

System Overview

Camera Layout

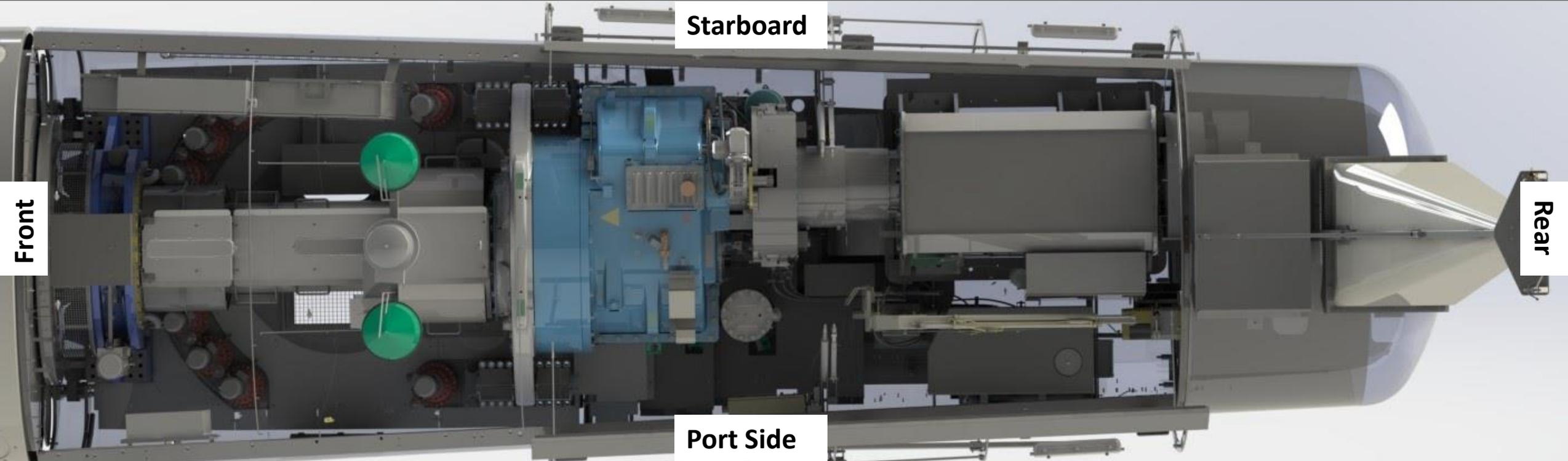


Figure 1: Overhead view of nacelle

Siemens 2.3 MW Turbine Remote Monitoring

System Overview

Final system is capable of monitoring the 18 critical components within the nacelle.

- 10 custom cameras and housings
 - Six gimbal-actuated
 - Four fixed
- Two USB Hubs
- Central Control Unit



Figure 4: Full product render of the 10 custom cameras, two USB hubs and the central control unit

Camera Layout

Home

System Overview

● Gimbal Camera ▲ Stationary Camera Camera

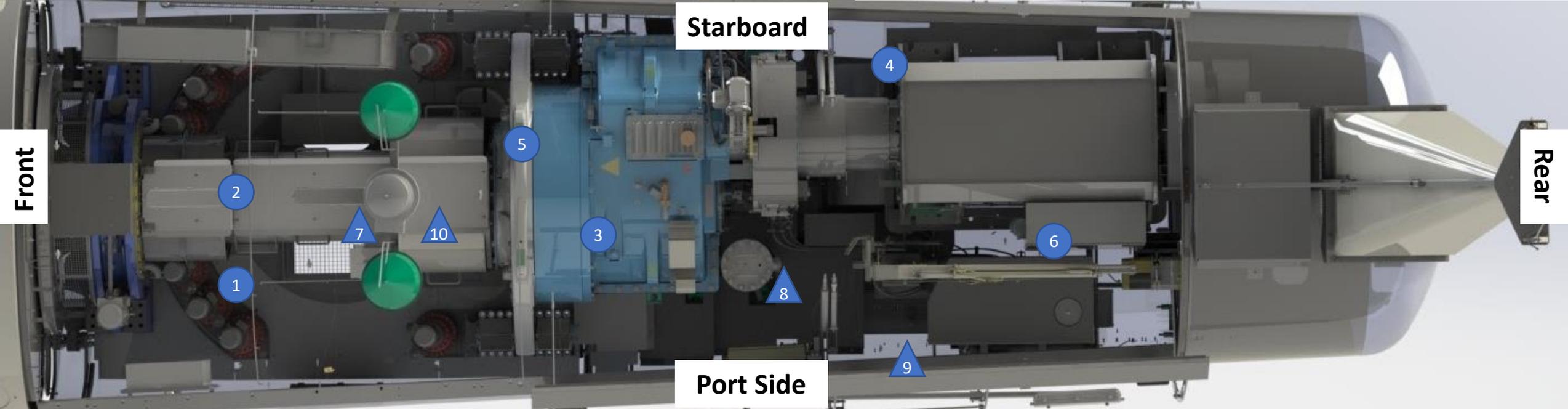


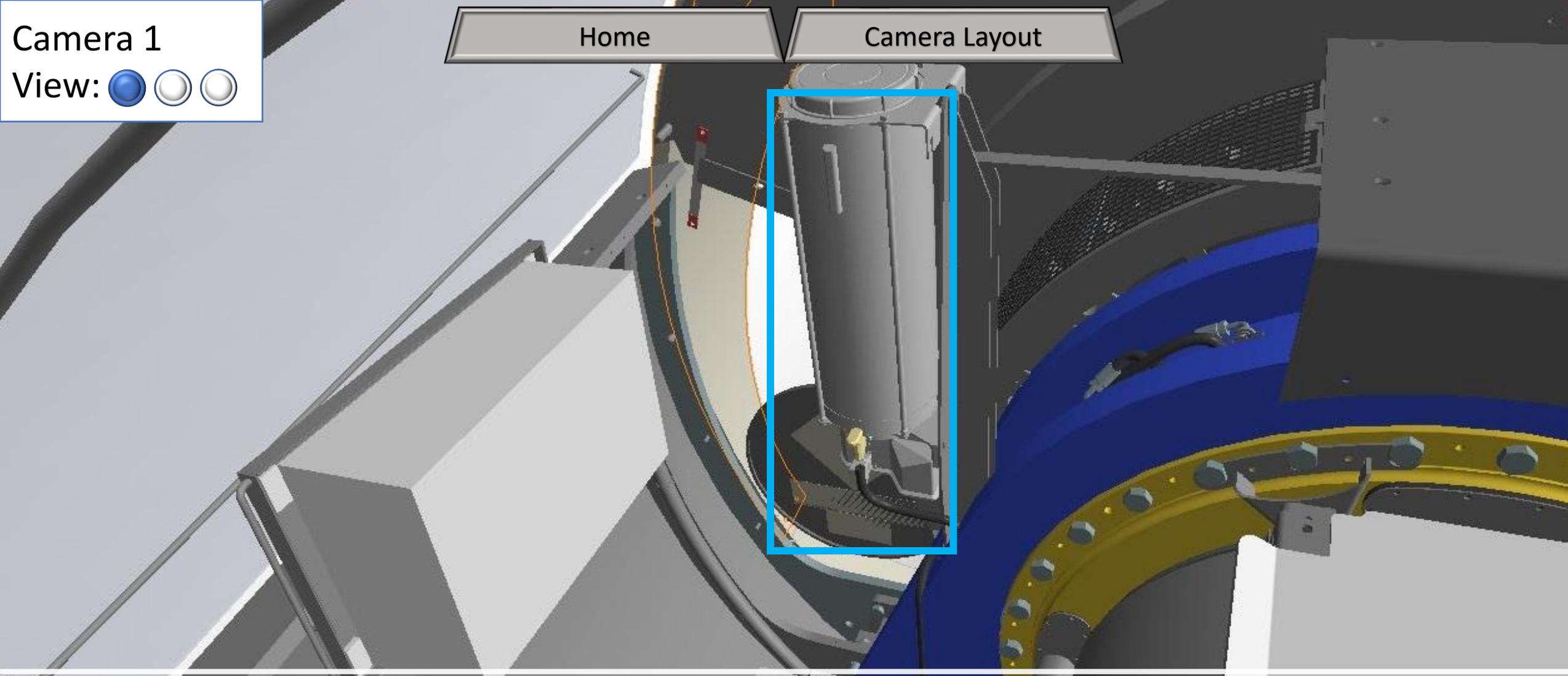
Figure 3 :Camera Layout of Nacelle

| | | | | |
|-------------------------------|----------------------|----------------|-----------------------------------|----------------------------|
| Camera 1 | Camera 2 | Camera 3 | Camera 4 | Camera 5 |
| Main Bearing Grease Reservoir | Yaw Lock | Gear Oil Pump | Starboard Generator Foot Pads | High Speed Rotor Lock Pins |
| Main Bearing Grease Waste Jug | Yaw Gear Reservoir | Yaw Ring Teeth | Offline Gear Oil Filter Gauge | Generator Grease Reservoir |
| Yaw Gear Reservoir | | Gear Oil Sump | | |
| Camera 6 | Camera 7 | Camera 8 | Camera 9 | Camera 10 |
| Port Foot Pad Port Foot Pad | Yaw Grease Reservoir | Gear Oil Level | Hydraulic Oil Level/Service Valve | Weather Station |
| Hydraulic Hoses | | | | |

Camera 1
View:

Home

Camera Layout



Main Bearing Grease Reservoir

Camera Layout

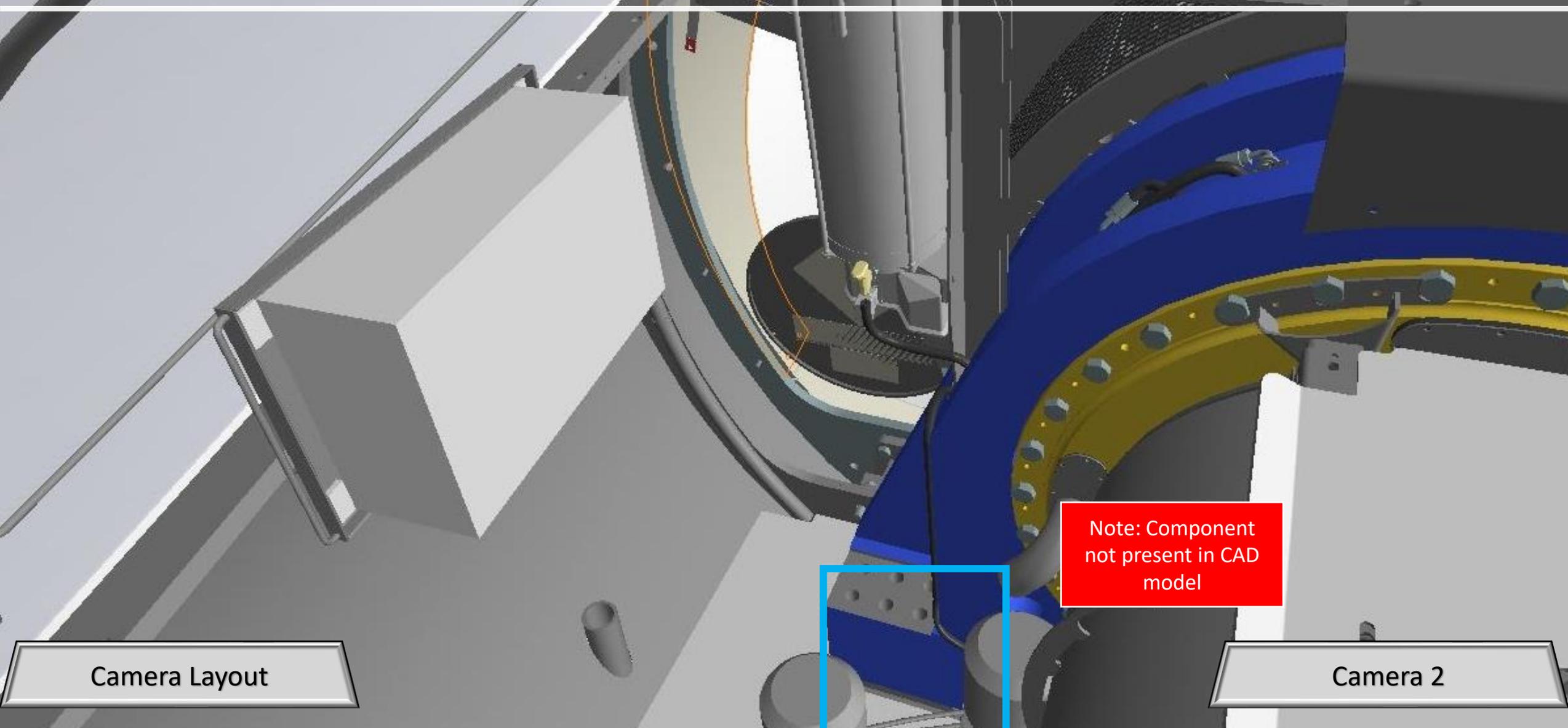
Camera 2

Camera 1
View:

Home

Camera Layout

Main Bearing Grease Waste Jug



Note: Component not present in CAD model

Camera Layout

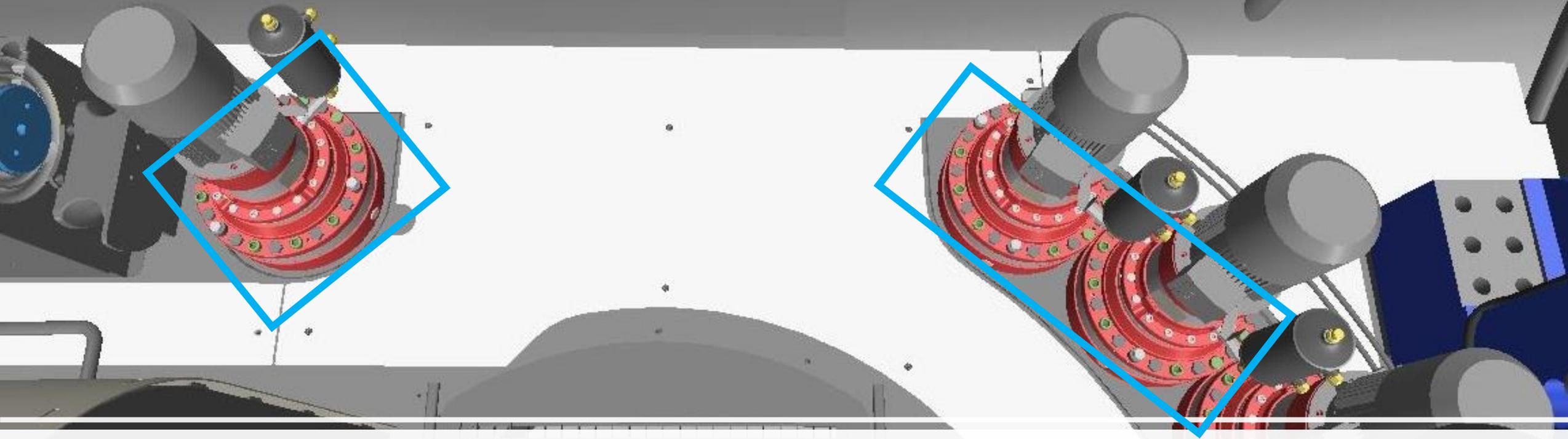
Camera 2

Camera 1

View:

Home

Camera Layout



Yaw Gear Reservoir

Camera Layout

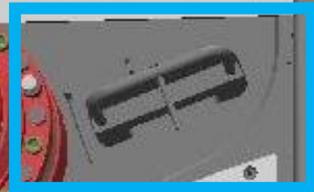
Camera 2

Camera 2

View:

Home

Camera Layout



Yaw Lock

Camera 1

Camera 3

Camera 2

View:

Home

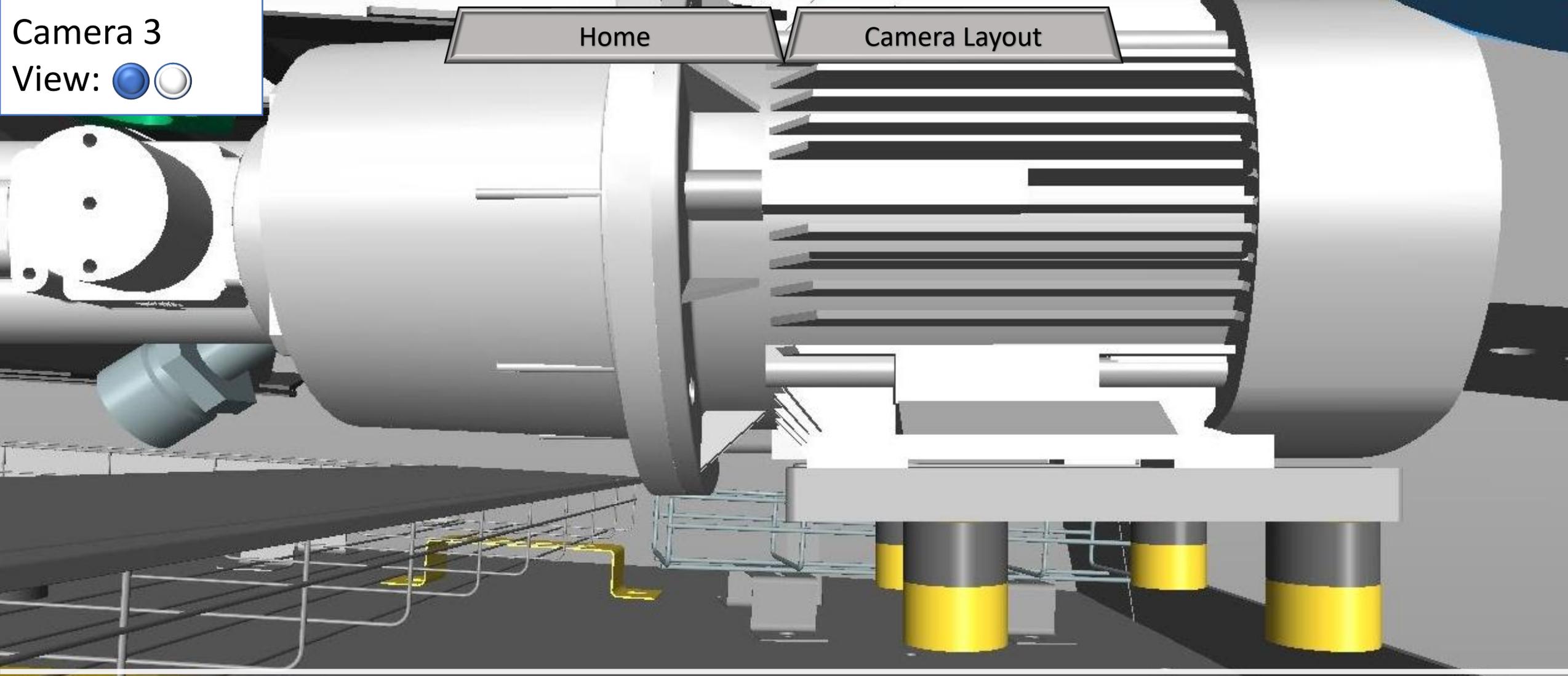
Camera Layout

Yaw Gear Reservoir



Camera 1

Camera 3



Camera 3
View:

Home

Camera Layout

Gear Oil Pump and Sump

Camera 2

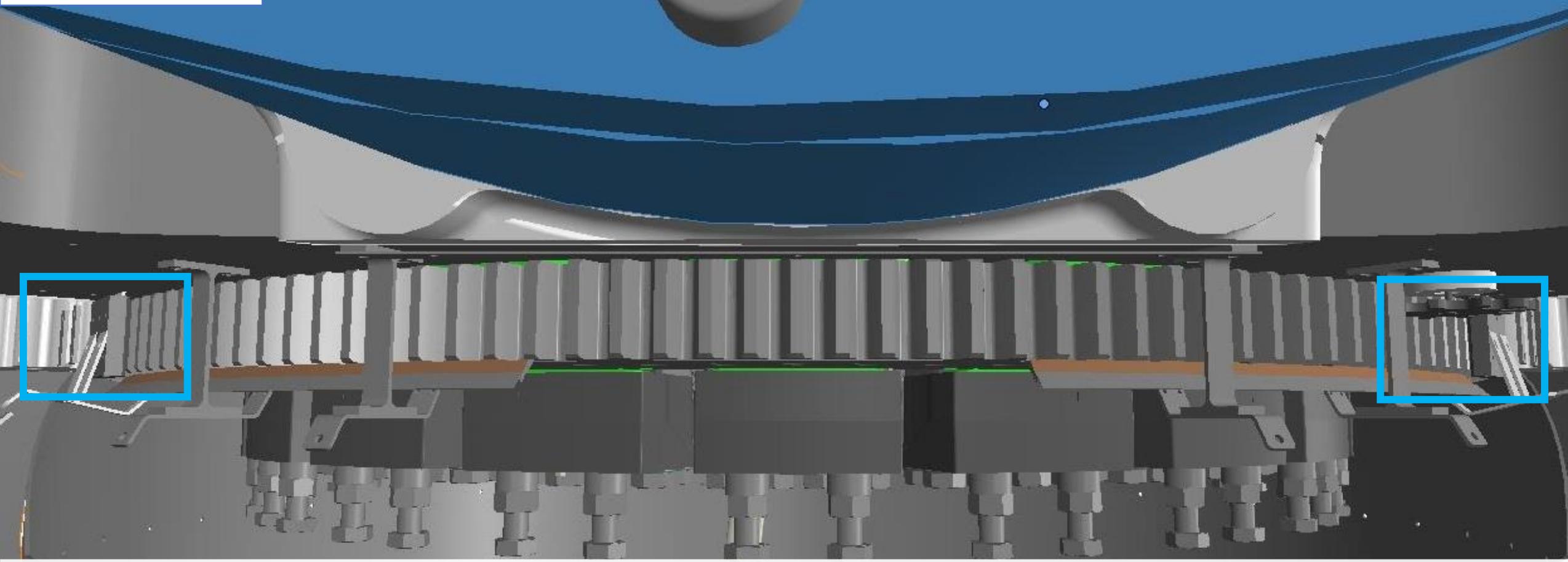
Camera 4

Camera 3

View:

Home

Camera Layout



Yaw Ring Teeth

Camera 2

Camera 4

Camera 4

View:

Home

Camera Layout



Note: Components
not present in CAD
model

Starboard Side Front and Rear Generator Foot Pads

Camera 3

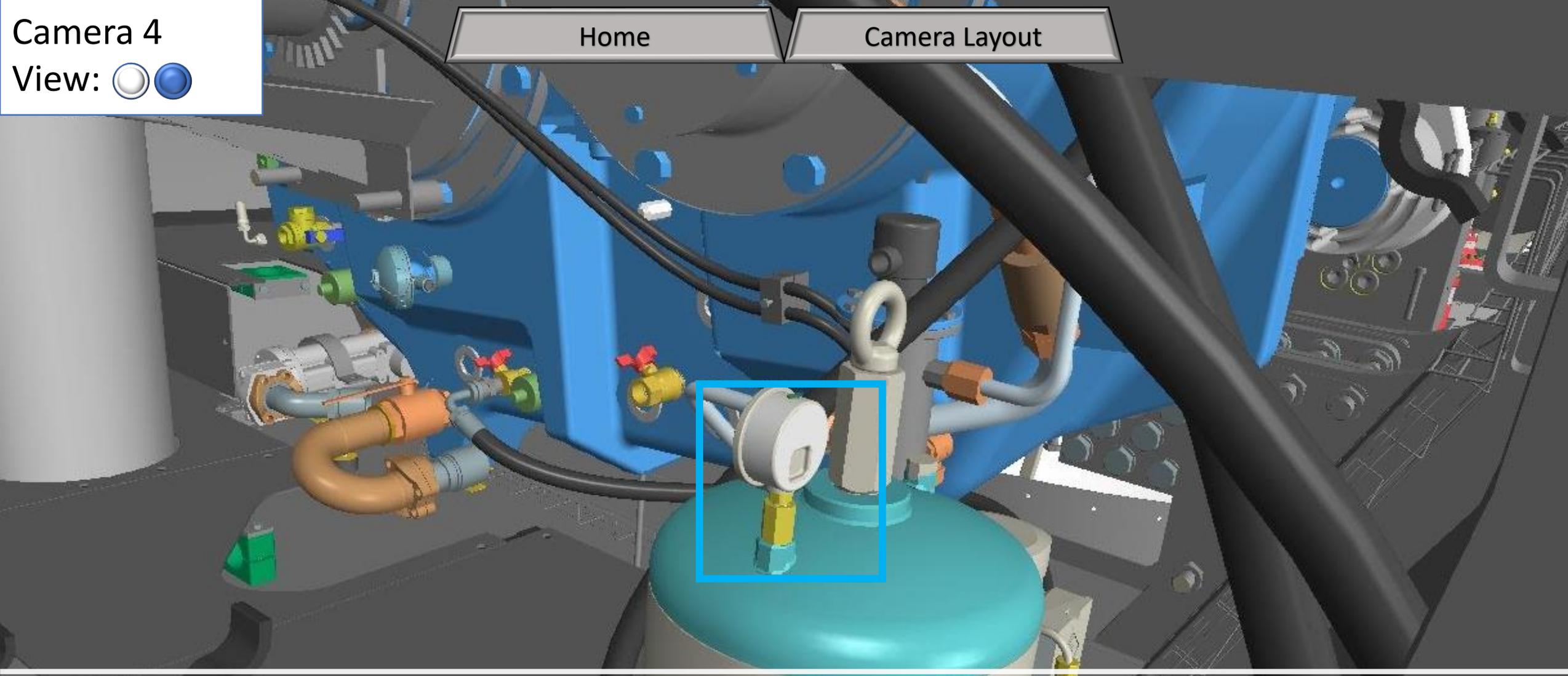
Camera 5

Camera 4

View:

Home

Camera Layout



Offline Gear Oil Filter Gauge

Camera 3

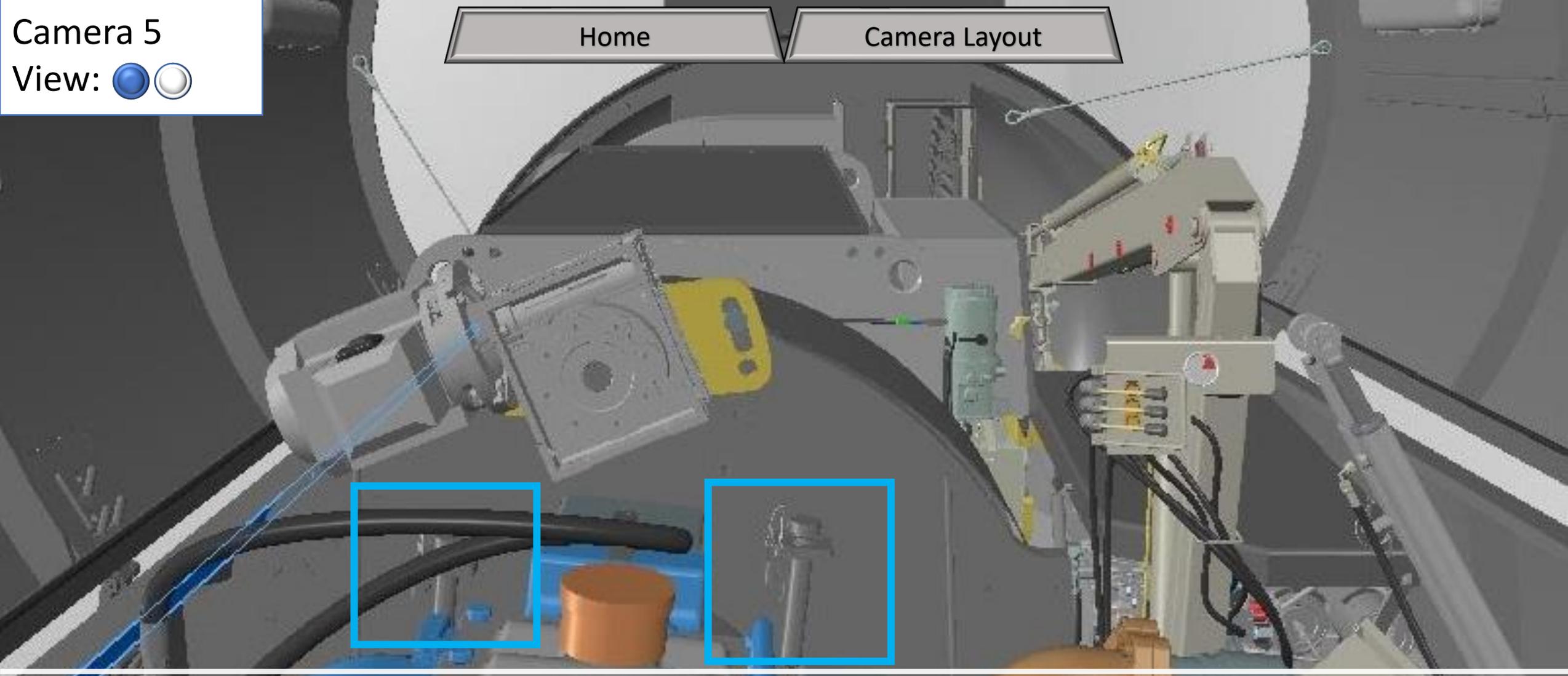
Camera 5

Camera 5

View:

Home

Camera Layout



High Speed Rotor Lock Pins

Camera 4

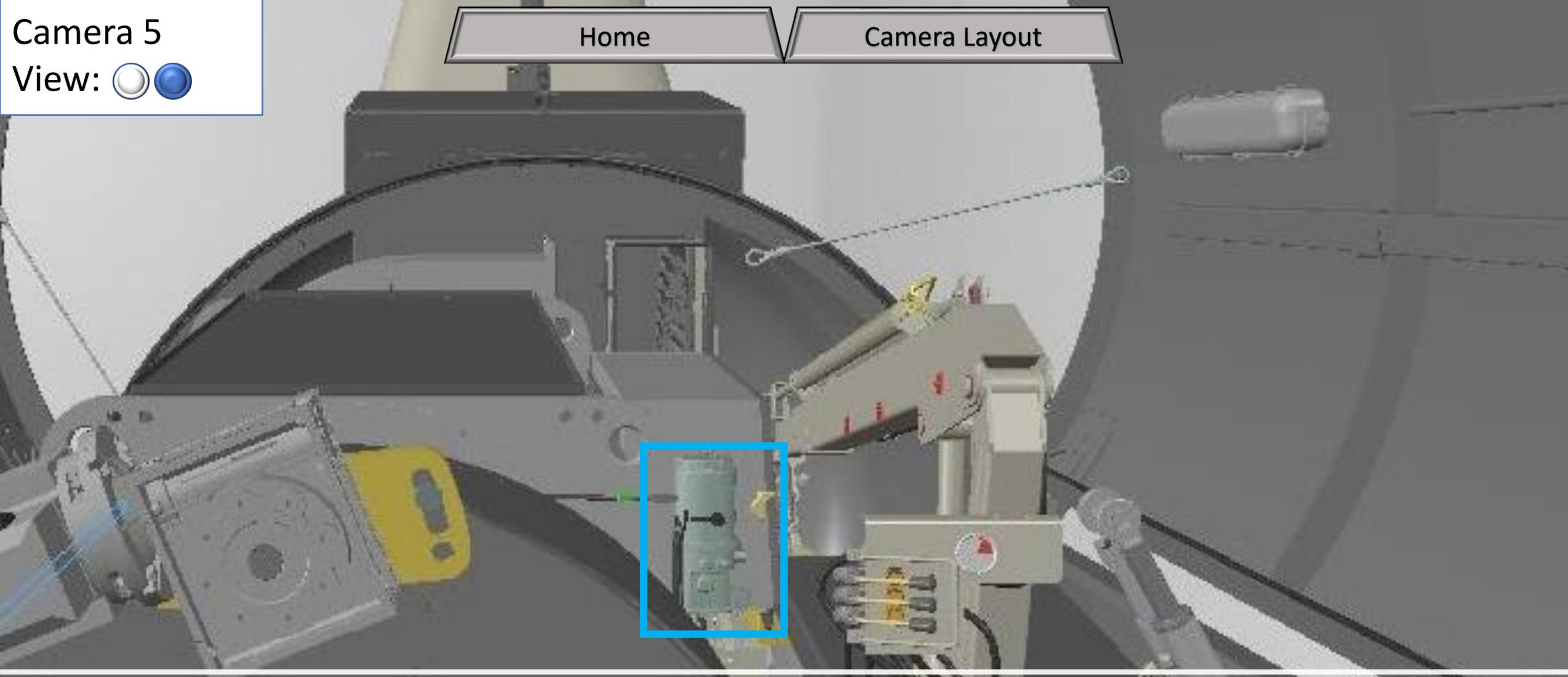
Camera 6

Camera 5

View:

Home

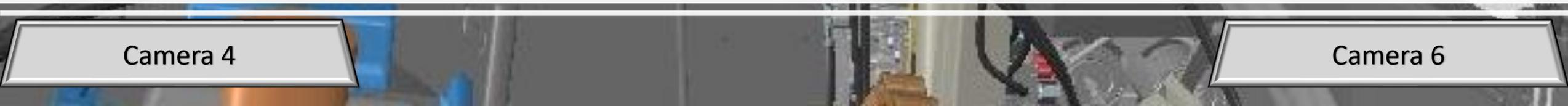
Camera Layout



Generator Grease Reservoir

Camera 4

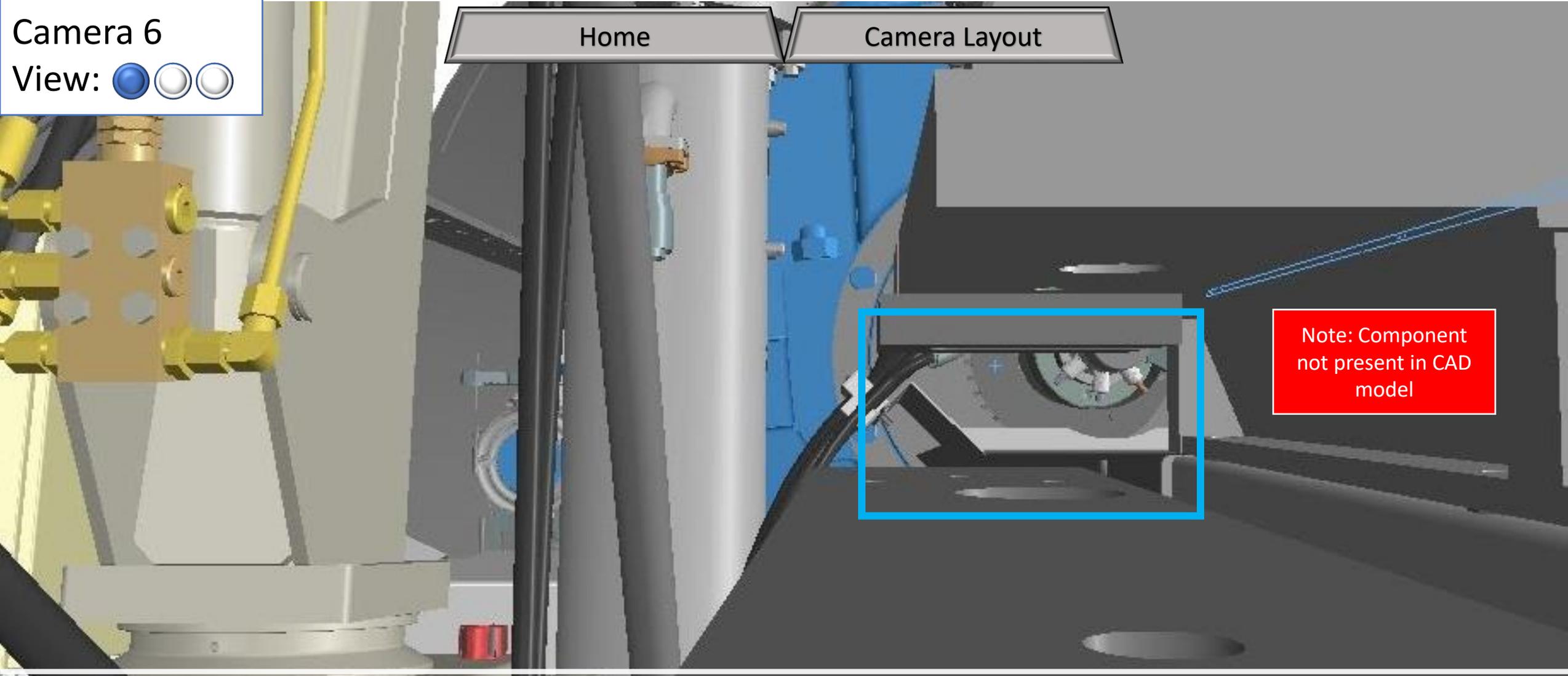
Camera 6



Camera 6
View:

Home

Camera Layout



Note: Component not present in CAD model

Port Side Front Generator Foot Pad

Camera 5

Camera 7

Camera 6

View:

Home

Camera Layout

Note: Component
not present in CAD
model

Port Side Rear Generator Foot Pad

Camera 5

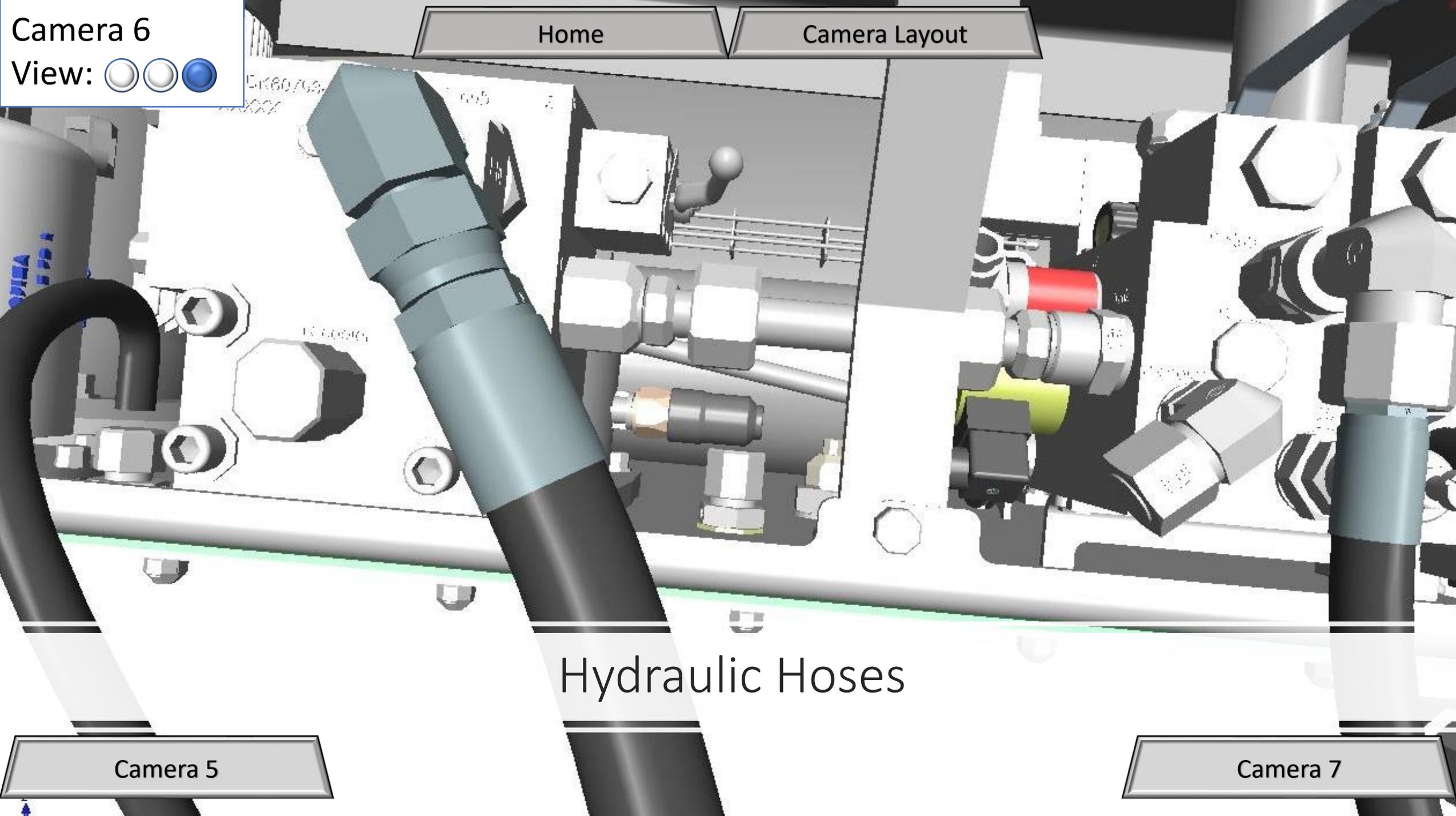
Camera 7

Camera 6

View:

Home

Camera Layout



Hydraulic Hoses

Camera 5

Camera 7

Camera 7

View: 

Home

Camera Layout



Yaw Grease Reservoir

Camera 6

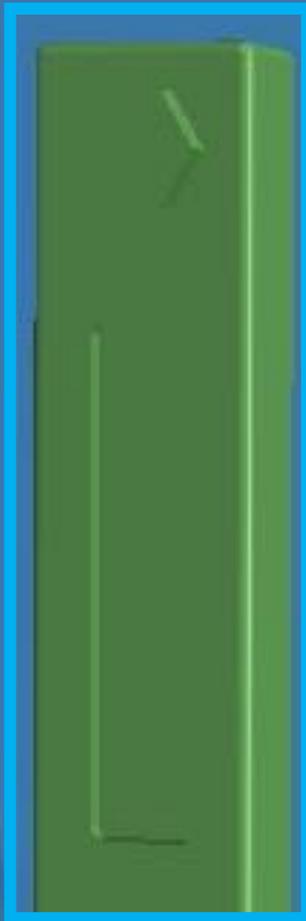
Camera 8

Camera 8

View: 

Home

Camera Layout



Gear Oil Level

Camera 7

Camera 9

Home

Camera Layout

Camera 9

View: 

Service Valve

Hydraulic Oil Level

Hydraulic Oil Level/Service Valve

Camera 8

Camera 10

Camera 10

View: 

Home

Camera Layout



Weather Station

Camera 9

Camera Layout