NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Washington, D.C. 20594

March 8, 2007

Voyage Data Recorder

Group Chairman's Factual Report
by Dennis R. Grossi

A. ACCIDENT

Location:	Bayonne NJ
Date:	April 15, 2006
Time:	4:21 local time
Vessel:	Container Ship – New Delhi Express (IMO #9301770)
NTSB Number:	DCA06MF013

B. GROUP

Audio Only
Captain Robert F. Flannery Jr, President Metro Pilots
Captain Dennis M Wheeler, President New York Sandy Hook Pilots Assoc.
Captain Rob Jones, Office of Marine Safety, NTSB

C. SUMMARY

On April 15, 2006, the container ship New Delhi Express ran aground just west of the Bayonne Bridge while maneuvering west bound through the Bergen Point West Reach. There were no injured, but the hull was breached and the vessel took on water resulting in a starboard list. Because of the list, the vessel grounded shortly after the initial impact. The vessel remained grounded for around 2 hours until it floated free on the rising tide. Cost of the hull damage was 1.5 million.

The vessel was fitted with a Samsung Simplified Voyage Data Recorder (VDR), in compliance with IMO requirements. The NTSB investigator in charge (IIC) assigned to this accident received, along with the U.S. Coast Guard, a copy of the 12-hours of VDR data downloaded from the hardened voyage recorder (HVR) memory. The original recording remained with the ship.

The track time history derived from the VDR latitude and longitude data from 18:12:40 to grounding position at 18:24:40 was overlaid on the image of the navigation chart[1] aboard the vessel at the time of the accident (see Figure 1). A dimensionally correct

[1] United States-East Coast, New York, Arthur Kill Van Kull and Newark Bay, Admiralty chart 4357, 4th ed. [Taunton, United Kingdom: United Kingdom Hydrography Office, June 2005]

model of the New Delhi Express was used to depict the location of the vessel at the times indicated. The approximate position of the dredging ship “Fractor” and the highlighted position of Buoy-14 shown in Figure 1 did not appear on the charts available to the crew. The position of the “Fractor” was approximated from an image of the automated identification system (AIS) display generated by Coast Guard vessel traffic service, New York Harbor from data recorded at the time of the accident.

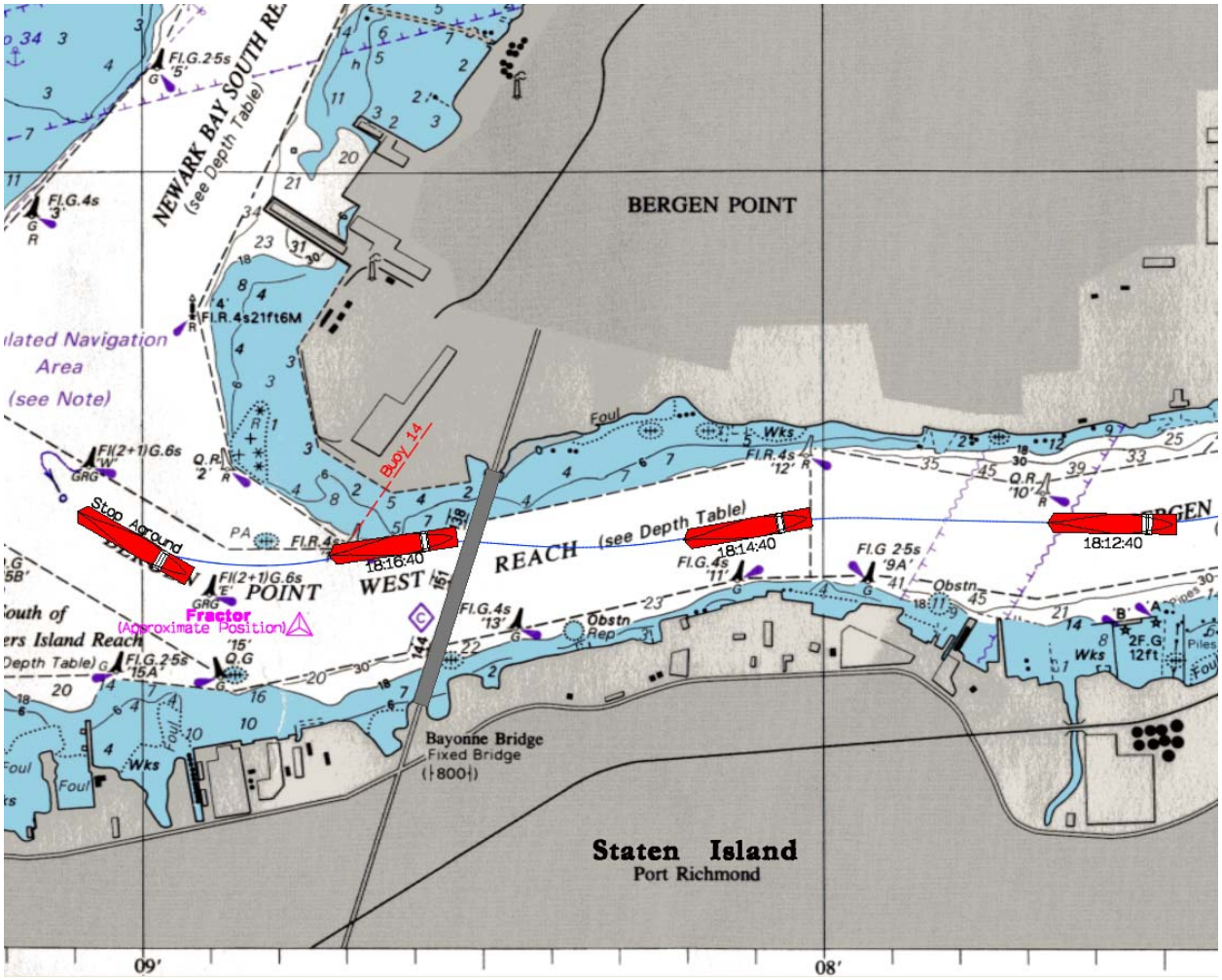


Figure 1

D. DETAILS OF INVESTIGATION

1. Description of Data

This VDR system records parametric data, radar video images and bridge audio files and stores them in a HVR that meets the survivability requirements of IEC 61996[2]. The HVR retains the last 12-hours of vessel operation. A simplified diagram of a generic Samsung SVDR system is shown in Figure 2.

[2] International Electrotechnical Commission (IEC) Performance Standards for Shipborne Voyage Data Recorders

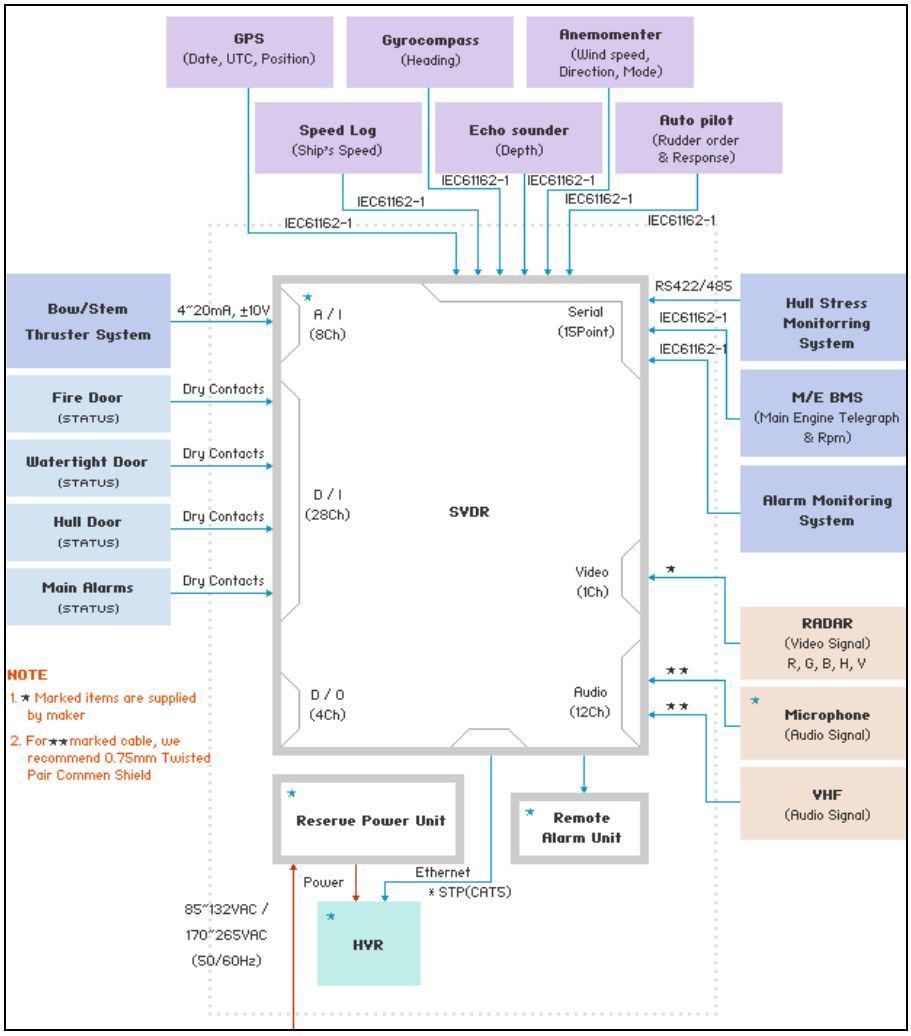


Figure 2

This VDR system can records inputs from 3 audio channels and the VHF radio channel, parametric data channels and still images of the radar video output. The data channels are recorded as IEC 1162[3] NEMA sentence fields [4], while the radar video input consists of the three-color (Red, Green and Blue) output from the bridge radar.

The audio recording is continuous while the data channels are sampled once per second. The recorded radar video still images were up-dated every 15-seconds. The following VDR parameters were referenced in this report:

Latitude and Longitude	Wind - Speed and Direction
Heading - Magnetic and True	Engine Shaft Speed
Speed – GPS and Water	Day Month Year
Time (elapsed seconds from 1st day of month)	

[3] IEC 1162 Maritime Navigation and Radio Communication Equipment and Systems – Digital Interfaces
[4] United States, National Marine Electronics Association (NMEA) standard for interfacing marine electronic navigational devices.

2. Examination of Recorder

The VDR data was successfully downloaded from the VDR interface unit located on the bridge of the ship. Therefore, the VDR HVR capsule was not removed from the vessel or examined by the NTSB on seen investigator.

3. Readout and Evaluation

a. Parametric Data

The parametric data were readout from the downloaded data using Samsung VDR playback software installed on the NTSB laboratory computer. Selected parameters were imported into other Board software program to create data plots, tabular listings and computer animation.

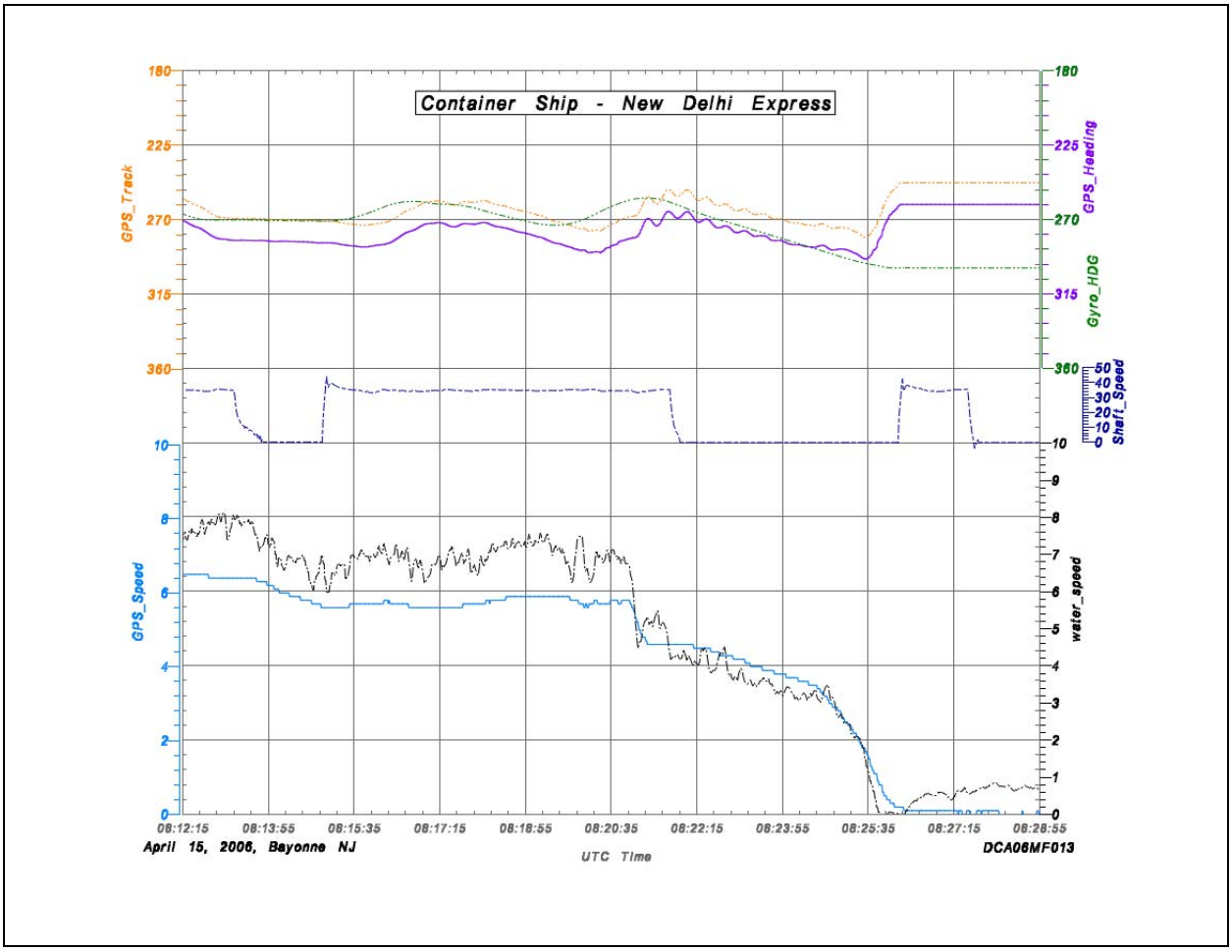


Figure 3

The data plot shown in figure 3 covers the 16-minute and 40-second period, which includes the initial impact with the rock outcropping near buoy-14, and the subsequent grounding cause by the starboard list. The latitude and longitude coordinates and the 2-

knot drop in water speed recorded at 8:20:57 are consistent with the initial impact near buoy-14. The data are also consistent with the vessel coming to rest at 8:26:06 when GPS speed goes to 0.2 knots and the gyro heading becomes steady at 299.3 degrees.

An examination of the data also revealed a significant lag between the GPS parameters "GPS-heading" and "GPS-track" and parameter "Gyro-heading". However, the Gyro-heading values were consistent with the helmsman heading callouts recorded on the VDR audio and heading values displayed on the radar images. The lag in GPS heading and track values may be the result of computational delays resulting from the derivation from the GPS position coordinates.

A tabular listing of the VDR parameters in the data plot in figure 3, plus parameters latitude, longitude wind speed and direction are available under separate cover in an electronic format in the Public Docket "VDR Tabular Data" .

b. Audio Data

The three channels of bridge audio and the VHF radio channel were recorded continuously in 200-second industry standard digital audio files. Each file name contained a time stamp reference that synchronized to the parametric and radar image time reference. A transcript of the audio data was created from 04:04:49 to 04:21:55 (local time). The transcript is available in the Public Docket under separate cover as "VDR Audio Transcript".

c. Radar Image Data

The radar image data are recorded as a series of snapshots of the bridge radarscope taken at 15-second intervals. Each image was recorded in a time stamped industry standard file format. The radar image data are presented in conjunction with the corresponding transcribed audio data (see Public Docket "VDR Audio Transcript"). The radar image data are also show in the animation of the vessel track time history and the animation stills attached to this document.

d. Animation of VDR Data

A computer animation of VDR data from UTC time 08:12:40 to 08:18:40 was created. The animation shows the track of the vessel overlaid on a plan view image of the navigation chart aboard the vessel at the time of the accident (see footnote 1). A dimensionally correct model of the New Delhi Express showing the shape of the container deck, bridge superstructure and the approximate shape of the hull at the water line was used to show the position of the vessel along the track constructed from the VDR latitude and longitude data. The orientation of the vessel model was driven by the gyro-heading data. The radar images appear in the upper right hand corner, while the transcribed audio data appears in the upper left corner.

The animation, which shows the vessels movement in real time, is available in an electronic file in the Public Docket under separate cover "VDR Computer Animation". In addition, a series of 18 still images of the animation are attached. Each still shows the

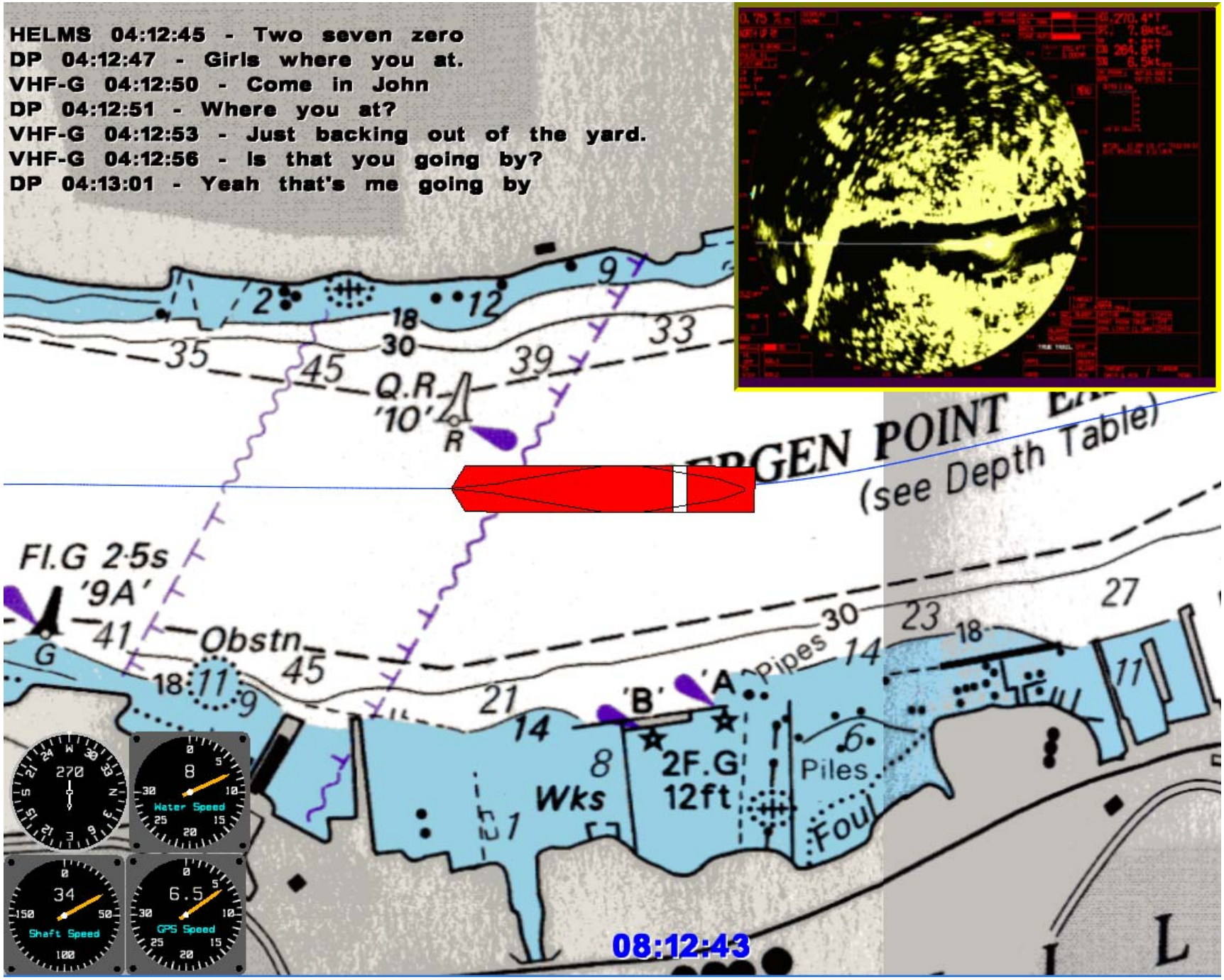
radar image at the time it was updated and the transcribed audio data for the following15 to 30-second period.

Dennis R. Grossi
National Resource Specialist Flight Data Recorders

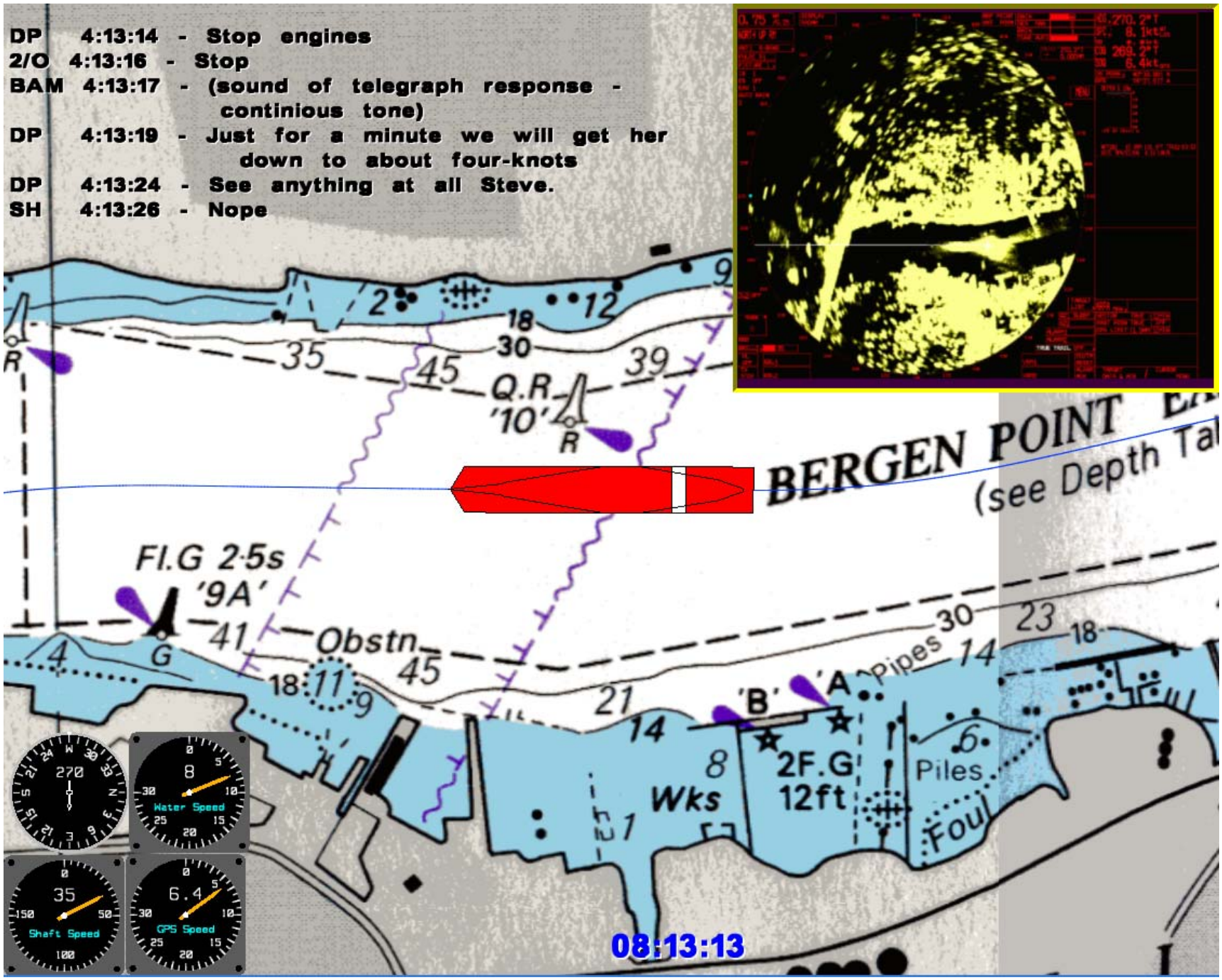
Attachment

ATTACHMENT

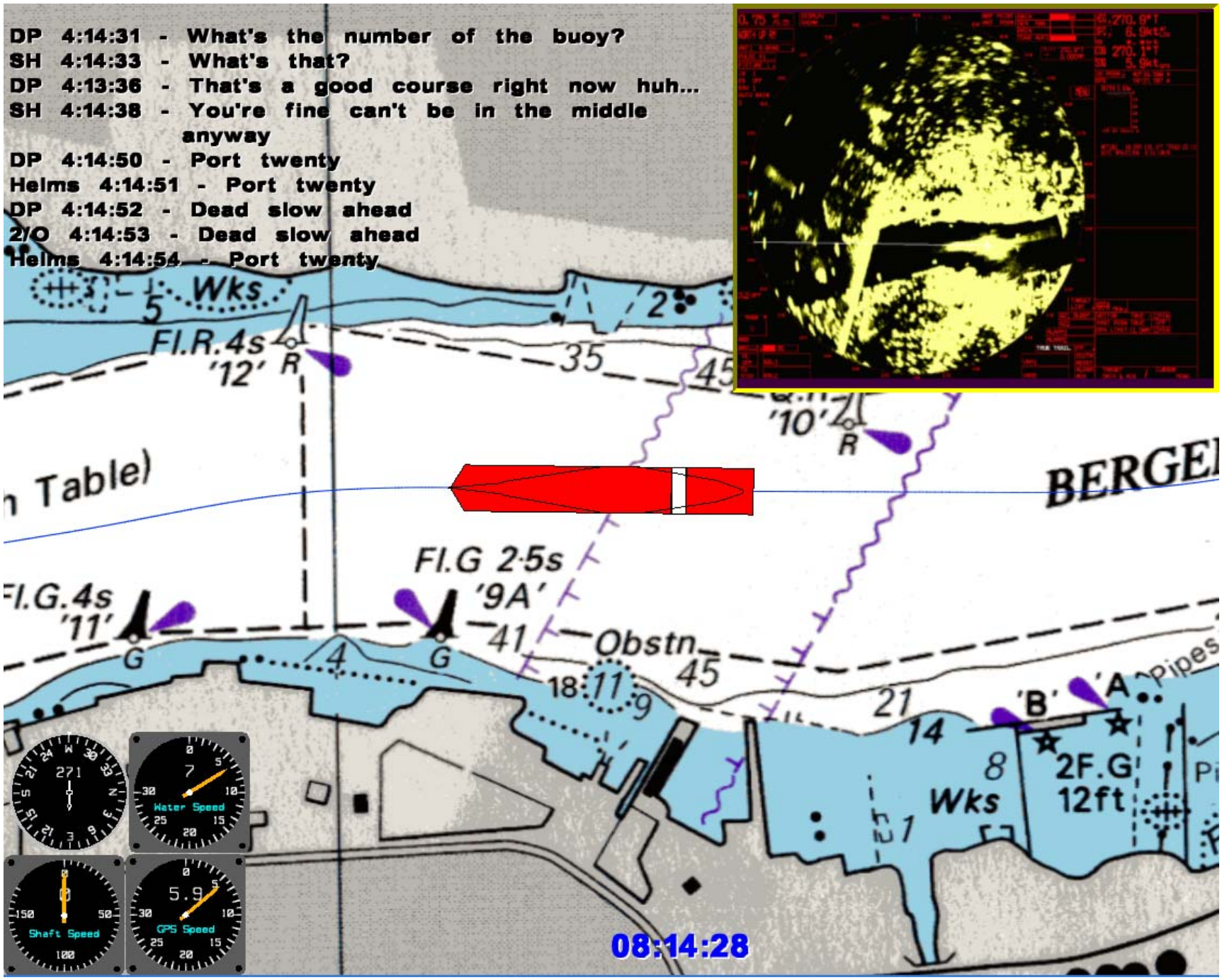
Animation Track Time History Stills


HELMS 04:12:45 - Two seven zero
DP 04:12:47 - Girls where you at.
VHF-G 04:12:50 - Come in John
DP 04:12:51 - Where you at?
VHF-G 04:12:53 - Just backing out of the yard.
VHF-G 04:12:56 - Is that you going by?
DP 04:13:01 - Yeah that's me going by
Q.R
'10'
R
(see Depth Table)
Fl.G 2·5s
'9A'
Obstn
Pipes
'B'
'A'
2F.G
12ft
Wks
Piles
Fou
270
Water Speed
Shaft Speed
GPS Speed
08:12:43

DCA06MF013


DP 4:13:14 - Stop engines
2/O 4:13:16 - Stop
BAM 4:13:17 - (sound of telegraph response - continious tone)
DP 4:13:19 - Just for a minute we will get her down to about four-knots
DP 4:13:24 - See anything at all Steve.
SH 4:13:26 - Nope
BERGEN POINT
(see Depth Ta
Fl.G 2·5s
'9A'
Q.R
'10'
Obstn
Pipes
Wks
2F.G
12ft
Piles
Foul
Water Speed
Shaft Speed
GPS Speed
08:13:13

DCA06MF013


DP 4:14:31 - What's the number of the buoy?
SH 4:14:33 - What's that?
DP 4:13:36 - That's a good course right now huh...
SH 4:14:38 - You're fine can't be in the middle anyway
DP 4:14:50 - Port twenty
Helms 4:14:51 - Port twenty
DP 4:14:52 - Dead slow ahead
2/O 4:14:53 - Dead slow ahead
Helms 4:14:54 - Port twenty
Wks
Fl.R.4s
'12'
'10'
Table)
BERGE
Fl.G 2·5s
'9A'
Fl.G.4s
'11'
Obstn
Pipes
'B'
'A'
2F.G
12ft
Wks
Water Speed
Shaft Speed
GPS Speed
08:14:28

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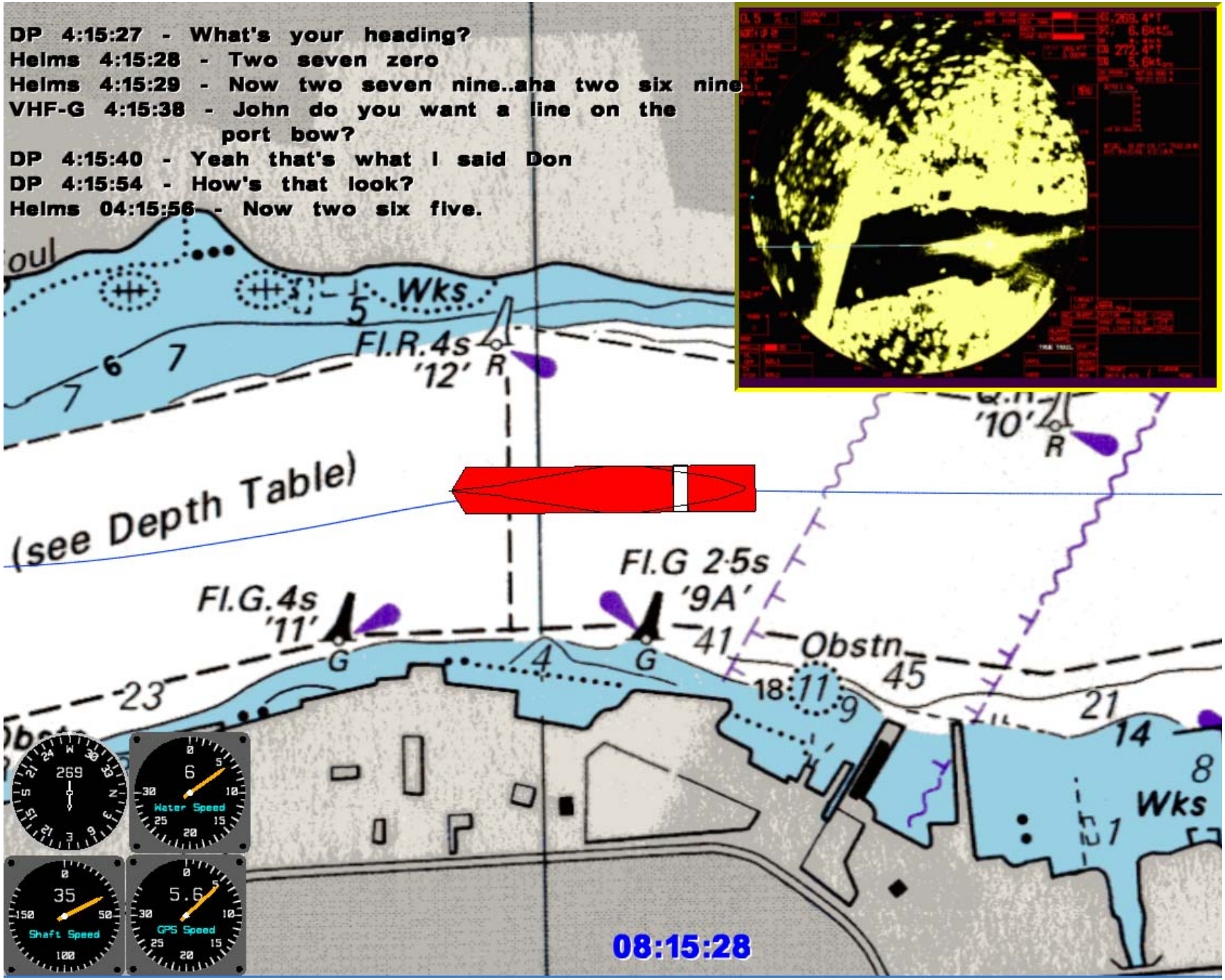
DP 4:15:27 - What's your heading?
Helms 4:15:28 - Two seven zero
Helms 4:15:29 - Now two seven nine..aha two six nine
VHF-G 4:15:38 - John do you want a line on the port bow?
DP 4:15:40 - Yeah that's what I said Don
DP 4:15:54 - How's that look?
Helms 04:15:56 - Now two six five.
Wks
Fl.R.4s
'12'
R
'10'
R
(see Depth Table)
Fl.G 2·5s
'9A'
Fl.G.4s
'11'
G
G
41
Obstn
45
18
11
9
23
21
14
8
Wks
1
269
6
Water Speed
35
Shaft Speed
5.6
GPS Speed
08:15:28

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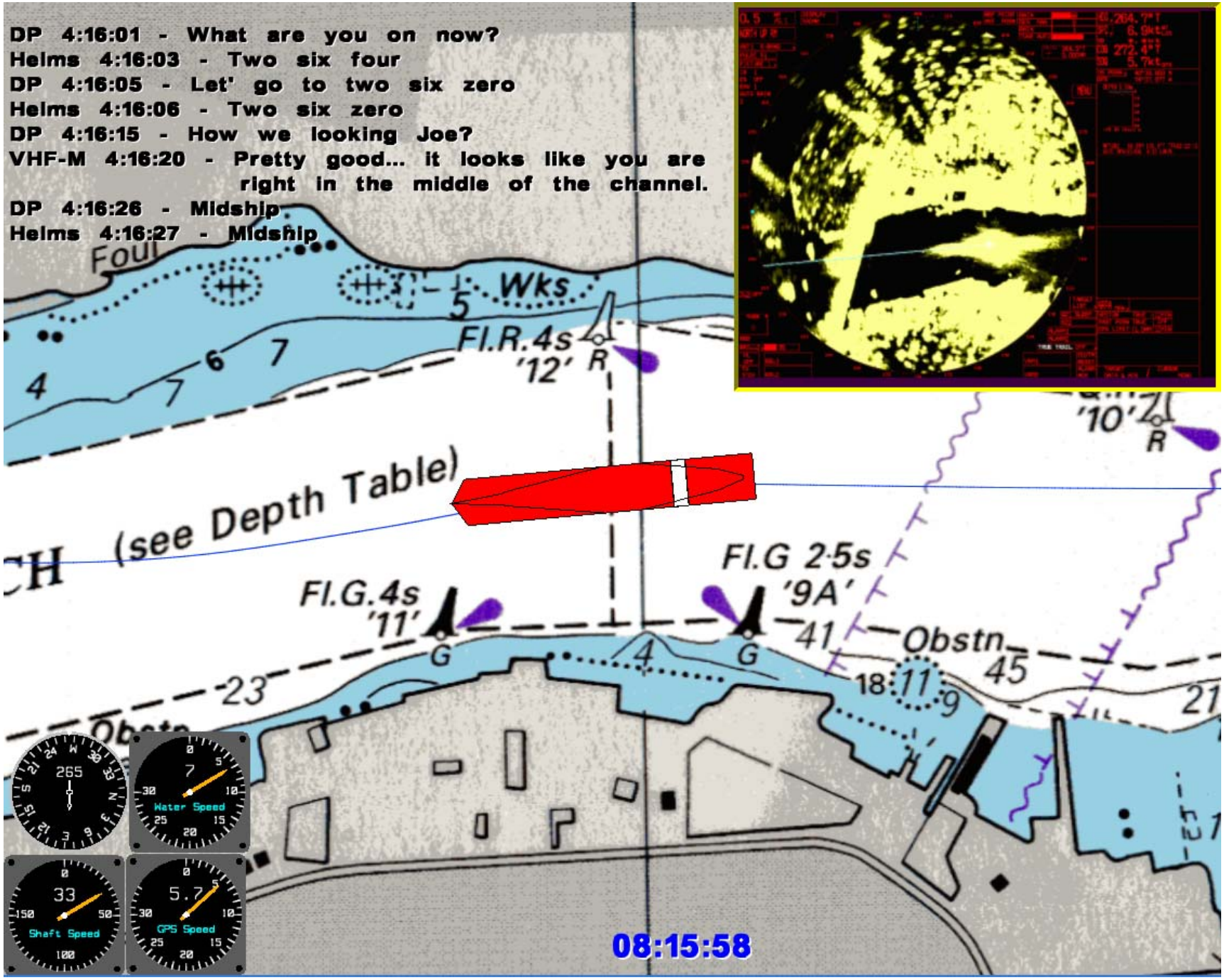
DP 4:16:01 - What are you on now?
Helms 4:16:03 - Two six four
DP 4:16:05 - Let' go to two six zero
Helms 4:16:06 - Two six zero
DP 4:16:15 - How we looking Joe?
VHF-M 4:16:20 - Pretty good... it looks like you are right in the middle of the channel.
DP 4:16:26 - Midship
Helms 4:16:27 - Midship
Foul
Wks
Fl.R.4s
'12'
(see Depth Table)
Fl.G.4s
'11'
Fl.G 2·5s
'9A'
Obstn
'10'
265
Water Speed
Shaft Speed
GPS Speed
08:15:58

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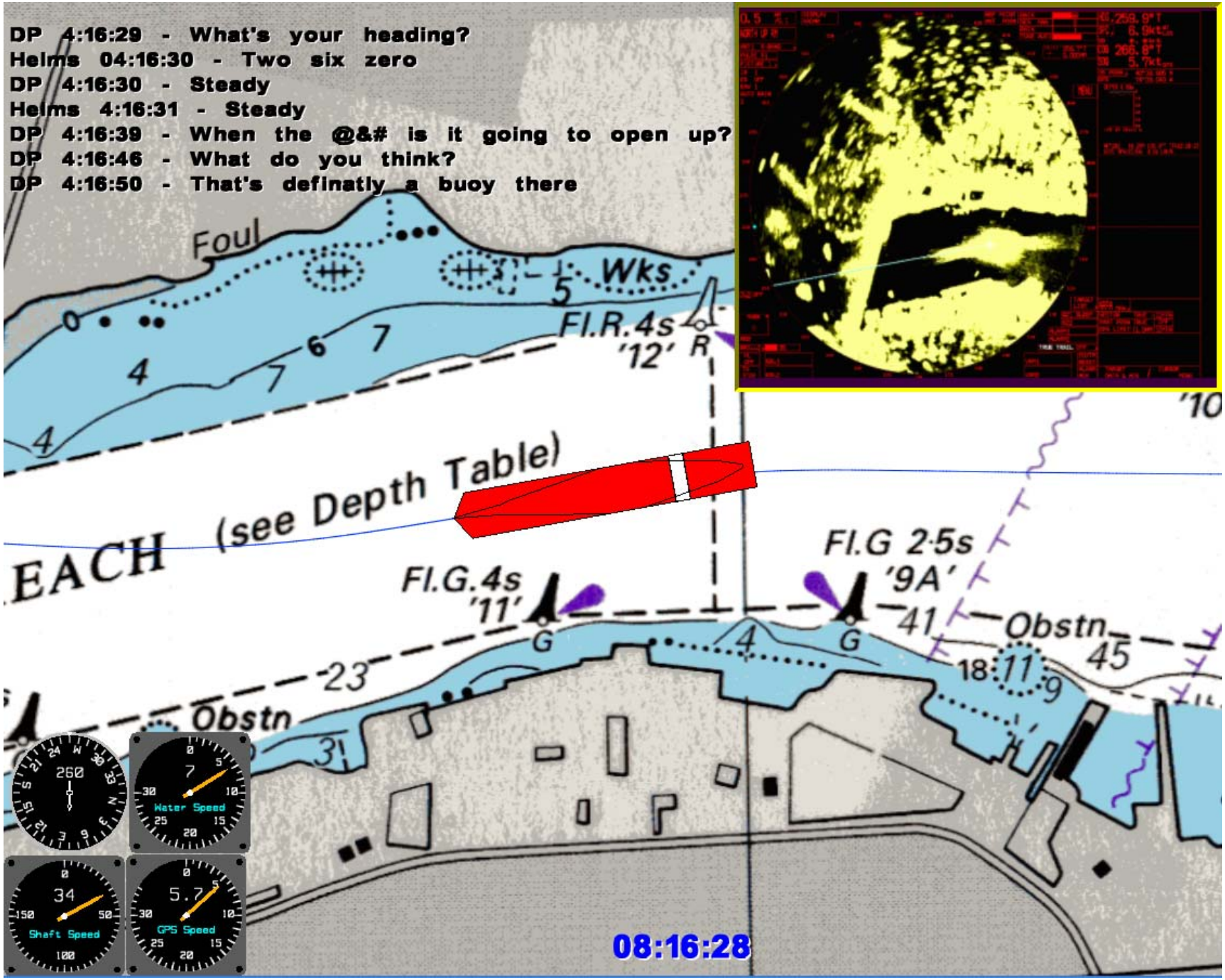
DP 4:16:29 - What's your heading?
Helms 04:16:30 - Two six zero
DP 4:16:30 - Steady
Helms 4:16:31 - Steady
DP 4:16:39 - When the @&# is it going to open up?
DP 4:16:46 - What do you think?
DP 4:16:50 - That's definatly a buoy there
Foul
Wks
Fl.R.4s
'12' R
(see Depth Table)
EACH
Fl.G.4s
'11'
Fl.G 2·5s
'9A'
Obstn
Obstn
260
Water Speed
Shaft Speed
GPS Speed
08:16:28

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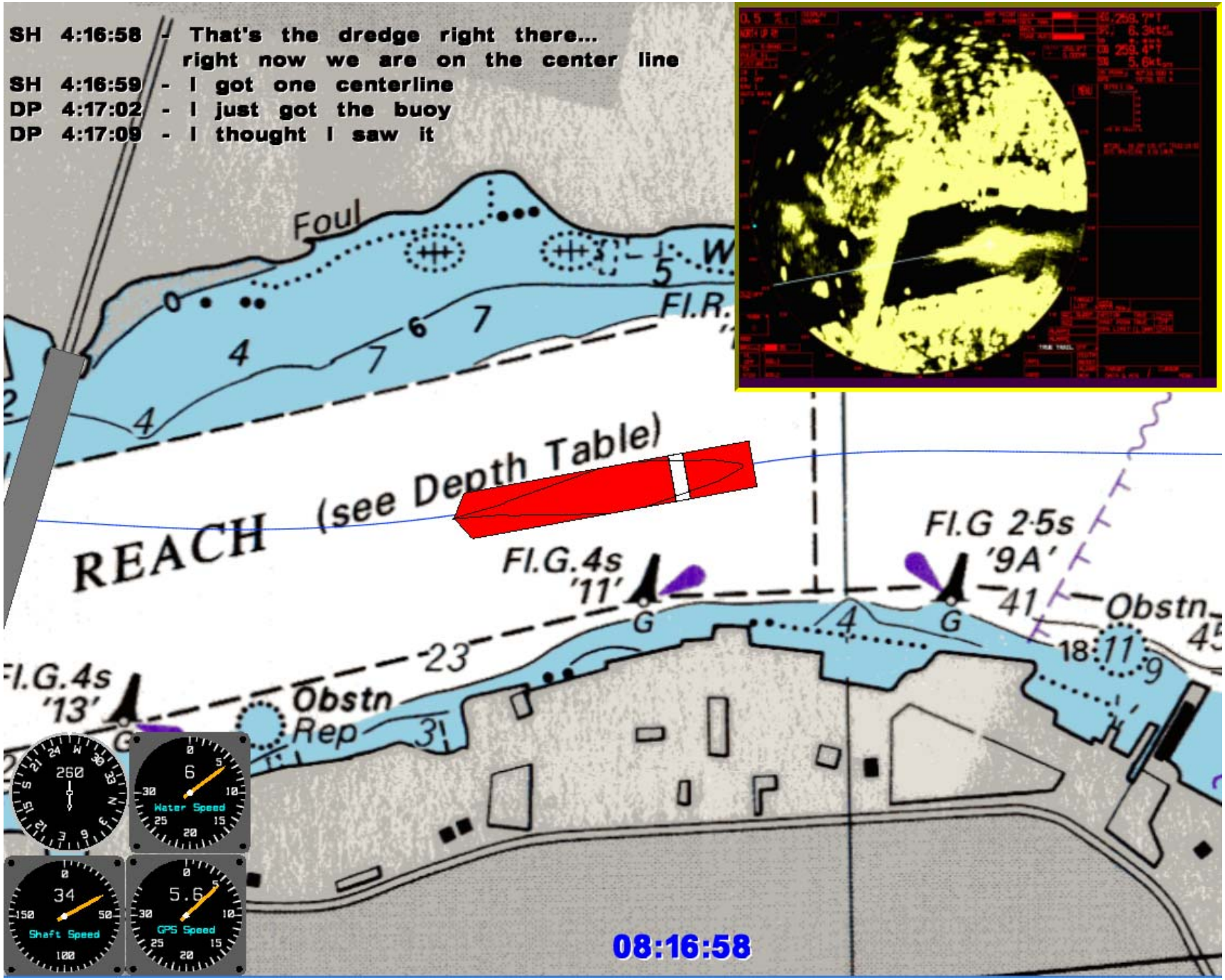
SH 4:16:58 - That's the dredge right there...
right now we are on the center line
SH 4:16:59 - I got one centerline
DP 4:17:02 - I just got the buoy
DP 4:17:09 - I thought I saw it
Foul
Fl.R.
REACH
(see Depth Table)
Fl.G.4s
'11'
Fl.G 2·5s
'9A'
Obstn
Fl.G.4s
'13'
Obstn
Rep
Water Speed
Shaft Speed
GPS Speed
08:16:58

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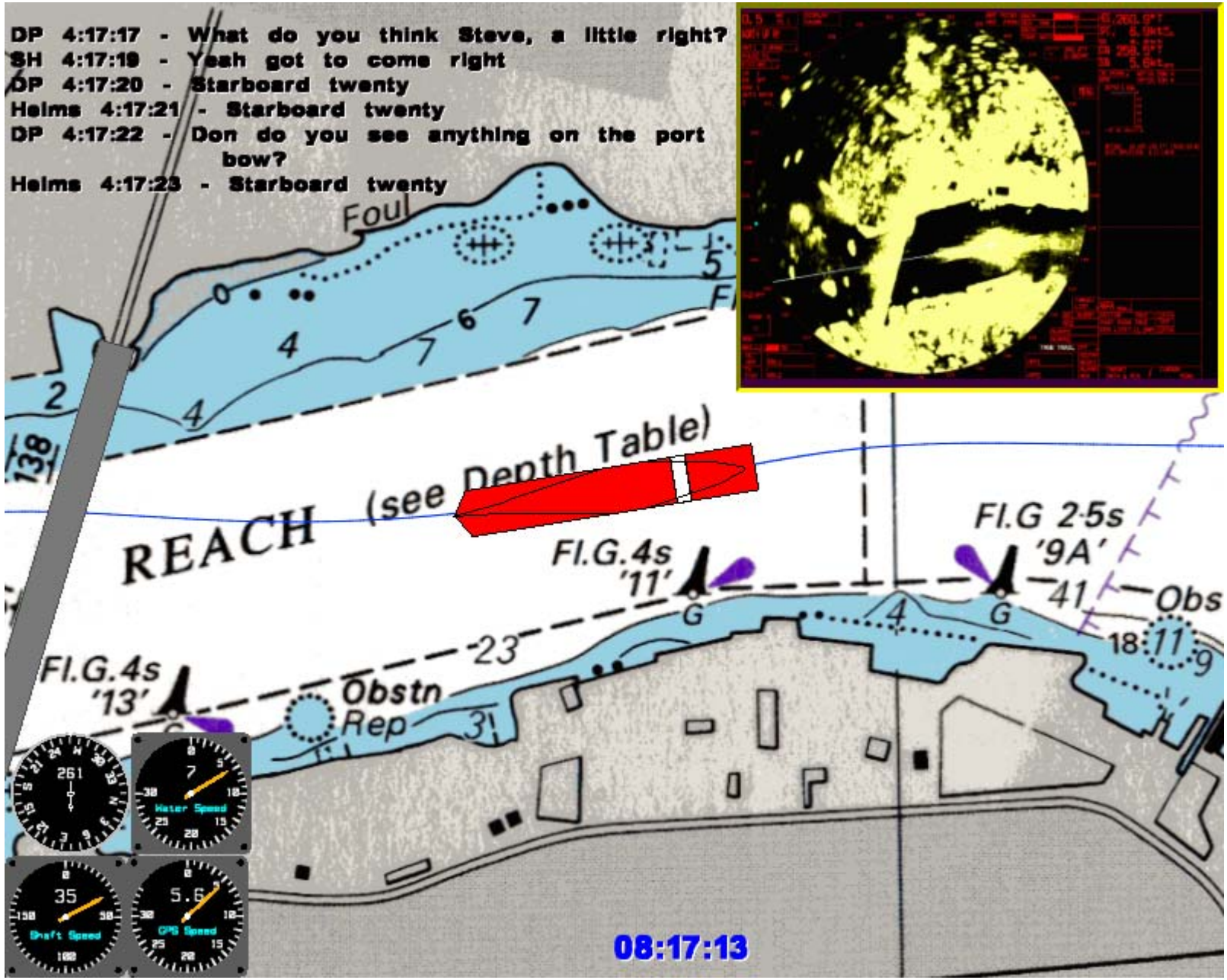
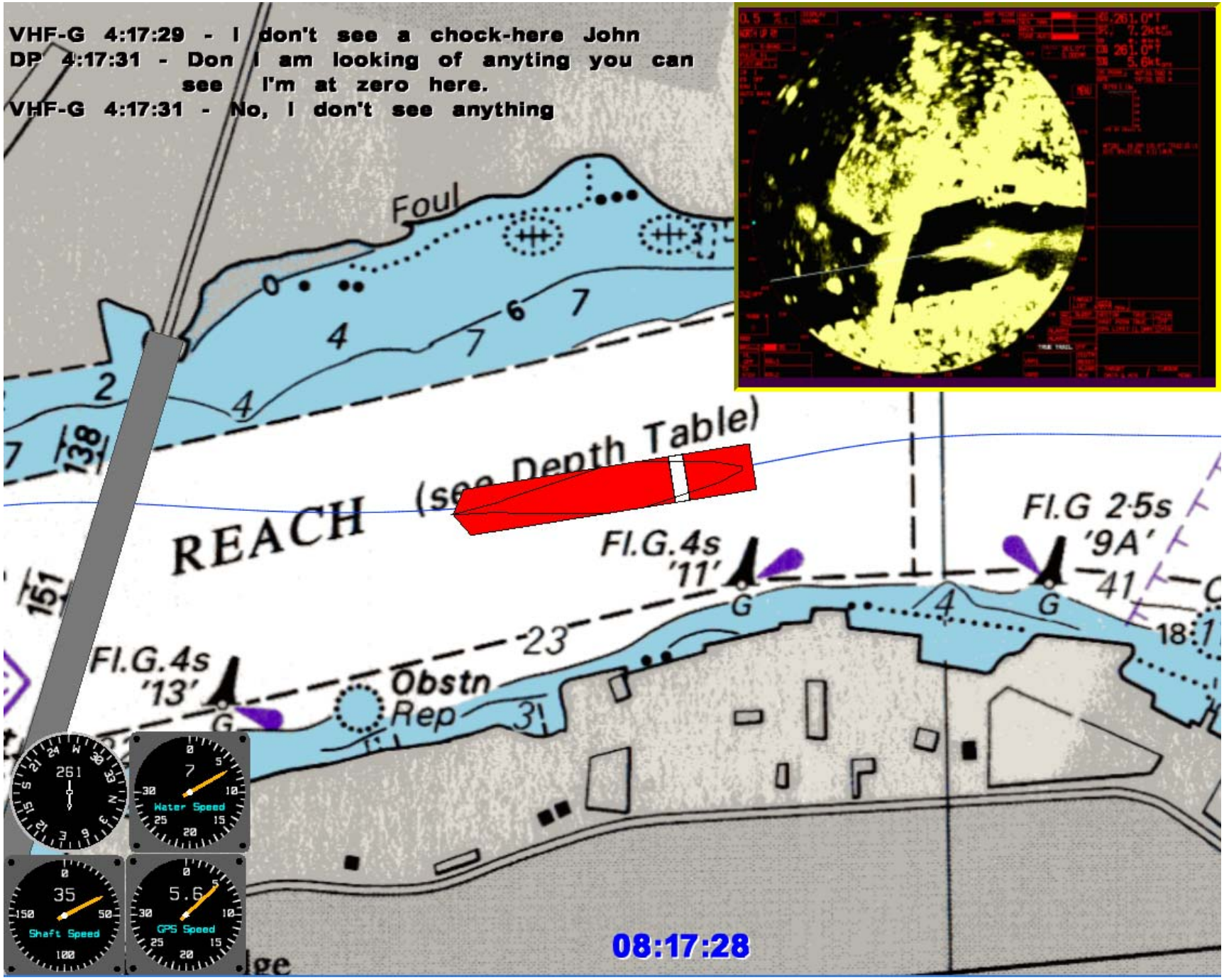
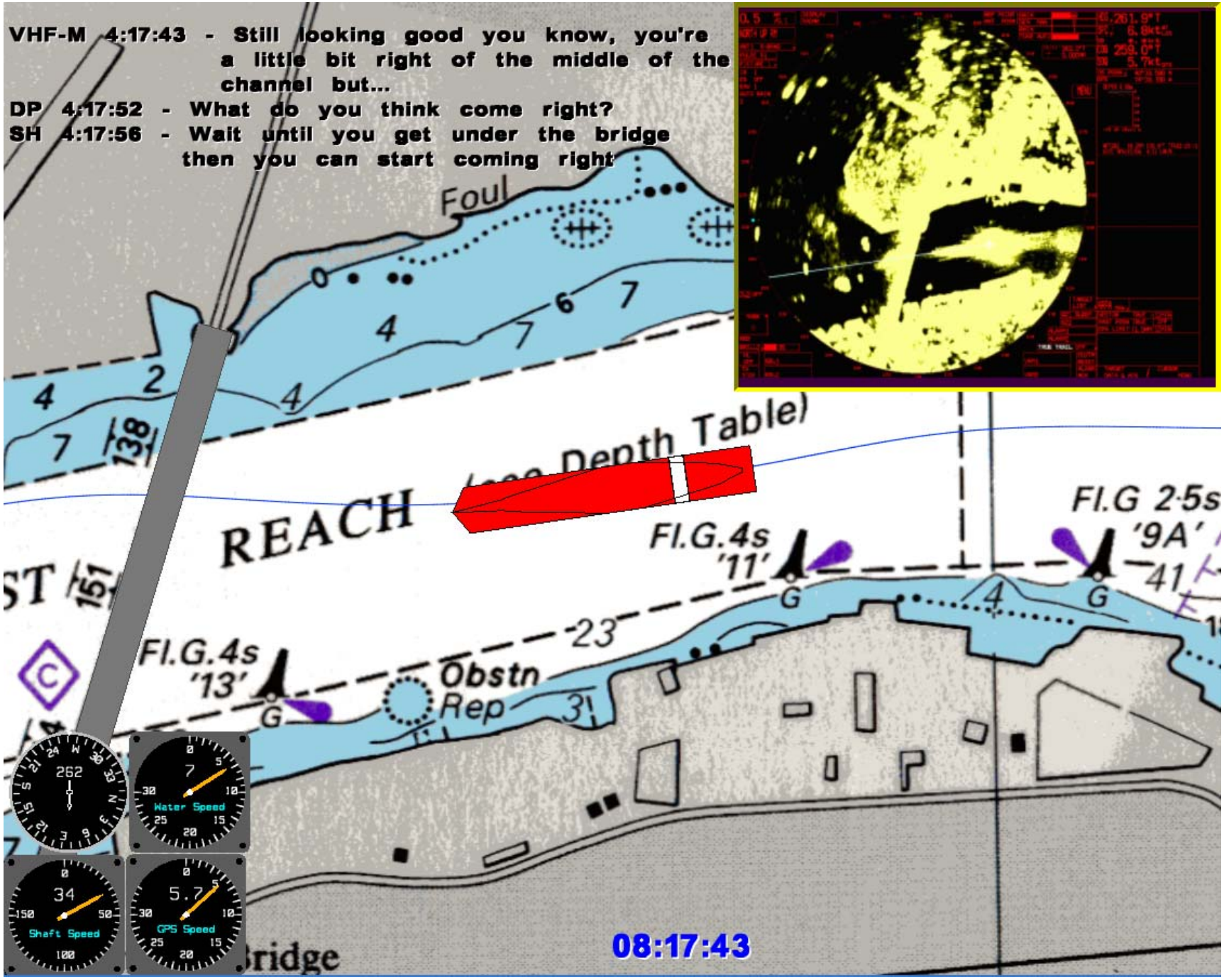
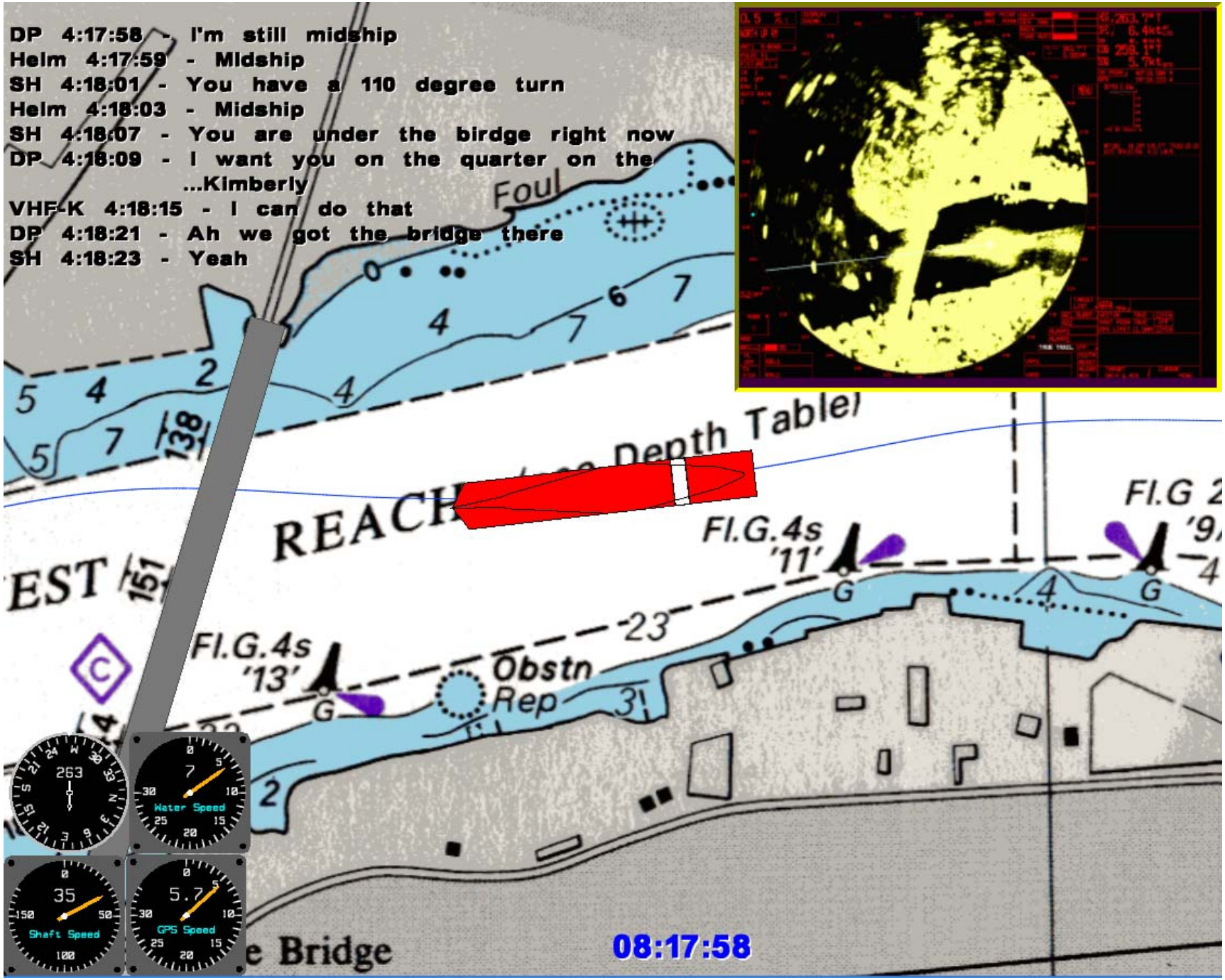

DP 4:17:17 - What do you think Steve, a little right?
SH 4:17:19 - Yeah got to come right
DP 4:17:20 - Starboard twenty
Helms 4:17:21 - Starboard twenty
DP 4:17:22 - Don do you see anything on the port bow?
Helms 4:17:23 - Starboard twenty
Foul
REACH
(see Depth Table)
Fl.G.4s
'11'
Fl.G 2·5s
'9A'
Obs
Fl.G.4s
'13'
Obstn
Rep
08:17:13


VHF-G 4:17:29 - I don't see a chock-here John
DP 4:17:31 - Don I am looking of anyting you can see I'm at zero here.
VHF-G 4:17:31 - No, I don't see anything
Foul
REACH
(see Depth Table)
Fl.G.4s
'11'
Fl.G 2·5s
'9A'
Fl.G.4s
'13'
Obstn
Rep
08:17:28

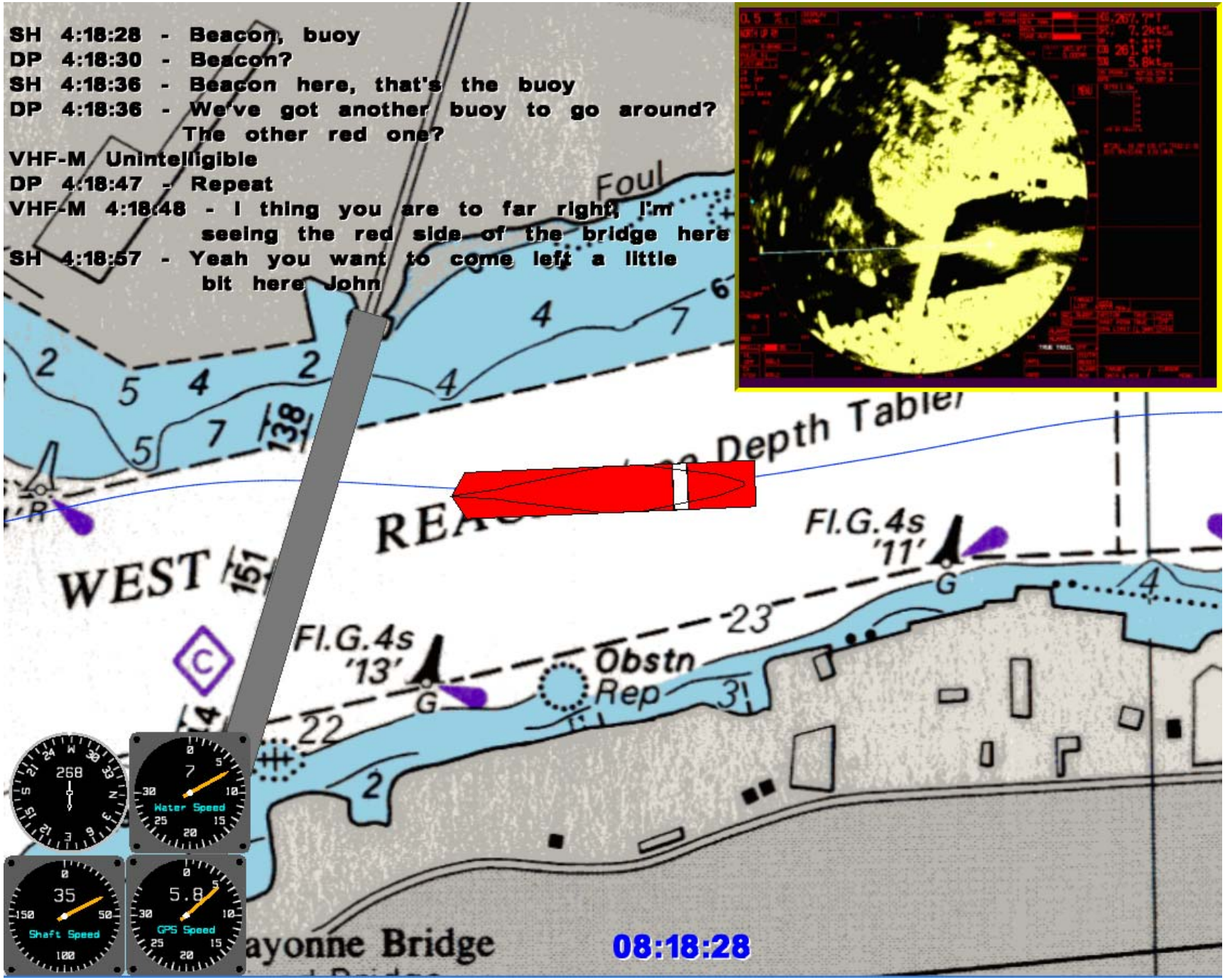
DCA06MF013


VHF-M 4:17:43 - Still looking good you know, you're a little bit right of the middle of the channel but...
DP 4:17:52 - What do you think come right?
SH 4:17:56 - Wait until you get under the bridge then you can start coming right
Foul
REACH
Fl.G.4s
'11'
Fl.G 2·5s
'9A'
Fl.G.4s
'13'
Obstn
Rep
262
Water Speed
Shaft Speed
GPS Speed
08:17:43

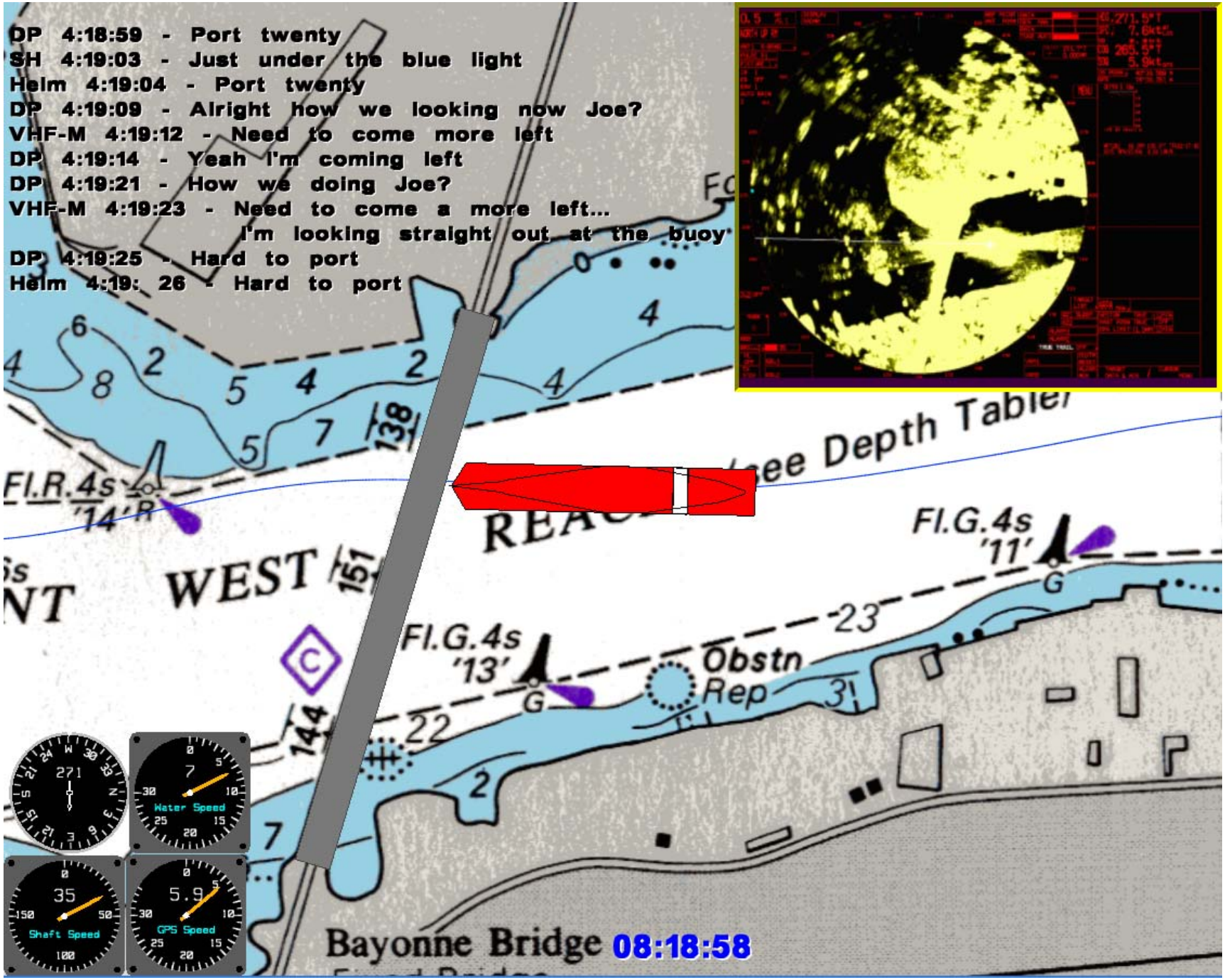
DCA06MF013


DP 4:17:58 - I'm still midship
Helm 4:17:59 - Midship
SH 4:18:01 - You have a 110 degree turn
Helm 4:18:03 - Midship
SH 4:18:07 - You are under the birdge right now
DP 4:18:09 - I want you on the quarter on the ...Kimberly
VHF-K 4:18:15 - I can do that
DP 4:18:21 - Ah we got the bridge there
SH 4:18:23 - Yeah
Foul
Depth Table
REACH
Fl.G.4s
'11'
Fl.G.4s
'13'
Obstn
Rep
263
Water Speed
Shaft Speed
GPS Speed
08:17:58

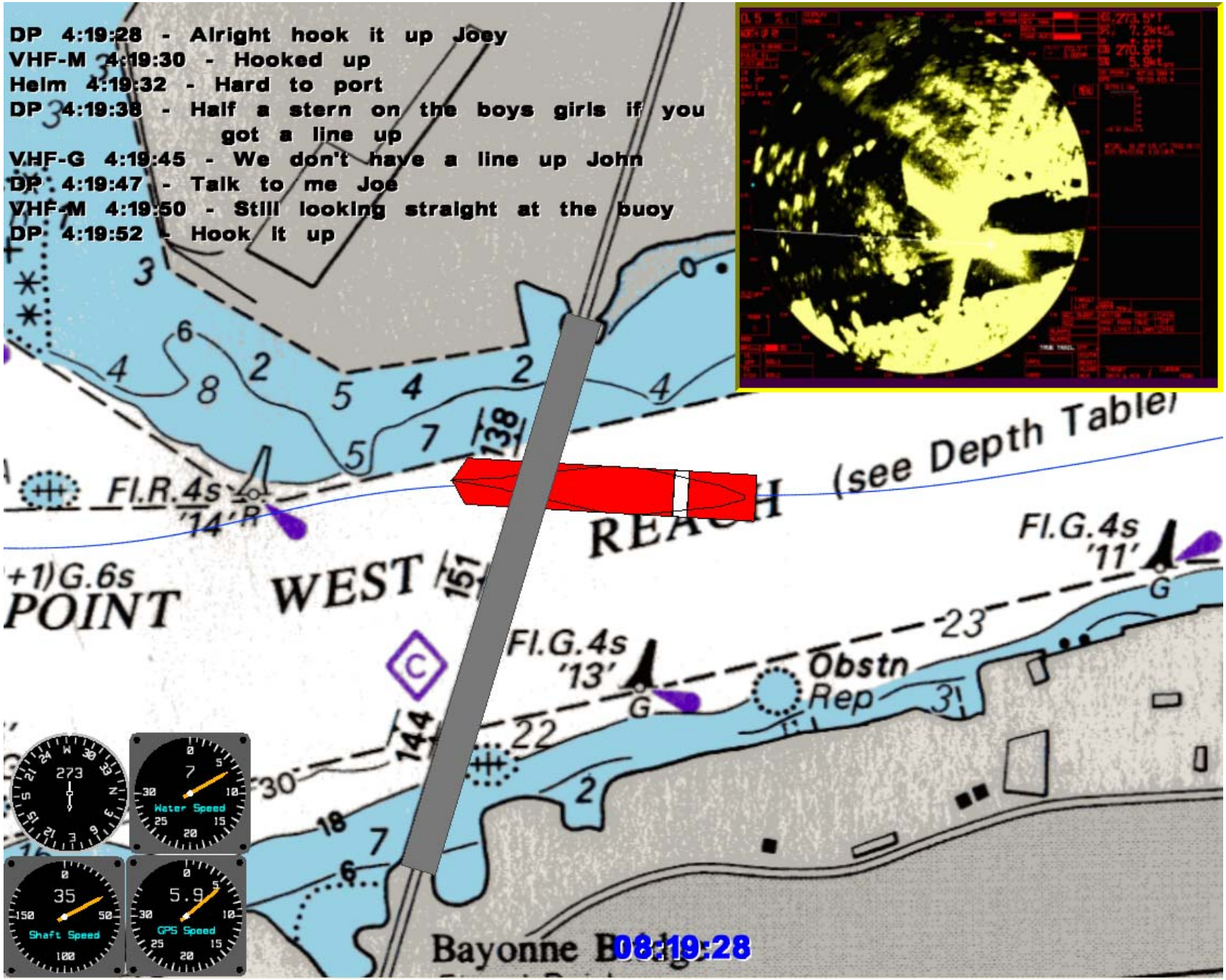
DCA06MF013


SH 4:18:28 - Beacon, buoy
DP 4:18:30 - Beacon?
SH 4:18:36 - Beacon here, that's the buoy
DP 4:18:36 - We've got another buoy to go around? The other red one?
VHF-M Unintelligible
DP 4:18:47 - Repeat
VHF-M 4:18:48 - I thing you are to far right, I'm seeing the red side of the bridge here
SH 4:18:57 - Yeah you want to come left a little bit here John
Foul
Depth Table
WEST
Fl.G.4s
'11'
Fl.G.4s
'13'
Obstn
Rep
23
22
Water Speed
Shaft Speed
GPS Speed
ayonne Bridge
08:18:28

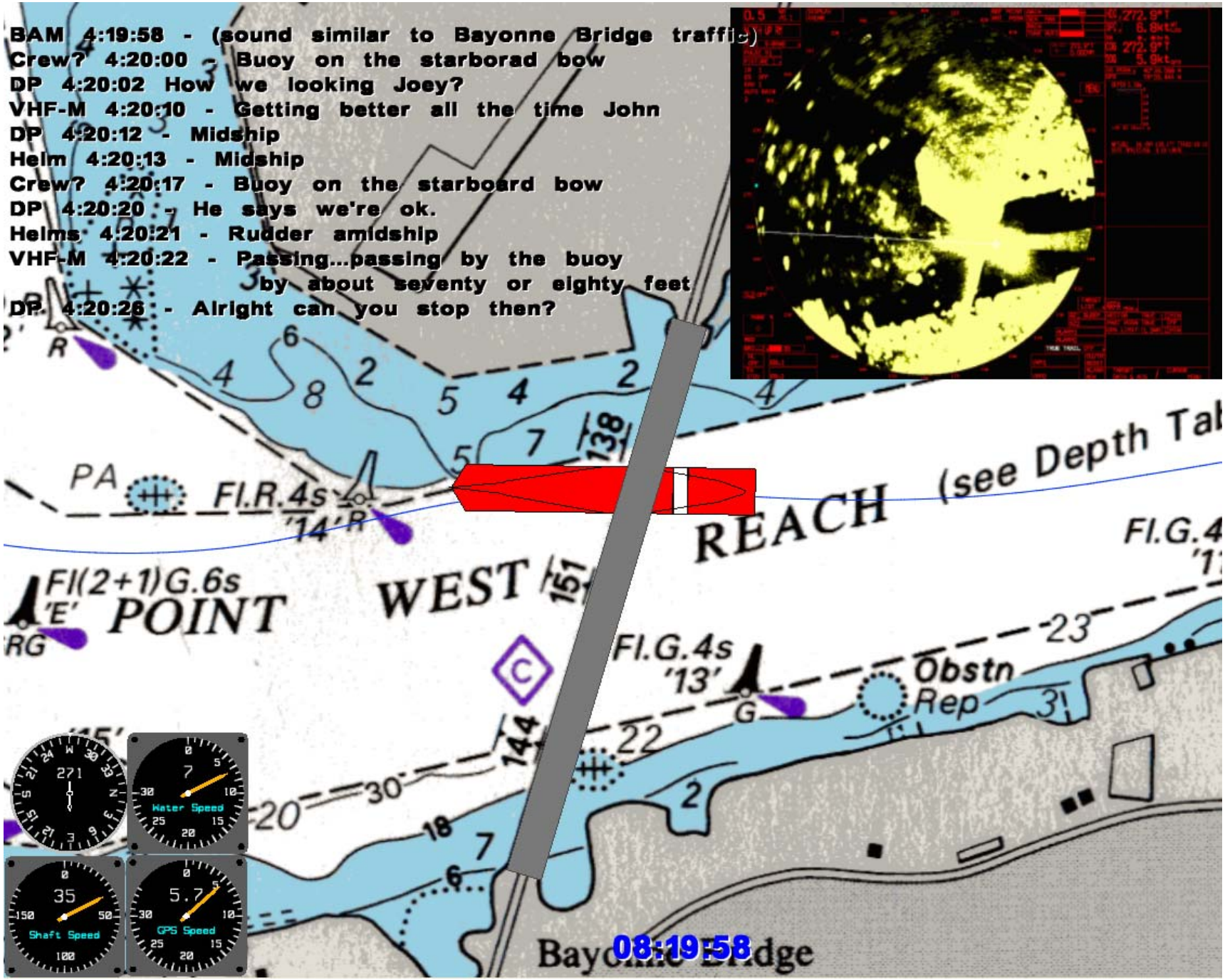
DCA06MF013


DP 4:18:59 - Port twenty
SH 4:19:03 - Just under the blue light
Helm 4:19:04 - Port twenty
DP 4:19:09 - Alright how we looking now Joe?
VHF-M 4:19:12 - Need to come more left
DP 4:19:14 - Yeah I'm coming left
DP 4:19:21 - How we doing Joe?
VHF-M 4:19:23 - Need to come a more left...
I'm looking straight out at the buoy
DP 4:19:25 - Hard to port
Helm 4:19: 26 - Hard to port
Fl.R.4s
'14'R
Fl.G.4s
'11'
Fl.G.4s
'13'
Obstn
Rep
WEST
Water Speed
Shaft Speed
GPS Speed
Bayonne Bridge
08:18:58

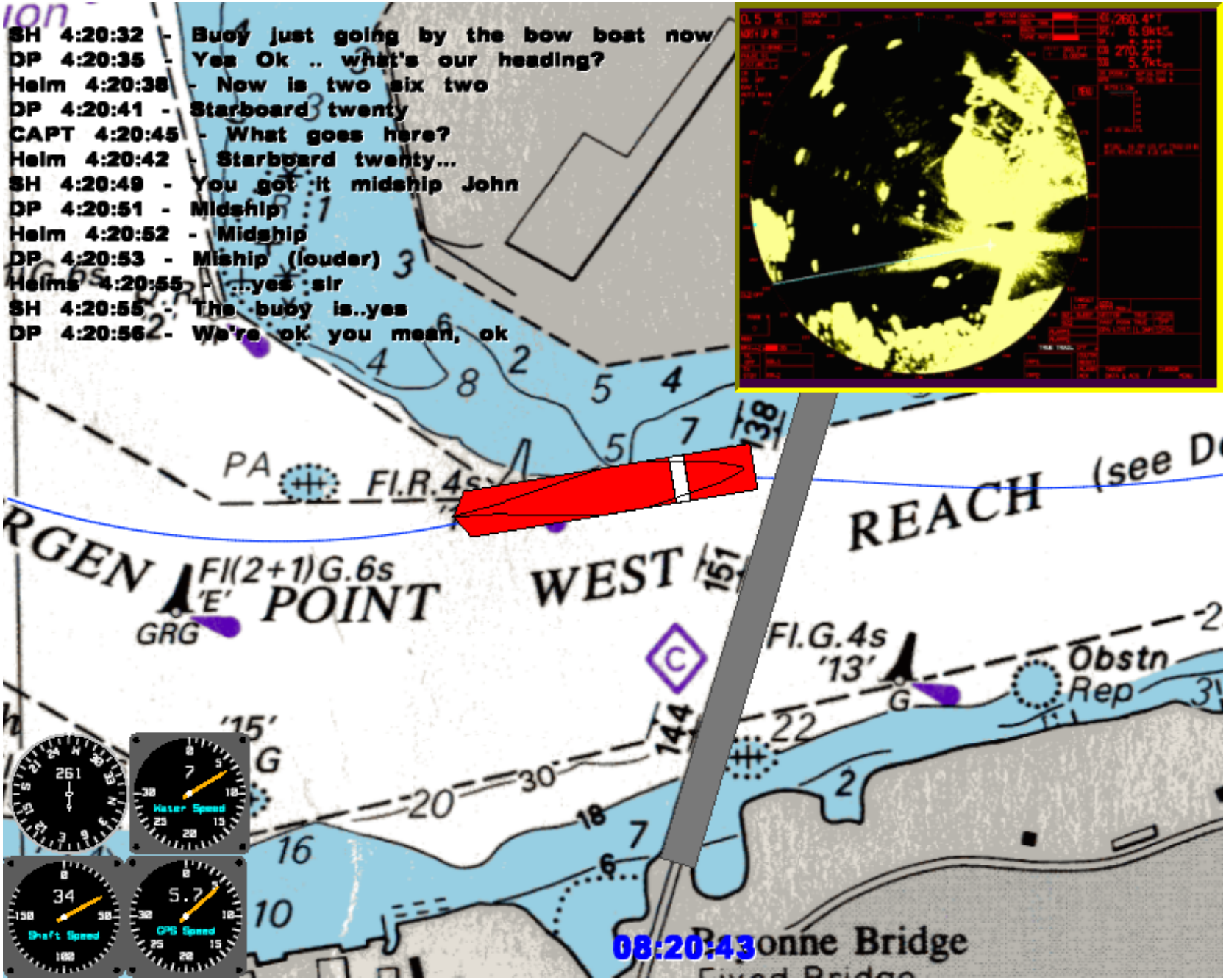
DCA06MF013


DP 4:19:28 - Alright hook it up Joey
VHF-M 4:19:30 - Hooked up
Helm 4:19:32 - Hard to port
DP 4:19:38 - Half a stern on the boys girls if you got a line up
VHF-G 4:19:45 - We don't have a line up John
DP 4:19:47 - Talk to me Joe
VHF-M 4:19:50 - Still looking straight at the buoy
DP 4:19:52 - Hook it up
(see Depth Table)
Fl.R.4s
'14'
Fl.G.4s
'11'
Fl.G.4s
'13'
WEST
POINT
Obstn
Rep
Water Speed
Shaft Speed
GPS Speed
Bayonne
08:19:28

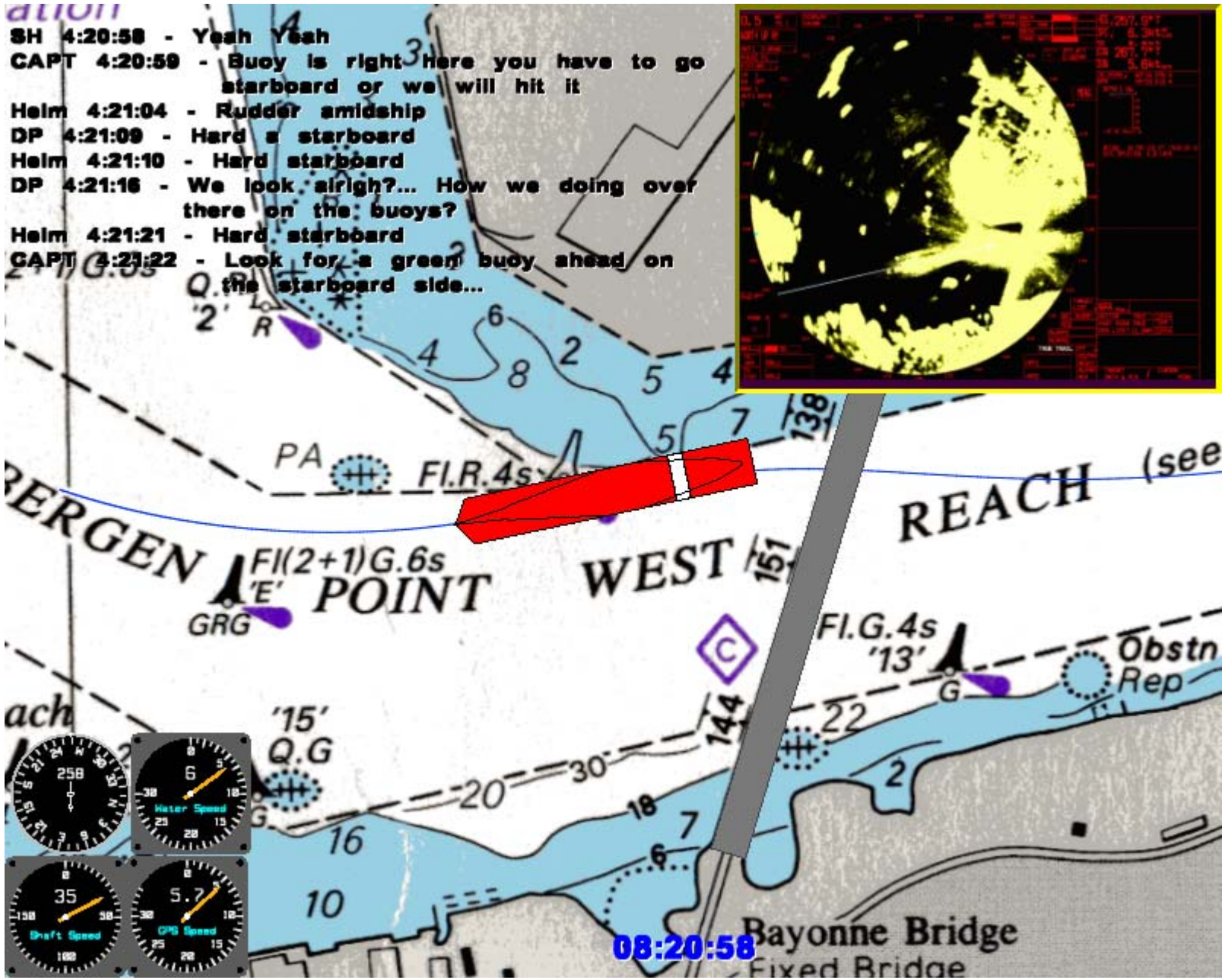
DCA06MF013

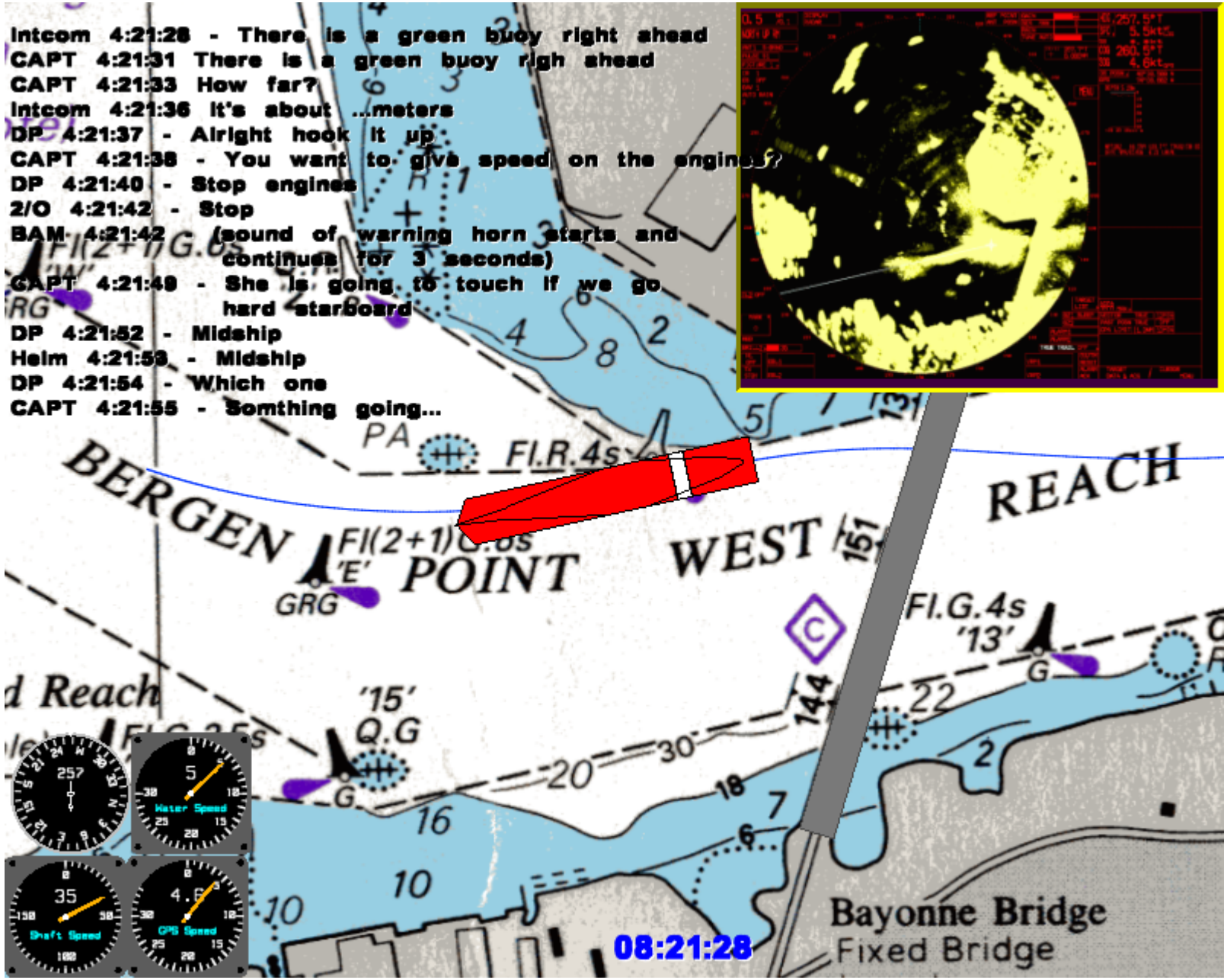

BAM 4:19:58 - (sound similar to Bayonne Bridge traffic)
Crew? 4:20:00 - Buoy on the starborad bow
DP 4:20:02 How we looking Joey?
VHF-M 4:20:10 - Getting better all the time John
DP 4:20:12 - Midship
Helm 4:20:13 - Midship
Crew? 4:20:17 - Buoy on the starboard bow
DP 4:20:20 - He says we're ok.
Helms 4:20:21 - Rudder amidship
VHF-M 4:20:22 - Passing...passing by the buoy
by about seventy or eighty feet
DP 4:20:26 - Alright can you stop then?
Fl.R.4s
'14'
Fl(2+1)G.6s
'E'
POINT
WEST
REACH
(see Depth Tal
Fl.G.4s
'13'
Obstn
Rep
Water Speed
Shaft Speed
GPS Speed
08:19:58
Bayonne Bridge

DCA06MF013


SH 4:20:32 - Buoy just going by the bow boat now
DP 4:20:35 - Yes Ok .. what's our heading?
Helm 4:20:38 - Now is two six two
DP 4:20:41 - Starboard twenty
CAPT 4:20:45 - What goes here?
Helm 4:20:42 - Starboard twenty...
SH 4:20:49 - You got it midship John
DP 4:20:51 - Midship
Helm 4:20:52 - Midship
DP 4:20:53 - Miship (louder)
Helms 4:20:55 - ..yes sir
SH 4:20:55 - The buoy is..yes
DP 4:20:56 - We're ok you mean, ok
PA
Fl.R.4s
REACH
(see D
RGEN
Fl(2+1)G.6s
'E'
POINT
WEST
GRG
Fl.G.4s
'13'
Obstn
Rep
'15'
G
261
Water Speed
Shaft Speed
GPS Speed
08:20:43
Bayonne Bridge

DCA06MF013


SH 4:20:58 - Yeah Yeah
CAPT 4:20:59 - Buoy is right here you have to go starboard or we will hit it
Helm 4:21:04 - Rudder amidship
DP 4:21:09 - Hard a starboard
Helm 4:21:10 - Hard starboard
DP 4:21:16 - We look airigh?... How we doing over there on the buoys?
Helm 4:21:21 - Hard starboard
CAPT 4:21:22 - Look for a green buoy ahead on the starboard side...
PA
Fl.R.4s
REACH
WEST
POINT
Fl(2+1)G.6s
'E'
GRG
Fl.G.4s
'13'
Obstn
Rep
'15'
Q.G
Bayonne Bridge
Fixed Bridge
08:20:58


Intcom 4:21:28 - There is a green buoy right ahead
CAPT 4:21:31 There is a green buoy righ ahead
CAPT 4:21:33 How far?
Intcom 4:21:36 It's about ...meters
DP 4:21:37 - Alright hook it up
CAPT 4:21:38 - You want to give speed on the engines?
DP 4:21:40 - Stop engines
2/O 4:21:42 - Stop
BAM 4:21:42 (sound of warning horn starts and continues for 3 seconds)
CAPT 4:21:49 - She is going to touch if we go hard starboard
DP 4:21:52 - Midship
Helm 4:21:53 - Midship
DP 4:21:54 - Which one
CAPT 4:21:55 - Somthing going...
BERGEN POINT
WEST REACH
Fl.R.4s
Fl(2+1)G.6s
'E'
GRG
Fl.G.4s
'13'
'15'
Q.G
Bayonne Bridge
Fixed Bridge
08:21:28
Water Speed
Shaft Speed
GPS Speed