Continuity and Change

2010

Annual Report

sma

A story in pictures In accordance with the theme of this annual report, we selected a story in pictures to accompany it.

René Groebli was born in Zurich in 1927. Over 60 years ago, he created in Paris the fascinating images in his series, "Magic of the Rails" and in so doing beautifully captured the dynamism and optimistic spirit after World War II.

The pictures of microsections of electrical-resistance rail welding are a half-century younger. Our thanks go to the company Schlatter Industries AG of Schlieren, Switzerland, for permission to use these images here.

Contents

Continuity and change again accompanied us in 2010. Our clients came to us with a large number of very different questions, resulting in almost hundred larger and smaller studies and projects, whose variety is hardly imaginable. In every case, solutions that have been proposed will mark the future of rail transport – be it in the form of better services, new infrastructure or improved processes.

Among these studies the highlight of the year was undoubtedly the new national timetable concept in France. The opening of the Rhine-Rhône high-speed line will bring a timetable change at the end of 2011 on a scale that could not have been imagined just a few years ago: all TGV trains and most regional services will operate on a new timetable concept developed by SMA that combines a systematic approach and market flexibility in an innovative way. So much for continuity.

A profound change has occurred since 2008 that is hardly visible for our clients but that is of decisive significance for SMA: a second generation of management has succeeded the company's founders. This has been tied with the creation of an organisational structure and the transfer of responsibilities for specific areas.

In accordance with our understanding of management, our employees were heavily involved in this process. It yielded documents describing the company vision, eight promising strategic areas and a corresponding company organisation. Just as important are the cultural values and principles that stand behind our daily actions. All participants were conscious of the significance and complexity of the process – surprises and detours could never be ruled out. But the effort was worth making: the company stands today as a well-organised entity with a clear common vision.

For our clients, this means that they can work with project managers who have a deep knowledge of their assigned project but who at the same time can call on broad international knowledge of similar questions.

Change and continuity will also accompany us in the future: continuity concerning the very high quality of our products and services, and change in anticipating and participating in new developments in public transport and in establishing its role in the society.

The company's vision and strategy for the future

Between 2005 and 2010, the number of employees and the turnover of the company doubled. A number of factors have contributed to this success:

- a company profile characterised by integrity, professional competence and absolute neutrality thanks to our independence from suppliers or others, and many years of experience in communicating the complex railway operational issues combined with a stable internal and external corporate identity
- our status as a well-known company among European specialists
- a strong growth potential within and outside of Europe in a market with steady, long-term growth prospects
- a strong capacity for generating turnover based on our strategy of both providing services and selling products
- a development portfolio with new implementations and the redesign of existing IT tools in order to secure the long-term strength of client relationships
- a new dynamism with the transfer of responsibility to the second generation of company management

We have thus reached an important milestone in our progress forward from technical to strategic consulting and in profitably combining these two elements.

In the wake of the growth of recent years, there was no other choice for SMA than to actively examine perspectives and expectations for the future. In the context of a planned long-term process, and with the involvement of management and employees, we developed and documented a company vision and strategic principles.

Our vision as the guiding path for company continuity:

- An independent company, SMA is the leader in consulting and engineering services for the planning of railway systems
- Our information systems group lends essential support to our activities and creates applications for the railway sector
- We deliver innovative, feasible solutions with high added value
- The keys of our success lie in the motivation of our employees, our technical skills, our cultural values and also in the quality of our work environment

A strategy for the future in the context of growth and change To be prepared for the future, it was necessary to define and harmonise the strategy and structure of the company. The result of these efforts is a business plan that foresees continued growth. This should help mitigate the consequences of our exposition to exchange rate fluctuations as an international company.

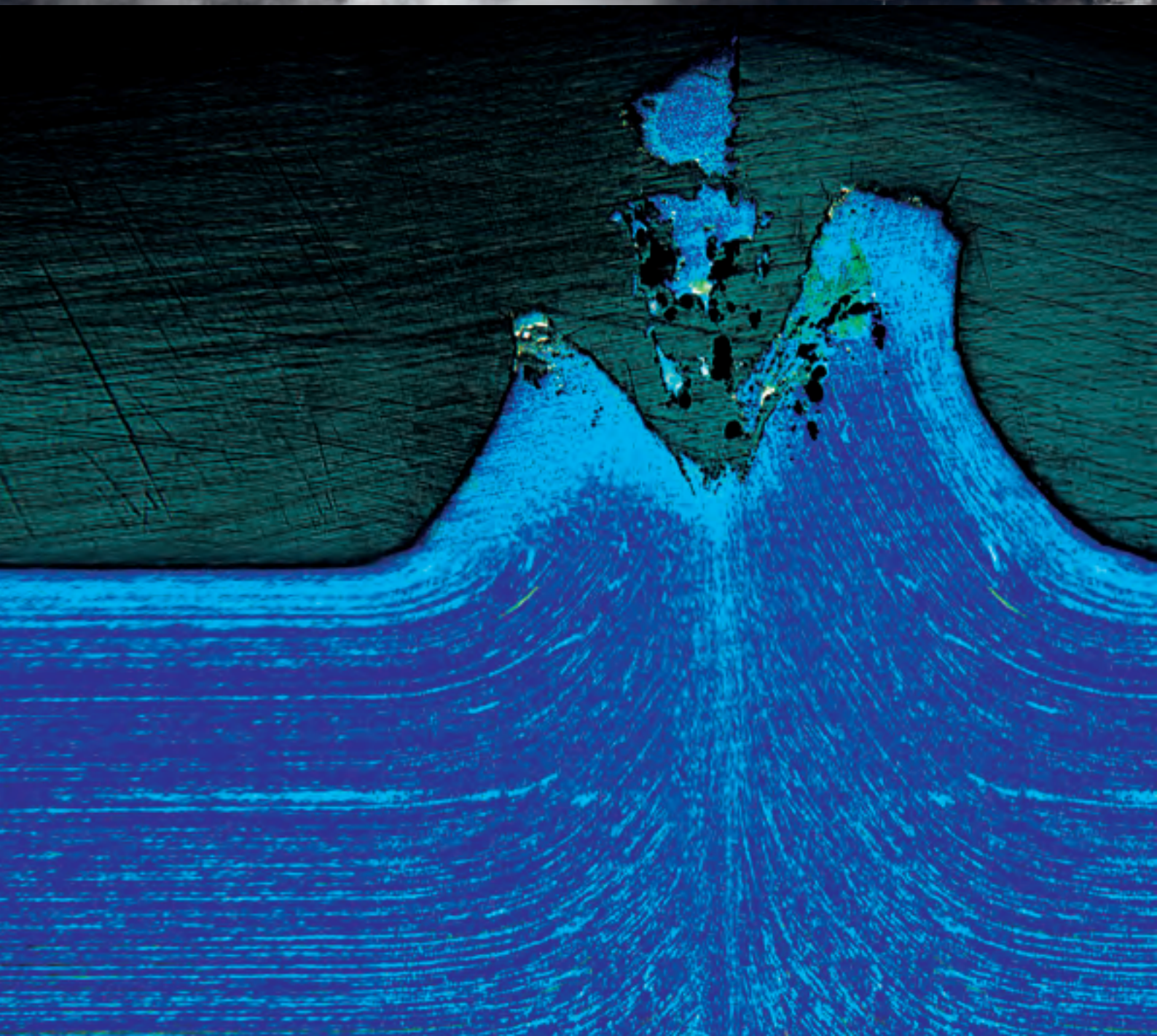
A successful future calls for planned growth. By identifying and implementing eight business areas, we are focussing the company's energies on core competencies that show our clients that SMA is a professional partner and clearly differentiate us from our competitors. It also means that the recruitment of new employees and their ongoing training is still among our central success factors.

With our strategic thinking, market-oriented vision and high capacity for innovation, we are actively shaping the complex changes in our sector and are creating at the same time the basis for further growth. All early forecasting indicators suggest that we will reach our established goals.

The development of sustainable mobility, particularly in rail transport, will continue to mark SMA in the coming years. On the basis of our experience until now and – to the extent possible – in anticipation of the future, we have divided our domain of activity into eight strategic areas:

1 Service and timetable planning
2 System optimisation of railways
3 Optimisation of operations
4 Viriato and other IT products
5 IT services
6 Methods for timetable evaluation
7 Process consulting
8 Strategic consulting

We have placed each of the following reference projects in one of these eight areas, although such an assignment is not always easy. Generally, a study combines issues from several topic areas.



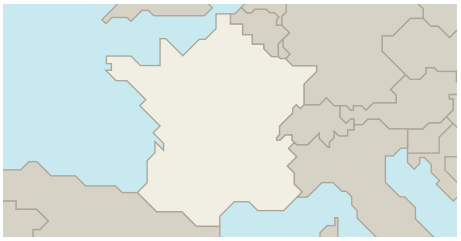
1 Service and timetable planning Throughout the world, railways are confronted with a continually changing market for mobility. They are meeting these challenges by many means, including vehicle comfort, customer service, pricing and distribution. But all these marketing activities are based on the service offering, i.e. on a timetable consisting of a number of trains, stops, running times and connection times. When a railway network still has capacity reserves, trains can be added as needed. But the greater the utilisation of capacity, the more often a redesign of the whole network is needed in order to once again increase service without major infrastructure enhancements. Such tasks are marked by countless constraints that tightly limit any scope for creativity. But thanks to a precise combination of creativity, technical know-how and supporting IT tools, we have again and again found innovative solutions.

Stuttgart 21 Seldom has a rail project raised political waves that go far beyond its own domain. Taking the number of hits in Google as an indicator, Stuttgart 21 achieves values similar to those of TGV or the Swiss project Rail 2000, which people have been discussing for over 20 years.

As long-time advisors to the regional authority for public transport of the German federal state of Baden-Württemberg, we suddenly stood in the centre of public interest. Partial results from internal documents reached the press; in public debates, supporters and opponents of Stuttgart 21 referred to SMA studies.

At the end of November, the declaration of mediator Heiner Geissler brought clarity: supporters and opponents agreed to subject the Stuttgart 21 project to a "stress test". The German Railway is to demonstrate that in peak periods, 30 % more trains than today could run with good operational quality. In its role as a neutral expert, SMA is to audit the study and evaluate its results.

As we started work, we took great care, particularly in the methodological definition of what a stress test of a railway system should contain, on what principles it should be based and what constraints it should respect. Work is still in progress as this annual report is going to press.

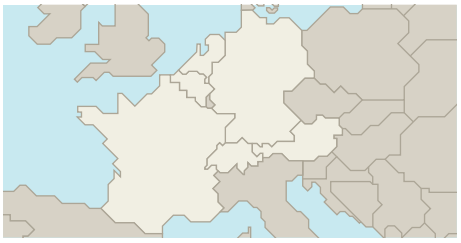


2012 fixed-interval timetable for France In some regions of France, fixed-interval timetables were already introduced in 2008–2010. This led the French rail infrastructure operator RFF to assign us the task of developing a nationwide fixed-interval timetable concept for 2012, the launch year of the Rhine-Rhône high-speed line.

We thus worked out a system of fixed-interval timetable paths for TGV, intercity, regional and freight trains and made it available to RFF. Geographically, the task included the four sectors for long-distance trains (southeast, Atlantic, north and east), about 20 regions and the metropolitan area (RER) lines in greater Paris, all of which had to be coordinated.

After several iteration steps in collaboration with SNCF, the French regions and other train-operating companies, the project converged onto a catalogue of system paths that then served as the official basis for setting priorities in path assignment.

On the basis of this global concept, the partners derived the definitive daily timetables. They combine system paths that remain unchanged and other paths that for various reasons differ from a system path. In some regions, the introduction of the fixed-interval timetable was delayed until a later date.

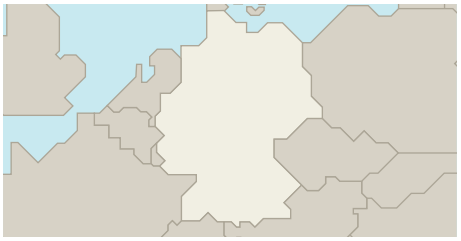


Railteam Network Study 2020 In the context of the "Railteam[1] Network Study", we were asked to establish the best possible timetable concept for the Railteam network for 2020 and to determine the resulting potential ridership. For the very first time, we were able to develop a timetable concept at the European level: a base scenario with the today's and planned trains and two optimised variants with additional line and node structures, each with and without infrastructure enhancements.

The demand forecasts for each variant, developed in collaboration with Intraplan (Munich), showed that new direct services between London and continental Europe and better connections in nodal stations (e.g. Strasbourg and Munich) could increase demand on the network as a whole by up to 10 % and improve the operators' productivity network-wide.

Salzburg fixed-interval timetable 2014 The completion of the remodelled Salzburg main station and more trains on the Western Railway (Westbahn) from 2014 require a new concept for local services throughout the Austrian federal state of Salzburg. The state of Salzburg asked us to develop several timetable variants. The main focus was an evaluation of services and stopping patterns in local rail passenger service.

We also developed cost estimates for the preferred variants. The next steps for implementation of the variants are currently under discussion in Salzburg state.



Tendering of local passenger train operations The tendering of local passenger train operations is an increasingly dynamic area in Germany. Again in 2010, we were able to support government agencies in preparing calls for tender and train-operating companies in preparing their responses. In a call for tenders, an optimal balance must be found between the timetabled services and rolling stock. In recent years, the rail rolling-stock industry has brought modular vehicle concepts to the market. It is therefore ever more challenging to find the variant that fulfils quality requirements but also promises the lowest operating costs.

[1] Railteam is a European alliance of high-speed train operators.

Our work includes activities such as the critical interpretation of tender documents, vehicle evaluation in accordance with the timetable and vehicle rotation plans, the determination of personnel needs and the development of workshop and maintenance concepts. Depending on the case, our client may be a government agency that finances train services, a train-operating company or a vehicle manufacturer – and all this in accordance with the strict non-disclosure of confidential business information to which SMA and its employees are contractually bound.

That's impossible!

"That's impossible" is the usual reply of the honourable old timetable office of the tradition-rich state railway when someone requests an additional train. Today, the answer is not so black-and-white, especially in countries where the principle of competition has taken hold. In technical terms, the answer can be as follows: A solution would be possible, if this number of trains was modified or this or that infrastructure element was enhanced.

In Europe today, with the compulsory separation between infrastructure managers (capacity managers) and train-operating companies (whose marketing plans also include the timetable), there still can be exchanges between the customers and makers of timetables that sometimes take on memorable twists. Thus it was a few years ago that a newly formed company for premium trains developed the following marketing concept and presented it to the timetable makers.

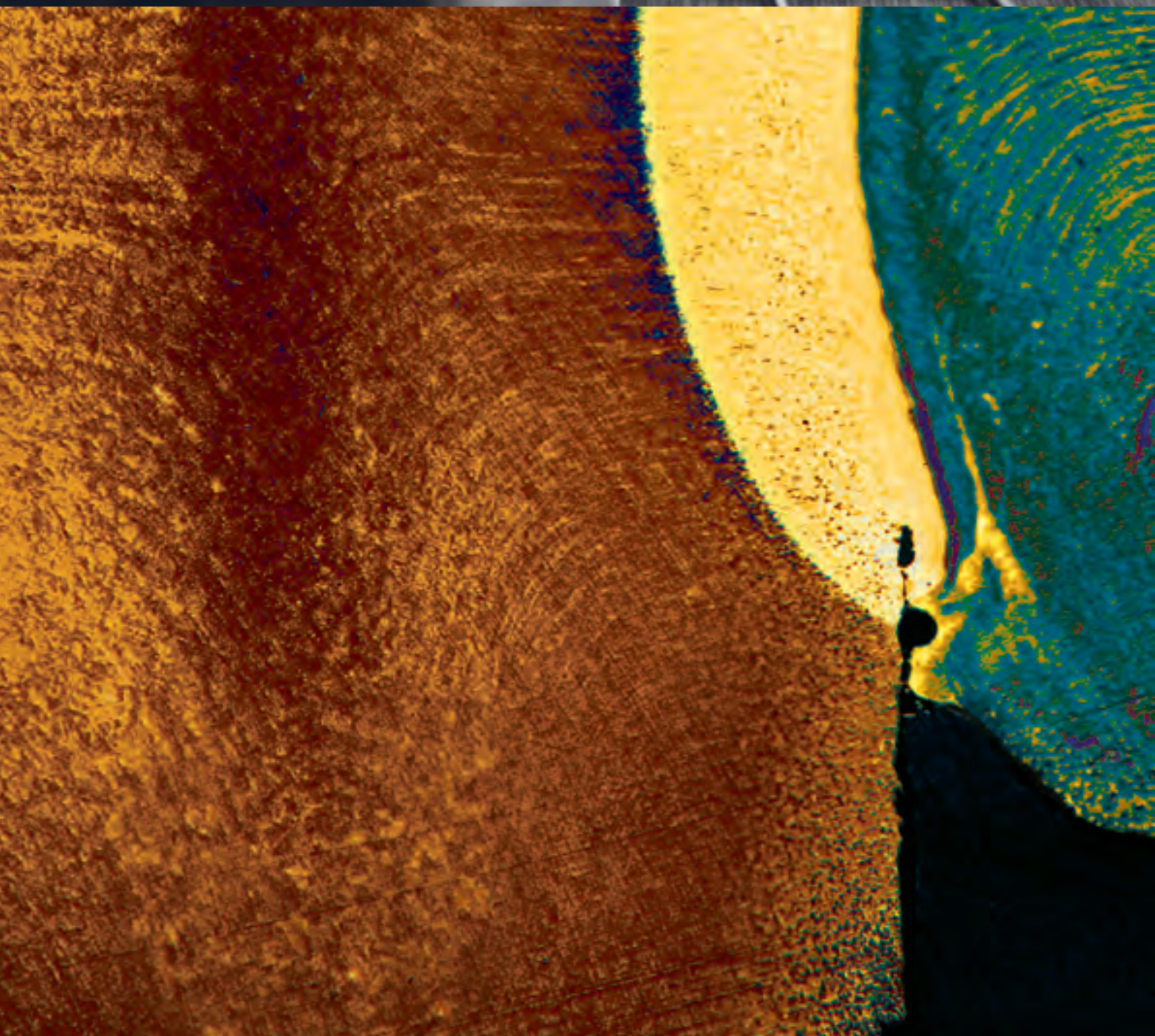
- **Desired run time 3 hours between origin and destination station**
- **Departure from origin station each hour at minute 00**
- **At origin, intermediate and destination stations, stops always on track 1**
- **In all manned stations, premium lounges reachable without stairs from track 1**

The customer and the capacity manager could not agree:
"That's impossible"

SMA then received an assignment to provide mediation, long before this concept was known in the railway world. We found the following compromise solution:

- **Hourly departure at minutes 16 and 11 from the two origin stations**
- **Run time, taking into account all constraints: 3 hours, 30 minutes**
- **Station stops on the platforms of the main tracks, in order not to block other trains**

The trains were bought and entered service, but had few riders. Was the main problem that the trains could not operate on track 1? Or was it that many other elements of the marketing plan were based on characteristics of air travel, for example compulsory reservations, and not on the needs of railway passengers? After a few years, the company ceased operation and was liquidated.

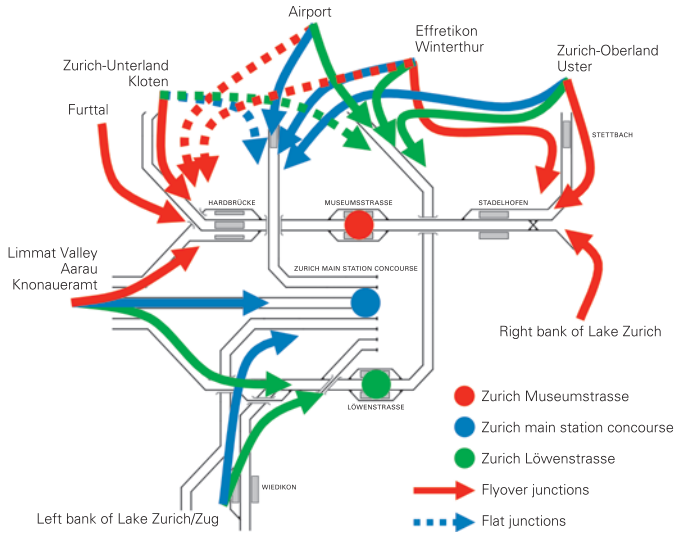


2 System optimisation of railways The system optimisation of railways is a complex task whose variables stem from numerous disciplines. It requires a broad know-how that starts with the transport market, moves then to political, organisational and process-based areas and continues all the way to technical disciplines such as mechanical and electrical engineering and, increasingly, information technology. Our knowledge of these global interrelationships and the ability to recognise the questions and challenges that come out of them are our prime field of expertise and differentiate us from our competitors. In each project, the constraints and the variables are different. Correspondingly, the solutions are also different. Every client, no matter his activity sector, benefits from this broadly supported global, interdisciplinary and international knowledge.

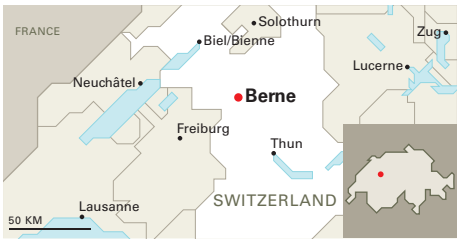
Zurich S-Bahn – the second generation How does the Zurich metropolitan area railway network (S-Bahn) look when demand doubles yet again? This is the question that a planning team of representatives of the Zurich public transport agency (ZVV), the Swiss Federal Railways (SBB) and SMA have been asking themselves in the study "Zurich S-Bahn – the second generation". The goal is to develop an innovative long-term vision for the Zurich S-Bahn.

This is not another incremental improvement in the S-Bahn system, but a fully new conception. The various wishes of passengers on public transport within and outside the city will be taken into account, as will the capacity limits of the network's central trunk between the Hardbrücke and Stadelhofen stations.

Particularly challenging are the approaches to the Zurich node. When entering the main station, trains are fed into one of the station's three parts. The ultimate goal is the elimination of almost all crossing conflicts between lines.

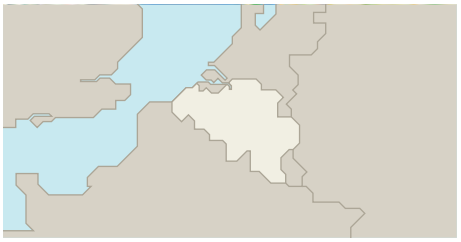


Assignment of corridors into the three parts of Zurich main station



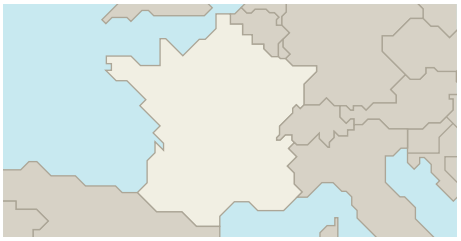
Study for a concept of future services and operations in Bern station The train operation facilities in SBB's Bern station and in the underground stub station of the Bern-Solothurn regional railway (RBS) will reach the limits of their possible capacity in the short to mid-term – or have already reached them. A large set of infrastructure variants is under study to solve this problem. Some variants foresee a partial merger of today's separate SBB/BLS normal-gauge and RBS metre-gauge systems, with a change of the track gauge on some sections. This opens possibilities for new through lines.

Thanks to our analysis, a couple of variants could be eliminated after drafting train service concepts because they would entail too many trains in certain places or because expected operational quality would be insufficient. The evaluation of the remaining variants by means of quantitative indicators of the service concepts (train kilometres and rolling-stock needs) as well as the travel time analysis produced no clear favourite; the calculated indicators all lay in much the same range. The decision among the variants has therefore to be taken on the basis of a political discussion and the infrastructure costs.



Strategic timetable for 2020–2030 in Belgium At the start of 2010, we received the assignment to develop a strategic vision for the horizon 2020–2030 on the basis of a long-term service and operations concept developed by SNCB. On this time horizon, a whole series of new, large infrastructure elements will already be in service in the Brussels area. This gives the opportunity to develop a new timetable concept from scratch, which offers SNCB a basis to correctly dimension production resources, including costs for personnel, rolling stock, energy and path fees.

The timetable study for 2020–2030 that we have conducted permits a realistic pre-dimensioning of costs and is a support for decisions on the ongoing corporate development of SNCB. In a second step, this strategic approach allows the identification of infrastructure requirements. This result will go to the infrastructure operator Infrabel and constitutes an important basis for definition of an overall optimum for both companies.



Strategic timetable for 2020 in France In the context of an internal RFF project meant to show the effectiveness and efficiency of the company's long-term planning, RFF gave us the assignment to develop a strategic fixed-interval timetable for the year 2020.

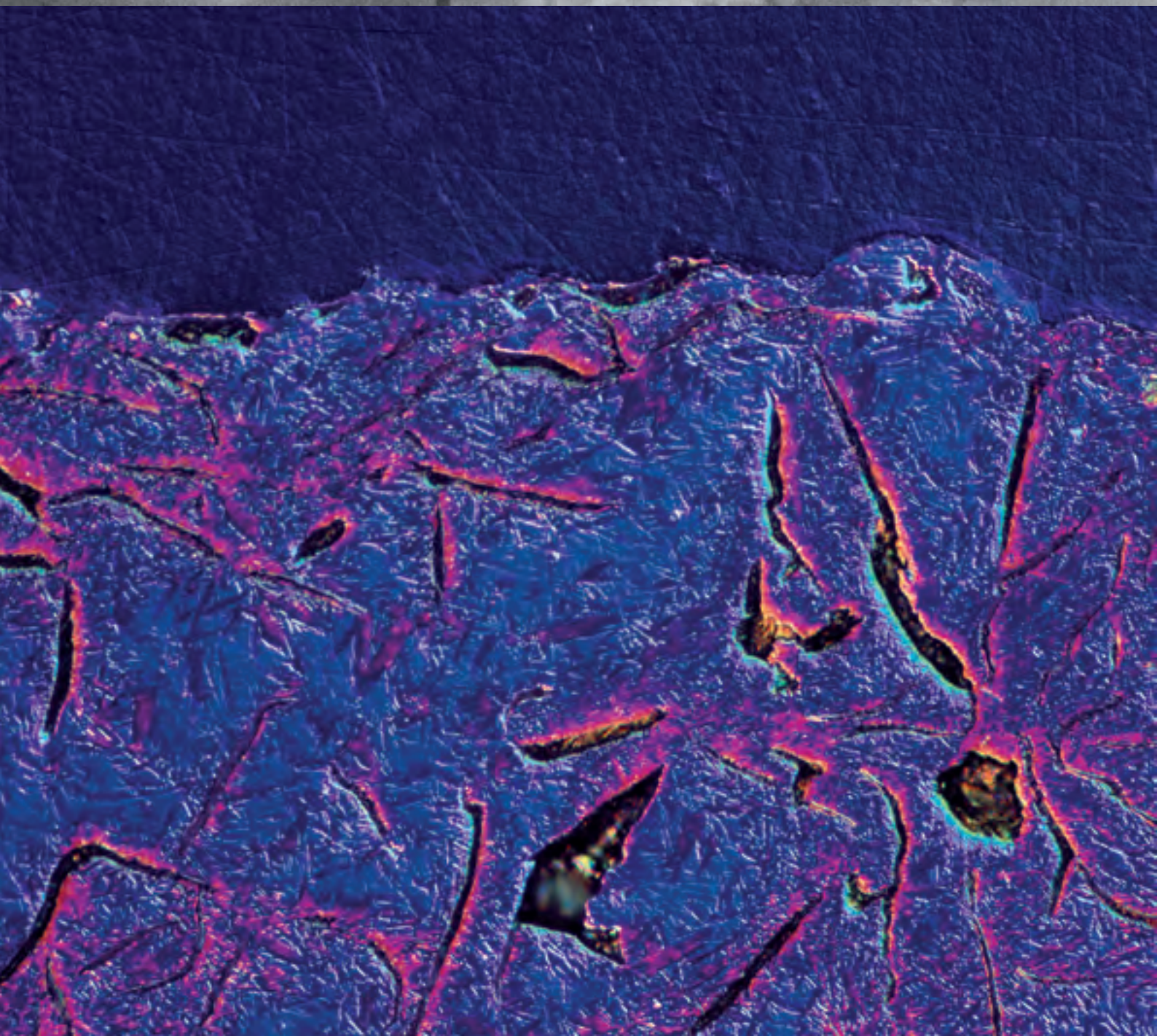
Analogously to the 2012 timetable, we developed a concept for all four geographical long-distance sectors and all regions that handles the expected increase in traffic. From that, we derived the infrastructure required for implementation. For the first time, RFF thus benefits from a nationwide and coherent long-term plan for new infrastructure that is attuned to and optimised for the expected number of trains.

This reference plan also served as the basis for completion of the project for the new Montpellier–Perpignan line, which is to accommodate both high-speed and freight trains between Lyon/Marseille and Barcelona/Toulouse. On the basis of the conceptual timetable, we were able to check the project's coherence with the nationwide plan and formulate precisely defined project extensions that best meet the anticipated wishes of the partners SNCF, regions and other train-operating companies.

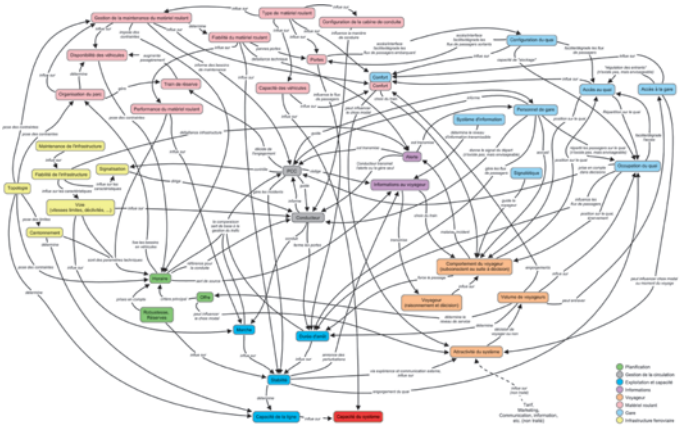
Service and operating concept for the Limmat light rail line (Limmattalbahn) The Limmat Valley west of Zurich is showing fast growth in terms of housing and workplaces – and this trend is forecasted to continue. Following the example of the Glatttal light rail line on the northern outskirts of Zurich, an additional means of public transport having the function of a medium-level distributor is to ensure that mobility growth can be handled properly from both environmental and urban-planning viewpoints. In the context of a multi-disciplinary assignment called "Rail technology and operations", we developed a service and operations concept for the planned metre-gauge light rail line. This concept serves as the basis for the design of the technical rail infrastructure such as track work, stations, catenary and energy supply. Taking into account the evolution of demand, connections to buses, trams, the Bremgarten–Dietikon Railway and the Zurich metropolitan area rail network (S-Bahn) as well as project phases, we developed different service and line concepts. The preliminary project will be completed by the end of 2011 and requires from both the client side (cantons of Zurich and Aargau, municipalities) and consultants (for sub-projects and multi-disciplinary assignments) intensive collaboration that crosses specialist boundaries.

Feasibility study for local passenger service between Aurich and Emden Since 2008, freight trains run again on the line Aurich–Emden in northern Germany. Given the already high demand for movement of wide loads, widening of the line's loading gauge is planned by 2014. This is an opportunity to also restore local rail passenger service on the line. In an assignment from the Aurich–Emden railway infrastructure company, we carried out a study that shows the feasibility and utility of a reactivated local passenger train service between the two cities.

A demand study and a cost-benefit analysis showed that an hourly service with a trip time of 29 minutes between Aurich and Emden is possible and that, assuming an optimal integration of train and bus services, demand growth of up to 90 % can be expected.



3 Optimisation of operations Operations management is the core business of a railway, regardless of whether it is an infrastructure, train or integrated operator. The degree of complexity and the rising saturation of existing infrastructure are constantly increasing the demands on operations management. The most important key performance indicator is punctuality. In fully saturated systems like the central trunk sections of metropolitan area rail networks (S-Bahn) the number of trains operating in the rush hour is another example of such indicators.



In-depth system analyses have shown us that about 40 system components – grouped in the passenger, information, rolling-stock, station design, timetable, capacity and operations management sub-systems – function and mutually influence each other as a complex global system. Today, much of this can be described mathematically. In simulation models of railway operations, and also for the study of pedestrian flows, it is possible to mathematically model conditions as they really exist in order to study and quantify the effect of changes on sub-components.

We have been working for a number of years with the railway simulation model OpenTrack of the company OpenTrack Railway Technology GmbH. With 200 users in 29 countries, the program surely stands among the railway simulation tools used most worldwide. Again and again, the proximity of program developer Daniel Hürlimann has allowed us, with small program adaptations, to take into account local signal systems and train driving and other safety-relevant rules and thus to carry out very realistic simulations.

Jærbanen pilot study At the west end of the Jærbanen railway line – in an economically fast-growing region of Norway – a double-track section between Sandnes and Stavanger with three additional stations entered service at the end of 2009. Since the introductory phase, however, the new 15-minute interval service offered by NSB has been marked by significant delays and train cancellations. For this reason, NSB asked us to conduct an analysis of the existing situation and to develop short- to long-term measures to stabilise and improve the situation.

The analysis showed that the line's propensity to suffer perturbations was due to a timetable unfit for the existing infrastructure. We developed new timetable concepts based on realistic assumptions that could be implemented without infrastructure enhancements. A simulation to assess the timetable proposals showed that punctuality could be significantly improved. The results elicited much interest and the first short-term measures are scheduled to be implemented at the end of 2011.

Development of incident management for Leipzig's city tunnel The rail network of the Leipzig metropolitan area (Mitteldeutsche S-Bahn), whose central trunk is the Leipzig city tunnel, was the subject of a call for tenders for its operation in 2009. The prescribed timetable for 2013 foresees six lines in the city tunnel, each operating on a half-hour interval. The companies competing for this operations contract had to present several concepts, including a concept for the management of perturbed situations in case of the interruption of train operations in the city tunnel. One of the candidate companies called on us to develop this perturbation management approach. On the basis of our experience with other S-Bahn networks, we developed emergency procedures for perturbations of various kinds in the area of the city tunnel and its approach lines.

4 Viriato and other IT products The timetable planning system Viriato, which SMA developed and presented for the first time in 1996, has reached a strong market position at government agencies and with railways. Originally designed for strategic, long-term planning, it has undergone continuous further development and is today used all along the process chain from long-term planning all the way to the generation of the daily timetables.

With Viriato, it was possible for the first time to develop several variants and compare them with reasonable effort. An ongoing dialog with the users of Viriato allowed us to make user friendliness a guide for successive developments. In addition to the standard version of Viriato, today there are modules for rostering, for the evaluation of timetables in transport planning and for the visualisation of results. They have triggered an enormous push in the direction of higher qualitative and quantitative productivity in all areas and phases of timetable planning. This is also the goal of the major Viriato.NET migration project.

Viriato.NET – the migration project The migration of Viriato to a new IT architecture and onto a new technology platform is the biggest project in our development pipeline yet. With the redesign of Viriato, we are pursuing the following goals:

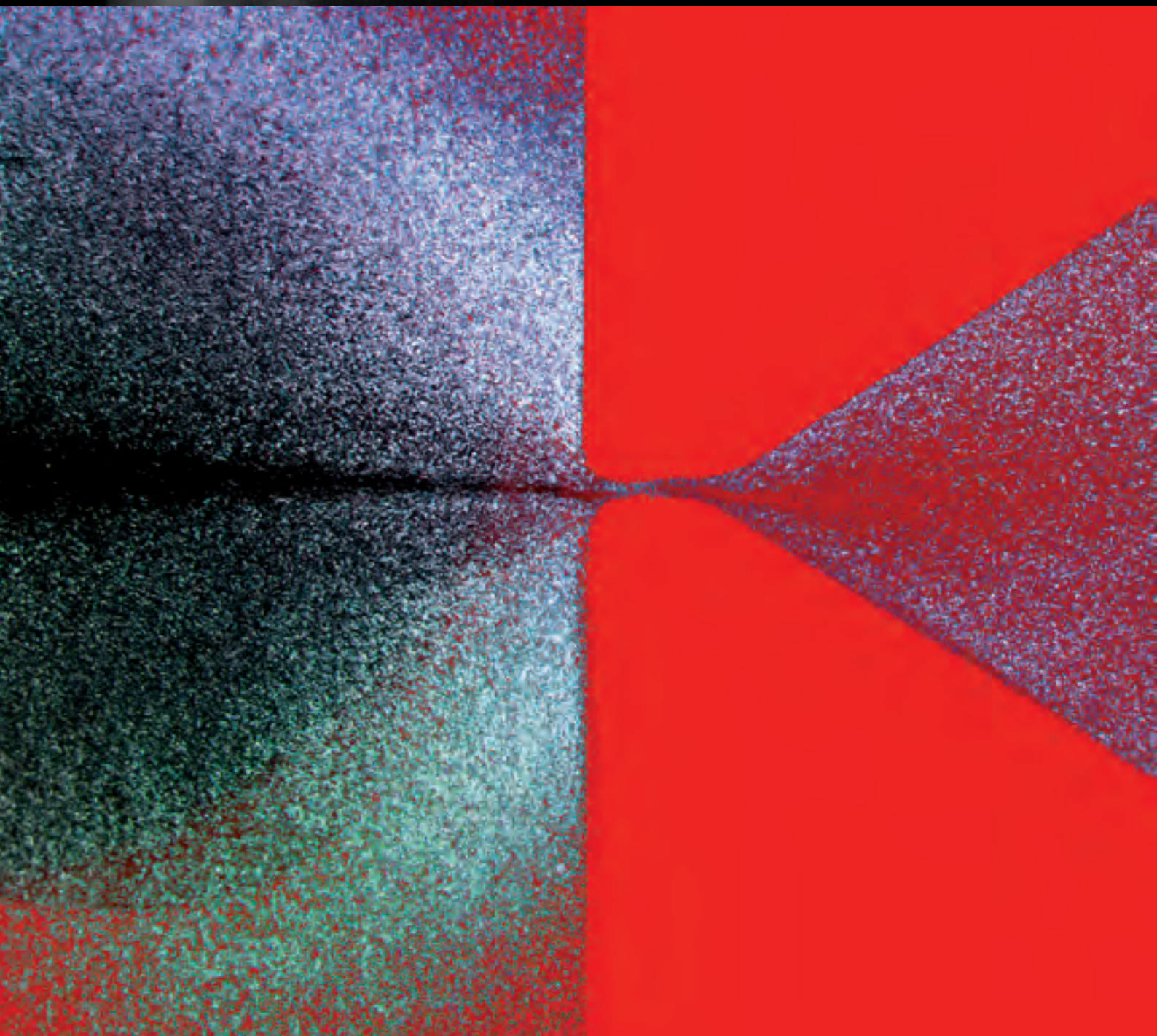
- Maintenance of value of our clients' investments in Viriato-supported processes
- Clear division of functionality between a Viriato core program and customer-specific requirements
- Simplified maintenance and thus shorter response times in case of problems

The project includes:

- Complete migration onto a new platform (replacement of Visual Basic)
- A modern platform and a new overall architecture
- High performance and scalability, particularly for larger networks

Current users will generally still find their functionality, but in many cases also encounter new and surprising features. In parallel, fully new possibilities for extensions in the form of additional modules are appearing, for example a flexible infrastructure model and an even more efficient train window. The new infrastructure model will enhance the already existing, unique versatility of Viriato with its variable granularity and thus support and simplify a continuous planning process, in particular in the coordination of operations with infrastructure maintenance.

It is also planned to group trains in families, even if some individual trains have small interval deviations, different routings or different days of operation. Finally, it will be much simpler in the future to integrate Viriato as a sub-process in the complex railway process environment.



Research and development: automatic calculation of paths and timetables In 2009, in the context of an internship project, we already began the development of a prototype for automatic timetable development. This work was pursued in 2010 with the future goal of integrating a module in Viriato.NET that supports the user in searching for free paths and in developing new timetable concepts.

The module uses modelling based on the "periodic event scheduling problem" (PESP), which allows description of a timetable as an event system with constraints such as train headways or connections. The program then searches for a solution within this system of restrictions that guarantees minimal travel times. In this context, individual trains can be declared in the model to be either fixed (in an existing timetable) or variable (new paths) depending on whether the task is the further development of an existing timetable or the creation of a new timetable from scratch.

5 IT services At the centre of SMA's IT services are customer-specific extensions and interfaces between Viriato and systems up- and downstream the planning process. At the same time, we are also developing customised IT solutions in the area of railway operations. A prominent example is SBB's new run time calculator (ZLR).

Today, railway companies are increasingly understanding and implementing the Viriato system as an element within their overall landscape of IT systems. Its implementation requires numerous interfaces for data exchange with other systems:

- Vehicle rotation planning
- Rostering of personnel
- Company-wide infrastructure databases
- Transport planning systems for project evaluations, demand forecasts and/or cost-benefit calculations
- Path ordering systems

The latter is a classic European example for the procedure according to the "path ordering/path providing" principle. A train-operating company communicates timetable demands via a path portal. The path manager then replies with data such as the exact train timing with stop and run times of each path, which must be compatible with the paths of other train operators.

Integration of Viriato within business processes In railway companies, the integration of Viriato in business processes plays an important role. In this environment, in parallel to the implementation of process-specific interfaces, we can also bring into such projects our skills in process definition.

For German Railway's passenger division, we are enhancing the interface to the TPN path portal with a function for the communication of capacity requests in the context of multi-year contracts. With such contracts, train-operating companies can reserve railway capacity over several years and thus benefit from greater planning security.

At the French infrastructure manager RFF, we introduced a central Oracle database and thus established the basis for further steps toward a comprehensive planning process. For our Finnish clients, the Finnish Transport Agency (FTA) and Finnish State Railways (VR), our IT specialists implemented the second development phase of FTA's path ordering portal LIIKE, thus fulfilling the prerequisites for introducing this system for the path ordering process.

Calibration of the train run calculator The run time calculator (ZLR) plays an important role in all phases of timetable design and in the forecast during operations. In order to evaluate and improve their run time calculator, the Swiss Federal Railways (SBB) asked us to calibrate it.

On the basis of systematic run time measurements on the SBB network, the technical run time was calculated with the help of a measurement analysis procedure. The comparison of the measured, technical run times with the values from ZLR calculated with the parameters used until now by SBB showed a high degree of congruity.

This study showed that an appropriate measurement analysis procedure can quantify and improve the accuracy of run time calculations for the broad spectrum of rolling stock and line characteristics to be found within a large railway company.

Tibco optimisation for the train run time calculator ZLR plays a central role at SBB in the context of the forecasts of the Rail Control System (RCS). It is integrated via the Tibco messaging system within the operational processes, meeting the high requirement in terms of performance and stability.

For continuous and robust live operation, we further optimised this connection. For each call to ZLR, a priority, a run time limit and an expiration time can be configured so as to guarantee that calculations are more evenly distributed over time and "traffic jam" situations in the system avoided. In addition, various measures improved the monitoring options.

6 Methods for timetable evaluation Transport, timetable and service planning as well as transport economics continue to converge into one field. Depending on the context and the questions asked, the needed degree of detail is higher in one discipline and lower in another. On densely travelled regional or national networks, no reliable statements are possible without a precise analysis based on the timetable. The planner must therefore be able to check, from the viewpoint of both technical feasibility and demand, whether a given work step brings him or her closer to a globally optimal solution. This requires methods for the rapid calculation of key indicators on the basis of the timetable data: from cost elements (path fees, average maintenance costs, energy use) all the way to indicators relevant for demand and revenue such as average trip times, connection times, propensity for train delays, increase of demand and revenues, and costs for train kilometres.

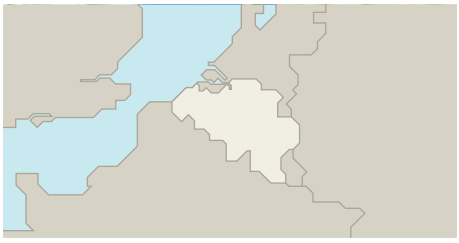
SMA has already developed such Viriato modules in the past and will continue analysing this field and developing practical methods and solutions.

The following list allows a look into the toolbox with which we approach our tasks:

Task/goals	Tool or method	qualitative/quantitative
Comparison of the trip times for two service concepts	Viriato trip time analysis	quantitative
Comparison of two service concepts in terms of potential ridership	Viriato estimate of potential ridership	quantitative
Visual communication of trip times (and changes) for planners, the client and the public	Viriato travel-time kiosk	quantitative
Rough cost comparison of two service concepts, including infrastructure and operations (based on annuities)	Viriato module for economic evaluations (developed in collaboration with the IVT institute of ETH Zurich and Professor Ulrich Weidmann)	quantitative
Estimate or comparison of resource requirements for a service concept	Resource requirements (train personnel), Viriato rotation planning (vehicles)	quantitative
Optimisation of capacity and number of vehicles	Viriato rostering tool	quantitative
Calculation of energy consumption	Module energy consumption of ZLR	quantitative
Evaluation of timetable stability	Macro- and microsimulation models	quantitative
Collection of ridership numbers and allocation of revenue shares	Measurement and analysis of ridership	quantitative
Determination of the benefits in a region or area of an infrastructure element built elsewhere (“spillover effect”)	Infrastructure cost allocation formula	quantitative
Evaluation of improvement measures for infrastructure or service, choice of transport system	– Cost-benefit analysis – Analysis of utility values – Utility profile	qualitative and/or quantitative

7 Process consulting The international political and macroeconomic environment of the railway leads to a large number of interfaces that contribute to the growth of complexity. This makes a systematic understanding of the railway as a whole all the more important. Experience shows that IT applications support these processes in the industry – and that these processes in turn support corporate strategy.

In the course of the years, SMA has acquired a broad-based know-how in the productive processes of the railway and in these processes' IT tools. Today, our international experience allows us to offer advisory services situated on the interface between the areas of processes and strategy. Our experience relates to the entire process chain, from strategic long-term planning to the detailed design of operations management systems.



Improvement of punctuality of passenger service in Belgium For years now, Infrabel and SNCB have launched technical, political and even institutional reflections on how to improve the punctuality of the national timetable. In this context, the two companies set up a joint programme to better understand the causes of delays, to find solutions and to develop a strategy for improvement.

The punctuality of operations depends on a range of factors, such as, for example, incidents, operational processes, operations management and personnel discipline. In this context, we became active in the area of analysing the production of the timetable and its stability. As a first step, on the basis of an international benchmark study, we defined a European scale for comparisons. In a second step various analyses and macroscopic simulations were carried out in order to find short-term solutions and to support Infrabel and SNCB in developing a reliable planning process for the coming annual timetables. Infrabel and SNCB would already like to take into account initial recommendations in preparing the timetable for December 2013.

Infrabel: Production management of the future Belgium has one of Europe's most heavily used rail networks. Following an international call for tenders by the Network Division of the Belgian infrastructure operator Infrabel, we won the assignment to bring in our expertise and know-how in the context of a four-year collaboration contract.

The Network Division is responsible for operations management and supervision and the information management on the Belgian rail network. We will support Infrabel in developing and implementing new visions and approaches for business processes such as information and operations management, maintenance interval planning and the planning of the annual and daily timetable.

Together with the operational and IT departments of Infrabel, we will define the requirements for data on topology or the timetable and collaborate in the design of the IT architecture and in the determination of the functional scope of the planning and operations management systems.

The project's goal is to bring about a significant improvement of the quality and stability of railway operations in Belgium.

8 Strategic consulting Strategic decisions in rail transport have the best chance of successful implementation when they are made with knowledge of their systemic context. This requires ahead reflection on the basic technical elements underlying each planning phase, including the essential business, financial and political aspects. Our deep understanding of the system and our experience from two decades and in 20 countries puts us in a position to markedly improve the quality of strategic decisions compared to conventional corporate consulting.

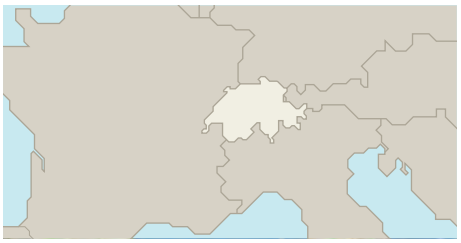
In the coming years, we wish to strengthen SMA's position as a major player in this area.

Consulting on public policy The building and maintenance of road and rail transport networks were and still are duties of the state. Depending on the political system, either the state – or one of its regional or specialised agencies – directly carries out planning, construction and maintenance duties or instead delegates them in the form of contracts or concessions to private entities. In the course of time, preferences among these options have shifted a number of times. For railways, the most recent chapter for now is the separation – anchored in EU law – of state-owned infrastructure and train-operating companies operated as private businesses.

Since then, the companies responsible for these two sub-areas have drifted ever further apart. This is particularly striking in the planning of new infrastructure, which increasingly is carried out on political criteria. Such planning generally triggers the investment of large sums that many countries can only finance by borrowing. Understandably, in light of efforts to limit debt, such projects are increasingly being called into question.

If one approaches the task of lowering costs and generating at least some benefits in the short term with methods that analyse the system as a whole, one often finds surprisingly efficient solutions that are feasible in phases. In such an approach, top speeds and/or record run times are delayed until a later, final phase. This makes communication to the public less spectacular and more challenging. Over the years, we have helped design many such infrastructure programs, including: the ongoing development of the Swiss Rail 2000 programme, the phased implementation of the Alpine crossings, the development of the French network and the Portuguese high-speed network, to name only the largest. The newest example is a student thesis, supported by SMA, concerning a high-speed network in California (see Personnel).

In all cases, we have been able to show how the cost-benefit ratio can be improved.



Bombardier Transportation (Switzerland) AG: Consulting in the tendering process for new SBB long-distance double-decker trains

In 2009, SBB issued a public call for tenders for 59 new long-distance, double-decker trains to which Bombardier Transportation (Switzerland) responded. The call for tenders was structured in numerous variants and options, which required much effort for the preparation of bids. Bombardier called on us to define their strategic position, to reduce the number of variants and to work on technical questions such as run time calculation and rotation planning.

The successful collaboration with the project team was an essential contribution to Bombardier's winning this large contract.

We define marketing as all external communications of the company with no immediate connection with a project, including advertising, public relations and branding.

The goals of all such actions are

- long-term retention of existing clients
- growth of the client portfolio
- positioning of the brand sma+ throughout Europe (and in selected areas outside Europe) as an independent and competent system consultant for the planning and operation of railways and other rail-based transport modes
- establishing Viriato as a standard program throughout Europe for timetable planning and coordination

From the viewpoint of marketing, 2010 began with a highlight:

IT10 RAIL

What once started as a modest conference for Viriato users has with the series IT05.rail, IT08.rail and IT10.rail become an international event of reference. Over 300 participants from 17 countries and numerous press representatives came together at ETHZ Hönggerberg above Zurich on January 21–23, 2010, under the title "The Interface Challenge – Mastering Interfaces in Railway Operation and Planning". Four parties organised the event: IVT (the institute for transport planning and systems at ETH Zurich), OpenTrack Railway Technology GmbH, systransis AG and SMA und Partner AG.

The workshop on January 21 offered the geographically widely dispersed Viriato and OpenTrack users a look at the newest developments and future directions for the two software products.

The SMA colloquium that same day was a platform for topics and questions surrounding service and operational planning in railway transport. In this colloquium, external specialists and SMA employees presented numerous projects and innovative solution approaches. Topics ranged from experience and lessons out of many years of planning for Rail 2000, the future outlook for the regular-interval timetable and the use of new IT tools and processes all the way to innovative approaches for improving punctuality and service performance on railways.

The symposium on January 22 – under the overall leadership of IVT – brought together research and practice in eight presentations, each followed by a discussion. The overall theme of the event, "The Interface Challenge – Mastering Interfaces in Railway Operation and Planning" was the specific focus here. Speakers from research, the railway industry, infrastructure operators and train-operating companies each illuminated this theme from their own viewpoint.

The technical excursion on January 23 around Zurich main station extended the event's theme with a tour to the construction site of Zurich's new cross-city rail tunnel, a presentation on the Rail Control System (RCS) and a live demonstration of the Customer Information System (CUS).

After a somewhat longer break, the next event of this type will be held in January 2013 in Zurich. News about this event will appear on our website www.sma-partner.ch.

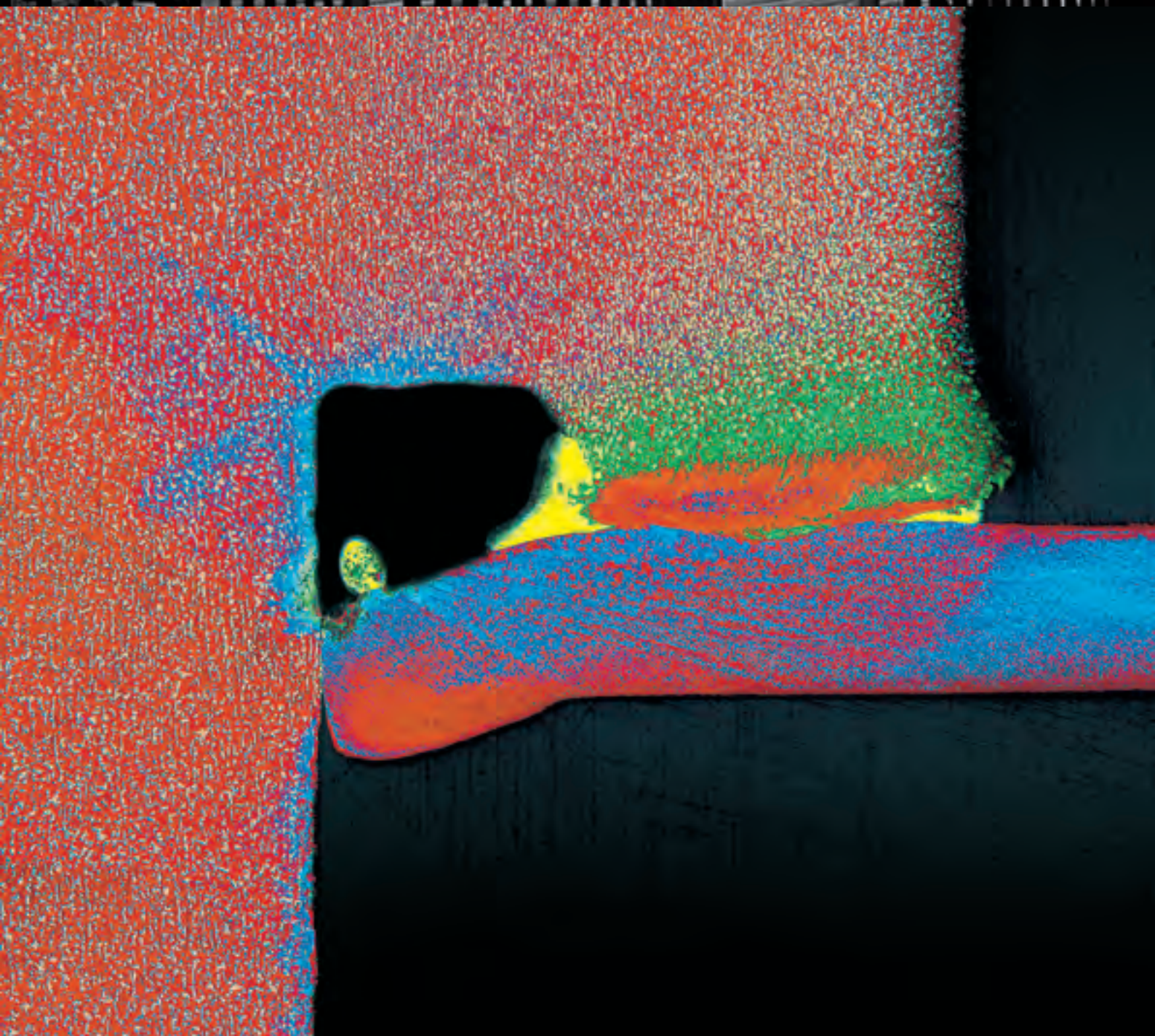
InnoTrans 2010 In September 2010, for the fourth successive time, SMA was present on this international railway exhibition in Berlin. Together with our partner, OpenTrack Railway Technology, we were able to greet many of our international clients and gain new contacts.

Presentations and participation at conferences and exhibitions

January 21–23	Zurich	International railway conference IT10.rail: The Interface Challenge – Mastering Interfaces in Railway Operation and Planning
May 6	Zurich	2010 ETH contact event
May 19	Berlin	Berliner Bahngespräche BAG SPNV: Taktverkehr in Frankreich – Ideen auch für Deutschland?
May 21	Boston	Sustainable Transportation Exhibit: A Challenge for the 21st Century?
June 6–9	Vancouver	APTA Rail Conference: Interoperability Planning and Implementation of High-speed Rail
September 21–24	Berlin	InnoTrans 2010
December 13–14	Font-Romeu, Switzerland	Les chemins de fer à voie métrique dans le système suisse des transports publics

Publications

ETR, March 2010	Hochgeschwindigkeit in Portugal – Von der Bauplanung zu einem nationalen Eisenbahnkonzept
Lignes d'Avenir, RFF, October 2010, page 11	Regard d'expert : La mixité est un levier pour optimiser l'utilisation du réseau existant et assurer une meilleure rentabilité des investissements de demain
RTR, Revista Técnica de los Ferrocarriles, November 2010	Alta velocidad en Portugal/Desde un projecto infrastructural a un concepto de ferrocarril nacional
RTR, Chinese edition, December 2010	葡萄牙高速铁路—— 从施工计划到全国铁路网规划方案
EURAILmag, first semester 2010, pages 106–108	Rhin-Rhône HSL High-Speed Line Sparks 2012 Timetable Revolution in France
EURAILmag, second semester 2010 pages 202–205	Deciding for the right timetable production system
www.sma-partner.ch, December 2010 and SER, January 2011	Netzgrafik Schweiz 2011



In an extremely specialised and at the same time interdisciplinary consulting company, the employees are the solid foundation for success. They are the individual bearers of knowledge and ambassadors for the collective knowledge of the whole company vis-à-vis our clients.

SMA is in an ongoing growth phase in which we regularly hire predominantly young employees. But the basis of our success is long-time specialists who cannot be simply replaced. They personify the unique nature of SMA, carry within themselves the future and guarantee our clients that they can continue to count on the best possible advice.

Long-time loyalty to the company has nothing to do with routine or even comfort. We are all in a permanent learning process, in terms of technical and increasingly also organisational expertise. This requires ongoing training. The company supports this with internal and external training programmes, attendance at congresses, exchange programmes and contacts with universities.

Employees in 2010 At the end of 2010, SMA had 51 employees. Their educational profiles are shown in the following figures:

	Head-count	of which PhDs
Bachelor's or master's degree in engineering	27	
Bachelor's or master's degree in mathematics or computer science	8	2
Other university degree (geography, chemistry, law)	4	1
Bachelor's degree from universities of applied sciences (Fachhochschulen)	4	
Interns	5	
Administrative and technical employees	3	

Average years of professional experience	9.1 years
Average years at SMA	6.1 years
Average employee age	34.4 years
Absence due to illness in 2010	0.53 %
Flexibility of employees (average number of hours worked, where 100 % means full time)	98.5 %
Flexibility of the company (average contractual work time of employees, where 100 % means full time)	90.8 %

For the first time, the average hours worked lay a bit under 100 % of the employment contract, after this indicator rose in the strong economic years up to 107 %. The economic situation in 2009/2010 had the positive side effect that employees could eliminate parts of the overtime they had accumulated in previous years.

Andreas Berchtold, who joined the company on September 1, 2010, had already worked at SMA from 1999 to 2007. After three years at another company in Zurich, he decided to return to us.

At the start of 2010, the government council of the Swiss canton of Aargau named Hans Ruedi Rihs head of the public transport office. He is the second official of a canton who acquired his railway experience with SMA.

Employees who joined SMA in 2010

July 1	Dorothea Deli	Bachelor's degree in psychology	Project assistant
July 1	Alexandra Ramuz	Law degree; personnel coach with Swiss SCA certification	Human resources
July 12	Pierre Ka-Wai Ho	Engineering degree, Swiss Federal Institute of Technology, Lausanne	Planning
September 1	Andreas Berchtold	Engineering degree, Swiss Federal Institute of Technology, Zurich	Planning
September 15	Maria Miceli Gozalo	Assistant	Back office
October 15	Daniel Wipf	Bachelor's degree in civil engineering, university of applied sciences (Fachhochschule), Zurich	Planning
November 1	Warner Daniel Oldenziel	Engineering degree, Swiss Federal Institute of Technology, Lausanne	Planning
November 1	Michael Schule	Application developer with Swiss EFZ certification	Software development

Employees who left SMA in 2010

March 31	Hans Ruedi Rihs
April 30	Manuela Groh*
Juli 1	Michael Karlen
August 31	Corelia Reichen
September 30	Simon Hofmann*
October 31	Felicella Tedeschi*

* Back-office and student employees

As every year, students were our guests as interns. They worked on projects, gained insight into the practice of railway planning and/or delved deeper into work on a topic. In 2010, our interns were Alexander Herbermann, Johannes Hering and Ulrich Leister from Germany, Takahiro Igo from Japan and Benoît Dumont, Olivier Schorer and Daniel Schweizer from Switzerland.

Particular mention goes to Ulrich Leister and his thesis (Diplomarbeit) for the Technical University of Berlin. In it, he investigated the possibility of integrating the planned new high-speed rail line between Los Angeles and San Francisco with the existing railway network. To this end, he developed a service concept that connects the new high-speed trains with existing and future intercity and commuter services. In this concept, conventional rail lines are also used by high-

speed trains in order to reduce the immense cost of high-speed lines in metropolitan areas. His work is based on Europe's acquired orientation in favour of both fast and frequent trains. Nodal stations with good connections can contribute to attractive services in areas that are some distance away from the high-speed route. The service concept contains a detailed timetable that can serve as the basis for the later organisation of operations. This element is wholly new on the railways of North America, which today are largely defined by freight service.

We have already successfully used the results of this thesis in our marketing in the United States.

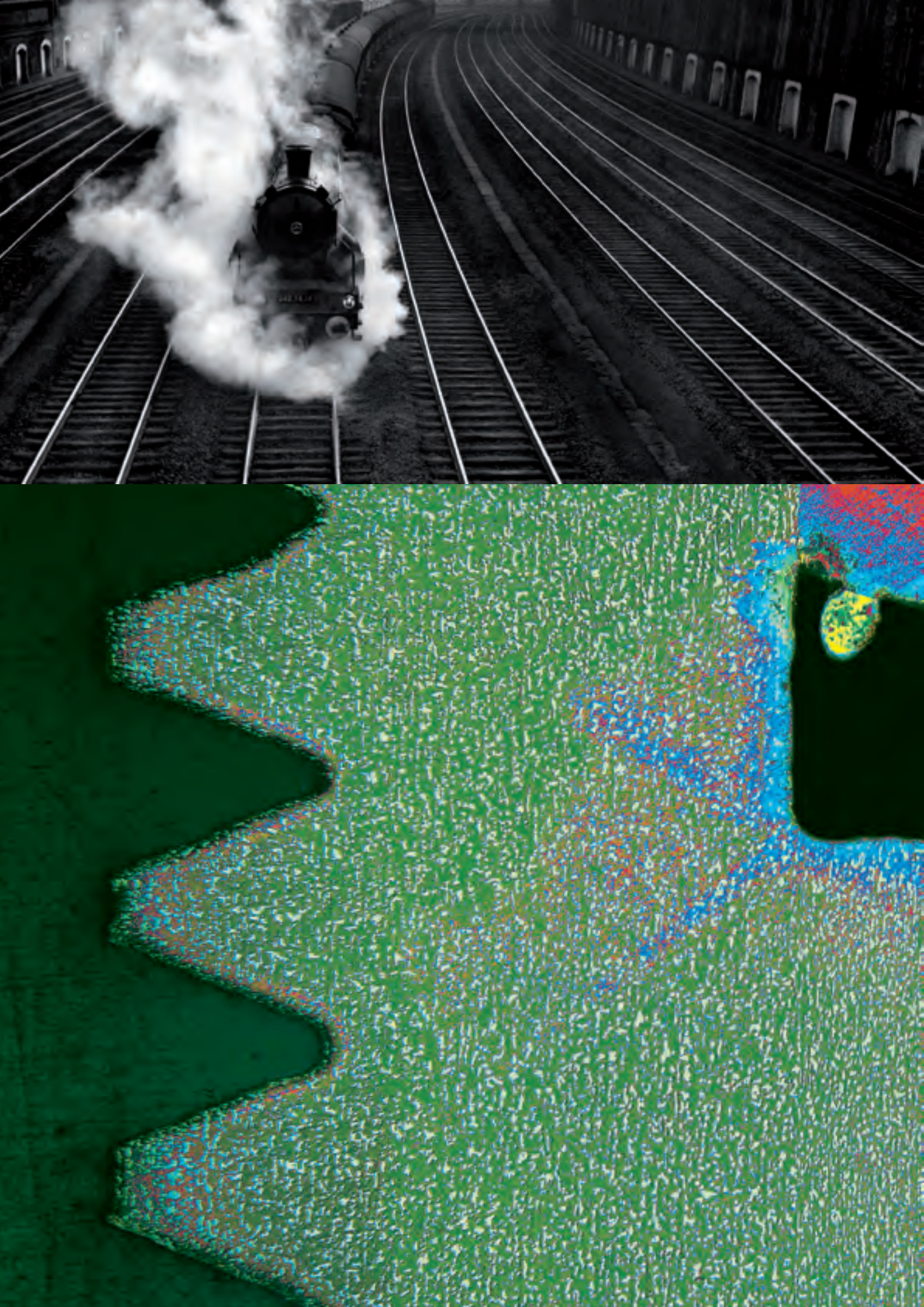
Study trip to Oslo In 2010, SMA's study trip led to Oslo. In the course of this trip, in addition to professional training and client contacts, we reflected on and discussed topics of great significance to the company and its future.

Employees who had not been involved in the "Futuro" process concerning the new generation of management and the development of SMA were able to consider this topic for the first time. This is another step along the way toward establishing a common company culture and integrating these principles and values in our daily work.

The outbound trip led on the night train from Zurich to Hamburg and then on the ferry from Kiel to Oslo. In this exotic but concentrated setting, the first part of the common workshop was carried out.

On the roof of the renowned Oslo opera house, in the context of a team exercise, all employees had the chance to articulate their own opinions, ideas, visions and expectations for the future of SMA and then to discuss these in the Vigeland sculpture park.

The professional training segment took us to the headquarters of the Norwegian State Railways (NSB), where we learned some fascinating details about the railway in Norway and in so doing experienced the extraordinary hospitality of the Norwegian railway people. A technical highlight was then the tour to the Oslo S operations management centre of the infrastructure operator Jernbaneverket and the dispatching centre of train operator NSB.

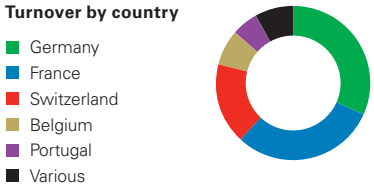


After the reduction of turnover and profit in 2009 due to the headcount growth in boom year 2008 followed by the freeze on new consulting services at two major clients, we returned to our growth path in 2010. All areas – planning, IT services and Viriato licence sales – contributed. At times, we found ourselves under pressure again, as in the boom times that abruptly ended in 2009, also reflected in the outlays for contractors, which again increased in 2010.

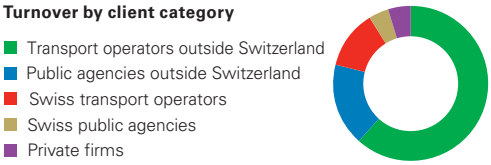
Key figures in millions of Swiss francs	2009	**2010**
Gross turnover	8.74	**10.14**
Expenses and contractors	0.55	**0.87**
Net turnover	8.19	**9.27**
Turnover per employee	0.17	**0.21**

Concerning the distribution of assignments, especially from the viewpoint of major clients, we observe a healthy tendency to a diversification of our clientele. Whereas in 2007, 60 % of our services (including turnover from licence sales and maintenance) were still for three large clients, this figure fell in 2010 to 40 %. Thanks to growth, therefore, risk has now become more broadly distributed. Our goal remains to be dependent on any one client for no more than 10 % of our turnover. We want to achieve this through expansion in new countries.

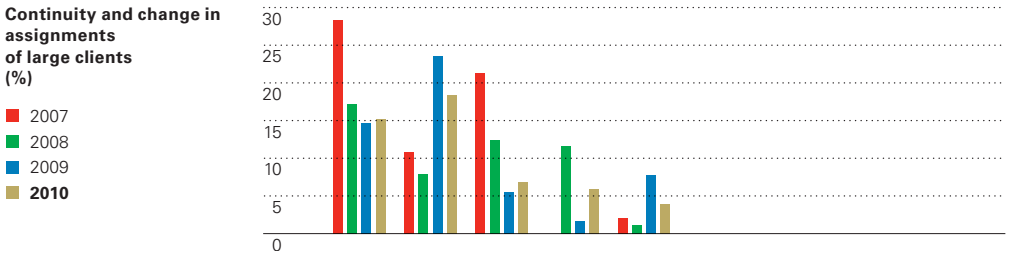
Turnover by country



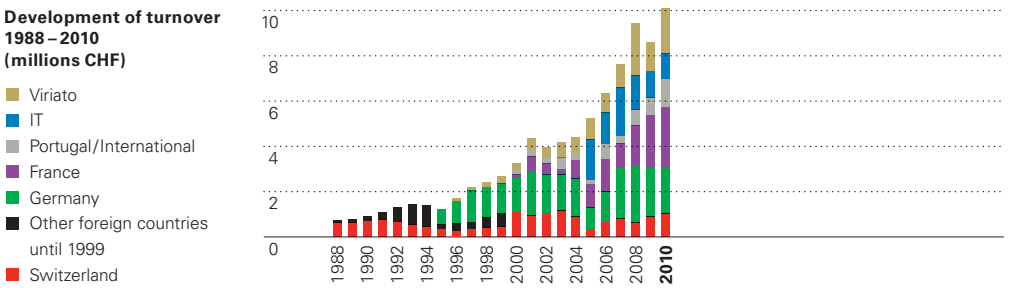
Turnover by client category



Continuity and change in assignments of large clients (%)



Development of turnover 1988 – 2010 (millions CHF)

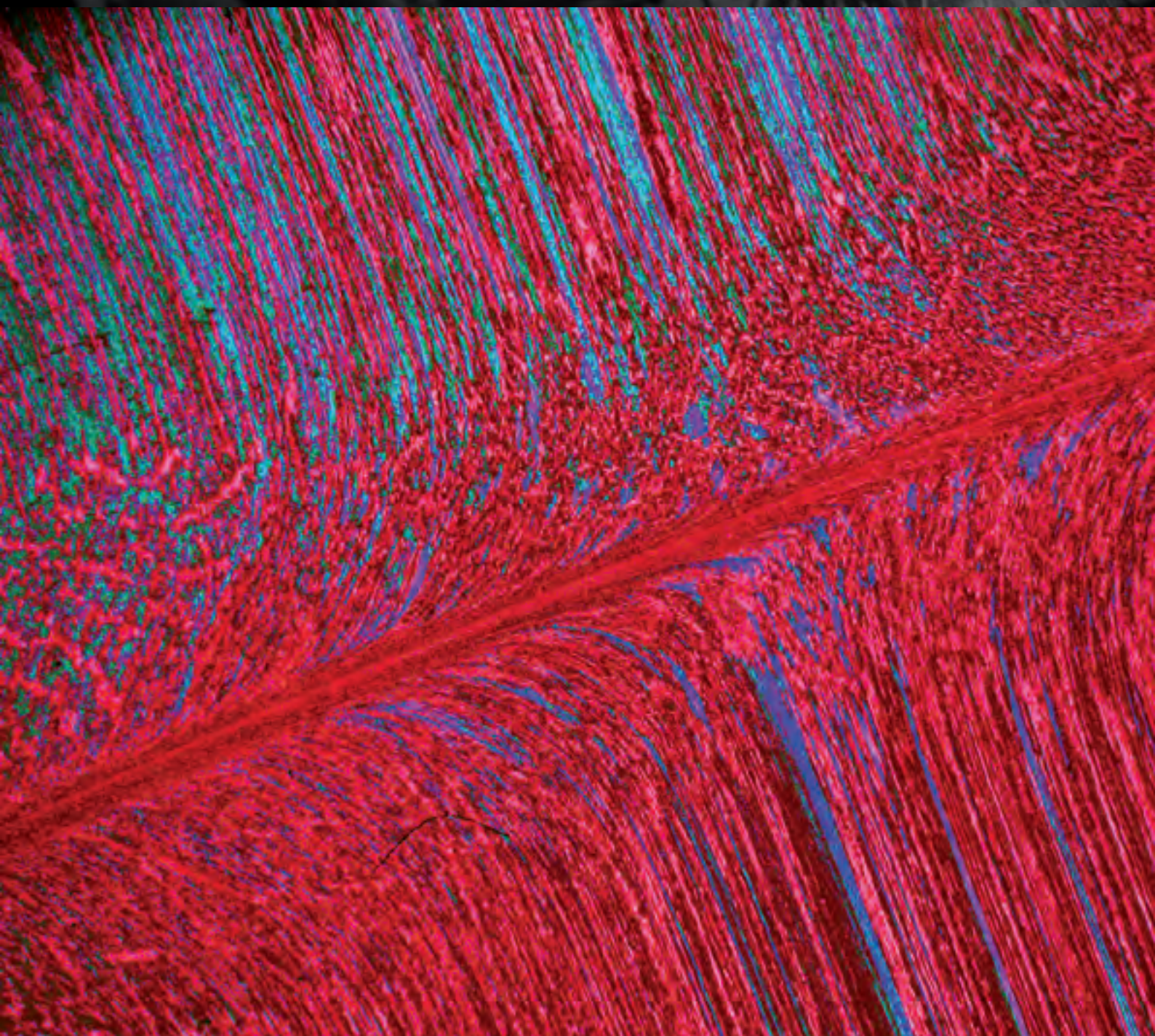


In the coming years, continuity and change will remain as the elements that guide and accompany SMA. The basis for continuity is above all an enormous trust that has developed over the past years in relationships at all levels: between clients and us as a consulting firm, between the people working on assignments and developing solutions on both sides, and also between the employees, management and board of directors of SMA.

In the name of the Board of Directors and the Management of SMA, I owe deep and sincere thanks to the institutions and people at all levels who have developed and continue to maintain this trust. This trust is our motivation to give our very best in all the tasks with which we are committed.

Werner Stohler

Zurich/Lausanne, June 2011



Employees in 2010

Board of Directors

Management Board

Planning and Operations Division Heads of department and experts

Employees

IT Division Heads of department and experts

Employees

Back office

1 Werner Stohler
chairman of the board of directors
2 Cécile Grünenfelder Stohler
3 Peter Weber
4 Giuliano Montanaro
chief executive officer and head of planning
5 Dr. Thomas Bickel
head of IT
2 Cécile Grünenfelder Stohler
chief financial officer
6 Eric Cosandey
7 Georges Rey
partner
8 Frederik Ropelius
9 Hans Ruedi Rihs*
10 Philipp Schröder
11 Luigi Stähli
head of office in Lausanne
12 Cyrill Bärtsch
13 Andreas Berchtold
14 Carolina De Boni
15 Dorothea Deli
16 Burkhard Franke
17 Michael Frei
18 Clément Haller
19 Simon Hofmann*
(without picture)
20 Christoph Inhelder
21 Pascal Joris
22 Pierre Ka-Wai Ho
23 Raphael Karrer
24 Patricia Kottmann
25 Simon Landureau
26 Marten Maier
27 Daniel Mäusli
28 Gösta Niedderer
29 Warner Oldenziel
30 Carole Raynard
31 Stefano Regazzoni
32 Lukas Regli
33 Corelia Reichen*
34 Daniel Wipf
35 Claudia Wirz
36 Florian Zumklei
37 Hans Rudolf Akermann
partner
38 Björn Glaus
39 Dr. Pierre Robyr
40 Markus Apell
41 Alain Bosonnet
42 Dr. Dan Burkolter
43 Matthias Cavigelli
44 Martin Gämperle
45 Christian Grosse-Wilde
46 Armin Häberling
47 Steve Hauffe
48 Michael Karlen*
49 Joachim Rubröder
50 Michael Schuler
51 Lukas Schwab
52 Robert Simons
53 Manuela Groh*
54 Kerim Jabbes
55 Lulu Leanza
56 Maria Miceli
57 Nadia Neuhaus
58 Felicella Tedeschi*
59 Alexandra Ramuz
head of human resources
(without picture)

* left in 2010

April 11	Start of planning for IT13.rail conference of January 2013
	Assignment to connect Viriato at SNCB's B-MO group with the electronic path ordering system (CapMan) of Belgian rail infrastructure operator Infrabel
	Timetable study "French-speaking Switzerland and Jura 2013" (SBB passenger division and Swiss federal transport office)
	Planning study in the Marseille/Aix-en-Provence metropolitan area (RFF and France's Provence–Alpes–Côte d'Azur region)
March 11	Preliminary study for the integration of the high-speed project (the so-called Basque Y) within the existing rail network of Spanish National Railways (RENFE), the metre-gauge Spanish railway FEVE and the Basque-region railway EUSKOTREN for the regional government of Gipúzcoa province
	Proposal to the US Transportation Research Board (TRB) together with Cambridge Systematics on the capacity of shared tracks
February 11	Completion of the Erding ring-line study near Munich (Bavarian state ministry for commerce, infrastructure, transport and technology)
January 11	Capacity study for southern Alsace, France, including the new connection to the Basel–Mulhouse EuroAirport (RFF Strasbourg)
	Regio-Bahn in Liechtenstein
	Company presentation at Luxemburg railways (CFL)
	Simulation of the track doubling at Hergiswil Matt station on the Zentralbahn, Switzerland
	Start of the project phase "Traffic Management of the Future" as part of a four-year contract with Infrabel
	Initial meeting on the "stress test" for the Stuttgart 21 project
End of 2010	Presentation of the Viriato program at Israeli State Railways (ISR)
December 10	Study "Reactiviation of local rail passenger service on the Ratinger west line" for the Rhine-Ruhr transport agency (VRR), Germany
	Initial meeting for the „Timetable evaluation" study (RFF)
	The German infrastructure operator DB Netz buys three Viriato licences for long-term planning
	First licence sale of the program Netvisio to BLS, Switzerland
	Completion of the timetable study for the second phase of the Rhine-Rhône East high-speed line (RFF)
	Completion of the travel forecasting study for Savoie et Haute-Savoie (French Rhône-Alpes region)
	Completion of the study "Half-hour interval in Valais regional service" (RegionAlps, a subsidiary of SBB and the Martigny and Regions transport agency TMR)
November 10	"By train from Aurich to Emden in 29 minutes", an information event on our feasibility study in Germany. Planning continues.
	Completion and presentation to the Swiss federal office of transport of the Rail 2030 study
	Start of the study "Long-term perspectives for the railway network in greater Geneva"
October 10	Start of the project "Belgian 2013 Timetable" (SNCB Mobility)
	Analysis for long-term projects in the Cologne railway node for the Rhineland local transport authority (NVR), Germany
	First sale of a Viriato licence in the US
	Three French consultants buy Viriato licences

September 10	Simulation study of the Sandnes–Stavanger line (NSB), Norway
	SNCF buys two Viriato licences
	Analysis of the west sector in Nuremberg for the Transport agency of greater Nuremberg (VGN) and the Bavarian railway company (BEG)
	Project "Calibration of the run time calculator" (SBB Infrastructure)
August 10	Initial workshop for the study "Service design for the Munich railway node"
	Analysis of the 2030 service strategy for the Wynental and Suhrental railway, Switzerland
July 10	Sale of two Viriato licences to the metropolitan mobility agency of Turin, Italy
	Planning study for the new Paris–Normandy high-speed line (RFF)
	Planning study for the new Paris–Orléans–Clermont-Ferrand–Lyon high-speed line (RFF)
	RFF migrates the Viriato database onto Oracle and buys the user rights management module
June 10	The Finnish Transport Agency (FTA) buys more Viriato add-on modules
	Start of IT project "Replacement of the legacy train dynamic calculation" (AAFD) with SBB Infrastructure
	Study for the network integration of the new Montpellier–Perpignan high-speed line (RFF)
	Completion of the study "Improvement of long-distance rail services for the city of Konstanz" (Germany)
May 10	Final presentation of the preliminary study on regional and metropolitan-area services for Ulm, Germany
	Completion of the study "The future Bern station – operational performance of RBS"
April 10	Sale of Viriato to the Rhine-Main transport agency (RMV)
	Start of the analysis "Bavaria 202X" (Bavarian railway company BEG and DB Netz)
March 10	Completion of the KTI project "Economic evaluation of service concepts and infrastructure improvements for rail passenger service", which SMA carried out jointly with the IVT institute of ETH Zurich
February 10	Hearing in the Bavarian legislature of expert opinions on the Munich airport line
	Presentation of the study "Main line for Europe/Trains for Europe" before the TEN-T Guidelines Committee in Brussels, and in particular the proposal for a timetable impact study that would be similar to an environmental impact study
	Completion of the study "DB line enhancements between Munich, Mühldorf and Salzburg"
	Assignment to conduct a passenger survey for the bus operator Auto AG Schwyz and the greater Zug transport authority (ZVB) in Switzerland
January 10	Long-term concept for 2020–2030 (SNCB)
	Implementation of an update function for the simplified use of different databases in timetable planning (DB long-distance division)
2010	Development of concepts for the improvement of rail services between Düsseldorf (Germany) and Eindhoven (Netherlands)
	Analyses for the northern Ruhr zone, the Duisburg–Emmerich line and the preliminary phases for the Rhine-Rhône Express (RRX) train (competence centre for the regular-interval timetable in North Rhine-Westfalia, Germany)
	Study of operations and timetable optimisation for a 2-minute interval on the Munich U-Bahn and higher frequency on lines U2 and U6

List of abbreviations and key organisations

The language of railway people is, like that of other specialists, full of abbreviations. The following list of abbreviations and key organisations should be of help to non-specialist readers:

BLS	Bern–Lötschberg–Simplon railway, Switzerland
DB	Germany Railway
DB Netz	German rail infrastructure manager
EPFL	Swiss Federal Institute of Technology, Lausanne, Switzerland
ETH, ETHZ	Swiss Federal Institute of Technology, Zurich, Switzerland
FTA	Finnish Transport Agency
Infrabel	Belgian rail infrastructure manager
IVT	Institute for transport planning and systems at ETH Zurich
IT	Information technology
KTI	Commission for Technology and Innovation, Switzerland
NSB	Norwegian State Railways
RATP	Transport authority for the metropolitan-area rail, metro, tram and bus networks of Paris
RBS	Bern-Solothurn Regional Railway
RER	Metropolitan-area rail network, Paris
RFF	French rail infrastructure manager
SBB	Swiss Federal Railways
SNCB	Belgian National Railways
SNCF	French National Railways
TEN-T	Executive agency for the trans-European transport network, Brussels
TGV	High-speed train (France)
ZLR	Run time calculator

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