

Alan Lievens

The River Plate Experience; Maintenance Dredging by Means of Privatisation

Abstract

At the beginning of the 1990s the Latin American continent needed to implement drastic solutions in order to recover from the economic recession that had occurred during the previous decade. Up to that moment the transport system including ports and harbours was managed by the public sector and it had degenerated to a precariously low level, mainly owing to poor management and a lack of funds. The Argentine government then started a privatisation process which included the port of Buenos Aires and the maintenance dredging of its main waterways, the River Plate (Rio de la Plata) and the Parana River.

For the first time in its history the Argentine government contracted out the maintenance dredging of a vital waterway to a private enterprise in the form of a concession. It handed over the administration of the waterway to a private company, enabling the company to collect tolls from the users of the waterway.

The case study of this Argentine experience demonstrates the application of a new concept – which is now open to other port authorities – of utilising the expertise of a private enterprise as an alternative way to raise funds needed for the maintenance dredging required for ports and harbours.

Introduction

The 1990s will be considered a landmark for economic reform in the Latin American continent. A key element in this economic reform is the privatisation process that is ongoing in most of the Latin American countries. Public industries and services are, to a large extent, being transferred to private enterprises. In order to cope with the economic growth, infrastructure in general, the ports in particular have to be reorganised, modernised and improved. It is generally reckoned that in terms of ports and shipping Argentina has “traveled further along the road” towards liberalisation than any other country in Latin America.

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The first important step was taken in 1993 when the government of President Menem decided to privatise the so-called Puerto Nuevo of Buenos Aires. After fierce bidding six terminals were transferred into private hands. These privatised terminals have been operational since the autumn of 1994. Since then handling and stevedoring costs in the harbour have been reduced significantly, in some cases up to one third of the cost as compared with when the port operation was still in public hands.

However the success of the privatised port could not have taken place without a drastic improvement of the maintenance of Argentine's principal waterway, the River Plate (Rio de la Plata). Indeed Argentina depends for 70% on the exportation of its products, particularly grain and cereals, on the waterway that consists of the River Plate and the Parana River. It extends from Punta Indio (km 205.3) on the River Plate up to Santa Fe (km 589) on the Parana River, over a distance of almost 700 km. This waterway however has a continuous need for maintenance dredging over a majority of its length (see Figure 1).



Figure 1. Maintenance dredging on the River Plate in the foreground; shipping traffic in the background.

THE PROBLEM

Before its privatisation in 1995, the Parana River and River Plate waterway presented two basic problems:

- a lack of depth, and
- ill-maintained and hardly existing navigational aids.

Both of these problems are equally disastrous for safe navigation. In the last years before privatisation the depth of the waterway had gradually decreased from 32 feet to a mere 24 feet. Navigation by night had become virtually impossible along certain stretches of the river.

The Argentine government was not in a position to cope with the maintenance of the waterway.

The reasons for the increasing sedimentation are various: the aging dredging fleet of the Ministry, the poor maintenance of the equipment, a lack of spare parts and inefficient logistics. The general conclusion from this state of affairs was that bureaucratic management had resulted in an inadequate use of resources – human, technical and financial.

Because of the lack of depth, large vessels had to “top up” their cargoes in other ports such as Bahia Blanca in the South of Argentina or even in neighbouring countries such as Brazil. Consequently freight costs rose

sharply. Moreover the frequent grounding of ships resulted in an increased cost of insurance premiums.

FINDING A SOLUTION

In 1993 the Argentine Ministry of Economy and Public Works issued a tender for the concession of the dredging and signalisation of the waterway between Punta Indio on the River Plate and Santa Fe on the Parana River.

The concept of this tender was totally new in the dredging industry: a vital waterway had to be constructed and maintained by a private company. However, instead of paying the contractor for the works executed, the completed waterway would be operated by the successful bidder in the form of a concession for a period of ten years. In fact the waterway, once constructed, would function as a toll highway, i.e. ships sailing along the waterway would pay a toll to the concession company. In order to render the project economically feasible and to reduce the risk to the concessionaire, the Argentine government agreed to pay a subsidy of US \$10 million quarterly during the concession period.

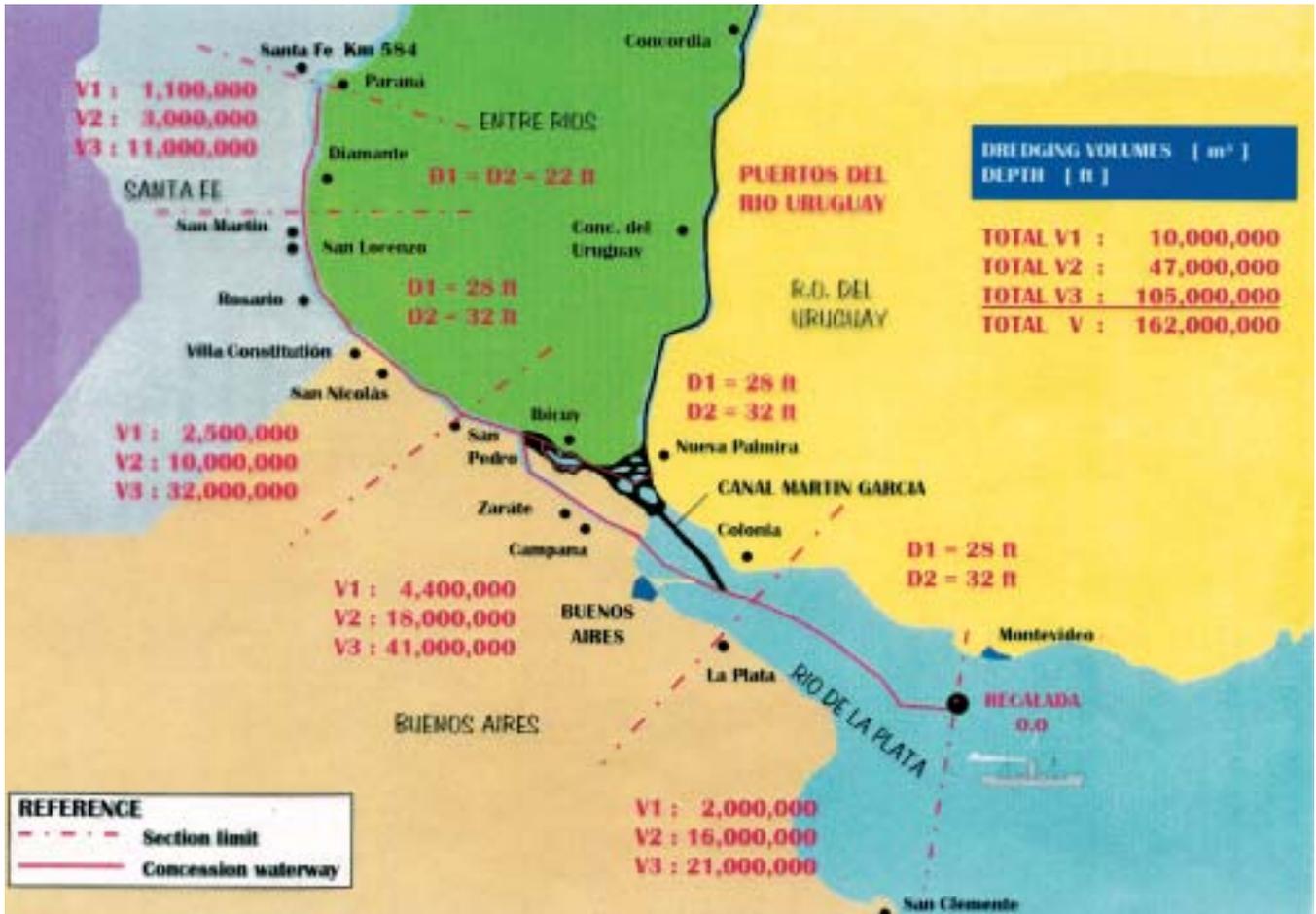


Figure 2. Dredging was done in stages: this drawing of the River Plate indicates the volumes to be dredged in each stage (V1, V2, V3).

The terms of reference of the tender were quite simple:

- to dredge and maintain a 100 m wide waterway over a length of approximately 700 km, and,
- to refurbish the navigational aids over the entire distance according to the international lighthouse standards.

Works had to be carried out in three construction phases (Figure 2):

1. During phase one the waterway had to be dredged to a depth of 28 ft over a period of 9 months including the time for mobilisation.
2. During phase 2 the waterway had to be deepened to 32 ft. The maximum execution period for this phase was 24 months.
3. During phase 3 the waterway had to be maintained at a depth of 32 ft. until the end of the ten year concession period.

The tender procedure itself consisted of two packages: a technical and a financial proposal.

The Technical Proposal

The technical proposal included amongst other things:

- the redesign of the waterway including a complete

signalisation system according to the international standard (Figure 3);

- a geotechnical investigation of the materials to be dredged and the corresponding output calculations of the different dredges to be used during the project;
- hydrographic surveys and an interpretation of the historic hydrological data of water levels and frequencies;
- volume calculations during the construction stage including sedimentation at 28 and 32 ft depths and a forecast of the future sedimentation during the maintenance period; and
- finally a traffic study (Figures 4 and 5) divided over the consecutive sections of the waterway in order to establish the level of income to be expected from the toll.

The Financial Proposal

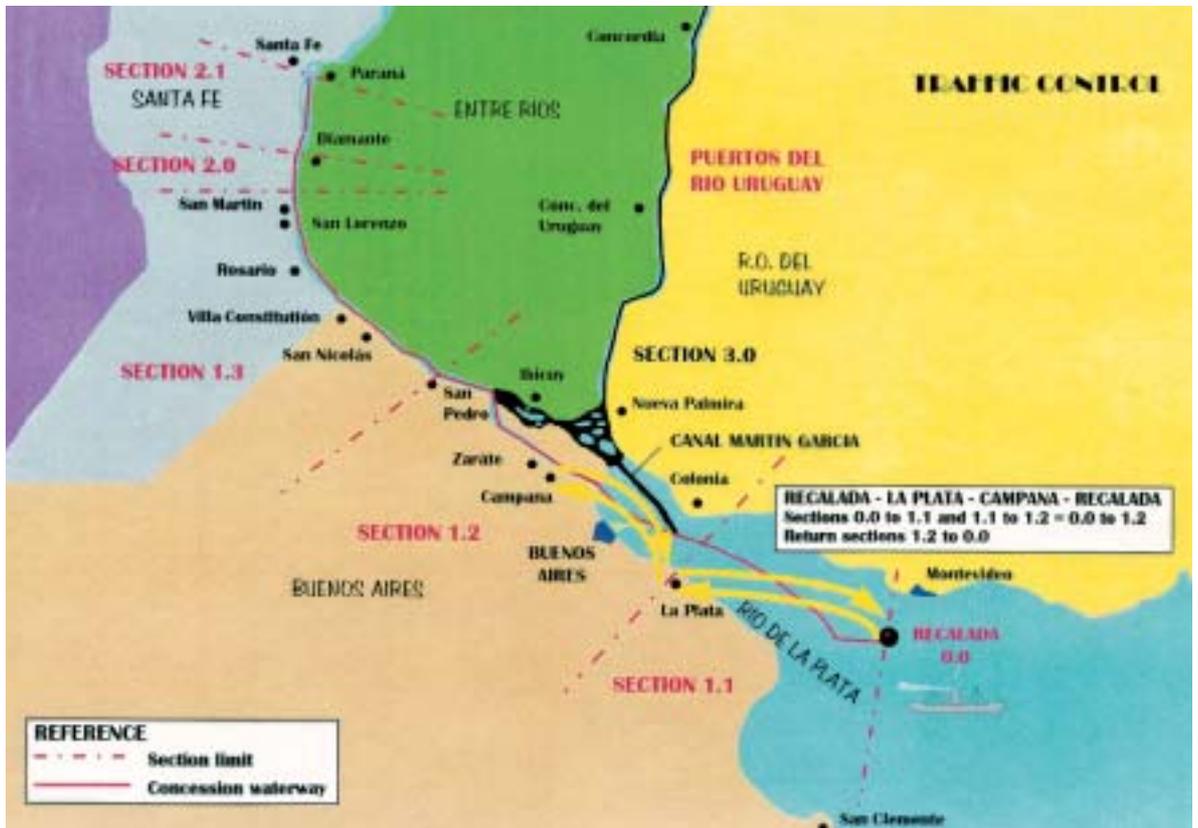
The financial proposal was a single figure: the amount of the toll to be applied per net registered tonnage of a vessel using the waterway.

In total the Argentine Ministry of Economy and Public Works received six proposals. After a technical evaluation, three offers were retained and their financial bids



Figure 3. Signalisation system was adapted to international standards. This drawing of the River Plate indicates the number of signals (buoys and beacons) per stage (S1, S2).

Figure 4. Traffic control: The river was divided into consecutive sections in order to estimate the expected toll income.



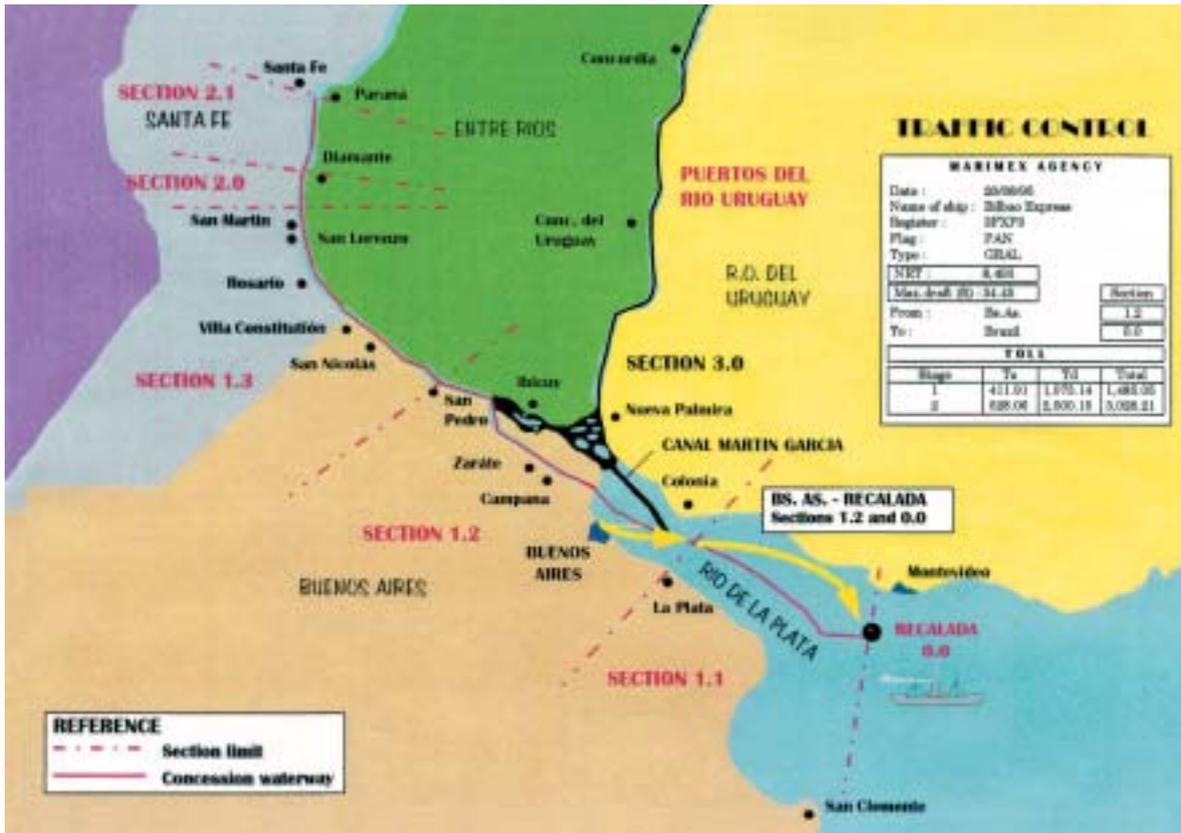


Figure 5. As an example, traffic control from Buenos Aires to Recalada for one ship, the Bilbao Express.

opened. The group of Jan De Nul was lowest bidder and consequently awarded the contract. The total estimated contract value was US\$650 million with approximately one third of this figure attributed to the collection of the toll.

THE WORK

The work involved in the first phase included the deepening of the River Plate channels and the Parana River up to Puerto San Martin (km 452) to a depth of 28 ft and secondly the deepening of the Parana River from Puerto San Martin (km 452) up to Santa Fe (km 589) to a depth of 22 ft.

In order to complete the work of the first phase by the end of 1995 various sections of the waterway had to be tackled simultaneously. Upon signature of the contract three dredges of Jan De Nul were mobilised in Argentina, one cutter suction dredge and two hopper dredges (Figure 6). The latter took care of the sandbars on the Parana River whilst the cutter suction dredge dredged the Emilio Mitre channel, the classical bottleneck of the waterway. Two dredges of the Ministry that were made available under the concession contract, were put to work in the outer channels of the River Plate. In order to achieve accurate and efficient dredging along the whole stretch of the waterway, the concessionaire installed a completely new Differential

Global Positioning System (DGPS) system. The satellite signal is corrected via three differential antennas installed along the waterway, one covering the River Plate area, the other two the River Parana area.

The progress of the works and the amount of sedimentation is monitored by means of continuous hydrographic surveys which requires the use of four, sometimes five survey vessels, with each of these covering its own allocated section of the river.

The project also requires substantial logistic support which is mainly provided from two sources: Buenos Aires and Rosario (400 km up river). A fleet of tugs and support vessels ensure the timely transport of manpower, fuel and supplies.

The First Phase

During the first phase of the project an enormous effort was made to bring the navigational signalisation system up to the required international standard. From Punta Indio to Puerto San Martin the system was completely redesigned and upgraded. Detailed engineering included simulation techniques in the laboratory of Wageningen in Holland. There the project engineers designed and calculated the best solution for the curves of the Parana de las Palmas, a particularly difficult section of the river tonegotiate and a real challenge for Panama size vessels. In total more than 500 buoys and beacons had to be converted or modernised and reinstalled.



Figure 6. Several dredgers were used to dredge the River Plate, including (above) the trailing suction hopper dredger James Ensor.

Figure 7. The trailing suction hopper dredger Amerigo Vespucci (below), has a split hull hopper.



By the end of 1995 navigation with a draught of 28 ft and navigation by night became a new reality on the River Parana, this just in time for the exportation of the 1996 cereal crop.

The Second Phase

The second phase which started at the beginning of 1996, included the deepening of the waterway from 28 to 32 ft. The section between Puerto San Martin and Santa Fe remained at 22 ft. The completion of the navigational signalisation system included the installation of buoys and beacons in the secondary branches of the Parana River, as well as the detection and signaling of existing wrecks in the River Plate estuary.

The completion period for the second phase was set at a maximum of 24 months. Thereafter the whole system has to be maintained during the rest of the concession period. If everything goes well the concessionaire has the option to extend the concession for a further period of ten years.

THE RESULTS

Only eight months after the taking over of the concession, the concessionaire was able to reestablish the 28 ft criteria. Equally the 32 ft criteria were achieved in the first quarter of 1997, almost a year ahead of the contract schedule.

The Toll System

The key item of the project is the toll system. A reduced toll can be applied to the entire waterway after the completion of phase one; thereafter the full toll applies

PROCENTUAL VALUES (signalisation)

From Subsection	To subsection				
	0.0	1.1	1.2	1.3	3.0
0.0	0.00	1.96	5.00	6.96	1.96
1.1	1.96	3.04	3.04	5.00	0.00
1.2	5.00	3.04	3.04	1.96	3.04
1.3	6.96	5.00	1.96	1.96	5.00
3.0	1.96	0.00	3.04	5.00	0.00

PROCENTUAL VALUES (dredging)

From Subsection	To subsection				
	0.0	1.1	1.2	1.3	3.0
0.0	0.00	22.88	34.52	60.78	22.28
1.1	22.88	11.64	11.64	37.91	0.00
1.2	34.52	11.64	11.64	26.26	11.64
1.3	60.78	37.91	26.26	26.26	37.91
3.0	22.28	0.00	11.64	37.91	0.00

T.P. = TOLL dredging + TOLL signalisation

1. $T_s = \text{US\$ } 0,97 \times \text{NRT} \times \% \text{ of channel used (table signalisation)}$
2. $T_d = \text{US\$ } 0,97 \times \text{NRT} \times \% \text{ of channel used (table dredging)} \times F_c$

F_c = correction factor for draft

Figure 8. Procentual values (T_s = toll signalisation; T_d = toll dredging) for the section between Recalada and San Martin for 28 feet.

once phase two is completed. The toll is calculated as a function of the vessel's Net Registered Tonnage (NRT), its maximum draught and the actual depth of the channel (28 or 32 ft). The whole channel is divided in sections and subsections. Ships are charged tolls according to the sections and subsections of the waterway that they actually use (Figures 8, 9, 10 and 11).

The total toll consists of two tariffs:

- one taking into account the dredging work, and
- the other taking into account the navigational signalisation.

Cooperation

In order to implement a correct toll system, a constant monitoring of the channel traffic is imperative and requires close cooperation with the maritime authorities. In respect to this cooperation, an agreement was signed between the Prefectura Naval, the Naval Authority and the concessionaire in order to guarantee a constant monitoring of all ship movements which include satellite communications. The concessionaire is responsible for collecting the toll, whilst the Naval

Prefecture has the authority to check upon payment by the ship's agent prior to issuing any port clearance to the vessel.

Conclusions

The response of the shipping industry to the changes has been quite positive. After an initial reluctance to pay tolls for maintenance dredging and signalisation, ship owners and terminals alike are now realising the enormous benefits of the system. The figures that illustrate the impact of the concession on transport prices are impressive.

Before the start of the concession, the transport cost of one tonne of cereal from Argentina to Europe was around US\$27 /tonne compared with US\$16 /tonne today.

In 1992 in total 200 ships with a length of around 150 m were loaded at the private terminals of Rosario. Only 17 could sail with full holds representing an average cargo of 12,000 tonnes only. In 1995 260 ships of the same size were loaded, 120 of them with full loads

PROCENTUAL VALUES (signalisation)

From Subsection	To subsection				
	0.0	1.1	1.2	1.3	3.0
0.0	0.00	2.61	6.41	8.37	2.61
1.1	2.61	3.80	3.80	5.76	0.00
1.2	6.41	3.80	3.80	1.96	3.80
1.3	8.37	5.76	1.96	1.96	5.76
3.0	2.61	0.00	3.80	5.76	0.00

PROCENTUAL VALUES (dredging)

From Subsection	To subsection				
	0.0	1.1	1.2	1.3	3.0
0.0	0.00	44.44	61.50	100.00	44.44
1.1	44.44	17.06	17.06	55.56	0.00
1.2	61.50	17.06	17.06	38.50	17.06
1.3	100.00	55.56	38.50	38.50	55.56
3.0	44.44	0.00	17.06	55.56	0.00

T.P. = TOLL dredging + TOLL signalisation

1. $T_s = \text{US\$ } 0,97 \times \text{NRT} \times \% \text{ of channel used (table signalisation)}$
2. $T_d = \text{US\$ } 0,97 \times \text{NRT} \times \% \text{ of channel used (table dredging)} \times F_c$

F_c = correction factor for draft

Figure 9. Procentual values (T_s = toll signalisation; T_d = toll dredging) for the section between Recalada and San Martin for 32 feet.

T.P. = TOLL dredging + TOLL signalisation

1. $T_s = \text{US\$ } 0,97 \times \text{NRT} \times \% \text{ of channel used (table signalisation)}$
2. $T_d = \text{US\$ } 0,97 \times \text{NRT} \times \% \text{ of channel used (table dredging)} \times F_c$

F_c = correction factor for draft

Figure 10. Composition of toll.

Figure 11. Correction factor for draught.

$$F_c = (C - C_r) / C_v$$

C_r = Reference draft (= 15 ft)

C_v = Maximum draft of vessel

C_d = Design draft of the waterway
 = 28 ft during Stage 1 or 32 ft during stage 2 between Recalada and San Martin
 = 22 ft between San Martin and Santa Fe

C = C_r if $C_v < C_r$

C = C_v if $C_r < C_v < C_d$

C = C_d if $C_v > C_d$

representing a cargo of between 24 and 26,000 tonnes each.

More important even than the impact on the direct transport cost, is the guarantee the shipper has nowadays that the vessel which has been chartered will be able to sail with the draft that has been planned. Too often in the past vessels arriving with a certain draft had to be lightened because water levels on the waterway were lower than expected owing to inadequate maintenance.

Finally it bears mention that by privatising the maintenance of their principal waterway, the Argentine government has been able to overcome a very serious deficiency in their exportation process. The government lacked the funds and the equipment necessary to re-establish the depths and safe navigation of a vital waterway. By privatising the maintenance dredging and implementing an innovative toll system, the Argentine government has assured itself of the services and efficiency of a specialist private contractor, at the same time assuring itself of having competitive exports in the years to come.