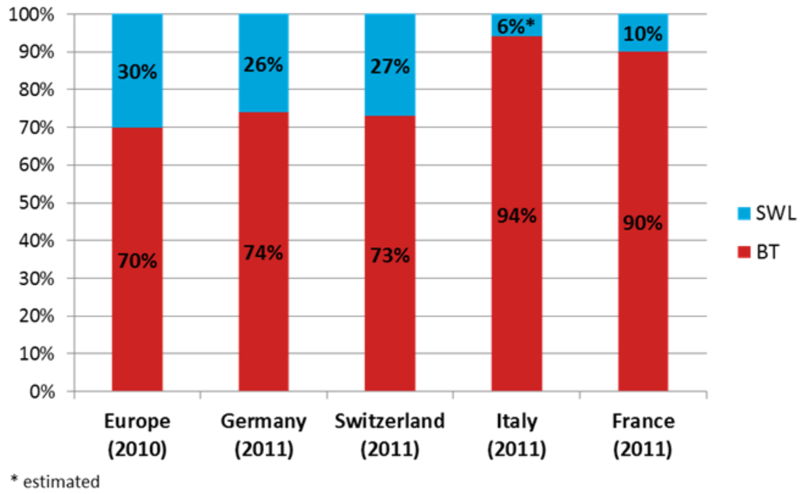
ViWaS - Publishable Summary

In Europe today, the general framework of rail freight transport is exposed to significant changes. This is especially true for rail transports of single wagons or wagon groups. In 2005, single wagonload (SWL) transport accounted for 39 % of Europe's rail freight transport performance, but only five years later this number dropped significantly to only 30 %. Nevertheless, SWL is still a major component in numerous European states' rail transport systems. This applies in particular to Germany and Switzerland. In Italy (in 2009) and France (in 2010), the "classic" rail production systems have been abandoned due to economic reasons. This led to significant losses of SWL transport volumes in these countries (cp. Figure 1).

Figure 1: Market shares of SWL on total freight volumes based on tonne-kilometres



Source: ViWaS; figures for Europe are based on data for Germany, Switzerland, France, Italy, Sweden, Poland and Slovenia

With a near to non-existent level of competition within the SWL market itself, low-quality standards and unfavourable cost structures have become widespread. While it may be lacking in internal competitiveness, it faces strong competition from conventional block trains, intermodal transport and road transport services.

Despite the current situation of SWL transport, it still provides a vital service to industries wanting to shift freight below the block train segment level such as forestry and the chemical industry. In a bid to halt its deterioration, the 39-month Viable Wagonload Production Schemes (ViWaS) project has undertaken to breathe new life into the SWL market through improvements in cost efficiency, transport quality and sustainability. Ten European companies and research institutions from the areas of rail transport and logistics have joined forces in the frame of the Seventh Framework Programme (FP7) of the European Commission. The aim was to further develop SWL technologies and concepts, tested and proven on the basis of real business cases and in line with the market requirements.

The developments are based on an initial analysis of the overall rail freight framework conditions, markets and trends in Europe and in particular in the ViWaS partner countries, focussing on SWL business. Following main conclusions have been drawn from the analysis:

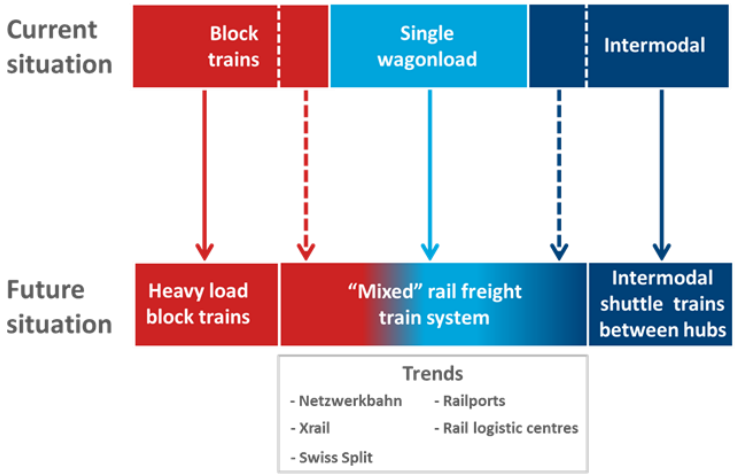
(1) Specific industries and market segments (e.g. forestry, chemical industry, steel industry, automotive industry) still demand rail freight services below the block train segment (single wagons, wagon groups) for domestic and international transports. Due to the

hard competition to road transport, SWL operation has to be optimised with respect to cost efficiency and transport quality.

(2) The existing and future market demand for SWL services has been realised by (many) European railway operators. Especially in France and - partly - in Italy, new railway operators are entering the market with offers based on alternative production systems and improved quality standards supported by ICT / telematics systems. The formation of the Xrail alliance is exemplary for the trend to improve quality and transport performance.

(3) Existing "borderlines" between the "classic" rail production systems will be narrowed in order to raise capacity utilisation and competiveness of the entire rail freight system. Netzwerkbahn in Germany and Swiss Split in Switzerland are examples for the trend towards mixed rail freight production forms (cp. Figure 2).

Figure 2: Rail production systems and trends



Source: ViWaS

(4) An important success factor for SWL is the improvement of last mile services and the provision of transhipment nodes for customers which do not have own access points. The use of hybrid technology for the propulsion of locomotives and bi-modal shunting vehicles can enhance operation processes within the last mile. The implementation of railports and rail logistics centres will support the access to SWL services for a bigger group of potential clients. At the same time, such rail logistics nodes facilitate an efficient "feeding" of SWL and the future "mixed" rail freight system (securing the critical mass of freight volumes).

(5) The findings from this initial analysis showed that the ViWaS developments correspond to the most urgent challenges and market needs. The aimed at solutions are therefore considered as important components in the evolution process to future rail freight systems that are able to compete in a more and more challenging transport market.

(6) In detail, the ViWaS developments tackle the following action fields (work packages):

- Market driven business models and production systems, considering opportunities for bundling different types of traffic to secure the critical mass needed for SWL operations;
- New ways for 'last mile' operational methods;
- Adapted SWL technologies to improve flexibility and equipment utilisation;

- Advanced SWL management procedures & ICT to raise quality, reliability and cost efficiency.

The ViWaS developments concern innovative and simultaneously practical solutions for a sustainable wagonload transport. The applicability of these solutions and their effects has been proven with the aid of business cases in terms of field tests and pilot operations. The following main innovations have been achieved within the ViWaS project:

Improved 'last-mile' operating concepts incorporating hybrid locomotives and bi-modal shunting engines (by Bentheimer Eisenbahn, Fret SNCF and SBB Cargo supported by HaCon and NEWOPERA): The new production method for last-mile delivery is based on the idea of separating train movements and sidings shunting processes by deploying bimodal road/rail tractors. Processes within the sidings have been simplified; as a result costs for equipment and staff could be reduced considerably. Hybrid locomotives are fundamental in securing a seamless access to regional distribution rail networks. Potential cost advantages have been identified comparing different traction combinations of real-life transport chains.

Modular wagon technologies for a flexible and efficient use of resources (by Wascosa and SBB Cargo): In detail, three components have been developed up to prototype status, namely the Flex Freight Car, Timber Cassette 2.0 and the Container Loading Adapter.

Wascosa's Flex Freight Car is a light container wagon with an accessible floor and thereby applicable for various transport purposes.

Figure 3: Wagon equipment for container loading and unloading in sidings

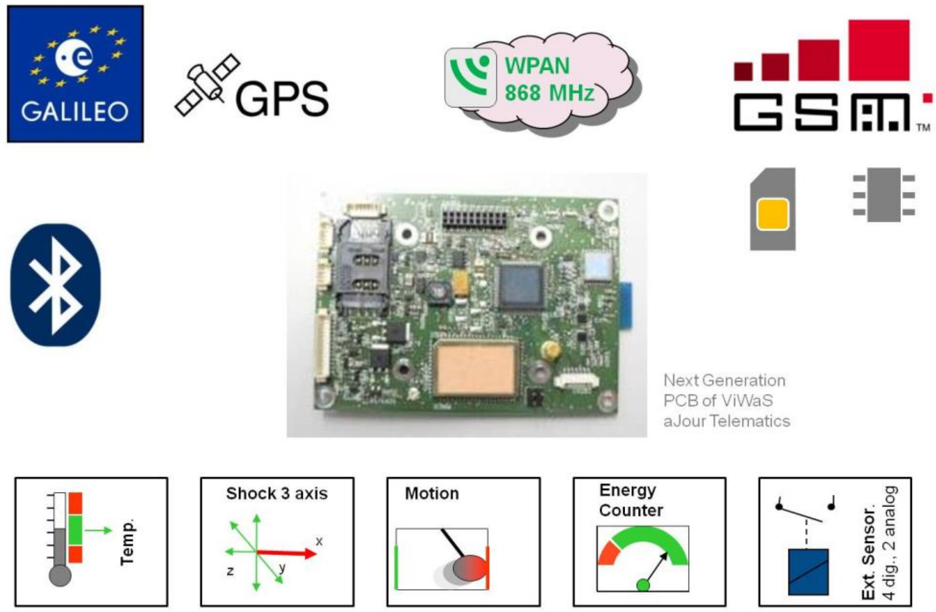
Container Loading Adapter (left picture) and Flex Freight Car with iron grid inlay (right).

Source: SBB Cargo

The Timber Cassette 2.0 is a new superstructure for log wood transport that features foldable stanchions and can be used in combination with a container wagon. In case the Timber Cassette is not loaded, it can be removed and stacked at the terminal or on a container wagon. Empty runs will be minimised generating efficiency improvements. Additionally, SBB Cargo has developed the so-called Container Loading Adapter, another add-on to a container wagon. It facilitates container loading and unloading in sidings. SBB Cargo will deploy this new component within the "Swiss Split" production system, combining intermodal with wagonload transport.

Smart wagon telematics allowing improved tracking at reduced costs (by Eureka): Innovative telematics and ICT services seek to improve operation performance and on-time delivery by introducing telematics devices together with a telematics data distribution service (TCCU). These devices are managed and controlled remotely by the TCCU and provide real-time information to the different actors involved in the transport chain according to their specific needs. This includes position information as well as different kinds of sensor data like speed, shocks, temperature, loading status and wear related data like wheelset mileage.

Figure 4: Functionality of new ViWaS telematics



Source: Eureka

A new simulation tool for planning and optimising single wagonload networks (by ETH Zürich): WagonSIM is an agent-based simulation tool for rail freight networks to facilitate the optimisation of SWL production schemes. It is based on the open source software MatSIM. The tool models the routing of freight wagons according to the routes within the real SWL network. Therefore, the modelling of two network levels is required, the production network and the physical infrastructure.