



CLOSE ENCOUNTERS

The number of huge containerships calling at the port of Hamburg keeps increasing – an enormous challenge. The “Nautical Terminal Coordination”, co-initiated by HHLA, helps the port manage big ship traffic smoothly.

Big, bigger, AGF: “AGF” is a German abbreviation for exceptionally large vessels, i.e. ships longer than 330 metres and wider than 45 metres. Ships like the “Alexander von Humboldt” of French owner CMA CGM and her sister vessels who are frequent guests at Hamburger harbour: 396 metres long, 53.6 metres wide and capable

of carrying 16,000 standard containers (TEU), they were unmatched giants when they were commissioned two years ago. Since then plenty of water has flowed down the Elbe river, and ships have become even bigger. Current champions carry around 19,000 TEU, and the first vessels capable of taking on more than 20,000 TEU were ordered recently (refer to diagram on p. 10).

A trend that makes Mathias Lünstedt’s work even more challenging. The 44 year-old navigational officer not only has to be intimately familiar with the vagaries of a tidal harbour and the weather, above all, he must command the art of ‘juggling’ ships – or rather, their dimensions and draughts, their current positions and prospective laydays for cargo discharging and loading. Delays >

Lay-by berth |
Handling an increasing number of large container vessels requires an intelligent control system.



Narrows | Ship encounters on the Elbe river are a major concern for the NTK staff: In some places, the combined width of two ships passing each other must not exceed 90 metres.

Space for giants | The shipping lane between the state border and the estuary will be widened to 385 metres, allowing very large ships to pass one another.

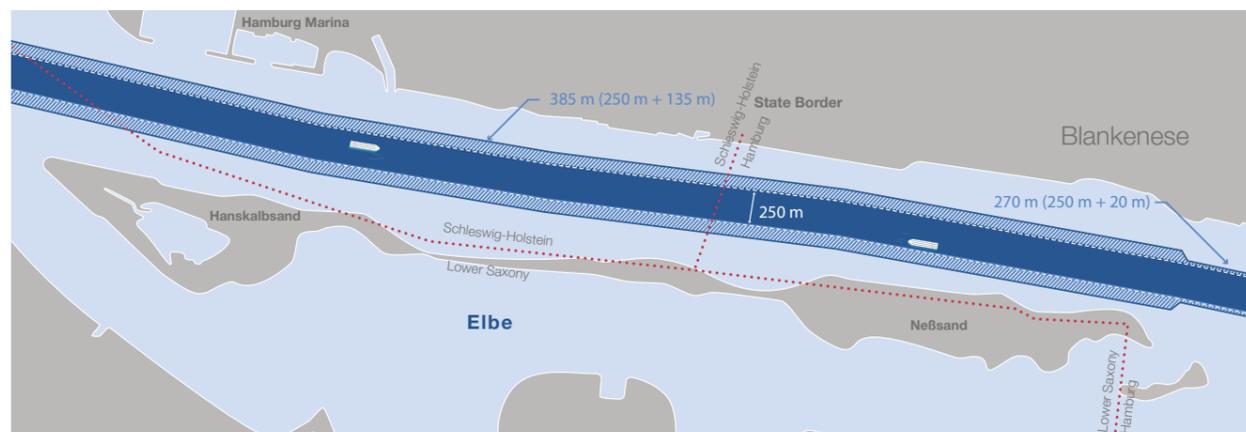
➤ must be kept in mind, as well, as the narrow time windows available for vessels up to 400 metres long to enter the port, turn around and be tugged into the right harbour basin.

Lünstedt, himself a former shipmaster, is one of currently three, and as of next September, five staff members of the Nautical Terminal Coordination (NTK) team in Hamburg. Established in autumn 2014, the NTK is part of FLZ Hamburger Feeder Logistik Zentrale, or feeder logistics centre, a joint venture of the two container handling and logistics companies HHLA and Eurogate.

It has been operating very successfully since 2004 and coordinated

nearly 1,200 feeder vessels at Hamburg harbour in 2014 alone. Feeders bring in containers for transhipping to the big oceangoing ships, mainly from the Baltic region. They also distribute cargo from the liners, mostly coming from Asia Pacific, to other ports.

Early-warning system | Hamburg's four container terminals were the initiators of the NTK. In addition, Hansaport, the port's biggest coal and ore transhipment centre, and Unikai, Hamburg's leading car terminal serving roll-on/roll-off and combined car and container vessels, have joined the club. HHLA holds shares in all of these companies. Ideally,



all terminals serving large vessels will use the services of NTK one day.

Mathias Lünstedt and his colleagues Martin Steffen and Lukas Heimlich proactively observe very large vessels entering the Port of Hamburg from the North Sea and returning from port so as to avoid problematic ship encounters in the shipping lane of the river Elbe.

Their job involves complex considerations, and deep-draught ships are their points of reference. "These ships need high tide for going upstream," says Lünstedt. "So we must schedule all the other ones around them." The river Elbe doesn't always carry the same amount

of water, depth varies along the shipping lane, and the North Sea's tides also influence water levels.

Growth forecast | The objective is simple enough: get every vessel, even the biggest ones, whether cruise ship, container, coal or car carrier, up the Elbe river and back down to the North Sea as smoothly as possible, avoiding anchoring times in the German Bight or unnecessary waiting times at the terminals. To accomplish this the NTK's staff must get an overall picture of the situation first, then develop flexible suggestions. ➤



Foresight | Mathias Lünstedt and his team plan for arrivals of big ships far in advance.



How the NTK works
The Nautical Terminal Coordination team keep track of ships departing from various terminals and calculate the available transit options as well as arrival and departure times based on draught requirements. A number of other requirements must be sorted out with the NTK, as well: At what time can a ship pass under the Köhlbrand bridge? Which ships may pass each other at what locations? How will changing water levels affect ship traffic? When will the ship currently at berth be ready to leave? During which shift is a terminal planning to begin discharging a vessel? The NTK team must also consider the effects of every decision on the operational status of other ships, and update their calculations accordingly.



Traffic | Proactive scheduling avoids unnecessary waiting times.

> Their job will become ever more important in future years. "All forecasts indicate a further significant increase in container traffic," says HHLA spokesperson Karl Olaf Petters. "We must make sure we are ready for that." Container throughput in Hamburg exceeded 9.7 million TEU in 2014. Even after the planned dredging of the Elbe shipping lane, this increased cargo volume will require intelligent coordination.

Not only will there be more oceangoing ships requiring high tide to enter the port of Hamburg on the Elbe river. The number of extremely long and wide vessels claiming lots of space on the river will grow, as well. On the river section between Glückstadt and Hamburg, which is just over 50 km long, the shipping lane is too narrow for two extremely large 'AGF' vessels to pass each other. The combined breadth in this section cannot exceed 90 metres. Meanwhile, more and more AGF ships call at the port of Hamburg. While in 2008 the total number was 621, the year 2014 saw a 60 per cent increase, with a total of 989 vessels. Adding up all incoming and outgoing traffic, more than five AGF ships were moving within the port and on the river Elbe every day.

The need for a centralised authority coordinating all this commotion is all too apparent. However, to do this successfully the authority must get involved as early as possible, before dozens of giant cargo and cruise ships back up in the German Bight. "In the past these big vessels often had to wait in the roads in the North Sea if they failed to liaise with the responsible authorities and pilots before approaching," explains Gerald Hirt,

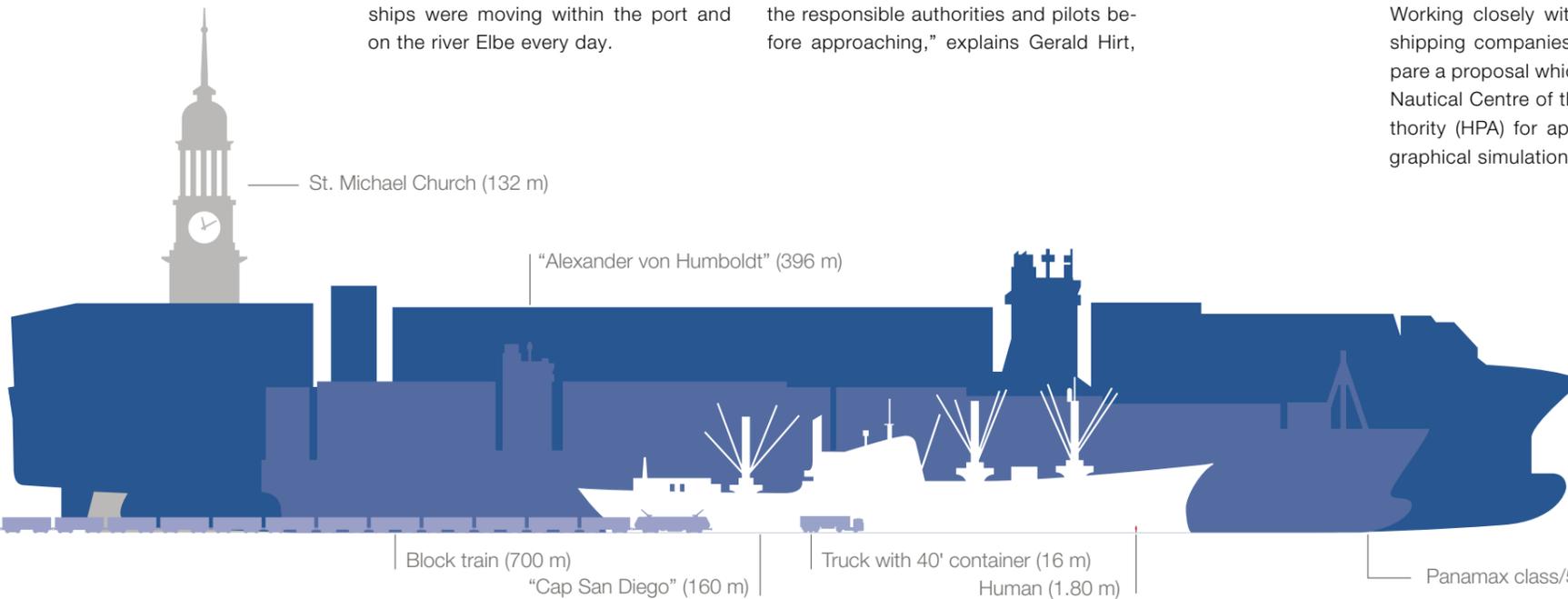
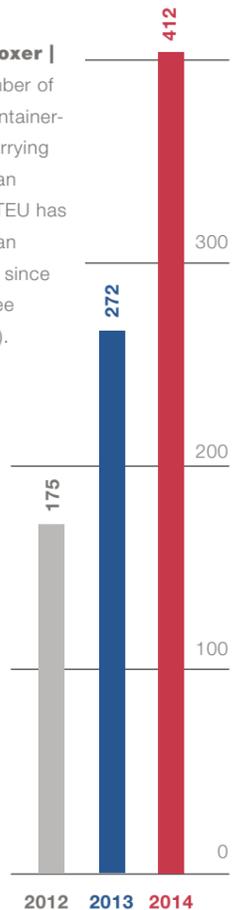
NTK operations manager. "Coordinating this ship traffic early from one central location to optimise the entire system is a much smarter approach, even if it means subordinating individual interests at times."

Shipping companies must accept an occasional waiting time so everybody can ultimately operate more profitably. Working closely with the terminals and shipping companies, the NTK team prepare a proposal which they submit to the Nautical Centre of the Hamburg Port Authority (HPA) for approval, along with a graphical simulation.

Saving time | While the preliminary overall view of potential ship encounters often contains a number of red bars indicating conflict situations, the final version prepared by the NTK is mostly free of red colour, at least for the next 24-hour period. If everything proceeds as expected, there should not be any critical ship encounters at the port and down the river to the North Sea ever again.

The HPA Nautical Centre checks the commented NTK proposals and sometimes makes slight adjustments. Then the Nautical Centre uses the schedule to organise the ship traffic, >

Megaboxer | The number of giant container-ships carrying more than 12,500 TEU has more than doubled since 2012 (see diagram).



Proportions The diagram illustrates the dimensions of the current generation of large containerships – in this example, the "CMA CGM Alexander von Humboldt". Nearly 400 metres long, the vessel has a capacity of just over 16,000 TEU and was commissioned in April 2013. The current world record is a bit over 19,000 TEU, but the Japanese liner company MOL recently ordered six 20,150 TEU ships from the Korean shipyard Samsung Heavy Industries, scheduled for delivery in 2017. In the early 1990's, 300-metre Panamax-class vessels carrying around 5,000 TEU were considered huge.



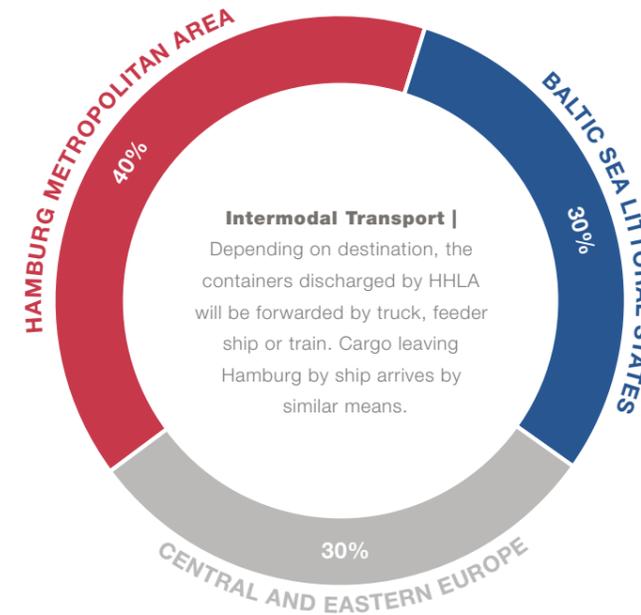
“Fuhre 2.0” – more efficient processing. Today a terminal handles between five and 250 trucks per hour, depending on the time of day or night. To distribute container quantities more evenly and get trucks ready faster, HHLA has been implementing its new concept “Fuhre 2.0” (Load 2.0) since 2011. This is how it works: A scanner automatically captures data such as the truck registration number and container number. Drivers can check-in their containers independently within two minutes using self-service terminals. As a truck approaches the check-in gate, any damage as well as hazardous goods labels are detected and displayed on-screen. Once a container has been pre-checked using the application TR 02 v. 14, the terminal transmits the current container status. This saves the truck operator unnecessary trips. The next step is the slot reservation procedure: In future the terminal and the haulage company will agree on a time window for the container delivery or pick-up. This requires prior electronic data transmission by the dispatcher, and the terminal’s “All Clear”.

which is its official responsibility. The NTK’s early intervention to avoid potentially costly conflicts between shipping companies, loading terminals and port service providers suits the purposes of the HPA perfectly. If the coordinators manage to top this by “cutting the overall time the ships spend in port” (Lünstedt), everybody will be pleased and thankful for the resulting cost savings.

To accomplish this, the NTK experts must begin observing the vessels long before they approach Hamburg, using ship position data acquired by satellite, terrestrial antennas and other means. For example, Lünstedt and his team begin tracking container ships coming from the Far East as soon as they pass Gibraltar. Doing so helps the NTK determine whether a vessel will reach subsequent ports of call, such as Rotterdam or Southampton,

with a delay, deviating from their shipping company’s coastal schedule. In such a case the navigational staff will contact the shipping company or the respective terminals to coordinate the remaining journey. “We are always on track in real time,” says Gerald Hirt who, as head of FLZ operations, is also in charge of the NTK (see bottom right)

Recommendations | If it turns out, for example, that a containership with a critical draught will depart from England with a three-hour delay and therefore miss the high tide for entering the river Elbe, the NTK employee on duty will inform the shipping company or terminal accordingly: “Your vessel might consider slowing down and conserving some fuel because it will not be able to make it into port until the next high tide.”



On the other hand, if the NTK coordinators see that a large container vessel could leave port sooner because the river is clear, they will inquire at the terminal whether loading could perhaps be sped up by one or two hours. If so the ship could leave port one tide sooner.

Perhaps nobody at the terminal would have even been aware of this opportunity for an earlier departure. “A shift manager at one of the four big container terminals in our port cannot see what is happening at any of the other terminals or what other huge ships are intending,” says Hirt. “Here at the port of Hamburg with its confined conditions we must continue to look for new, smart solutions and ways to handle the available resources more

efficiently.” This is the reason behind the gigantic, state-of-the-art container gantries, the fully automated block storage facility and Automated Guided Vehicles at Altenwerder, a sophisticated truck logistics concept (see at left) and excellent cargo train connections to Central and Eastern Europe.

And it is the reason behind the NTK. As the year progresses, communication between the partner terminals within the port and the NTK regarding arrivals of big ships will be consolidated and routed exclusively through the new centre. “This is an entirely new concept which will bring about a major change of culture here at the port,” says Gerald Hirt. Be that as it may, the benefits clearly speak for themselves.

Connections | Cargo is delivered and picked up at the port rapidly by choosing the best mode of transport for each destination.



Gerald Hirt not only heads the NTK but also the Feeder Logistics Centre (FLZ). He and his team work to optimise and accelerate the handling of feeder vessels at the port of Hamburg. Feeders pick up containers delivered by ocean-going vessels at various terminals and take them to their destinations, mainly in the Baltic region – and vice versa. This requires sophisticated logistics, helped by the FLZ’s experts. The FLZ team maintain contact with shipping companies, shipmasters and terminals around the clock and are able to access their control monitors directly – Hirt calls this “One-stop traffic control”.