

HS trains in Switzerland : an successful example of interconnection also without high speed lines



Switzerland: a small confederation in the heart of Europe, ...



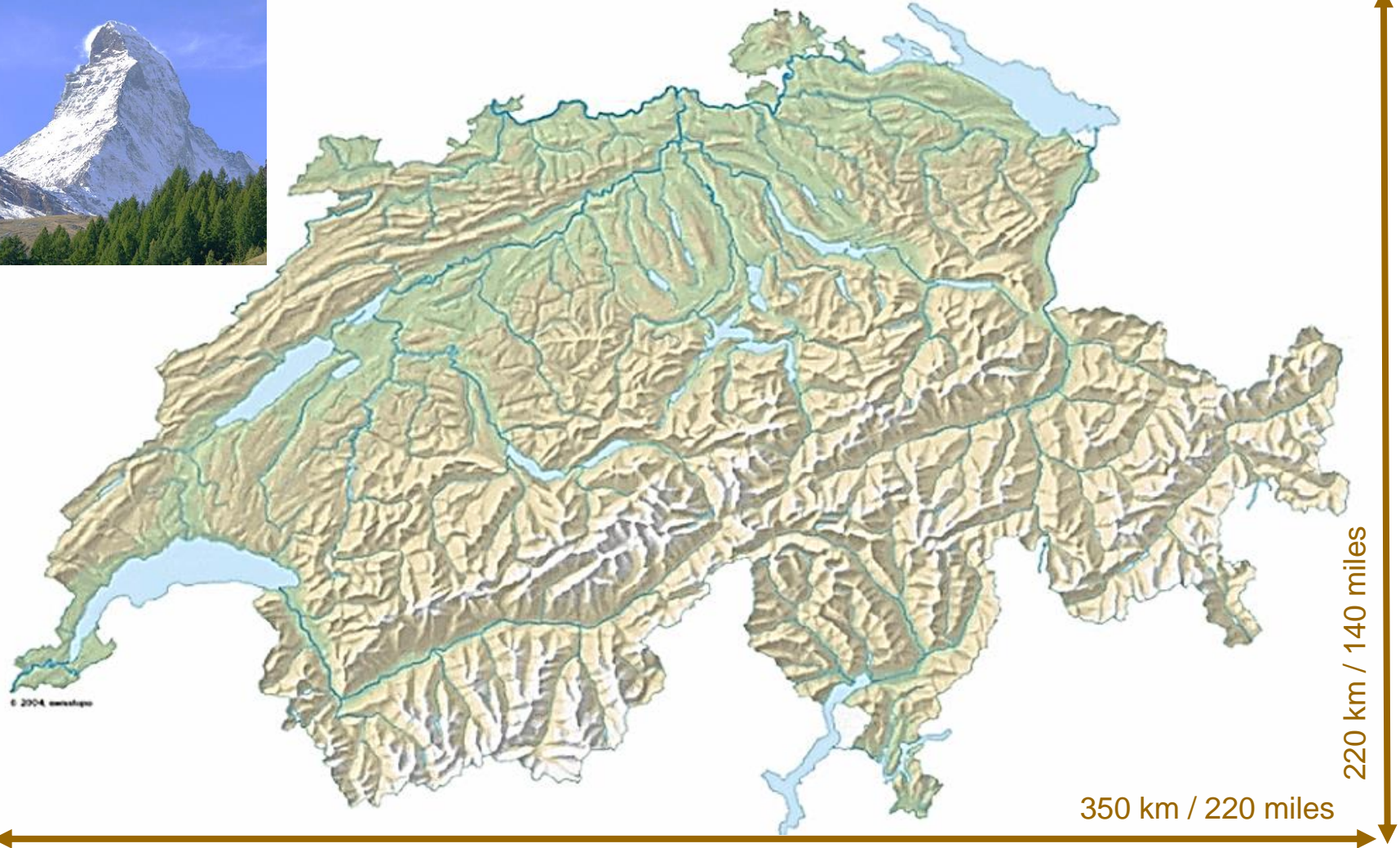
... in the middle of the Alps mountain chain ...



.... with only 8 million citizens and 4 languages, ...



... full of mountains, ...



... but with a very dense railway network, ...



... that is the most densely used in term of traffic and one the most frequented in term of passengers in the world !

- ❑ Freight modal share for rail: **~ 45%**
position 5 in the world with the USA and European champion
- ❑ Passenger modal share for rail: **~ 17%**
position 2 in the world after Japan and European champion
- ❑ Passenger-km travelled per year and per inhabitant: **~ 2'200**
position 1 in the world ahead Japan

In Switzerland the train is organised to be interesting for everyone and to do everything



Switzerland, a country of mountains and lakes: is there room for high speed services ?



Tilting trainset on the vineyards of the Lake Geneva



Tilting trainset on the Gotthard line through the Alps



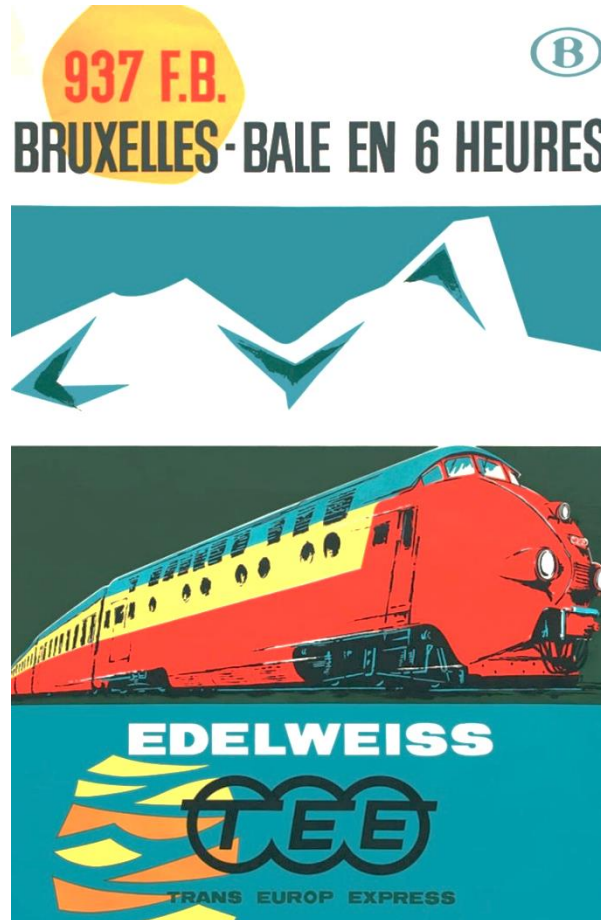
The Rhaetian Railway through the Grisons



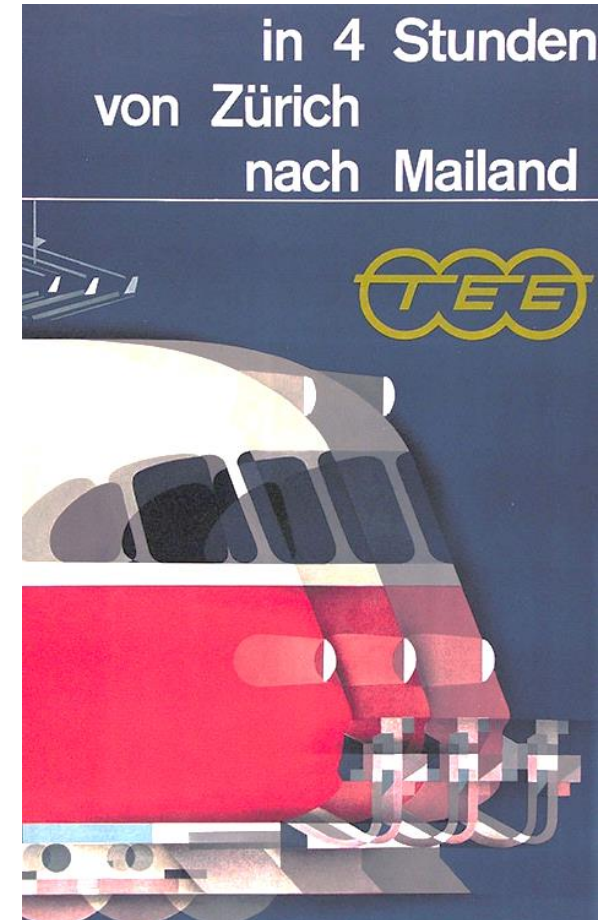
Switzerland was historically very involved in the development of the TEE - Trans Europe Express.



“connect over 90 European cities”

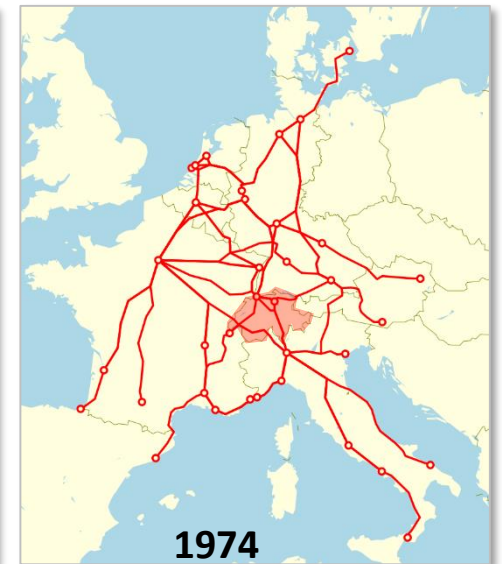
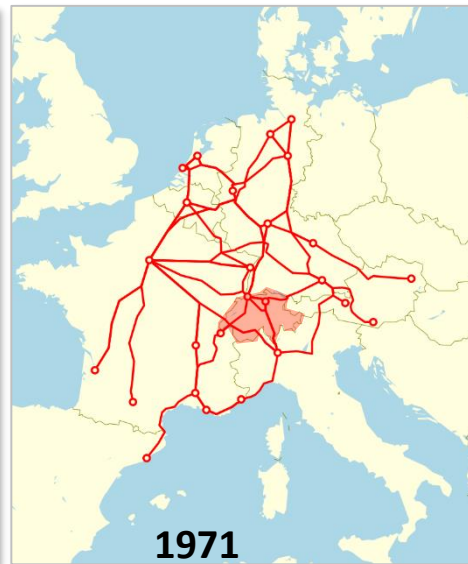
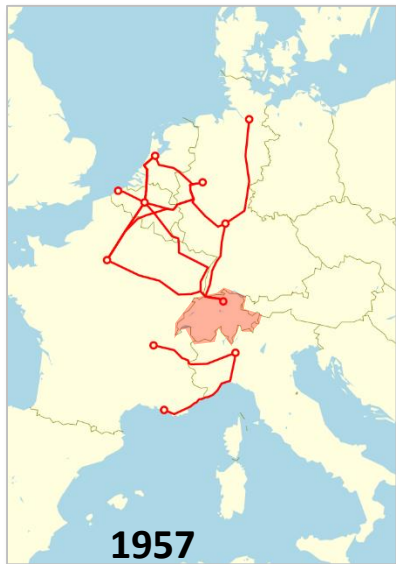


“Brussels – Basel in 6 hours”



“In 4 hours from Zurich to Milan”

The TEE network continued to expand starting from the 50's and new luxury trainsets were put into service, ...



... like the first-class-only Swiss RAe TEE, introduced in 1961,...



... able to run under four different overhead line voltages and different signaling system in many countries.



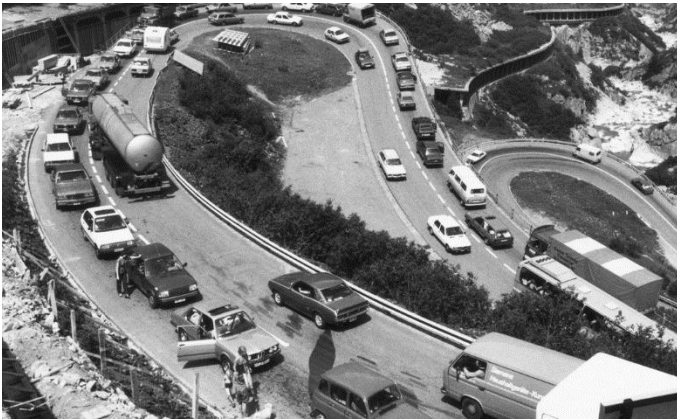
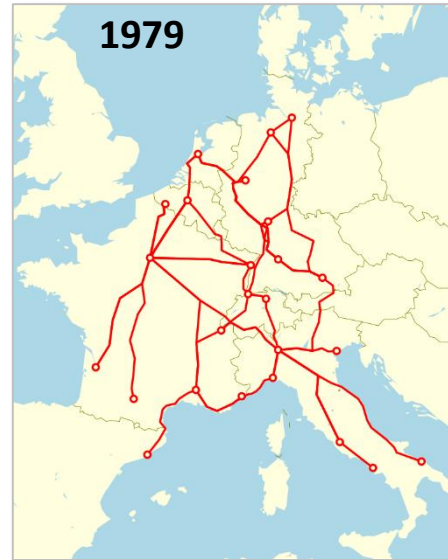
A wonderful trainset that continues to run today thanks the “Swiss Federal Railways Historic” Foundation.

↔ Historic

Gönerclub
«RAe TEE II 1053»



But after the early 70's the network began to shrink ,
due to the strong development of the road traffic...

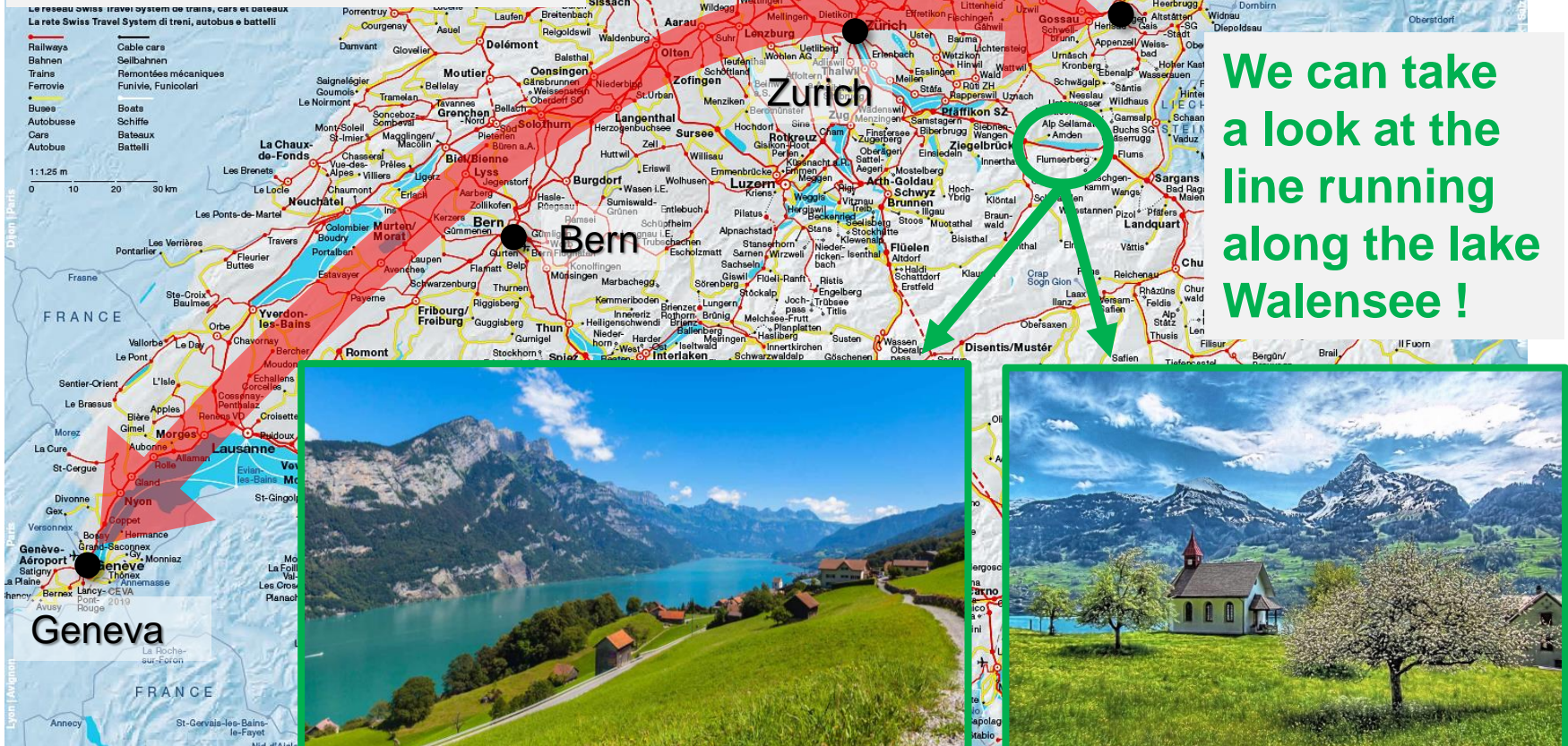


... and the first high-speed trains in Europe, with the “orange” TGV PSE trainset reaching Switzerland.



But at the end of the '70, the Swiss population rejected a project for a new HS line between Geneva and St Gallen.

How to develop High Speed services without high speed line?



The train running on the Walensee: Commuter, Intercity (single deck and double deck) and freight trains, ...



... tilting trainset, new national double deck composition deck train, the historic TEE trainset (!), ...



... as well as ICE HS train from Germany, TGV HS train from France and Railjet HS train from Austria.



Today you can observe many different high speed trains in various stations of Switzerland



TGV and ICE3 in Basel SBB



ICE1 and ETR470 in Basel SBB



Railjet and TGV in Zürich main station



ICE1 in Bern

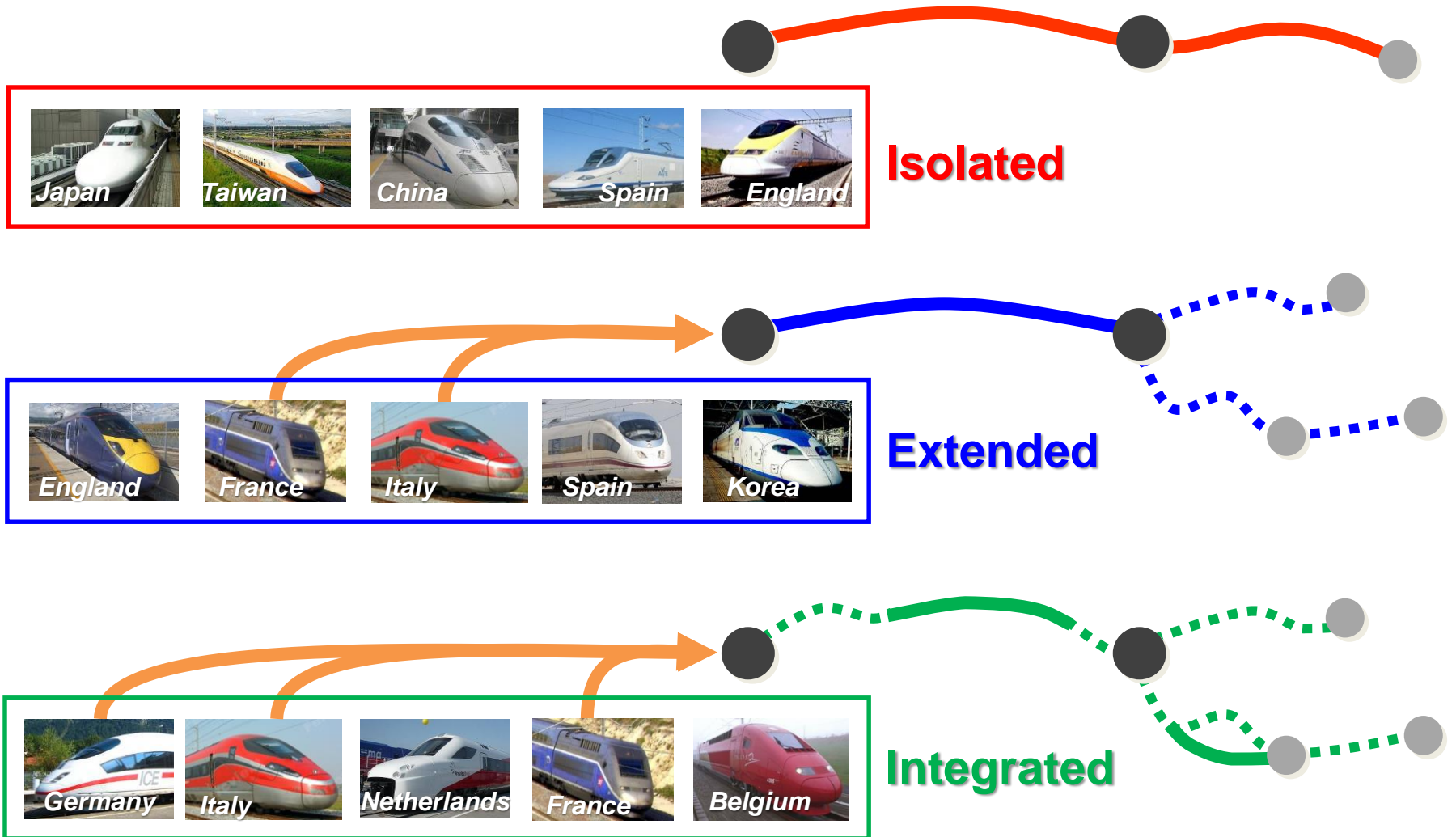


TGV and the Swiss ICN tilting train in Lausanne

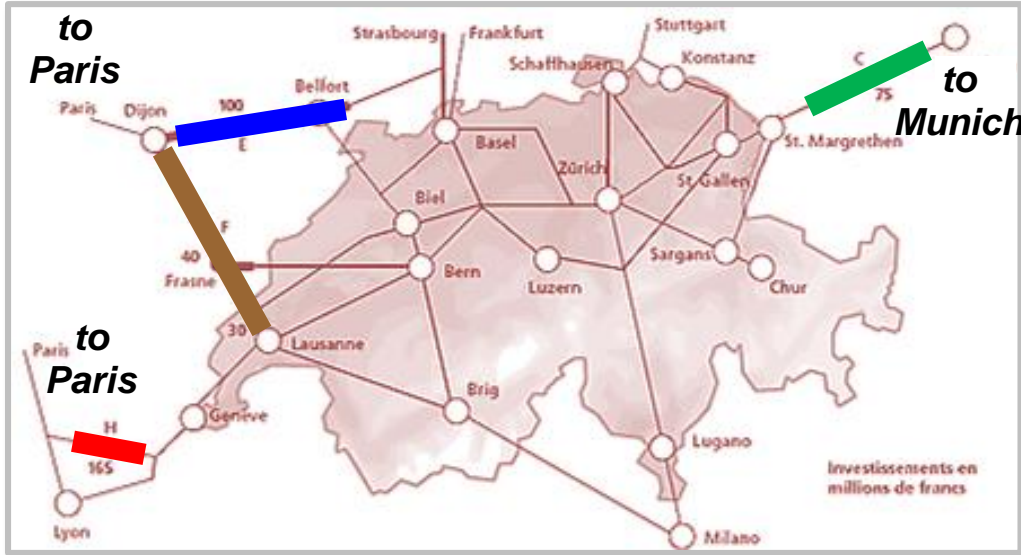


TGV's in Geneva

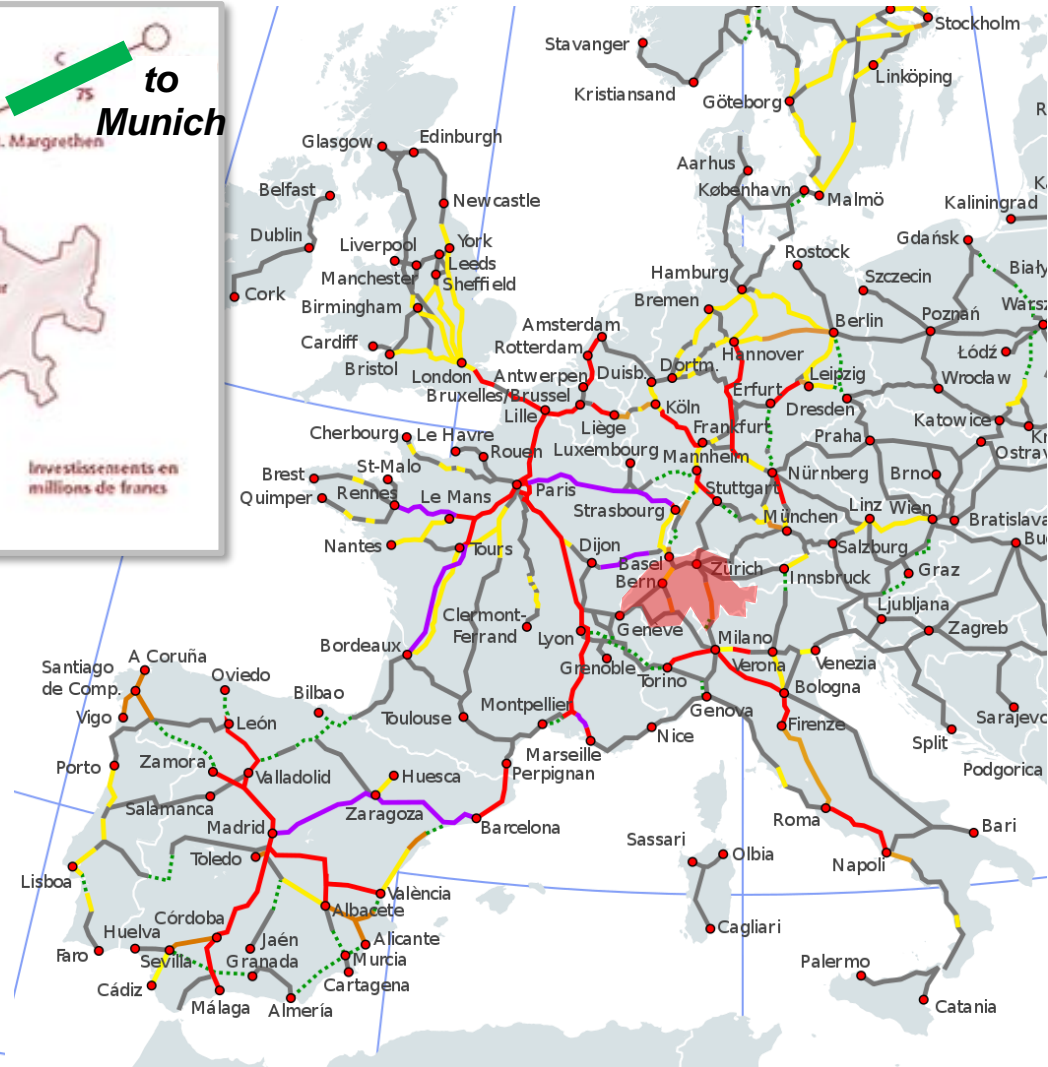
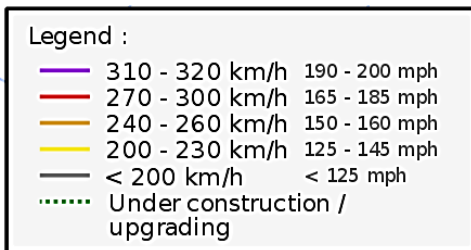
This is possible thanks the configuration of the HS networks in the countries close to Switzerland



The European HS network today (2017) and the “connection strategy” of Switzerland



Participation in the financing of new HS lines or renovation of existing classic lines outside the national territory



Some examples of Switzerland investment outside the country : reopening the conventional Haut Bugey line



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**Travel time reduction
Geneva – Paris
from 3h30 to 3h00**



Some examples of Switzerland investment outside the country : reopening the conventional Haut Bugey line



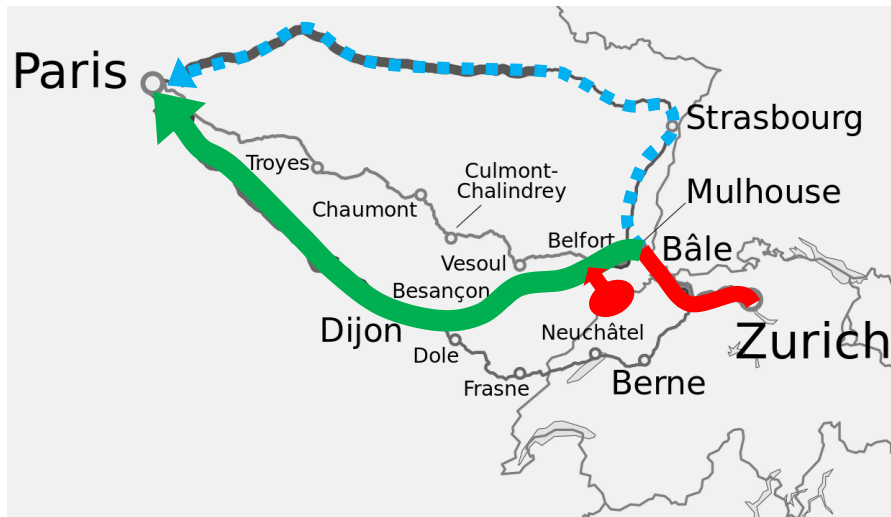
Maximal speed: 100 km/h



Some examples of Switzerland investment outside the country : reopening the conventional Haut Bugey line



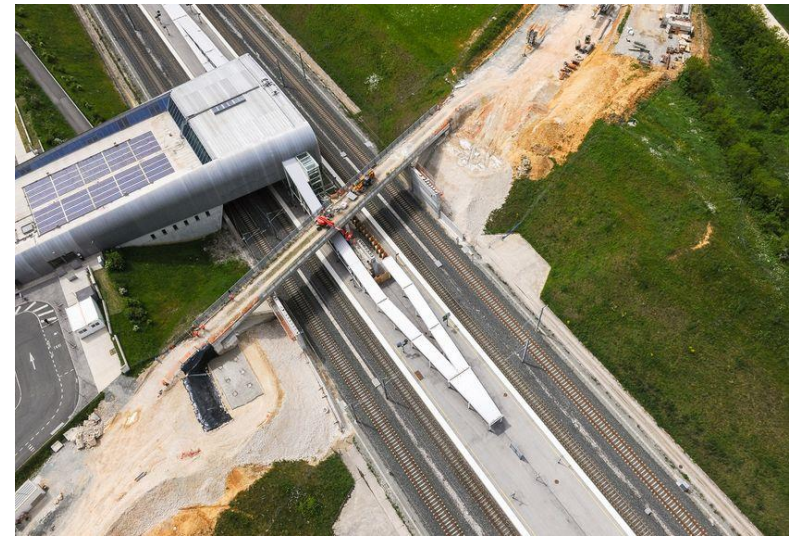
Some examples of Switzerland investment outside the country : support the new French Rhin-Rhône HS line



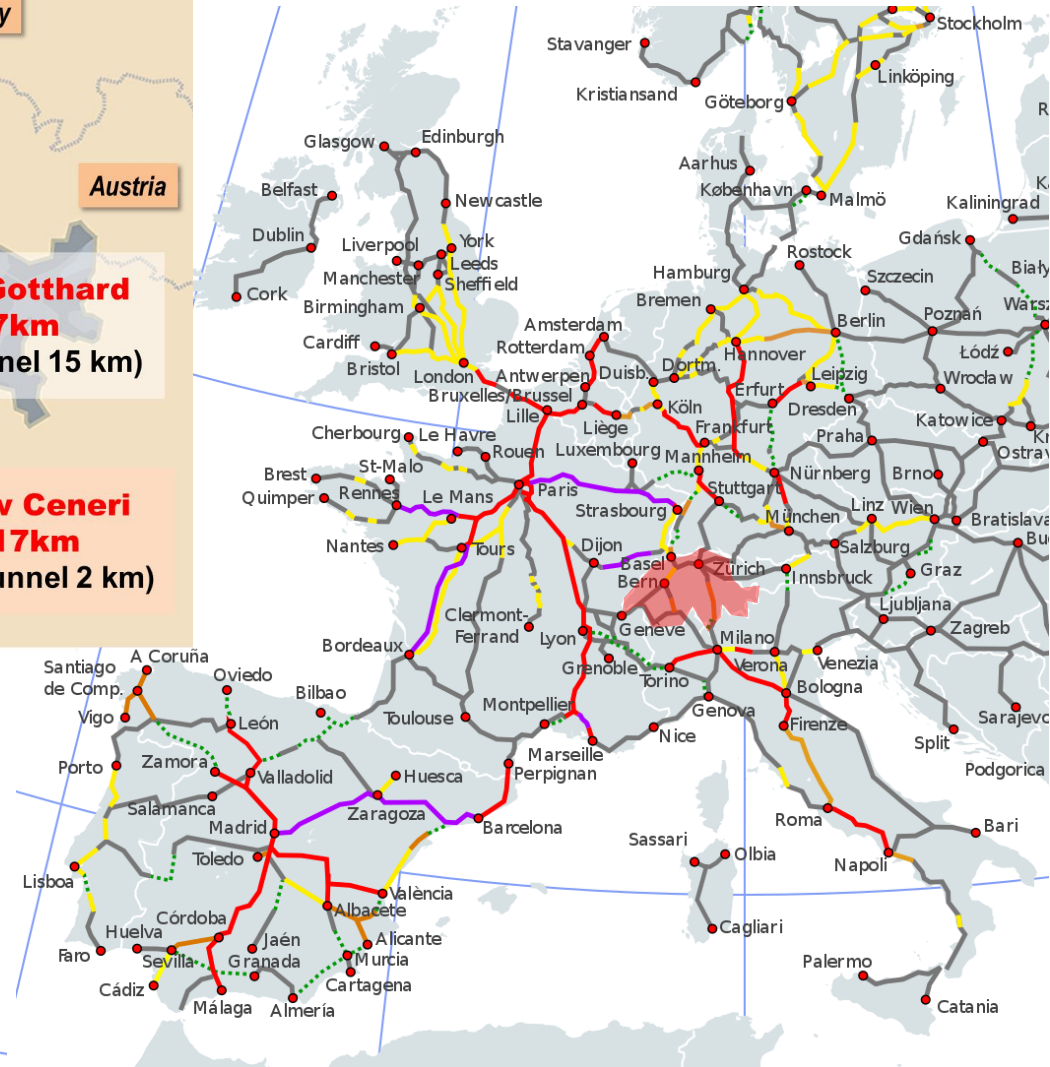
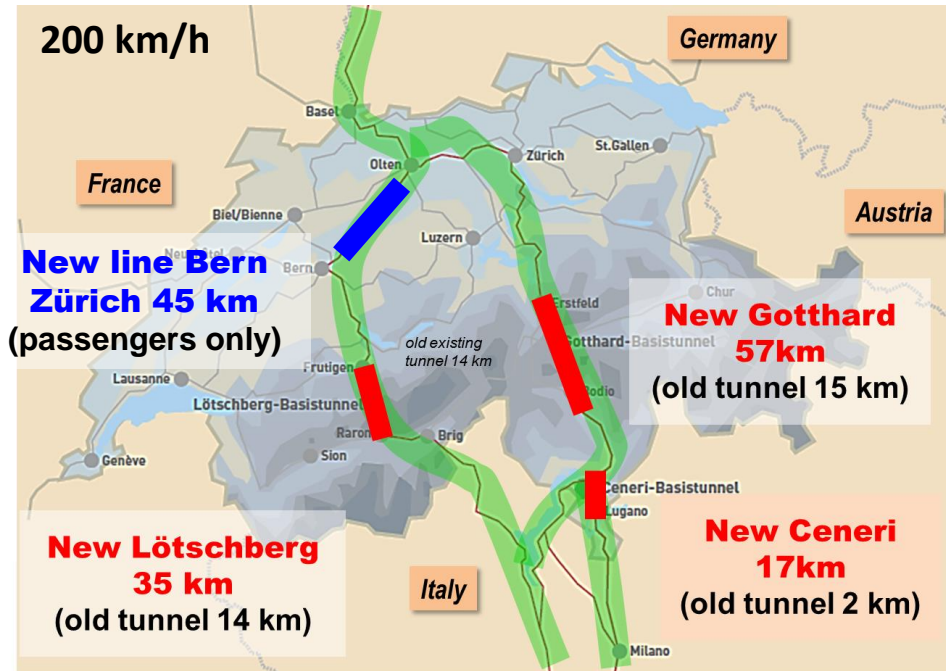
- ❑ Maximal speed: 320 km/h
- ❑ Travel time reduction Zurich-Paris from 4h30 to 4h00
- ❑ Arrival in Paris at the more convenient Gare-de-Lyon station instead of Gare-de-l'Est
- ❑ Connection with the Swiss peripheral region Jura thank a new line and station



Some examples of Switzerland investment outside the country : support the new French Rhin-Rhône HS line



But Switzerland continue to invest also on the national network to improve capacity and speed



Legend :

| | | |
|------------|--------------------------------|---------------|
| — (Purple) | 310 - 320 km/h | 190 - 200 mph |
| — (Red) | 270 - 300 km/h | 165 - 185 mph |
| — (Orange) | 240 - 260 km/h | 150 - 160 mph |
| — (Yellow) | 200 - 230 km/h | 125 - 145 mph |
| — (Grey) | < 200 km/h | < 125 mph |
| — (Dotted) | Under construction / upgrading | |

But Switzerland continue to invest also on the national network : new line Zurich Bern, 45km, 200 km/h (2005)



But Switzerland continue to invest also on the national network : new Lötschberg Tunnel, 37km, 200 km/h (2007)



But Switzerland continue to invest also on the national network : new Gothard Tunnel, 57km, 200 km/h (2017)



Conclusion

- To open the doors to high speed services it is **not absolutely necessary to build everywhere new infrastructures**.
- With an **extended or integrated high speed concept** it is possible to **expand the benefit to the conventional rail network**.
- This is the **big power of high speed**, this is the way it is done in Switzerland, a small country, full of mountains, full of trains... and also high speed trains ! 😊

