Sea Tech offers a fresh perspective

Sea Technology's designs offer flexibility and scale and are friendly to small and medium sized ports

Sweden-based Sea Technology AB has further developed its concept for its Sea Tech Satellite hub and spoke shipping system using a large mother vessel that transports float-on/float-off satellites for calls at different ports on any range.

As previously discussed in *WorldCargo News* (November 2012, pp25-26), the mother vessel is a large, semi-submersible dock ship carrying two, four or six satellites, according to satellite size. As loaded satellites are floated off, returning satellites can be floated on.

The satellites can be simple barges or motorised vessels. Mother ships and satellites will operate on dual fuel with LNG or methanol. The design allows for LNG storage of 8000 m^3, (enough for 70 days cruising). The tanks are safely located within the double hull and, significantly, they have B/5 classification.

The Sea Tech Satellite system does not try to buck the trend towards large scale shipping, but it has the capability to bring small and medium-sized ports into main port status and ports do not have to invest huge sums in dredging and port construction to take part in the system. This is simply because the mother vessel does not make port calls.

No rehandling

There are no feedering or rehandling costs and containers or other cargo can be landed closer to the final destination, reducing expensive land transport costs. The idea is to try and capture at least some big ship economics, without the downside. There are additional environmental benefits as well, as the risk of invasive species in ballast water or pollution from foul bottoms is reduced.

The mother vessel is designed as a 370m long vessel capable of transportation through the New Panama locks (NPX). Extreme beam is 52.6m, but waterline beam is 48m. Draft is 10m-11m and displacement is 130,000t, with 85,000dwt. Other versions optimised for via Suez, Africa, areas requiring ice-strengthening, and so on can be designed. The system can be designed as post-NPX, with, say, four longer and beamier satellites for certain bulk trades.

The standard satellites are 110m long and 23m wide and have a draft of 6m-8m. Up to seven satellite systems are envisaged, for all kinds of dry and wet cargo and, if required, the satellites can be geared/self-unloading.

In container mode, as previously discussed, the mother ship will transport 6 x 1200 TEU, 12,000dwt satellites, so its trunk haul capacity will be 7200 TEU.

It is possible that this might be scaled up in future, but for the time being the size is based on what the Swedish studies consider the maximum for the design safety of the type of float-on/float-off operation that will be used. An example of the direct call economics and time saving versus a 14,000 TEU NPX ship and a feeder move in a Wuhan-Baltimore USEC trade can be viewed on *www.seatech.se* This shows a TEU cost saving of US$3200 and a time saving of 18 days (40 days instead of 58) using a direct call by a Sea Tech satellite.

Michael P McCarthy, of Earth Shipping International, the agent and consultant for Sea Tech in the US, adds that a similar case can be made for a range of NAEC ports, such as Wilmington, Philadelphia, Jaxport, Savannah and so on.

15,000 CEU

In contrast to the container version, the ro-ro Sea Tech Satellite system actually results in a much bigger trunk haul for cars than is possible today, 15,000 CEU. This easily provides the scale that ship financiers may be looking for. Each satellite would have a capability for 2200 cars or 1200 cars and 70 trucks or 40 heavy roll trailers/ro-ro cassettes.

To provide the rolling cargo flexibility of modern PCTCs, up to 7000t of heavy cargo can be carried per satellite. The main deck has ample clearance height and 9ft 6in high boxes can be double-stacked on roll trailers/cassettes.

One of the questions with the ro-ro design concerns deep sea car shipping logistics, which are currently based around large PCTC calls at ports that have devoted plenty of land to car terminals.

Land-poor no problem

While the container Sea Tech Satellite avoids the need for long, deep berths with heavy cranes, deep dredged fairways and very large turning basins, ro-ro Sea Tech allows cars to be distributed over relatively land-poor ports, again on a direct call basis, but with tremendous trunk haul ship fuel economics per car carried.

As Sea Technology points out, there are a number of ports with relatively small car terminals that handle intra-regional car trades or cars transshipped from a bigger car terminal. Multi-storey garages reduce the land take even further, although car terminal operators would seek some kind of time commitment from shippers or receivers before investing in them.

Bulking up

The dry bulk Sea Tech Satellite has a draft of 7m-8m and 12,000dwt and is divided into five holds, including two shorter holds that are strengthened for heavy mineral bulks such as iron ore, while holds 1, 3 and 5 may remain empty.

This harks back to a combined bulk/car transporter design by the man behind Sea Technology, Bengt Lundquist, for Wallenius Lines many years ago (CARMEN and MEDEA). Holds 2 and 4 were loaded to the hatch covers with iron ore while the longer holds 1, 3 and 5 were fitted with easily removable car decks.

In any event, the dry bulk Satellite must surely be worth looking at in the context of the tremendous port congestion and delays faced by Brazilian soybean exporters. "New" ports could be brought into play very quickly because the satellites make very limited demands on port facilities. A similar case could be made for Brazil's burgeoning box traffic.

Needs looking at

The economics of the Sea Tech Satellite system versus calls by large bulkers or containerships at a limited number of ports surely warrant serious investigation. It is easy to envisage, say, a mothership anchored off the River Plate Estuary receiving agri-bulk shipments from Argentina, Uruguay and southern Brazil. Perhaps bulk and containers could be carried in certain trades.

Alternatively, adds McCarthy, agri-bulks such as soybeans from Brazil and/or the US Gulf can be loaded in 12,000t loaded satellites for a total of 72,000t, which can be disbursed to six ports or berths for ease of handling.

A fitting trade

Lunquist illustrates a point-to-point operation from Wuhan via Shanghai to African ports, Red Sea and North African ports. With this system, says Lundquist, "we can carry satellites from way upstream the Yangtze River, Chongqing, Chengdu or from Hong Kong and the Guangzhou area directly to a wide range of Red Sea and African ports. Many of these ports and their associated land resources and infrastructure are of satellite size.

Lundquist does not have an ideal, systematised liner service - whereby six satellites are floated off and immediately replaced by six other satellites floated on - in mind for initial deployments.

Step at a time

His thinking is more nuanced. There is no point in competing toe to toe with main haul carriers, but Sea Tech can offer a viable alternative in areas not readily serviced by the bigger ships. A mother ship sails from China for Southern Africa, say, and arrives close to Durban and Maputo. The six satellites, a mix of container and ro-ro cargoes, are floated off. The satellites sail to the ports, discharge, and return with export cargoes - cars, commodity exports - for China. This may take one week.

So a round trip takes 49-52 days. It takes 20 days to sail westbound, 7-10 days stopover, 20 days back to China and two days to rendezvous off Shanghai. The capital cost is based on one mother ship and six satellites, with local crew arrangements in Africa and in China. The fuel cost is reasonable and LNG storage on board is good for the whole trip, enough for 70 days. "This calculates well," says Lundquist. It is possible that oil and LNG could be satellite cargoes as well.

The capital cost of one mother ship and six satellites is relatively low, but in absolute terms the start-up costs are high and the sources of finance are uncertain, particularly as ship financiers tend to be conservative. Putting the first service into a developing trade, such as China-Africa, makes sense all round. It makes sense to start small and prove the concept.

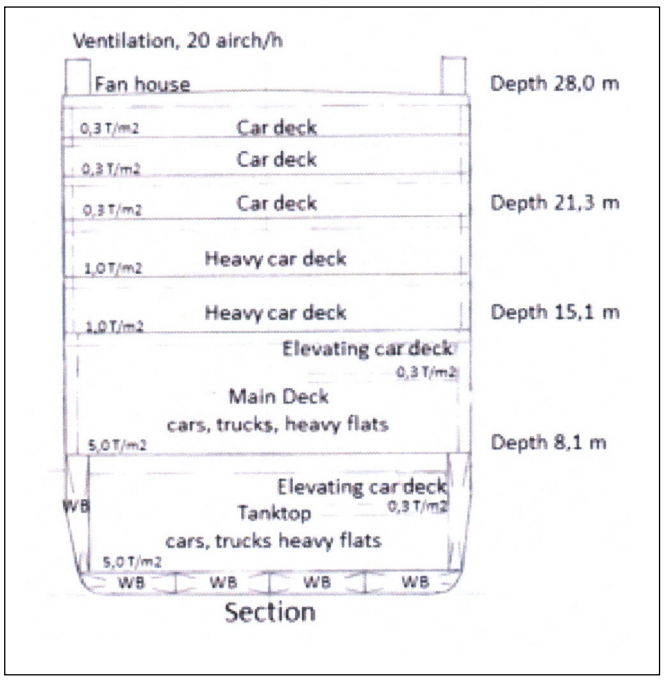
Like for like

This could pave the way for finance for a regular liner system. That would need at least two mother ships making the satellite exchange and 24 satellites - six on each mother ship and six on each side of the trade lane. The comparator, however, is not just one or two large containerships, but their associated feederships and related transshipment costs.

It remains uncertain whether Sea Technology's "outside the box" thinking will ever be translated into reality. Conventional "big is better" thinking is driven by the need to focus on the lowest possible slot cost per TEU, but given the current poor state of profitability in the liner industry, carriers are reluctant to pass on these savings to shippers.

Meanwhile, the bigger ships can and often do create many inconveniences in the supply chain - bottlenecks in the port, strain on landside transport capabilities, extra handling costs for feedering, etc. Everyone, including the shipping lines themselves, is forced to invest more and more simply to stay in the game.

Is this really the right way forward? Sea Technology is saying there might be a better way. it is in contact with several classification societies and ship engine manufacturers and has a test programme with SSPA Sweden. □



Cross-section of a Sea Tech ro-ro satellite. Ro-Ro Sea Tech has a transoceanic capacity of as many as 15,000 CEU for new cars, almost twice the intake of the latest post-Panamax PCTCs

Illustration of point-to-point Sea Tech Satellite system between Wuhan and Red Sea/North Africa or South Africa/South West Africa - a flexible conduit between small and medium-sized ports