Module 13

Modern Navigation Systems

Terrestrial and Marine Navigation Systems

Module 13C

Crossing the Atlantic

Summary of Module 13

- The simplification of the GPS and celestial algorithms to the 2-dimensional case is presented. But first, a few catch-up slides are included to elaborate further on concepts explored in earlier modules. The sub-module concludes with a brief introduction to hyperbolic radio-navigation systems. (13A)
- The basics of practical terrestrial and marine navigation will be introduced via a combination of slides, charts, and photographs that illustrate various important features. (13B)
- **The module includes a photo-documentary of the voyage of a commercial freighter from Bremerhaven, Germany to Newark, New Jersey in 1978, pre-GPS. (13C)**
- Students will continue presenting their final projects.

A “cruise” from Bremerhaven to Newark in June 1978

- The MS Roman Pazinski was a container ship with four officers, about 30 sailors, and 8 paying passengers.
- It was operated by Polish Ocean Lines. It has operated under numerous names, but is no longer in service.
- It was the subject of a lawsuit when it lost a container at sea (like the one Robert Redford sailed into at the beginning of the film “All is Lost”).
- Only the officers and two of the other passengers spoke English.
- No signage on the ship was in English; Polish was used throughout.

The route

- The ship started in Gdansk and traveled through the Keil Canal to Bremerhaven, where it stopped to take on cargo.
- It went through the English Channel to avoid hazardous waters.
- In a winter crossing, it would have taken a similar route, but much farther south in order to avoid icebergs.

Navigation

- For open ocean, the ship seemed to navigate based on a gyrocompass, autopilot, and wishful thinking.
  - There was often no one on the bridge.
  - GPS did not exist.
- For littoral navigation, Loran-C seems to have been used.
- For close-in navigation, buoys and visual landmarks were used.
- At New York, two harbor pilots boarded and took command of the ship.
  - The outer harbor pilot boarded outside the Verrezano Strait, and the inner pilot shortly after crossing under the Verrezano Bridge.
- A tug accompanied the ship and assisted with docking in the turning basin at the Newark Container Terminal.

The dress code

- Enroute, the crew and officers dressed like tourists, with appalling color combinations, jeans, and footwear ranging from tennis shoes to flip flops.
- In U.S. waters, the captain wore a full-dress uniform, and the harbor pilots business suits
- Crew members wore safety shoes and clothing suitable for wear while operating cranes and unloading containers.

Getting to Bremerhaven

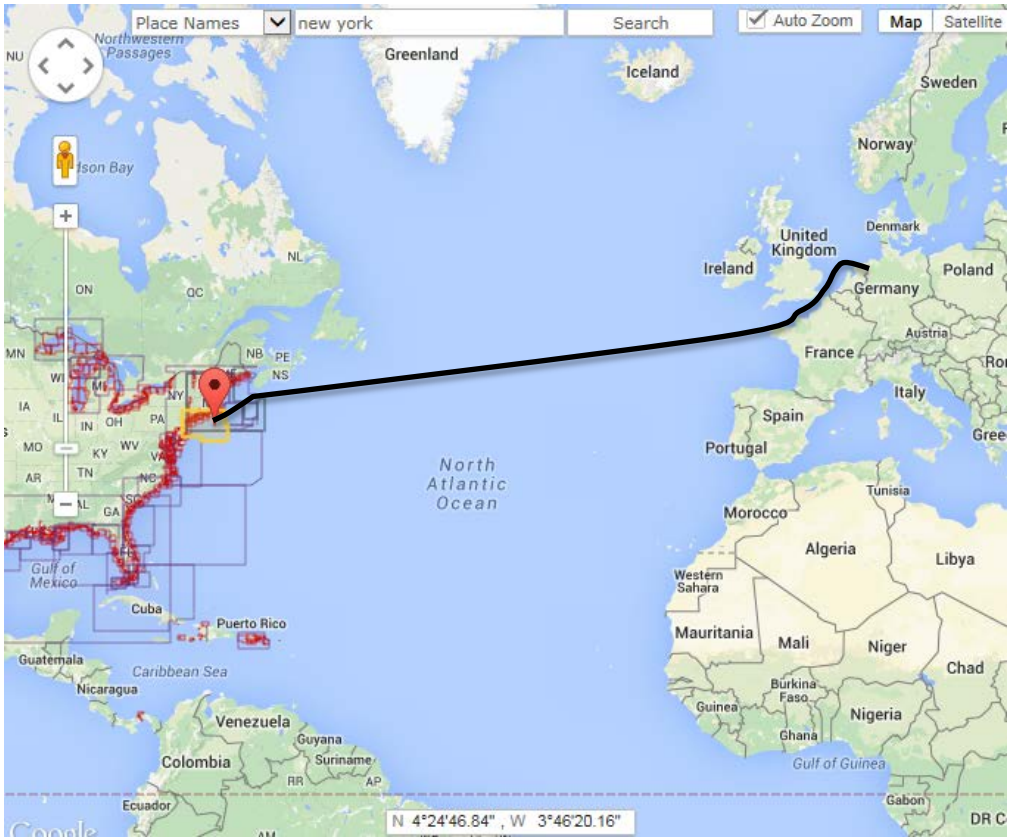
- Start at Cambridge, England
  - o Taxi to rail station
  - o Train to London
  - o Train to Harwich
  - o Ferry to Rotterdam
  - o Train to Bremen
  - o Train to Bremerhaven
  - o Taxi to container terminal

Getting from Newark to Bethesda, MD

- Taxi to Newark Airport from the container terminal
- Flight to DCA (now Reagan National)
- Get picked up at the curb by parents
- Drive home
- To quote the late singer Harry Chapin,

  “It's got to be the going, not the getting there that's good”

Chart of the North Atlantic Ocean

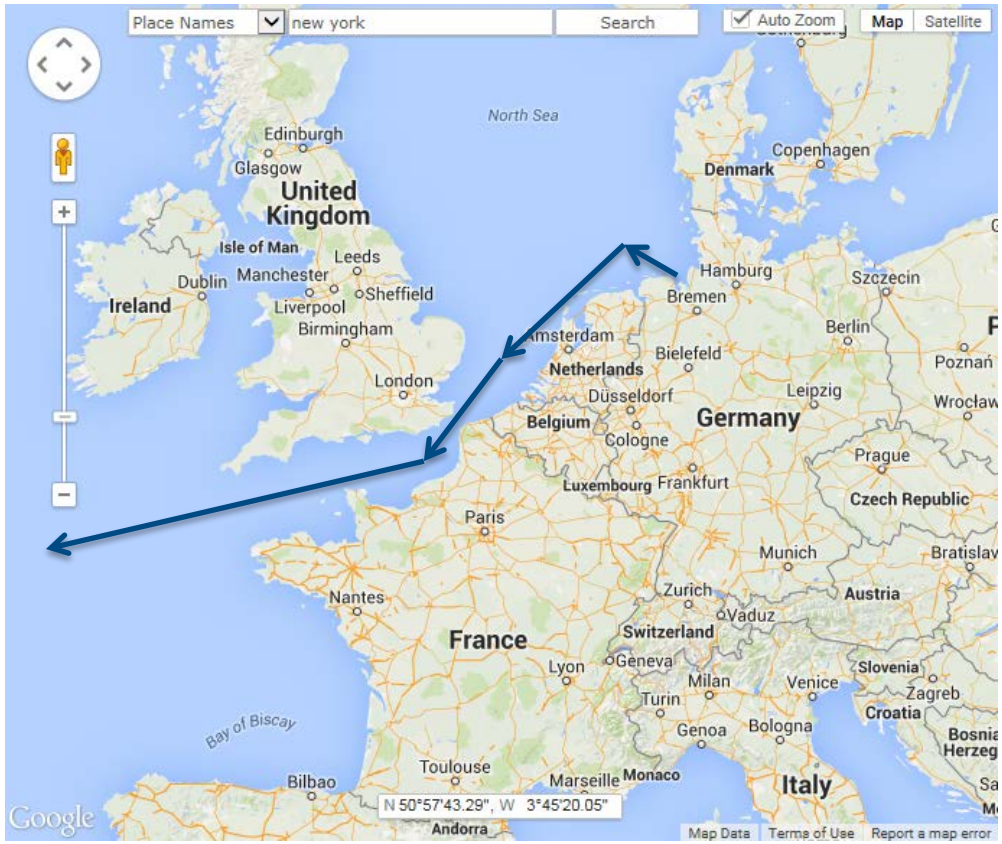


The solid line shows the approximate route taken from Bremerhaven, Germany to Newark, New Jersey in a 5 ½ day Atlantic crossing in June 1978.

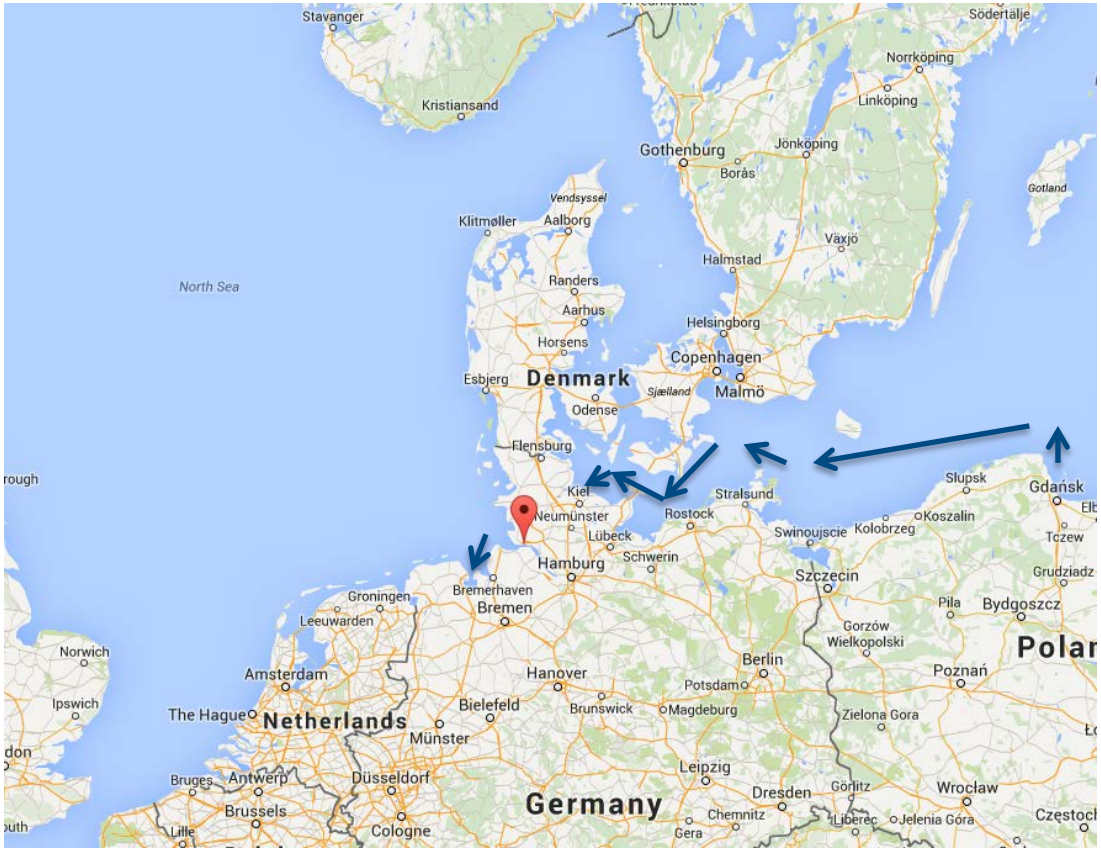
The vessel taken was the container ship
MS Roman Pazinski,
operated by Polish Ocean Lines.

The circles on the east coast of the U.S. might be Loran-C stations. (TBD)

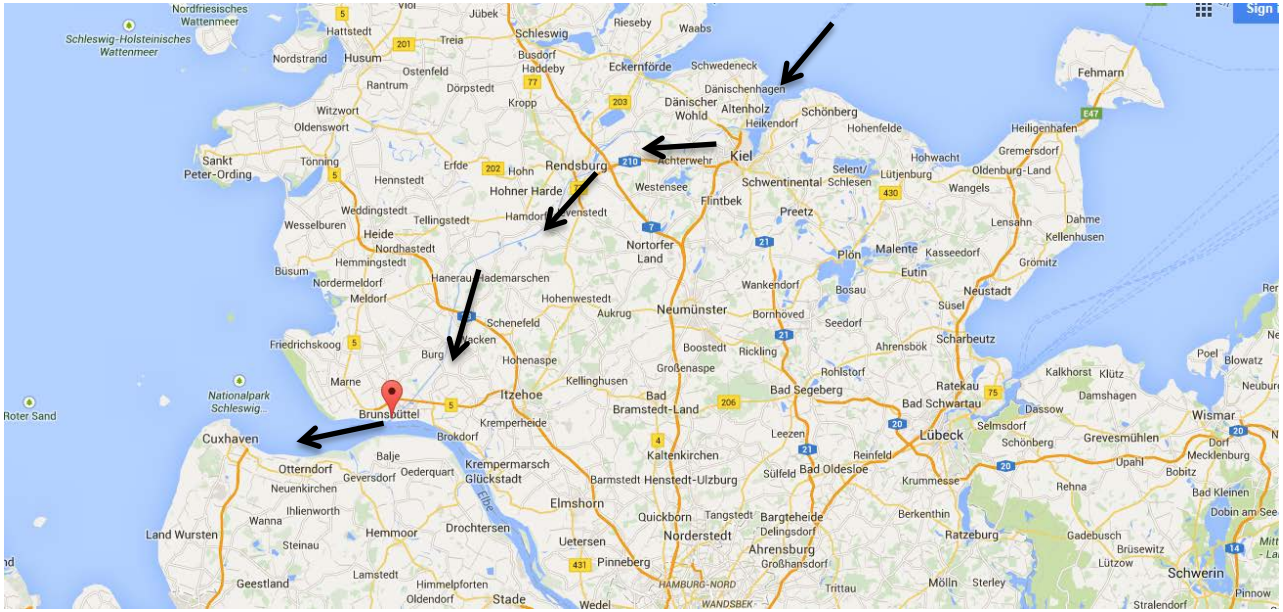
Through the English Channel



Gdansk to Keil to Bremerhaven



The Keil Canal



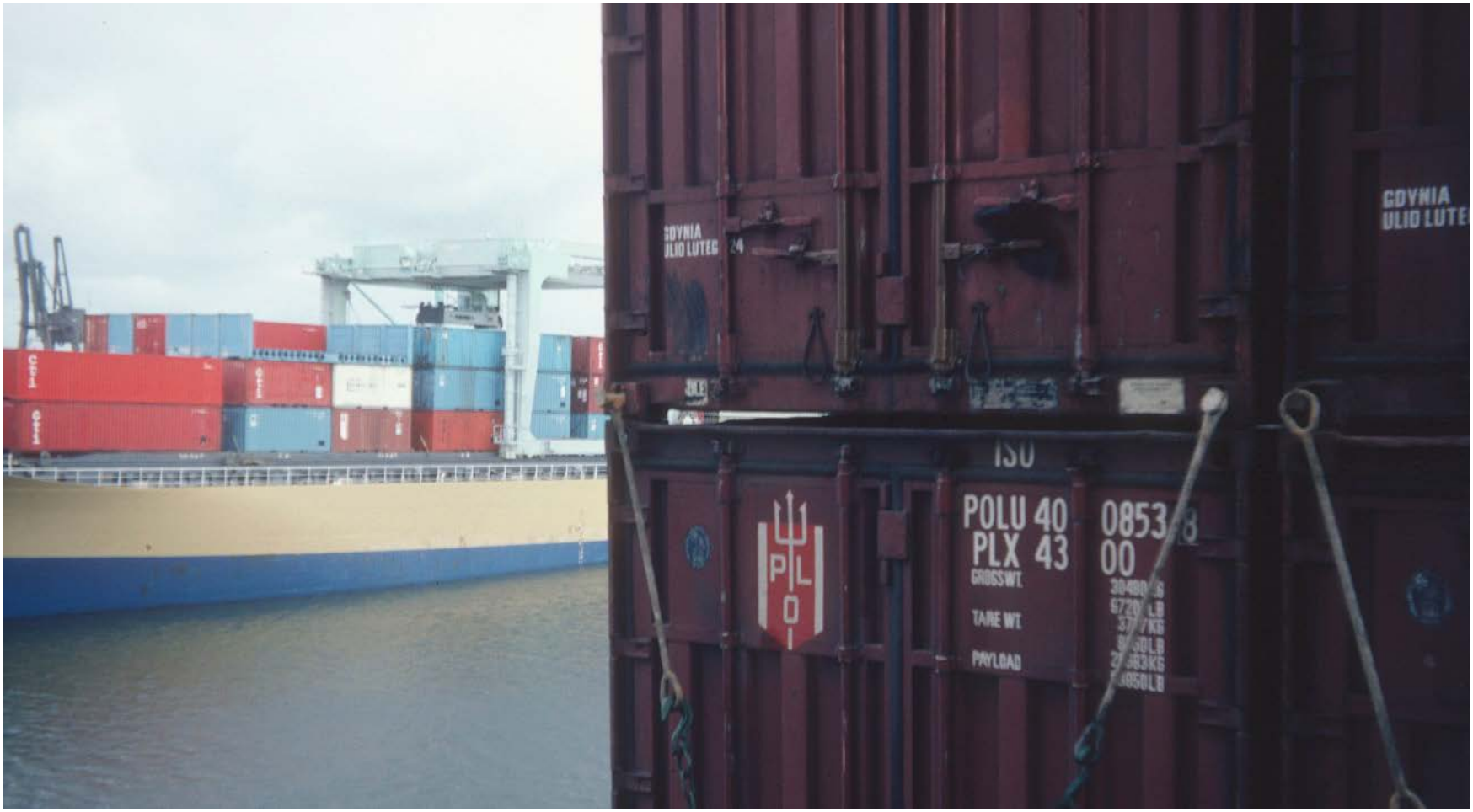
First view of the ship

Quay-side

“Taking-on” containers

Bremerhaven Container Terminal

View from the stateroom



Cross-traffic

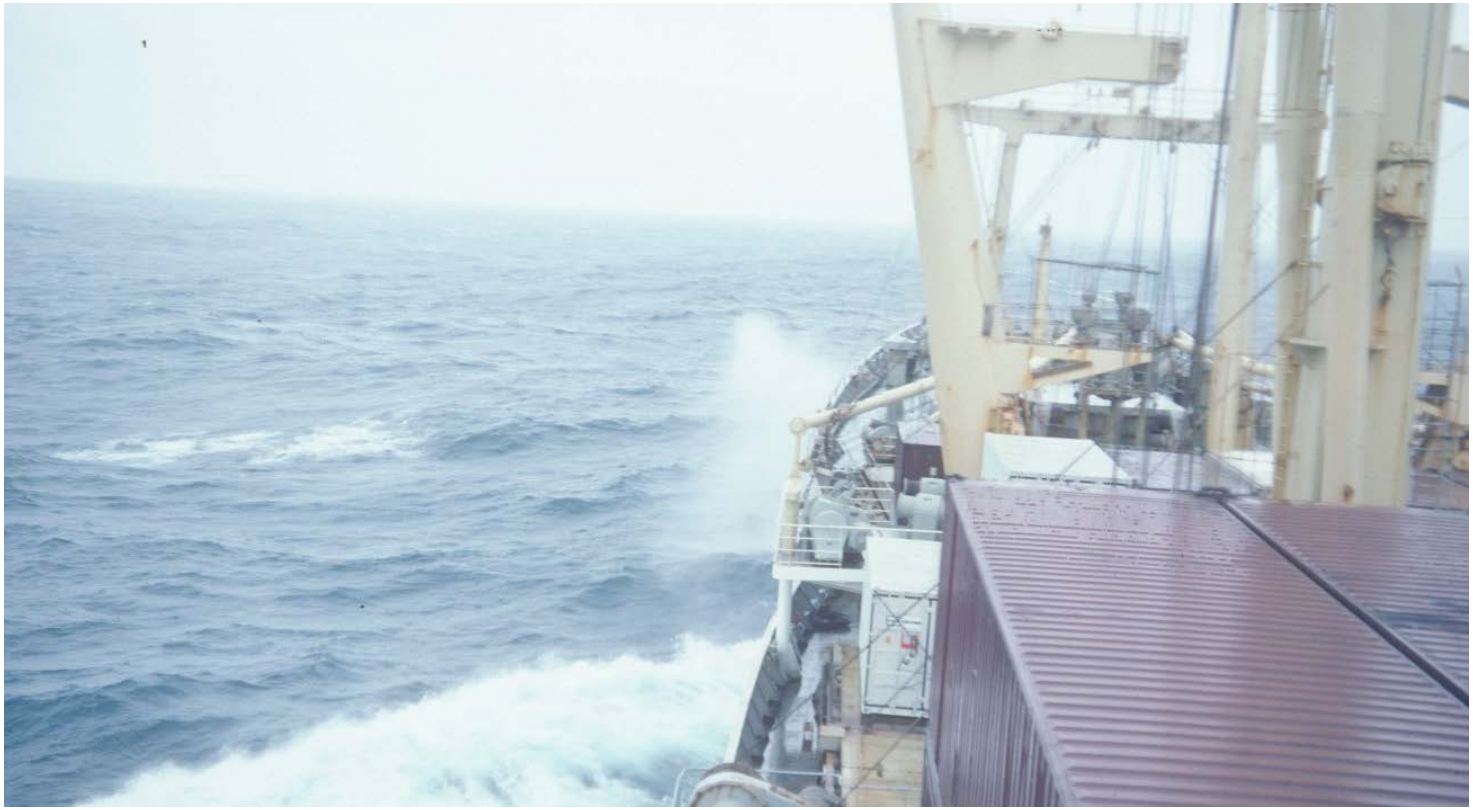
North Sea oil rig

Cross-channel hovercraft

View from outside the bridge

Weather at sea

Beginning of rough seas



Why people fly to and from Europe

Twilight haze

Why people don't fly to/from Europe

The difference between pitch and roll

More roll

Several days of swells

Period of a swell was about 30 seconds

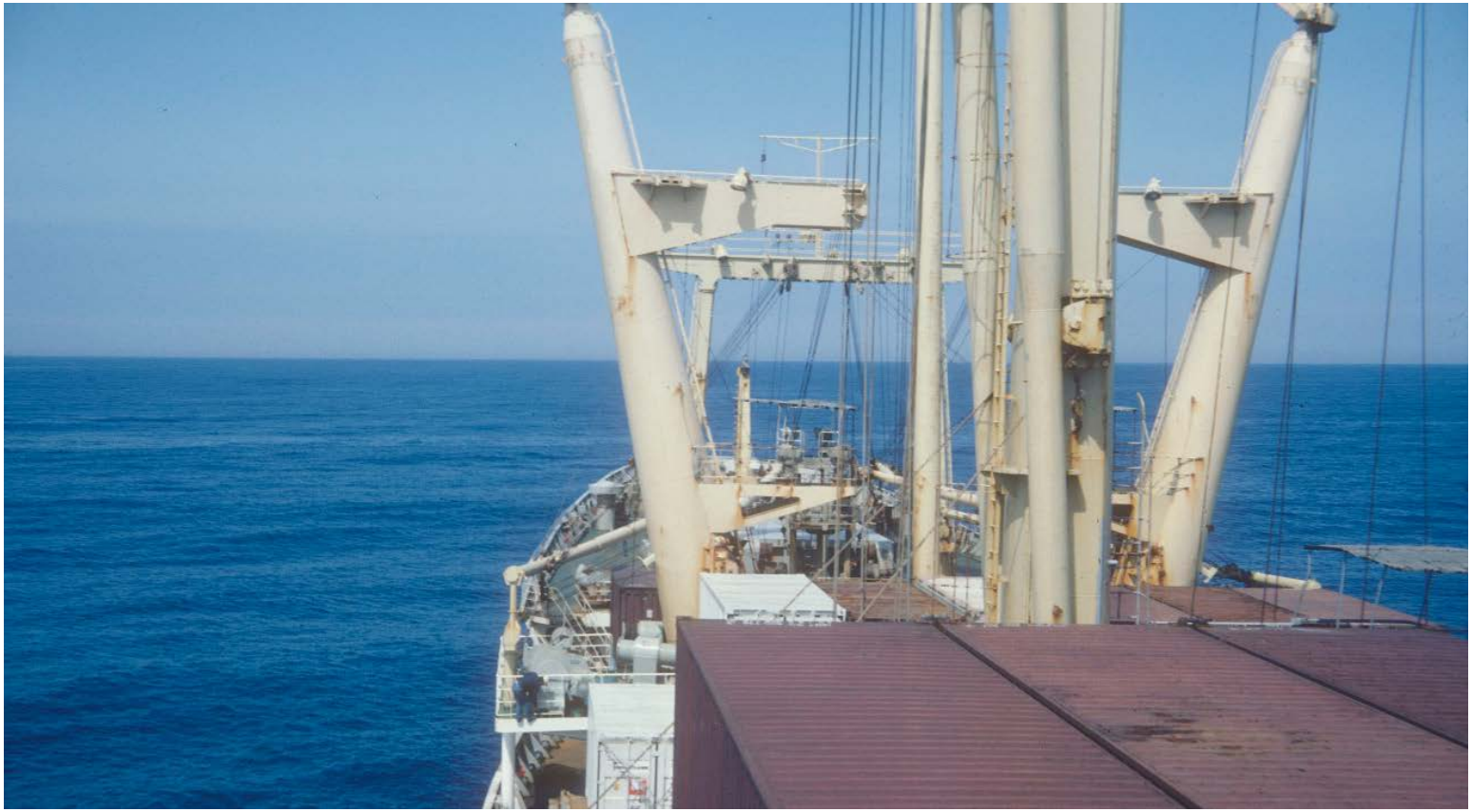
View from the Bridge

Inside the bridge

Sunset from the bridge

Approaching the U.S. Note the pelorus on the flying bridge

Calm seas mid-ocean – note how clear the air is



Fog – radar becomes essential for avoiding collisions

More fog

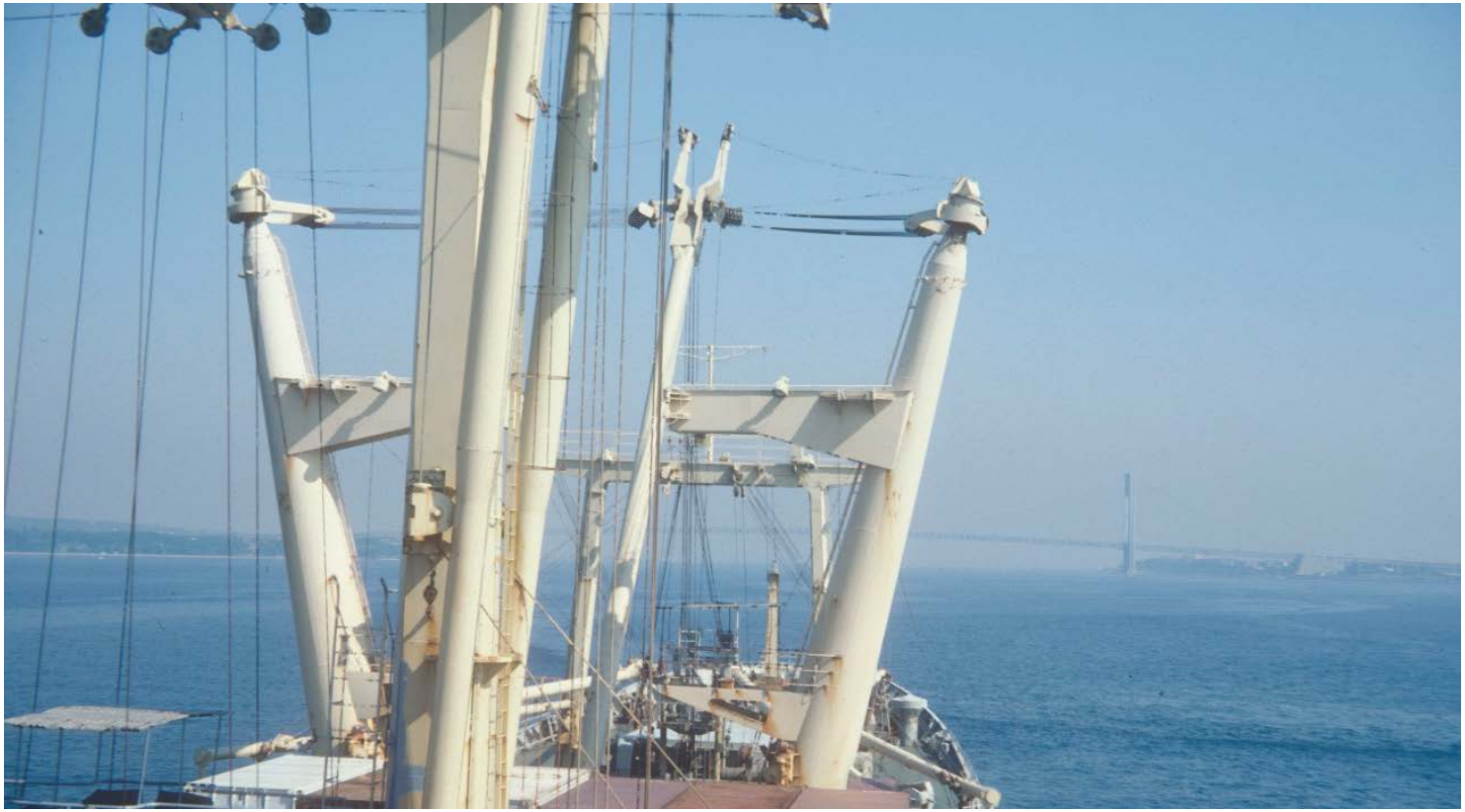
View astern

Rain squalls

The captain, preparing for arrival in the U.S.

The outer harbor pilot, arriving onboard

Approaching New York Harbor – note the smog in 1978



Brooklyn, circa *Saturday Night Fever*

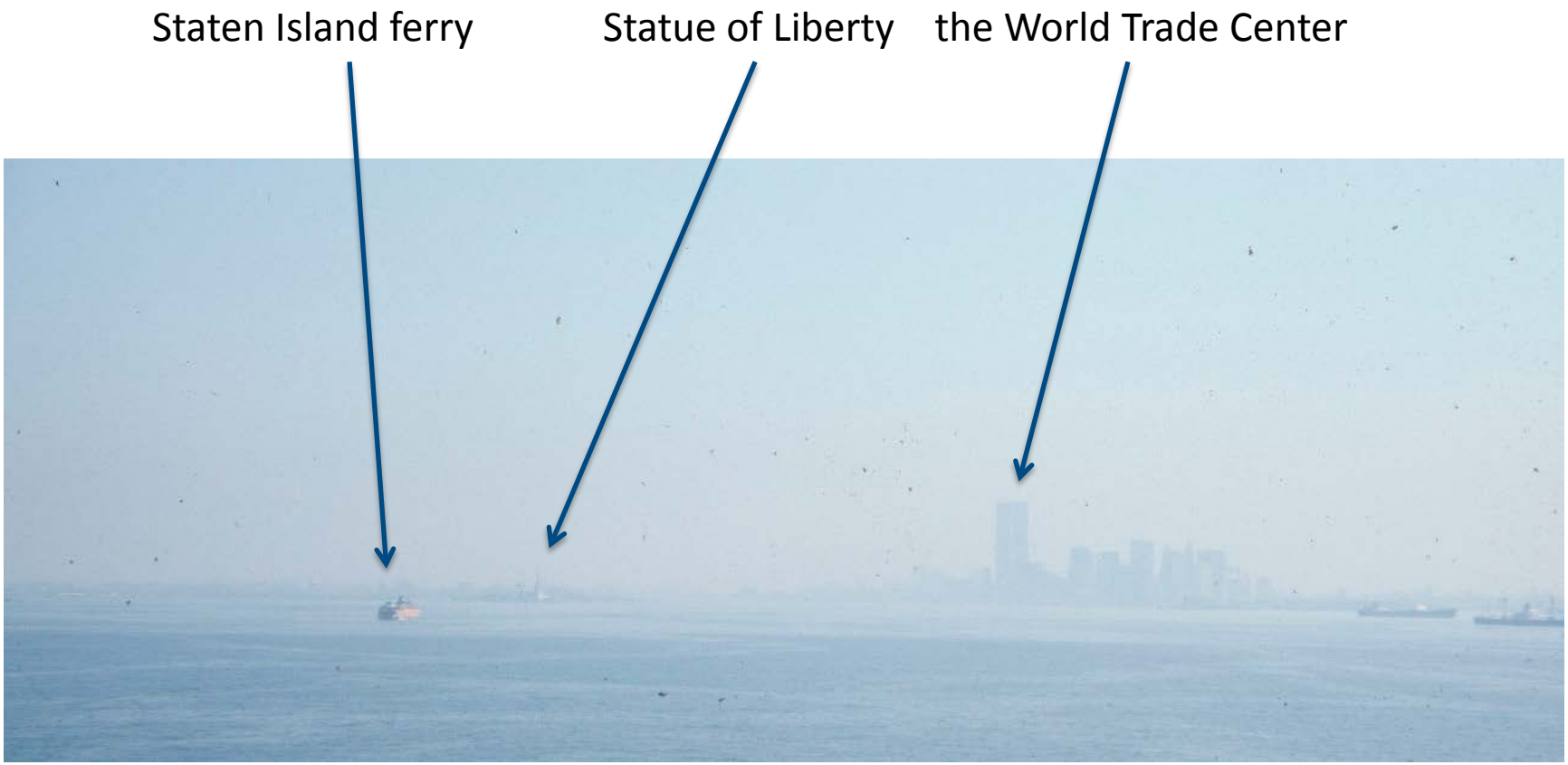
Staten Island

Arrival of the support tug and the inner harbor pilot – note the ladder

Freighters now have armed guards to prevent this from happening in the open seas, a problem first confronted by Thomas Jefferson

Manhattan in smog, pre the Clean Air Act

New York Harbor



Staten Island Ferry terminal

Begin to follow buoys – “right on red return”

New Jersey

Bayonne Bridge

Tug escort under the railroad lift bridge

It is customary to fly the flag of the host country

Approaching the turning basin with Newark International Airport in the background

Arrival at Newark

The unloading process at Newark

A Polish Ocean Lines sister ship

Newark Liberty Airport

A crew member on the bridge

Assignment 13-3

1. Identify what the round forward-facing window on the bridge of the freighter is and what it does.

End of Mod 13C