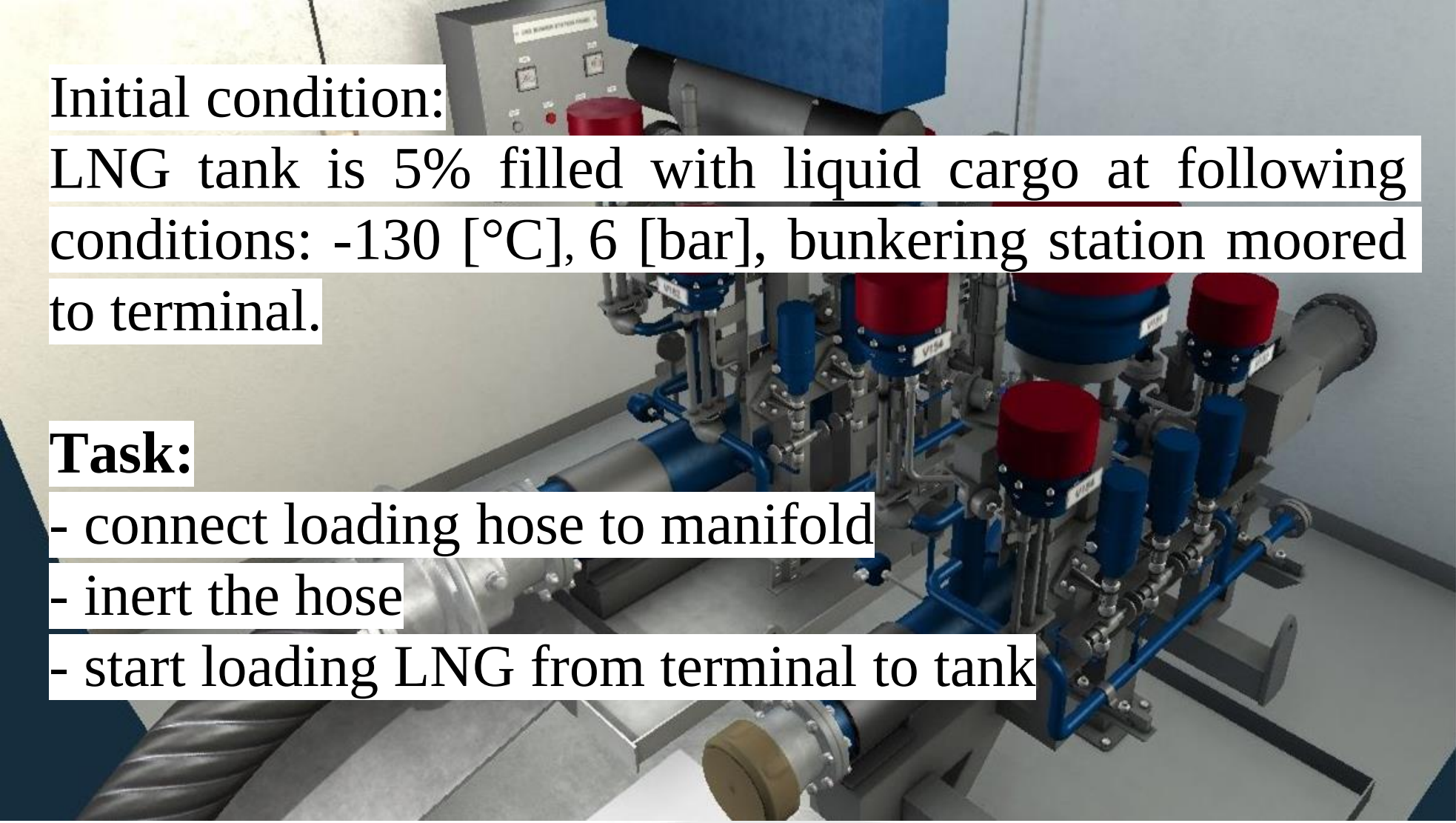
# LNG bunkering operation: terminal-vessel

Co-funded by the Erasmus+ Programme of the European Union
Cofinanțat prin programul Erasmus+ al Uniunii Europene



Initial condition:

LNG tank is 5% filled with liquid cargo at following conditions: -130 [°C], 6 [bar], bunkering station moored to terminal.

**Task:**

- connect loading hose to manifold
- inert the hose
- start loading LNG from terminal to tank


**Bunkering station is moored to the terminal**

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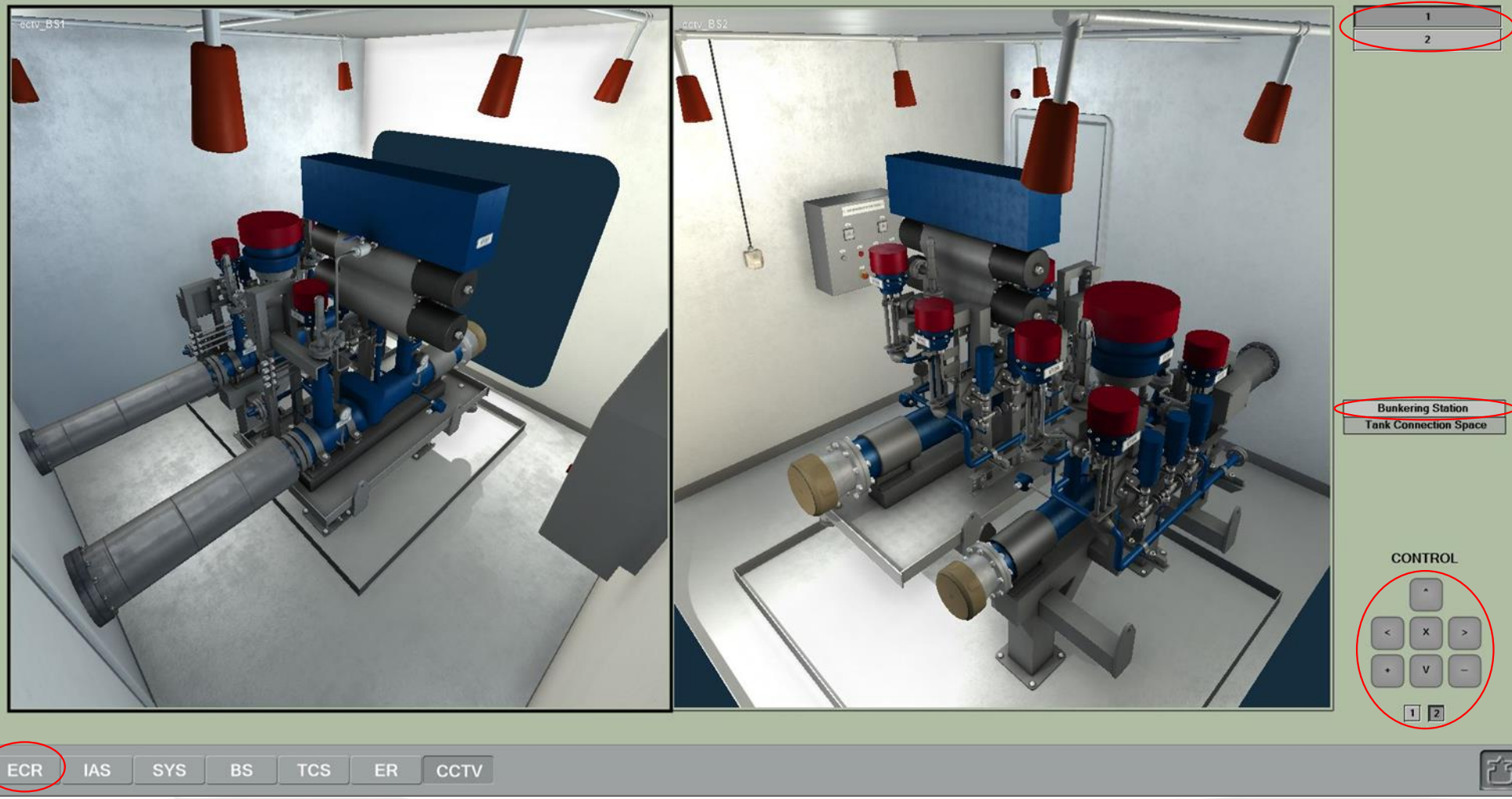
cctv_BS1
cctv_BS2
1
2
Bunkering Station
Tank Connection Space
CONTROL
ECR
IAS
SYS
BS
TCS
ER
CCTV


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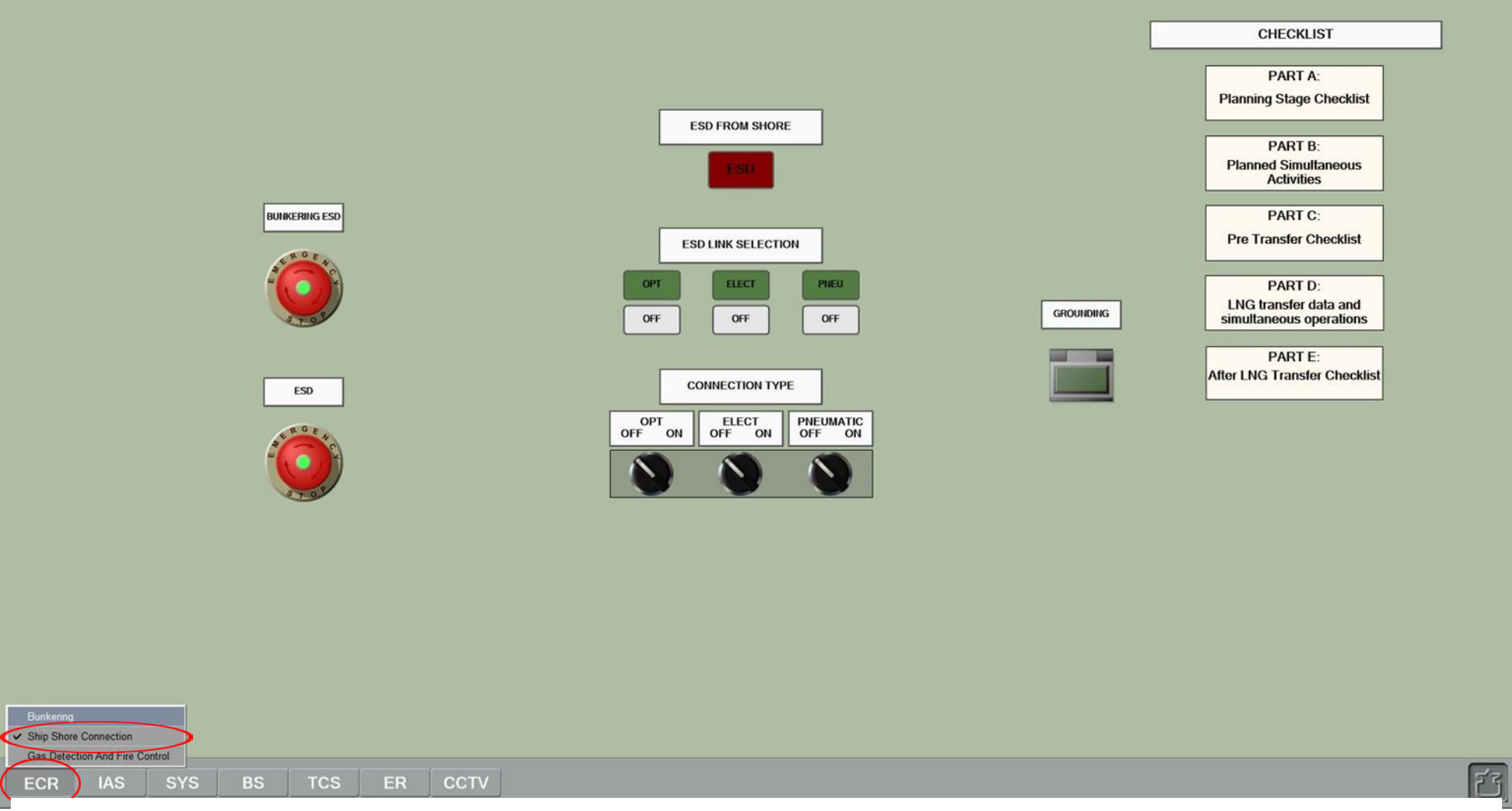
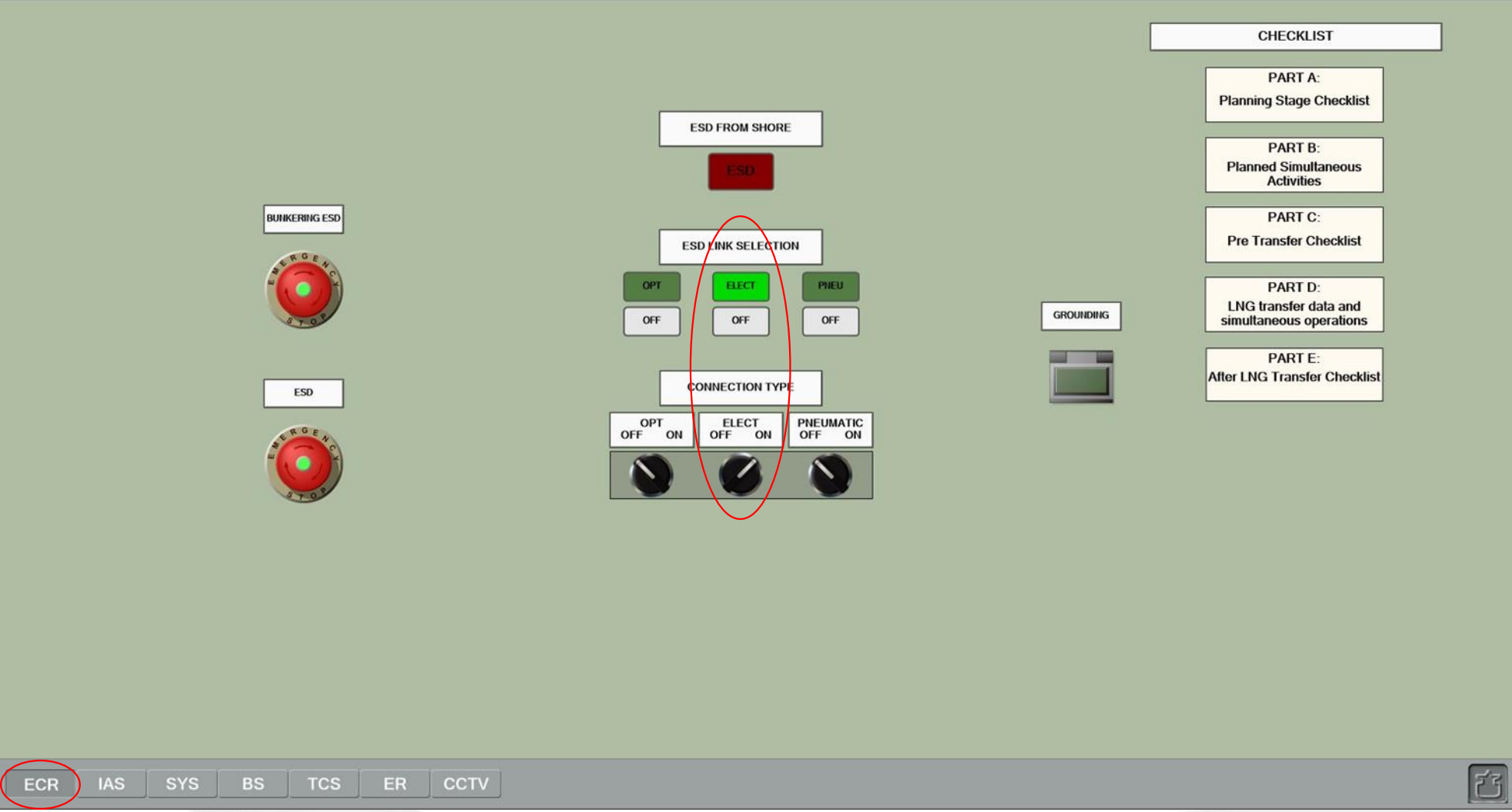
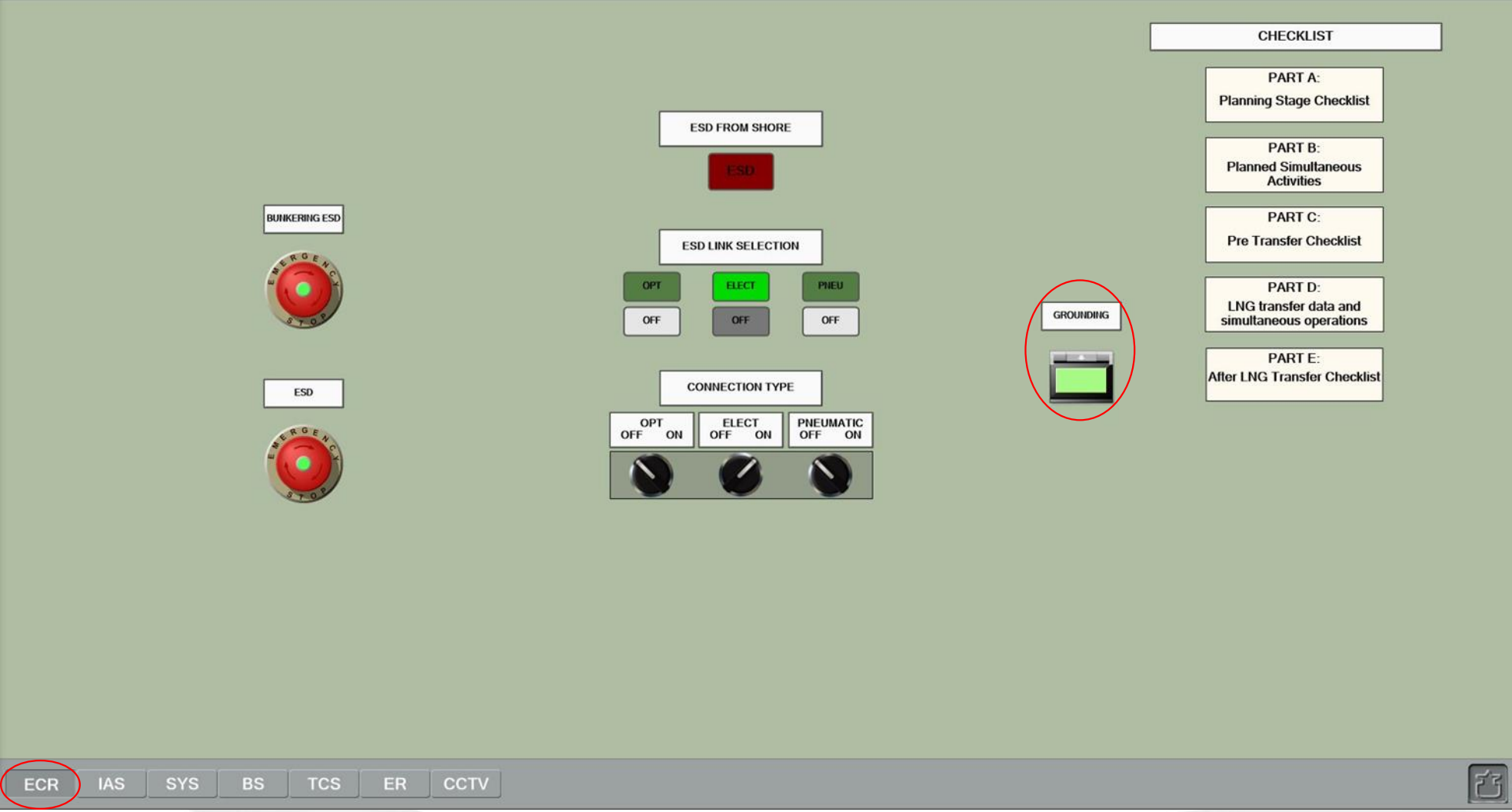


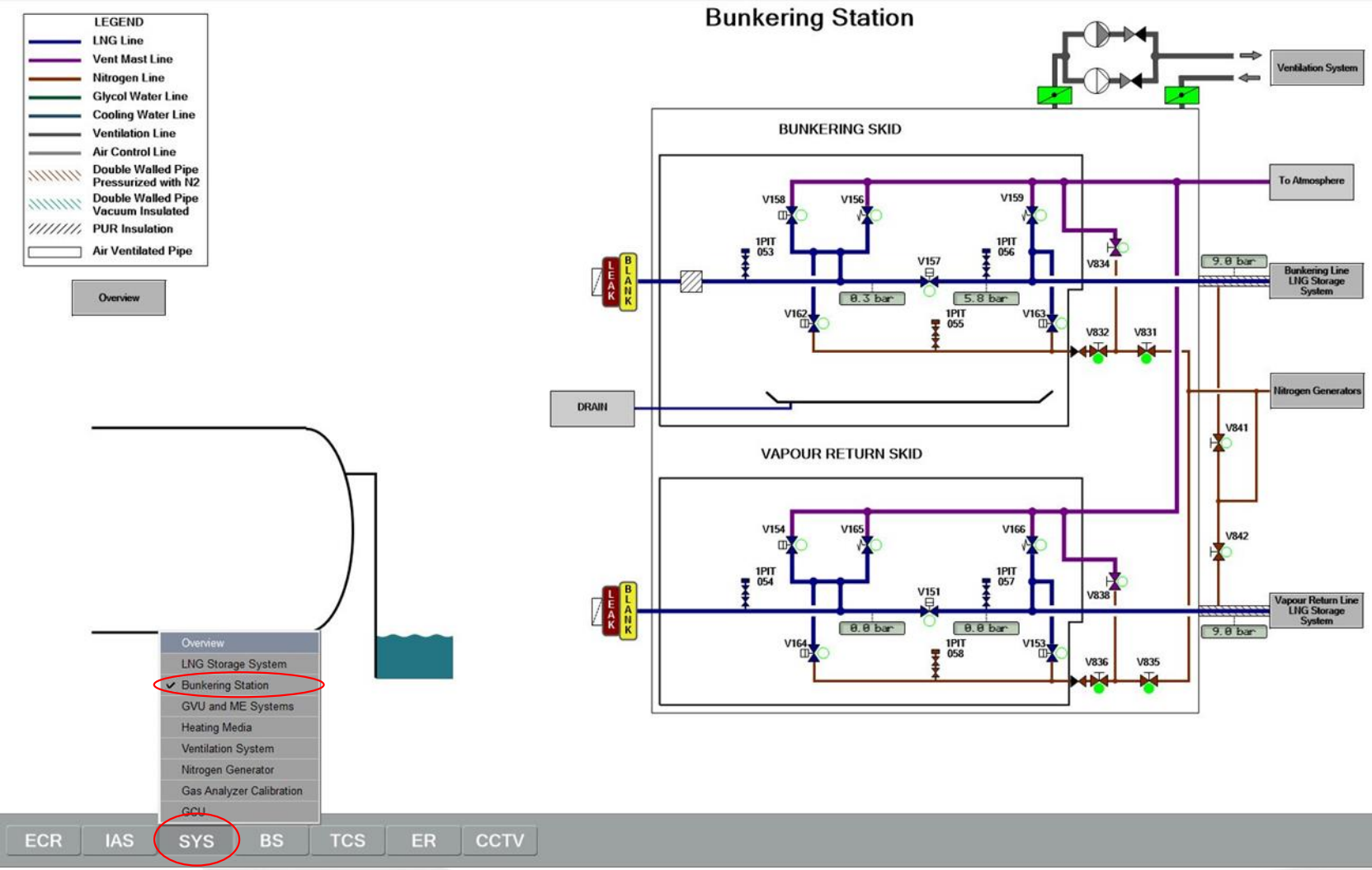

01. Connect the earthing cable and check the ship-to-shore link.




- Go to the ECR > Ship Shore Connection page. Change the ELECT switch state to ON to turn on the electrical ship-to-shore connection.




- Click the Grounding button to remove the protecting coating. Click the button for the second time to connect the earthing cable. The lamp inside the button should light up.




Connect loading hose to the ship‘s manifold

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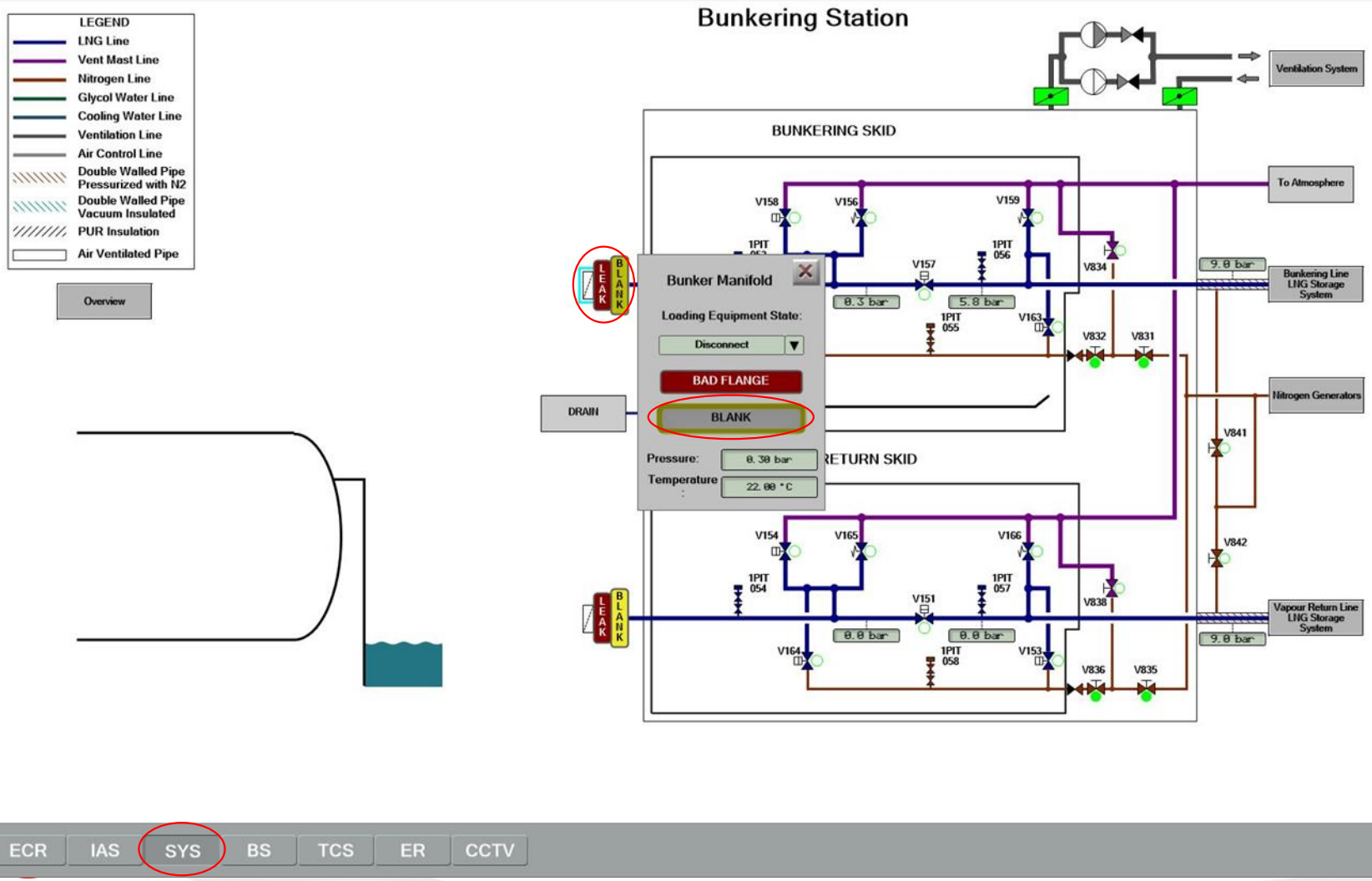
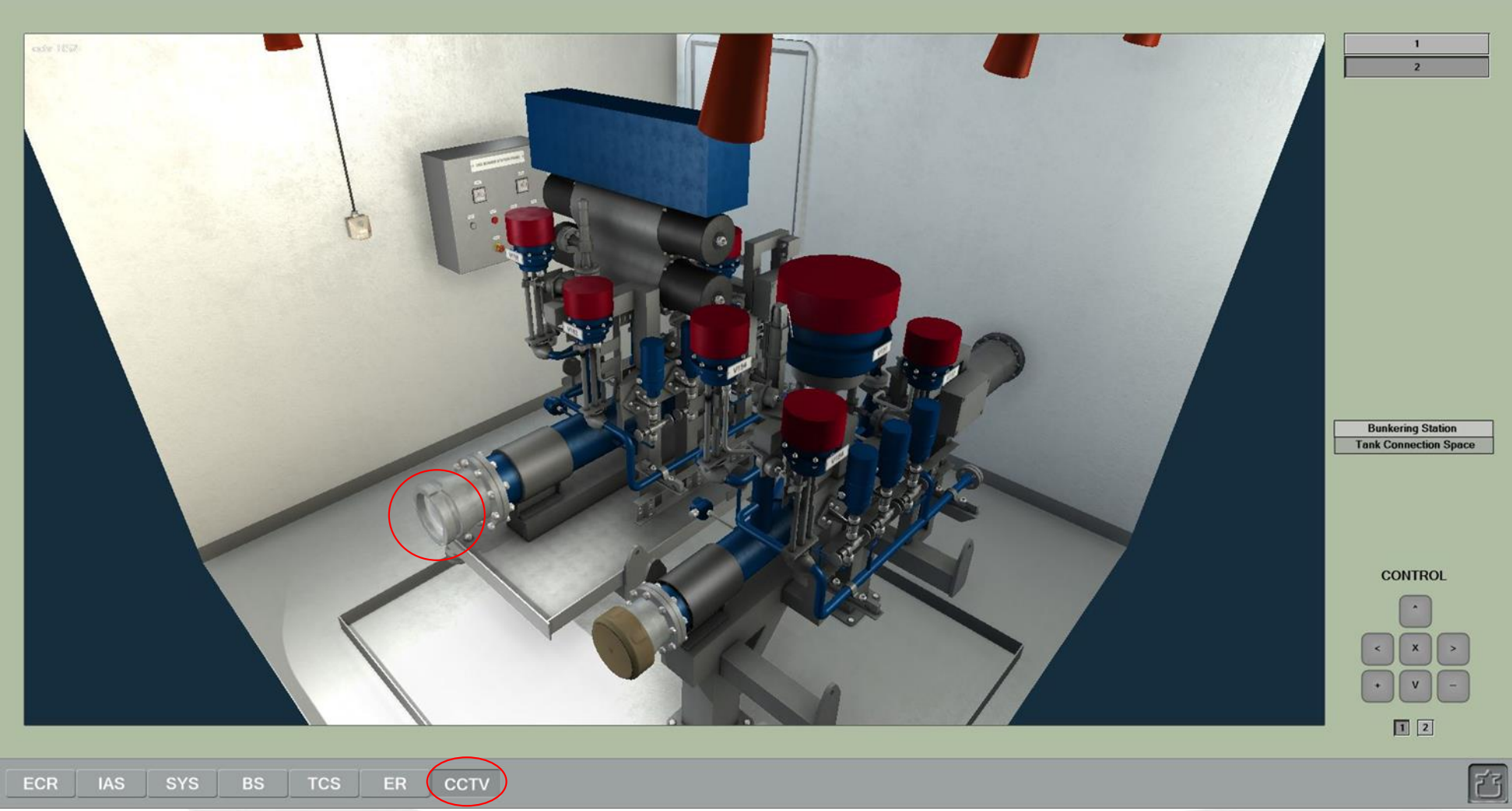
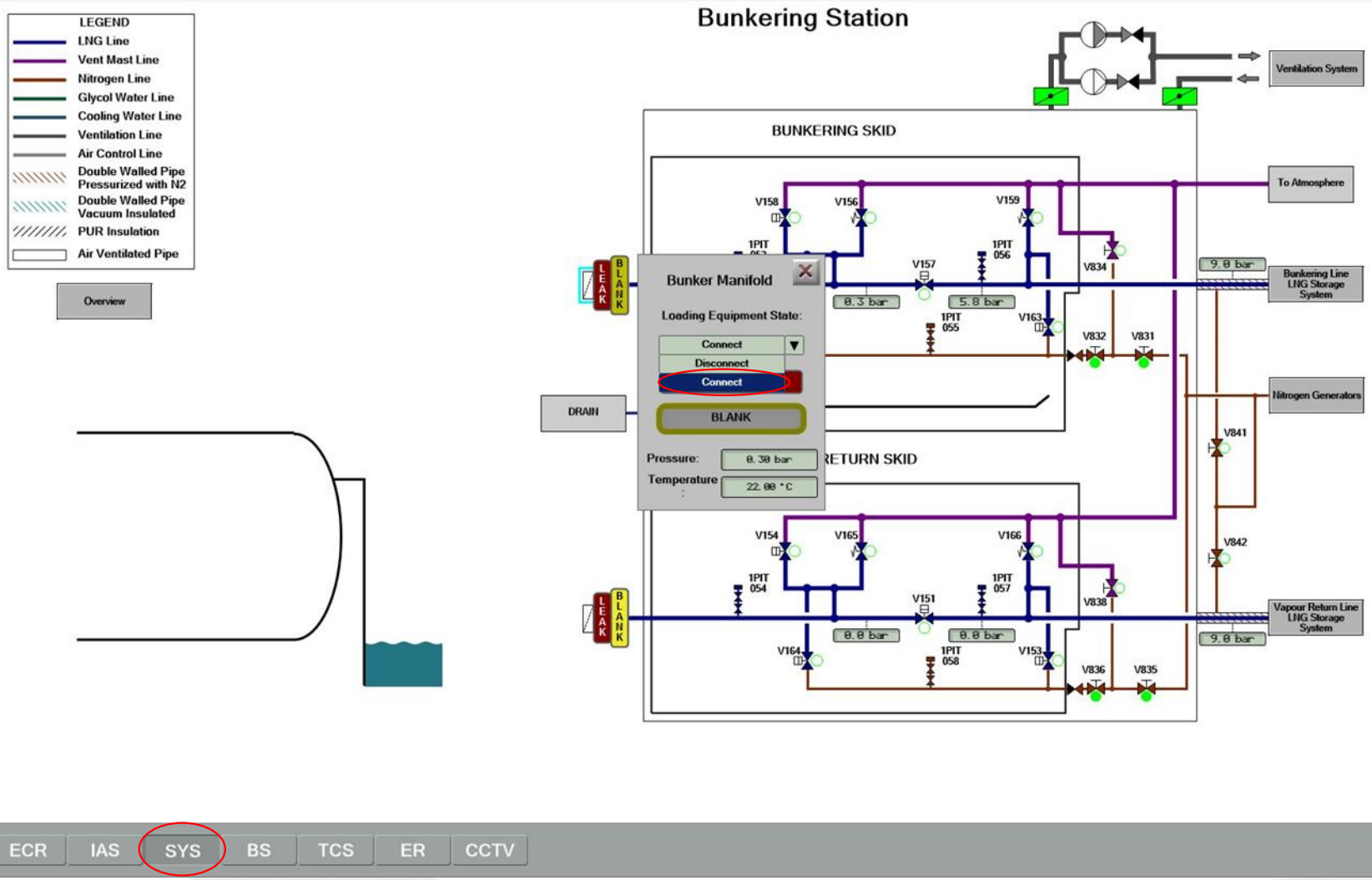



02 Remove the protection blank flange from the bunkering manifold.

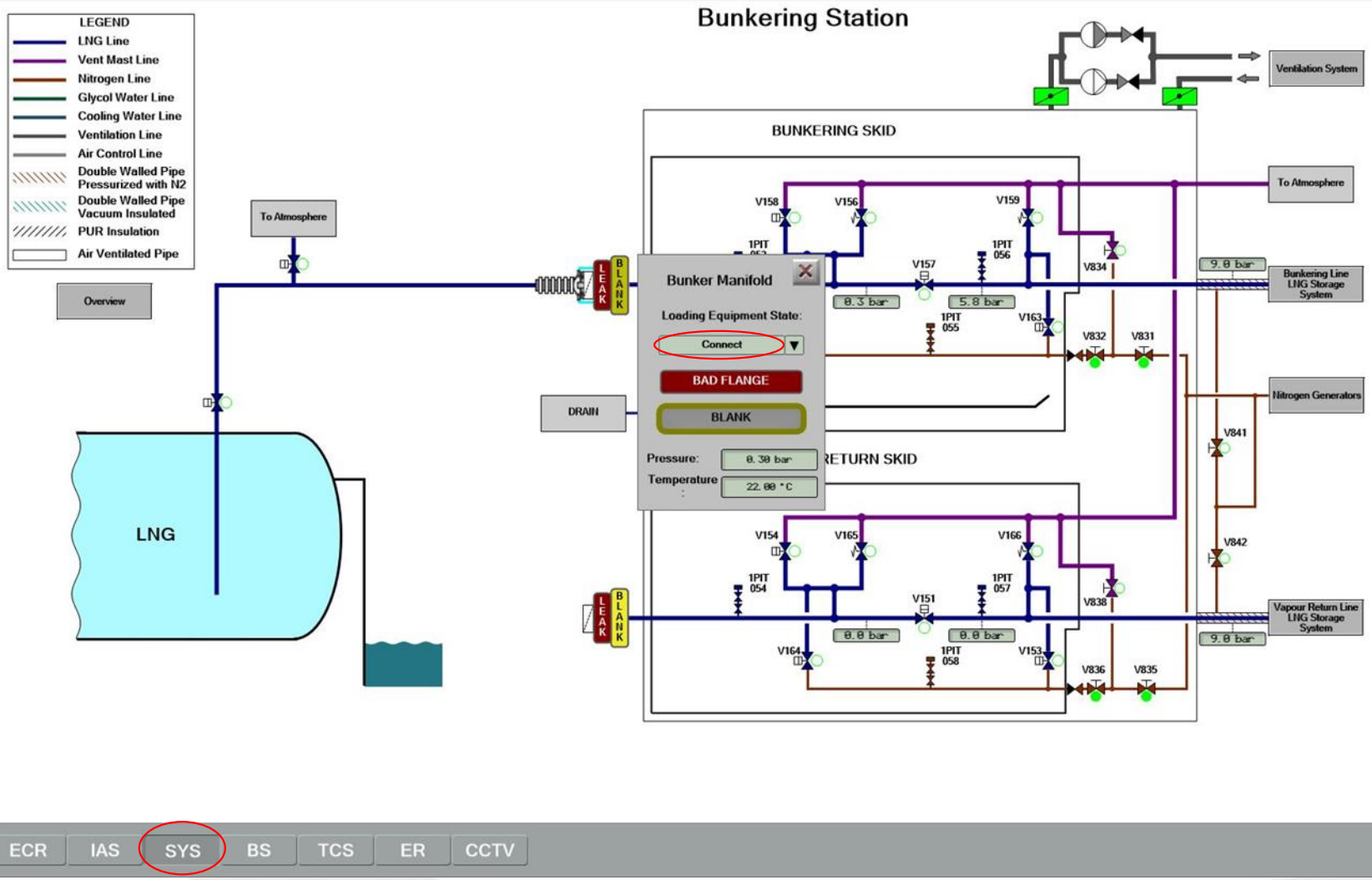
- Select the bunkering manifold. Click the BLANK button to remove the blank flange



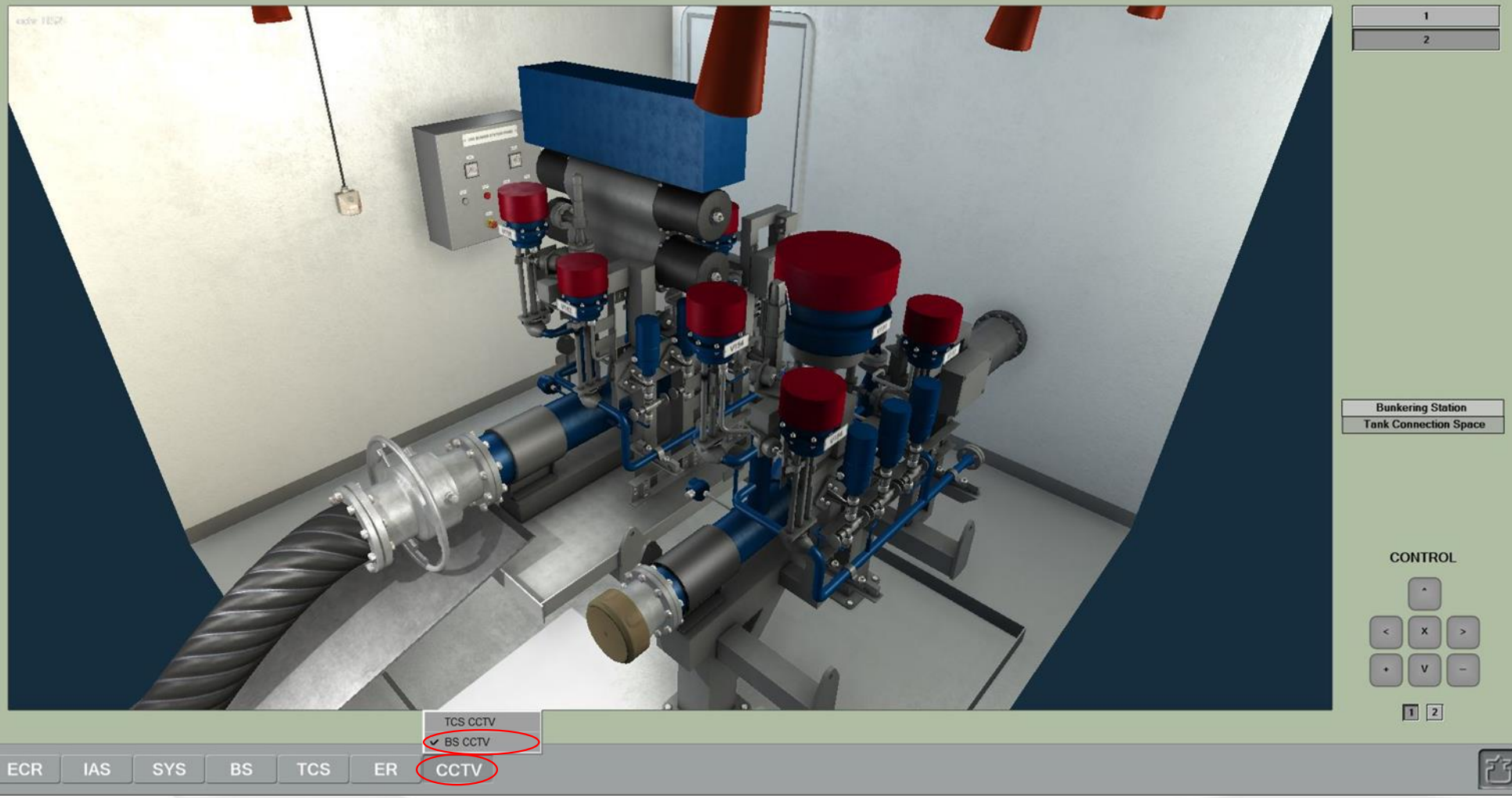

Check or the protection blank flange from the bunkering manifold is removed.




Connect loading hose to the ship‘s manifold. Select **Connect** for the Loading Equipment State in the combobox




Loading hose is connected to the ship‘s manifold.

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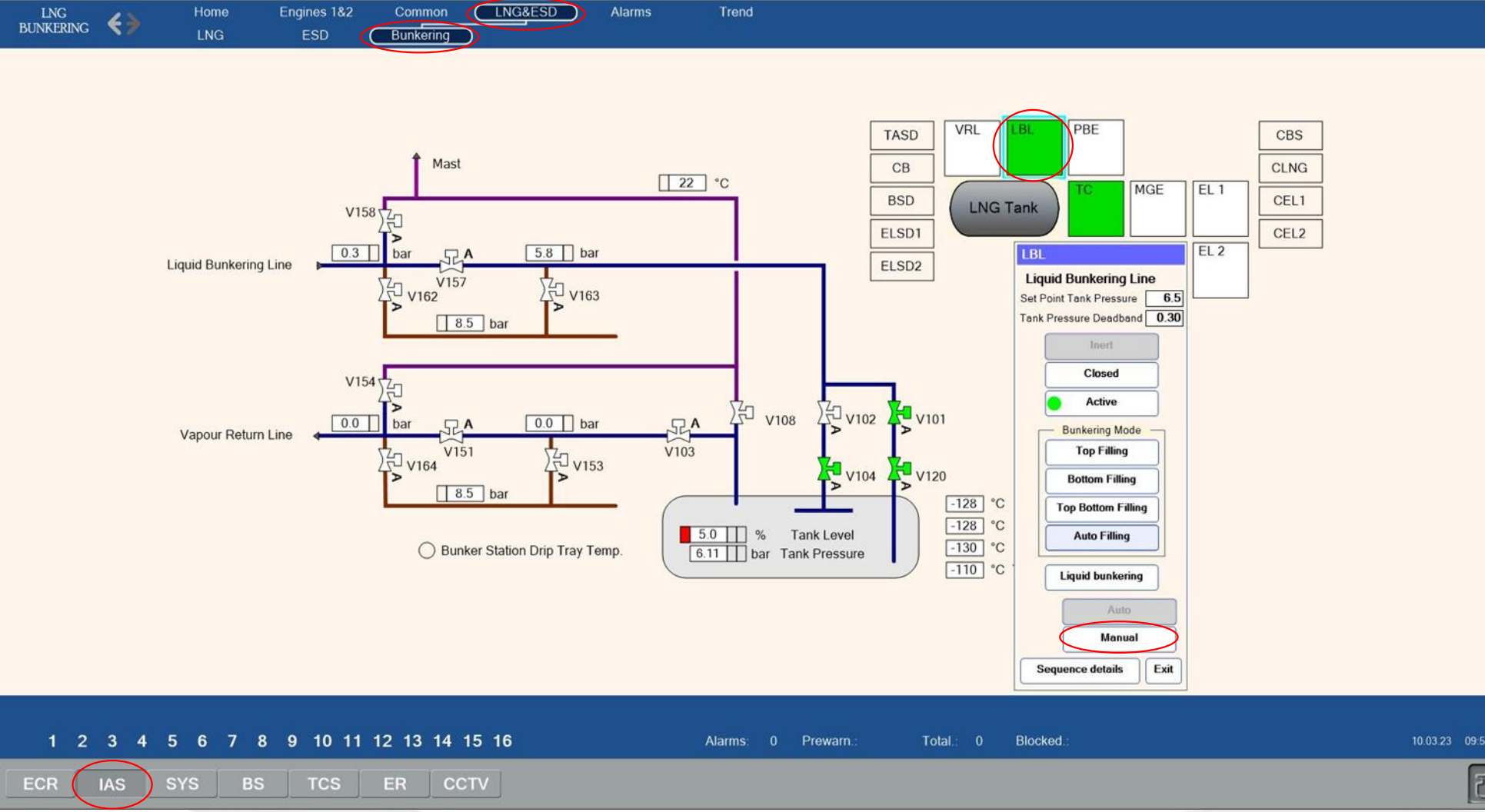
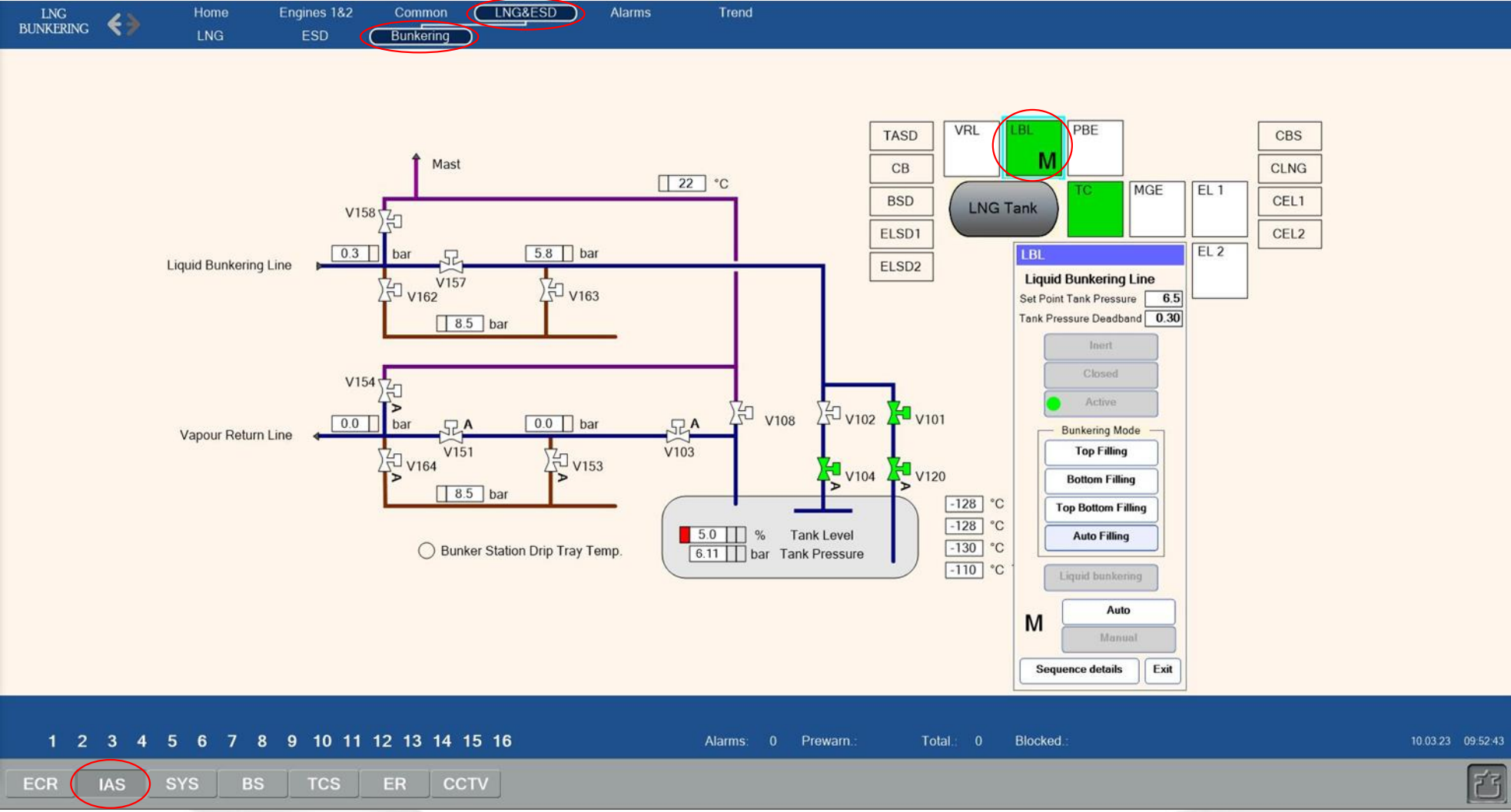



Inert the hose

04 Switch the bunkering line control to the manual mode.

- Go to the IAS > LNG&ESD > Bunkering page to switch the bunkering line control to the manual mode. Select the LBL control box and press the Manual button.




LBL control status is changed to **M** (**Manual)**


Inert the hose

05 Prepare bunker manifold for inerting.

- Go to the ECR > Bunkering page.
- Select Venting for the Bunker Manifold State in the combobox.

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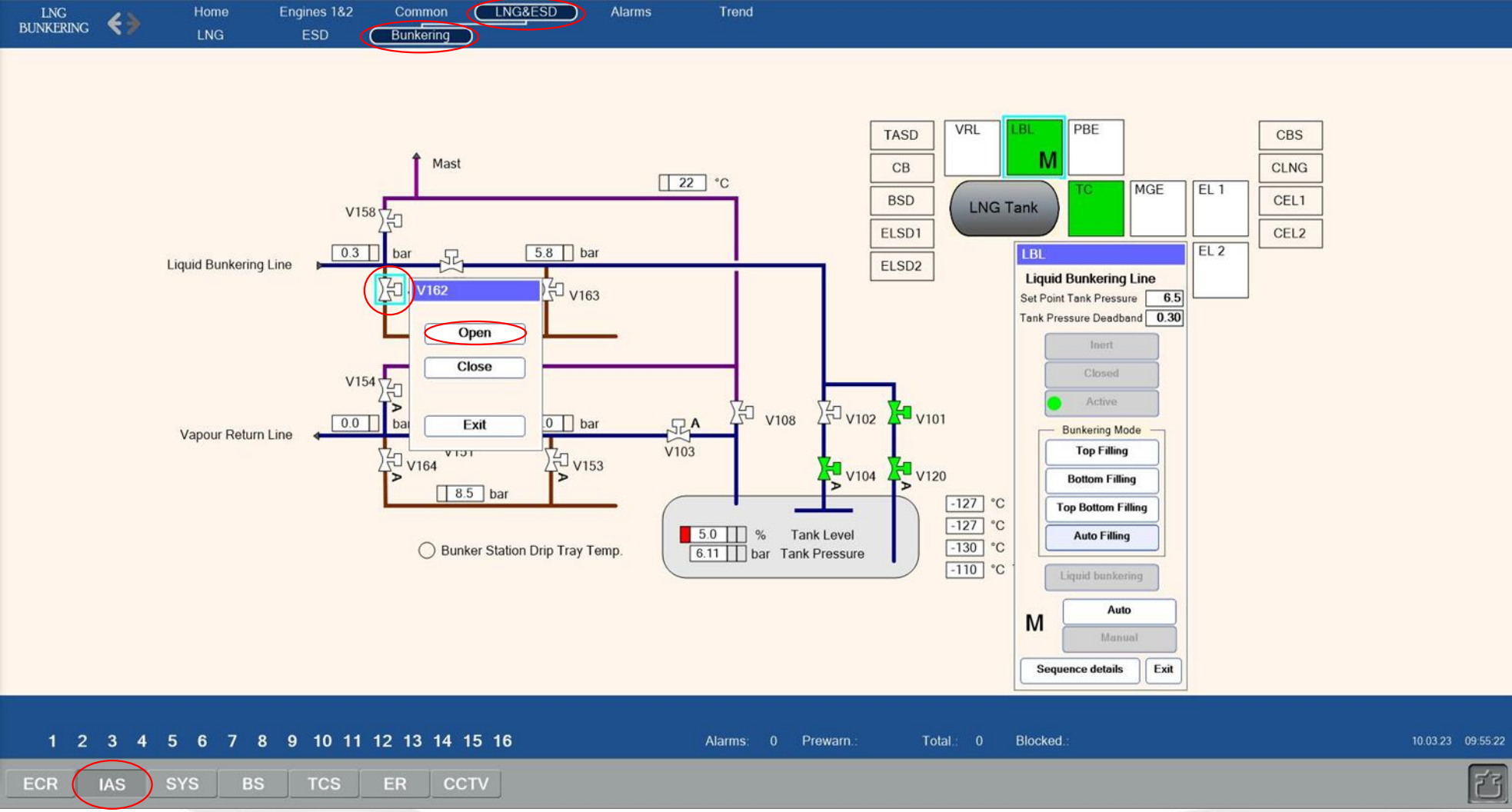


Inert the hose

06 Supply nitrogen to the pipeline and the hose.

- Go to the ECR > Bunkering page.
- Select valve V162 and click the Open button.

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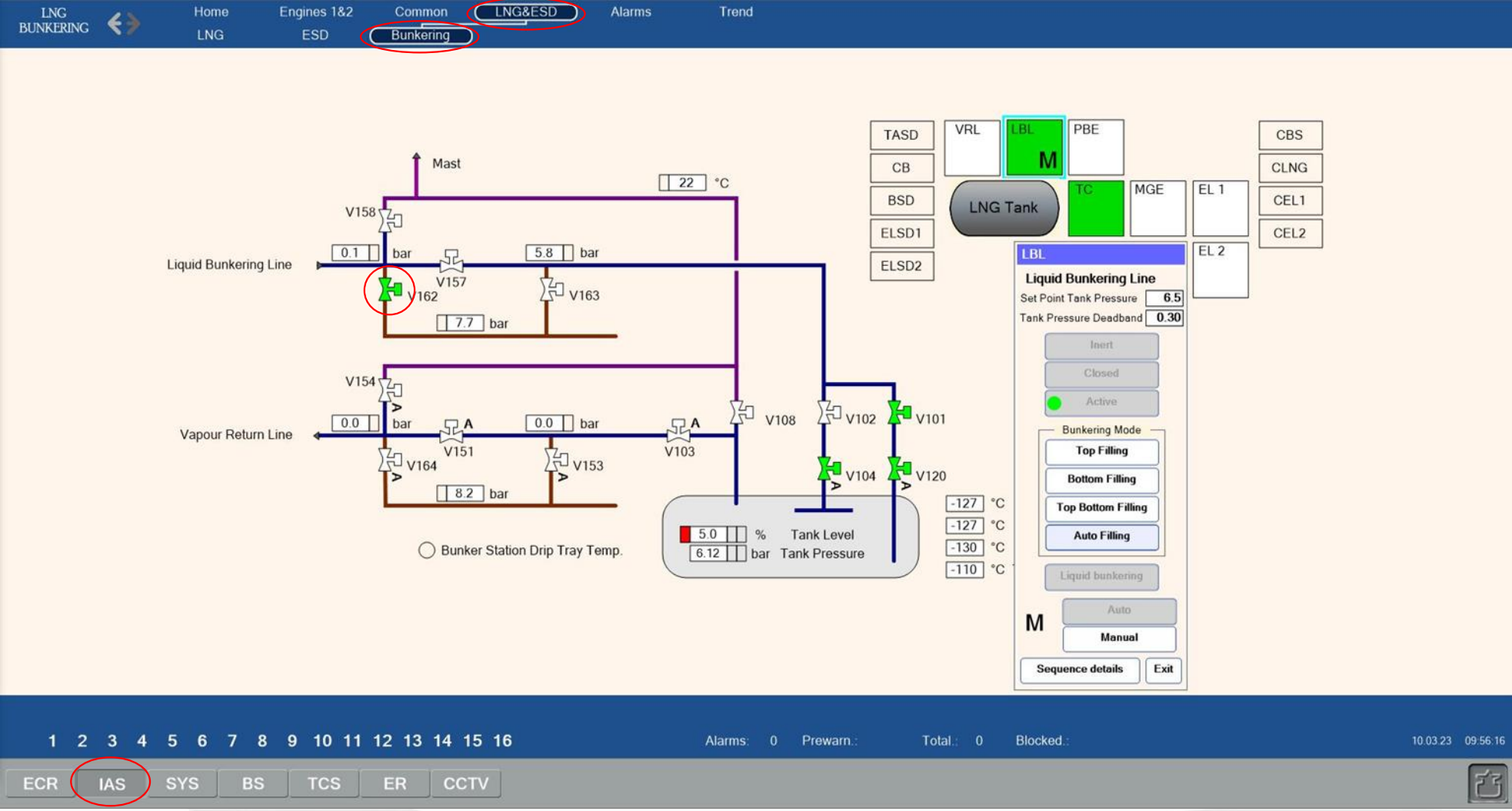
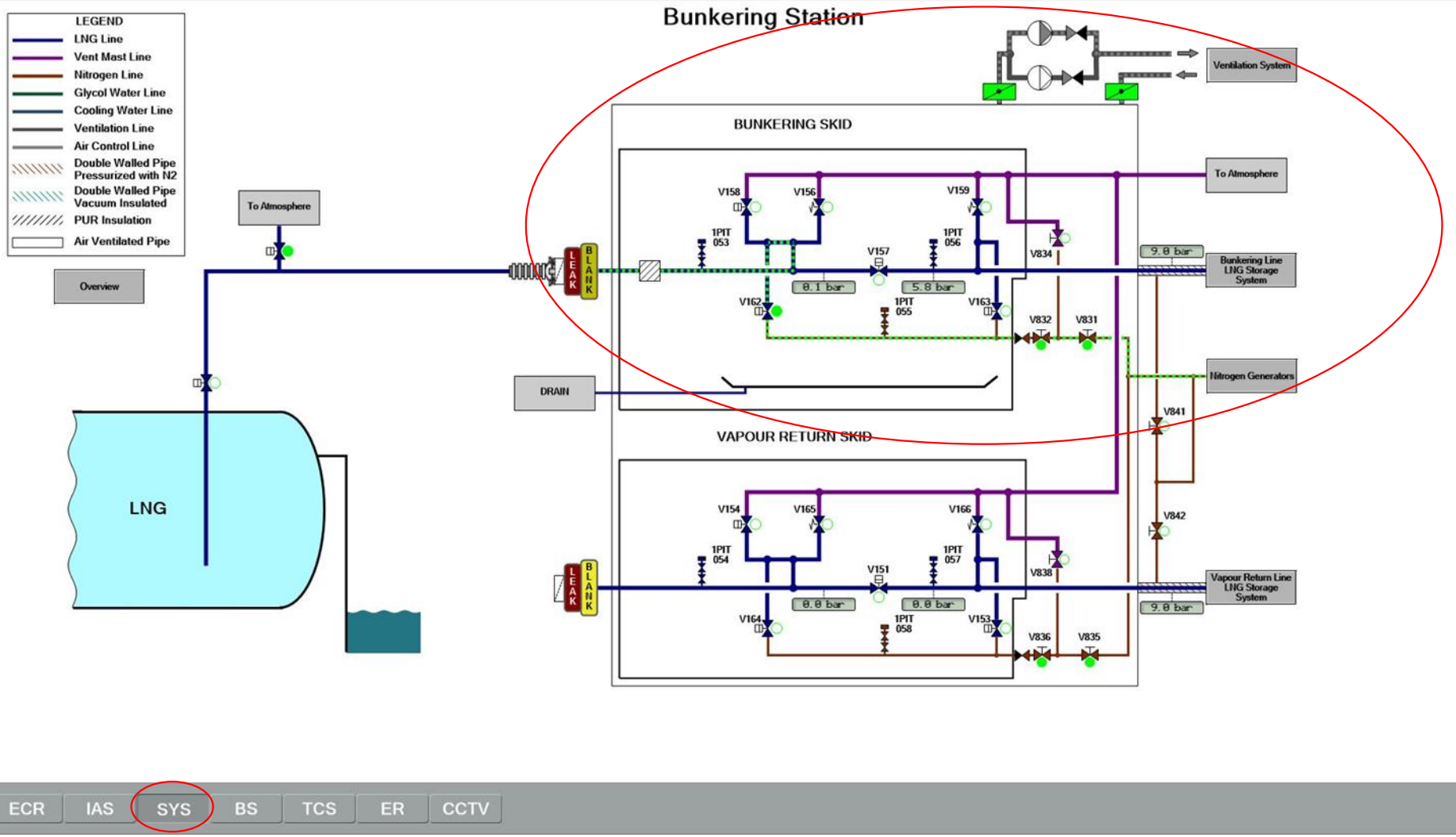



Valve V162 is opened.

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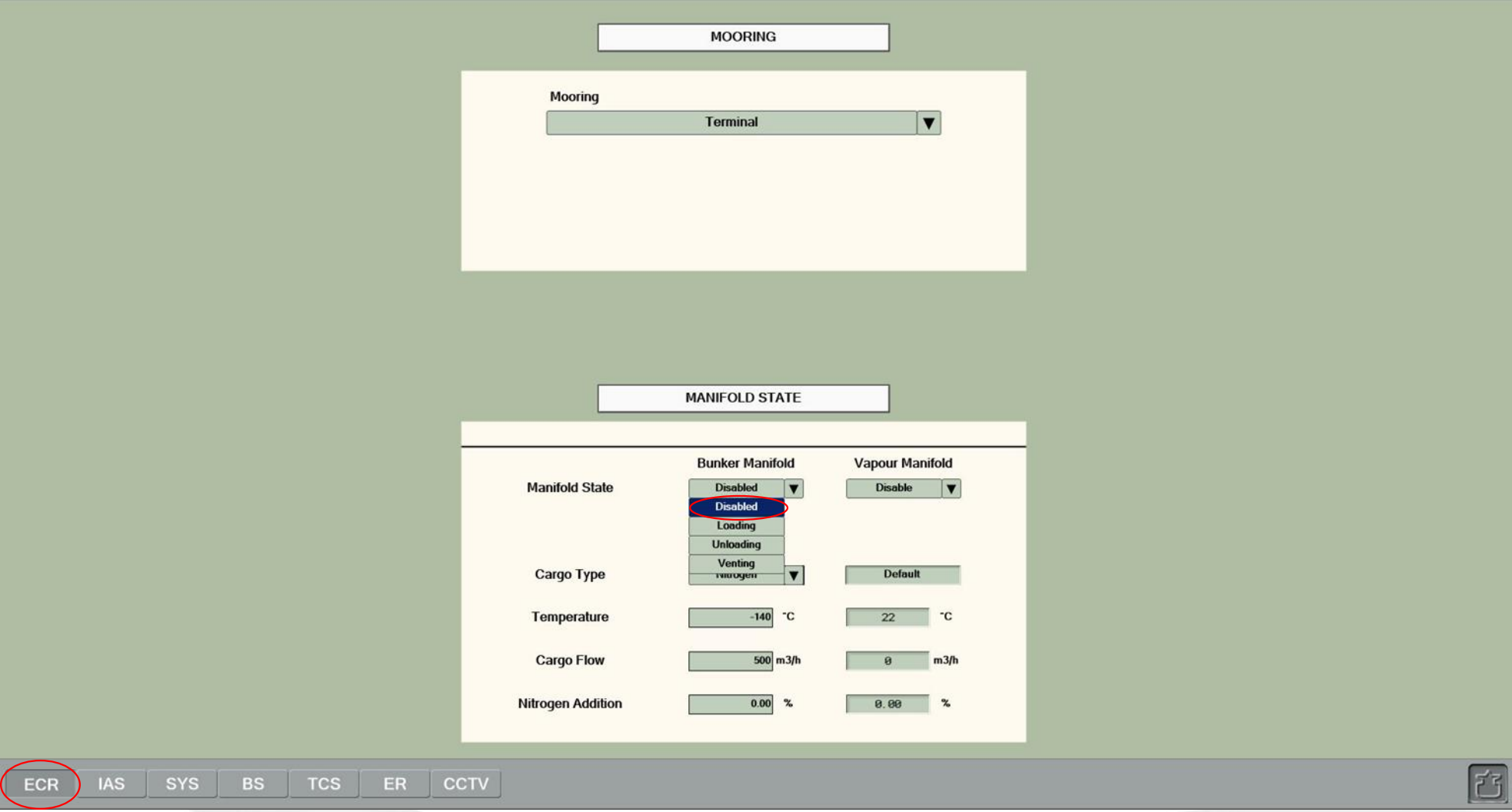
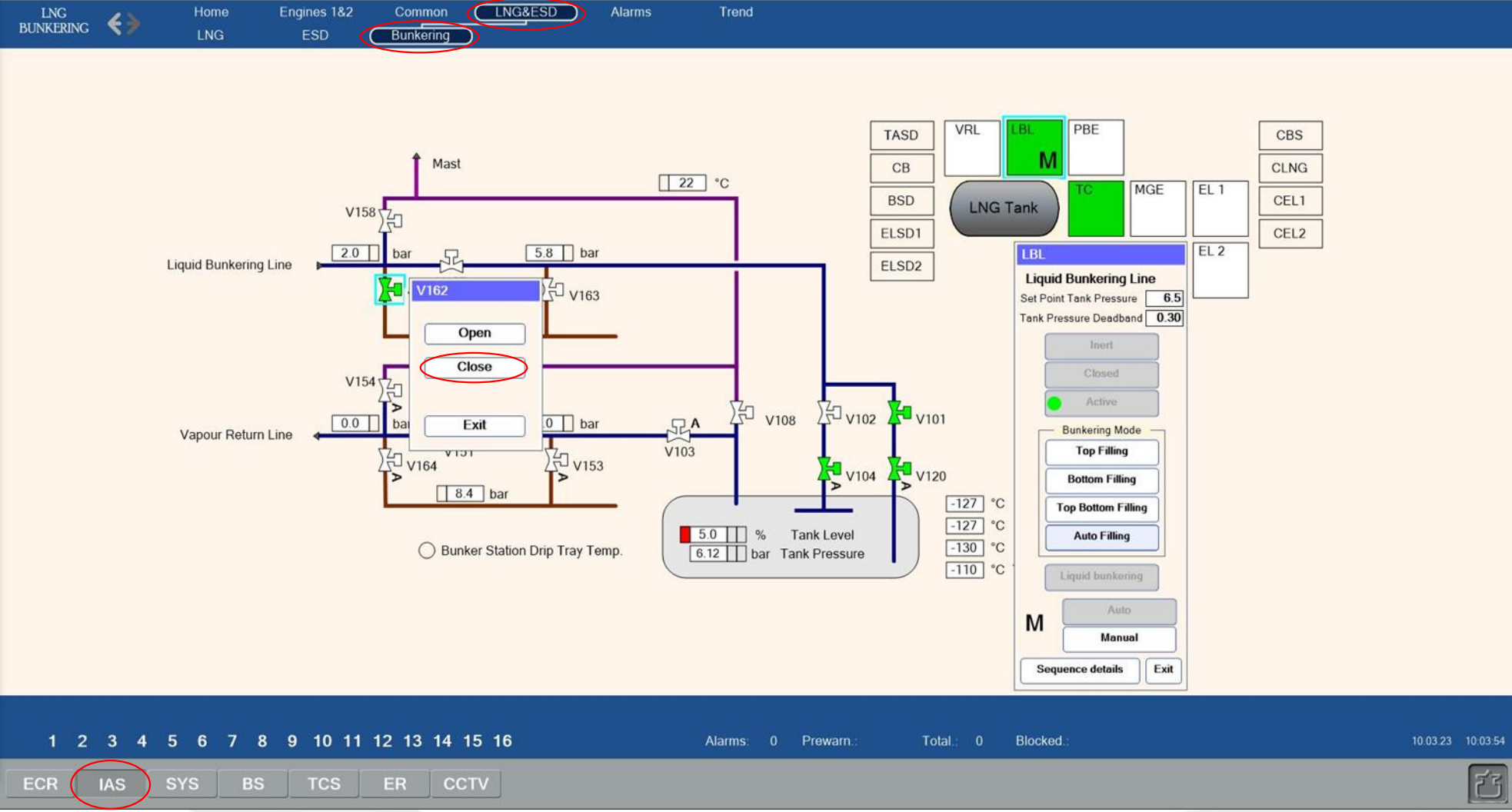
07 Let the inert gas flow through the hose and the piping until the inerting is considered complete.
Stop the inerting process after reasonable amount of time by disabling the bunkering manifold ventilation mode.
- The required inerting time depends on the total pipe volume and the available nitrogen flow.
- Check flow from the SYS > Bunkering Station page (hints should be turned on)




Select the Disabled Manifold state for the Bunker Manifold.




Commence loading of LNG from terminal to ship‘s tank. 08 Pressurize the hose and check connections for leakage.

- Ensure the pressure in the hose is not less than 2 bars.
- Close valve V162. Go to the IAS > LNG&ESD > Bunkering page.
- Select valve V162 and click the Close button.

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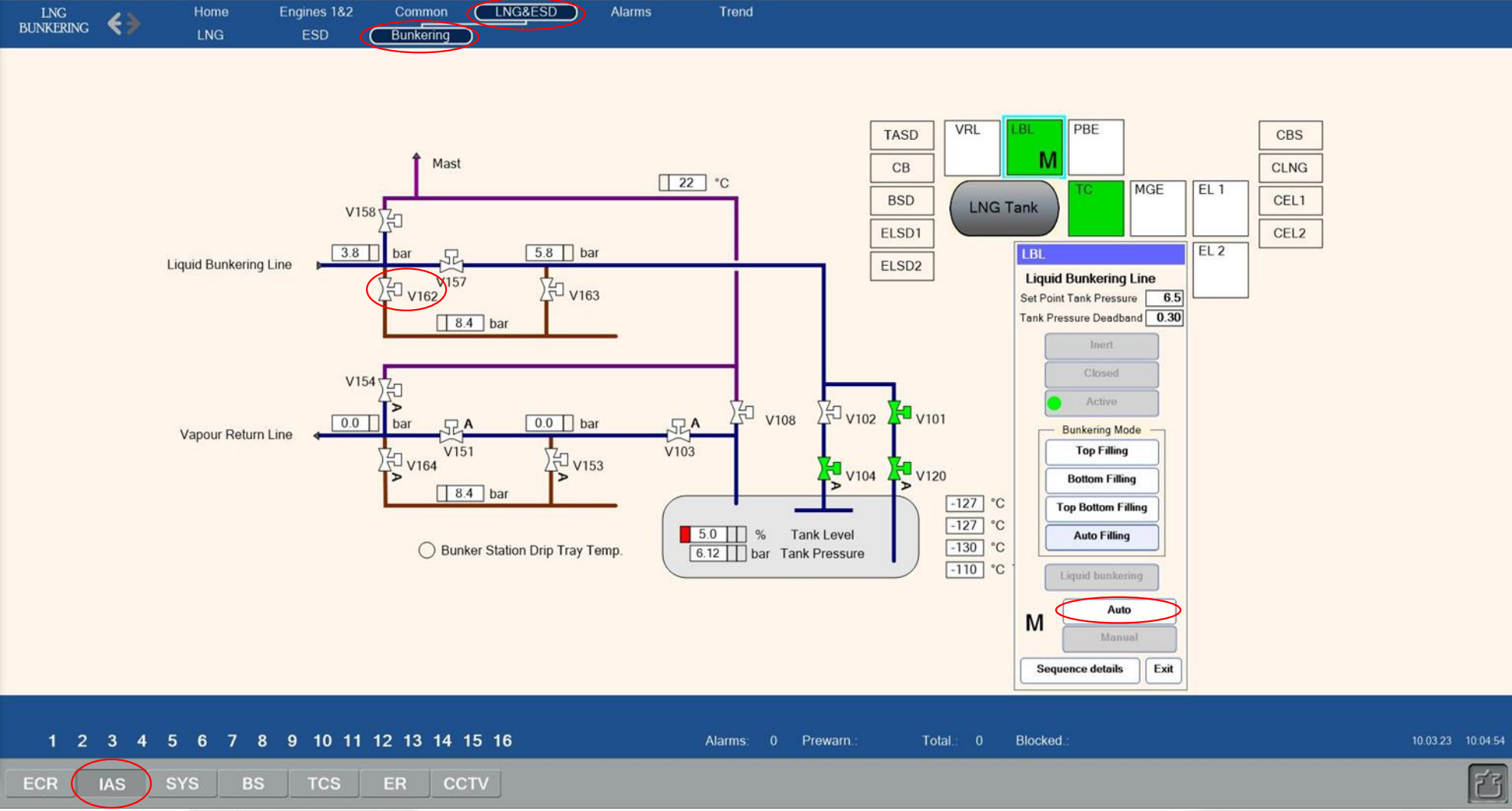


Commence loading of LNG from terminal to ship‘s tank.
Valve V162 is closed. If no leakage is observed, return the system to the automatic mode.
- Check pressure reading from the PIT053 sensor and confirm the pressure is constant.
- Select the LBL control box and press the Auto button.

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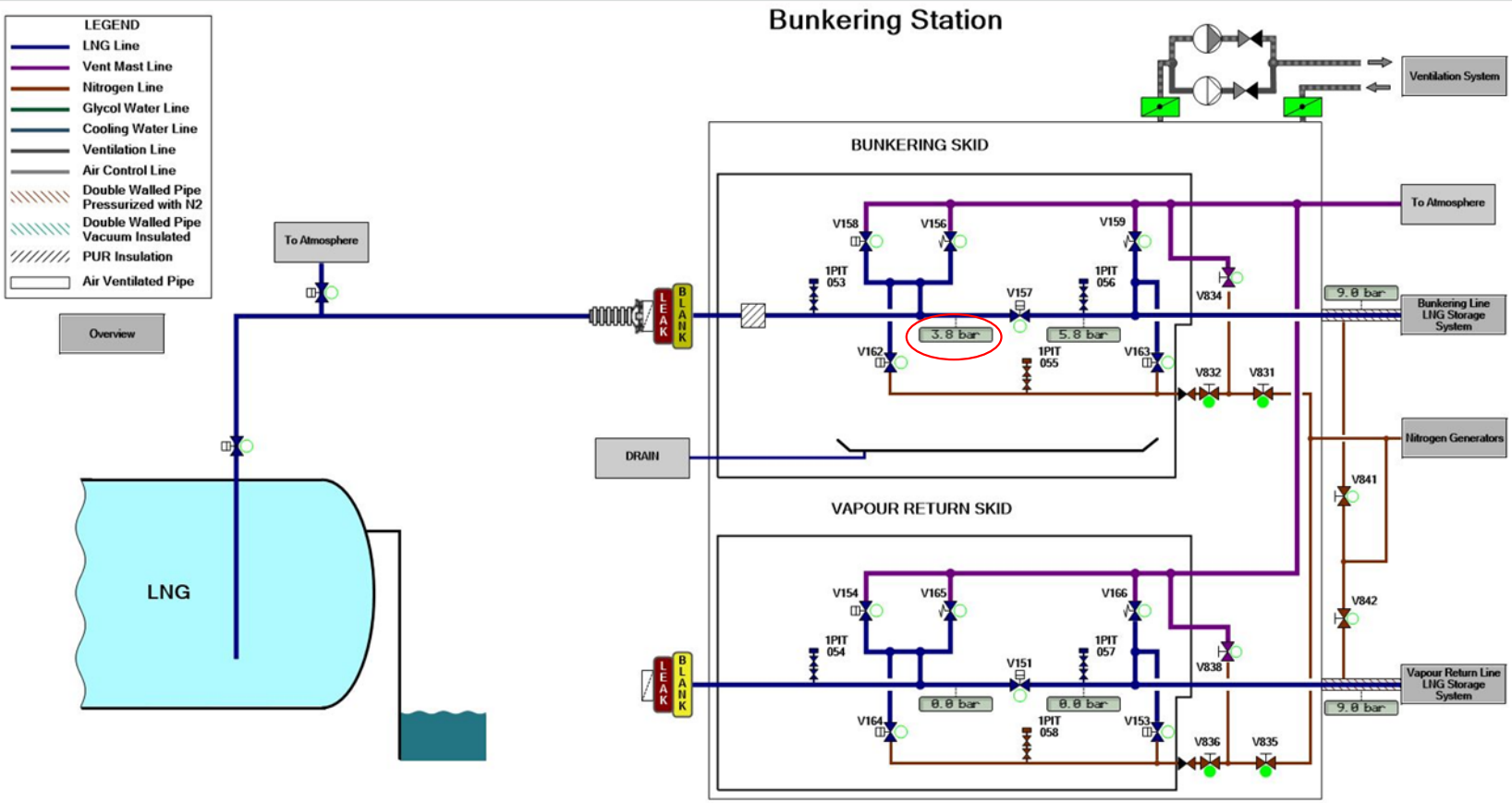


ECR | IAS | SYS | BS | TCS | ER | CCTV

Commence loading of LNG from terminal to ship‘s tank.

- Check pressure reading from the **PIT053** sensor and confirm the pressure is constant.

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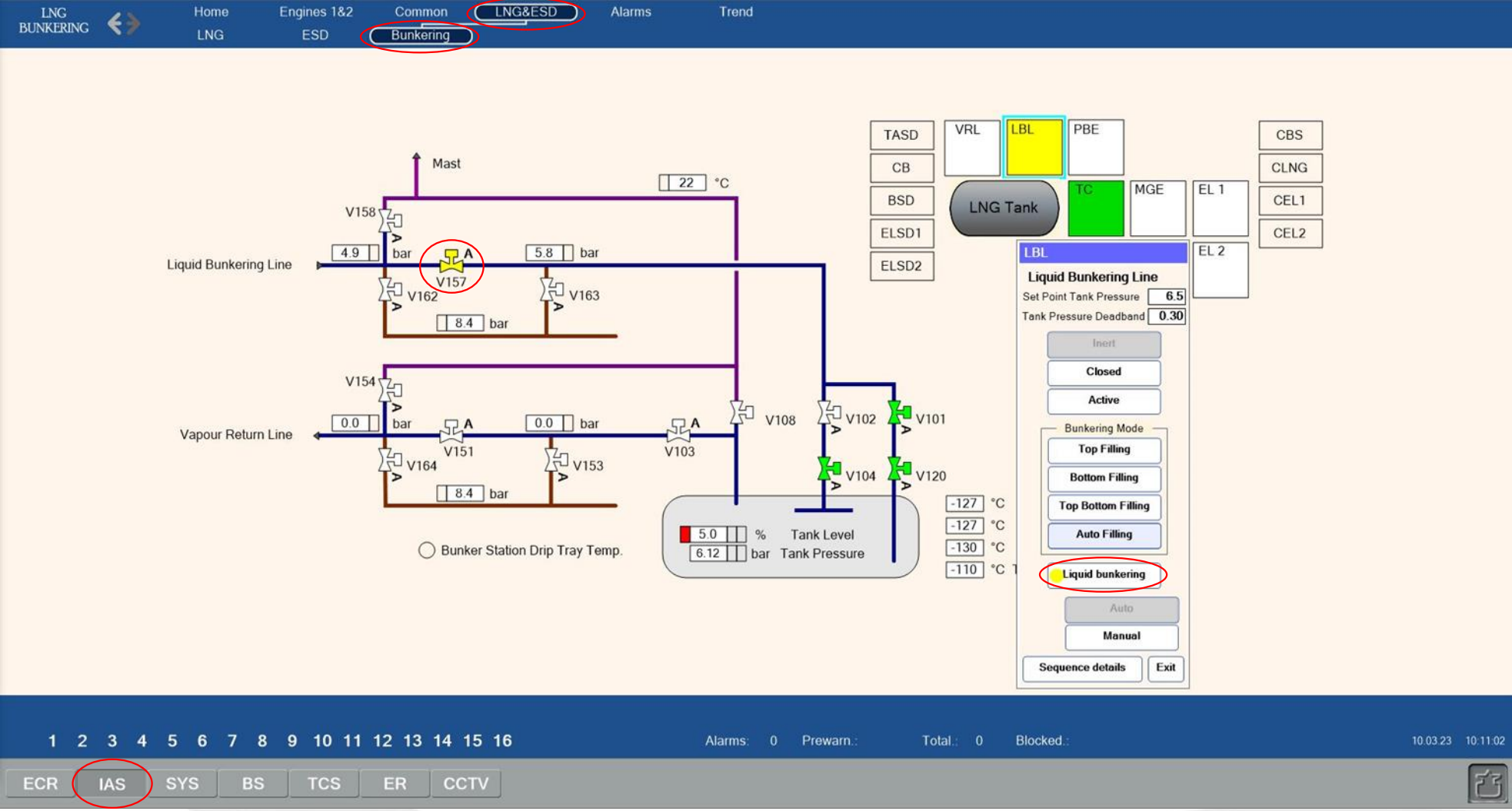
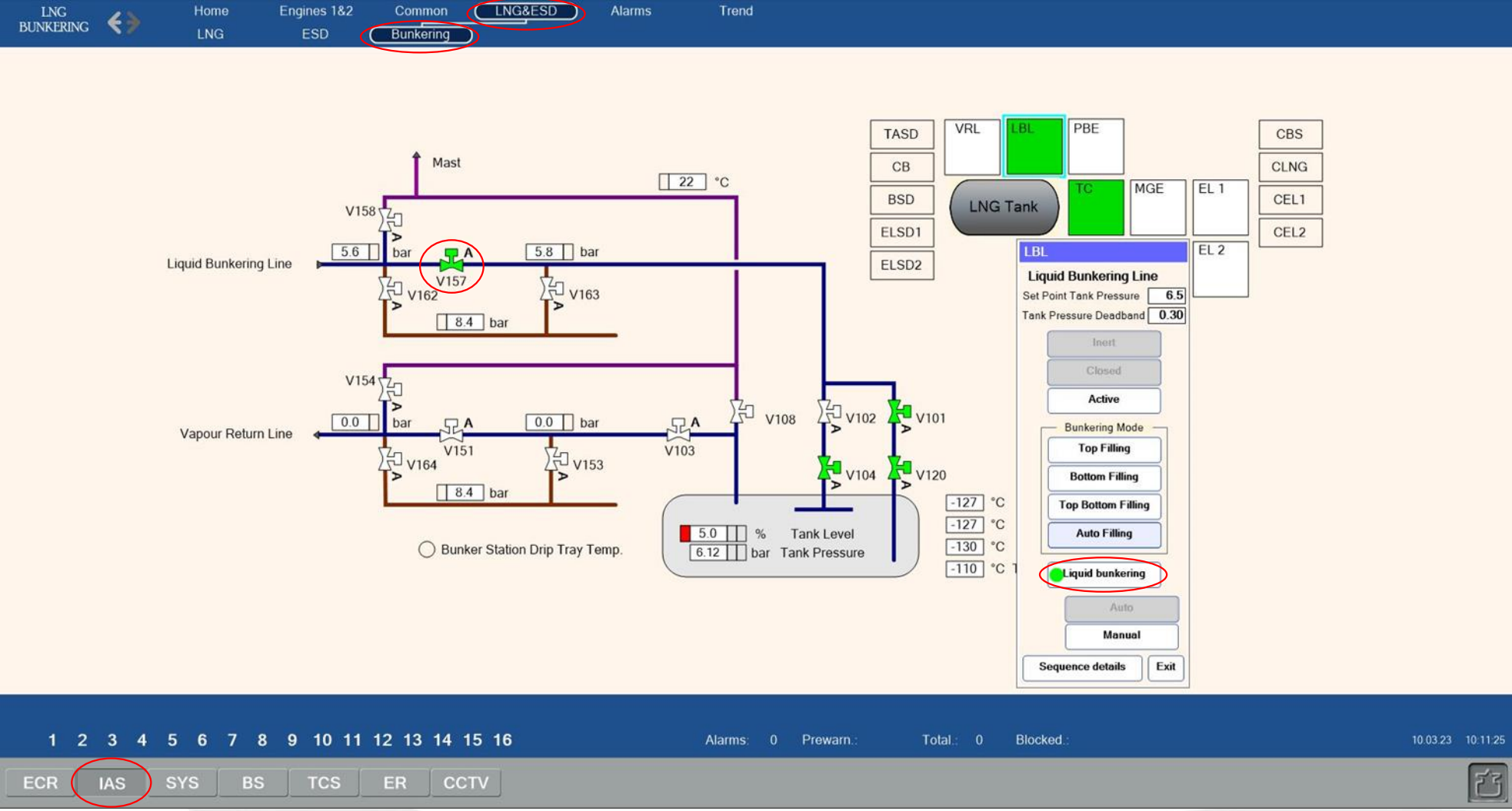
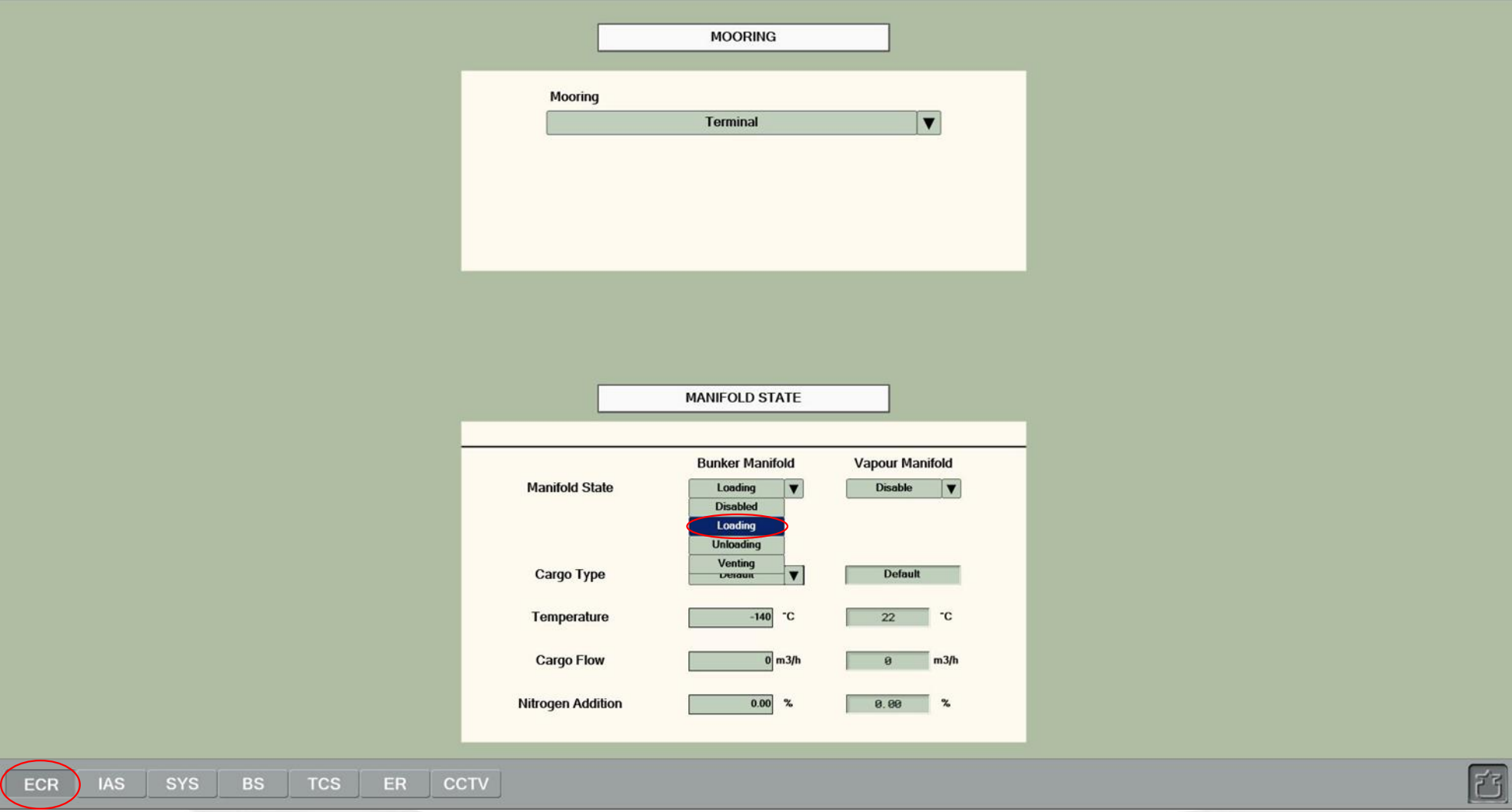



Commence loading of LNG from terminal to ship‘s tank
10 Switch on the automation for the bunkering.
- Select the LBL control box and press the Liquid bunkering button.
Bunkering valve V157 will open automatically


LNG BUNKERING
Home
Engines 1&2
Common
LNG&ESD
Alarms
Trend
LNG
ESD
Bunkering
TASD
CB
BSD
ELSD1
ELSD2
VRL
LBL
PBE
LNG Tank
TC
MGE
EL 1
EL 2
CBS
CLNG
CEL1
CEL2
Mast
22 °C
V158
Liquid Bunkering Line
5.6 bar
V157
5.8 bar
V162
V163
8.4 bar
V154
Vapour Return Line
0.0 bar
V151
0.0 bar
V164
V153
8.4 bar
V103
V108
V102
V101
V104
V120
-127 °C
-127 °C
-130 °C
-110 °C
5.0 % Tank Level
6.12 bar Tank Pressure
Bunker Station Drip Tray Temp.
LBL
Liquid Bunkering Line
Set Point Tank Pressure 6.5
Tank Pressure Deadband 0.30
Inert
Closed
Active
Bunkering Mode
Top Filling
Bottom Filling
Top Bottom Filling
Auto Filling
Liquid bunkering
Auto
Manual
Sequence details
Exit
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Alarms: 0 Prewarn.: Total.: 0 Blocked.:
10.03.23 10:11:25
ECR
IAS
SYS
BS
TCS
ER
CCTV




11 Start bunkering with a low flow of LNG.
- Go to the ECR > Bunkering page.
- Select Loading Manifold state for the Bunker Manifold to start bunkering process.

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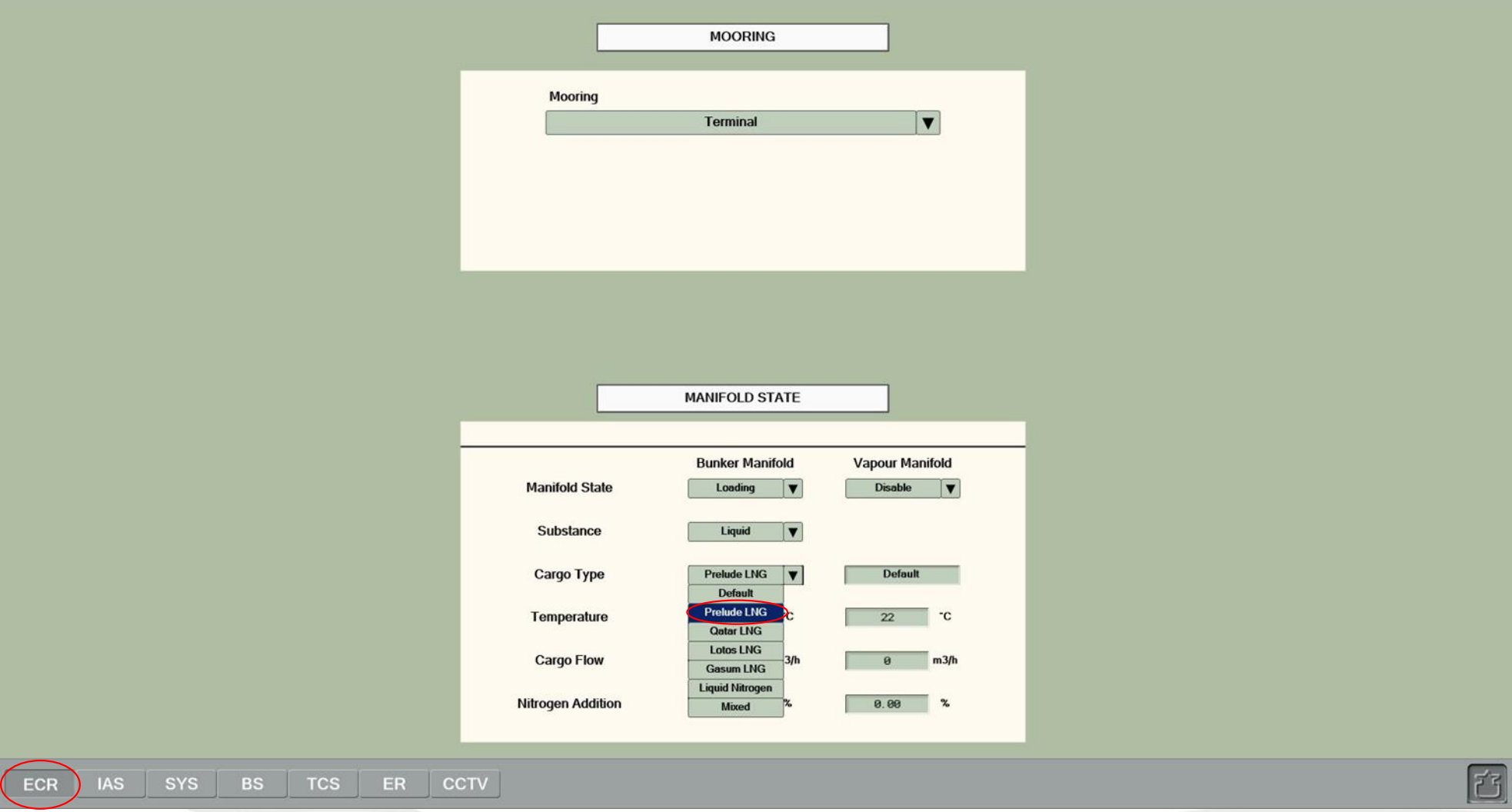


Choose **Prelude LNG** for the Cargo Type.

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Enter a small value (5-15 m³/h) for the desired LNG flow in the Cargo Flow box.

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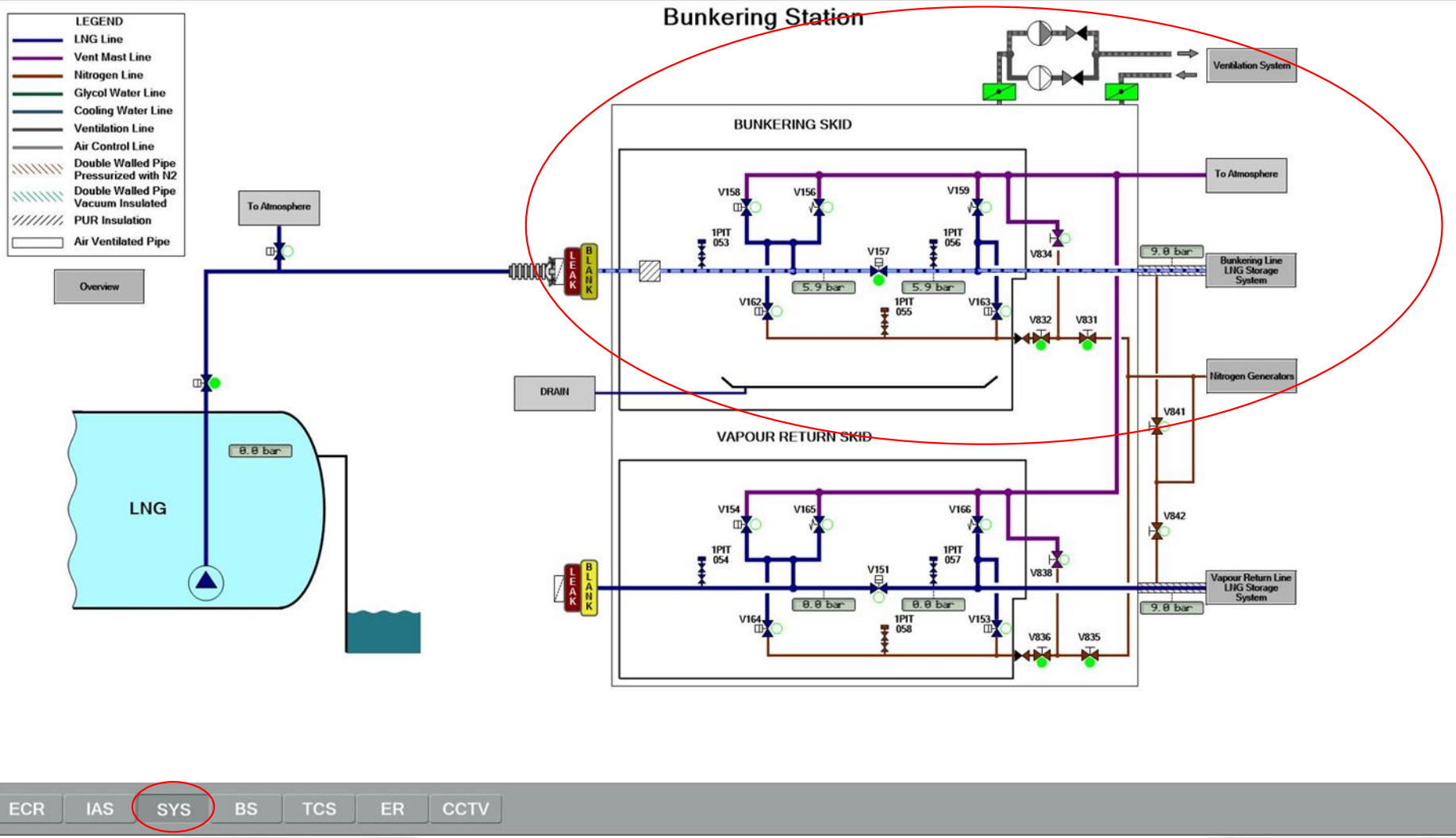
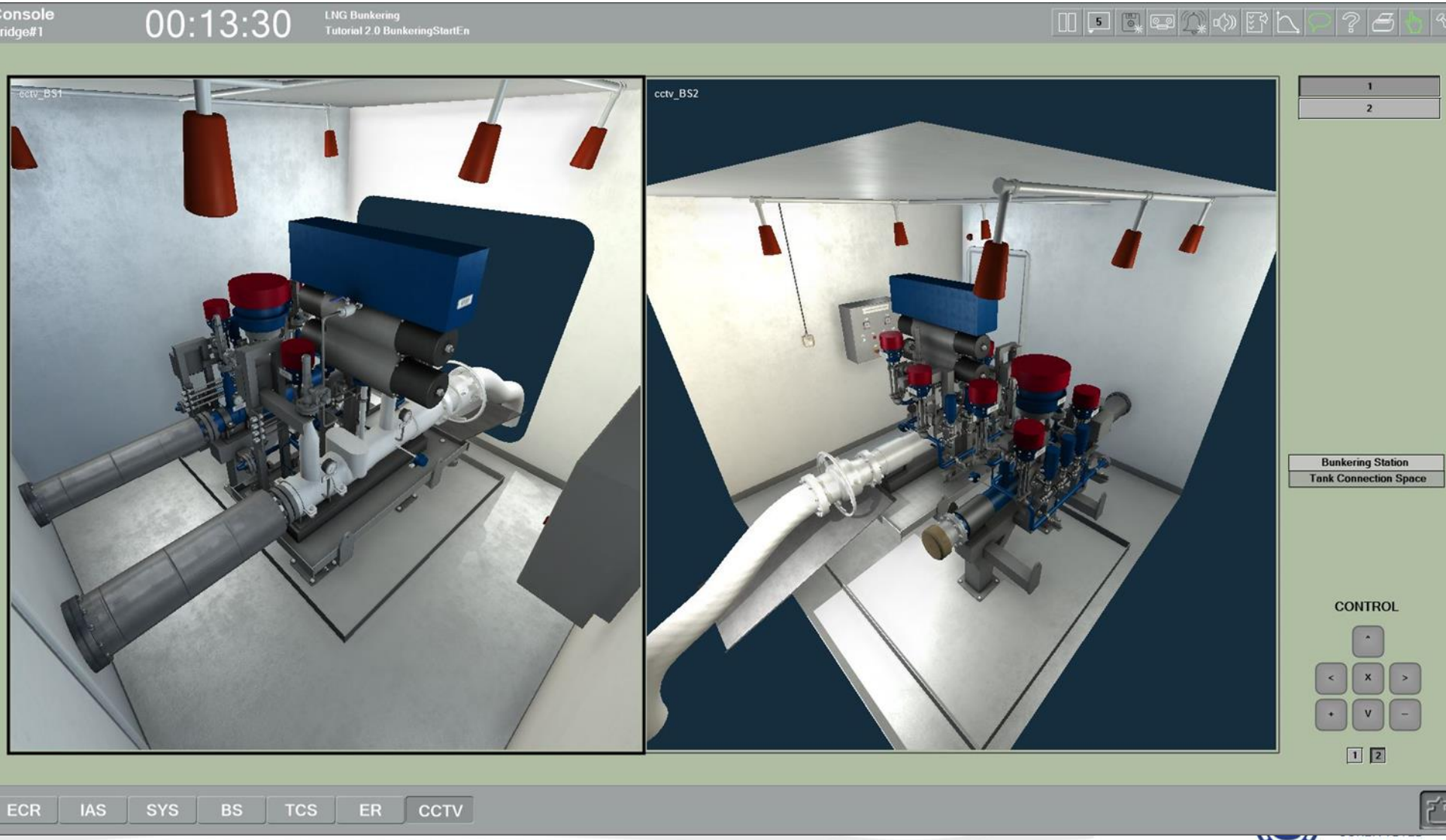
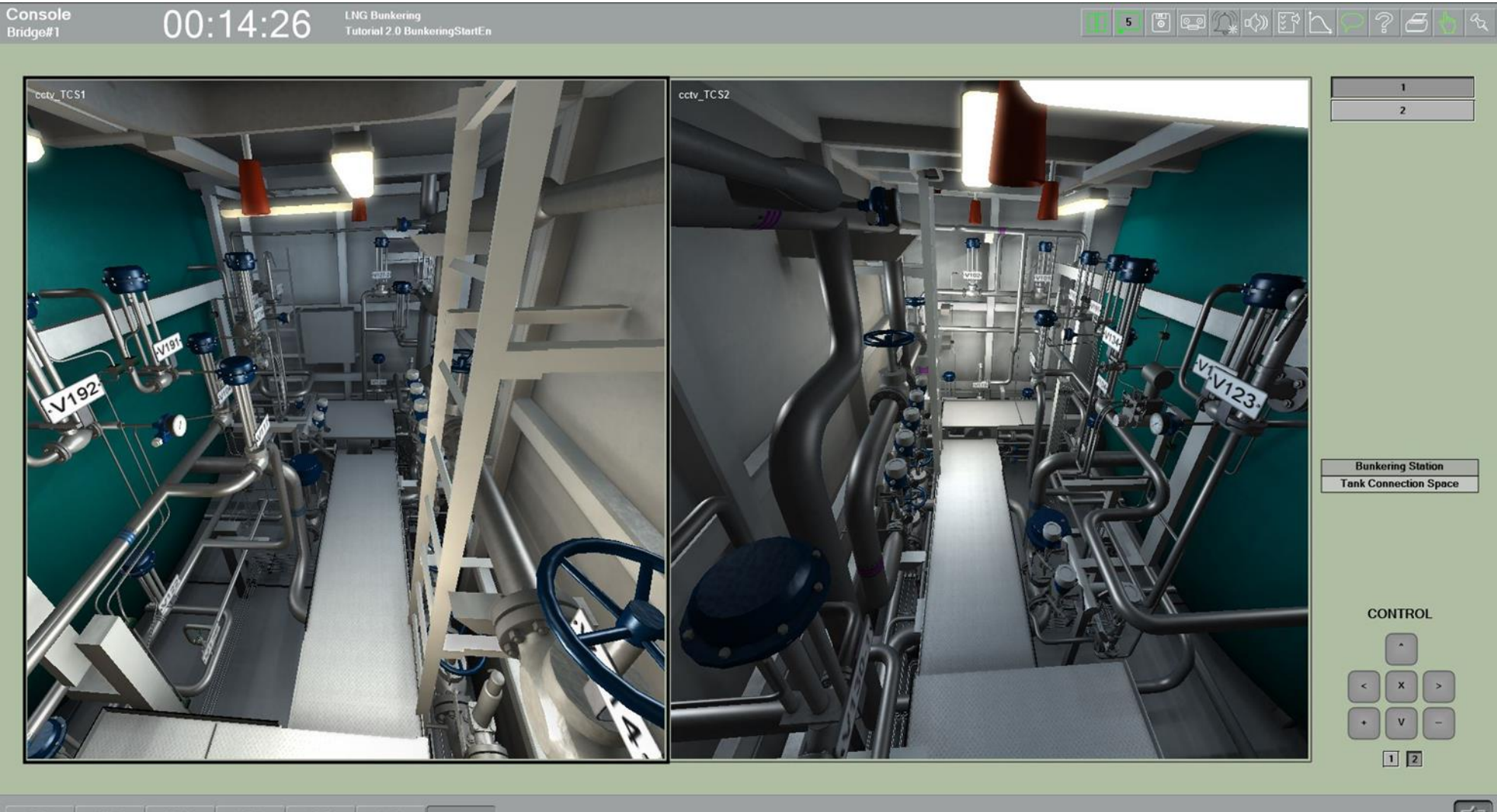


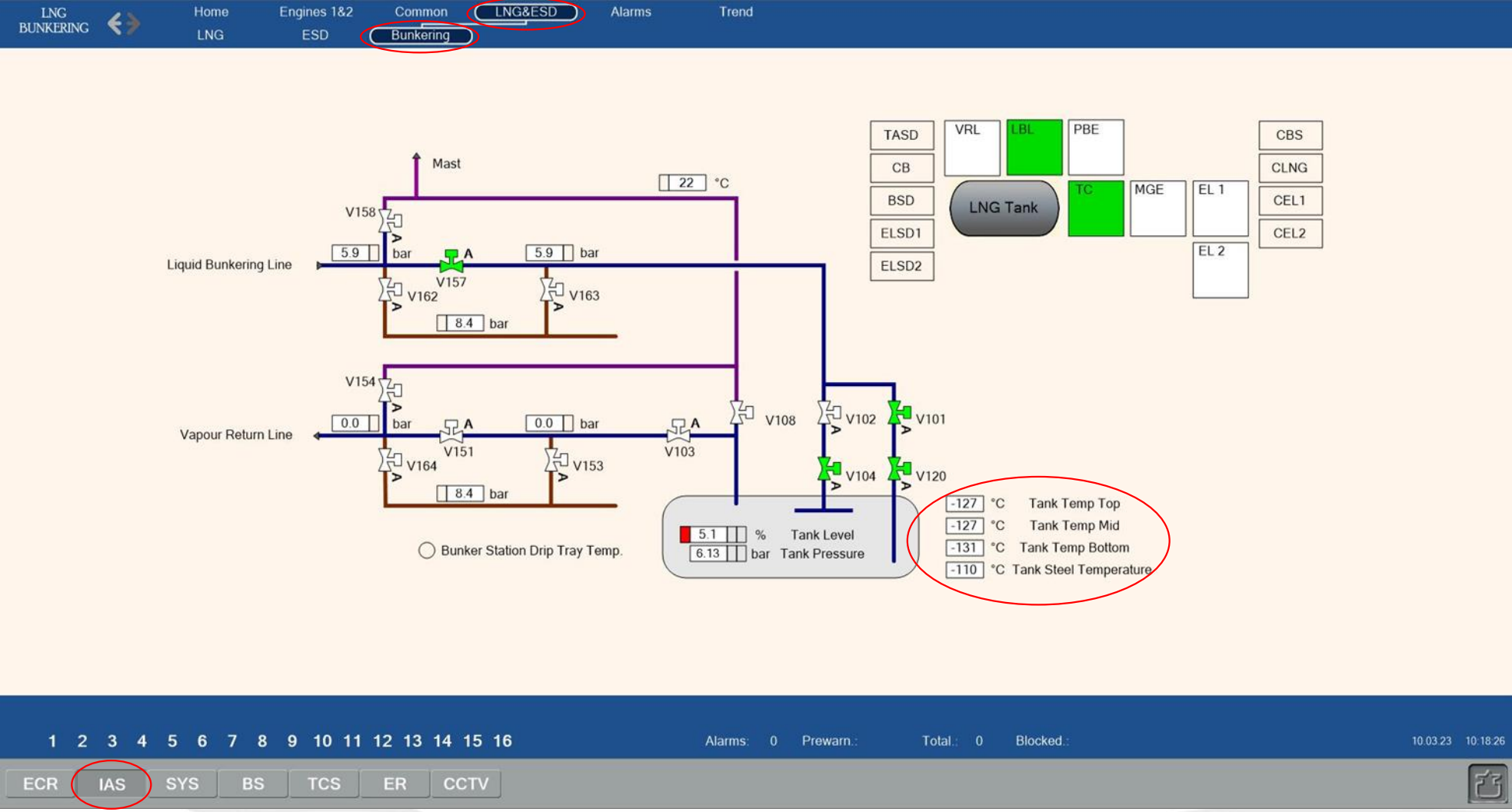

Commence loading of LNG from terminal to ship‘s tank
13 Monitor the bunkering process until the tank level reaches 10%


Console
Bridge#1
00:13:30
LNG Bunkering
Tutorial 2.0 BunkeringStartEn
cctv_BS1
cctv_BS2
1
2
Bunkering Station
Tank Connection Space
CONTROL
ECR
IAS
SYS
BS
TCS
ER
CCTV

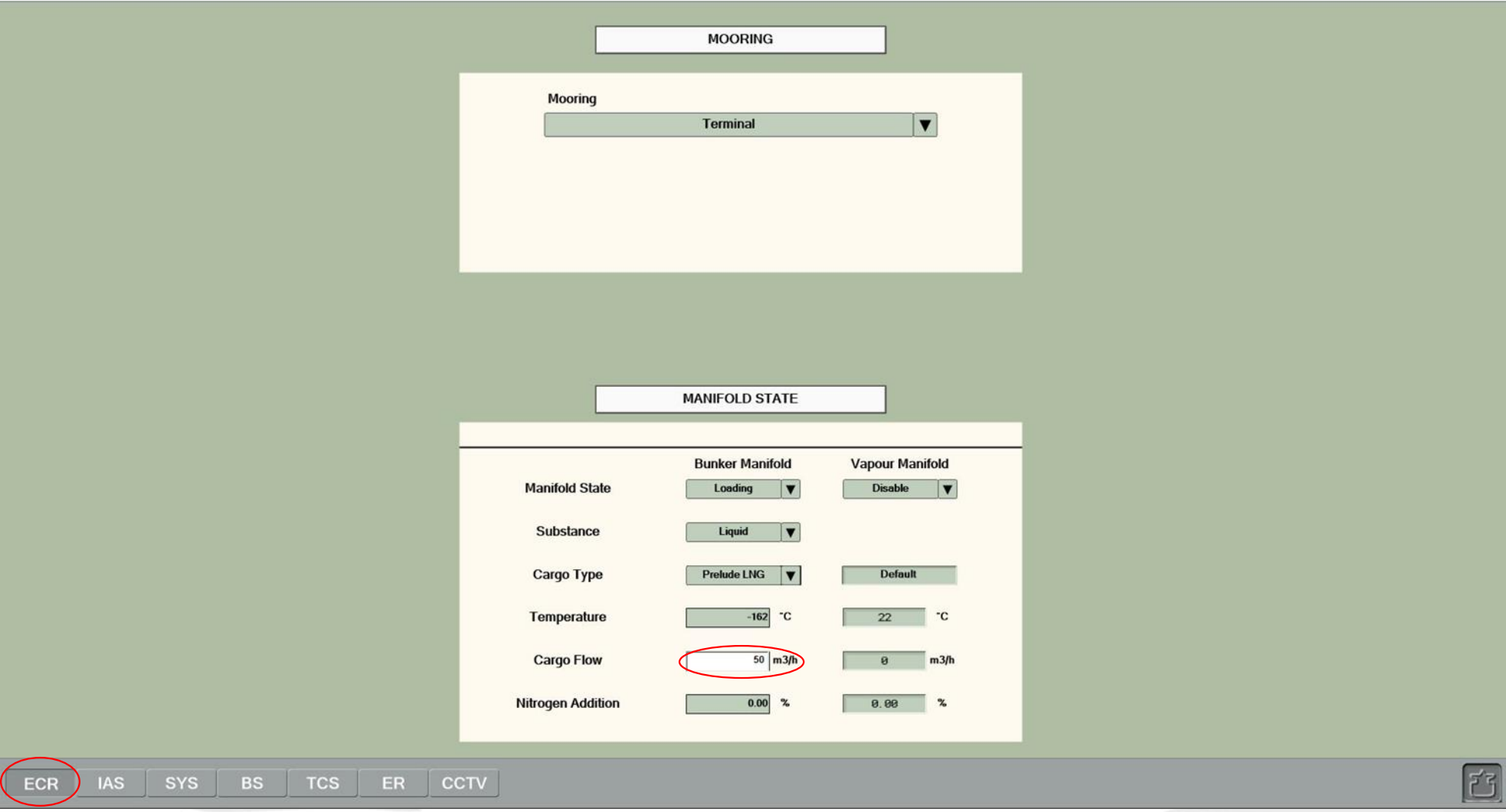

Console
Bridge#1
00:14:26
LNG Bunkering
Tutorial 2.0 BunkeringStartEn
cctv_TCS1
cctv_TCS2
1
2
Bunkering Station
Tank Connection Space
CONTROL
ECR
IAS
SYS
BS
TCS
ER
CCTV


Console
Bridge#1
00:14:26
LNG Bunkering
Tutorial 2.0 BunkeringStartEn
Navigation Panel
ECR
IAS
SYS
BS
TCS
ER
CCTV

MOKYKLA




Wait for a reasonable amount of time until the bunkering pipelines cool down. After the pipes have cooled down, the cargo flow setting can be increased to its maximum value.




Enter 50 m³/h flow value in the Cargo Flow box.
NOTE: Now cargo flows into the tank (with 5-time acceleration)

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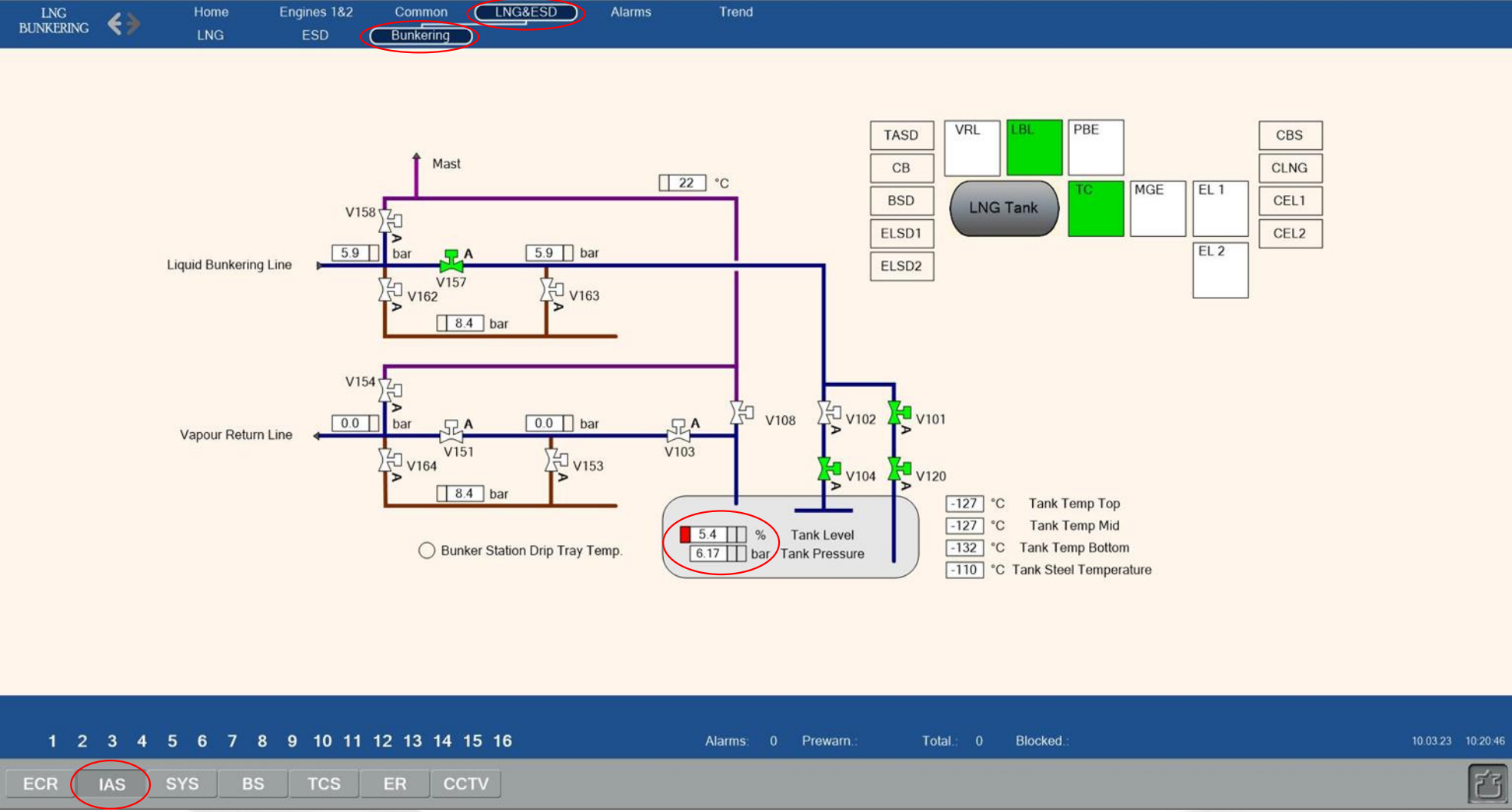


Monitor the bunkering process until the tank level reaches 10%.

- Monitor the tank level and pressure readings from the IAS > LNG&ESD > Bunkering page.

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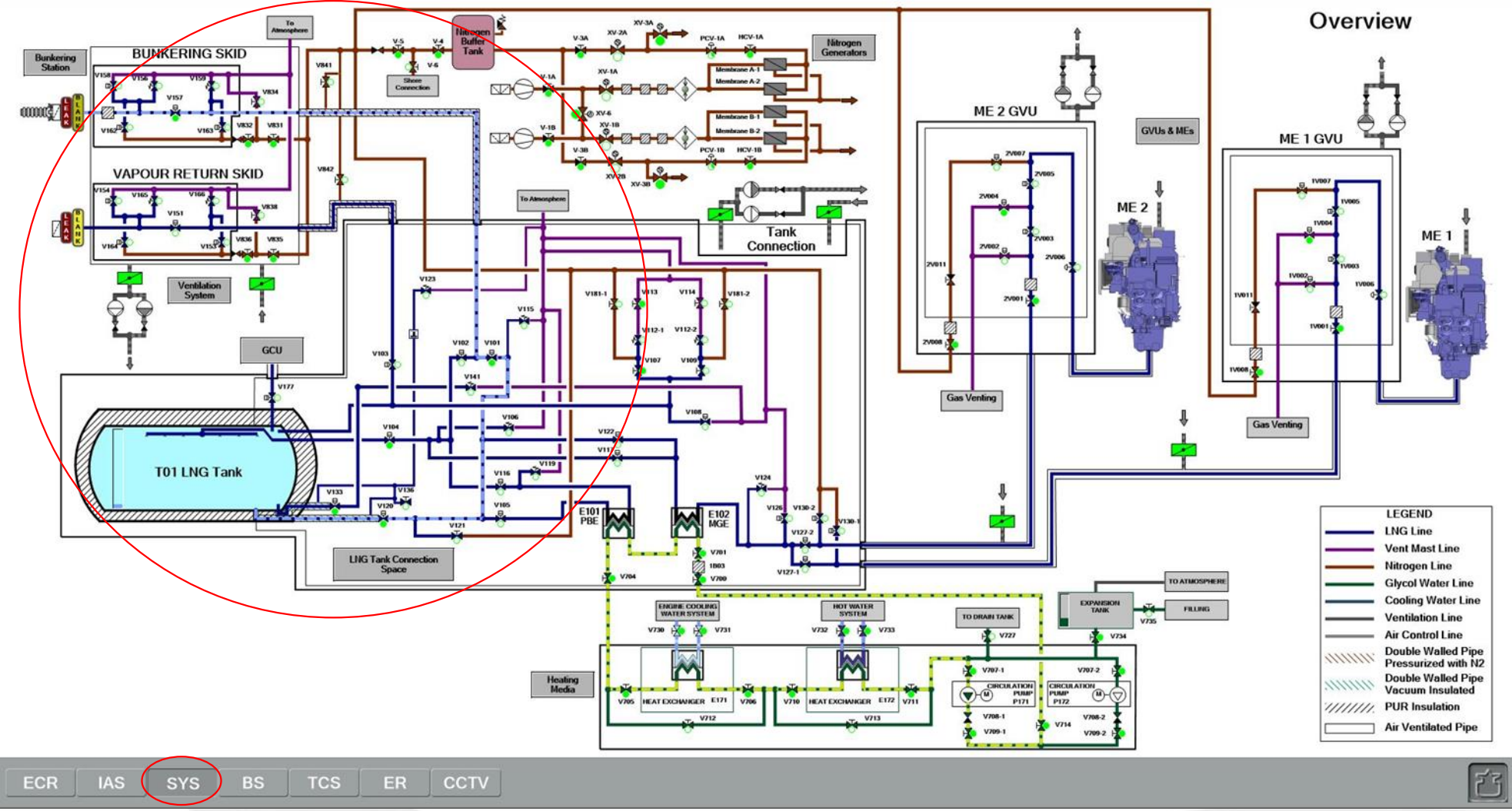


- Check the liquid flow from the SYS > Overview page (hints should be turned on)

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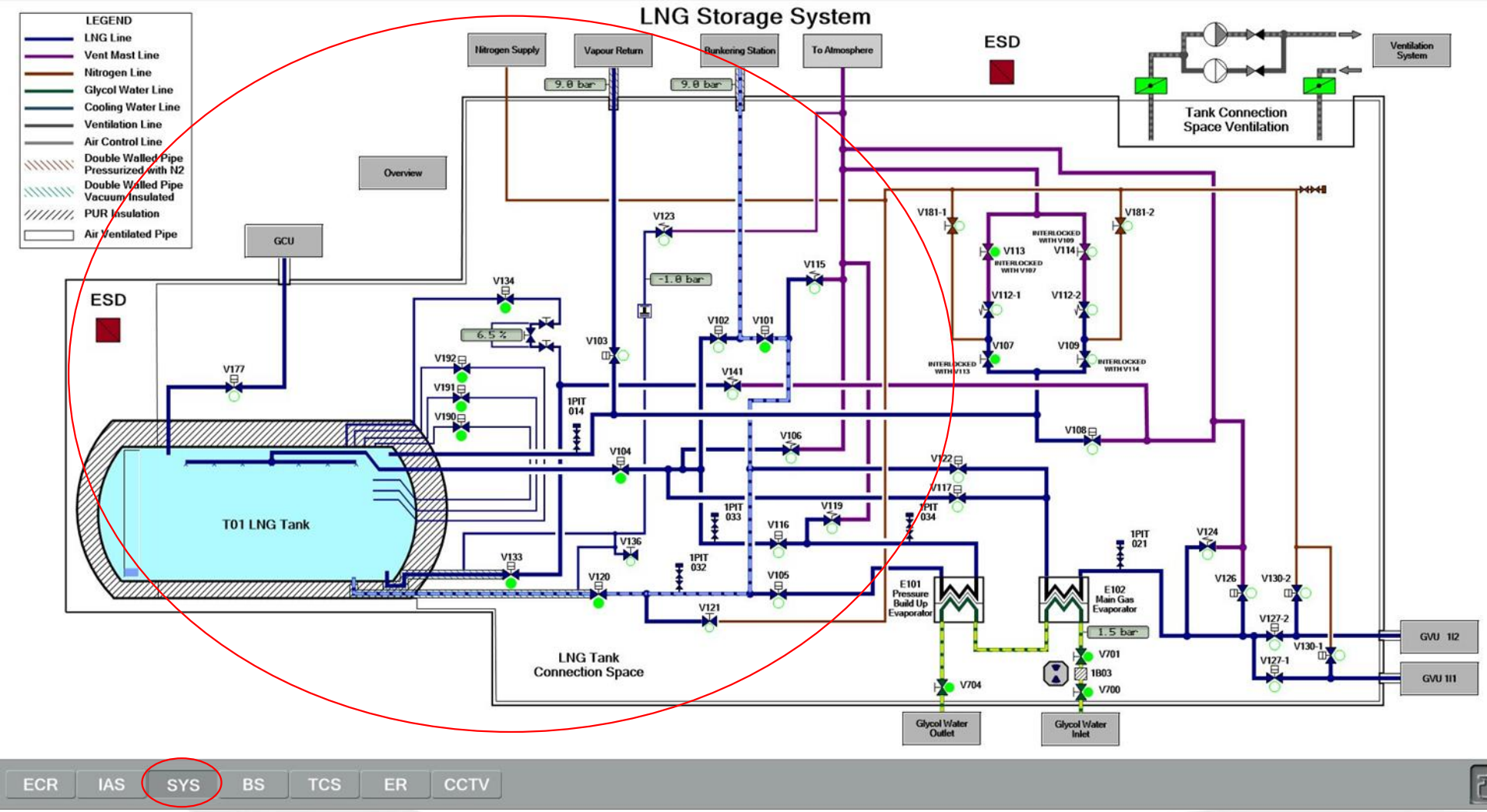


Bunkering start is successfully performed.

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