" → departure as soon capacity available
- **Events**
  - In case of accidents, natural phenomenons the reservation system can be switched off



Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (4)

- **Enforcement**
  - Easy solution
  - Transit passes are controlled in the HGV center
- **Organisation**
  - Development and operation can be done by authorities or transfered to private parties
- **Effects (based on traffic simulation)**
  - Reduction of waiting times for vehicles with reservation (during heavy traffic)
  - Improvement of capacity utilisation (breaking the demand peaks)
- **System is technical and operational feasible**

	Spitzenwoche	Jahresdurchschnitt		
		Verkehr 2000	Verkehr 2000 + 30%	nur PW Zunahme 30%
	Minuten	Minuten	Minuten	Minuten
Zeitgewinn für reservierte Fahrzeuge gegenüber Regime o. Reservationssystem	170	31	132	41
Zeitverlust für nicht reservierte Fahrzeuge gegenüber Regime ohne Reservations-system	25	6	21	10

Anzahl Tage (ohne Sonn- und Feiertage) mit Wartezeiten bzw. Zeitgewinnen von	Verkehr 2000				PW Zunahme 30%			
	Mit Reservations-system		Vergleich zu ohne Reservationssystem		Mit Reservations-system		Vergleich zu ohne Reservationssystem	
	Wartezeit ÜGV	Wartezeit RV	Zeit-gewinn RV	Zeitver-lust ÜGV	Wartezeit ÜGV	Wartezeit RV	Zeit-gewinn RV	Zeitver-lust ÜGV
	Tage/Jahr	Tage/Jahr	Tage/Jahr	Tage/Jahr	Tage/Jahr	Tage/Jahr	Tage/Jahr	Tage/Jahr
0 – 30 Minuten	252	274	261	286	222	270	238	272
30 - 60 Minuten	1	8	2	2	7	9	8	8
60-120 Minuten	10	24	11	18	17	27	24	26
> 2 Std.	43	0	32	0	60	0	36	0

Solutions in Discussion: Slot Management / Reservation System for Heavy Goods Vehicles (5)

- **Benefits for authority**
  - More homogenous demand
  - Better use of capacity
- **Benefits for transport company**
  - Guranteed slot
  - Minimal waiting times
  - Benefits depend on the possibility for planning the trip
- **Investment costs**
  - Software: approx. 1 Million CHF
  - Booking terminals: approx. 1-2 Million CHF
  - Infrastructure for HGV Service centers
- **Operation costs**
  - Approx. 0.5 to 1 million CHF per year
- **Conclusion**
  - With todays traffic volume benefits too low
  - Implementation suitable if the road transit traffic increases furthers

Solutions in Discussion: Alpine Crossing Exchange for Heavy Goods Vehicles

- **Basic idea**
  - Management of truck freight transport using economical instruments

- **Model 1: Cap-and-Trade**
  - Mandatory transit pass which is tradeable
  - Limitation to 650‘000 passages per year

  → Reduction of the transalpine traffic, modal shift

- **Model 2: Slot management scheme with dynamic pricing**
  - Voluntary reservation for a specific slot
  - Dynamic price for according to the demand
  - Tradeable slot

  → Better use of road capacity, reduction of congestion

- **Results of research project**
  - both models are feasible
  - both models are effective and efficient relating to the objectives aimed at
  - Cape-and-Trade model only to be impmented in coordination with neighbouring countries
  - Slot management with dynamic pricing could be implemented by Switzerland alone

- **Conclusions**
  - Possible solution for the future, especially if freight transport increases
  - Political acceptance to be investigated

Conclusions

- **Road freight transport management is needed to deal with increasing road freight transit**
- **The implemented measures show positive impacts (improving safety, improving capacity utilisation, modal shift)**
- **The measures are transferable to other situations/ conditions with high share and increasing freight transit traffic**
- **A comprehensive freight transport strategy is needed (framework conditions, objectives, measures)**
- **Further innovative measures have to be implemented in the coming years to reach the policy objectives**

Thank you for your attention!

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