

# Fact sheet large cruise ships to Passenger Terminal Amsterdam

Port of Amsterdam  
Amsterdam-IJmond Pilot Organization

# 2009



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This fact sheet provides information on the passage of large cruise ships between IJmuiden Approach and Passenger Terminal Amsterdam.

The maximum dimensions of the cruise vessels referred to in this fact sheet are length: 340.0 meters, beam: 39.0 meters and draught: 8.80 meters.

Within operational safety limits set by Port of Amsterdam and the Pilot Organization, the passage from IJmuiden Approach to Passenger Terminal Amsterdam with these ships will be possible.

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### **1. Request**

Port of Amsterdam and the Amsterdam-IJmond Pilot Organization have received a request from Passenger Terminal Amsterdam to give their opinion on the accessibility of the terminal for large cruise ships. A study has been made based on research and on simulator tests with a cruise ship model of: length: 340 meters, beam: 39.0 meters and draught: 8.80 meters.

At the same time, the fact sheet for large cruise ships to Passenger Terminal Amsterdam has been revised. Due to dredging operations in the port of Amsterdam, Passenger Terminal Amsterdam now has better accessibility for large cruise ships, the latest data are incorporated in this revision of the fact sheet.

### **2. Summary**

As long as operational safety limits set by Port of Amsterdam and the Amsterdam-IJmond Pilot Organization are adhered to, the arrival and departure of cruise ships of above mentioned dimensions to Passenger Terminal Amsterdam will be possible.

On recommendation of the Pilot Organization, in late 2008 and early 2009 Port of Amsterdam carried out extensive dredging operations, during which the fairway 'Het IJ', turning basin 'IJ haven' and turning basin 'Sumatrakade' were widened and deepened.

### **3. Nautical aspects**

Nautical aspects of entering the IJmuiden breakwaters, the locks, the North Sea Canal (Noordzeekanaal) and Passenger Terminal Amsterdam will include the assessment of the traffic situation in relation to wind, weather and - for entering the breakwaters - the tidal current. No problems are expected, since large cruise ships have good manoeuvring characteristics and restrictions for current or wind will generally not be necessary, as long as the ship's speed can be maintained or as long as the ship's bow- or stern thrusters (azipods) are powerful enough to manoeuvre at slow speed or to maintain position.

The fairway alterations that have been carried out were based on simulator tests for large cruise ships to Passenger Terminal Amsterdam. This research was carried out by Port of Amsterdam in cooperation with the Amsterdam-IJmond Pilot Organization in 2005 and 2006. March 2009 new simulator tests with a cruise ship model of 340 meters length, based on the new dredged situation, have been successful.

One of the main concerns to undertake these simulator runs was testing the effectiveness of bow- and stern thrusters or azipods, in order to keep the ship on a straight track, and to accurately control ship movements when navigating within limited manoeuvring space along the NAP<sup>1)</sup>-10.50 meters deep fairway 'Het IJ'. On the 340 meters ships model, used in the simulator, thrusters and azipods have proven to be effective up to a cross wind of 10 m/s (Beaufort scale 5) on the lateral surface of the cruise ship and squat and bank-effects were well within safe limits.

#### 4. IJmuiden

All ships bound for IJmuiden and Amsterdam first have to enter the port via the IJmuiden breakwaters; the entrance is 500 meters wide. Inner breakwaters divide the entrance into 'Nieuwe Buitenhaven' and 'Oude Buitenhaven'. All shipping in the Amsterdam North Sea Canal area, including the port of Amsterdam, is regulated by the Amsterdam vessel traffic service.

The main leading line, used by all ships, has a range of more than 12 nautical miles, and marks the last part of the 25 miles long approach through the deep water route, a buoyed channel to IJmuiden. Radar information and radar assistance are available.

#### 5. Locks

The lock at IJmuiden, operated and managed by Port of Amsterdam, gives access to the North Sea Canal. According to the Inland Navigations Police Regulations, all ships with dimensions exceeding length 325 meters, or beam 42 meters, or draught 13.10 meters, need an exemption for the passage of the locks and North Sea Canal. This settlement normally is an agent task. The competent authority normally grants this exemption.

The North Sea Canal leads up to Passenger Terminal Amsterdam, and other commercial harbour basins in the port of Amsterdam. It forms part of the network that has a direct connection with Germany via the river Rhine. Distance from the pilot station to the locks is 8 nautical miles (14.80 kilometers) and takes approximately 1 hour and 15 minutes. The locking process will take about 30 minutes.

Dimensions	Yacht lock	South lock	Middle lock	North lock
length	110 meters	120 meters	200 meters	400 meters
breadth	11 meters	18 meters	25 meters	50 meters (47 meters between fenders)
depth <sup>1)</sup>	NAP-3.75 meters	NAP-8.0 meters	NAP-10.0 meters	NAP-15.0 meters

<sup>1)</sup>NAP: the Normaal Amsterdam Peil (NAP), is the reference level in the Netherlands which heights and depts are related to. The NAP level matches with mean sea level. (MSL)

#### 6. North Sea Canal.

The dept of the North Sea Canal, up to the Mercuriushaven (bulk- and grain terminal) is NAP-15.50 meters and kept at a constant water level; there are no currents and tides. The actual water level on the North sea Canal and Amsterdam port basins, related to the NAP, is 0.45 metres below NAP level. (NAP-0.45 meters) In practice this implies a dept of the North Sea Canal of 15.05 meters, fairway 'Het IJ' and turning basins of 10.05 meters.

Between the banks the North Sea Canal is 270 meters wide. From the Mercuriushaven to Passenger Terminal Amsterdam the fairway follows the fairway 'Het IJ' and has several turns; this buoyed channel is 1.5 nautical miles (2.70 kilometers) long, the width at a depth of 10.00 meters varies between 118 meters and 158 meters.

The distance along the North Sea Canal, from the locks to Passenger Terminal Amsterdam, is 13 nautical miles (24.10 kilometers) and takes approximately 2 hours and 15 minutes.

Because of the official speed regulation on the North Sea Canal, any delays encountered at earlier stages of the journey, cannot be compensated at a later stage by transiting the North Sea Canal at a higher speed.

### **7. Turning Basins**

In the port of Amsterdam the North Sea Canal gradually narrows and enters the fairway 'Het IJ'. In this area the fairway and turning basins have been dredged and widened in late 2008 and early 2009. An increased UKC and a wider fairway reduce squat and bank-effects for large cruise ships and create a safer passage. At the same time the widened fairway 'Het IJ' provides a safer separation between seagoing ships and inland barges and small craft.

Near Passenger Terminal Amsterdam two large turning basins are laid out:

- turning basin 'IJ-haven' opposite the Passenger Terminal Amsterdam, with a diameter of **270** meters at an actual depth of 10.05 meters;
- turning basin 'Sumatrakade' opposite the Sumatrakade and near the berth, with a diameter of **375** meters at an actual depth of 10.05 meters.

In case of technical failure of the bow- or stern thrusters or lack of lateral propellers there is a possibility to use tug assistance to turn in the turning basins 'IJ-haven' or 'Sumatrakade'. However, safety limits should be taken into account at all times.

### **8. PTA Arrival manoeuvre**

Usually, cruise ships berth port side to, bow facing west. Upon arrival, two options are available: use the turning basin 'IJ-haven' or the turning basin 'Sumatrakade' more to the east. In either case the best manoeuvre is considered to be the one turning the ship to port, with the bow turning to the north and the stern turning closing in to the 'Sumatrakade' (sufficient deep water). Before that, the ship will have to be accurately positioned into the centre of the turning basin and then stopped, before the turning-manoeuve can be started. The use of NMS or accurate DGPS-instrument is recommended.

Because during this manoeuvre the ship will completely close off the fairway 'Het IJ'. Vessel traffic control will be carried out by Port of Amsterdam vessel traffic service. At the end of the manoeuvre, the ship will have been brought safely alongside Passenger Terminal Amsterdam.

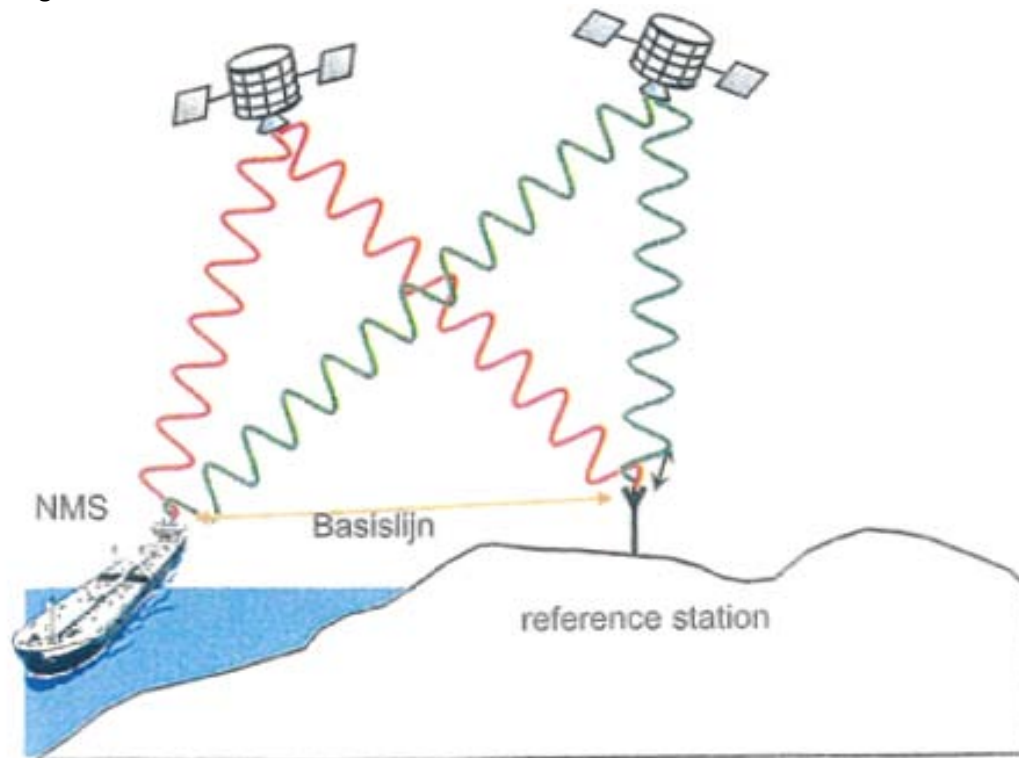
### **9. PTA Departure manoeuvre:**

Since the passenger ships will mostly be berthed bow facing west, the departure manoeuvre is considered to be quite easy.

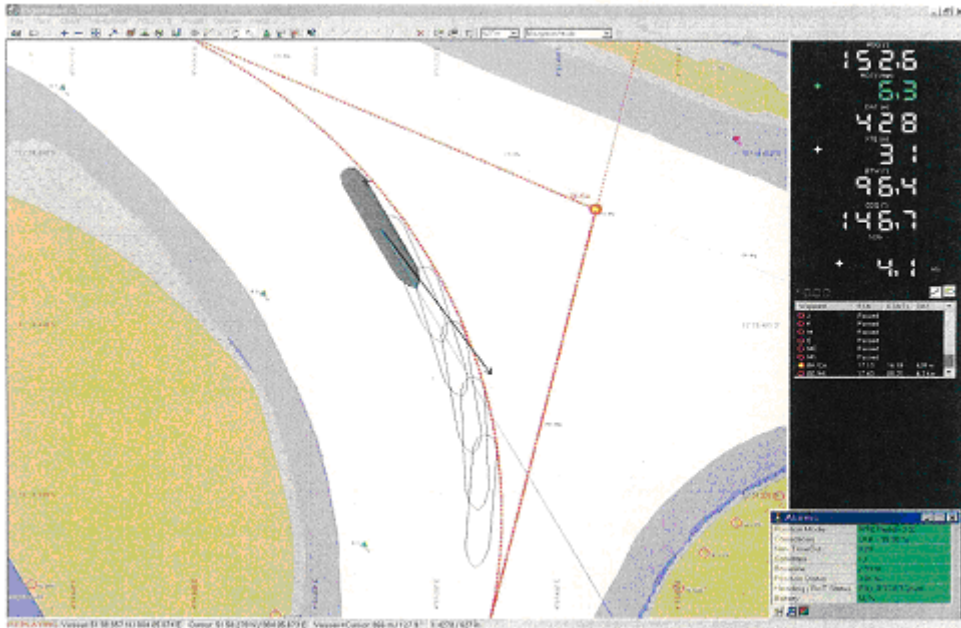
### **10. Navigator Marginal Ships:**

Normal GPS receivers are known to have slight position inaccuracies < 5 meters due to atmospheric disturbance, ship's structures, clock-error, and interference from other radio signals. The pilots use

the precise navigation system Navigator Marginal Ships (NMS) for navigation and docking. In most countries this system is known as a Portable Pilot Unit (PPU). This is a portable RTK-GPS receiver with 2 antennas and a local reference station (RTK-station) based on Real Time Kinematics. Via radio signals the RTK-station, placed in a precise geodetic position on land, has contact with the NMS receivers on board. The RTK-station checks GPS signals with its own reference position and transmits the corrected position to the NMS. This system has an accuracy  $< 0.04$  meters and has proven to be a reliable navigational aid.



In the future real-time data/information will be sent to the NMS, such as VTS-data (Radar, AIS), Meteo- and Hydro information. The NMS is certified by the Dutch Ministry of Transport for the use as a precise navigational instrument for deep draught ships (draught  $\geq 14.10$  meters and  $\leq 17.80$  meters) when piloted through the 25 miles (43 kilometers) long deep draught channel to IJmuiden.



The NMS display is based on a certified Electronic Nautical Chart (ENC) with an adjustable scale on which the shape of the vessel is projected. The accurate position of NMS-antennas guarantees the exact ship's position, ground course and ground speed, on the ENC. Continuous GPS/RTK data are translated into ship's longitudinal and transverse movements and can be visualised with vectors and predictions of future positions up to 1-5 minutes in advance.

### 11. Wind and weather

Prevailing winds in the Netherlands during the year are from SW to W, average 4-6 Beaufort. The berths at Passenger Terminal Amsterdam are in an East-West direction, so on most occasions ships are moored with bow or stern in the wind. Summer conditions are generally better than winter conditions.

Detailed predictions of wind, wind direction, wind gusts, showers and visibility are on-line available via the national weather service (KNMI); moreover, the official Hydro Meteo Centre North Sea (HMCN) provides specialised forecasts for deep draught ships. Via weather news or Schiphol Airport a detailed local forecast for the North Sea Canal area can be obtained. Port of Amsterdam will be installing an accurate wind and visibility reporting system in 2010. Via wireless connection this information will also be available to the pilot on board the ship.

## 12. ETA and ETD notifications

All ships with destination Amsterdam will have to pass through the IJmuiden locks upon arrival and departure. Lock planning is based on ship's ETA and ETD. For a smooth lock passage all ships have to adhere to the ETA and ETD notifications as stated by the Dutch Government.

ETA Notification			
Who	How	When	Remarks
All ships with a draught ≤14.10 and >8.00 m	<p>VTS Port of Amsterdam  tel: +31(0)20 5234778  fax: +31(0)20 5234800  email: <a href="mailto:pivts@portofamsterdam.nl">pivts@portofamsterdam.nl</a>  VHF: Traffic Center IJmuiden VHF-07</p> <p>Amsterdam Pilots  tel: +31(0)255 564500  fax: +31(0)255 532535  email: <a href="mailto:pilots.amsterdam@loodswezen.nl">pilots.amsterdam@loodswezen.nl</a></p>	<p><b>ETA-12 hours</b>  IJmuiden Racon buoy  (52°28.5'N04°23.7'E)</p> <p><b>ETA-6 hours</b>  IJmuiden Racon buoy  (52°28.5'N04°23.7'E)</p> <p><b>ETA-3 hours</b>  IJmuiden Racon buoy  (52°28.5'N04°23.7'E)</p> <p><b>ETA-1 hours</b>  IJmuiden Racon buoy  (52°28.5'N04°23.7'E)</p>	Deviations in ETA >30 minutes should be reported immediately
ETD and Shift Notifications			
Who	How	When	Remarks
all ships with draught ≤14.10 and ≥8.00 m	<p>VTS Port of Amsterdam  tel: +31(0)20 5234777  fax: +31(0)20 5234800  email: <a href="mailto:pivts@portofamsterdam.nl">pivts@portofamsterdam.nl</a>  VHF: corresponding VTS-channel</p> <p>Amsterdam Pilots  tel: +31(0)255 564500  fax: +31(0)255 532535  email: <a href="mailto:pilots.amsterdam@loodswezen.nl">pilots.amsterdam@loodswezen.nl</a></p>	<p><b>ETD-8 hours berth</b></p> <p><b>ETD-4 hours berth</b></p> <p><b>On ETD berth</b></p>	Deviations in ETD >30 minutes should be reported immediately

## 12. Overall conclusion

Based on simulator tests, arrivals and departures of cruise ships of dimensions: length: 340 meters, beam: 39.0 meters and draught: 8.80 meters, are possible within operational safety limits set by Port of Amsterdam and the Pilot Organization.

These operational safety limits include at least:

- to avoid delays: send **ETA or ETD** notifications well in advance for the planning process of the locks and also for the planning of qualified and well rested pilots;
- availability and evaluation of accurate and detailed **wind- and weather forecast**;
- ship's **manoeuvrability** in average hydro/meteo conditions (up to Beaufort 6) must be sufficient;
- the availability of **assisting tugs** in relation to infrastructure;
- use of pilot's **NMS-system** for navigating and docking;
- availability of ship's **D-GPS** system as a second main system;
- during manoeuvring into turning basins, good **communication with ships crew** for distances to the quays, as backup for precision GPS-systems;

- h. following condition may be **critical** for arrival and departure:
  - a. **Strong winds:** due to the exposed topographic situation on the North Sea Canal and the IJmuiden locks, in relation to large lateral wind surface of large cruise ships.

### **13. Ships simulator**

The Amsterdam-IJmond Pilot Organization have their own ship simulator, which they use to practice the passage from IJmuiden Approach to Passenger Terminal Amsterdam. Demonstrations of simulator runs can be given to masters of passenger ships.

### **14. Enclosures**

1. overview fairway 'Het IJ' , turning basins 'IJ-haven' and 'Sumatrakade';
2. updated ENC's;
3. prints of simulator runs.