

The grounding of the Ever Given (IMO 9811000)

Compiled by Maurice Jansen MSc

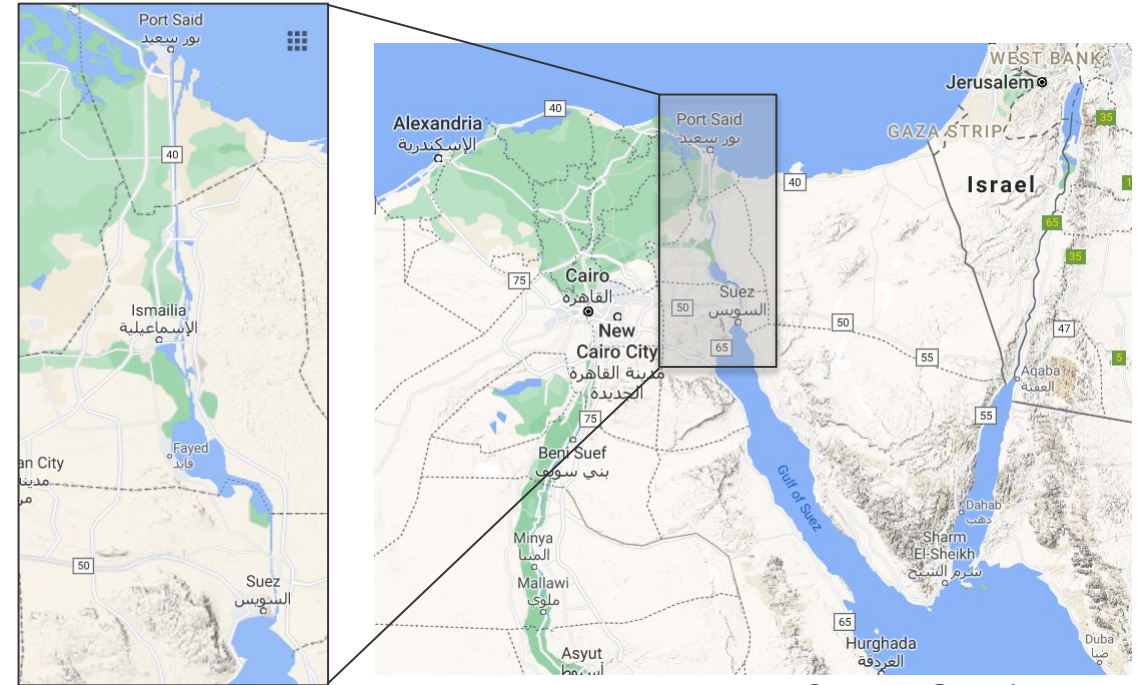
Senior Researcher Erasmus UPT

31 March 2021

Maritime canals

Suez Canal

- Opened in 1869 and is 193 km long between Port Said and Suez, no locks.
- Sailing time approximately 13 to 15 hours
- Vessels are subject to tolls charges in US dollars based in the net tonnage of the ship (separate rates for laden (full) ships and ships in ballast (empty))
- Shorter route from Asia to Europe than the alternative of sailing around the Cape of Good Hope
- Cost: \$600,000 and more for a one-way trip for ultra-large container ships. For exact toll fees, check [Suez Canal Authority](https://www.suezcanalauthority.gov.eg/)).



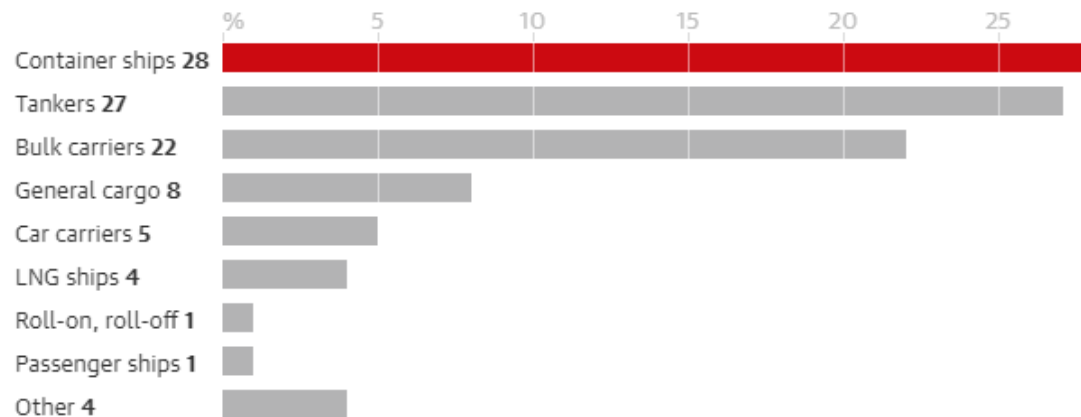
Source: Google maps

The Suez Canal reduces the transit time with 7 – 12 days of extra sailing time compared to going via the Cape of Good Hope, depending on the type and speed of the vessel.

Suez canal expansion completed in 2015

- The Suez Canal is one of the most important waterways in the world.
- It was expanded in 2015 to enable ships to transit in both directions simultaneously, but only in part of the waterway.
- Normally ships go through this part of the canal in convoy.
- 29 km were added to its original length of 164 mtr.
- The expansion was a US\$ 8.5 billion project and was completed in 2015.

Container ships such as the Ever Given are the most common type of ship using the Suez canal



Guardian graphic. Source: Suez Canal Authority, 2019 figures

Suez canal extension



\$8.5bn

Money raised for canal expansion project

\$13.2bn

Projected revenue by 2023 (up from \$5.3bn)

72 km

Length of new channel and bypasses

97

Number of ships per day by 2023 (up from 49)

11

Hours taken for a southbound transit (down from 18)

12

Months taken to complete project by August 2015

Guardian graphic

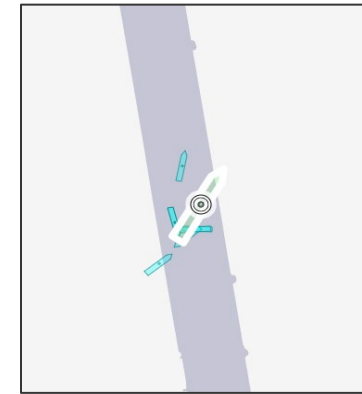
Source: [The Guardian](#)

Suez Canal blocked by megaship (Tue 23 March 2021)

- The 220,000-ton, 400 metre long Ever Given got stuck near the southern end of the canal.
- On average 50 vessels pass the Suez Canal each day (2019). Blockage lasted for half almost a week.
- High winds and sandstorm were said to be at the root cause of the problem, although it could also have been caused by human error or engine failure.
- Pilots are required to sail through the Suez Canal.

PORT CALLS			
Current AIS Destination		Estimated Time of Arrival	
 Rotterdam		Mar 31, 02:00	
Port	Arrival (UTC)	In Port	
 As Suways (Suez) Anch.	Mar 22, 22:12	6d 15h	
 Tanjung Pelepas	Mar 12, 07:49	18h 1m	
 Yantian	Mar 7, 21:49	1d 4h	
 Taipei	Mar 5, 21:36	23h 38m	
 Ningbo	Mar 4, 04:04	1h 8m	

Source: Vesselfinder



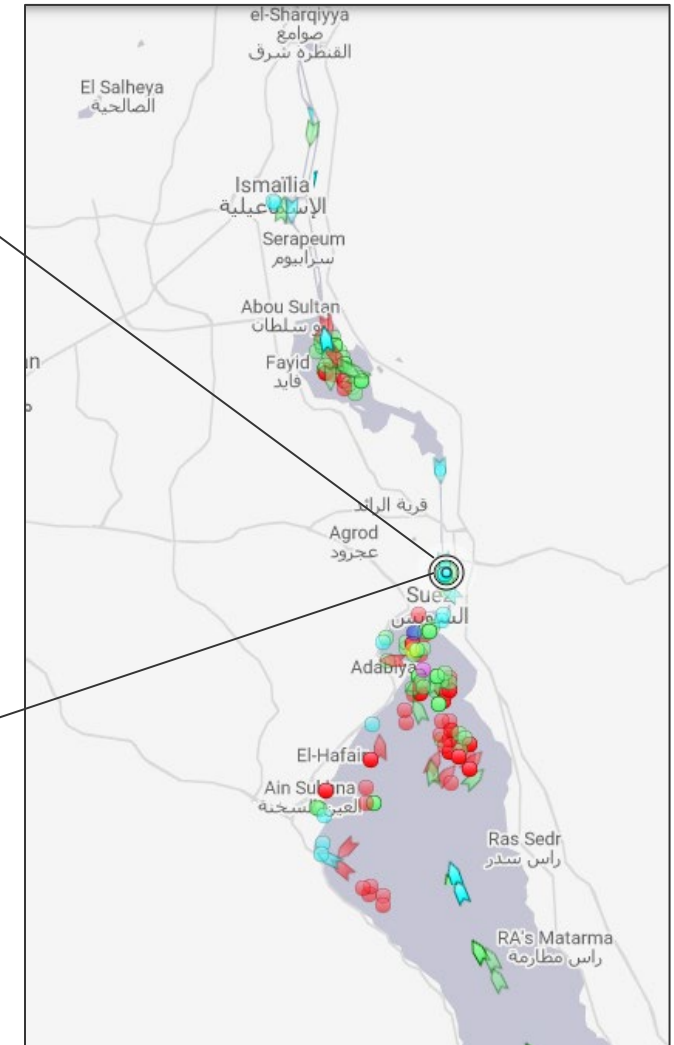

EVER GIVEN
 Container Ship

Add to Fleet Vessel Details

EG SUZ NL RTM
 ATA: 2021-03-24 03:34 ETA: 2021-03-31 04:00

PAST TRACK ROUTE FORECAST

Status: **Stopped** Speed/Course: 0kn / 0° Draught: 15.7m
 Received: 3 hours, 35 minutes ago



Source: MarineTraffic

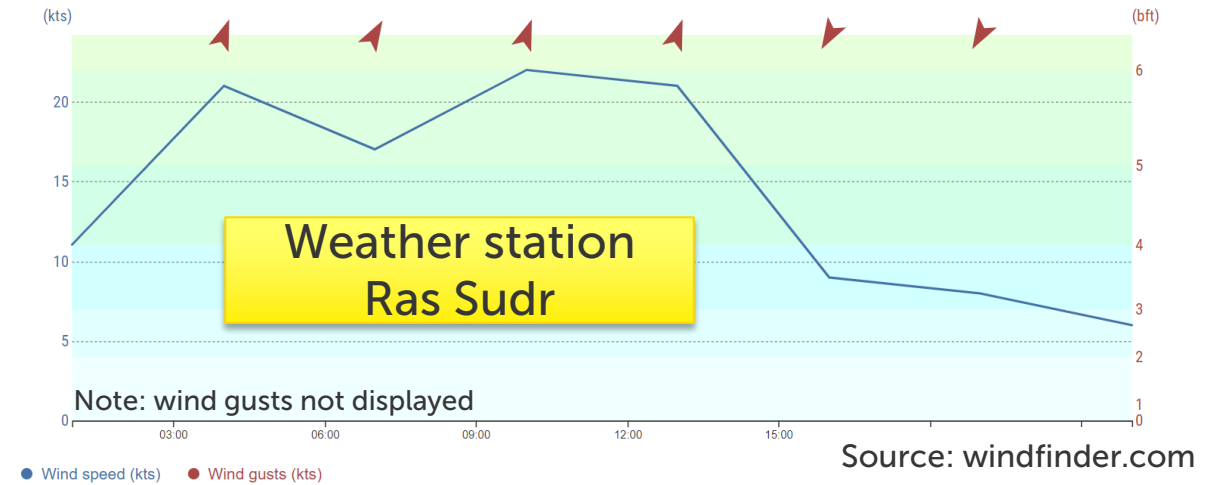
What could have caused the Ever Given to get stranded?



Source: Maritime Casualty Specialists, <https://vimeo.com/531626438>

Navigational experts who commented on the event say the increase in speed may have been to maneuver the ship better in the face of a strong wind ([Bloomberg](#))

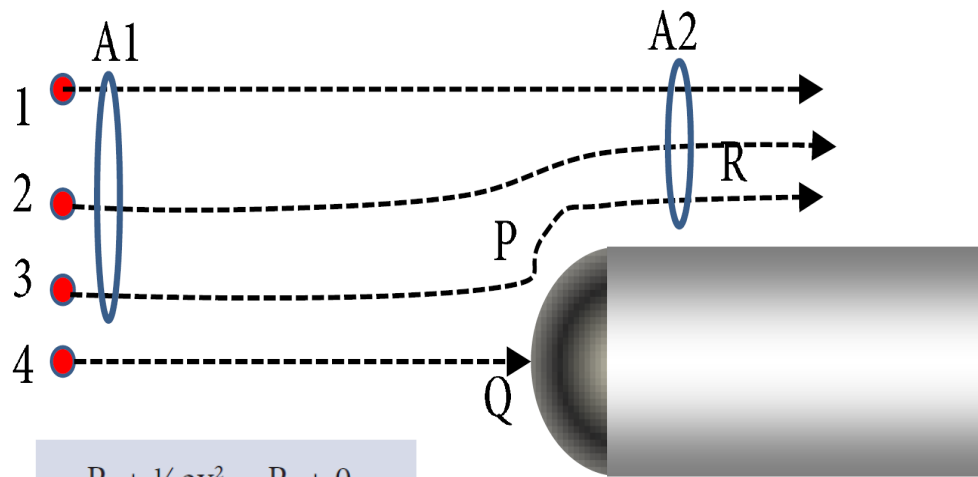
Wind reports from Tuesday, March 23, 2021



- The ship got into a sandstorm in the early morning of 23 March 2021. Bad weather conditions, lack of visibility and strong wind from irregular directions, with **gusts of 40 knots (74 km/hr)** (source: [Egypt Independent](#)). This made it difficult to maneuver the ship through the canal.
- The vessel accelerated speed. Last known speed was **13.5 knots (7:28 am local time)** which can be seen in the video on the left. This is above the maximum speed limit of 7.6 – 8.6 knots to transit through the canal.

What could have caused the Ever Given to get stranded?

Bernoulli's Principle



$$P_1 + \frac{1}{2}\rho v_1^2 = P_2 + 0$$

Ship's dimensions seem to have reached the maximum of 400 meters long. Over the last few years, ships have become wider, not bigger. That trend may now have reached its maximum boundaries as well.

- The hydrodynamics of large vessels get more complicated in a shallow waterway, like the Suez Canal. The amount of water which is displaced by the ship finds its way under the keel as well as between the ship's hull and the sides of the waterway.
- The water gets squeezed, which causes the water to speed up and the pressure to drop.
- A similar phenomenon is known as the '**bank effect**' which happens along the edge of a shallow waterway. Faster water means lower pressure, and as a result the stern of the ship gets pulled in towards the bank while the bow is pushed out and away. This then becomes a self-fulfilling effect. The smaller the gap, the lower the pressure and the stronger the pull on that part of the ship.

Refloating the Ever Given

11 tugboats
2 seagoing tugs

- Pull and push maneuvers from three directions.

Cutter suction
dredge

- ~30,000 metric tons of sand to a depth of 20 meters deep

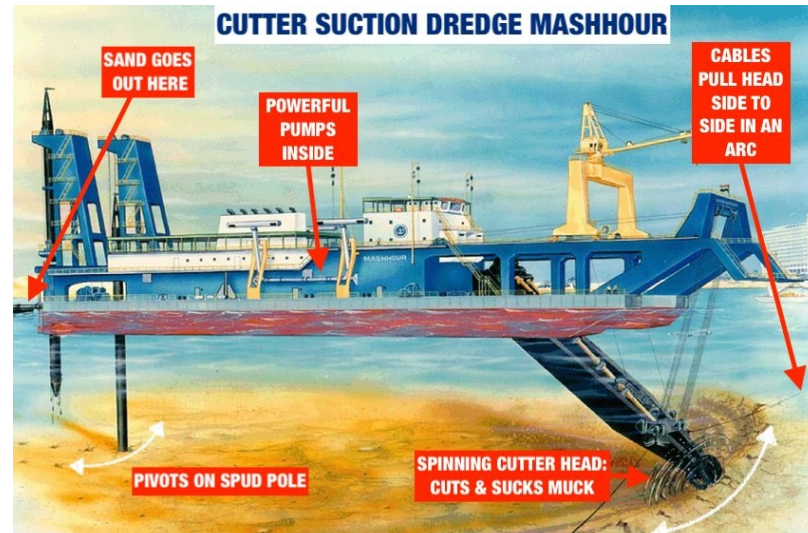
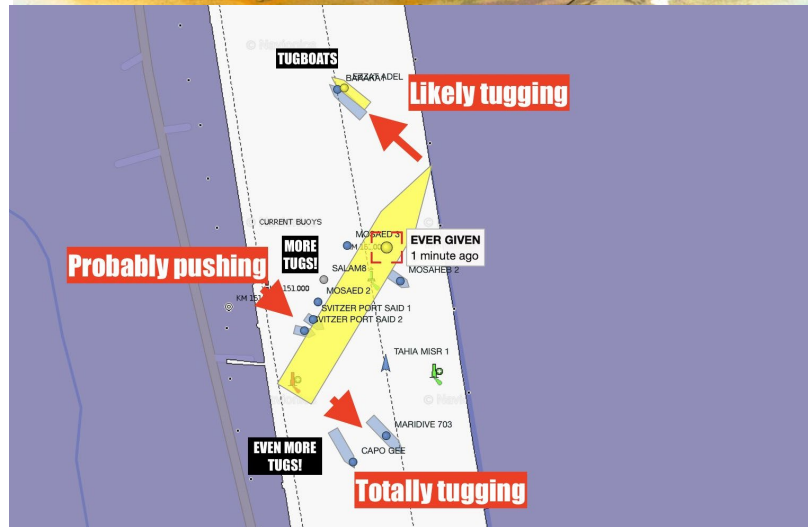
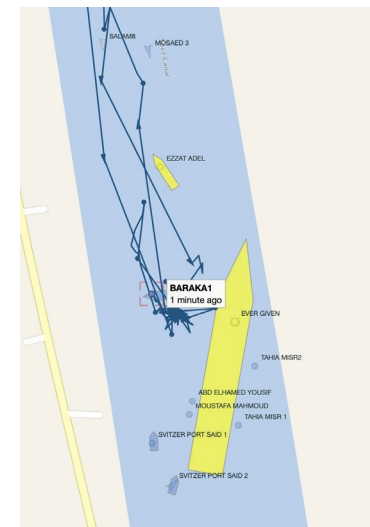
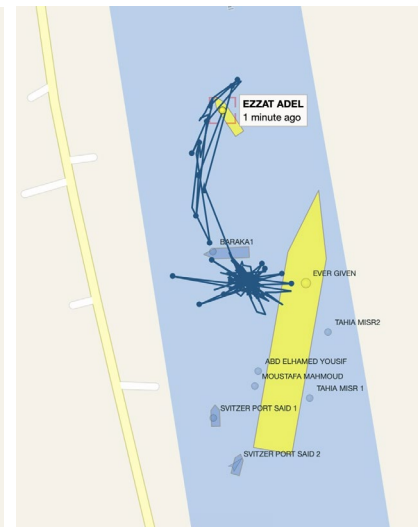
Spring tide

- Full moon together with the relatively close position to Earth in its orbit, caused the water levels to rise about 46 centimeters higher than usual



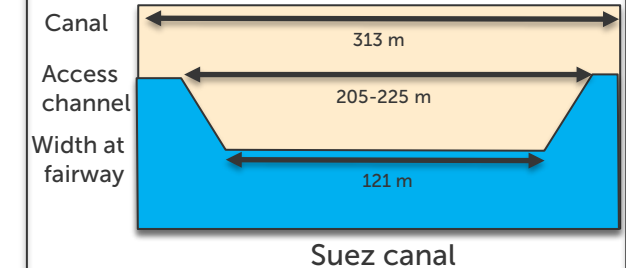
Source: AFP Getty Images

Ever Given refloated on 29th of March



29 March 2021 15:05 local time

- 11 tugboats on scene
- 2 seagoing tugs
- 1 cutter suction dredger
- (1 shovel)



Source: John Scott-Railton, via twitter

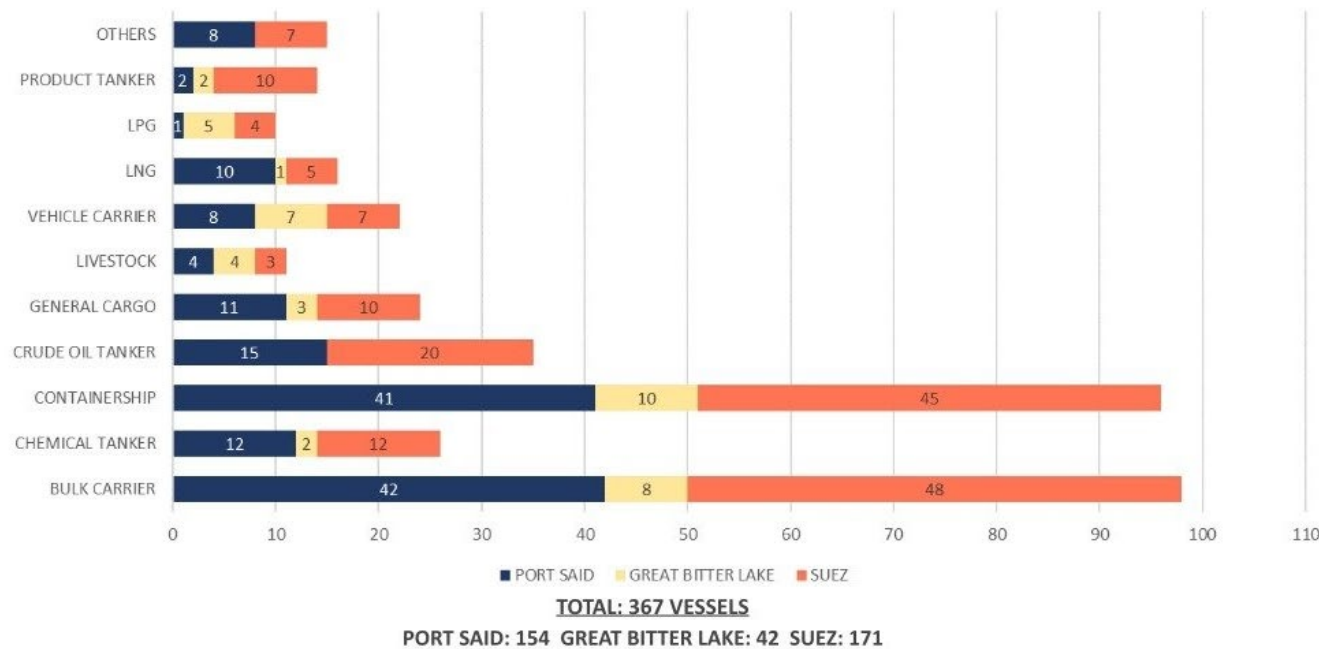
Who's involved in the Ever Given (IMO9811000) grounding and salvage?

Type of actor	Details	Country
Owner	Shoei Kisen Kaisha Ltd	Japan
Ship manager	Bernhard Schulte Shipmanagement	Germany
Ship register	Panama Ship register	Panama
Captain	Details not given	India
Officer's nationality	Details not given	India
Crew (ratings) nationality	Details not given	India
Charterer (time charter)	Evergreen Marine	Taiwan
P&I club	UK P&I	United Kingdom
Class	ABS	USA
Shipyard	Imabari Shipbuilding	Japan
Voyage load port	Tanjung Pelepas	Malaysia
Voyage discharge port	Rotterdam	Netherlands
Territorial waters	Lake Manzala, Lake Timsah, Bitter Lakes	Egypt
Authority	Suez Canal Authority	Egypt
Pilots	Suez Canal Authority	Egypt
Salvage company	Boskalis SMIT Salvage	Netherlands

Impact of Suez Canal blockade on global trade



VESSELS AWAITING SUEZ CANAL TRANSIT 29 MARCH 2021



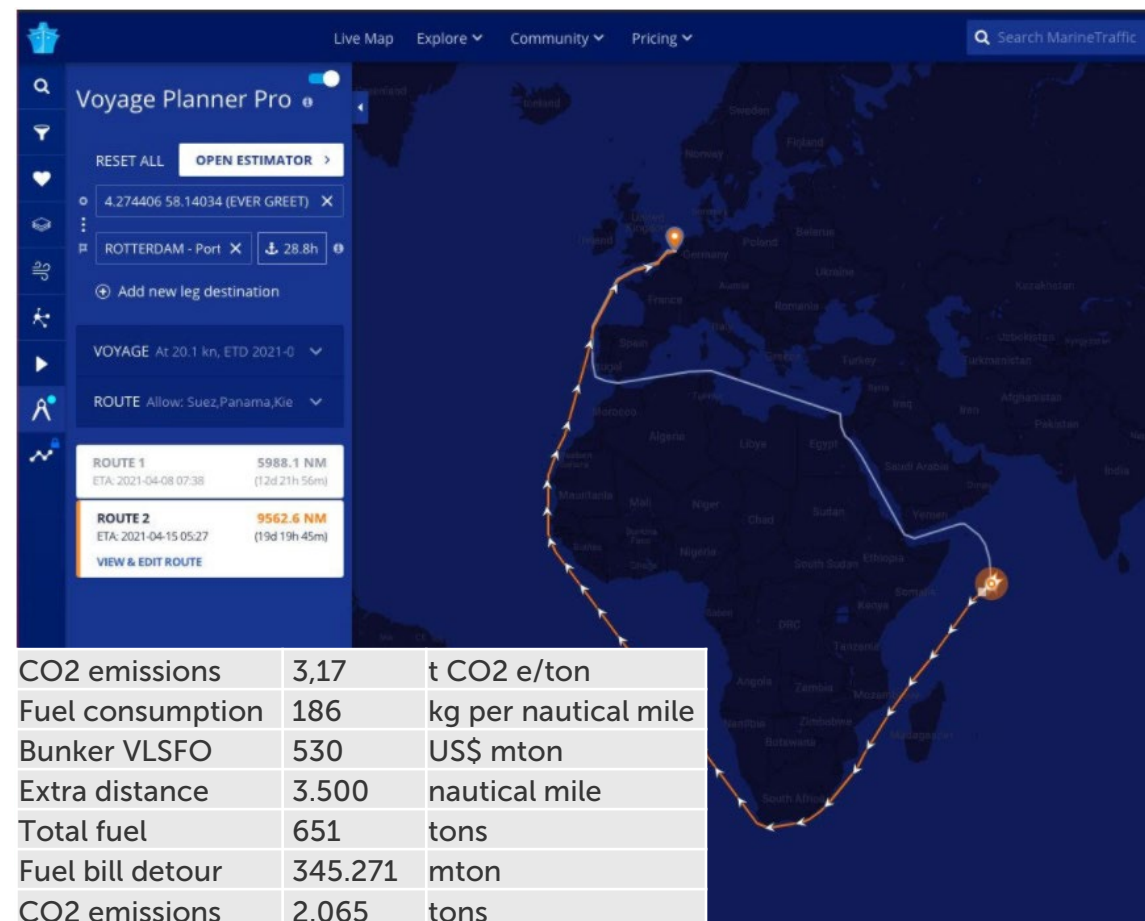
DATA AS AT 29.03.2021 0330 GMT+2 BASED ON LLOYDS LIST INTELLIGENCE & LETH INTERNAL SOURCE

Source: LETH Agencies, 29 March 2021

- 12% of global trade passes through the canal. 5 – 10% of world's seaborne oil
- 367 ships jammed in southern section of Suez Canal (as per 29 March 2021);
- Lloyd's List estimates that US\$ 5.1 bn of trade per day passes northbound, while US\$ 4.5 bn passes daily in southbound directions.
- A shipowner would lose US\$ 60,000 per day or US 3,400 per hour of delay (The Guardian).

Alternatives for container trade – reroute via the Cape

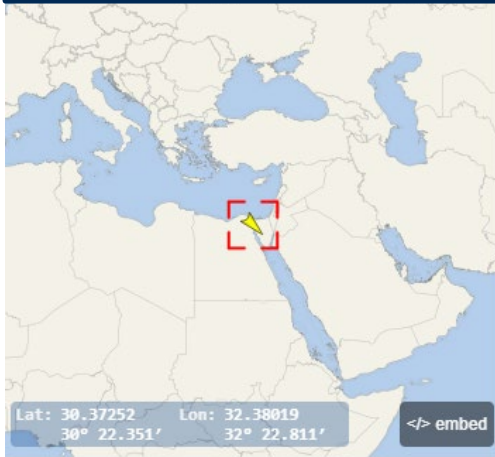
- Liner operators have started to reroute ships via Cape of Good Hope, which is a detour of 3,500 nautical miles and 7 – 12 days of extra sailing time.
- Maersk announced (27 March'21) to reroute 14 ships. MSC rerouted 11 ships to avoid the ship jam in the canal. Hapag Lloyd planned to reroute 4 ships
- A detour of 3,500 nautical miles of a 20,000 TEU vessel into Rotterdam via the Cape of Good Hope would emit an additional 2,065 tons of CO₂e.
- This is based on a fuel bill of US\$345,000 for the extra sailing, requiring 651 tons of VLSFO 0.5% sulphur.
- Average price \$530 (11 March'21) on bunker fuel and using a CO₂ emission factor of 3,17 from Lloyd's List Register.



Source: Marine Traffic, analysis supplychaindive.com

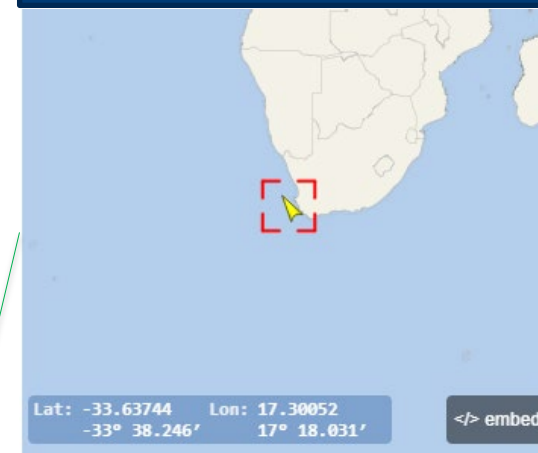
Taking the detour around Cape of Good Hope

Ever Given



While Ever Given is held up by Suez Canal Authorities, Ever Greet is taking route via the Cape.

Ever Greet



VESSEL NAME	TERMINAL	ETA	ETD
EVER GOVERN	EUROMAX terminal	2021-04-08 04:00 CEST	2021-04-11 16:00 CEST
EVER GLORY	EUROMAX terminal	2021-04-12 16:05 CEST	2021-04-15 01:20 CEST
EVER UNICORN	ECT Delta Terminal	2021-04-14 13:00 CEST	2021-04-15 14:00 CEST
EVER GENIUS	ECT Delta Terminal	2021-04-16 07:00 CEST	2021-04-18 22:00 CEST
EVER GREET	ECT Delta Terminal	2021-04-20 10:10 CEST	2021-04-23 02:10 CEST
EVER GIVEN	ECT Delta Terminal	2021-04-24 13:20 CEST	2021-04-27 13:00 CEST
EVER GENTLE	ECT Delta Terminal	2021-04-24 14:05 CEST	2021-04-27 14:05 CEST
EVER GENIUS	EUROMAX terminal	2021-04-27 00:35 CEST	2021-04-29 10:35 CEST
EVER GRADE	ECT Delta Terminal	2021-04-29 00:10 CEST	2021-05-02 00:10 CEST

POSITION & VOYAGE DATA

Rotterdam, Netherlands

ETA: Apr 20, 05:00

Course / Speed	326.9° / 17.5 kn
Current draught	15.9 m
Navigation Status	-
Position received	7 days ago
IMO / MMSI	9832729 / 371829000
Callsign	3FLF4
Flag	Panama
Length / Beam	399 / 59 m

Tanjung Pelepas, Malaysia

ATD: Mar 20, 04:39 UTC

PORT CALLS

Tanjung Pelepas, Malaysia

Arrival (UTC)	Departure (UTC)	In Port
Mar 19, 12:34	Mar 20, 04:39	16h 4m

Yantian, China

Arrival (UTC)	Departure (UTC)	In Port
Mar 14, 22:55	Mar 16, 08:30	1d 9h

Ningbo, China

Arrival (UTC)	Departure (UTC)	In Port
Mar 11, 00:52	Mar 12, 01:38	1d

Hongqiao, China

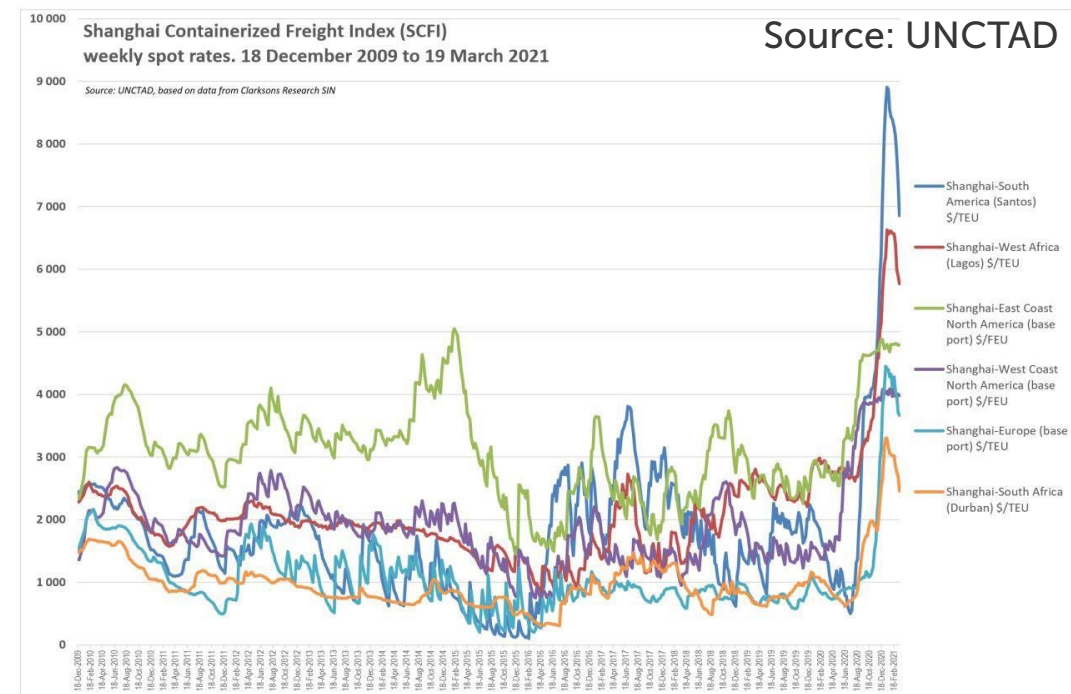
Arrival (UTC)	Departure (UTC)	In Port
Mar 9, 17:54	Mar 10, 15:38	21h 43m

Hongqiao, China

Arrival (UTC)	Departure (UTC)	In Port
Mar 8, 15:55	Mar 9, 17:33	1d 1h

Impact on container trade

- Liner operators have rerouted some ships via Cape of Good Hope, which is 3,500 nautical miles longer;
- Freight rates have already increased rapidly in recent months as a result of the shortage of containers. Longer voyages will only add up to the shortage.
- Before the grounding- happened, spot rates for a 40 ft container from Shanghai to Rotterdam is now roughly 7,500 US\$, which is approx. 3 times higher compared to one year ago.
- European ports such as Rotterdam, Antwerp and Hamburg are expecting a 'tsunami of containers' in two weeks after traffic jam has been resolved.
- According to a spokesman of the Port of Rotterdam, 56 container ships, 3 tankers and 1 car carriers are bound for Rotterdam. The MSC and Maersk ships which have been rerouted to take the Cape of Good Hope will come on top of these port calls.



Container freight rates Shanghai – Rotterdam v.v.

Type	Westbound (US\$)	Eastbound
20 ft	3.500 – 4,000	1,050 – 1,500
40 ft	6.800 – 7,700	1,450 – 1,850

Source: Searates.com, 30 March 2021

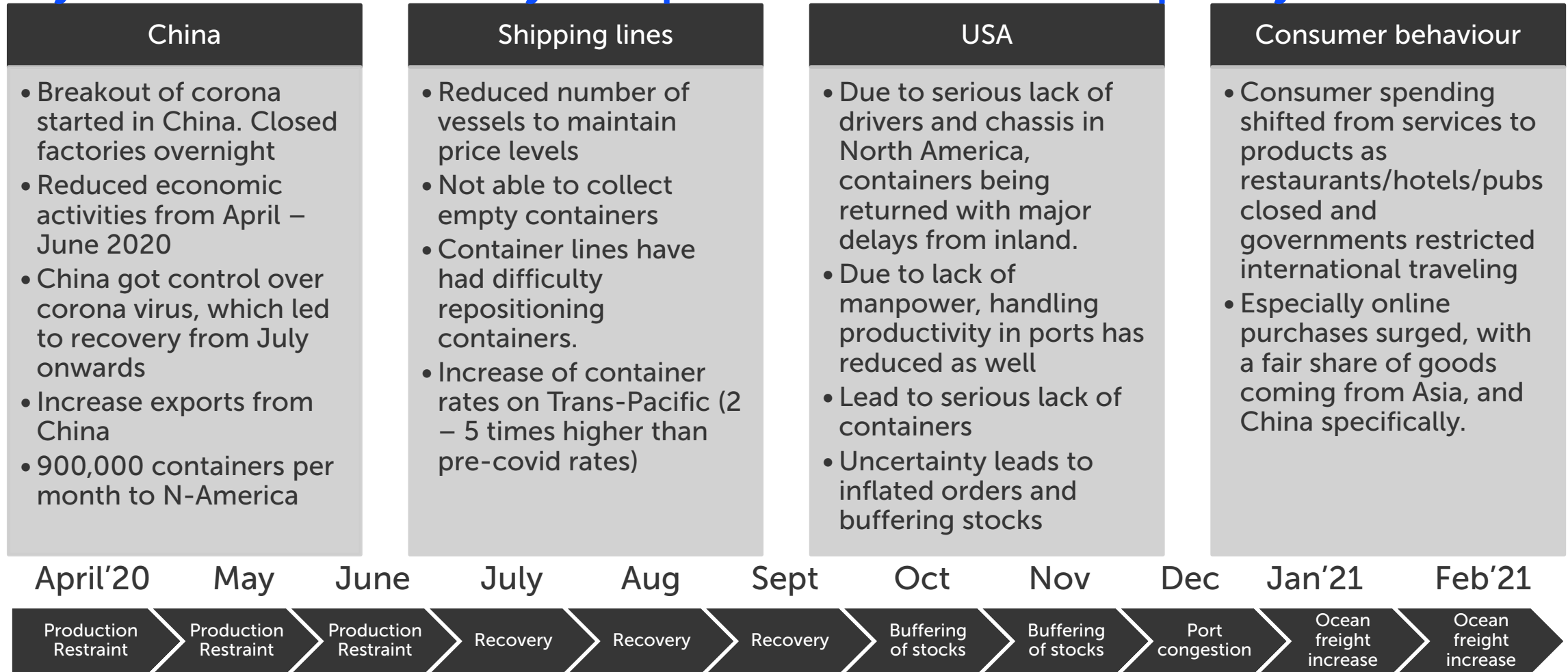
Is the land alternative a viable option when Suez canal is blocked?



Instead of focusing on economies of scale, the train addresses the need of single / few dedicated clients (economies of scope)

- The 45-container-long block train arrived to Małaszewicze, Poland on 8th March 2021, 10 days after its departure from Hefei, China. The train carried a total of 45 high cube containers.
- "Rail increases supply chain flexibility for our customers, offering a reliable and scalable mode of transportation. This first block train for Amica shows that it does not only achieves reliable lead times, but also provides customers with improved cargo visibility through GPS tracking," shared Justyna Barycza, Customer Experience Manager and Poland Country Representative at Maersk.
- A.P. Moller - Maersk's China Rail volume has increased significantly between 2020 and 2021 as they are significantly less costly than air and has become a trustful solution in COVID times.
- Maersk has completed its first block train for Amica from China to Poland's border, reducing from 43 days to 10 days the transit time.

A year of covid-19 already disrupted the container transport system



The imbalance is most severe on Trans-Pacific trade but impacts other major trade lanes in the world

Compiled on basis of various sources

The event triggers some questions on the future of container shipping

From a shipping perspective:

- Above all, what (combination of) factors caused the Ever Given to get grounded?
- What will be the outcome of the liability claims raised against shipowners for accidents with megaships, e.g. Ever Given, MSC Zoe?
- When will maritime transport be back to normal in terms of price and service levels (reliable, frequency, predictability)?
- What needs to be done in terms of nautical safety of the Suez Canal to provide mega container vessels a safe passage?
- How resilient is the global trading and transport system against disruptions?
- What can be the value of network simulation techniques to anticipate on such disruptive events at the chokepoints of the global transport system?

From a port and hinterland perspective:

- What will happen with the ever-increasing economies of scale in shipping?
- Will container liner operators continue to order bigger ships, knowing that the limitations of ports and canals have been reached?
- To what extent are port authorities inclined take a more directive approach toward collaboration with port operators?
- To what extent will authorities of canals and riverine ports in the world have to take infrastructural precautions (such as wind shields) but also restrictions to prevents such accidents from happening in the future?

Erasmus Centre for Urban, Port and Transport Economics

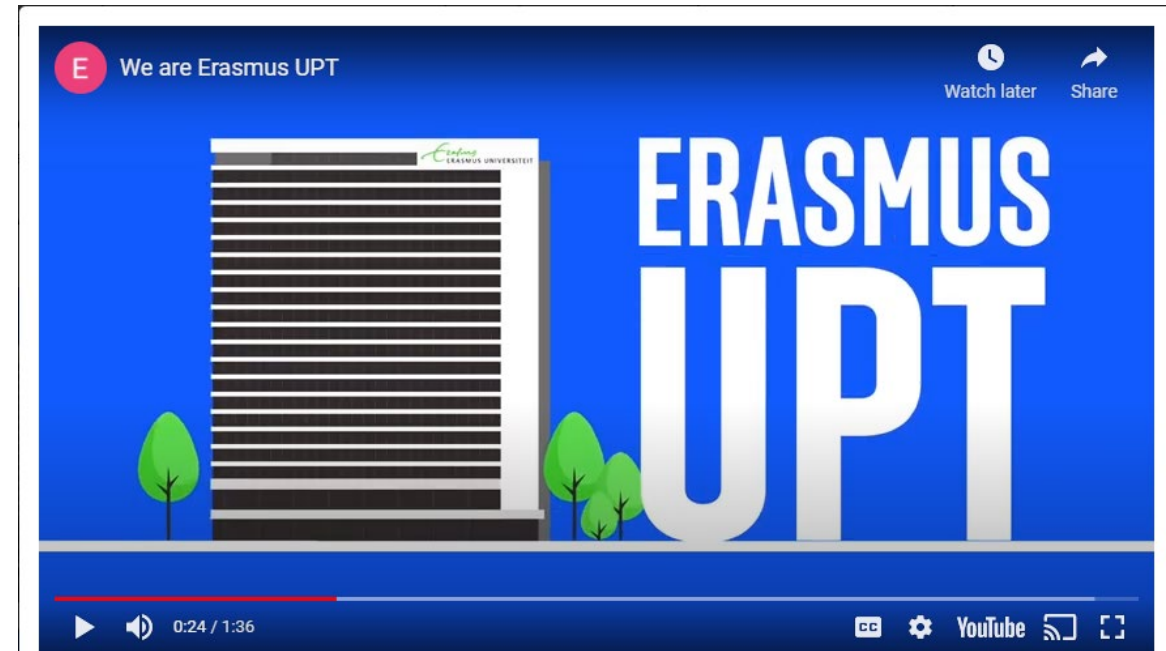
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Contact Maurice Jansen for any of your inquiries:
T. +31 6 81016678 / E. M.Jansen@ese.eur.nl
www.eur.nl/upt

Further reading

This presentation is compiled only for educational purposes at Erasmus University Rotterdam. News articles which were used for this presentation can be found in the Flipboard Magazine '[Maritime Logistics](#)' for further reading.



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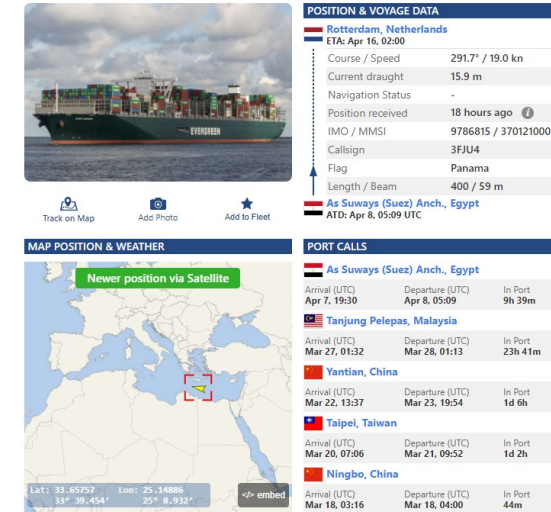
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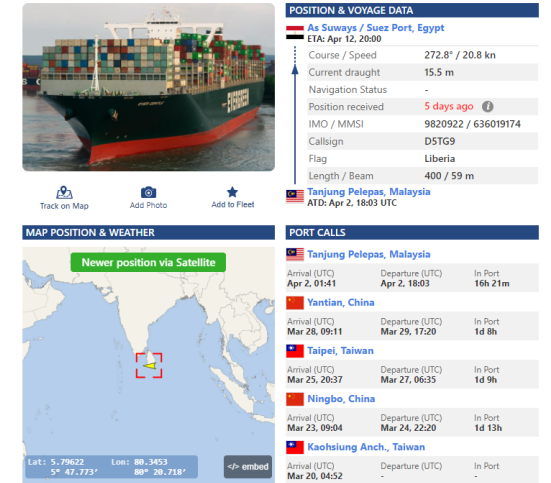
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Ever Given's sister ships' locations

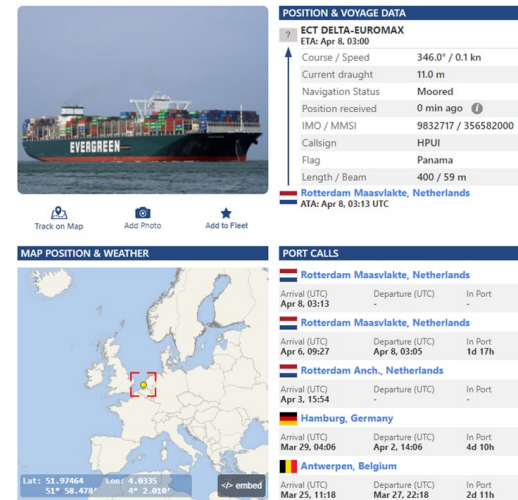
The vessel **EVER GENIUS** (IMO: 9786815, MMSI 370121000) is a Container Ship built in 2018 (3 years old) and currently sailing under the flag of **Panama**.



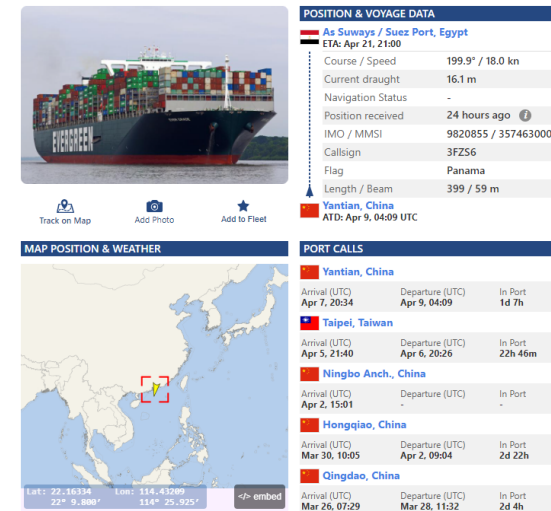
The vessel **EVER GENTLE** (IMO: 9820922, MMSI 636019174) is a Container Ship built in 2019 (2 years old) and currently sailing under the flag of **Liberia**.



The vessel **EVER GOVERN** (IMO: 9832717, MMSI 356582000) is a Container Ship built in 2019 (2 years old) and currently sailing under the flag of **Panama**.



The vessel **EVER GRADE** (IMO: 9820855, MMSI 357463000) is a Container Ship built in 2019 (2 years old) and currently sailing under the flag of **Panama**.



The vessel **EVER GLORY** (IMO: 9786839, MMSI 636019234) is a Container Ship built in 2019 (2 years old) and currently sailing under the flag of **Liberia**.



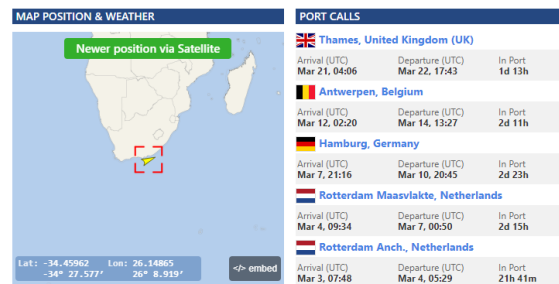
The current position of **HMM STOCKHOLM** is at South Africa (coordinates 34.48675 S / 18.2861 E) reported 6 days ago by AIS. The vessel is en route to , sailing at a speed of 17.9 knots and expected to arrive there on **Apr 22, 02:00**.

The vessel **HMM STOCKHOLM** (IMO: 9868352, MMSI 351127000) is a Container Ship built in 2020 (1 year old) and currently sailing under the flag of **Panama**.



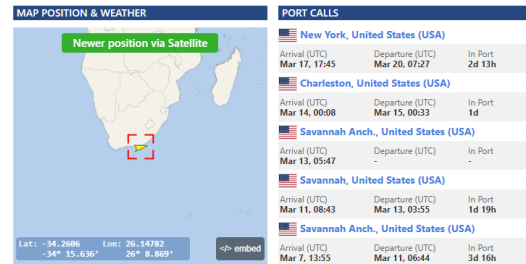
The current position of **HMM ROTTERDAM** is at South Africa (coordinates 34.45962 S / 16.14865 E) reported 2 days ago by AIS. The vessel is en route to , sailing at a speed of 14.7 knots and expected to arrive there on **Apr 20, 04:00**.

The vessel **HMM ROTTERDAM** (IMO: 9868338, MMSI 351246000) is a Container Ship built in 2020 (1 year old) and currently sailing under the flag of **Panama**.



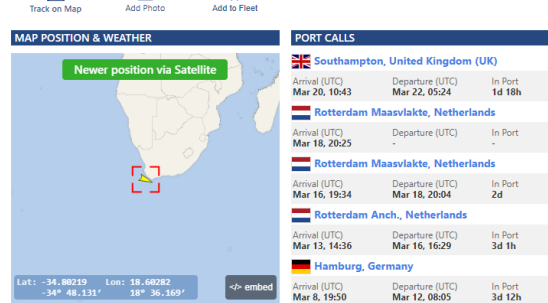
The current position of **ONE MUNCHEN** is at South Africa (coordinates 34.2606 S / 26.14782 E) reported 2 days ago by AIS. The vessel is en route to , sailing at a speed of 19.4 knots and expected to arrive there on **Apr 19, 07:00**.

The vessel **ONE MUNCHEN** (IMO: 9706750, MMSI 373911000) is a Container Ship built in 2015 (6 years old) and currently sailing under the flag of **Panama**.



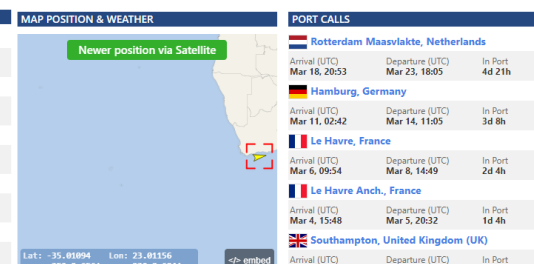
The current position of **HYUNDAI PRESTIGE** is at South Africa (coordinates 34.80219 S / 18.60282 E) reported 3 days ago by AIS. The vessel is en route to , sailing at a speed of 17.9 knots and expected to arrive there on **Apr 21, 07:00**.

The vessel **HYUNDAI PRESTIGE** (IMO: 9625528, MMSI 636015806) is a Container Ship built in 2013 (8 years old) and currently sailing under the flag of **Liberia**.



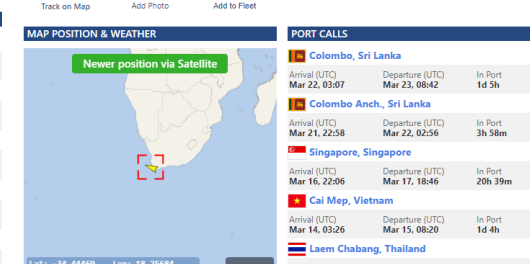
The current position of **HMM DUBLIN** is at South Africa (coordinates 35.01094 S / 23.01156 E) reported 45 hours ago by AIS. The vessel is en route to , sailing at a speed of 18.3 knots and expected to arrive there on **Apr 21, 03:00**.

The vessel **HMM DUBLIN** (IMO: 9863314, MMSI 356429000) is a Container Ship built in 2020 (1 year old) and currently sailing under the flag of **Panama**.



The current position of **ONE MARVEL** is at South Africa (coordinates 34.44469 S / 18.25684 E) reported 6 days ago by AIS. The vessel is en route to , sailing at a speed of 18.3 knots and expected to arrive there on **Apr 20, 08:00**.

The vessel **ONE MARVEL** (IMO: 9475612, MMSI 538003993) is a Container Ship built in 2010 (11 years old) and currently sailing under the flag of **Marshall Islands**.



Multiple container ships are rerouting to the Cape of Good Hope to avoid the logjam created by the Ever Given blocking the Suez Canal, according to carriers and the ship tracking service Marine Traffic.