

# BALLAST WATER MANAGEMENT

ERMA FIRST BWTS

CERTIFICATION

RETROFIT

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Established in 1977 and by continuous investing in R&D and new technologies, became a Global player in environmental protection, offering a variety of products and services in the **Marine** and **Industrial** field.



Produces the sound and reliable ERMA FIRST BWTS, by being at the forefront of R&D with a team of specialists in Water Treatment Technology.

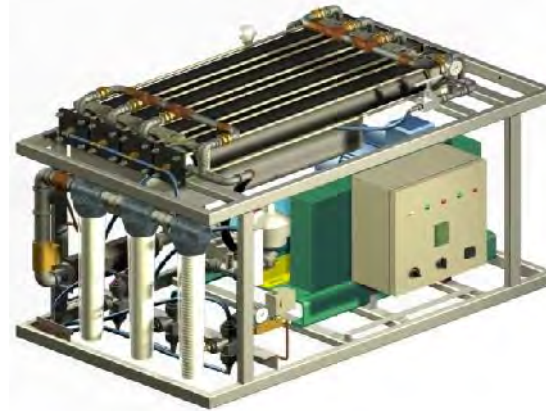


Founded in 2001 and comprises the sole fully licensed company in Greece, providing integrated **Waste Management & Valorization Services**.

# EPE S.A. Group can provide a Water & Waste water package



**POSEIDON FIT**  
Bilge Water Separator  
Acc. to MEPC.107(49)



**ALIOS EVO**  
Reverse Osmosis  
Fresh Water Generator



**TRITON EC**  
Sewage Treatment Plant  
Acc. to MEPC.227(64)



**POSEIDON i**  
Failsafe bilge water accidental discharge

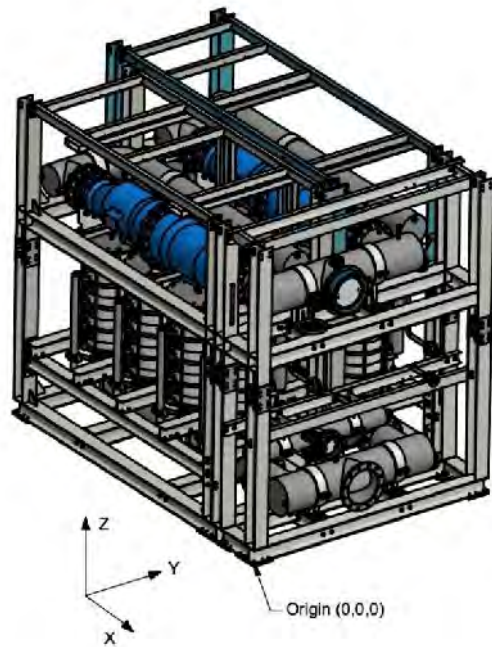


**POLCOR®**  
Aluminium & Zinc  
Sacrificial anodes

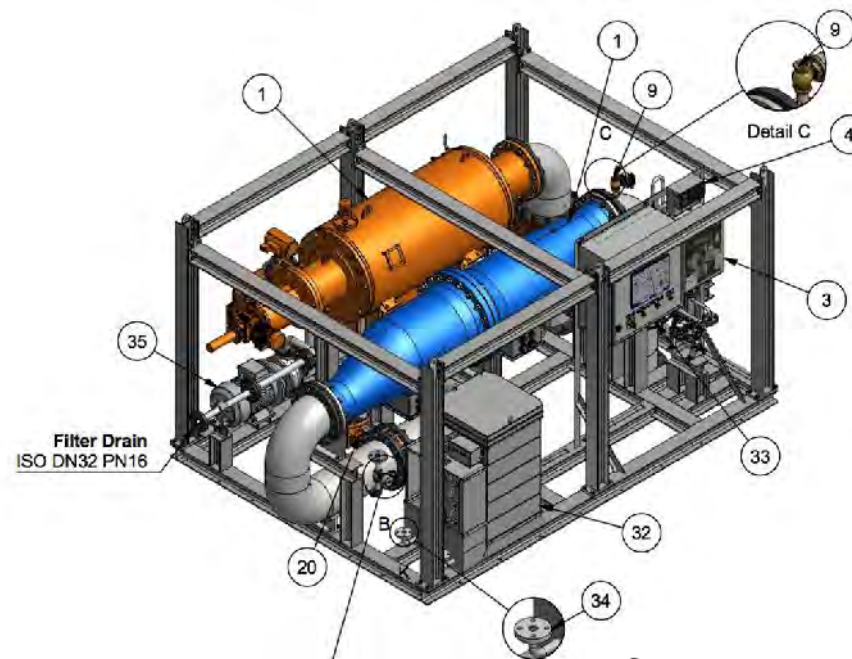
BALLAST WATER TREATMENT = SEPARATION + DISINFECTION

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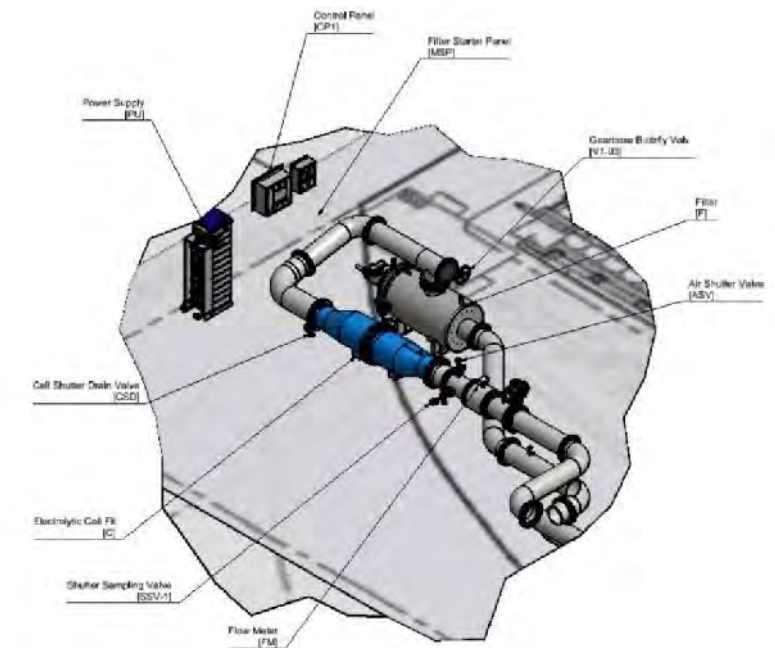
## ERMA FIRST BWTS

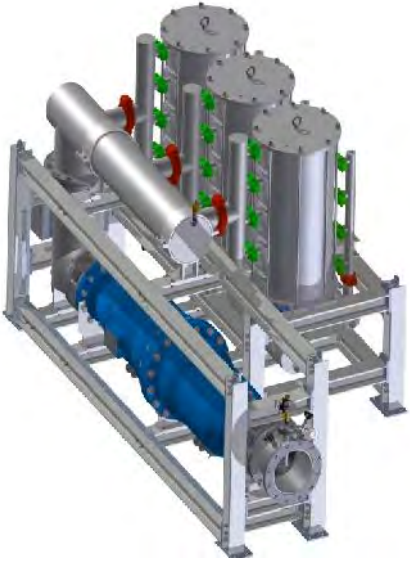


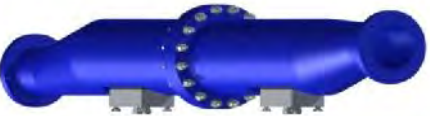


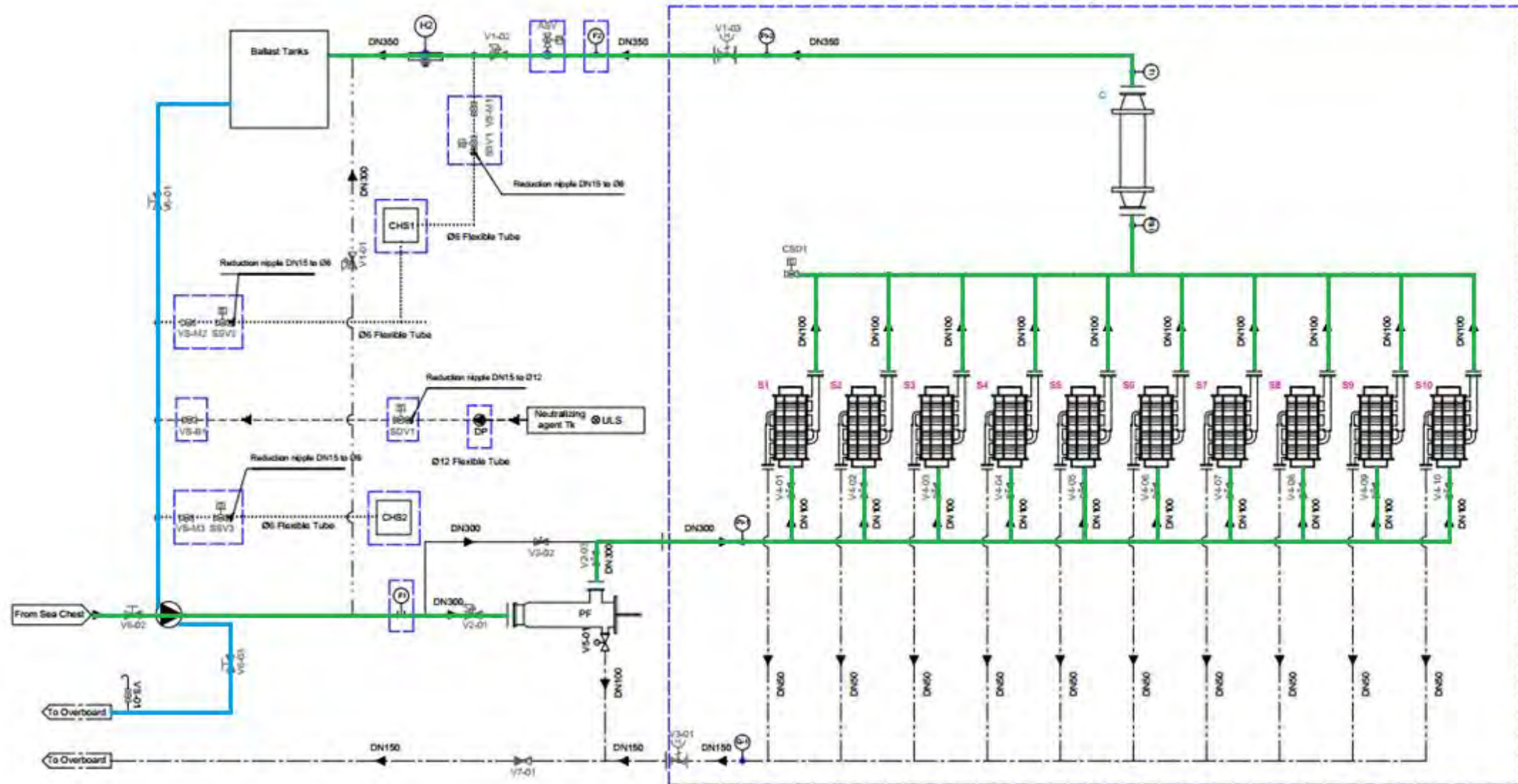
## ERMA FIRST BWTS FIT (Skid)

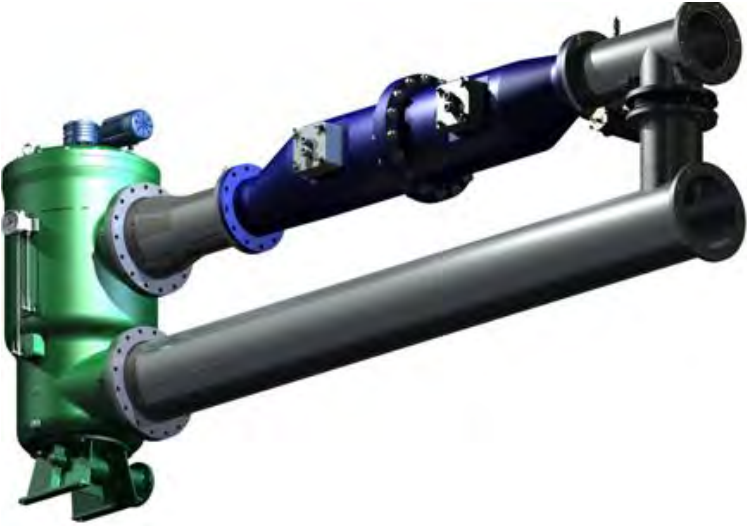


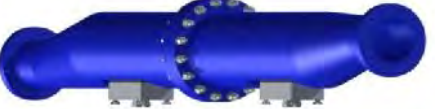


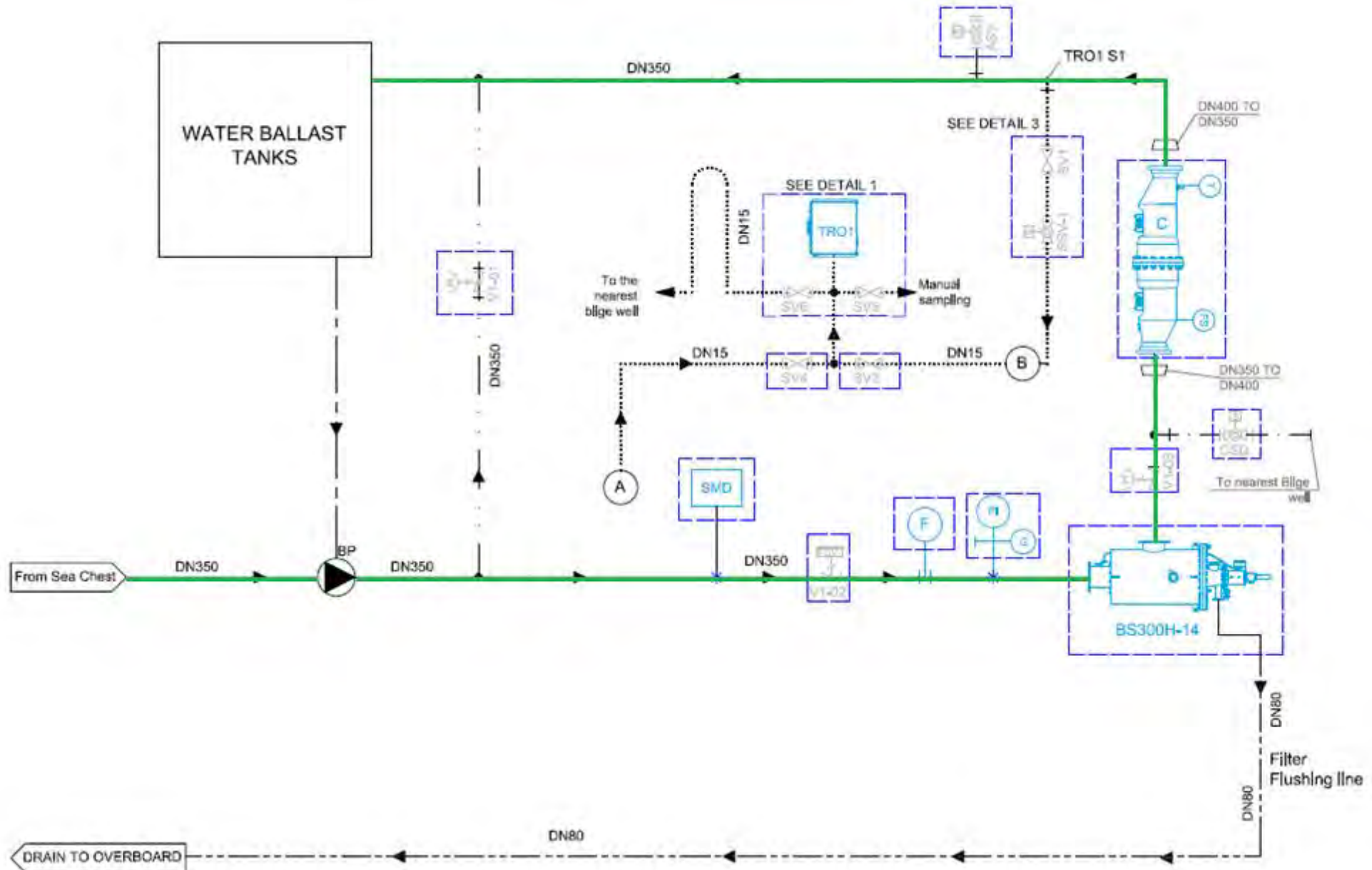
## ERMA FIRST BWTS FIT (Loose)

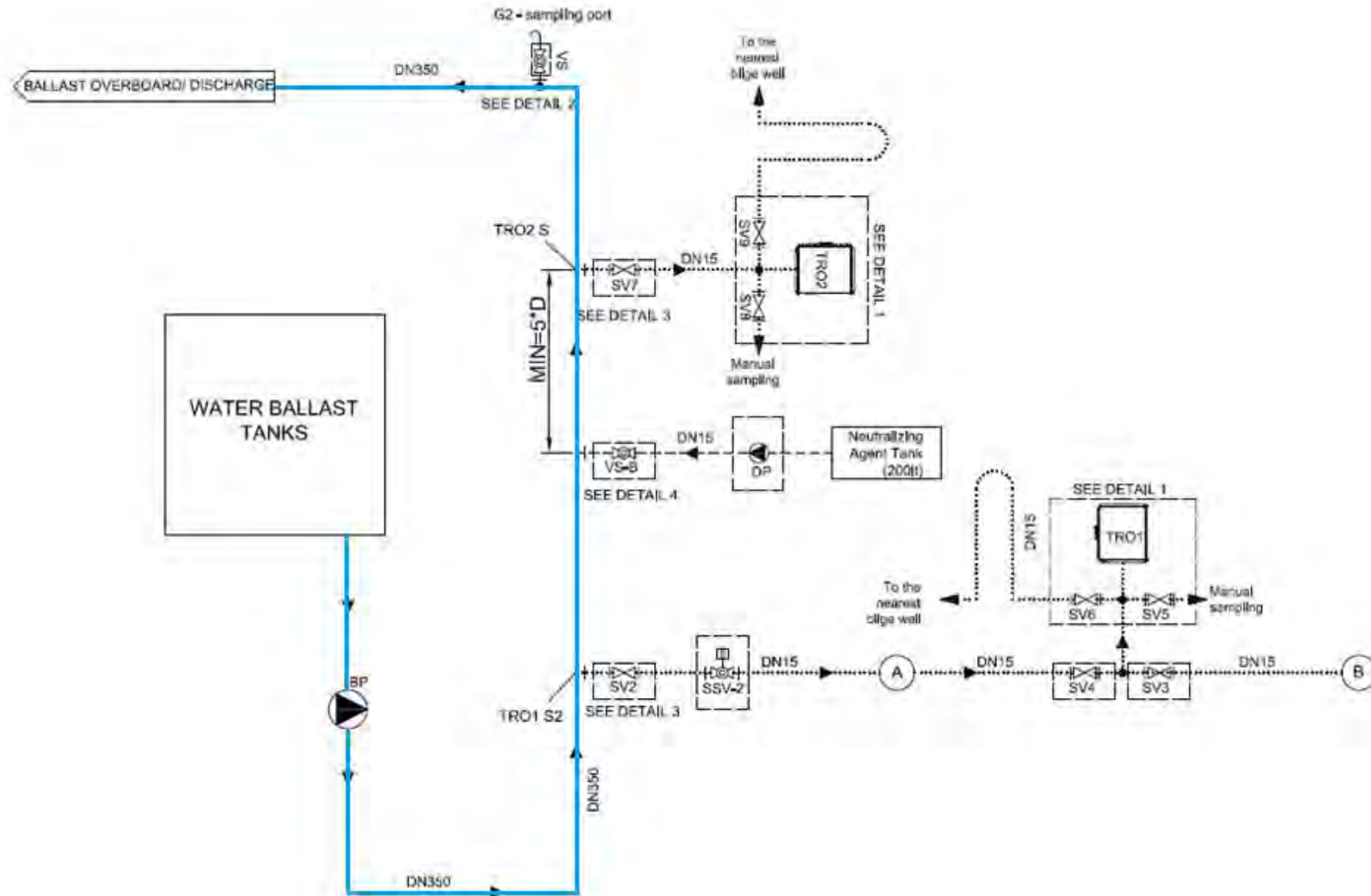


ERMA FIRST BWTS	Stage - Components		
	SEPARATION	<p>200 microns mesh self-cleaning pre-filter</p> <p>20 microns Hydrocyclones</p>	 
	DISINFECTION	<p>Advanced Technology</p> <p>Electrolysis Cells</p> <p>TRO Concentration 8-10 mg/L</p>	



ERMA FIRST FIT BWTS	Stage		
	Separation	<p>Option 1</p> <p>Filtersafe: 40 microns self-cleaning automatic screen filter</p> <p>Option 2</p> <p>Filtrex: 40 microns self-cleaning automatic screen filter</p>	 
	Disinfection	<p>Advanced Technology</p> <p>Electrolysis Cells</p> <p>TRO Concentration 4-6 mg/L</p>	





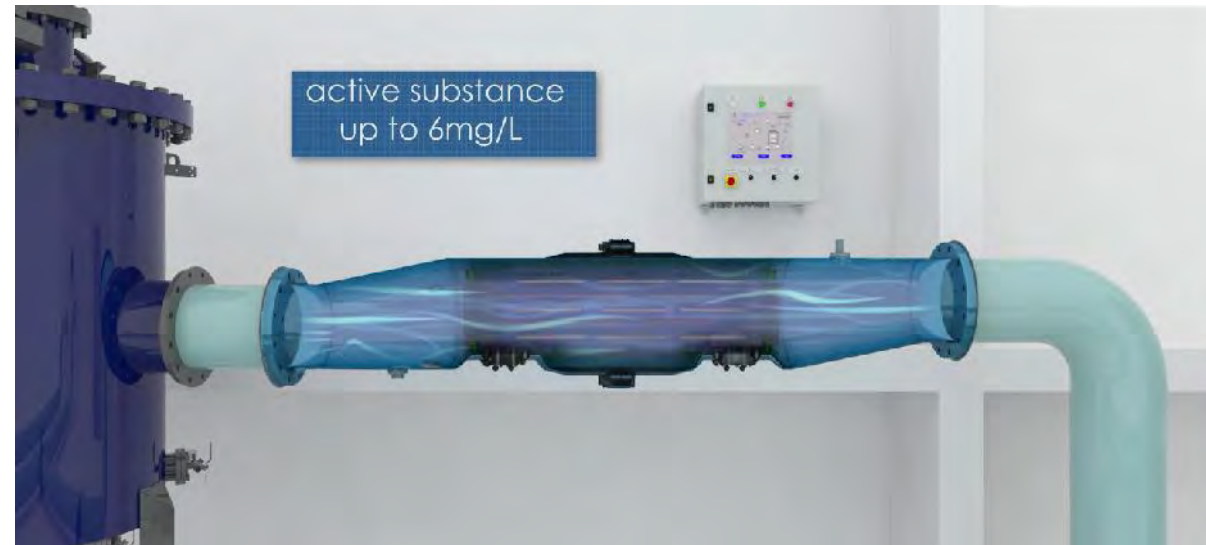
# High End Filtration

- Screen: Sintered
- Screen Material: SS316 or 904L
- Filtration grade:  $>40\text{ }\mu\text{m}$
- Pressure Drop: 0.05-0.5 bar
- Capacity : 50 ~ 3,740 m<sup>3</sup>/h
- Installation position: Vertical / Horizontal
- Explosion proof type available
- Uninterrupted operation under heavy sediment conditions



# Simplicity in Service

- Full Flow Type
- Specifically designed for marine applications
- Low energy consumption
- Negligible pressure loss
- Small footprint
- Vertical or horizontal installation
- No corrosion risk
- No acidic cleaning (CIP) is required
- Electrodes lifetime exceed 5000 operational hrs
- Fresh water operation according to IMO & USCG standards
- Very low Hydrogen production that requires no special handling
- Made in Sweden



Sodium Hypochlorite (Chlorine) is produced at a max concentration of **6mg/Lit**

CERTIFICATION

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## Certification:

- Grid of Rules IMO/Class Societies
- Follow updates (USCG)
- Translate New Requirements

## ERMA FIRST BWTS System holds:

- IMO Type Approval by Lloyds/Greek Maritime Administration and Liberia Maritime Administration
- USCG AMS Acceptance
- CCS & ABS class type approval in progress
- ATEX vs IECEx ERMA FIRST BWT Systems are in full compliance with the IECEx requirements in order to be installed in hazardous locations of U.S. flag vessels.
- USCG Type Approval : [Test completed, on the way to application](#)



## NSF Independent Laboratory, 1<sup>st</sup> company to finish

### ERMA FIRST Time schedule for the USCG Type Approval

No.	Task	Start date			Finish date
1	USCG Type Approval	Sep-15			4th Qtr. 2016
2	USCG AMS acceptance		<b>COMPLETED</b>		
3	Application Submission for USCG Type Approval		<b>LOI 3.Oct.2014</b>		
			<b>Completed Tests</b>	<b>Remaining Tests</b>	
4	Land-based test (Total 15 tests)	Sep-15	15	0	August 2016
	Freshwater Testing ( 5 Tests)	Sep-15	5	0	August 2016
	Brackish Water ( 5 Tests)	Jun-16	5	0	August 2016
	Seawater ( 5 Tests)	May-16	5	0	June 2016
5	Ship-board test ( 5 Tests)	Sep-15	5	0	July 2016
6	Environmental tests		<b>COMPLETED</b>		



NSF International

### NSF International U.S. Coast Guard Independent Laboratory Statement of U.S. Coast Guard BWMS Type Approval Participation

ERMA FIRST ESK Contact:

Dr. Efi Tsolaki  
 ERMA FIRST ESK Engineering Solutions S.A.  
 Schisto Industrial Park  
 (VIPAS) Block 13, Keratsiniou  
 Skaramagas Ave.  
 18863, Perama, Greece  
 Direct phone: +30 210 4093017

DATE: August 28, 2015

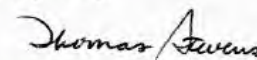
#### To Whom It May Concern:

NSF International, a U.S. Coast Guard (USCG) accepted Independent Laboratory for USCG type approval testing of ballast water management systems (BWMS), acknowledges the participation of ERMA FIRST ESK Engineering Solutions S.A. in USCG type approval testing with the NSF IL. Type approval testing of the ERMA FIRST BWTS (with two different models – 50-3000 and FIT 100-3000) is being evaluated (not yet completed) against the requirements of 46 CFR 162.060, including documentation review, land-based testing, shipboard testing and environmental testing.

ERMA FIRST entered into agreement with the NSF IL in September 2014 and is expected to complete all evaluations and testing in the third quarter of 2016.

While the NSF IL is required to independently inspect, evaluate and test BWMS for compliance with the evaluation and testing requirements of 46 CFR 162.060, the final type approval resides with the U.S. Coast Guard Marine Safety Center (MSC).

Respectfully,



Thomas Stevens  
 NSF IL Manager  
 NSF International  
 Phone: +1-734-769-5347  
 Email: [stevenst@nsf.org](mailto:stevenst@nsf.org)

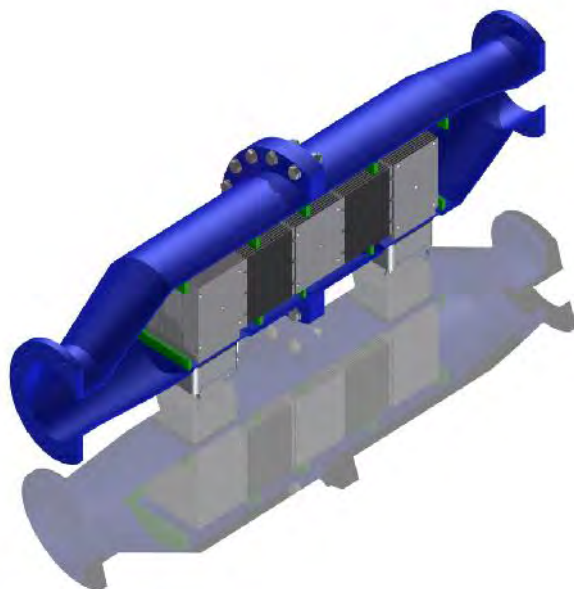
789 Dixboro Road, Ann Arbor, MI 48105 USA  
 734-769-8010 1-800-NSF-MARK Fax 734-769-0109  
 E-Mail: [info@nsf.org](mailto:info@nsf.org) Web: <http://www.nsf.org>



## Alternate Management Systems<sup>1</sup> (AMS) Accepted by the U.S. Coast Guard 01 June 2015

### Operating Specifications

- Min. Operating Temp.: 3 °C
- Min. Operating Salinity: 0.9 PSU



Manufacturer	System Name	Accepted Models	Acceptance Date	AMS Identification No.	Accepted for Use in		
					Freshwater <sup>2</sup>	Ballast <sup>3</sup>	Marine <sup>4</sup>
COSCO Shipbuilding Industry Company – China	Blue Ocean Shield	Models BOS02 and BOS05, with treatment rated capacities of 100 to 3,500 m3/hr, with associated filters	19-Nov-13	AMS-2013-COSCO BOS-001		X	X
DESMI Ocean Guard A/S Denmark	OxyClean	Models OxyClean 75, -100, -200, -300, -400, -500, -600, -700, -800, -900, -1000, -1200, -1300, -1400, -1500, -1600, -1700, -1800, -1900, -2000, -2100, -2200, -2300, -2400, -2500, -2600, -2700, -2800, -2900, and -3000, with associated filters	11-Oct-13	AMS-2013-DESMI-OxyClean-001	X	X	X
DESMI Ocean Guard A/S Denmark	RayClean	Models 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, 2800, 2900, and 3000.	30-Jan-15	AMS-2015-DESMI-RayClean-001	X	X	X
Ecochlor Inc. – USA	Ecochlor	Series 75, 100, 150, 200, 250, and 300, with filter models BS-050 to BS-1200	15-Apr-13	AMS-2013-Ecochlor-001		X	X
Elite Marine Ballast Water Treatment System Corp – China	Seascope	Model 250-BWMS	03-Oct-14	AMS-2014-Elite Marine Seascope-001		X	X
ERMA FIRST ESK Engineering Solutions SA – Greece	ERMA FIRST	Models BWTS 50, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, 2200, 2300, 2400, 2500, 2600, 2700, 2800, 2900, and 3000, with associated pre-filter and hydrocyclonic separator. Models BWTS FIT 100, FIT 200, FIT 300, FIT 400, FIT 600, FIT 800, FIT 1000, FIT 1200, FIT 1500, FIT 2000, FIT 2500, and FIT 3000. <b>Revision adds FIT models and acceptance for use in FW.</b>	11-Oct-13 <b>Revised 31-Mar-15</b>	AMS-2013-ERMA FIRST BWTS-001	X	X	X
Techcross, Inc. – Korea	Electro-Cleen	Models ECS-150B, Ex-ECS-150B, ECS-300A, Ex-ECS-300A, ECS-300B, Ex-ECS-300B, ECS-450B, Ex-ECS-450B, ECS-600A, Ex-ECS-600A, ECS-600B, Ex-ECS-600B, ECS-1000A, ECS-1000B, and Ex-ECS-1000B, with parallel treatment configurations as approved by the flag administration	04-Oct-13	AMS-2013-Techcross Electro-Cleen-001		X	X
Hyundai Heavy Industries – Korea	EcoBallast™	Models 360, -600, -700, -720, and -1000 with associated filters, UV reactors, and cleaning unit. Treatment Rated Capacities (TRC) can be increased through parallel configurations of UV reactors. <b>Revised for reissued TA Certificate that allows parallel configurations.</b>	04-Mar-14; <b>Revised 05-Dec-14</b>	AMS-2014-Hyundai EcoBallast-001		X	X
Hyundai Heavy Industries – Korea	HiBallast	Models HiB-75, -150, -225, -300A, -300B, -500, -600, -900, -1000, -1200, -1200, -1500, and -2000, with associated filters. TRCs can be increased through parallel configurations of electrolyzer units. <b>Revised for reissued TA Certificate that allows parallel configurations and clarifies TRO dose values.</b>	24-Jun-13 <b>Revised 05-Dec-14</b>	AMS-2013-Hyundai-HiBallast-001		X	X
Hyundai Heavy Industries – Korea	HiBallast-EX	Models HiB-75-Ex, -150-Ex, -225-Ex, -300A-Ex, -300B-Ex, -500-Ex, -600-Ex, -900-Ex, -1000-Ex, -1200-Ex, -1500-Ex, and -2000-Ex, with associated filters. TRCs can be increased through parallel configurations of electrolyzer units. <b>Revised for reissued TA Cert. allows parallel configurations &amp; clarifies TRO doses.</b>	24-Jun-13; <b>Revised 05-Dec-14</b>	AMS-2013-Hyundai-HiBallast-EX-001		X	X
NK Company, Ltd – Korea	BlueBallast	Models NK-03-010, -015, -030, -040, -050, -075, -100, -150, -200, -250, -300, and -400	15-Apr-13	AMS-2013-NK(03-BlueBallast-001)		X	X

ERMA FIRST BWT Systems required **NO Changes** or any type of modification in order to start the tests for USCG Type Approval

- Overall design and systems configuration remained unchanged
  - Treatment process met all the requirements (IMO & USCG AMS)
    - Components where neither altered or replaced

#ZERO\_changes\_made

## Manuals

Fully descriptive manuals have been developed so vessel's Crew that is or might be involved with the process can have a standard comprehensive reference .



## Training

For the efficient and trouble-free operation of the installed systems ERMA FIRST has developed an in-depth training scheme. Its hands-on format either on board or in our training facilities guaranties the required knowledge background so our systems to be used with confidence.



## MADC requirement: 0.2 to be reduced to 0.1mg/L

Vessel General Permit (VGP) which is related to and defines vessel's effluent limitations (not IMO or USCG) indicates  $MADC < 0.1\text{mg/L}$

As such, ERMA FIRST BWT Systems have been by default equipped and calibrated to handle efficiently the said TRO limitation.

Systems sold: 175 (retrofit:28)

Tankers:48

Bulkers: 63

Containers: 24

LPG:18

Car Carries: 7

Passenger/Yacht:8

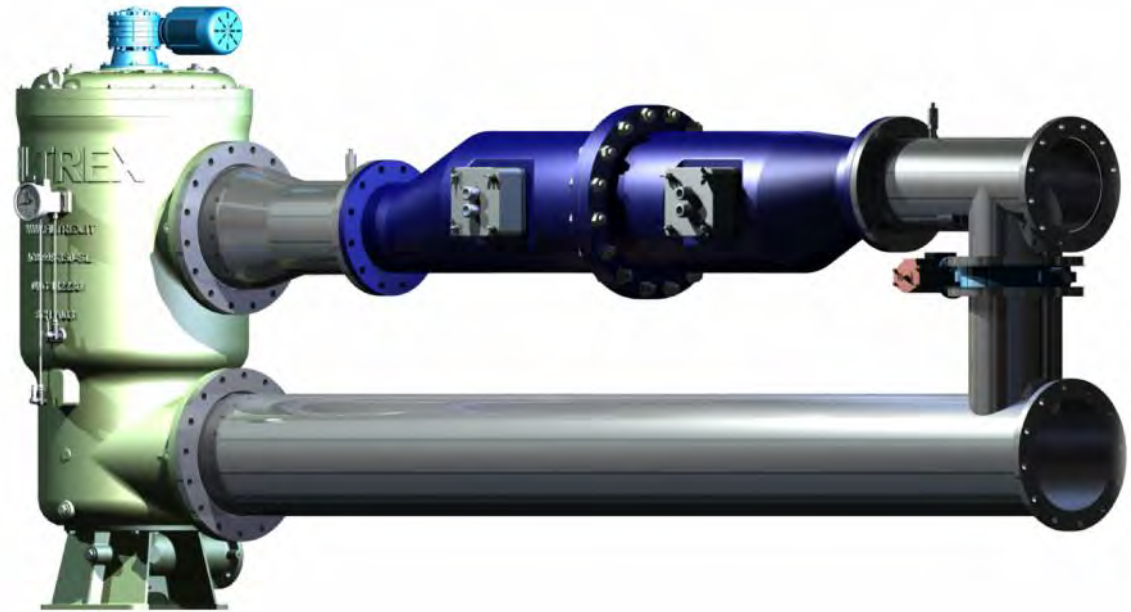
Other:7

## Reference List

## Availability of **Systems** for Retrofit needs

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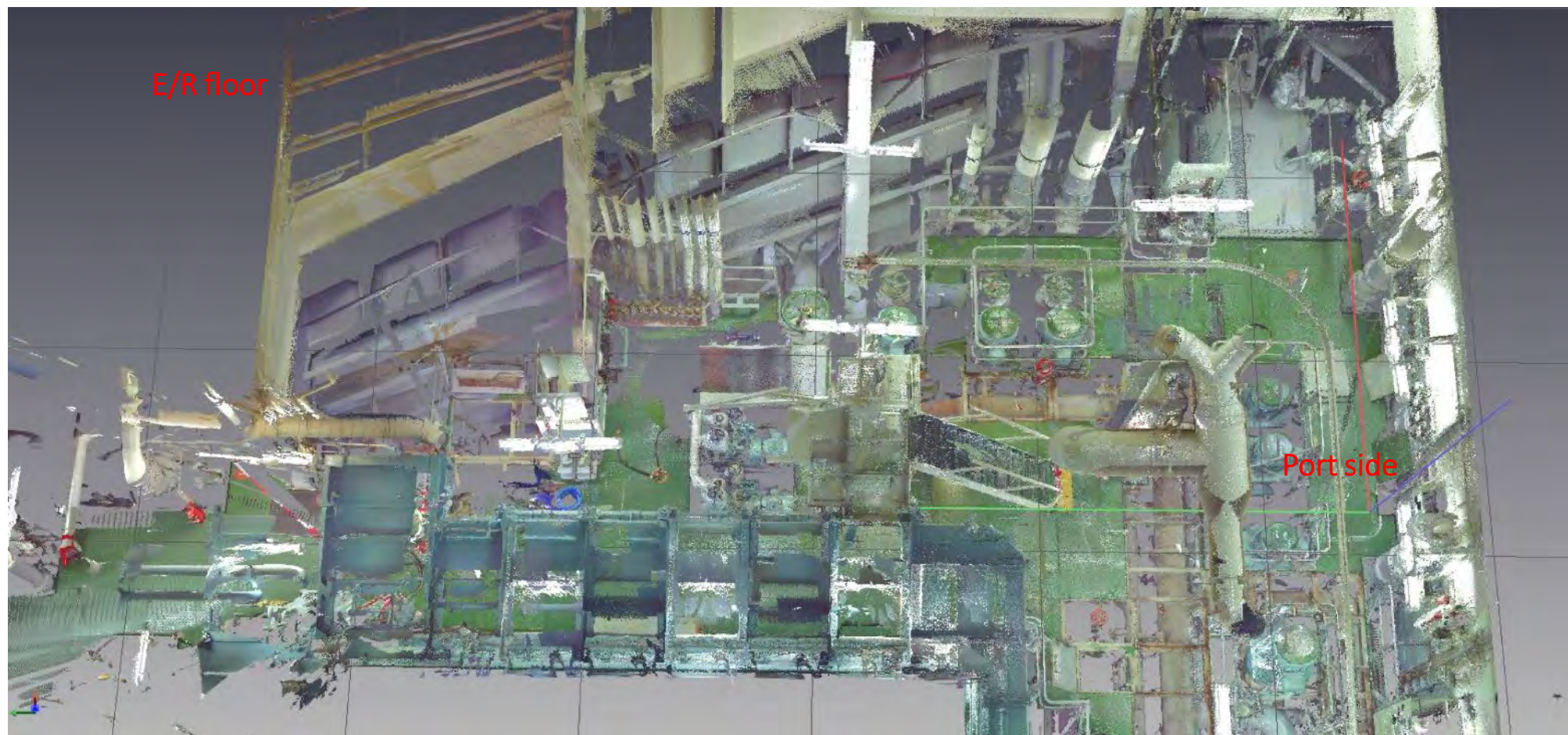
- Capacity range 50 to 3000 m<sup>3</sup>/hr
  - Minimized footprint
  - Simple installation
  - Negligible pressure drop
  - Skid or loose
  - Low maintenance
  - ATEX / IECEx configured
- 
- Fleet agreements with priority on availability of units
  - Yearly capacity of 500 units (hardware + engineering)
  - Retrofit full engineering package



## ENGINE ROOM ARRANGEMENT

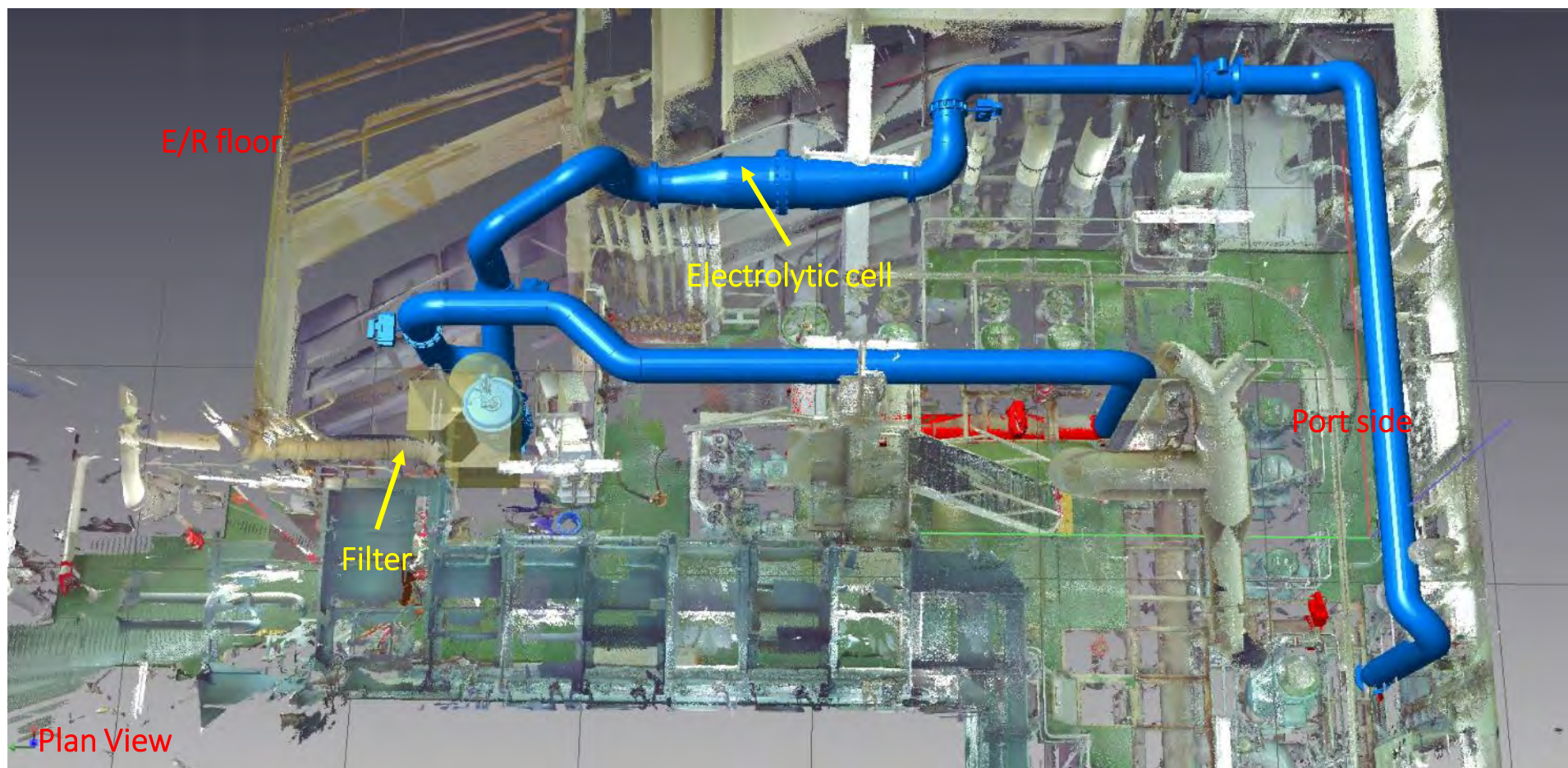


## ERMA FIRST FIT 1x1000 m<sup>3</sup>/h: Piping & equipment arrangement in ENGINE ROOM



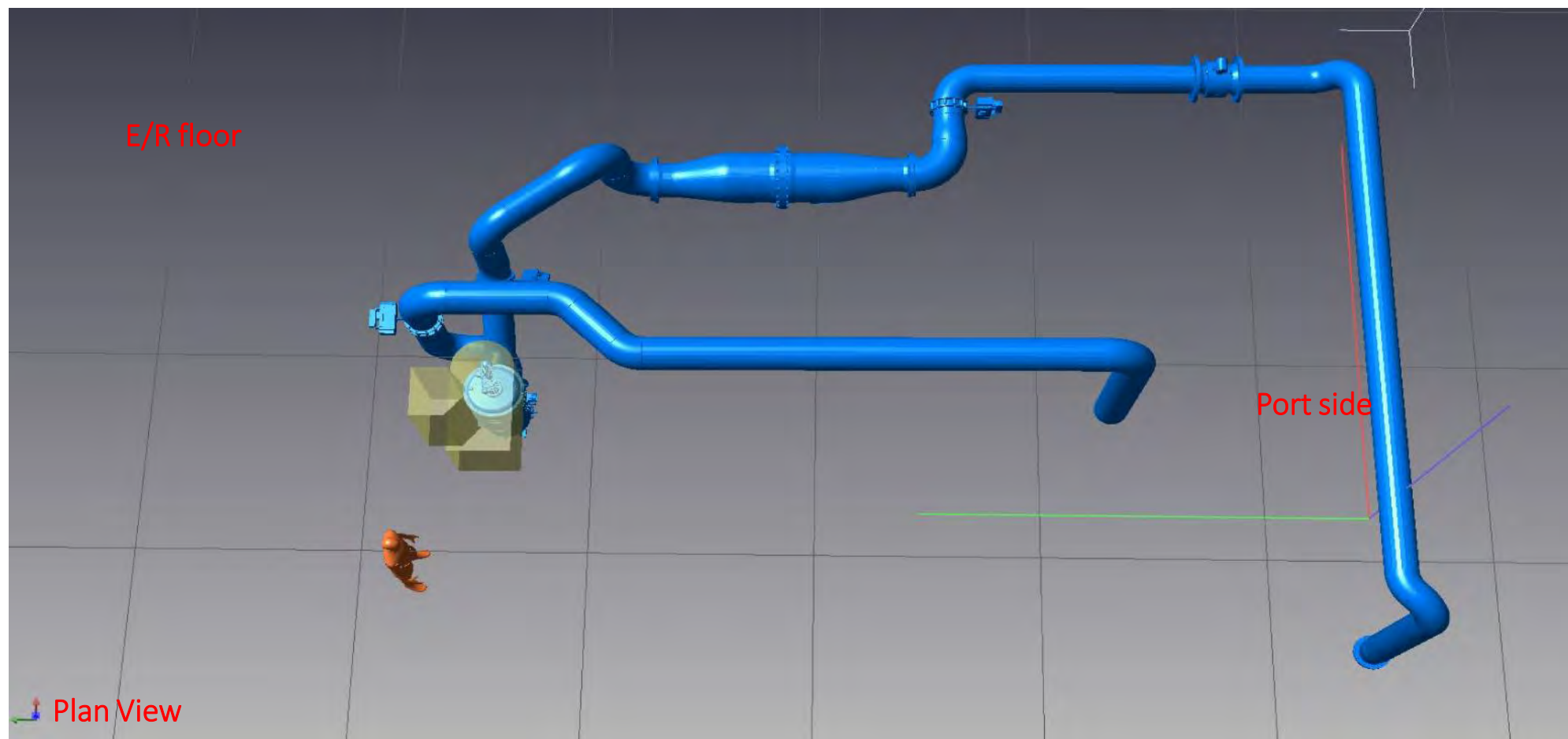
Plan View

## ERMA FIRST FIT 1x1000 m<sup>3</sup>/h: Piping & equipment arrangement



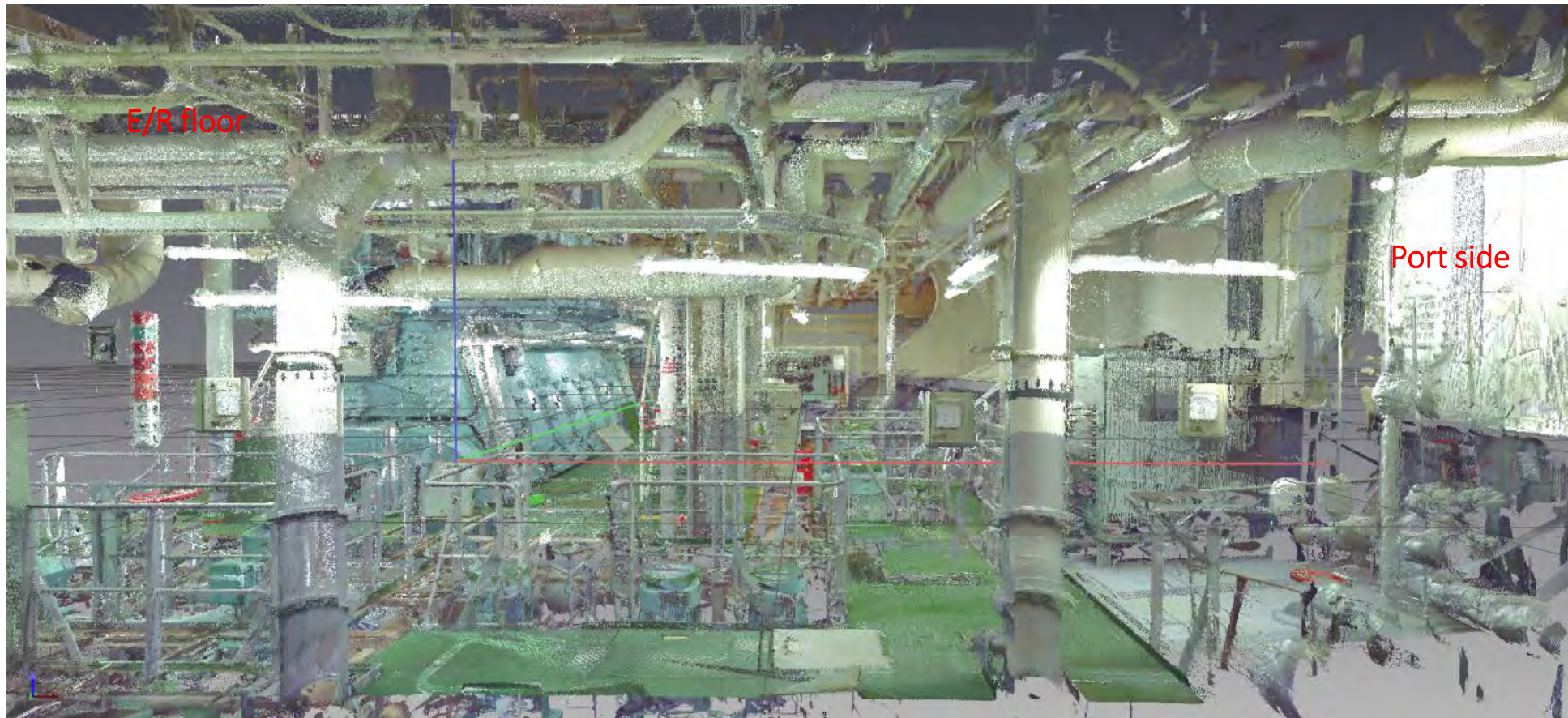
*(yellow colored volume indicates required service space)*

## ERMA FIRST FIT 1x1000 m<sup>3</sup>/h: Piping & equipment arrangement



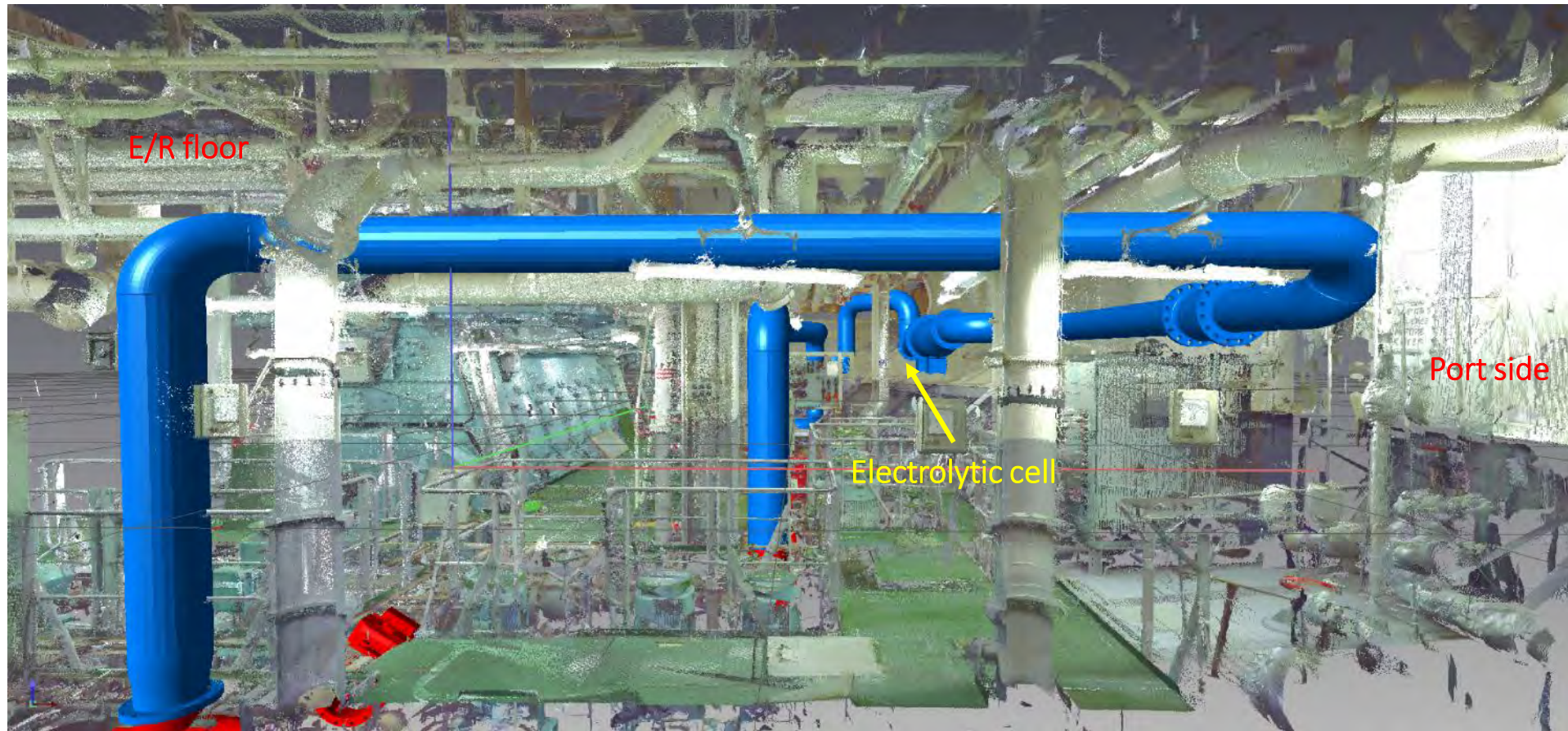
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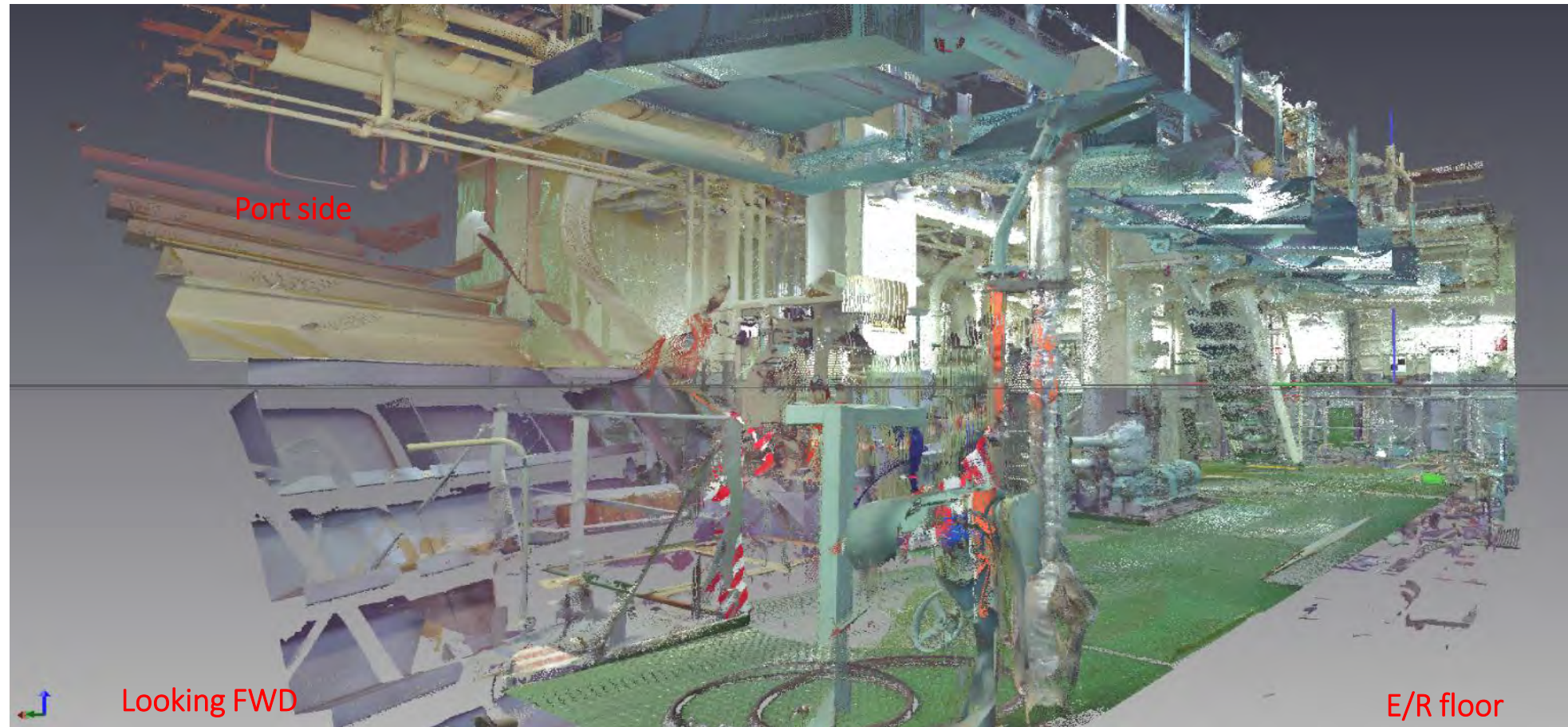
Looking Aft

## ERMA FIRST FIT 1x1000 m<sup>3</sup>/h: Piping & equipment arrangement

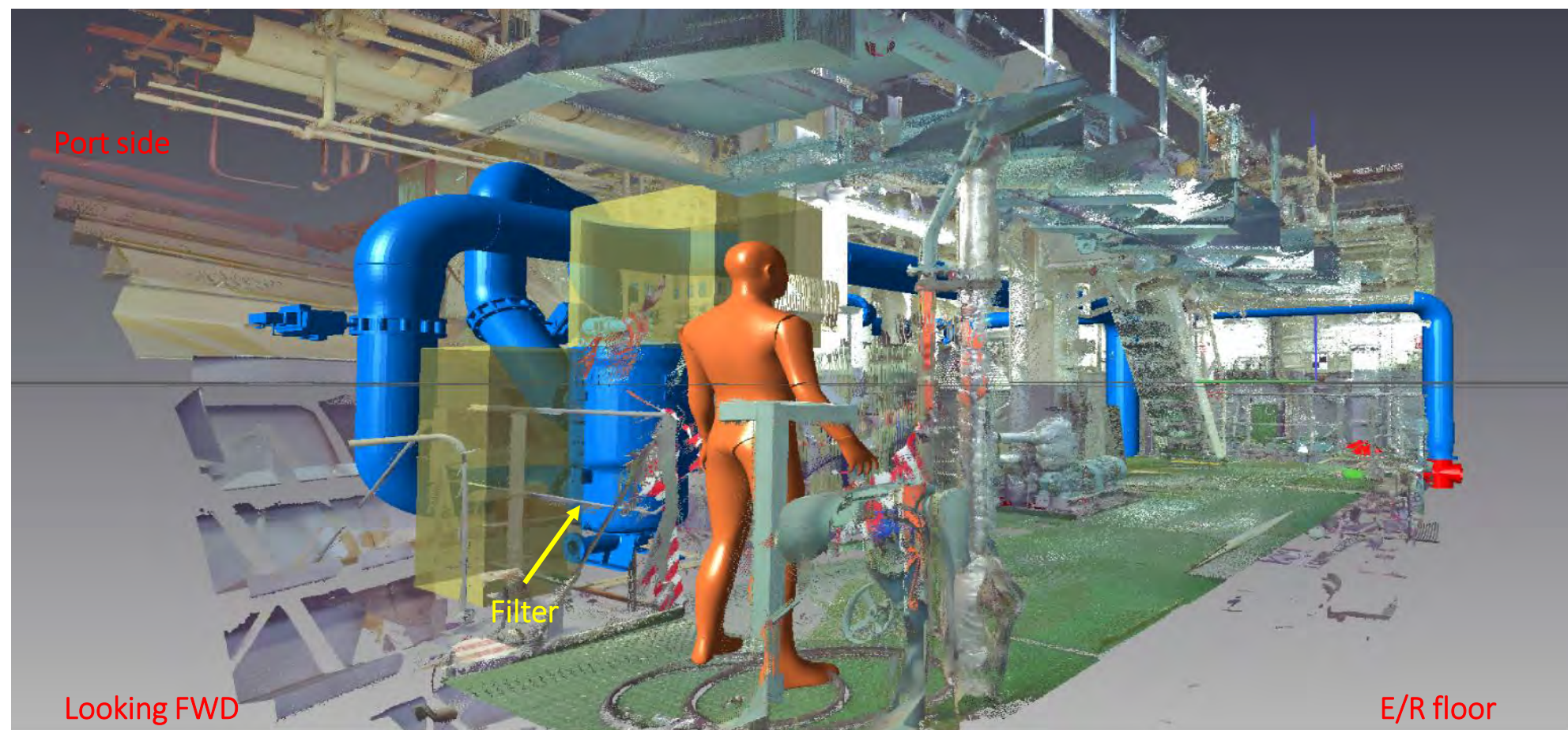


Looking Aft

## ERMA FIRST FIT 1x1000 m<sup>3</sup>/h: Piping & equipment arrangement

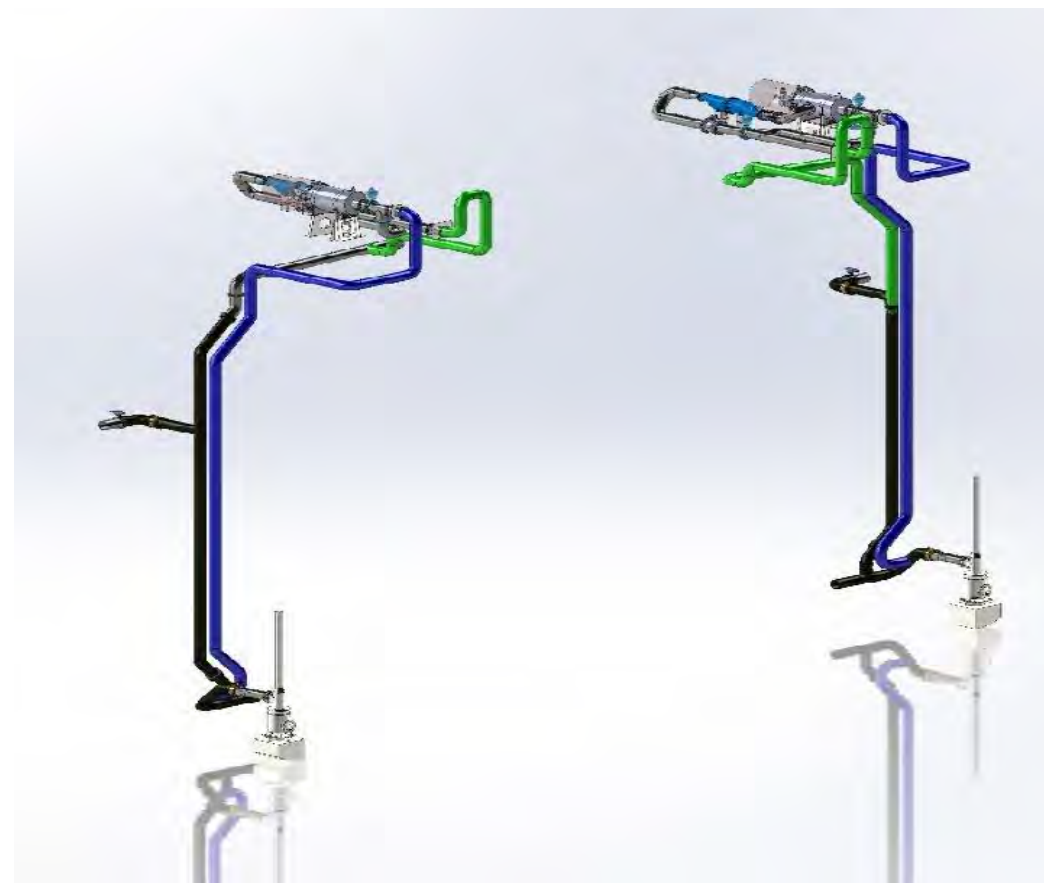
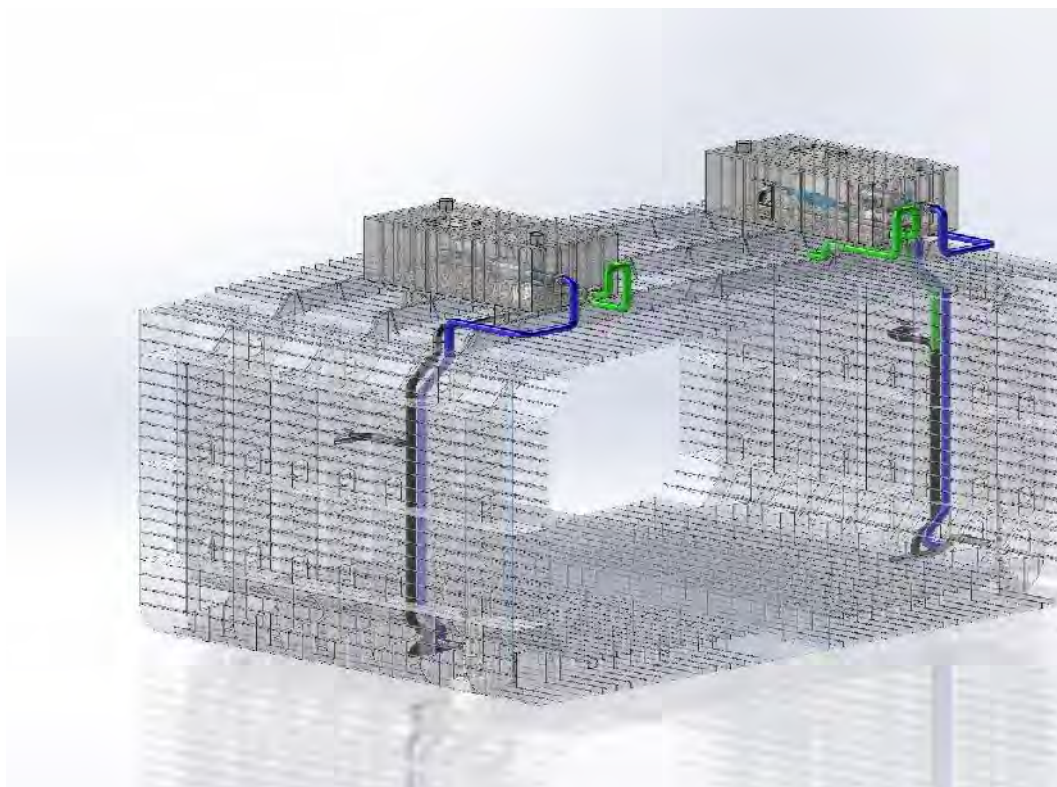


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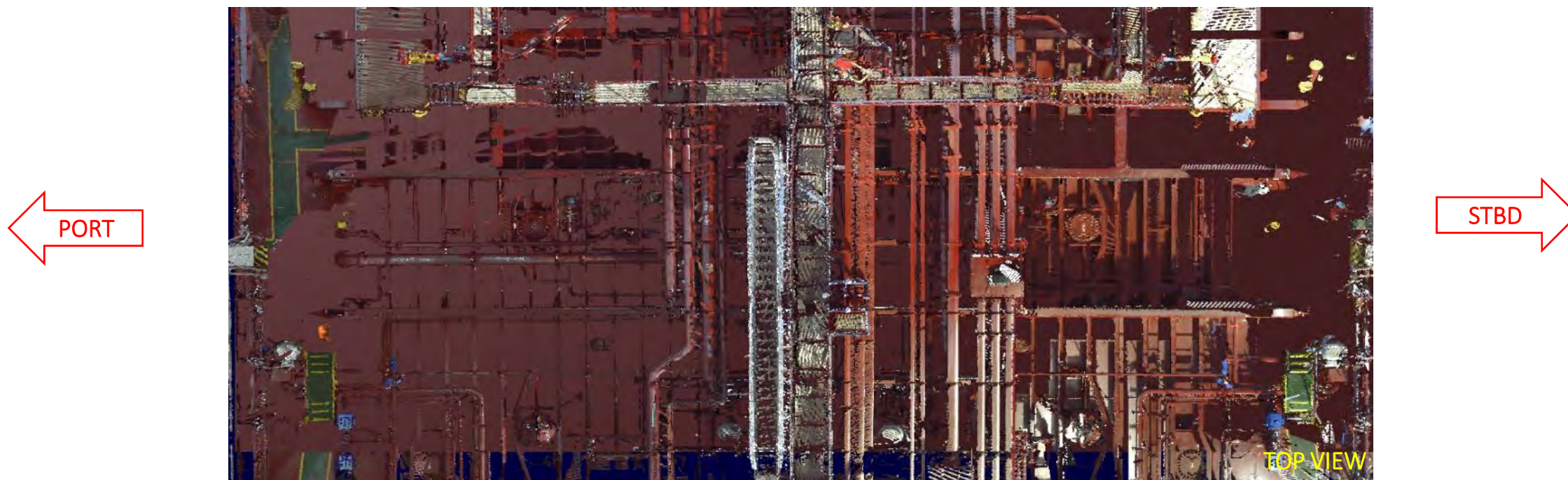


*(yellow colored volume indicates required service space)*

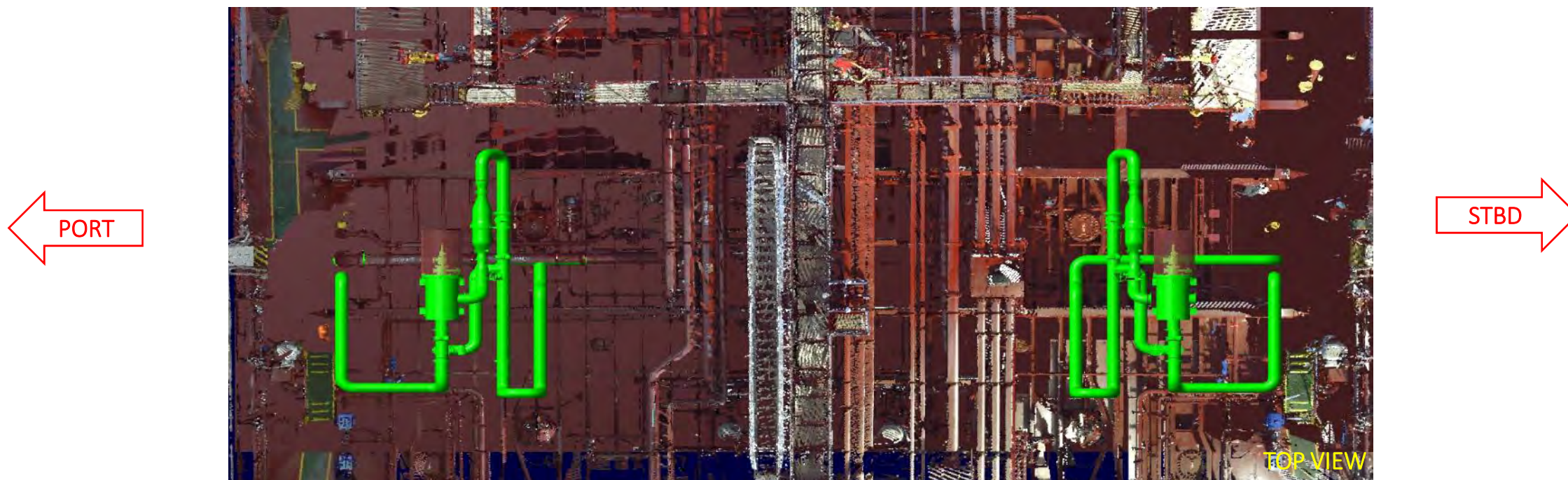
## MAIN DECK – ERMA FIRST Treatment System



## MAIN DECK – ERMA FIRST Treatment System on main deck

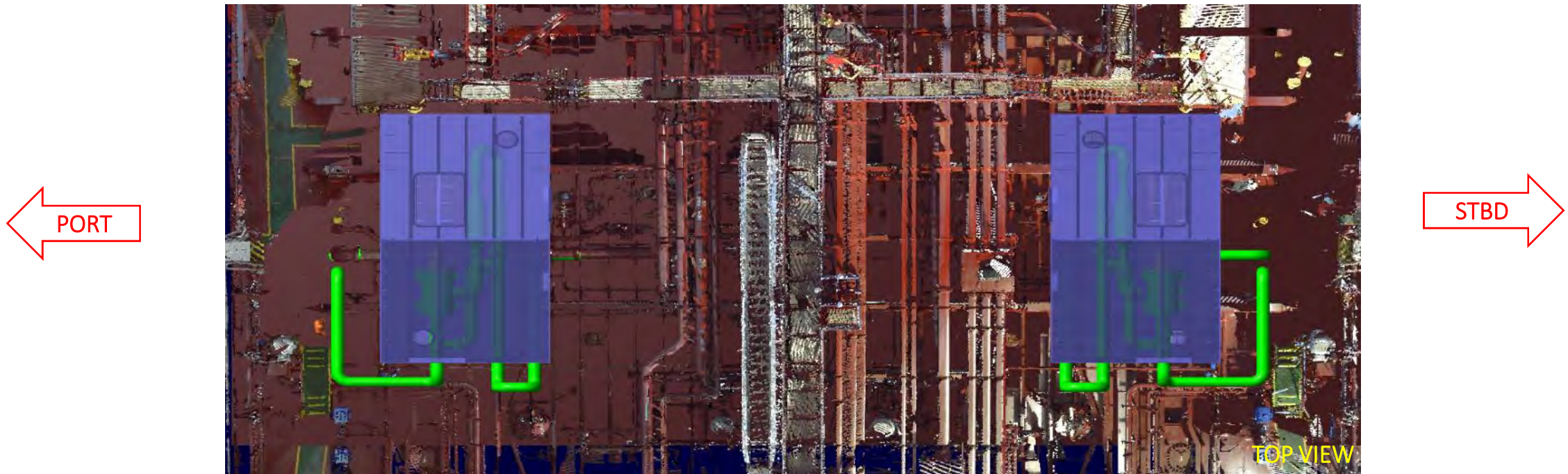


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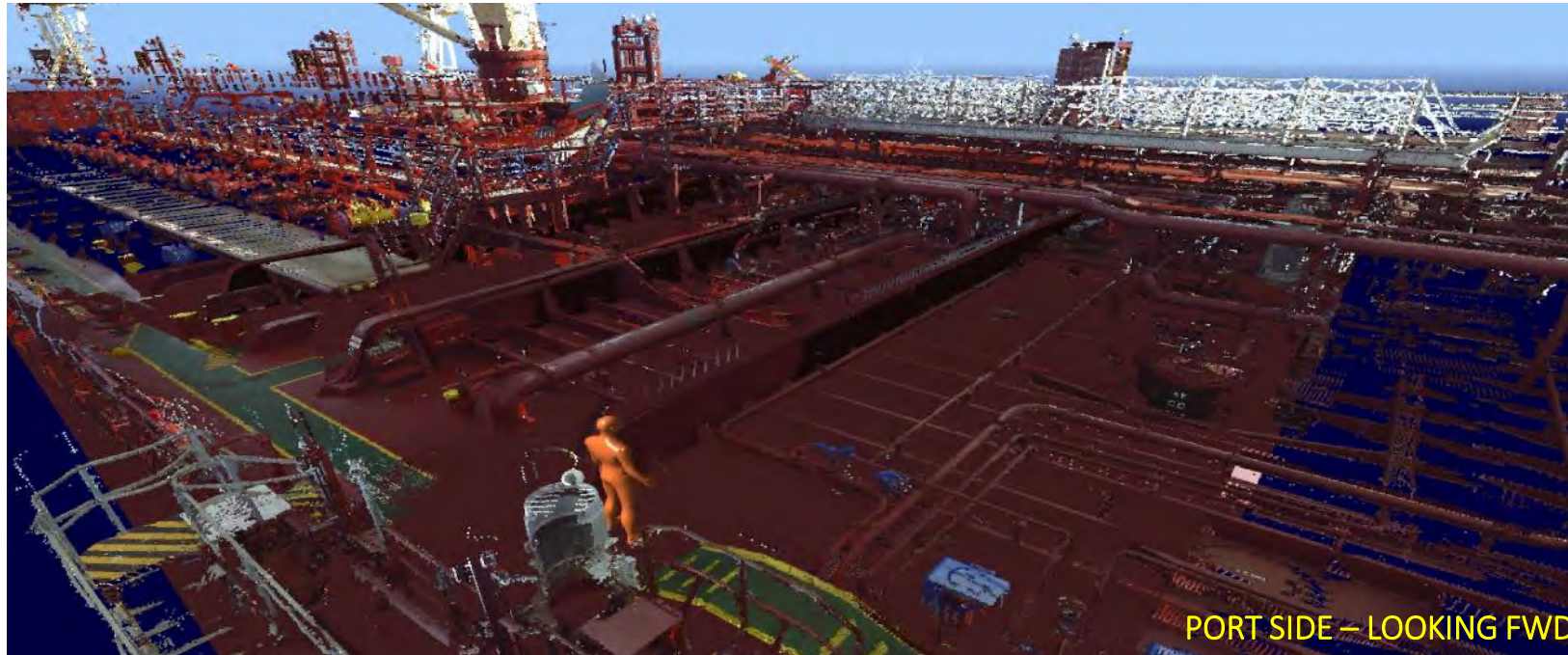


With pink color is indicated the minimum service space required

## MAIN DECK – ERMA FIRST Treatment System



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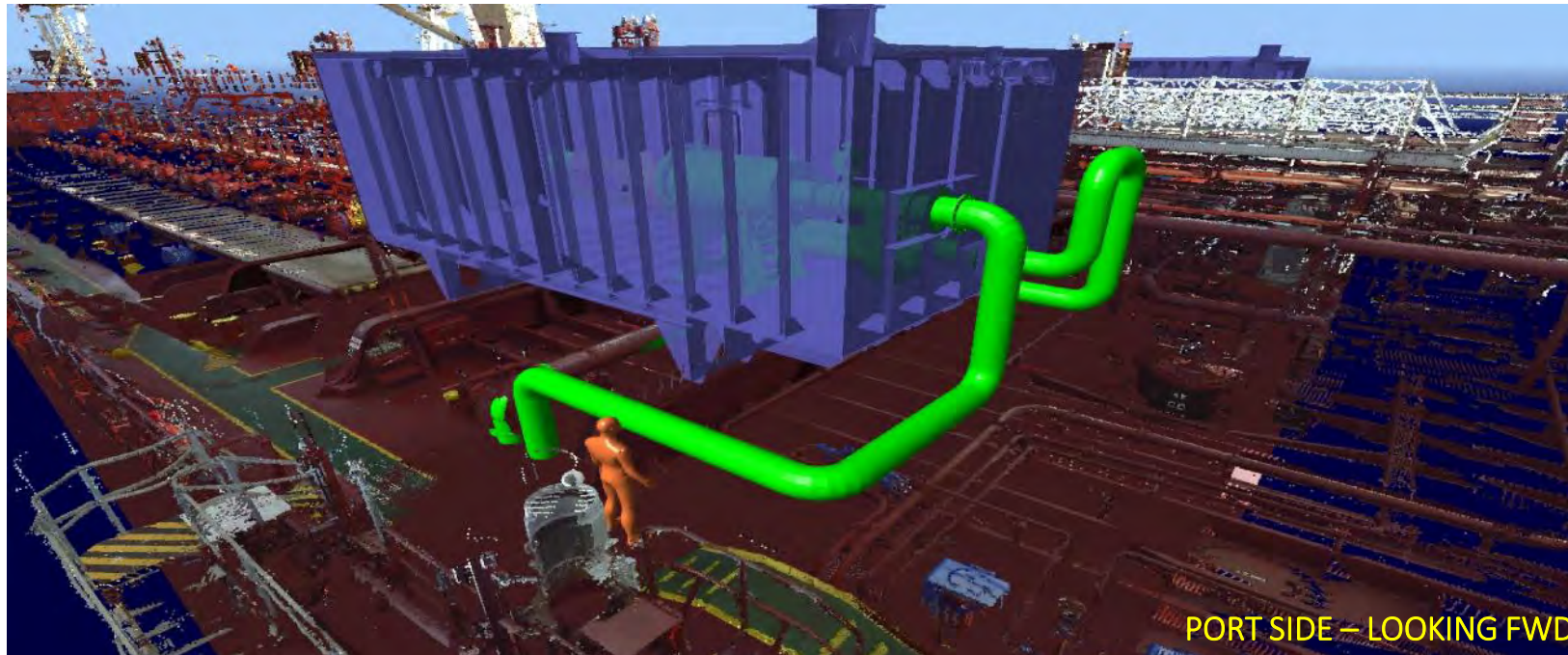


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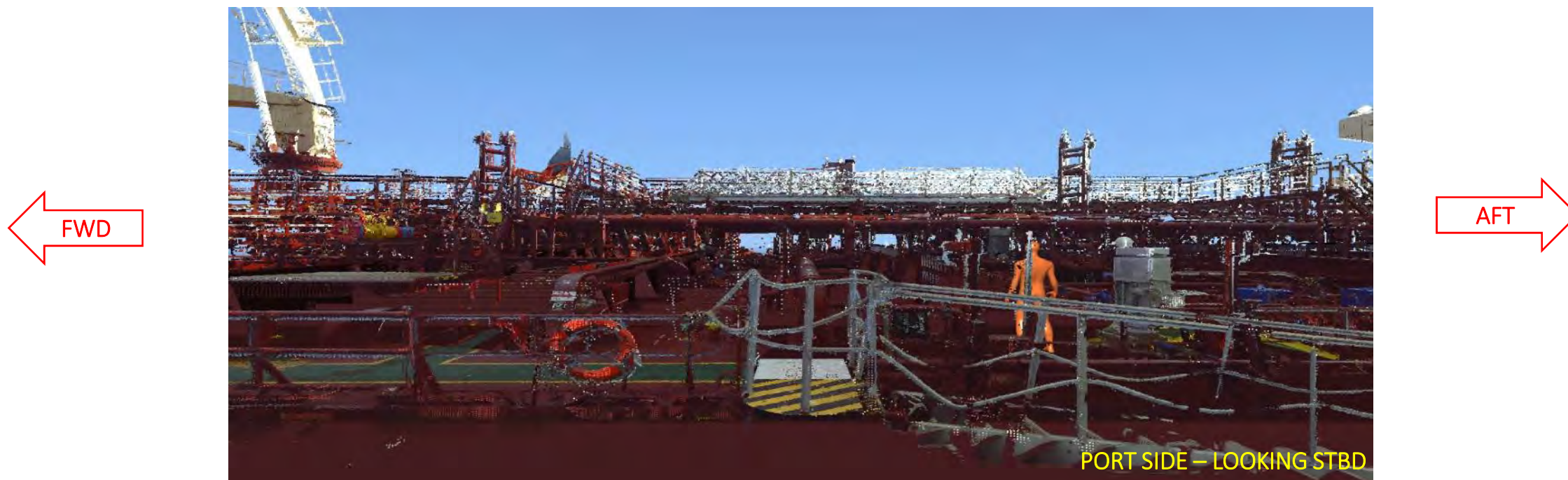


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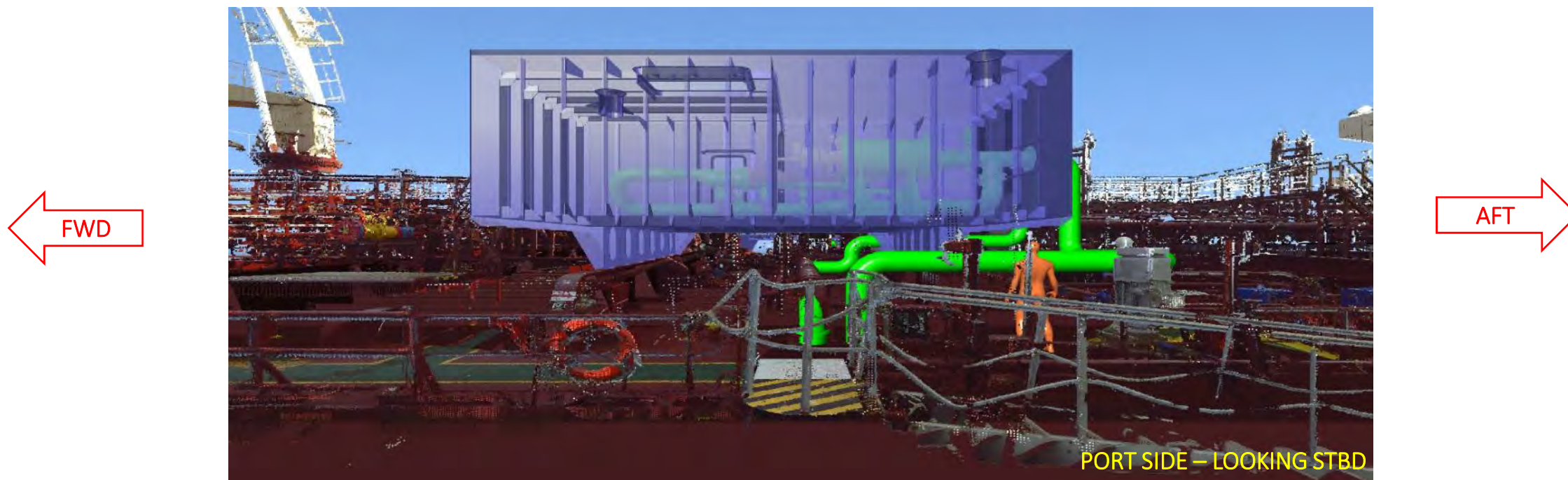


## MAIN DECK – ERMA FIRST Treatment System



With pink color is indicated the minimum service space required

## MAIN DECK – ERMA FIRST Treatment System



## Local Stations for Preliminary Inspection & Service

- Japan
- Korea
- China (2 stations)
- Philippines
- Singapore
- India (Sri Lanka)
- Dubai
- Denmark (Scandinavia)
- Greece
- Houston U.S.
- Tampa U.S
- Spain
- Netherlands
- Romania (Black Sea)
- Germany
- Lithuania (Baltic)
- Other on process



[ERMA FIRST RETROFIT INSTALLATION 360 Video!!!](#)

Thank you for your kind attention

