

## Collaboration in the Maritime Transport Ecosystem

"This is an important sale for the people at Transnational Chemicals so you can't be late. They're expecting you at Virovitka in nine days' time." The harsh tones of Charlie Cramwell's voice on the phone, told Captain Julian Sundin everything he needed to know about this voyage. Cramwell had made a commitment to his client, Harold Gravenhurst, and it was going to be up to him to make sure it was carried out. Julian sighed quietly while holding the receiver slightly away from his ear. "You're working for me on this trip, my boy, and I expect your fullest cooperation."

Perhaps if he'd been a more seasoned captain he would have spoken up about the tight timeline. The weather out there wasn't exactly promising. But he knew that his shipping company, Hellenic, made a lot of money by chartering its ships to cargo owners or more often, charterers, who served as middlemen moving specific cargos in a particular timeframe. Cramwell was a charterer who specialized in finding ships for cargos and cargos for ships at the right time and in the right place. It was Julian's fortune -- good or bad -- he wasn't sure which, that he had happened to be at Bigglestowe with a cargo ship when Cramwell needed one to move a load of fertilizer to Croatia.

Cramwell brayed on, "We've got a deal with Croatia Chemicals to supply them with fertilizer on a regular basis. I've negotiated a bonus with them if we get there early." Timing was everything in the maritime transport business. Charterers made contracts with ship owner to use a ship for a certain period of time -- and faced serious penalties known as demurrage if they were late (see box). Julian glanced again at his planned route. They could make it -- just barely. There wasn't much slack in this schedule -- not that there ever was -- but it wasn't easy to plan for the unexpected.

His new orders had been relayed to him yesterday by Hellenic's Bigglestowe port agent, Reggie Finch, who also helped broker its ships when needed. He and Cramwell had nominated a port agent in Virovitka, Val Antic, who would coordinate the *Eleni's* arrival, unloading onto the trucks supplied by Croatia Chemicals.

The whole process was a bit like an elaborate ancient dance, thought Julian, where participants were handed off to other partners, did a fancy step, and then handed off to someone else, eventually ending up with their original partners. The problem was, if one of the participants tripped or missed their beat, it destroyed the whole pattern of exchanges. The beauty of it only worked if everyone knew their part and carried it off without a hitch.... and when no obstacles got in their way.

Charlie eventually wound down and Julian got him off the phone by telling him to watch for his noon reports which would keep him up-to-date on his progress. Hearing a small "ahem", he turned around to see Reggie with the ubiquitous paperwork. "You'd better double-check the weather report," Reggie said cheerfully as he and Julian ploughed through the documents that would allow him to leave the port. "The visibility is getting bad. Fortunately, the pilot and the tug are already here, so you can get off a little early." He edged

### Demurrage<sup>1</sup>

In commercial ship chartering, demurrage is a cost representing damages for delays. It occurs when a vessel is prevented from loading or discharging cargo within the stipulated laytime. Laytime is the time contracted within which an operation is allowed to be made. At the end of a stay in port, the port agent draws up a *Statement of Facts*, setting out a log of events during the ship's stay in port. The Statement of Facts enables a time sheet to be drawn up and signed by the master and the shipper or receiver of the cargo. The time sheet enables laytime and therefore demurrage to be calculated.

<sup>1</sup> <https://en.wikipedia.org/wiki/Demurrage>

out the door of the cramped office just as the pilot squeezed in. "We're ready when you are," he said as he headed to the bridge. Julian tuned his radio to the weather channel for the latest update. Fog was beginning to creep in to the port and that could be a problem when high traffic areas were concerned. Definitely time to get moving...

The fog wasn't too thick heading out of port but by the time they reached the English Channel, it was a dense "pea-souper" making it very difficult to see ahead and around. Because of the weather, Julian took the first watch and ordered an extra look-out because the risks of collision were increased. Julian peered through the mist anxiously, constantly checking radar and AIS, to figure out what other ships were in his vicinity. There appeared to be two large vessels heading across his bow. "Get me the *Landlubber* and the *Sea Lion* on the radio pronto," he barked at the mate assisting him. "Ahoy *Landlubber*," he shouted into the VHS radio. "What are your heading and intentions?" After clarifying that the vessel was going to turn into the traffic lane just behind him, he asked the captain of the *Sea Lion* the same question. "Holy Cow, they're headed right at us! Dead slow!," he shouted to the mate, who immediately cut the speed just as a dark bulk loomed on their port side. The ship began to slow although still moving forward into the thick mist.

### COLREGS<sup>1</sup>

The **International Regulations for Preventing Collisions at Sea 1972 (Colregs)** are published by the International Maritime Organization (IMO) and set out, among other things, the "rules of the road" or navigation rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels.

<sup>1</sup>[https://en.wikipedia.org/wiki/International\\_Regulations\\_for\\_Preventing\\_Collisions\\_at\\_Sea](https://en.wikipedia.org/wiki/International_Regulations_for_Preventing_Collisions_at_Sea)

The International Regulations for Preventing Collisions at Sea, known as COLREGS, required Julian to yield to ships coming from his starboard side (see box), but in this weather, he wasn't going to take any chances. With a hazardous load of fertilizer on board, he didn't even want to think about the environmental damage that might result. The *Sea Lion* had slowed by now and adjusted its heading so that the *Eleni* could pass, but just barely. "Thank goodness for AIS and radar," thought Julian. It was a godsend in this weather, but these situations were still extremely tense. Adjusting a ship's course and speed took time. They weren't like cars, able to stop on a dime.

Moving carefully past the *Sea Lion*, he recalled an experiment that had been posted on the website for ships' captains a year or so ago. The MONALISA project had shown that providing vessels with the ability to see each other's planned routes gave navigators a more complete picture of their current environment and helped them adjust their voyage plans accordingly. "That sure would help in conditions like this," he thought. "It could prevent a lot of collisions -- and a lot of anxiety for captains. I wonder if anything more was done about that? If we knew what everyone else was planning to do in this small area, we could even go a little faster."

After passing through the Dover Straits, the traffic eased up a bit and Julian was able to increase the *Eleni's* speed a little but he still felt it wise to proceed cautiously. He had lost some time, but the turn in the weather was just one of the many factors that wreaked havoc with shipping timetables and the ability of charterers like Cramwell to predict when their cargos would arrive. Although modern ships' captains had more tools at their disposal than those in the old days, there were still many things that could prevent the smooth execution of "the dance" and create serious obstacles for the partners involved. All too often one of more of them ended up not being able to perform their step in the elaborate chain of activities involved because a partner hadn't arrived.

As they moved into less congested waters, Julian ordered an increase in speed to 12 knots, and they began to sail along at a smarter clip. Checking the route and his ETA, he breathed a sigh of relief that they could still meet the stipulated laytime. First Officer Pieter Rostov arrived to take the next watch, and Julian headed gratefully to his cabin for some much-needed sleep.

It seemed like he had been asleep only a few minutes when he was rudely awakened by his phone. "What's up?" he asked groggily, checking the time on his watch. It was the middle of the night. "I've got some bad news," said Pieter. "Scotty's just informed me that we've got a warning light on one of the fuel pumps and until he figures out the problem, we can only go half-speed." "Okay, keep me informed," said Julian.

The next call, just as Julian had drifted back to sleep, was from Scotty himself. "The hydraulic cylinder to the steering engine is making a 'thunk, thunk' sound," he explained. "We've checked the manual, and tried to bleed any air out but I think the pistons are worn... And I think we'll have to replace them asap." "What's the bottom line here Scotty?" he asked. "We need to get to a port as soon as possible and replace the cylinder. We can fly a new part in from the factory in Norway and I can do the repair itself in about five hours." "I'll be up as soon as possible," said Julian cursing under his breath.

Struggling into his uniform and running his fingers through his unruly hair, Julian considered what he needed to do. First, he had to inform Cramwell and make arrangements to get a new cylinder. Second, he had to plot a new route to the nearest port. Finally, he had to make arrangements with the port to berth there so the maintenance could get done. Heading into the bridge, he reflected that there was going to be hell to pay with all this delay. Cramwell was going to blow a gasket and would be sure to extract the cost of any penalties from Hellenic, which in turn would not be happy. Well, that was their problem. The ship had been in good order when he had left Bigglestowe and he had to do what was required to keep the ship and its contents safe. He was glad he wasn't responsible for sorting out the contractual ins-and-outs however. He had enough trouble just getting an agreed-on statement of facts.

After some delays reaching Cramwell, it was agreed that the Eleni would head for the nearest port, Ebro, on the northwest corner of Spain, still a few hundred nautical miles away. "I'll speak to our agent there, Consuela Garcia." "Thank you very much sir and I'm sorry this happened," said Julian, inwardly thanking the universe that Cramwell was taking it so well. "Well, keep me updated about your progress," Cramwell said. "Will do sir," said Julian as he rang off. Delegating the new route to Pieter, he made his way wearily off to his berth.

The new day dawned bright and sunny, and Julian was in a much better frame of mind. On the bridge with a cup of coffee and the open sea out ahead of him, the world seemed much less complex and stressful. His email told him that the agent had been informed, and the cylinder ordered with expedited delivery. As they limped along, Julian began to complete the inevitable paperwork for the port authorities forwarded to him by Consuela. Even though this was a mere stop-over, all the paperwork needed to be done just the same and there were special forms to fill out because of his hazardous cargo.

Later that day, when they were 12 hours out from port, Julian called Consuela to confirm that the pilot and tug boat needed were available. "I've sent requests in to both groups," she told him, "but I have yet to hear back from them. Let me call them now and I'll send you an email. I've also received confirmation that the

filter you need is on its way. I'm tracking it on my computer. It should be delivered later on tomorrow afternoon."

Boy, the air and land transport companies sure were better-organized than the sea-transport ones, thought Julian, as he waited for Consuela's email. These shipments were tracked every step of the way and people could easily see when their deliveries were scheduled. He knew Cramwell hadn't informed his clients of their delay yet, preferring to see how long it would take until the *Eleni* was underway again. So as far as Croatia Chemicals was concerned, they would be arriving in six days when clearly *that* wasn't going to happen!

His email pinged and he opened his inbox to find a note from Consuela asking him to anchor for a few hours when they arrived. "Our pilot is ready but the tug is not," she wrote. "They say they'll both be available at noon, so expect them then. Julian sighed. This was not an unusual situation. Communication between the various actors in a port was often poor, tending to leave the vessel waiting for her partners to arrive. Nevertheless, the lack of coordination was frustrating and could delay their journey even more. Different ports had different ways of ensuring that their services were made available, but they all relied on the agent communicating with the different players. Tugs, pilots, linesmen, equipment, berths, and stevedores were all booked separately, often using different systems. It was as if everyone was dancing to slightly different music. The miracle was that they most often managed to make the dance work, though not without a lot of extra coordination effort from the agent.

Consuela was doing a great job, Julian reflected, even promising to stay late to make sure all was in order for their departure, but he couldn't help thinking that there had to be an easier way coordinate this than having a person orchestrate all their movements. It seems pretty inefficient to me, he thought, having one person filling out various booking forms and then following up with emails and phone calls to confirm. I'd bet the industry could save a lot of time and eliminate delays and mix-ups if we standardized the booking processes and made them more transparent to all the partners. Why on earth couldn't you look up your bookings yourself or have your agent manage them all on her computer? Even if they're separate services, you'd think they could be better coordinated. And if there were fewer delays, ports could move more vessels through them faster and accommodate the unexpected more easily.

Julian interrupted these musings to prepare his noon report to Cramwell, just as the pilot came on board to guide them to their berth. Julian noted their port, the particulars of the vessel, and added that they hoped to be back at sea later on that night if Cramwell would authorize overtime for the services they needed. "Done!" Cramwell wrote back quickly. "Get underway asap and maximize your speed. Send me your ETA and course when you've got it plotted." Julian forwarded the approvals to Consuela who would ensure everyone worked late and gave her a preliminary time of departure at 11pm that evening based on Scotty's initial estimates. "Please arrange for linesmen, a pilot, and a tugboat tonight," he wrote. "And let me know the instant that cylinder arrives!"

Calling his Second Officer, Anders Haraldson, to the bridge, he asked him to plot the speediest course around Portugal and into the Straits of Gibraltar and then Croatia. "Cut as many corners as you can so we can make up some time," he instructed and headed off for lunch. At 4pm, his email pinged again with a note from Consuela to say that the filter had arrived. Julian marveled again at the predictability of the land transport system. He knew it wasn't a perfect system but the ability to track each leg of the journey made it much easier for him to plan the next steps in his "dance".

He called down to Scotty in the engine room to inform him and arrange some mates to oversee the delivery and then checked in with Anders. "This new route will get us into Virovitka only 18 hours behind schedule," Julian commented. "That's amazing given all the delays we've had on this voyage. The only problem is that we'll have to use a lot of extra fuel if we go at top speed. I'll speak to Cramwell about it." Reached by phone, Cramwell gave his grudging approval. "It's going to cost us in fuel but that's better than being even later," he acknowledged. "Keep me informed as you go."

Sounds of banging and clanging emerged from the bowels of the ship and as the evening wore on, Scotty reported that they were on track for an 11 pm departure. "We caught that cylinder problem in time and no further damage was done. I've checked everything thoroughly," Scotty stated with obvious relief. "That's great, since we'd have been penalized for changing our departure this late," Julian said. "This voyage is already well over budget." He called Consuela to confirm their departure time. "I'll just phone everyone to confirm your departure bookings and then I'll be over with the paperwork," she said.

Underway again, the *Eleni* made good time keeping close to the coast of Portugal throughout the night. Julia was back on the bridge at 7am, when his VHF radio buzzed. Picking up the receiver, he heard, "This is VTS Algarve Region. You are about to enter a Marine Protected Area. With your cargo, you must reduce your speed to 10 knots or move out of the area." "There's no protected area on our maps!" exclaimed Julian, checking his route. "It was just named three months ago to protect rainbow sardine schools, which are a threatened species," said the operator. "How far out does it extend?" asked Julian. "You must stay at least 50 nautical miles out from the shore until you are past Cape St. Vincent." "Noted," said Julian as he rang off (see box).



**Figure 1. A Ship's VHF Radio**

"How come we didn't know about this?" he asked Anders, who had just come into the bridge. "It might have changed our route!" "These restrictions change all the time," Anders commented. "And there are more of them when you carry hazardous cargo. Our planning computer clearly needs an upgrade. I'll have to figure out what to do. Just give me a minute." Turning to the computer, he began to replot a route that would take them farther out from shore.

Julian considered the situation. It was sometimes difficult to know the "rules of the road" in shipping. They changed by country, region, cargo, and season. It was the captain's responsibility to incorporate them into his route planning, but when you were taking a variety of different routes all the time, it was hard to keep up. Planning computers helped but even they couldn't always incorporate the myriad geographical restrictions involved. Couldn't this information be communicated to vessels in some way when a route was being planned? He didn't know. Of course that would require some sort of external route validation service, which navigators didn't currently use in general. It would certainly have been helpful here because this present situation meant that he would be slowed down and his ETA adjusted yet again. Which option was best? Go slower through the protected area or faster but further out, adding a couple of hundred miles? That option would require route approval by Cramwell. The first would only require a new ETA in the noon report.

### What is VTS<sup>1</sup>?

A **vessel traffic service (VTS)** is a marine traffic monitoring system established by harbour or port authorities. VTS use radar, closed-circuit television, VHF radiotelephony and AIS to track vessel movements and provide navigational safety in a limited geographical area. It integrates this information into a single operator working environment to allow for effective traffic organization and communication. In areas that are covered by VTS there are a wide variety of required procedures for vessels to follow depending on the marine area and country involved .

A VTS uses a comprehensive traffic image that provides information about all participating vessels and their intentions. This image helps the operator evaluate and respond to developing situations and provide various services to vessels such as:

- The **information service** which broadcasts information at fixed times and intervals or when deemed necessary by the VTS or at the request of a vessel, and may include reports on the position, identity and intentions of other traffic; waterway conditions; weather; hazards; or any other factors that may influence the vessel's transit.
- A **traffic organization service** which prevents the development of dangerous maritime traffic situations and provides for the safe and efficient movement of vessel traffic within the VTS area.
- The **navigational assistance service** which helps in difficult navigational or meteorological circumstances or in case of defects or deficiencies. This service is normally rendered at the request of a vessel or by the VTS when deemed necessary.

<sup>1</sup>[https://en.wikipedia.org/wiki/Vessel\\_traffic\\_service](https://en.wikipedia.org/wiki/Vessel_traffic_service)

"That new course is going to cost us," said Anders looking up from the planning computer. "If we go slower through this area, we'll save fuel. If we go out to deeper water and speed up, it will take just as long and we'll use a lot more fuel." "Okay," said Julian. "The slow route it is. I just hope Cramwell agrees with us." The new ETA was calculated and an additional 4 hours added to their journey. Cramwell was notified and agreed reluctantly, so Julian had time to admire the beautiful Algarve coastline as they headed south-east for the Straits of Gibraltar.

This time, he didn't feel as optimistic. He hated it when reality messed up his plans, especially when they made him late! There was still a mindset in maritime shipping, built up from previous centuries, that it was better to be early than on time and being late was even worse. "I don't know why everyone wants to get there *early*," he thought to himself. "What's the point if nothing's ready for you? Why wouldn't it be better to be more *predictable*?" It was a fact of life that things went wrong and the whole dance had to adapt, he knew. It just seemed like there was much more uncertainty and lack of predictability in shipping than in other forms of transport. Planes and land transport did get disrupted by weather but it seemed that there was much more transparency to all the parties involved when they did and the whole system seemed to be better able to adjust. Julian wondered if Val or Croatia Chemicals had any idea how late they were. He doubted it...

In Bigglestowe, Charlie Cramwell sat at his desk contemplating Julian's latest report. He knew the *Eleni* wasn't going to make her original ETA, but how much did he want to tell Gravenhurst and Croatia Chemicals? And when? Hopefully, there wouldn't be any more delays, but what if there were? If he handled the situation carefully as it was, most of the time lost (and penalties) could be blamed on Hellenic. The more he thought about it letting them know was the smart thing to do. The days of anxiously scanning the horizon waiting for your ship to come in were long gone. These days too much time and too many resources were dependent on just-in-time shipments. Delays were sometimes unavoidable so the best thing was to keep everyone informed. Not all charterers felt this way of course, but increasingly this transparency was the way of the world. "Better to join the trend..." he thought as he picked up the phone for a couple of unpleasant conversations.

Meanwhile Val Antic, in Croatia, was running around. Virovitka was a busy port in the spring and there was lots to manage and little time to wonder where the *Eleni* was. He had made some tentative bookings for the vessel when he had first been nominated, but after that, nothing had been heard. This was not unusual. Agents often weren't informed of the progress of "their" vessels, that is, until the ship was about 24 hours out. The first he knew there was a problem was when an email arrived from the pilot service on his cell phone just as he was headed back to his office. "We're booked for the *Eleni* in 12 hours. Can you confirm?" Val hurried to his computer. Had the *Eleni's* arrival notification somehow escaped his notice?

A scan of his emails and a check in with VTS confirmed that the *Eleni* was nowhere near. "They may have got stuck in that traffic jam in the Straits of Gibraltar," said the operator. "Did you hear? An oil tanker and ferry collided last night. The tanker is leaking oil and there's a lot of people in the water. There's a lot of vessels around it now assisting with the search and rescue (SAR) and a massive area has been affected. Everything's blocked up." Val hadn't heard, but that was a likely explanation for the *Eleni's* delay. "I guess I'd better postpone everything by 24 hours," he said to himself as he began a round of changing bookings for pilots, tugs, linesmen, stevedores, berth, and unloading equipment. "How many times a day do I make these types of changes?" he thought to himself. "Too many," he concluded. Shipping was an imprecise business at the best of times. Even within a port, there were many things that could prevent ships leaving on time and which then had ripple effects throughout its various systems -- delaying arriving ships as well as changing departing ships' ETAs at their next port. It was his job to ensure everything happened as smoothly as possible, but there was a lot to organize.



**Figure 2. A VTS Operation**

He thought back to last fall when he had spoken to some researchers who were trying to better understand the process he coordinated. They had sent him a diagram to confirm the steps involved. The agent was right in the middle of everything, like a spider in its web. He dug around in a pile of paper and found it. "Wow," he thought when he looked at it again. Getting all these partners to work together was an incredibly complex and time-sensitive process when you saw it on paper like that (see Figure 3). And when you added in the fact that multiple vessels were going into and out of the port throughout the course of a day, that he was managing quite a few of them at the same time, and that there were, by necessity, numerous

changes and adaptations that needed to be made due to changes in voyage plans, it all added up to a giant coordination challenge. "That's why they have agents, I guess," he thought. "Someone has to help all these different groups and situations work together." It was a headache at times, he admitted, and it would be nice if he had a bit more support with the rescheduling. "Wouldn't it be great if every time a ship changes its ETA, all these services could be changed at the same time by the computer, without all the emails and booking forms?," he thought. "We could really make these ships fly through the ports in record time!" He loved working in maritime transport but he wouldn't mind a little less of the repetitive stuff that would give him more time to work on things where he really added value, like supporting captains with their port needs and straightening out problems, and coordinating with land transport... Speaking of which, he wondered if anyone had told Croatia Chemicals about the delay?

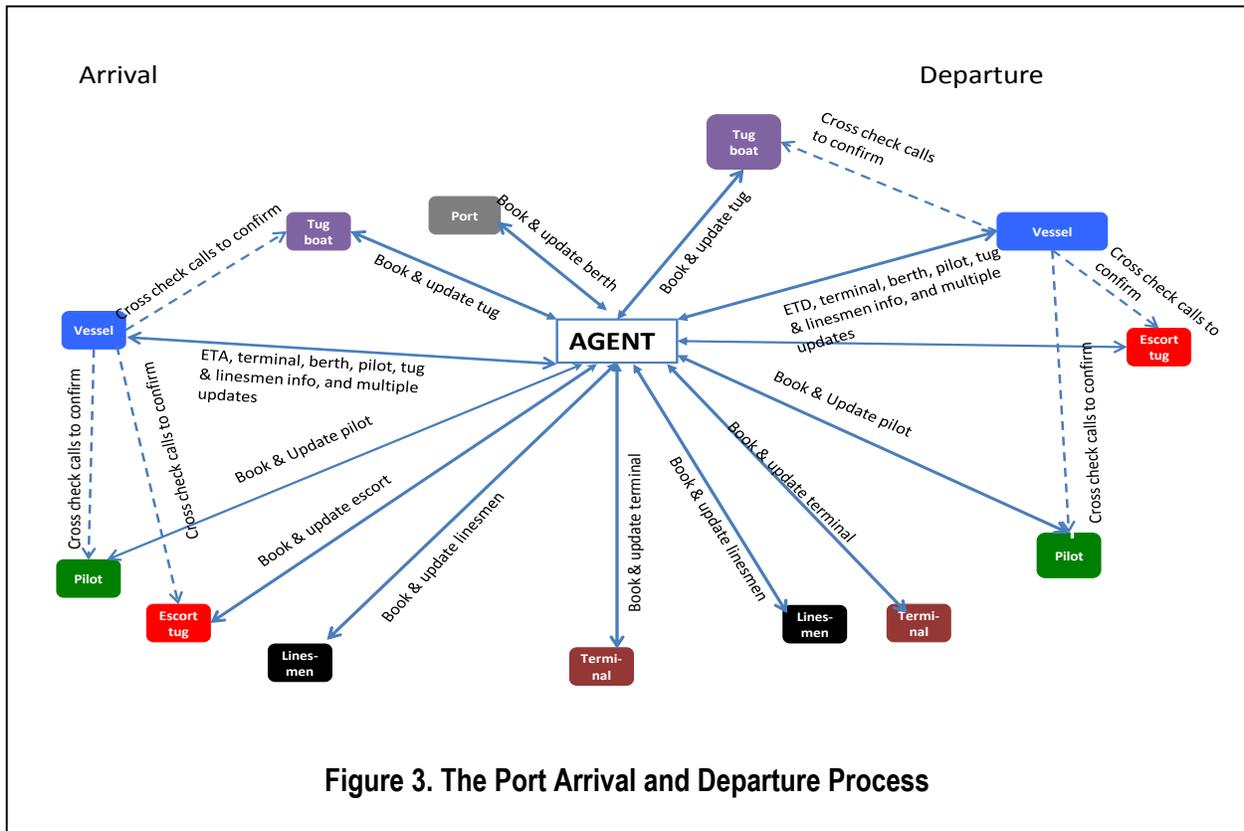


Figure 3. The Port Arrival and Departure Process

Back on the Eleni, Julian had just finished crawling through the Straits. Because of the grounding, only one traffic lane was open, and VTS was making vessels pass through one at a time. He didn't envy the VTS and SAR operators. They first had to scramble to assess harm to the people and the environment and determine how to handle a very complex and potentially hazardous situation. Then, they had to deal with all the ships that were late because of the incident and guide them through the narrow passage safely away from the collision. He wondered how the captain had managed to get off course without noticing, but he knew that in certain circumstances this was all too easy to do. A slight change of course in confined waters, a distraction, or even sleepiness, had been causes of serious accidents in other parts of the world in the past. With so many ships everywhere these days, maybe VTS should take a bigger role in preventing them. Of course, they already tried to do this but without knowing a vessel's planned route, it was much harder to know when it was moving off course.

Finally, past the problem and back into open water, Julian ordered "Full Speed" to try and make up lost time. Glancing at the AIS, he saw that there were many fewer ships in the area -- just a few fishing vessels closer to shore. "I guess they're all hung up at the Straits," he said to himself. "Well that makes it easier for us." Checking their route, he saw it took them quite a bit south of Sicily before they turned north to Croatia. Turning to Anders, he asked. "Why are we going so far south? We would save time and fuel if we changed the route to go between Malta and Sicily." "I agree," said Anders "but the IMO has created a new

### Traffic Separation Schemes<sup>1</sup>

A Traffic Separation Scheme (TSS) is a traffic-management route-system overseen by the International Maritime Organization. TSSs are used to regulate traffic at busy, confined waterways or around capes. Within a TSS you normally see at least one traffic-lane in each main-direction, turning-points, deep-water lanes and separation zones between the main traffic lanes. In most cases you can find an "inshore traffic zone" between the traffic-lanes and the coast.

A ship navigating in a traffic-lane should sail in the general direction of that lane. The body of water between two opposite lanes is to be avoided by vessels travelling within the TSS as far as possible except in certain circumstances such as emergencies or for fishing activities.

<sup>1</sup>[https://en.wikipedia.org/wiki/Traffic\\_Separation\\_Scheme](https://en.wikipedia.org/wiki/Traffic_Separation_Scheme)

eastbound TSS because of all the disastrous accidents lately due to so many fleeing refugees. It's safer and there's less likelihood of collision (see box). Too bad because we could save a lot if we took the shorter route."

Checking the route again, he saw it was time to contact Val and tell him they were about 24 hours out. Shortly after the email was sent, he got a response. "You have missed the window I booked for you and there's no unloading equipment available for your requested ETA but I've got you a slot for 6 am the following day. When you are 12 hours out please contact me again. Here's the paperwork you need to

complete."

Julian groaned. Another delay! He couldn't get a break on this voyage. They were now making great time, but they'd be held up by the port for another 12 hours. This was seriously going to affect the cost of this journey. Pieter came back to the bridge for his watch. As Julian briefed him, he looked thoughtful. "Have you thought about slow steaming?" he asked. "We could at least save the company a bit of money if we can't get a berth until the morning." "That's a good idea," Julian said "but I'd have to ask Cramwell. My orders are to get to port as fast as possible."

Cramwell considered Julian's suggestion carefully when he was reached via satellite phone. "You've made a fair point," he said. "And it would save me money. Just make sure you get there on time. I don't want any more delays. I'll be calling Croatia Chemicals to get their trucks there tomorrow morning." Julian ordered the *Eleni's* speed reduced to 10 knots and contacted Val to explain that he had adjusted his ETA to meet the berthing time he had given the vessel. "Well, that's a new one on me," he remarked. "But it helps ... a lot. As long as you arrive in your window, I'll keep the services booked for you. Call me again when you are six hours out."

Taking his time steaming up the Adriatic Coast, Julian considered the "slow steaming" idea (see box). It seemed sensible to him. Fuel was almost 50% of the cost of operating a ship like the *Eleni* so if going slower lowered costs and made schedules more realistic and predictable, *and* reduced emissions, it

seemed like a win-win all around. It would have taken some of the pressure off him as well if he'd had a little more slack in his schedule and it would make the whole "dance" easier to manage.

### **Slow Steaming<sup>1</sup>**

Slow steaming (also known as green steaming) is the practice of operating ships at lower speeds to reduce fuel costs and carbon emissions. Slow speeds reduce fuel consumption and, therefore, the output of harmful emissions, helping shippers reduce their carbon footprint.

Sailing ships at slower speeds significantly reduces fuel consumption. Lowering engine speed by 10 percent cuts engine power by 27 percent, and reduces the overall energy needed for the voyage by 19 percent. Slow steaming reduces shipping line costs, because fuel comprises a huge share of operating costs. Slow steaming vessels are also more likely to arrive at port on schedule. When a ship sails at full speed, it has no buffer time if it is delayed by weather or congestion at other ports. With slow steaming, however, the vessel can increase speed to make up lost time.

For many manufacturers, retailers, importers, and exporters, supply chain reliability and predictability are more important than transit time or rates.

<sup>1</sup><http://www.inboundlogistics.com/cms/article/is-slow-steaming-good-for-the-supply-chain/>

Finally arriving at Virovitka ...on time... Julian called Val to notify him. "We're finally here," he announced. "Have you got a pilot and tug for me?" Val hesitated. "We have got the pilot and tug standing by," he said in heavily accented English. "But there is a *bit* of a problem." "You're kidding me!" said Julian with frustration. "What else can possibly go wrong? This voyage has been a nightmare!" "We have had a bit of a disagreement with the *Frederica*, the ship that is in the berth assigned to you. We are trying to get a clear statement of facts so she can depart, but since they cannot agree on the draft statement, it is delaying her departure. Do not worry. You will be next and I will keep you informed. The Croatia Chemicals trucks are here waiting nervously."

"That was an understatement!" Val thought. Ever since Cramwell had told the Croatia Chemicals people of the delay and given them Val's contact information, they'd been hounding him for updates. "I have had to book and rebook these trucks," the Operations Manager complained. "It's impossible to run a business when you're always changing the plans!" It had taken a lot to calm him down. Val hated these situations. Stuck in the middle between all the players, trying to coordinate everything, everyone had a tendency to take out their frustrations on him, even though there wasn't much he could do about it.

One hour later the *Frederica* received clearance to depart and Val finally gave Julian the go-ahead to berth. "The pilot and tugs will be there shortly," he informed him. "I am looking forward to meeting you at the berth. You must have a great story to tell me. It seems like you have had a few more delays than usual." "You can say that again!" said Julian. "It's been one for the record book!"