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The New Franco - Genevan Rail Passenger Service "Léman Express": The Challenge of Sustainable Mobility in the Cross-Border Metropolis of Greater Geneva?

LAURENT GUIHÉRY

Abstract The Léman Express is the achievement of an old project of connecting Geneva with the French hinterland of Annemasse and the North East part of the Region Auvergne Rhône-Alpes. 16 km of new tracks have been build (2 km in France and 14 km in Geneva with 5 new underground stations). This Swiss – French rail service is opened to cross-border commuters mainly since Mid-December 2019 on 230 km of tracks from Coppet to Annecy, Thonon, Bellegarde and Evian. 50 000 passengers are targeted for this service: now around 40 000 passengers are travelling every day in March 2021. 500 000 commuters cross the French – Swiss boundaries every day, which means a huge impact in terms of congestion and greenhouse effects and this new service will speed up modal transfer towards rail. Mid-2021, reliability of the system and quality passenger information have to be improved. The key issue is to improve the French – Swiss interoperability of rail system.

Keywords: • France • Switzerland • Geneva • Rail Passenger Transport

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This article aims to evaluate, in mid-2021, the first eighteen months of operation of the new rail passengers service Léman Express connecting Geneva² and the French hinterland, which is likely to reverse the trends of growing congestion and the associated environmental nuisances in the cross-border metropolis of Greater Geneva.

Every day, 630 000 trips take place, mainly commuting, around Geneva, between France and Switzerland (65 %), but also between the Canton of Vaud and the Canton of Geneva (35 %). The overall modal share of public transport on the cantonal borders was close to 14 % in 2018. For working people living in France and working in the canton of Geneva, 80 % of trips are made by car, 13 % by public transport and 7 % by two-wheelers (2014; see Table 1).

Table 1. Modal share of public transport for cross-border flows to Geneva

France	
Annemasse side	15 %
Ain side	8 %
Saint-Julien-en-Genevois side	3 %
Chablais side	2 %
Switzerland	
Canton of Vaud	33 %

Source: [3].

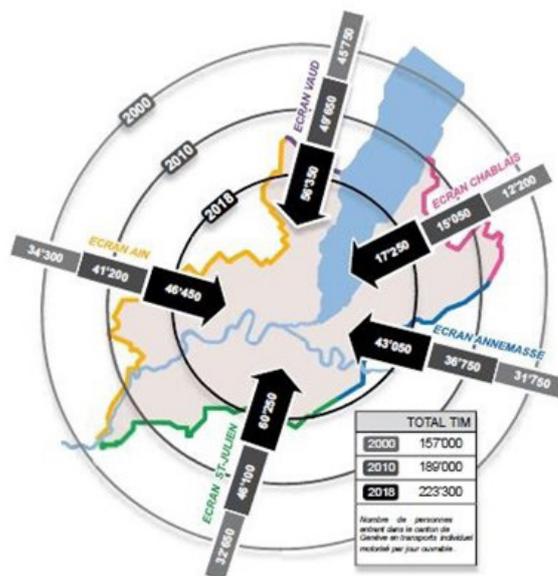
Mobility by private car – 223 300 crossings of the cantonal border by motorized transport every day, mainly characterized by single driver's vehicles - is very impressive in a city that has long been devoted to the car: it is no coincidence that Geneva hosts, on an annual basis, the major international motor show that celebrated its centenary in 2005! The city has very heavy congestion in its various accesses, particularly for border crossings, which causes environmental nuisances and makes Geneva one of the cities most affected by automobile pollution. In addition to the problems of congestion and nuisance (pollution, noise, road insecurity), there are also parking problems in a highly constrained public space.

A CROSS-BORDER REGION WITH STRONG CONTRASTS

This new Franco-Genevan, cross-border, high-frequency rail service appears in a region - Haute-Savoie, Annemasse and Geneva - with very strong contrasts.

² This compares with 550 000 inhabitants in Geneva.

Figure 1. Entry into the canton of Geneva per day by motorized individual transport: 2000 – 2010 – 2018



Source: [3].

On the one hand, the quality of life is one of the best in Europe: beyond the presence of Lake Geneva and the mountains, the proximity of Geneva makes this region, for some, an Eldorado. Geneva occupies a special position on the West side of Lake Geneva: 110 km of border with France (Ain and Haute-Savoie), which surrounds it, but only 4 km with the canton of Vaud, which links it to the Swiss Confederation. The high salaries in Switzerland attract many workers who want to obtain the status of cross-border commuter. It must be said that Geneva's place in Europe remains central: After being the historic headquarters of the League of Nations (SDN), it remains today a place of diplomatic exchanges and conventions and still hosts many international organizations: WTO, ILO, CERN, UNHCR, etc. The weight of these international organizations is estimated at nearly 11 % of GDP, i.e., approximately 1 job in 10. The department of Haute-Savoie has a median standard of living of almost 23 700 euros³, the highest among the French departments outside the Ile-de-France region.

On the other hand, as a former railway and working class town, Annemasse has a poverty rate of 22 %, 3 points higher than the national average [10]. Inequalities are among the highest in France, with Annemasse ranking 4th in France for the highest

inter-decile inequalities⁴. The Swiss Eldorado does not work for everyone⁵.

A city of contrasts, Haute-Savoie, and Annemasse, is also a city of contrasts because of the dynamism of jobs in Geneva and jobs on the French side, which have difficulty in finding human resources⁶. In 2021, 26 % of jobs in the Canton of Geneva will be occupied by cross-border workers, compared with 15 % in 2005. Roughly speaking, 50 % of the active population of Annemasse work in Geneva. The health sector is the leading recruiter of cross-border workers: more than 50 % of employees in Geneva's public hospitals (12 000 in all) live in France.

Finally, this region also has a strong contrast in mobility! Geneva's strong attractiveness generates considerable mobility that the current infrastructure, especially roads, cannot support. The flow of commuters is growing rapidly and threatens the ecological balance of the region – air quality, global warming, road water runoff, pollutant emissions, road safety, road noise. Congestion, which is omnipresent at peak times, causes misunderstandings and tensions in Swiss companies, where compliance with schedules is essential, along with delays by border workers. 140 000 cross-border commuters go to work in Switzerland every day, generating 8 billion euros in wages per year. Part of this money goes to the French local authorities (3,5 % of the wage bill) but this is too little to meet the management costs of the authorities in the face of this influx of people, in particular to manage transport.

AN INITIAL SOLUTION: THE CROSS-BORDER METROPOLIS OF GREATER GENEVA

The urgent need to find a framework to improve the sustainable mobility in Geneva comes first from the Swiss Confederation: in fact, there is a strong imbalance between the Lake Geneva area (1,5 million inhabitants with a modal share of public transport of 16 %) and the Zurich area (1,9 million inhabitants and a modal share of public transport of 35 %), which led the Confederation to support and finance the Léman express project in the name of a certain homogeneity of living conditions on Swiss territory.

Then came the construction of the Greater Geneva area, a local grouping for cross-border cooperation (GLCT) bringing together 209 municipalities between France and

4 Behind Neuilly, Paris and Boulogne-Billancourt (Hauts-de-Seine). In Annemasse, the poorest 10 % of households earn less than 800 euros per month (barely 10 000 euros per year), while the richest 10 % earn 5,3 times as much, an average of 4,200 euros per month (50 400 euros per year [10]).

5 Annemasse offers a very high rate of social housing (27 %) and manages a priority district of the city policy [10]. 577 homeless people took up residence in Annemasse in 2020 compared to 492 in 2019 [10]. In Haute-Savoie, the number of recipients of the minimum active solidarity income remained high: + 22 % between 2019 and 2020.

6 Strengthened thanks to the exchange rate with the Swiss franc, which has gone from 1,60 Swiss francs (CHF) for 1 euro in 1999 to almost parity today [10].

Switzerland. It takes the form of a Franco-Swiss discussion and decision-making area, corresponding to a European cross-border metropolis: this cross-border conurbation bringing together the Canton of Geneva, the district of Nyon and the French Genevan metropolitan area, in detail:

- Canton of Geneva
- Community of communes of the Pays Bellegardien
- Pays de Gex agglomeration community
- Annemasse Agglomeration Community
- Thonon Community of communes Arve et Salève Agglomeration Community
- Community of communes of the Genevois
- Community of municipalities Faucigny-Glières
- Community of communes Pays Rochois
- District of Nyon

A forward-looking agglomeration plan has provided a framework for development shared by all the territories. At the heart of this plan is the question of commuting between France and Geneva. The employment area covers approximately one million inhabitants over more than 2 000 km²: 50 % of the French population in this territory works in Geneva.

In a logic of catching up, a strong response from Greater Geneva to deal with road congestion was the launch of the Léman Express project. It aims to put Geneva and its French hinterland on a new trajectory to reverse the trend of strong and congested growth in road traffic and pollutant emissions. Indeed, this RER-type rail service offers a modal alternative that is finally credible in order to meet the very high demand for commuting by French people working in Geneva and the resulting environmental damages that it implies (CO₂ emissions, noise and local pollution). Could this new Léman Express service meet the challenge of strong growth in mobility? Will it help reposition Geneva as a major European metropolis?

A RESPONSE TO THESE CHALLENGES THROUGH A CROSS-BORDER RAIL PROJECT OF METROPOLITAN SCOPE: THE LÉMAN EXPRESS

A response to the challenges of mobility in Greater Geneva took started 15 December 2019 with the launch of a major metropolitan rail network, the Léman Express⁷. On

7 At the same time, the Annemasse-Geneva cross-border tramway was inaugurated in 2019, which is obviously much slower. The Léman express has led to an increase in the range of soft and low-carbon mobility services in Greater Geneva: 200 km of cycle paths have been made permanent (a greenway links Annemasse to Geneva, using the roof of the CEVA tunnel in some parts), 4 BRTs, 3 trams.

schedule, the new regional rail service – the first cross-border metropolitan rail service in Europe – will serve Geneva, the Canton of Vaud and, above all, Annemasse and the neighboring French departments (Ain, Haute-Savoie). After a year and a half of operation, Annemasse station is thus becoming the second most important interchange hub in the Auvergne-Rhône-Alpes region behind Lyon Part-Dieu. Let's try to draw up an initial assessment.

Let us show its impact on mobility: Geneva-Annemasse in 23 minutes, as opposed to more than 50 minutes previously. This project is not new, since it dates back to the 19th century, when a link was missing between the French rail network and Switzerland⁸. Preparatory work began in the 1850s and a Franco-Swiss agreement for the construction of a link between Geneva and Annemasse was signed in 1881. The project was even imagined in 1912. The rise of the automobile and Franco-Swiss rivalries put it on hold and it was not until 2011 that work began on the project, which will lead to its inauguration on 15 December 2019.

In all, there are 230 km of railway lines in Switzerland and Auvergne Rhône-Alpes with a central axis in a 16 km tunnel, 2 km of, which in France leads to the Annemasse station, which has been modernized, as well as its surrounding areas. This rail service stops at 45 stations in France and Switzerland (including 4 new underground stations in Geneva), which has enabled the city to launch numerous urban and housing projects, with a current terminus at Coppet station, near the castle of Germaine de Staël (1766-1817)⁹. It is currently the largest cross-border railway network in Europe. It consists of 6 lines: L1 L2 L3 L4 L5 and L6 (see diagram below). It offers a service with a wide range of hours from 5:00 to 00:30 on weekdays between Annemasse and Geneva. The frequency reaches 6 trains per hour and per direction between Annemasse and Geneva. On the other branches of the network, the frequency is 2 connections per hour with interconnections designed with the TER trains of the Auvergne Rhône-Alpes Region. Finally, a great deal of work has been done on both the Swiss and French sides to improve interconnections with the public transport networks, to develop park-and-ride facilities and multimodal interchange centers. The use of bicycles is growing rapidly and, during the rush hour at the end of the day, many cross-border commuters are equipped with folding bicycles to get home.

As for the rolling stock, each country wanted to use its national manufacturer to provide the rolling stock, i.e., 40 brand new comfortable trains. Alstom, on the French side, produced the 17 French trainsets¹⁰ for € 210 million and Stadler, on the Swiss

8 See the very interesting issue of the *Revue Générale des Chemins de Fer (R.G.C.F.)* - Nr. 296 of September 2019 [11].

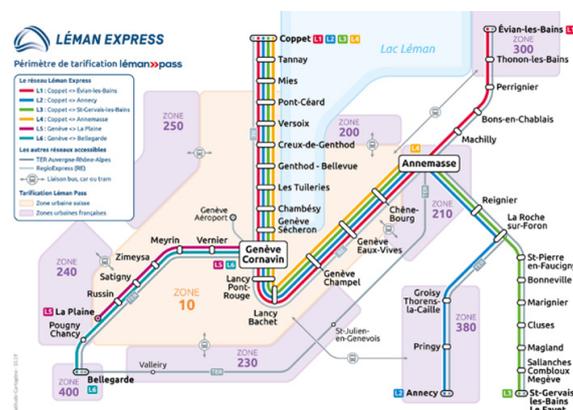
9 A proud opponent of Napoleon, who exiled her to Coppet. She was the first to describe, in the romantic wave of the first half of the 19th century, Germany as a homogeneous space, certainly disunited at that time but driven by a dynamic of artistic, literary and scientific creativity, which displeased the emperor.

10 The Auvergne Rhône-Alpes Region has indicated that it has ordered ten more train sets for reinforcement.

side, built the 23 Swiss trainsets. The rail service is timed with a high frequency, for example from Annemasse but also from the other major centers of Greater Geneva, which poses formidable operating difficulties in the event of incidents or delays. Annemasse nevertheless remains a real railway frontier as it is also the terminus of the Swiss Regio Express trains, which have Saint-Maurice as their destination, serving Geneva and the CEVA stations.

The entry into service of the Léman Express should enable a reduction in motorized traffic of 12 %, which is enormous. Despite some operating difficulties due to bottlenecks on the SNCF regional network and problems in recruiting SBB drivers under the pressure of the pandemic, the Léman Express has found its public with 45 000 passengers at the beginning of March 2020 [9], close to the target of 50 000/day. A peak was reached around 26 February 2021 with 49 000 passengers per day. Thus this rail service allows first of all French people with a border permit to reach their place of work in Switzerland. Annemasse, for its part, is betting on the development of tourism with a welcome reception center and mobility center. On the Geneva side, the 4 underground CEVA stations have made it possible to rethink mobility and urban planning in the refuge city. CEVA is thus accompanying a new direction in mobility in Geneva and is used as a mode of urban transport: 50 % of the flows concern local travel in Geneva and 50 % cross-border travel.

Figure 2. Transport plan



Organization of the links:

1. Coppet – Annemasse with L1, L2, L3, L4 and Regio Express connections

Monday to Sunday, from 5am to 12:30 pm: a train every 15 minutes

Friday and Saturday nights: one train every hour, all night, between 00:30 and 5:00.

RegioExpress trains are extended to Annemasse from Saint-Maurice, Vevey and Lausanne (stop at Lancy-Pont-Rouge and Genève-Eaux-Vives), with a train every 30 minutes from Monday to Friday and one train per hour at the weekend.

Annemasse – Evian-les-Bains – Annecy – St-Gervais-les-Bains-Le Fayet.

2. L1, L2, L3 and TER:

One connection per hour, in both directions, and two connections per hour, during peak hours.

The connections are direct or in connection (Annemasse or La Roche-sur-Foron) with the TER, the TER buses or the Léman Express buses.

3. Coppet – Geneva

A train every 15 minutes from Monday to Saturday and every 30 minutes on Sunday.

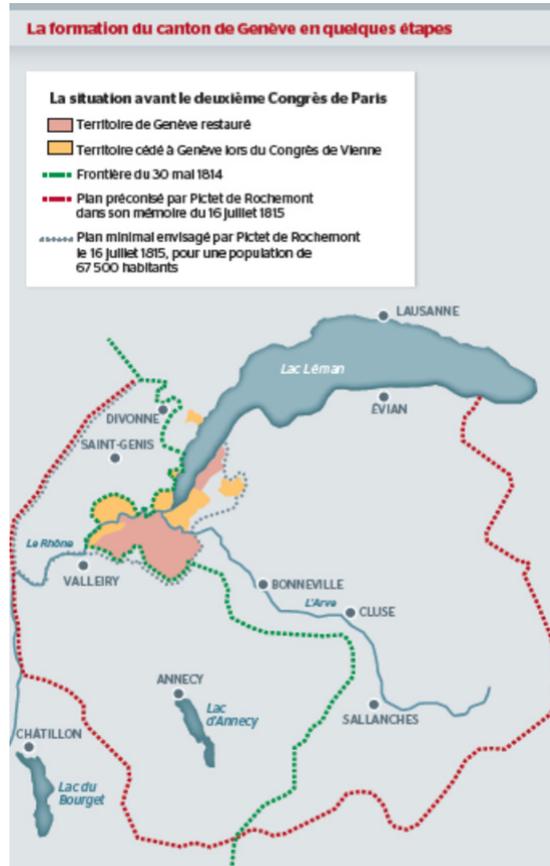
4. Geneva – La Plaine

Monday to Saturday: a train every 30 minutes, then every hour in the evening. On Sunday, a train every hour.

5. Geneva – Bellegarde (Ain)

Monday to Friday: every hour, during rush hour.

It is interesting to note that the hinterland of the new Léman Express service, i.e., its area of influence, corresponds roughly to the "*Greater Geneva of 1815*" desired by the Genevan diplomat Pictet de Rochemont at the Congress of Vienna in his memorandum published on 16 July 1815. Taking advantage of the French defeat at Waterloo, the plan - see diagram below – recommended integrating the Arve valley, Annecy and its lake and a good part of the Ain department into Geneva. Fortunately, the intrigues and diplomatic finesse of the Prince of Talleyrand and his team at the Kaunitz Palace in Vienna made it possible to counter this proposal!

Figure 3. Geneva at the Vienna Congress 1815

Source: [8].

CLEAR AND TARGETED FUNDING

This section aims to make an ex-post assessment² of the amounts invested in the project. In keeping with a tradition that is deeply rooted in Swiss public management, the work was completed on schedule, in December 2019, without any major cost overruns. This did not prevent a few start-up failures, which a longer running-in period, from a more French perspective, would perhaps have helped to limit.

The Auvergne Rhône-Alpes Region was at the heart of the financial package for the financing of the Léman Express as shown in Table 1. It is contributing 52 % (€ 320 million) of the total funding on the French side, which amounts to € 612 million. If we add the necessary work on access, park-and-ride facilities, stations, the Annemasse technical centre and work to reinforce the rail infrastructure, the Auvergne Rhône-

² See Issue 296 of the Revue Générale des Chemins de Fer (September 2019) for a precise analysis of the projected financing of CEVA and the Léman Express rail service.

Alpes Region estimates its total financial effort at € 400 million in 2021. To this must obviously be added the coverage of the operating costs of the Léman Express service, which will vary greatly depending on the periods of confinement and the use of teleworking, which will reduce the commercial revenue.

To speak of the Auvergne Rhône-Alpes region is to forget that Switzerland is the main contributor to the financing of this infrastructure, which is primarily built in Switzerland: with a total bill of € 1,8 billion, Switzerland contributes three times more than France. This helps to explain, in part, why Lémanis, as a Euroregional cooperation grouping (ECG), is 60 % owned by the SBB and 40 % by the SNCF.

Table 2. Balance sheet for the financing of the Léman Express

France		Switzerland	
Auvergne Rhône-Alpes region share - CEVA + Léman express		Total cost CEVA + Léman express	
Infrastructure (CEVA - 2km in France)	55 m €	234,2 m €	1 390 billion € for the 14km of CEVA in Switzerland, the rolling stock (20 Stadler Flirt) and 5 new stations
Railway equipment (17 Régiolis trains - Alstom (+10 in reinforcement))	210 m €	210 m €	
Regional stations (18 SNCF Réseau stations)	36 m €	149,3 €	162 m: stations and crossings 53,5m: intermodality 230m to Geneva Public Transport (TP interconnections).
Maintenance workshop (Annemasse)	14,7 m €	14,7 m €	
Various	3,7 m €	3,7 m €	With approximately: 44 % Canton Republic of Geneva 56 % Swiss Confederation
	400 m € in total	611,9 million	1,835 billion

Source: Auvergne Rhône-Alpes Region, various cross-checks.

On the French side, most of the territory's players have participated in financing the French section of CEVA, i.e., 2 km for a total cost of € 234,2 million, which again shows a certain unanimity in the face of an infrastructure that is fundamental for today's and tomorrow's mobility in the cross-border metropolis of Greater Geneva. The Haute Savoie department is contributing € 65 million, the main funder, the

Auvergne Rhône Alpes region € 55 million, the State € 45 million, SNCF Réseau € 35 million, the EPCIs of Haute Savoie € 18,75 million, the Swiss confederation € 14,5 million and the European Union € 1 million for preparatory studies.

The action of the Auvergne Rhône Alpes Region has also focused on the stations of the Léman Express and their development, with good results, such as Annemasse, even if the development work was not completed by May 2021. For it is the 18 stations served by the Léman Express that the Region's action has mainly focused on. Out of a total budget of around € 150 million, it has financed a little over € 50 million, and this in all the areas of action:

- Alongside SNCF Réseau, for example, for the platforms and access to the station network (8 stations modernised in 2018 and 10 stations in 2019-2021), but above all for Annemasse station, with 30 % of the regional funding (total operation around € 14 million).
- Alongside SNCF Gare et Connexions with almost 50 % of the funding, especially for Annemasse station (a little over € 16 million in all).
- At the level of local authorities for developments and surroundings with an average project support of 20 %.

In the summer of 2021, many actions are still underway and the success of the Lemman Express service calls for new actions to modernise and upgrade the service.

To date, the 2015-2020 CPER has made it possible to make the service operational: first of all, of course, the missing link of the CEVA in France (2 km), especially in a cut-and-cover section; then the reorganisation of the Annemasse track plan², the automated modernization of the previously manual signaling between Annemasse and La Roche-sur-Foron – this single track, with crossing points, is a common trunk line that opens onto two branches, those of Annecy and Saint-Gervais. modernisation of the third branch of the Léman Express towards Evian and Thonon, this station being controlled from Annemasse; and finally work to remove two level crossings at Etrembières and Reignier.

SNCF Réseau is waiting for a number of additional works that will improve the reliability of the network, which is a single-track network (except towards Bellegarde). There is currently talk of making the crossing points at Pringy and Saint-Pierre-en-Faucigny more robust, equipping them with GSM-R and installing storage tracks at Annecy and Saint-Gervais.

2

7 tracks now including 2 with Swiss type electrification allowing direct access to the SBB network.

Finally, the Region attaches importance to the reinforcement of video-protection in the vicinity of railway stations and subsidises the municipalities that act in this direction.

FUTURE PROSPECTS FOR THE LEMAN EXPRESS

After a year and a half of operation, badly affected by the successive crises of the COVID, which saw alternating periods of lockdown and recovery, but also use of teleworking and Therefore, a drop in travel, certain lessons can nevertheless be proposed to improve the robustness of the "Léman Express" system.

Infrastructure side

The central bottleneck of the "Léman Express" system remains, on the French side, a single-track railway infrastructure, with the exception of the Geneva-Bellegarde axis. The slightest delay on the French side leads to a domino effect of delays on train movements, which affects the timetable. Despite ongoing modernization, traffic management is still very manual, with 40 to 50 agents assigned to this task. Haute-Savoie was in fact very under-equipped in terms of rail infrastructure in favor of motorway routes. The Léman Express marks a major change of direction, which calls for new and indispensable investments in rail infrastructure investments, which are obviously complicated, in the name of the principle of territorial equity, in a privileged region and one of the richest in France!

The Léman Express must also meet the challenge of Franco-Swiss rail interoperability, from the different electrical voltage to the real-time passenger information system, which has proved very complex to interoperate between the two countries, at least at the beginning.

On the traffic side, Annemasse station now has 280 trains per day, compared with 70 before the new Léman Express service. Seven tracks are dedicated to operations, with two Swiss-type electric tracks, three tracks (C-D-E) for the Léman Express and two tracks for TER, TGV and Freight. SNCF Réseau experts predict that the station will quickly become saturated and are calling for new investments.

Finally, conflicts sometimes arise between the Lyria TGV, Léman Express trains, TERs and freight, for example for the transport of Evian water.

On the Swiss side, numerous works will be scheduled on the network. Geneva Cornavin station remains saturated and a major redevelopment plan will be launched in 2023 for many years (underground station), which will lead to work periods that

conflict with the Lemman Express services (L5 and L6 Geneva – Bellegarde).

Operational side

The strength of the new Franco-Swiss rail service is an end-to-end service with no load break at Annemasse (for lines L3, L2 and L1), which results in a very high traffic density with a train every 6 minutes at Annemasse. The interest is obviously a direct link between Annecy (L2), Saint-Gervais (L3) and Evian (L1) with Geneva via Annemasse. Since 5 April 2021, the Franco-Swiss Léman Express network has been operating at full capacity. At the very beginning, due to problems with the rolling stock and the timetable, but also since 18 May 2020 due to a lack of SBB drivers trained for France, all trains stopped at Annemasse and, with a change of train, a shuttle train left Annemasse for Geneva. Fortunately, the Lémanis teams managed to return to the initial end-to-end service (especially Annecy-Geneva direct) but this hesitation in Franco-Swiss management led to fears of the worst, namely a break in Franco-Swiss continuity and Therefore, a failure of the offer!

Punctuality remains good for trains that are not cancelled. In fact, if the expected train is more than 10 minutes late, it is cancelled because it becomes unmanageable to integrate it into the traffic. These cancellations are very much decried by customers, particularly on social networks. On the French reference basis (4 min 59s), punctuality is 98 % (TERs in the Auvergne Rhône-Alpes region have a rate of 89 %).

The hardware went through a burn-in cycle that resulted in some adjustments in the first few years of operation. The Stadler Flirt had serious software reliability problems that have been largely resolved today. The Alstom Regiolis trains also underwent some running-in adjustments. Driver recruitment was not easy on the Swiss side, with the labour market under great pressure due to a shortage of manpower. The Covid and the withdrawal of rolling stock handicapped the first months of operation, with a drop in supply to cope with these shortages.

Finally, the launch of the service in December 2019 coincided with an SNCF strike, which disrupted the tests and did not improve the complex but cordial relations between the Swiss and French managers.

A major challenge for the service is to achieve reciprocity in passenger flows between France and Switzerland, i.e., to make Haute-Savoie more attractive to Swiss tourists, for example to the Arve Valley and to Annecy. Lémanis is currently working in this direction (information campaign). It is a pity that the Annemasse station has been delayed by more than a year and a half in its development -, which should nevertheless be superb! Numerous park-and-ride facilities and improved station

access have been built in this respect.

Pricing and Franco-Swiss intercultural management

The Léman Pass fare system is the great success of this fare community, both because of its simplicity (two fares, one French (classic TER unchanged) and the other Franco-Swiss for a cross-border journey³) and its low cost. This pricing system has led to changes in the organisation of inter-municipal cooperation in France, with mergers of inter-municipalities and genuine cross-border mutualisation. Thus, on 1 January 2019, a major merger of communes was agreed between the communes of Bellegarde-sur-Valserine, Châtillon-en-Michaille and Lancrans, which become Valserhône (approximately 16 500 inhabitants). These municipalities belong to the Greater Geneva area and are 30 km from Geneva and 15 km from the French-Swiss border. The L6 line of the Léman Express connects Bellegarde and Geneva Cornavin. In mid-December 2020, an agreement relating to the Léman Express fare community was signed between Valserhône – and its Mobi'Vals transport network – and the Léman Express for greater cross-border fare integration: investment costs are shared 50 %-50 % between the canton of Geneva and the French organising authorities⁴, with Valserhône's share amounting to 2,13 %. Similarly, a distribution of the operating costs has been validated: Valserhône will have to contribute between 3300 and 4748 € per year to the scheme until 2024. The mayor of Valserhône observes this tariff integration with interest: "What is interesting in this system is that we are entering more and more into this cross-border mutualisation" [9]. What a project!

But it is in the ratio of revenue to expenditure (R/D), close to 20 %, that the new Léman Express service offers us its greatest surprise or disappointment! Indeed, in a privileged region with a high income, the R/D is at a lower level than the TER Auvergne Rhône-Alpes (R/D close to 30 %). The Léman Express is Therefore, largely subsidized by the taxpayer and/or the debt! The Auvergne Rhône-Alpes region estimates its financial contribution under the operating agreement with SNCF Voyageurs at € 27 million. The commercial revenues must be deducted from this amount, but during the periods of confinement or recourse to teleworking, they were very low, which led the region to add even more! The Region Therefore, compensates for the commercial revenue between France and Switzerland: the organising authorities⁵ cover 100 % of

3 The Léman Pass ticket or season ticket allows you to use the trains, trams, buses, "mouettes genevoises" and transport networks of the 10 partner operators. It is extremely simple to use: all you need is a ticket to travel on cross-border public transport.

4 Currently 8 organising authorities: Republic and Canton of Geneva, Auvergne-Rhône-Alpes Region, Annemasse agglomeration, Grand Annecy agglomeration, Thonon agglomeration, GLCT public transport, Communauté de communes Pays d'Evian Vallée d'Abondance, Commune de Valserhône.

5 Six organizing authorities manage public transport on the French side. This institutional fragmentation, which is very French, poses formidable coordination problems. The French Geneva metropolitan area is currently considering a single transit authority. With a more integrated A.O. on the Swiss side, Geneva is considering an urban toll, the revenue from, which could be used to develop cross-border public transport services in particular.

the costs of public transport, in particular the Region for the Léman Express. There is Therefore, a certain gap between the level of fares and the rather high standard of living in the region. One explanation lies in the strong Swiss influence on the service, which aims to provide a strong incentive to use public transport (in the wake of the Swiss unireso⁶ card, for example).

Finally, Franco-Swiss governance seems to be well organized around production committees every two months, and Franco-Swiss pairs at all levels for the management of the network and operations.

CONCLUSION

The Léman Express has confirmed its relevance as a quality and innovative alternative modal offer to the car. Its beginnings are promising after a running-in phase, which now seems to be over. The offer has found its demand, with 45 000 passengers per day on average.

Our interviews with the actors of the Léman Express system revealed three main areas of work:

1. The reliability of the rolling stock, and above all the avoidance of train cancellations, which are very badly perceived by passengers, but also the optimization of the passenger information system and making it truly interoperable between the French and Swiss systems.
2. Study and prevent future saturation of the service, which calls for reinforcement of the rolling stock, but above all the elimination of the infrastructure bottlenecks in France, i.e., the single tracks or at least the automation of their operation, towards Annecy, Evian and the Arve valley. It is also necessary to prevent future operating constraints linked to the numerous works on the Swiss side: Geneva (Cornavin station, Coppet axis⁷).
3. Study an extension to the Haut-Bugey in connection with the TER (regional express trains) because the hinterland of Geneva is growing.

In the long term, for the transport scientist involved in a reflection on European transport policy, the question arises as to the compatibility of this rail service with the European texts calling for competition in regional passenger rail services. This is not a question of competition on the market, as with rail freight, but of competition for the market in the context of tendering, in line with the provisions of the new rail

6 The unireso card offers a common tariff between three public transport companies in Geneva: the TPG (Geneva public transport), the CFF (Swiss Federal Railways) and the mouettes genevoises (shipping).

7 In the summer of 2021, for example, trains to Coppet stopped at Cornavin (Source: SBB).

law (Journal Officiel – law no. 2018-515 entitled "for a new rail pact"). Admittedly, these provisions only apply to France, but the Swiss authorities are following the developments of the major European railway reform very closely and sometimes draw inspiration from them. Would another operator be likely to promote an innovative, differentiated service with improved quality of service? And why not imagine, as should have been the case, a single common rolling stock for the entire network?

And finally, could we not imagine a total automation of the Léman Express service at a time when the autonomous car is making considerable progress in an unconstrained space, whereas the rail system is a simple, guided mode?

What about the future? Will the new configuration of mobility in the Greater Geneva area lead to new institutional adaptations, for example Franco-Swiss (a joint Franco-Swiss organizing authority) in order to advance even further in the network of European metropolitan areas? There are signs of this. The Lemman Express network is just one step for Geneva on the road to regaining its natural place as a leading European metropolis. A vote in February 2014, by a large majority, made it possible to set up a railway investment fund (FIAF), which will enable the synergies of the Greater Geneva railway network to be strengthened. For example, traffic forecasts on the Swiss side between Lausanne and Geneva could increase from 50 000 journeys per day in 2010 to almost 100 000 in 2030, which should lead to a quarter-hourly interval for the Léman express and links to the canton of Vaud with a planned doubling of seating capacity. Geneva station, like Renens station, should undergo extensive development, in particular an underground extension for Geneva-Cornavin.

These prospects should provide strategic thinking for Lyon, the regional capital, as well as Annecy, Chambéry and Grenoble, in order to position themselves in the new European metropolis.

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