AquaRailTransit ART

Final Report PACT project 98/20

Report version for public use.

This report describes work carried out, and conclusions reached, under PACT project 98/20. This was the second phase of the Project ART, the first stage of which was a Feasibility Study carried out under PACT 97/23.

The Partners

CIM, proprietors of the Intermodal Terminal in Novara, Italy;
Ambrogio Trasporti, intermodal service operators of Gallarate, Italy;
PENTA, a consortium of French, Dutch and Swiss Rhein shipping interests;
BLS, as associate partner, a Swiss private rail company with an Alpine transit route used for international traffic.
Project management: Senior Logistic Consultants, Mulhouse and Basel.

These parties are also the shareholders of ART S.A., Mulhouse, a wholly-owned company created to manage the realisation, quality assurance and administration of joint intermodal services performed as a result of the Project.

The Contractual Beneficiary in Project 98/20 is Senior Logistic Consultants, Mulhouse.
Chr. Aeschlimann , B.A Stone

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Executive Summary

The final report describes:

- The second phase of the Project ART, supported by PACT contract 98/20
- The work undertaken by the ART Consortium, and the measures introduced to implement the project
- The reasons why the project is being suspended by decision of the Board of ART SA, the holding company, at this point in time
- The background, for which it is appropriate also to go back to the ART Feasibility Study supported under PACT contract 97/73
- The deliverables
- Lessons learned, and opportunities for the future

The project had its origin in three factors, all of which have been developed in detail:

- First, the partners saw an opportunity of using **barge capacity along the Rhein** for the intermodal potential of road freight traffic to and from Italy.
- Second, the anticipated rail deregulation and open access should permit **a dedicated low-cost rail shuttle** to be established between a Rhein port and a strategic concentration point in Northern Italy, in which the prospective Italian partners could concentrate cargo.
- Third, the European Union, aware of an unused opportunity for intermodal promotion, wishes that **the Rhein should be integrated into domestic (inner European) intermodal traffic,** where it serves areas of considerable trade and highway traffic.

Technically and operationally, these concepts have been realised. Commercially they have not proved to be potentially profitable in the form proposed. The Project Consortium has therefore decided, in view of the on-going financial risks and the funds already committed by all parties, to suspend work on the Project in the context of the PACT programme, but retains the structures set up, including the joint venture company ART S.A. set up to facilitate operations.

Background: The advantages of economy, absence of congestion, and environmental acceptability of inland waterways had already been exploited successfully for deep-sea containers, principally on the Rhine river. Today some 1,6 million TEU are carried to and from Rotterdam and Antwerp by barge.

Use for intra-European domestic traffic has not yet been successfully implemented. Several reasons are known: transit times (not apparently an obstacle for maritime boxes), limitations of access to cargo flows, competition between potential partners, and the apparent incompatibility of existing swap bodies and standard barges.

The growing volume of road goods traffic on the north-south Alpine crossing routes, for much of which there is no through rail-based intermodal service available, represents a serious problem. These flows parallel the Rhein as far as the Alps. ART, which obtained the Commission's support in PACT 73/97, was therefore conceived to evaluate the true opportunities and possible limitations of a combined water and rail intermodal service between the regions served by the Rhein, and northern Italy.

The feasibility study on the conditions of 1998 showed that the implementation of such a service was feasible and, potentially, should at that time have been economically sound. Its success would depend upon tight cost control in all parts, effective marketing, careful co-ordination of the modes, the achievement of a smooth flow through disparate systems of Rhine and rail, maximum efficiency of rail with shuttle train operations, adequate terminals, and a broadly based partnership.

The study concentrated upon service quality, technical requirements, information, markets, demand, and optimisation of costs of the entire transport chain. It developed the concept of a three-times-weekly barge connection of PENTA consortium, to a shuttle train at Basel Rhine port. The rail shuttle, operated by the BLS, was to run direct between Basel Rheinhafen (Rhine port) and the CIM terminal in Novara.

As well as the operating, economic and business challenges, **two technical issues** were known to require solution; their development was critical.

First, **the question of pallet-wide boxes by Rhein barge** was to be solved. This was a special concern of the European Commission. The study evaluated several designs on offer, and profited from recent research and CEN work and innovation in this field. The project was supported by Sea Containers and Consent, who offered equipment, wishing to be involved in developing this type of operation. However, it became apparent that the problem was no longer primarily one of technical solutions, but of degrees of market acceptance. **Pallet-wide high capacity stacking units are now readily available, at moderate rental**, but they are not fully compatible with traditional swap-bodies. The project found that the road-served shipper and forwarder was not prepared, without significant economic advantage, to accept at this time another unit or handling method than the road freight vehicle or analogous swapbody. But **by this stage, the project could not now demonstrate sufficient shipper price advantage** for this resistance to be overcome.

The combination of these two factors, overcoming market resistance to equipment change, and the inability to demonstrate user advantage in the face of rapidly deteriorating market conditions, was **a principal reason for suspending the project at this moment.**

This raises the inevitable question, whether only a completely ‘look-alike’ swap-body for inland waterway use is likely to overcome shipper resistance to change; for in this low cost, low-margin business, the advantage of the Rhine shipping leg will quickly be eroded by having to use a high cost special load unit. Moreover, such a unit does not exist. The alternative which we, and existing equipment suppliers, retained, presupposed that with a price advantage, shippers could be helped to accept (as they do on the lower Rhine) an inland-waterway-compatible high-capacity pallet-carrying box which is robust and low-cost. Without a significant price advantage this acceptance will clearly not occur.

The second technical issue was external: the **rail operation for high-cube load units (2,90 m height) into Italy**, with profile clearance and electrification promised in 1999 on the direct line from Domodossola to Novara. This work is still not complete (2/2000). Substitution of a wagon composition able to handle high cubes led therefore to additional costs for Megafret wagons in place of Multifret, and a loss of optimisation of train capacity.

The pricing trap: the service was planned, at 1998 conditions, to be potentially profitable, at known market rates and rail costs, during the second year. This encouraged the Consortium in its decision to take all measures appropriate for putting the project into operation, to commit substantial own funds, and to submit an application for PACT support in the 1999 programme.

The planned result was however undermined by a variety of adverse factors, to be described. These included

- A 4-month blockage, by accidental damage, of rail access to Basel Rhineport
- Sharp falls in road freight market prices during 1999, still apparently continuing
- Transitional situations for rail infrastructure access (track charging) in 1999 and 2000, imposing severe additional burdens upon rail costs
- A lack of co-operation from FS since Italy has still no basis for open access
- Ongoing delays with engineering work to pass high-cube containers and obtain through electric operation on the direct route Simplon - Domodossola – Novara; these have also prevented planned timetables being confirmed
- Unexpected costs arising from the separation of competences for operation and infrastructure under Swiss rail legislation from 1.1.1999
- Collection and delivery costs by road, especially to and from Novara

These have now removed the expectation that a profitable service can be achieved within the PACT conditions of 'profitability within three years', or within the financial resources which the Consortium members might still have been prepared to commit. **The suspension of the project in 1/2000** without any further expenditure, and foregoing further claims upon PACT funding, **was therefore decided by the Steering Committee, and endorsed by the Board of ART S.A.**

The feasibility study had shown the necessity of a common joint venture company of the partners, to manage physical assurance of the through service and to manage quality, cost control, cargo booking through the system, and purchase of services of third parties. A single information chain was to be established.

The company ART S.A., Mulhouse, France, was formed in 1999, with the statutory objective of organising through services in the interests of its owners. By common decision of its owners, the Consortium members, ART S.A. will not be liquidated on termination of the project, but will continue to exist, so as to permit realisation of transport operations as market and background conditions improve, and continuation of the co-operation achieved. ART S.A. is therefore the holder of the intellectual property represented by the project work, knowledge and operating procedures.

The BLS, a Swiss private railway, is not eligible for its operations and track costs to be supported by the EU in the PACT programme. It has however greatly facilitated the project work, and has represented the project's interests in relations with the FS and the Swiss government department BAV, responsible for track access charging and for support for creative intermodal solutions. The BLS has facilitated test running of demonstration trains between Basel and Novara in Autumn 1999 to demonstrate the effectiveness of the measures put in place.

Results and deliverables:

- The project has shown that through integrated services by rail and inland waterway can be planned, operated and monitored to give predictable and reliable services but that the detailed implementation and local circumstances must all be favorable to demonstrate competitive advantages.
- The project brought Rhine shipping, terminal and rail interests together for the first time, raising awareness and resulting in a new transalpine partnership.
- The economic advantages of inland waterway, collecting at various points, permit cargo to be collected and distributed through river ports over substantial catchment areas. This advantage is weakened by local costs of road haulage operations (well known also in road/rail operations). Nevertheless, if cargo can be delivered concentrated at a transhipment port to rail shuttle, and the dedicated rail shuttle then runs port – inland terminal at high efficiency, the basis of a successful commercial operation exists.
- The operation therefore needs a high level of professional skills, and a high level of hands-on control. The disposition office and information exchange system are a necessary part of such an integrated operation. Partner and customer interfaces would have required further improvement.
- The transalpine markets for freight transport are not only dominated by road transport, but the market prices practised have been falling sharply during 1999. This will affect further policy and market developments. It had the result that despite progressive action to reduce rail costs, including support from external subsidy, the planned service could not be competitive or profitable.
- Track cost regimes will require substantial subsidy as long as rail and road infrastructure costs are not both subject to a harmonised policy of infrastructure provision. This was apparent in Switzerland, where the Federal authority was prepared to subsidise track costs including for ART at a later stage; in Italy there is no knowledge of how competitive operations will be viewed, since conforming legislation is still not in place.
- The project underestimated the case-by-case marketing work to be undertaken by partners who had up to this point not been involved extensively in continental intermodal operations. This was intensified by the erosion of the planned price advantage as rail rates rose and road prices fell.
- The administrative and operating conditions of operation of trains in open access have not yet been put in place; the project overcame many difficulties by local intervention. The lessons learned should be valuable to legislators.
- The service, procedures and working arrangements are summarised in the ART Operating Handbook, for partners and for operatives of service suppliers.

Main report: Introduction

The project ART has as objective the realisation of an integrated intermodal operational system between the Rhein and its catchment areas, accessible through Rhein intermodal terminals, and the trading partner region of northern Italy.

Its elements are

- A Rhein shipping operation using the existing regular, scheduled service of the PENTA Consortium, (capacity of 723 TEU per week up to Basel, now being increased) and carries otherwise maritime boxes. There is a synergy achieved between the maritime demand, focussed on Rotterdam, and the continental requirement from Rhein ports up-river to Basel. Terminals served by the service are well situated for the needs of continental traffic with moderate to short road approach hauls. PENTA's terminal in Basel is adequate for ART and its planned development.

- A shuttle train between Basel Rhein port (PENTA container terminal) and the terminal of CIM in Novara, Piemonte. This train would run with a single set of wagons, up to three times weekly in each direction, in connection with PENTA schedules.

- Integration of these operations and the terminal activities, also provided by consortium partners, into a seamless and competitive through service.

The total market in the regions to be served, in terms of road freight, was restrictively estimated at about 10 million tonnes (1997 estimate; 1994, with reliable planning data, was 8 million tonnes) and had increased rapidly.

Marketing the through service product was retained by the ART-Consortium partners, individually and competitively, as part of their own range of services to particular cargo sectors. This has proved to be a source of weakness in markets principally served by road, and where some partners had little existing experience of domestic intermodal operations. This could have been overcome by training and recruiting, but by this stage the decision to break off the project was taken.

Operational planning

The feasibility study had drawn attention to certain commercial risks and operational needs. These were addressed under PACT 98/20 with a view to implantation of the first services in 1999, including operating procedures, training and project management in detail, and information flow. Rolling stock was obtained, at greater cost than originally planned because the profile requirements in Italy were not yet realised. Customs and documentary process were reviewed.

Trial trains were run in Autumn 1999 between Basel and Novara and return to test the viability of the operating arrangements. These were accompanied and the results monitored. Although certain service requirements still could not be published (the delays to Italian engineering work on the proposed route prevented optimal timetables being finalised), a sales and marketing action to support the consortium members was launched in Autumn 1999.

This however confirmed the reports received during the summer of 1999, that the market was fast deteriorating. Volumes were no longer rising, but much more serious was the fall in road haulage rates, for reasons outside immediate control. It was learned in January 1999 was that Track Costs for the Swiss section (critical for the shuttle) were to be substantially increased, and the lack of legislative clarity in Italy on rail deregulation threatened ART with high and non-transparent cost elements for the traction Domodossola - Novara. Rail costs by now no longer permitted ART to offer a competitive advantage, to justify users' switching to the proposed service.

Project Organisation

The ART consortium partner members are the member companies of PENTA, the BLS railway as an associate, Ambrogio Trasporti of Gallarate, Italy, and the CIM company, proprietors of the Novara terminal.

Partners (detailed descriptions in confidential version)

Ambrogio Trasporti S.p.A Gallarate (AMBROGIO)

BLS Lötschbergbahn AG (BLS) : Associate partner

CIM Centro Interportuare Merci S.p.A. Novara (CIM)

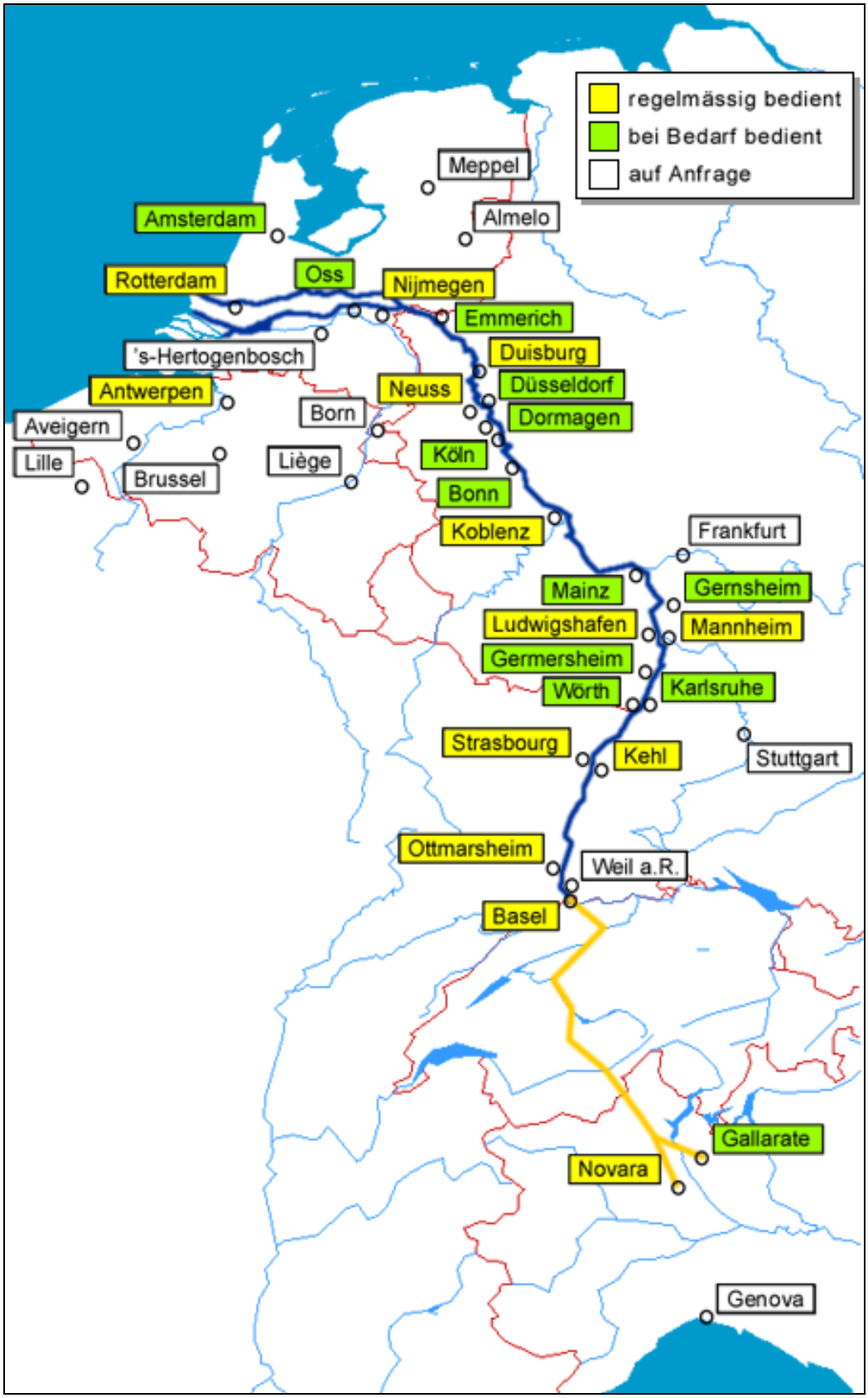
CIM is an associate of ASSOINTERPORTI and part of EUROPLATFORMS.
CIM provides a surface of 839 000 m^2 divided as CIM 1 with 688 000 m^2 and CIM 2 with 151 000 m^2. The intermodal terminal has 70 000 m^2 with 3 tracks of 350 metres and various warehouses and buildings. The tracks are being extended to 650 m. The recapitalisation of CIM was decided in late 1999, and will result in the development of CIM 2, becoming one of the biggest intermodal centres in Piemonte.

PENTA Container Line AG Bâle/Strasbourg/Sliedrecht (PENTA)

C/0 C.F.N.R. STRASBOURG

Project Management
Senior Logistic Consultants SARL
16, Rue de l'Horticulture
F-68100 Mulhouse

Project description



The Rhein river scheduled container service, between the ports situated along the Rhein, is served by PENTA container line; in connection with intermodal shuttle trains between Basel and Novara, over the Lötschberg line of the BLS railway. The service is directed at inner-European road freight traffic inn this corridor, suitable for intermodal operation and for which the service characteristics are appropriate.

ART provides services therefore between regions of Benelux, Germany and France, where these are within range of a suitable Rhein port, and northern Italy served via the strategic high-performance intermodal terminal of CIM in Novara. The project required that issues of operating costs, suitable intermodal equipment, including rail rolling stock and pallet-wide containers suitable for loading on Rhein barges, setting up an integrated information chain for operating and commercial purposes, be addressed. It should resolve all the problems of interoperability, practical and economic, between the modes and between the suppliers of services.

A marketing appreciation was established by the partners as part of the feasibility study. It was known that much road traffic between the Rhein catchment area and northern Italy (Piemonte and Milano, Genova) does not use the direct Swiss routing, by rolling highway or on the Gotthard route, but, loaded to 40 tonnes, accepts higher costs and longer journey time by taking the diversion through France to reach Italy, to avoid Swiss 28 tonne transit restrictions.

Research by the Swiss government (BAV: published by GVF), conducted in connection with an Alpine transit investment policy, had revealed in 1994 a base volume of about 8 million tonnes of heavy vehicle road traffic between the regions concerned. Extrapolation on the basis of observed growth rates allowed an assumed 10 million tonnes of regionally suitable cargo. Its composition was known to include substantial flows of steel, chemicals, ceramics, semi-manufactured articles, and bulk foodstuffs such as rice, known to be non-urgent commodities.

Research and forecasts of CETE Méditerrané (1996) showed also a supporting pattern of 186 000 heavy goods vehicles annually between Belgium and Italy, and 134 000 goods vehicles between Netherlands and Italy. Clearly the problem for new operators is not normally the existence or size of the market, but the provision of a competitive offer to address niches and segments of the market. Intermodal is not normally able to do this except in favourable cases of distance, concentration and types of cargo.

The ART shuttle achieves a 9 hour transit between Basel and Novara by the Lötschberg route, to be added to the Rhine shipping movement. The ART service, offering capacity up to 300 000 tonnes annually in its first mature phase, was expected to appeal to these specialised markets. Its slower operation north of Basel appeared to be offset by a high reliability and by a high security for hazardous cargo, as well as a natural appeal to heavy cargo. It was however clear from the start that this demanded managed and integrated use of barge and shuttle to achieve low costs through high utilisation, justifying the transfer to the service where road is operating successfully today.

The project ART II, supported under PACT contract 98/20, was the second phase of the project ART, which began with a feasibility study, PACT 73/97. The feasibility study showed that on the valid best assumptions and on the research data collected, it should have been possible to achieve break-even in the second year of operation.

The consortium was therefore at the end of 1998 prepared to launch and market a service as planned, and to commit its own financial resources to do so, while applying for PACT support.

It was agreed to put the following measures into effect, which were retained in the Annexe to the 98/20 contract:

- To form a joint venture company for ART to purchase elements of the integrated service from suppliers, to maintain quality and regularity of performance, and to organise intermodal services which would be supplied to the consortium members for these to market to users and third parties.

- The formation of this company in the form of an S.A. was required to launch the service, since a legal and contractual basis of purchase and supply of performance elements had to be formally put in place. ART would be a trading company without objective of profit maximisation, but with targets of performance optimisation. The legal form and the draft contract of technical collaboration were prepared and approved by the consortium members, and ART S.A. was founded in Mulhouse with a capital of FFr 250 000.

- The company ART S.A. was empowered, in co-operation with the partners, to put in place a monitoring and quality control system. This was also done during 1999.

- It was intended that ART would also be responsible for obtaining or mediating for technical equipment, such as rolling stock, load units and informatic services, but this was not realised at this stage. It became clear that ART could not appear as a customer, of the Italian railways or SBB for example, since Open Access conditions were not yet in place. The ordering of train paths and contracting to operate rail equipment could only be undertaken through a recognised railway. The BLS therefore made these arrangements.

- ART S.A. commissioned Senior Logistics Consultants, SARL, 16 rue de l'Horticulture, F-68100 Mulhouse, to execute the project covered by contract 98/20, during the phase of implementing its operational stage. The partners, in the Board of ART S.A., constituting the steering committee of the project. (Termination of the project by decision of the Board of ART S.A. on Jan 18 2000 means that this commission will be withdrawn as soon as the terminating stages of the Project, including this Final report, under EC contract are completed.)

- The BLS took measures to locate and secure suitable rail rolling stock. This was undertaken in 1999.

- It was at that stage hoped to start operations in spring 1999, and this was the justification, as the business plan showed, of concluding the contract 98/20 with the Commission. It was however clear that the need to make a submission in early 1998 to cover events expected to be realised in 1999 required a substantial level of extrapolation and of assumed problem solving. In fact, the end of 1998 brought several difficulties which had not been expected. The principal of these was the track access charging regime in Switzerland. This was implemented on 1.1.99 and

transferred to the Transport Ministry the responsibility for fixing access charges. The level fixed was punitive; SFr 12 per train-km, or EURO 8 per train-km. At the same time difficulty was encountered in obtaining a quotation for a private shuttle train for the Italian section of the route. The FS was not prepared to anticipate the then unresolved issue of open access, still in discussion at the EU Council of Ministers. Its quotation when obtained was clearly not in line with rates known by experience for similar traffics.

By early 1999 the following was the planned operational basis :

Rail shuttle ART Basel - Novara / Gallarate
(Gallarate was retained as an alternative until mid 1999)

Train 1'300 t /length 476 m /payload 840t / 59 TEU /number of wagons 17.

Schedule

Paths were agreed as follows:

North - South				**South- North**			
Basel Kl.H. Hafen			**Novara**	**Novara**			**Basel Kl.H.Hafen**
Train	Days	Closing	available	Train	days	closing	available
42903	1,3,5	14.20	B 07.00	42902	2,4	*14*	B 07.00
				42904	6	*12*	C 07.30

Rhein shuttle ART operated by Penta Container Line (existing)

- Capacity from 1.1.1999 616 TEU weekly each way
- Calling at Basel: Monday, Wednesday, Thursday, Friday
- Vessels in service

The operating centre ART to plan the cargo flow and transportation for ART (monitoring, reservations, documentation, invoicing, etc.) was prepared at the Basel Kleinhüningen terminal, equipped with IT and communications services.

The problems of 1999

All steps for implementation of the first operational phase, as foreseen in the Proposal to the PACT Directorate, Project 98/20, had been completed. Operationally and organisationally, the project could start at once.

Measures already completed included:

- Management of service provision: capitalisation and creation of the joint company, ART S.A., which would progressively take responsibility for purchase of service elements and integration into a full service package as required by consortium members. Statutes of ART S.A. and operating agreements approved
- Establishing the product: schedules, negotiation of rental conditions for rolling stock and material, technical conditions and specifications, terminals, communications
- Management and monitoring of performance: Disposition and control office at Rhein/rail interface
- Sales and Promotion: Press and PR information well received, Website operational; agreements on sales and agency competences between members

However, **new obstacles arising in the rail sector** had put in question the premises upon which work to now has been undertaken. They made it much more difficult to envisage a progression to long-term profitability.

The project encountered various external problems. One of these physically prevented the start of operations in Spring 1999.

This was a **railway accident in December 1998**, at the entrance to the Basel port rail system. It severely damaged a bridge of the port access line (the Hafenbahn) carrying the principal flow of traffic into and out of the port, so that during a four month repair period the port's rail traffic was seriously impeded. The Basel Rhine port is the third biggest source of freight traffic for the SBB, and its operations could only be sustained with difficulty. During this period, the launch of ART, as a new, schedule-sensitive rail service for an outside operator (BLS) was formally excluded.

The second issue was ultimately of greater consequence for further development. Referred to above, it shifted competitive conditions of intermodal services as a result of **measures introduced in 1999 in Switzerland and Italy for use of rail**. On 1.1.99 the Swiss rail law entered force. It allowed competition on the rail network (Open Access) but by greatly increasing access charges, it increased shuttle train costs in Switzerland, substantially above those previously supplied by BLS. Since these costs incurred outside the EU were not eligible for PACT support, their full impact would fall upon the project from the moment of launching.

In addition, FS Cargo, now involved in a merger process with SBB Cargo, the principal competitor of the BLS, sharply increased rates for the section Domodossola – Novara. Italy was, as described, also opposing measures of rail deregulation (COM 98/480 and later, COM 99/616) proposed by the European Commission to the EU Council of Ministers. ART not only anticipated this debate, but there is still no legislative basis in the EU (except 440/91) requiring the proposed measures to be implemented to create fair and impartial competitive opportunities on rail. EC COM 99/616, while broadly accepted in Helsinki in 12/99, cannot become a Directive until at the earliest 12/00, and must then be implemented in practice.

The market, however, showed at this stage an opposite trend. Both ART partners Ambrogio and BLS reported falling market prices and a weakening of volumes. It was known that all intermodal domestic operators were in difficulty on the north-south routes, with falling volumes, but also with deteriorating service standards and rising costs on rail operations. The Commission was of course aware of these difficulties.

Rail route improvements: The profile improvements and electrification work on the direct route Domodossola – Novara, although in progress, continued to be delayed. Completion is now forecast for late 2000. This line was a secondary route, single line, non-electrified and with difficult engineering and operating conditions, but carrying a regular local passenger service. Its reconstruction for through freight has been agreed and financed, and it forms a strategic link between Northern Europe, the Lötschberg line and the Novara region, avoiding Milano. It is potentially a powerful asset in the European network, and is being rebuilt to accommodate high-cube containers on standard rolling stock. Its completion was a contributory factor for ART and also for the economic development of the Piemonte region and Novara.

On-going delay to completion of this work is **a lasting handicap**, not only to ART but to the development of the international Lötschberg route and to the economy of the trading region of Piemonte, as well as to the CIM Terminal at Novara for which it is the natural northern approach route, and an ongoing obstacle to increased use of rail for Alpine Transit.

The Steering Committee of ART decided in April 1999, in the face of these circumstances, to delay again the launch of the service, to request BLS and FS to obtain improved conditions, invoking the aid of the Swiss Minister of Transport, and to re-examine means of launching the service on a reduced basis, if necessary in partnership with another operator. Despite interest, this attempted interim solution proved ineffective, partly because the railways' existing rates agreements to other operators excluded new associations and train sharing. It was therefore not pursued.

The interim report of May 7 1999 informed the European Commission of these problems, and noted also the project management problems likely to result from on-going delay to the launch. Attention was drawn at this stage to their effect upon the prospects of success, and upon contractual implications. 1999 was to involve a period of considerable planning cost to redraft the project in detail, in the light of the changing and deteriorating situation. A launch could not be undertaken without new assurances of services and schedules, new rates negotiations and marketing assurances. Work continued to re-establish these.

Several improvements could be achieved. The Swiss Government (Transport Department, BAV) announced in May 1999 its intention to reduce track costs in Switzerland for intermodal transport, if only from Jan. 1 2000, to 0.001 CHF/gross tonne-km, plus 0.4 CHF /train-km, exclusive of energy costs.

This reduced the track costs in Switzerland for ART, including energy, by over 50%, to an estimated 4 Euro/ train-km, but only from Jan 1. 2000.

In June 1999, the BAV invited all combined transport operators throughout Europe to submit propositions inviting subsidy of transit traffic from 1.1.2000. Through its member, BLS, ART submitted an proposal; this was accepted, with the BLS as the beneficiary. With the other railways involved, SBB and FS, acceptable conditions were obtained, for ancillary costs and the section of route through Italy, until the end of 2000. Although rates for the door-to-door market by road were still falling, the rail shuttle costs between Novara and Basel were potentially now under control.

FS remained unable to distinguish between track access charges and rail traction.

The timetable slot Basel – Novara was reserved in August 99. However, the delayed rebuilding work on the Novara line again blocked optimisation of the offer, since the route was to be closed during the time of the planned train passage, between 04.00 and 08.00 each morning until mid-2000. The through schedule was seriously degraded by this, since the alternatives prejudiced the ship-train connection in Basel.

Costs and rates in 1999 could not be reduced to market levels. In view however of the rates improvements through the Swiss subsidy, which would become available from Jan 1 2000, the BLS decided to lease the wagons and to offer to ART the train haulage at almost the same conditions which should apply in 2000.

The first train operation: October 13 1999

Between October 13.-15. a first technical test train was operated on the route Basel Rheinhafen to Novara and back. Accomplished without difficulty, this was certainly the first train to leave the Basel Rheinhafen in an Open Access regime, and is believed to be the first successfully to transit Switzerland without delay. The administrative, customs and operation measures put in place were correspondingly new, had not previously been addressed, and were not previously known to those putting involved along the route. The trains were accompanied by a project team specialist. These aspects, which had caused serious problems for other attempts, such as in the TERFFs process (e.g. the Hangartner train of 1999), could now be considered to have been resolved, even with some improvisation, on this route.

The Operating Handbook (Betriebshandbuch) created to accompany these operations, and agreed with all responsible bodies involved en-route, is confidential but is supplied to the Commission as an annexe to the Main Report. This book is a valid guide to subsequent operations.

The reasons for breaking off the project

In October 1999, the situation was reappraised. It was clear that the delays in starting a service during 1999 had resulted in a distortion of the costs position compared to the Budget included in the contract, since, in the face of the constantly changing circumstances, considerable re-planning work had been engendered. However, operational costs would be incurred much later and this implied an extension of the PACT Phase II contract until late 2000. This however effectively made the Phase III grant under the PACT 1999 programme irrelevant.

18.1.2000. **Board meeting, ART S.A., Bern** (extract of protocol)

> The board decided that the Project ART as now developed, despite the resolution of extensive technical, operational, regulatory and external problems, could still not be launched successfully and reach profitability under present market conditions. The project manager was therefore authorised to terminate the project, as foreseen in the contract with the EC, with effect 31.03.00, with submission of a Final Report as required in the Contract.
> Responsibility for the project results, and the ownership of the products of the work completed, will remain with ART S.A., in accordance with Annexe 1 to the statutes.
>
> The Board agreed that ART S.A. is to be retained, following the conclusion of the project, in order to develop activities which are in conformity with its objectives.

Market development

1997, as the ART concept emerged, the combined transport market was still growing and intact. The negotiations on bilateral agreements EU-Switzerland were not yet agreed. The outcome was still uncertain. Rail liberalisation was not progressing; the EC Rail White Paper and Communication on Intermodality COM243 indicated an urgent need of change and a wish to achieve improved competitive condition for intermodal, not least through rail reform. World markets were strong; Germany was overcoming the East-integration problems, the Asian crisis was not yet apparent, and transportation and trade indicators were mostly positive. Combined transport was still showing growth.

The first calculations for ART showed costs which, in the market of the time, permitted the service to operate competitively without subsidy (except for PACT starting help). For example, 40‘/WEB Benelux-Northern Italy 1025 -1230 EUR. The rail shuttle, Basel-Novara, was planned at 170 EUR/TEU.
The situation changed sharply in 1998, as, following the Asian and Russian/CIS financial crises, traffic went into decline and trucking competition increased. Transalpine combined transport was severely affected, and all intermodal operators suffered traffic and revenue losses. Rates for road freight and in combined transport fell, by around 20%.
In the second half of 1999, total traffic began to recover; but rates did not. A road freight equivalent to WEB/40‘/45‘ Benelux – northern Italy has fallen to less than 800 EUR, a 40‘ Container Rotterdam/Antwerpen to Novara (combined transport, Terminal -Terminal) less than 500 EUR.

The following table shows the effective deterioration of equivalent door to door rates based on observation of the trucking market in the period 1998/9.

Novara - Benelux 97/98-1999 **44/40 t Full-load Net.26t WEB13.6m or Cont /40'/45'**				
Period observed	**Door to door (Euro)**			
			(150 EUR /Trucking/Handl)	
	min	max	min	max
10.98 Rapp Final 73/98	1023	1227	723	927
10.99 Action Start ART	800	1000	500	700
Difference	**223**	**227**	**223**	**227**
	22%	19%	31 %	24%

With the financial aid offered in the meantime, from 1.1.2000, not only from PACT, but also from the Swiss government BAV (for the Swiss transit) the rail cost Basel – Novara could be lowered to about 130 EUR/TEU, or. 260 EUR/40‘. This reduction does not suffice to overcome the competitive door-to-door market price erosion of more than 100 EUR/TEU, or over 200 EURO per full load.

Conflicts of aims

From the beginning it was intended, with the waterway-rail integration of ART, to establish a new Alpine intermodal transit route and to serve new markets. The BLS, not yet greatly involved, a private but heavy duty and high performance railway, on the direct line of route, was well placed to provide a new rail connection. With the CIM Terminal in Novara a geographical and, for transportation, strategically ideal location was secured. Novara-CIM is planned as main terminal on the Lötschberg axis of the Swiss NEAT planning. It was necessary to involve a combined transport operator with a strong implantation in the Italian market. Ambrogio Trasporti, the successful and experienced private intermodal operator, with a private terminal in Gallarate, and PENTA, already operating a scheduled service to Basel with own terminals, and with partners in several countries, were the other partners.

However, the strength of these partners, and the high level of voluntary co-operation, was offset by the conflicts of interest which from time to time arose, especially as markets, in which the partners were already involved, changed during the Project period. It is a reality of such multimodal consortia that conflicting interests will arise. For example, certain promising traffic flows had to be excluded because they were already carried in part by conventional rail freight.

ART, also as a PACT project, was not intended to be active in the maritime market. Some maritime boxes were expected to be offered, but it was clear that these would not in any case convert quickly where well-established routings by rail and by own vessels were already effective.

In 1999 the catastophic and long-lasting high water situation on the Rhine caused severe problems to all operators, including service suspensions and high costs. During this period, rail intermodal operators were contracted to carry inland waterway containers by rail throughout as a relief measure.

Use of a road-inland waterway-rail-road link requires also the establishment of logistic chains based upon pallet-wide containers. This is more than a simple sales and acquisition task, and requires first, economic arguments in favour of change, and second, serious sales support to adapt logistics and cargo handling. The ART project management was for good reasons not to undertake sales and cargo acquisition, but only to co-ordinate back-up information such as the web-site, press and trade fair support. The partners reserved to themselves the selling of services, each individually, as part of their own separate businesses. Support material was supplied, in three languages, and service background information, equipment provision, and rates and operations, were discussed at marketing briefings. Sales and development did not achieve a market breakthrough. This was accentuated by the divergent interests of the partners. This suggests that, although development of sales was also greatly inhibited by the uncertainties throughout 1999 of track access, rates and open access operating conditions, this was not the only problem. Given a decisive economic selling argument, a specialist team with one or more selected co-operative pioneer customers might have been able to concentrate on achieving mode changes by systematic detail work.

Objectives and results

The ART project has pursued operative, commercial and transport policy objectives:

1. integration of rail and inland waterway
2. Open Access on the rail network for dedicated operations
3. Promotion of pallet-wide containers and stackable swap bodies.

The primary objective was however to set up an economically self-sustaining service, within a reasonable payback time for the partners, but also following the guidelines of PACT, of profitability without support after three years. Since this objective is seen to be unattainable under present circumstances, the project is being stopped by decision of the partners (Board meeting ART S.A. of 18.01.00), and as advised to the EC (informal meeting SLC-DG-TREN of 26.01.00).

Although this is disappointing and has involved considerable investment of time and money from all involved, it is noted that significant results have been achieved, with relevant market and policy elements. We believe it also important to analyse why objectives were not fully achieved. The specific consortium-internal considerations have been referred to above, and so has the on-going transport market and political environment. The following points are more specifically focused.

Co-operation rail – inland waterway.

The creation of the company **Aqua Rail Transit SA,** which has the explicit task of carrying out intermodal traffic with integration of inland waterways, and which will continue to exist following the cessation of project work, might be regarded as one of the major achievements of the project.

Inland waterway operators and transit rail, as well as intermodal operators in Italy, have now opened an intensive dialogue which was triggered by ART. Although it is EU policy to involve the inland waterway operators in continental (domestic) intermodal traffic, these have had no experience, before ART, of the market or its characteristics. Although ART underestimated the degree of adaptation required, today there is an awareness of continental and Alpine transit traffics, which is increasing.

Optimisation of rail and barge loadings and operations are very different; this is now better understood in both modes, and future co-operation will no longer start at zero.
Equally, Italian transport interests were largely unaware of the potential of inland waterway north of the Alps. This is now changing.
The project has acted as a catalyst. We note that barge operators and railways not involved in the project have suddenly found a will to co-operate. A similar project ROMI, Rotterdam – Milano, was announced by SBB, HUPAC and Haeger und Schmidt, in spring 1999, although not addressing primarily the domestic market which was the objective of ART (and of the PACT programme).

Open Access

Open Access was an implicit part of the project. In practical terms it was planned and tested with the test trains which operated in October 1999. The operational and procedural requirements are met and have been tested.
The Project was being pursued during a period of intensive discussion at EU government level on Open Access and on-rail competition. In Switzerland, Open Access was assured under Swiss legislation from 1.1.99, although charging methods were not at first acceptable to users. Combined transport in Alpine transit traffic was the subject of an invitation to tender; ART received in Nov. 99 approval for support.

In Italy, Open Access could not be achieved during the time of the project, and it will be at least one to two years before the Agreement of the EU Council of Ministers (Helsinki, Dec 10 1999) will be implemented. In fact, the differences and provocations which arose with the merger of SB Cargo and FS Cargo, and with the co-operation agreement between DB Cargo and BLS, led to conflicts of interests, so that for some time during 1999 the FS was not prepared to accept and programme the ART shuttle train.

We regard it therefore as a success of the project, that at the last it was possible to operate test trains, and to test all formalities and procedures. It should be understood that to pass a private train in such circumstances, authority to operate has to be clearly given, access to infrastructure agreed and scheduled, and safety of a licensed rail operator established. But equally to be resolved are documentary and administrative issues, since working instructions, waybills, invoicing and credit, settlements between railways, etc, and extras such as shunting charges, all have to be in place so that local rail offices can accept and forward trains.
With the ART Project and its political presence, the process of obtaining access to the networks on this TEN route has been accelerated.

Palletwide Containers and inland waterways

The inland waterway transport system is alone in having free capacity on major transport corridors in Europe. Most European rivers are too small for efficient intermodal goods transport. Belgium, Germany, the Netherlands and, partly, France, could and do transport goods in serious quantities.

Intermodal transport is possible on the river Rhine; physical conditions are uniquely favorable. Between the North Sea and Karlsruhe there are no locks; above Karlsruhe, locks inhibit dimensions, especially the beam (width), of vessels accepted. The Rhine offers additionally generous clearance height and, at most times, reliable water supply. Under these conditions a traffic of 1,6 million TEU per year of maritime containers was built up. A free market and intense competition prevail.

Numerous terminals, mostly with adequate capacity, are located on the Rhine. Inland waterway transport is also the safest, most environmental friendly and energy efficient mode. Promotion of water transport, using spare capacity, and without heavy infrastructure investment, is therefore logical, featuring in public policy, and was central to the ART concept. The combination of all three land-based modes of transport, is operationally feasible, as this project shows. A principal technical condition is the availability and use of inter-operable container equipment.

Why this is an issue needs explanation. The dimensions of inland waterway ships are limited by length and width, mostly by locks and partly by navigational conditions. Height of stacked containers depends on clearance height of bridges and on maximal depth of the waterway. The European inland waterway network is divided into five classes, of which only classes V and VI have any importance for intermodal. The following are the minimum dimensions, not of vessels, but of the classes of waterways:

Table: Inland waterway classes relevant for Intermodal Transport

	class IV	**class V**	**class VI**
length in m:	80 - 85	95-110	140
Width/beam in m:	9.5	11.40	15.0
draught in m:	2.5	2.80	3.90

Most parts of the European inland waterway system are in class IV, the upper Rhein (with locks) being class V.

A vessel on a class V waterway may have a maximum beam of 11.110 mm; this and constructional regulations limit the deck hatch opening, for access to the hold, at its widest to slightly over 10 m. Load unit width is not harmonised with this dimension. Inland waterway intermodal vessels which are designed for transport of ISO-containers, can load and transport four parallel rows of ISO-containers.

Maximum dimensions of road vehicles, however, allow swap bodies at a width of 2,55 m. Four rows of swap bodies, with total width requirement (including working clearances) need minimum 11.550 mm (SGKV Frankfurt data), a width not available

in the hold and even wider than the permitted vessel. A maximum of three rows is possible. This means also that mixed loads of wide swap bodies, and maritime containers, are only possible when vessels are lightly loaded or when swap bodies are secured on deck.

Since on a barge the load units are stacked in the hold in parallel rows, with minimum clearances, units have to be stackable and to have top lift. This is not usual for swap bodies, but can be assured by specially designed units and pallet-wide containers.

This was well-known; to overcome it, ART enjoyed the support of various equipment suppliers. Boxes of GE-SeaCo (pallet-wide and SeaCell) and Consent were available to the partners for trial marketing. SeaCell units are in successful use for pallet cargo between Rhein terminals (Duisburg/Emmerich) and Great Britain. The Consent designs represent more closely the new CEN norms.

Road transport, even for the goods for which ART should be interesting, is largely dependent on swap-body and trainer lengths of 13,6 m (almost 45‘) . Open tops (for steel) are extensively used. To convert these logistic systems with open top or with full length swap bodies to pallet wide and standard length containers was seen to require long planning, extensive marketing support, and also a serious economic motivation, which ART is not able at present to provide.

This raises a further problem. Even when 13,6 m units are available, the length is not compatible with existing holds and divisions (bulkheads) of vessels designed for ISO containers. ART planning considered all units acquired in the project as at this stage marginal loading, with standard unit prices similar to ISO boxes. This concession could not have applied to 13,6 m units, and would not have been sustainable in full operation for other than occasional deck loads.

ART has however stimulated serious development work. Italian road transport interests have planned, and one is purchasing, stackable swap bodies to inland waterway dimensions for steel traffic.

In this subject, ART has had exchanges of experience with swap body and container lessors and with SGKV in Frankfurt, whose Director Dr. C. Seidelmann is Chairman of the CEN committee on standards for future load units. The project has therefore formed part of the work of adaptation, harmonisation and new design which is needed to reduce the barriers to interoperability. A clearer economic advantage to users would, of course, have helped to overcome theses barriers by the use of available equipment.

Further lessons, summarised

At one level ART had to combat technical and system problems. These were mainly in the rail sector: track access charges, traction charges, access authority, delays in infrastructure improvements, no (or unsuitable) rail cars.

As these problems were overcome, the markets were collapsing. The anticipated price advantage was, despite external help by PACT and by the Swiss BAV, no longer present. This meant that customers could not be found quickly who would pioneer a conversion of their methods from road and 13,6 m capacity, to adapt to intermodal, with slower but regular service, but with no obvious price advantage.

The Rhein terminals were not laid out for transhipment and holding of swap bodies. This can be arranged, but requires an economic incentive. However, handling costs would be higher, since even with 3-high stacking (CEN standard) there would be loss of space and more ground movement. It is therefore desirable that a container-analogue pallet-wide system such as SeaCell, already successfully in use in lower Rhein regions, should be used. This is not possible without shipper enthusiasm.

The Rhein shipping operators have as yet no experience of domestic (continental) traffic. This implies intensive training or recruitment, but the alternative will be that such services will in future be marketed by integrators and intermodal operators. This had been foreseen in the project consortium, but the decline in the markets on the north-south route has also obliged existing integrators to concentrate on protecting existing traffics without taking new risks.

Collection and delivery by road from terminals is still too expensive, as many other studies have shown. The effect under market rate pressures is to reduce the radius of interest around the terminal, and therefore to eliminate parts of the potential.

The thorny road to open access

Open Access as a concept is far from assuring true, free use of the rail infrastructure. Unlike on road, the user of rail is dependent on various services at different locations. These can often only be provided by the existing rail operator. Use of the network is required to be non-discriminatory. Supply of these support services, such as provision of assisting locomotives, stabling of trains and wagons, marshalling, is however not subject to any competition and can be a punitive barrier to third party operation. It can only be suspected that these services are not provided for third parties with the same readiness as for the national railway's own operations. We must imagine the problems if highway filling stations and parking lots were a monopoly of a state trucking company.

While it may be expected that these effects can be brought under control with time, especially where, with increased demand, a market in service provision emerges, they are at present a serious problem. EC 99/616, adopted by the Council of Ministers in Dec 1999, goes further in reducing the opportunity of abusive behaviour, but will become law at the earliest in 2001, and has to be tested in practice.

The overall experience of ART was therefore two-fold:

- Practical and operational problem solving, mostly achieved.
- A battle, against a falling market, to achieve economic competitive operation. This, despite considerable progress (the ART rail shuttle rate per slot fell by one third in two years) could not be achieved.

We find an interesting and completely independent confirmation of the project, but also of its results, in a study published by Planco-Hacon in October 1999 („Terminal-konzept für den Kombinierten Güterverkehr der Binnenschiffahrt“ im Auftrag des Bundesministeriums für Verkehr durch PLANCO/HACON, Seite 22) for the German Transport Ministry. This study shows that continental traffic use of inland waterway only has a chance of becoming competitive in Alpine transit, and then only with connection in Basel. This demonstrates that ART has been tackling the right process, even though it has not led to the success the consortium and the Commission had hoped for.

Summary of results and deliverables

- The project has shown that through integrated services by rail and inland waterway can be planned, operated and monitored to give predictable and reliable services but that the detailed implementation and local circumstances must all be favorable to demonstrate competitive advantages.
- The project brought Rhine shipping, terminal and rail interests together for the first time, raising awareness and resulting in a new transalpine partnership, as well as creating a joint venture company, ART S.A., to create formal conditions for co-operation and service integration.
- The economic advantages of inland waterway, collecting at various points, permit cargo to be collected and distributed through river ports over substantial catchment areas.
- This advantage is weakened by local costs of road haulage operations (well known also in road/rail operations). Nevertheless, if cargo can be delivered concentrated at a transhipment port to rail shuttle, and the dedicated rail shuttle then runs port – inland terminal at high efficiency, the basis of a successful commercial operation can exist.
- The operation therefore needs a high level of professional skills, and a high level of hands-on control. The disposition office and information exchange system are a necessary part of such an integrated operation. Partner and customer interfaces would have required further improvement.
- The transalpine markets for freight transport are not only dominated by road transport, but the market prices practised have been falling sharply during 1999. This will affect further policy and market developments. It had the result that despite progressive action to reduce rail costs, including support from external subsidy, the planned service could not be competitive or profitable.
- The project underestimated the case-by-case marketing work to be undertaken by partners who had up to this point not been involved extensively in continental intermodal operations. This was intensified by the erosion of the planned price advantage as rail rates rose and road prices fell.
- The administrative and operating conditions of operation of trains in open access regime have not yet been put in place; the project partially overcame these difficulties by local intervention, but the lessons of this project should be valuable to legislators.
- The service, procedures and working arrangements are summarised in the ART Operating Handbook, for partners and for operatives of service suppliers.
- Track cost regimes will require substantial subsidy as long as rail and road infrastructure costs are not together subject to a harmonised policy of infrastructure provision. This was apparent in Switzerland, where the Federal authority was prepared to subsidise track costs including for ART at a later stage; in Italy there is no knowledge of how competitive operations will be viewed, since conforming legislation is still not in place.

Future prospects (as at Spring 2000)

ART SA remains in existence in order to co-ordinate any traffics which may be developed successfully as a result of the study. Bilateral approaches between certain of the partners have also been concluded. Certain traffics are under examination which can be handled by ART throughout or by sections of the service. It is the intention of the partners to use ART S.A. as a marketing and management platform also for future Rhine intermodal traffics.

Lessons for the future

The **combination of inland waterway, road and rail** will establish itself in this transalpine sector of the inner-European continental, or domestic, markets. There may also be other suitable niches, as we learn of a new project be attempted on the Danube. Successful implementation will require time, endurance and excellent logistic knowledge, by a powerful integrator who can exploit the best performance of each mode.

Pallet-wide containers could be effective today in inland-waterway and rail/road intermodal. They require acceptance by customers, which will not readily be achieved except with major price incentives. The work of CEN to set standards for stackable swap bodies (13,6 m) with top lift and side and top loading is therefore essential and these norms should be given wide support. Acceptance and comfort of road transport is high and is a barrier to change.

Inland waterway shipping must be adaptable for rational carriage of 13,6 m units to offer adequate continental load capacity.
Italian road transporters are clearly thinking now of the inland waterway option; stackable swap bodies are here being studied, and will increase intermodality.

Communications are still poor. Tracking and tracing and information flow of rail are fully inadequate; integrators will have to create their own information chains. The Internet will facilitate this.

Open access is at present a political process, and imperfect. Its use demands that there is an assurance of non-discriminatory access to the network, and also to all services required when carrying out operations. This requires infrastructure management companies which are indeed independent of the existing operating railways, as is foreseen under current draft EU legislation (Implementation of the decisions of the EU Council of Ministers of Dec. 1999, based upon COM 616).
Track access conditions must be harmonised in the whole of Europe for effective infrastructure use.

Future integrators, and even inland waterway operators, or consortia such as ART, must also to be able to reserve and buy slots, so as to secure their service quality, and to organise traction accordingly. This, described in COM 480 as the 'Authorised Applicant' procedure, is not yet established under open access conditions, but it is necessary for intermodal operators of all kinds.

There should also be established clear rules for detailed administrative IT and documentation, and acceptance and passing of trains of third party operators, including arrangements for coherent contractual relationships with rail service suppliers, covering the purchase, payment, and guarantee of delivery, of services of every kind.

Acknowledgement

The ART Consortium is most grateful to the European Commission and to the PACT programme in particular for their support and encouragement to pursue this project, in the knowledge that it represented a pioneering and challenging task, but also would help to test public policy in practice.