



ERMA FIRST Powered by EPE
The Essential Ballast Solution

BALLAST WATER MANAGEMENT

ERMA FIRST FIT

ERMA FIRST

"Developed in The Biggest Shipping Nation In The World"



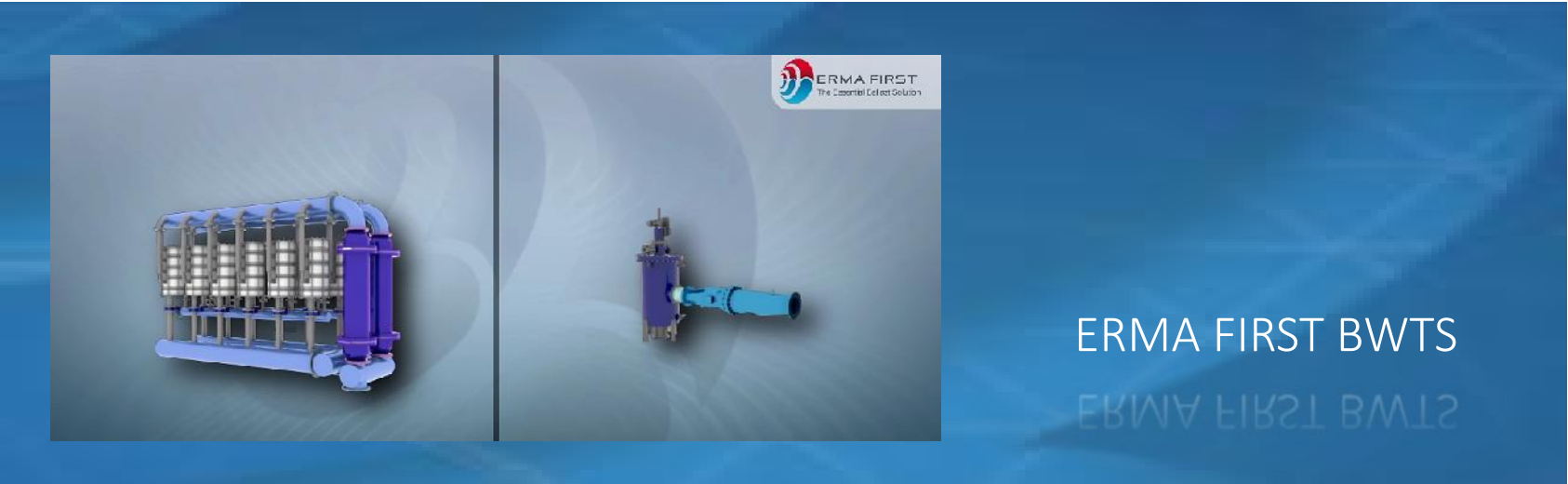
Established in 1977 and by continuous investing in R&D and new technologies, became a Global player in environmental protection, offering a variety of products and services in the **Marine** and **Industrial** field.



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**.

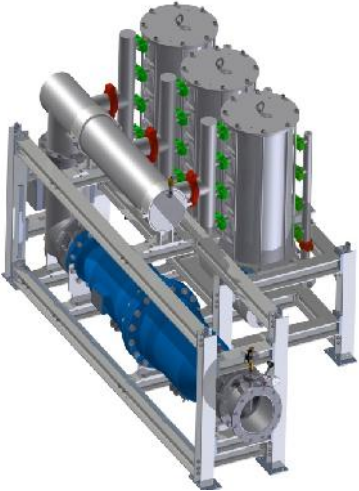

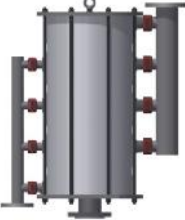
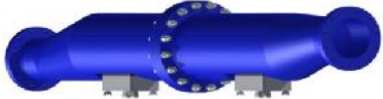




ERMA FIRST BWTS

ERMA FIRST BWTS

THE SYSTEM IN A GLANCE: OPTION 1, ERMA FIRST BWTS

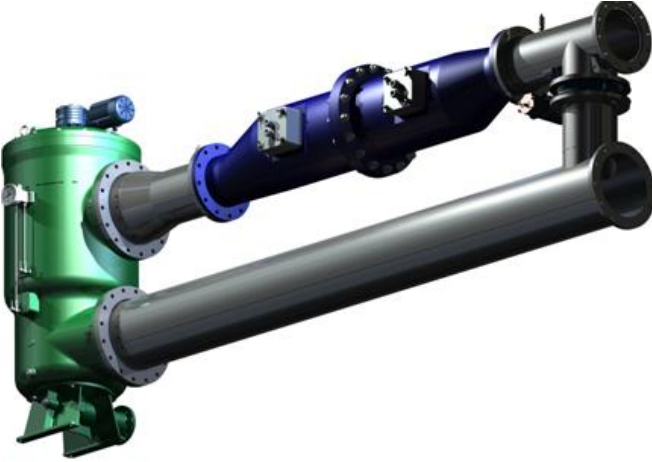



ERMA FIRST BWTS	Stage - Components		
	SEPARATION	200 microns mesh self-cleaning pre-filter 20 microns Hydro cyclones	 
	DISINFECTION	Advanced Technology Electrolysis Cells TRO Concentration 8-10 mg/L	



ERMA FIRST BWTS FIT

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THE SYSTEM IN A GLANCE: OPTION 2, ERMA FIRST BWTS FIT

ERMA FIRST FIT BWTS	Stage – Components		
	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>	



ATEX and IECEX Now available

Advanced Filtration

- Removal of particles > 40µm
- Negligible pressure drop
- Maximized Electrolysis results
- Minimized footprint

Electrolytic Cells

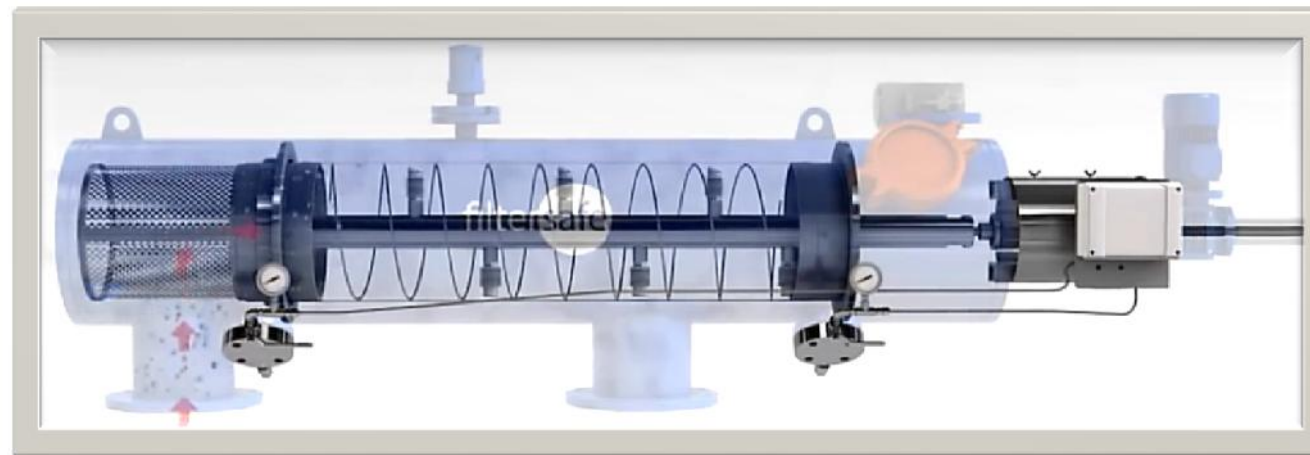
- Effective disinfection
- Low maintenance
- No cleaning required

OPERATION AT 0.9 PSU

Option 1 - FILTERSAFE



- Sintered Screen Type
- Pressure drop: 0,05-0,5bar
- [Automatic cleaning](#)
- Screen size : 40 μm
- Capacity : 50 ~ 3,000 m³/h
- Explosion proof type available
- SS 316L filter basket



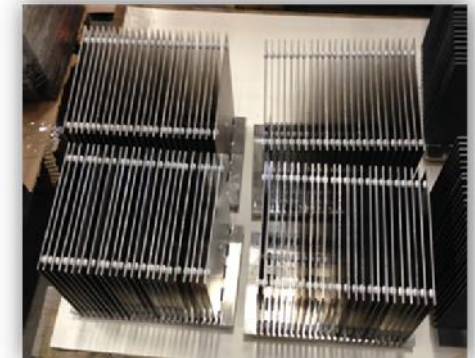
Option 2 - FILTRES Ultra Compact



- Wedge wire pleated Screen Type
- Pressure drop: 0,05-0,5bar
- Automatic cleaning
- Screen size : 40 μm
- Capacity : 50 ~ 1,000 m³/h
- Extremely small footprint
- EX Available
- Housing: Bronze Aluminum Alloy

* Parallel hydraulic connection of filters results to higher flow rates

Electrolytic Cell



- Full Flow Type, Sodium Hypochlorite is produced at a max concentration of 4-6mg/Lt

Electrolytic Cell

Available Sizes:

- Cells: 150 - 300 - 600 – 800 - 1250 m³/ hr
- Parallel Connection – Higher flow rates
- Larger versions under development

Operating Specifications:

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

Installation:

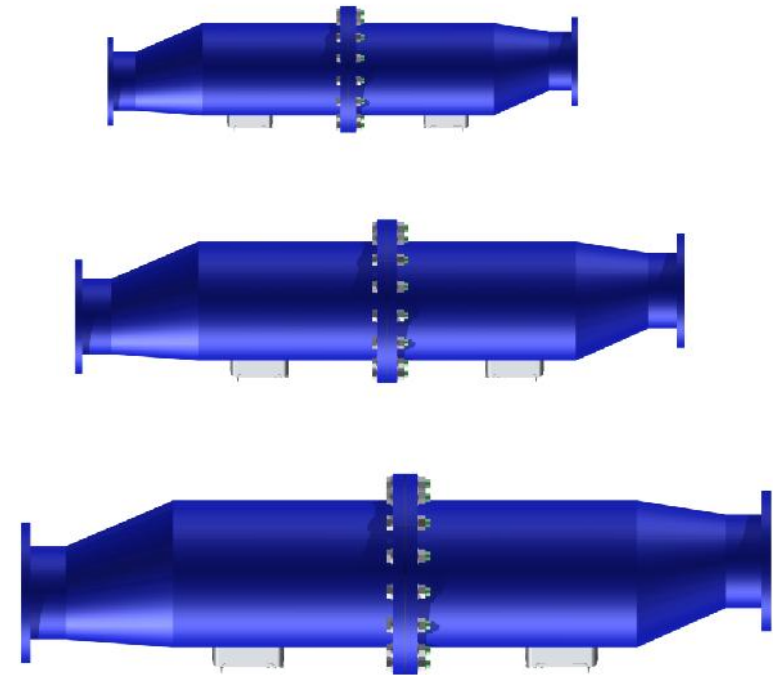
- Vertical or horizontal orientation

Maintenance:

- Electrodes lifetime exceeds 5000 hrs

Advantages:

- Very low power consumption
- Negligible hydrogen production of Max 0.1% v/v
- No corrosion risk



Power Consumption

	m ³ /hr	100	250	500	750	1000	1500	2000	3000
0.9 psu	kW	6.23	15.6	31.15	46.7	62.3	93.5	124.6	186.9
15 psu	kW	2.73	6.82	13.65	20.48	27.31	40.95	54.6	81.9
30 psu	kW	1.8	4.3	9.0	13.3	18.0	27.0	36.0	54.0

ERMA FIRST Operation in Freshwater

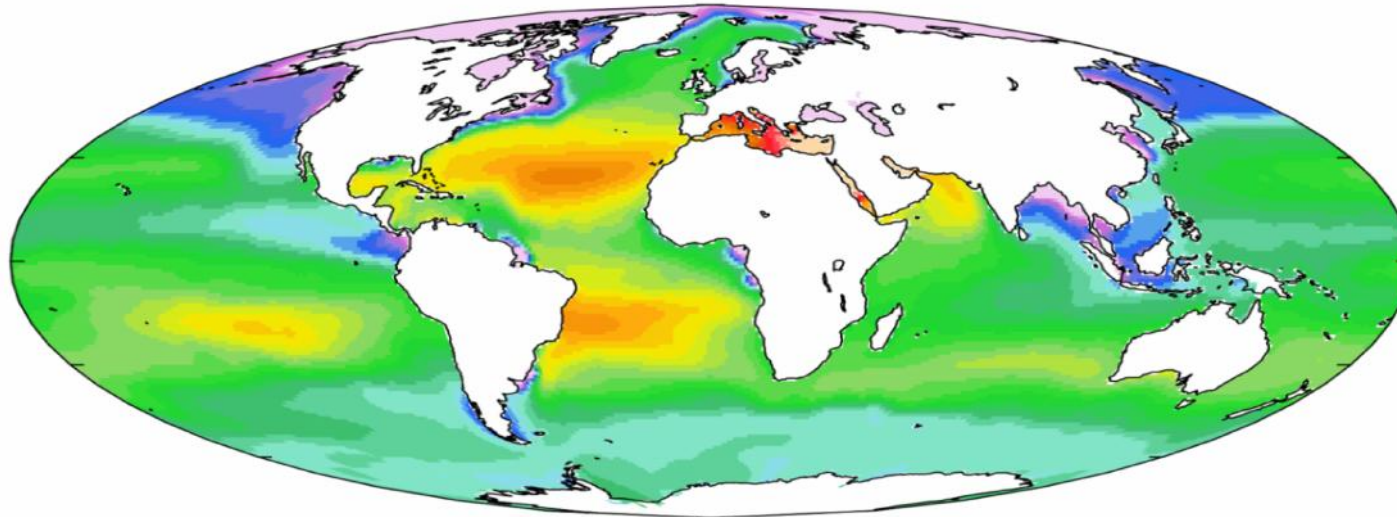
- IMO defined as water salinity <3 PSU
- USCG defined as water salinity <1 PSU
- [ERMA FIRST is type approved to operate at 0.9 PSU](#)
- For lower salinity, addition of sea/brine water is required

Parameter	Values
Intake Water Salinity	200 mg/lit (0.2PSU)
Sea water Salinity	35,000 mg/lit
Brine water Salinity, Evaporator	55,000 mg/lit
BWTS Intake Requested Salinity	900 mg/lit (0.9PSU)

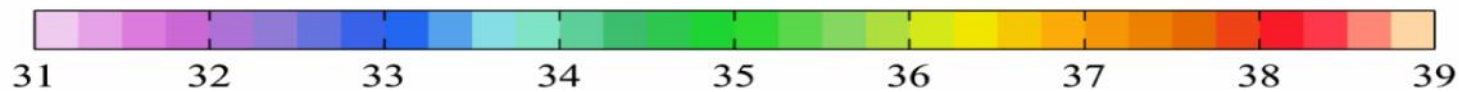
Type of vessel	DWT	Total BW per operation (m ³)	Sea water, 32 PSU (m ³)	Mixing ratio % (injection of sea water in ballast flow rate)	Brine water, Evaporator, 55 PSU	Mixing ratio (injection of brine water in ballast flow rate)
LPG	28500	9500	191	2,1	121	1,3
LPG	14500	4850	98	2,1	62	1,3
AFRAMAX	115000	32000	644	2,1	409	1,3

Salinity

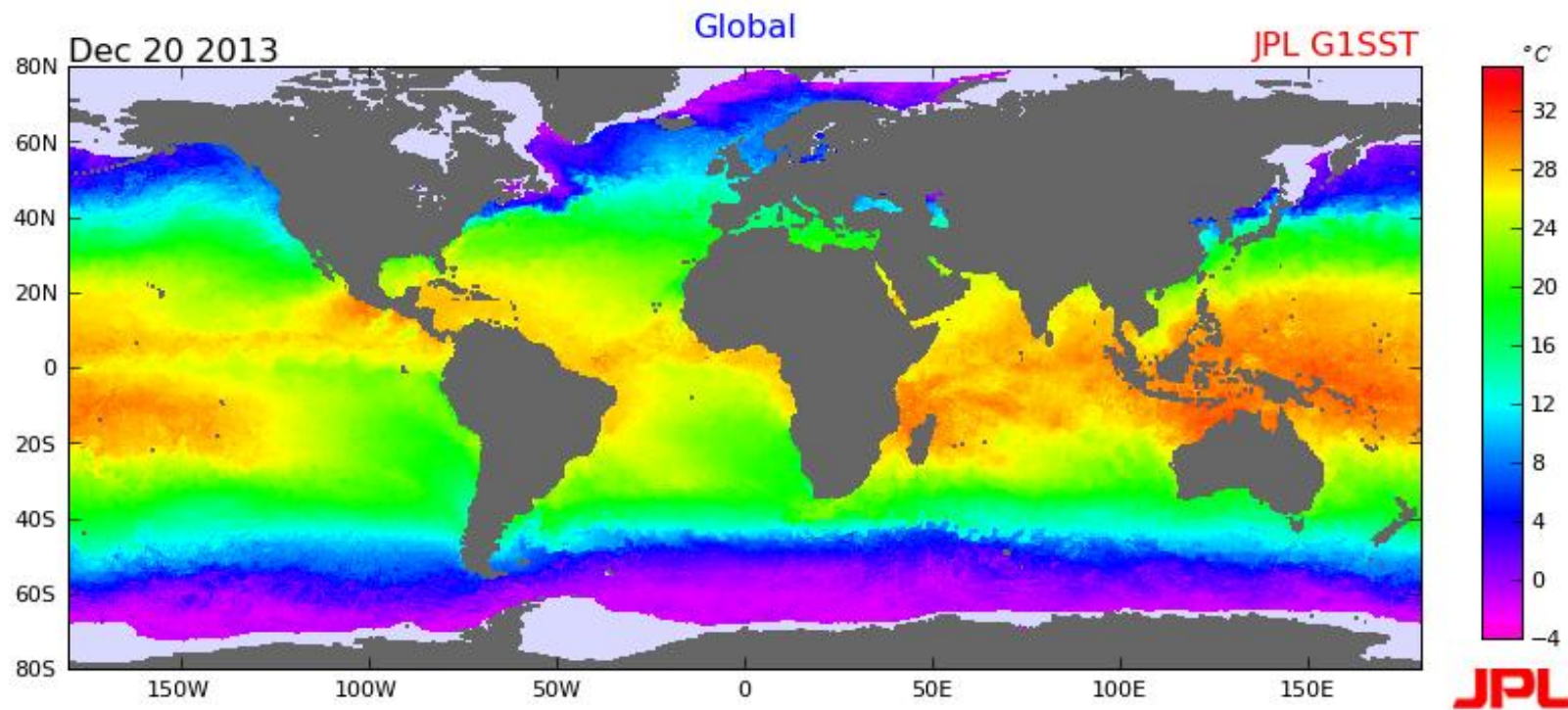
The below illustrates different salinity in the sea around the world. Have in mind that the ports around often are found in river areas and the salinity might be somewhat different from the illustration



Sea Surface salinity



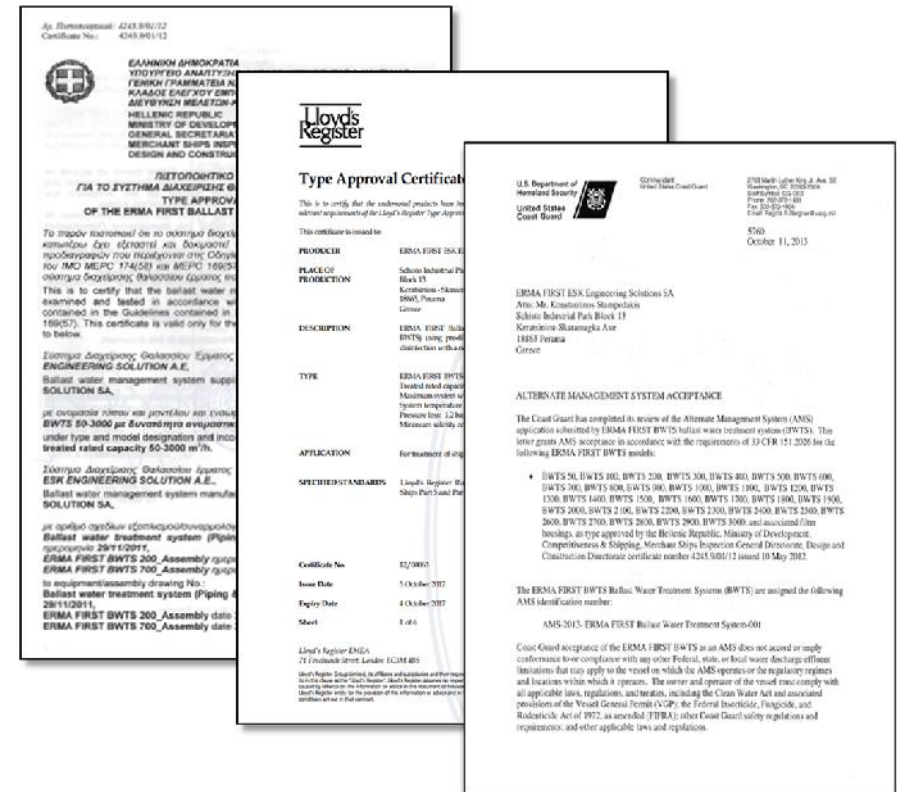
Temperature



Sea surface temperature

ERMA FIRST BWTS System holds:

- IMO Type Approval by Lloyds/Greek Maritime Administration
- [USCG AMS](#)
- USCG Test for Type Approval will start at USCG Approved Lab NSF in USA mid 2015
- [USCG Type Approval expected 2nd semester 2016](#)



USCG process

Time schedule for the USCG Type Approval



NO.	Task	Start date	Finish date
1	USCG AMS approval Fresh, Brackish, Seawater	COMPLETED	COMPLETED
2	Submission of Application for USCG Type Approval	LOI 3.10.2014	LOI 3.10.2014
3	Land-based test Total	SEPTEMBER 2015	MAY 2016
	Land-based test Fresh 5 tests	OCTOBER 2015	MARCH 2016
	Land-based test Brackish 5 tests	MARCH 2016	MAY 2016
	Land-based test Sea 5 tests	APRIL 2016	APRIL 2016
4	Ship-board test 5 tests	NOVEMBER 2015	MAY 2016
5	Environmental test	COMPLETED	COMPLETED
6	USCG Type Approval	2nd QUARTER 2016	3rd QUARTER 2016

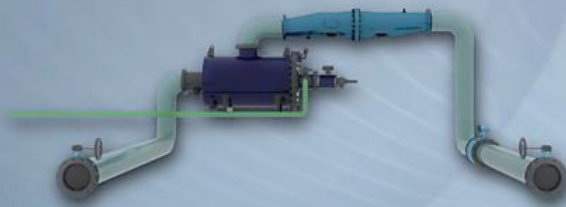
COMPLETED COLOR
IN PROGRESS COLOR



ERMA FIRST BWTS FIT MODULARITY



VARIOUS CONFIGURATIONS



horizontal filter with horizontal electr. Cell



vertical filter with horizontal electr. Cell

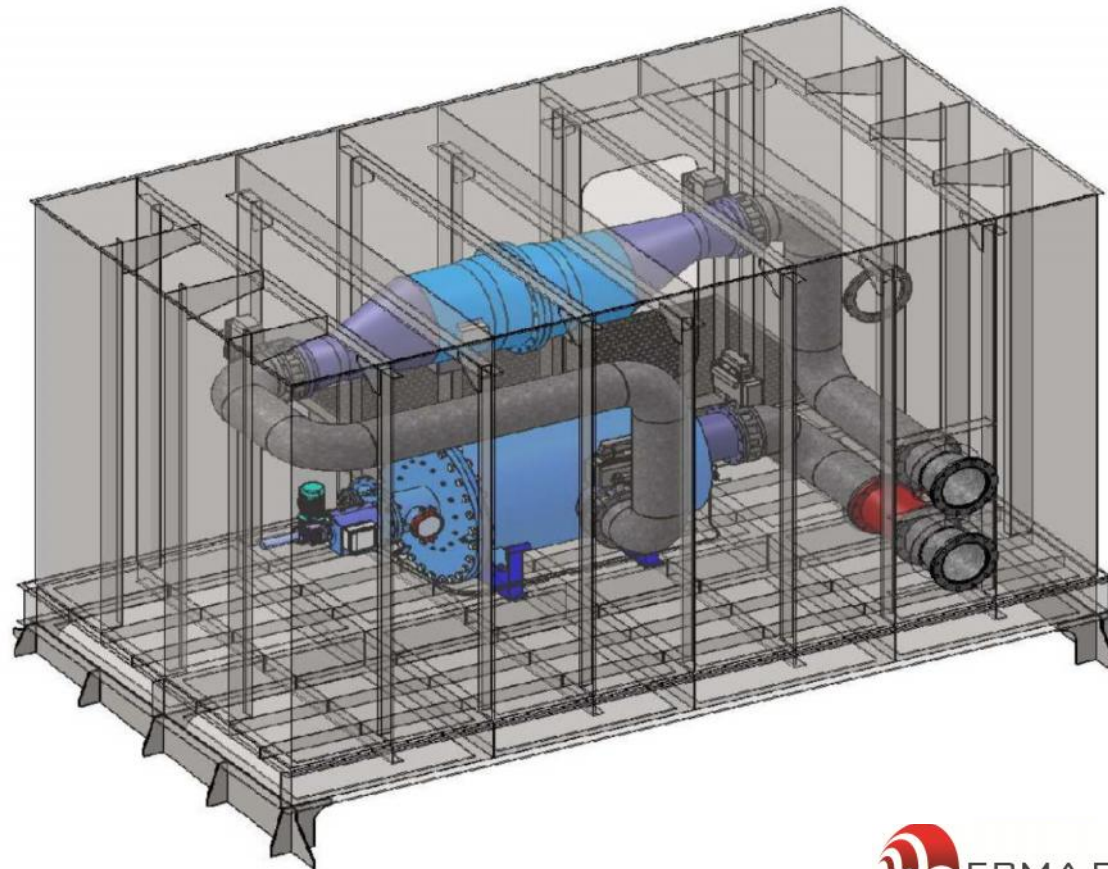


vertical filter with vertical electr. Cell



horizontal filter with vertical electr. Cell

ERMA FIRST BWTS FIT EX PROOF – CONTAINERIZED SOLUTION



Option 1 INSPECTION & REPORTING

A report with the survey findings in electronic format will be this project's deliverables.

Option 2 INSPECTION, 3D LASER SCANNING & REPORTING

A report with preliminary suggested arrangements for the BWTS, including 3D model of the equipment on the alternative locations, followed by a presentation at the Client's premises or tele-conference (at the Client's discretion).

Option 3 INSPECTION, 3D LASER SCANNING, FEASIBILITY STUDY, ENGINEERING STUDY & RETROFIT SPECIFICATION

- Isometric piping drawings (with materials' and parts' list)
- Detailed piping sections / spools
- Modifications of affected "as built" structural, outfitting, diagrammatic piping and single line electrical drawings
- Class approved drawings
- Technical Specification of installation and related modification works

ERMA FIRST is committed to work closely with the Classification Society, with absolute confidentiality and continuous communication of information.

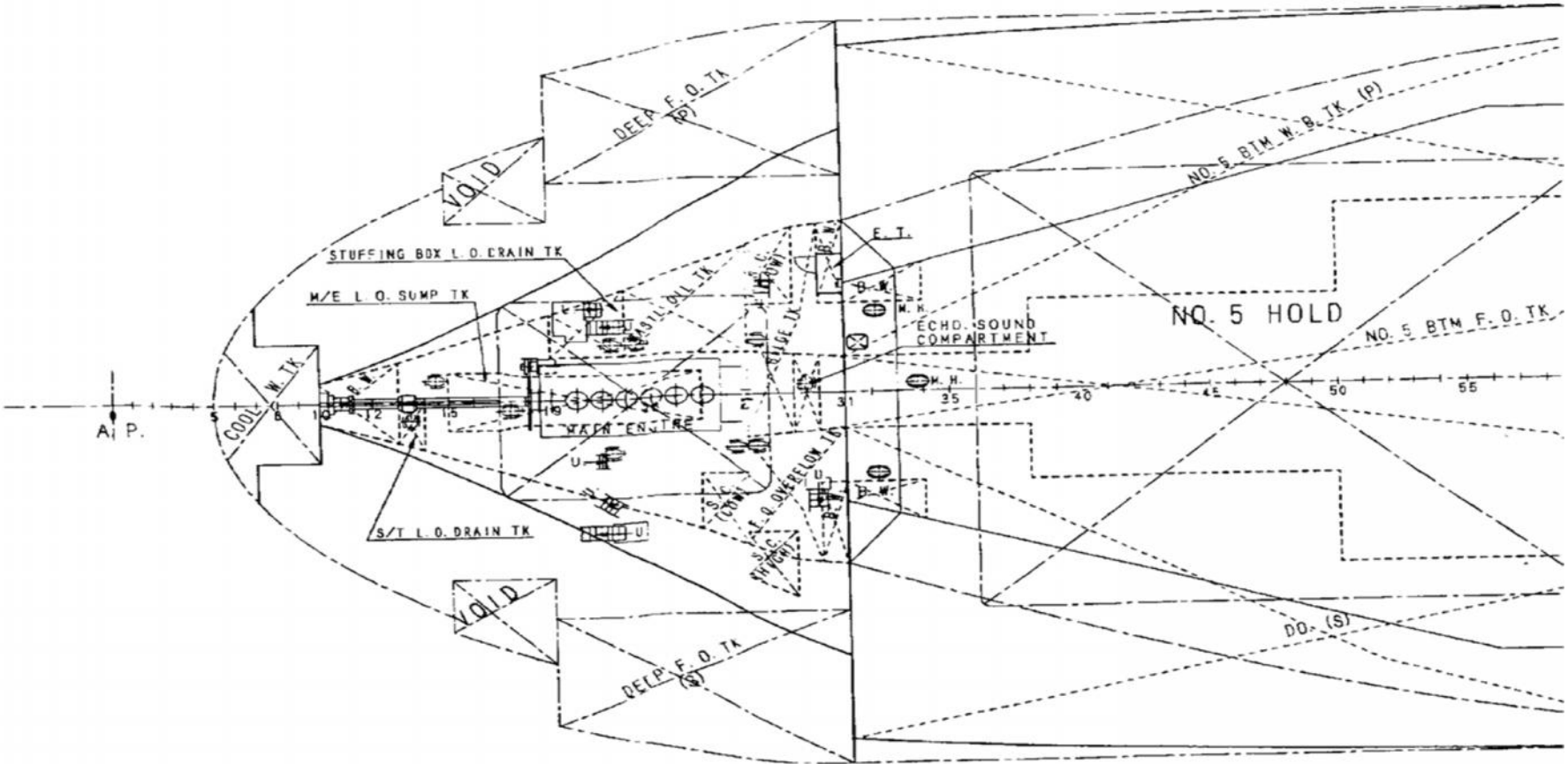
Option 4 SUPERVISION OF RETROFIT WORKS

One experienced ERMA FIRST Engineer will attend the modification works in order to survey them and to ensure that installation study and various drawings are followed by the shipyard or repair facility or riding crew.



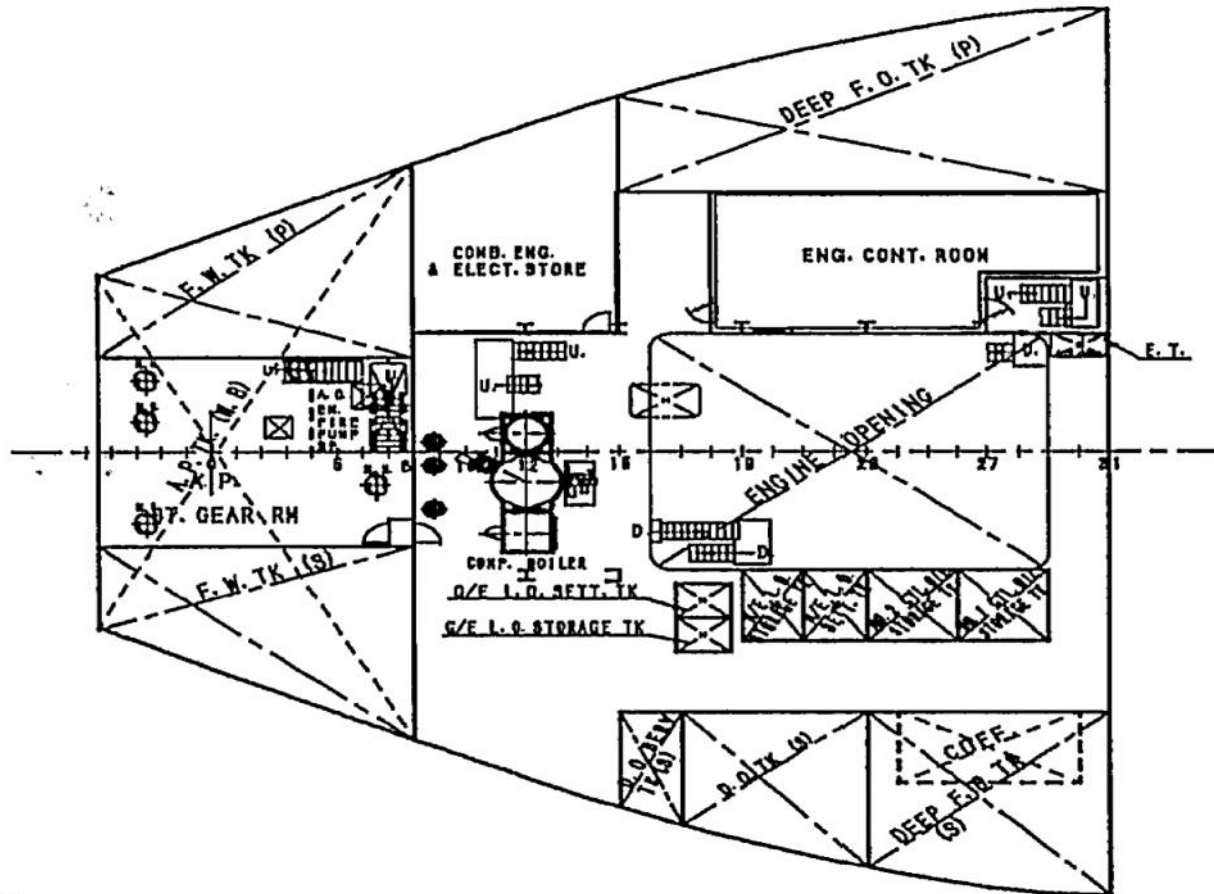
Vessel's floor layout

Tank top



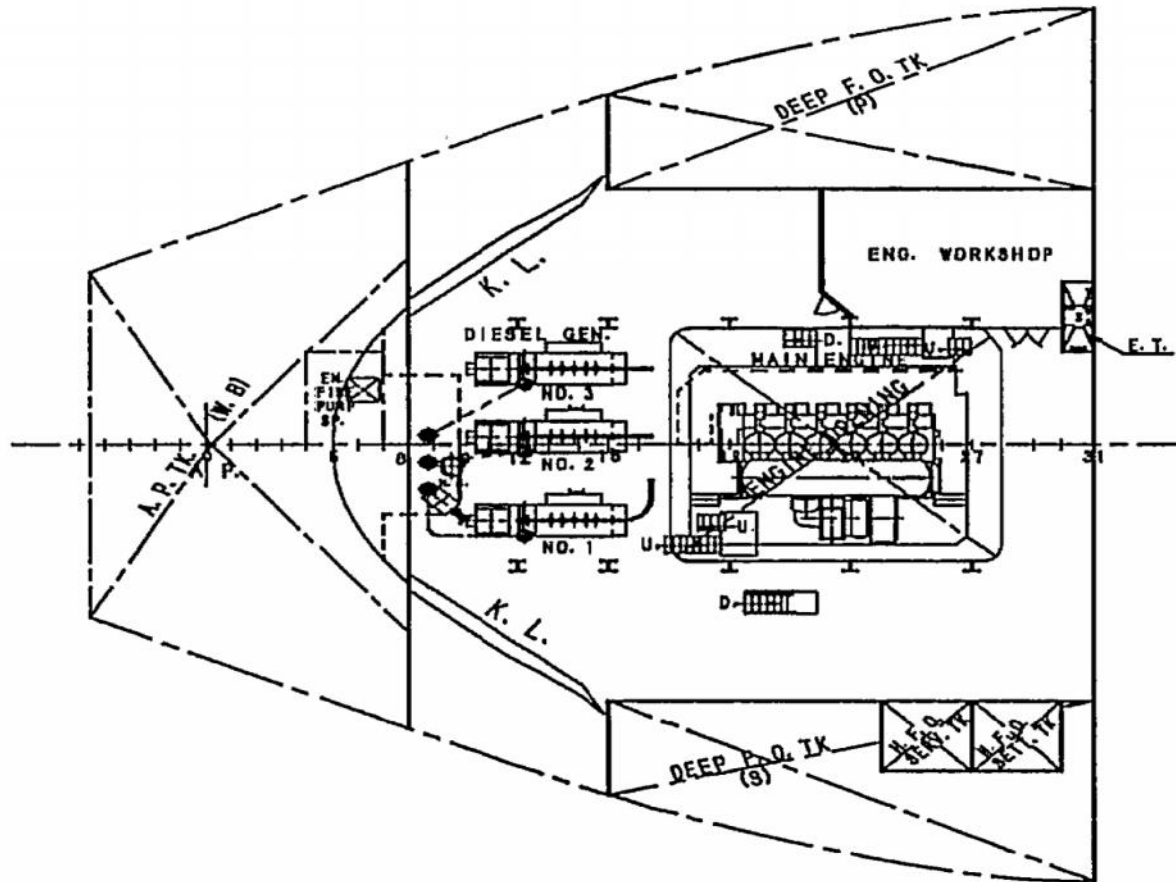
Vessel's floor layout

2nd Deck



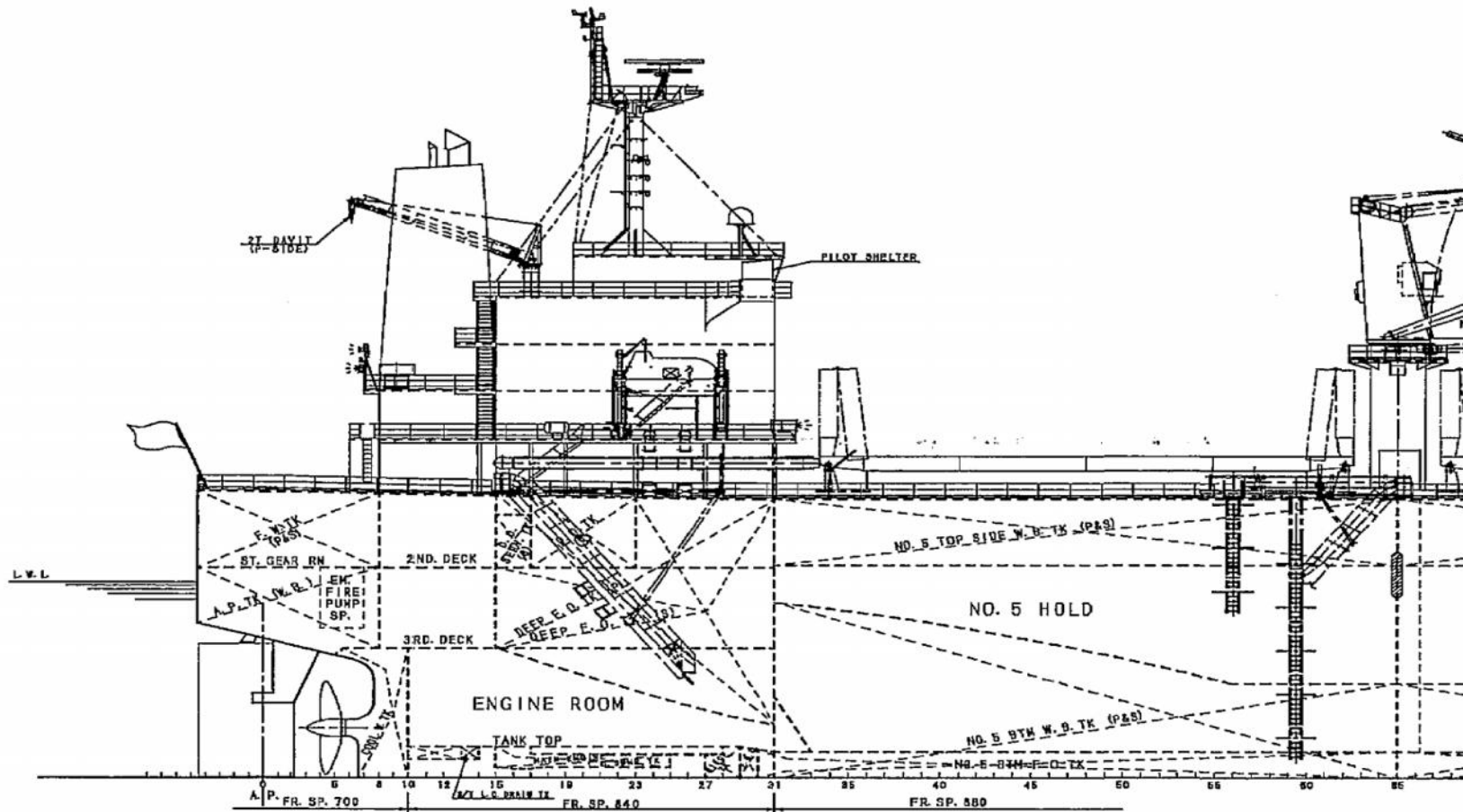
Vessel's floor layout

3rd Deck



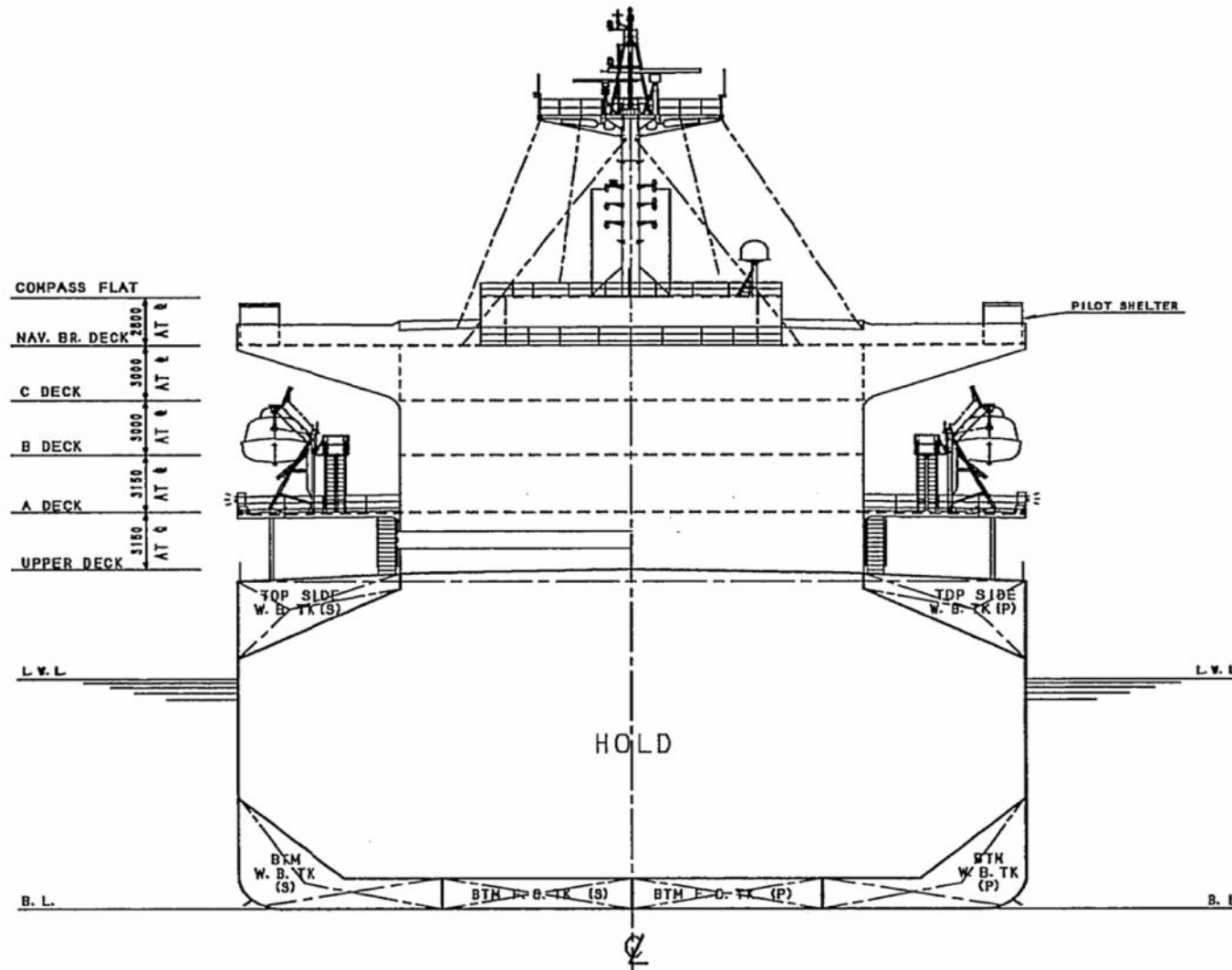
Vessel's floor layout

Longitudinal section



Vessel's elevation layout

Front section

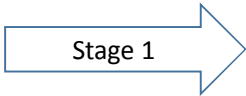




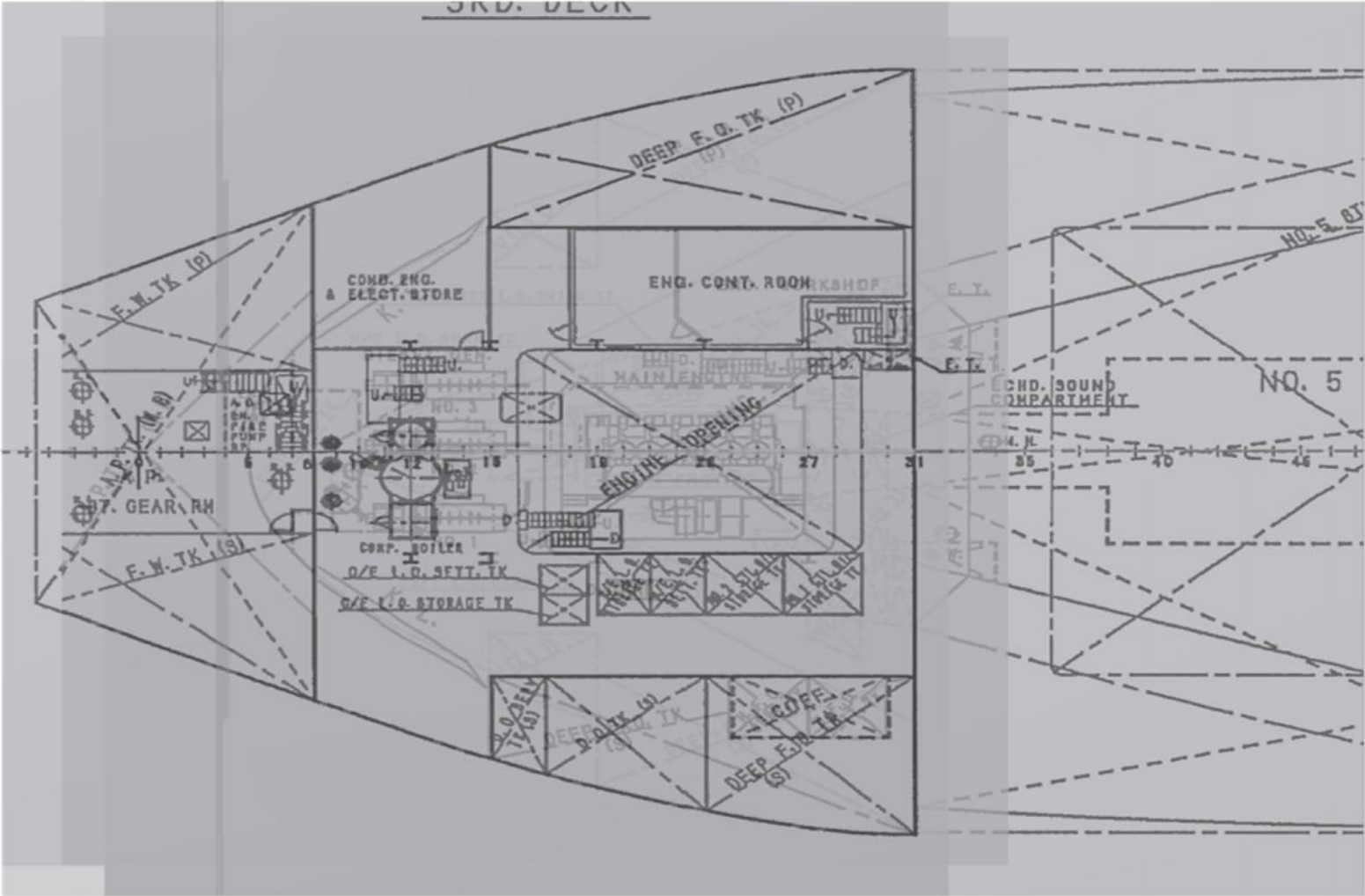
OUR PROPOSAL

OUR PROPOSAL

Conversion to 3D Model



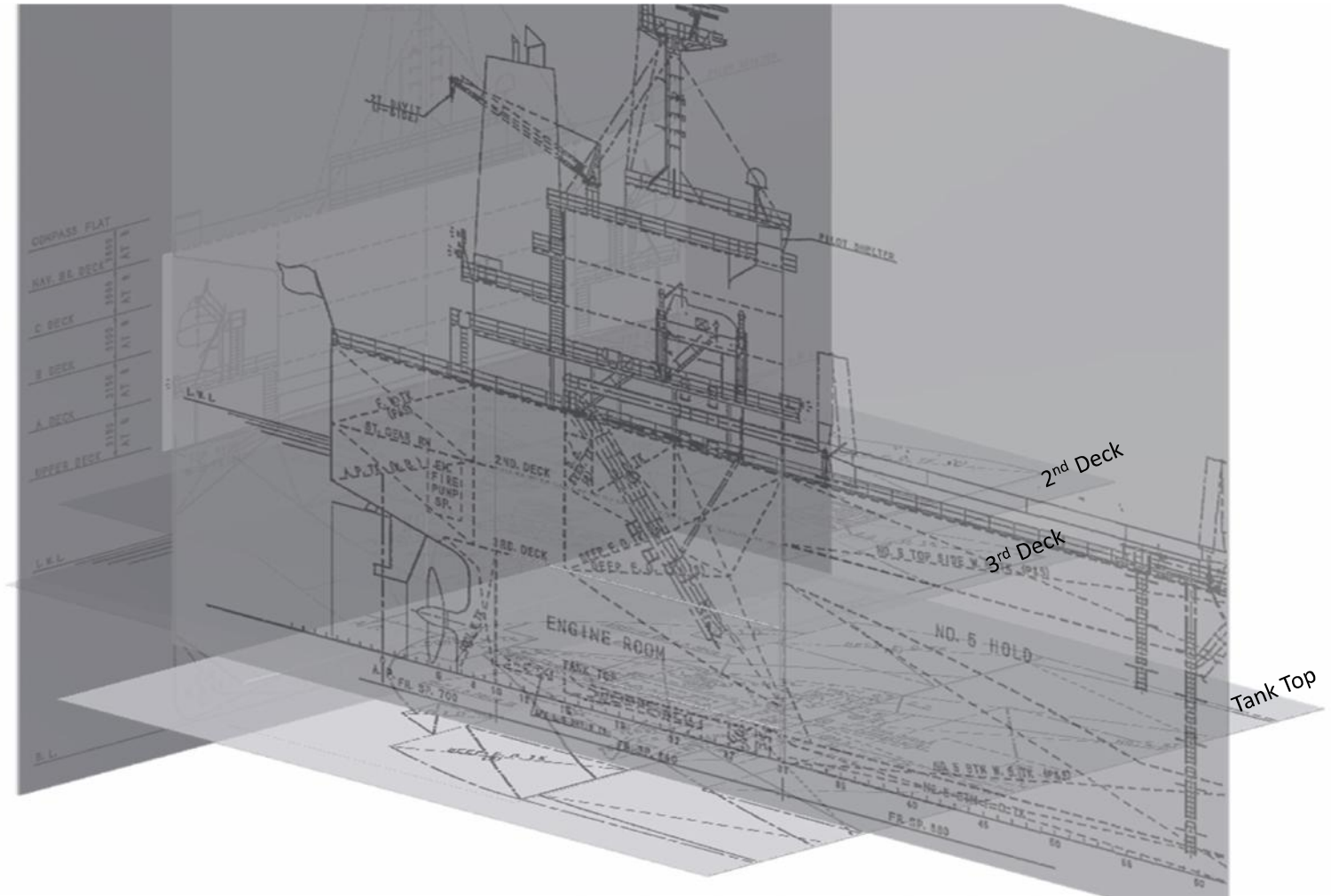
The drawings received in pdf format, are converted into 1:1 scaled pictures



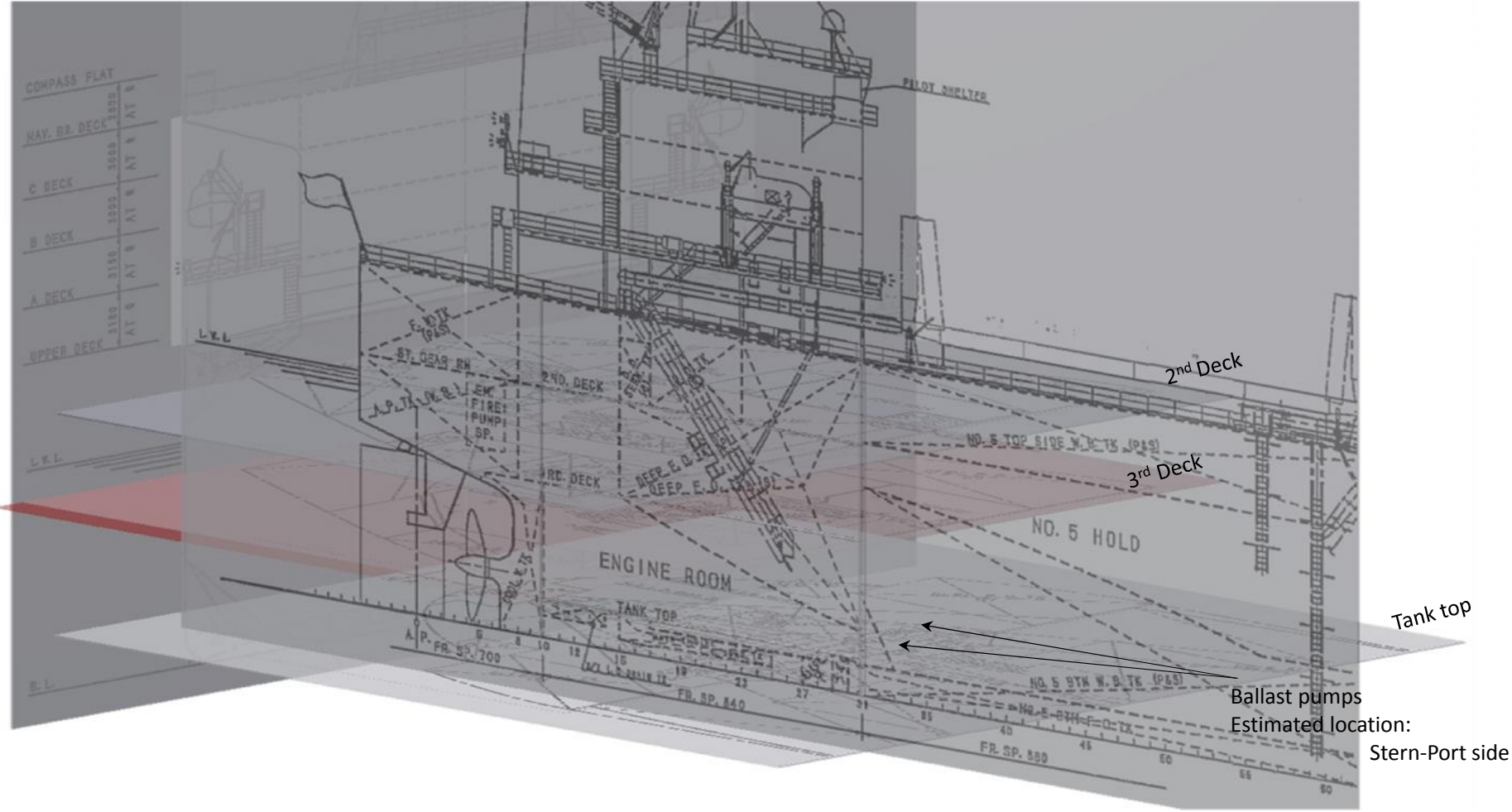
Conversion to 3D Model

Stage 2

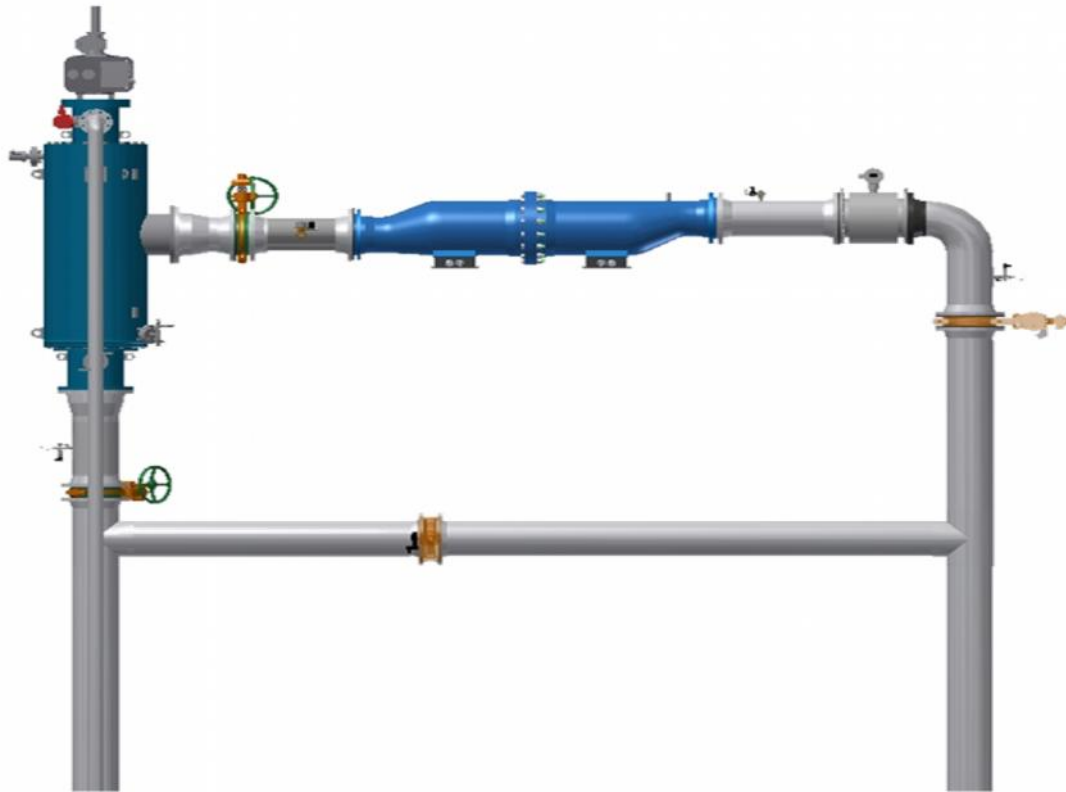
The 1:1 scaled pictures are inserted and correctly aligned in 3D space, creating the 1:1 skeleton of the vessel in the specific area.



Conversion to 3D Model



Suggested ERMA FIRST FIT arrangement

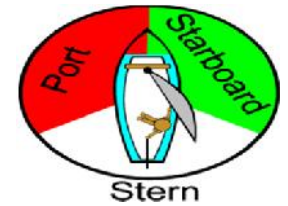
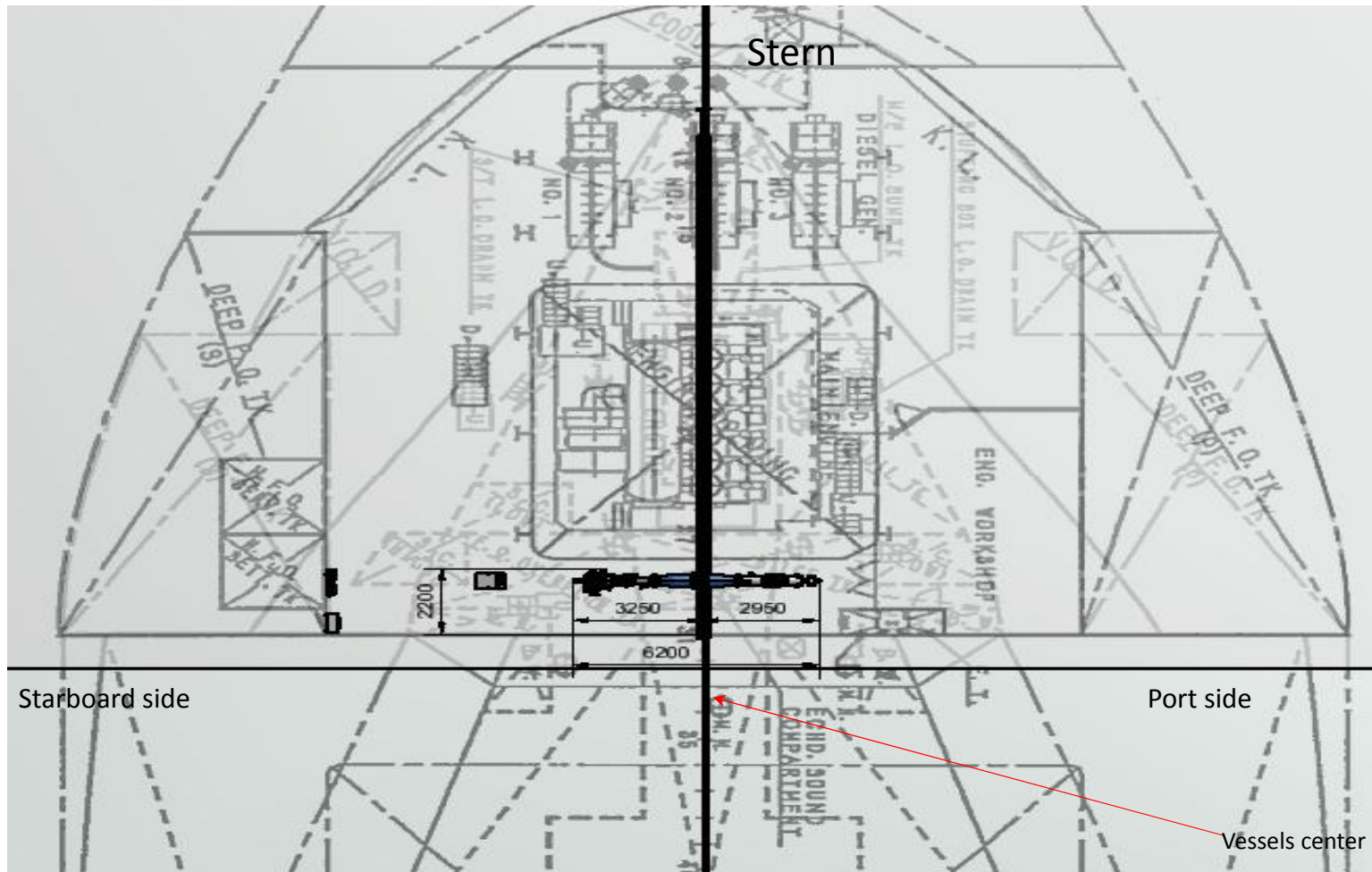


Front view

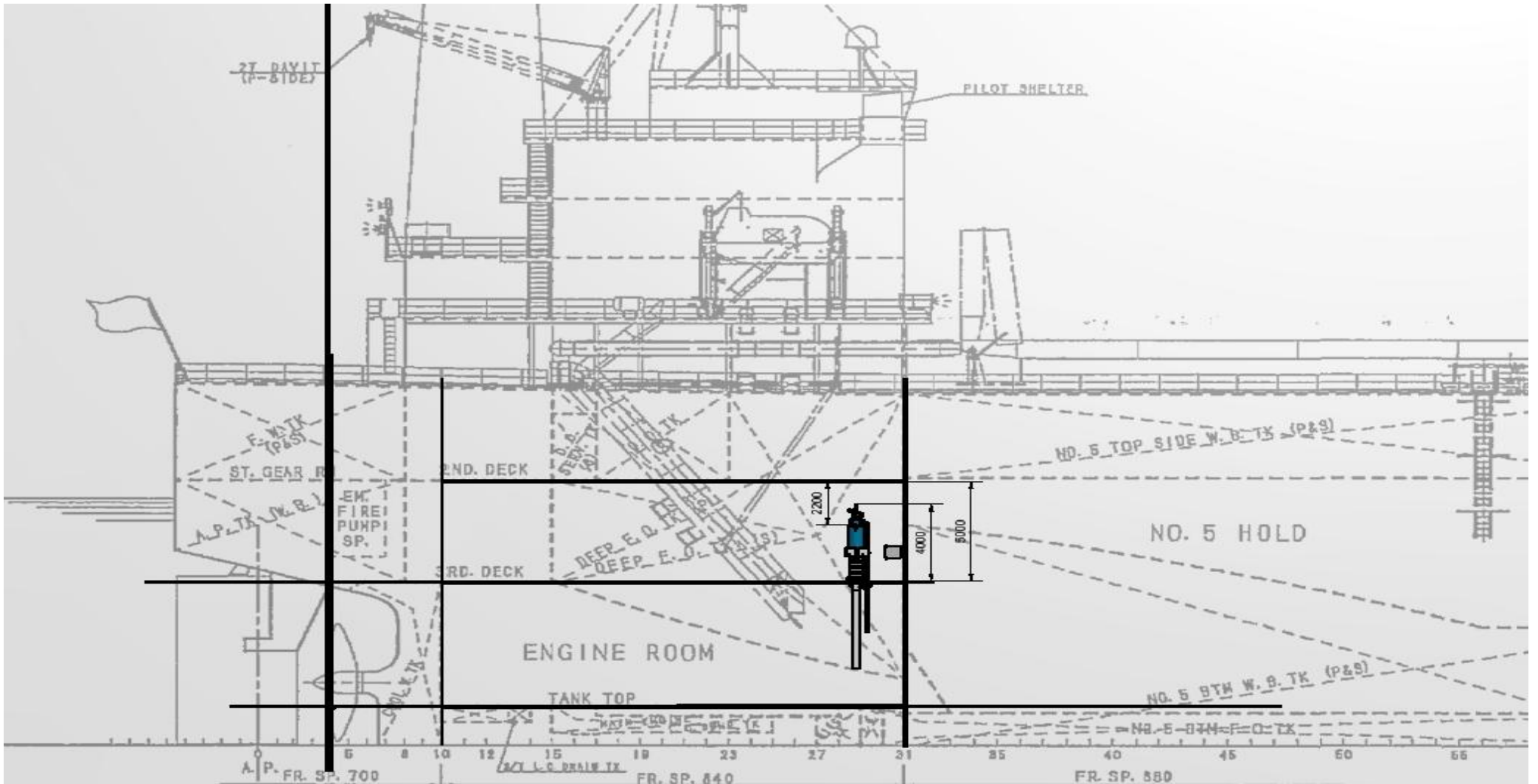
Top view



Suggested ERMA FIRST FIT arrangement

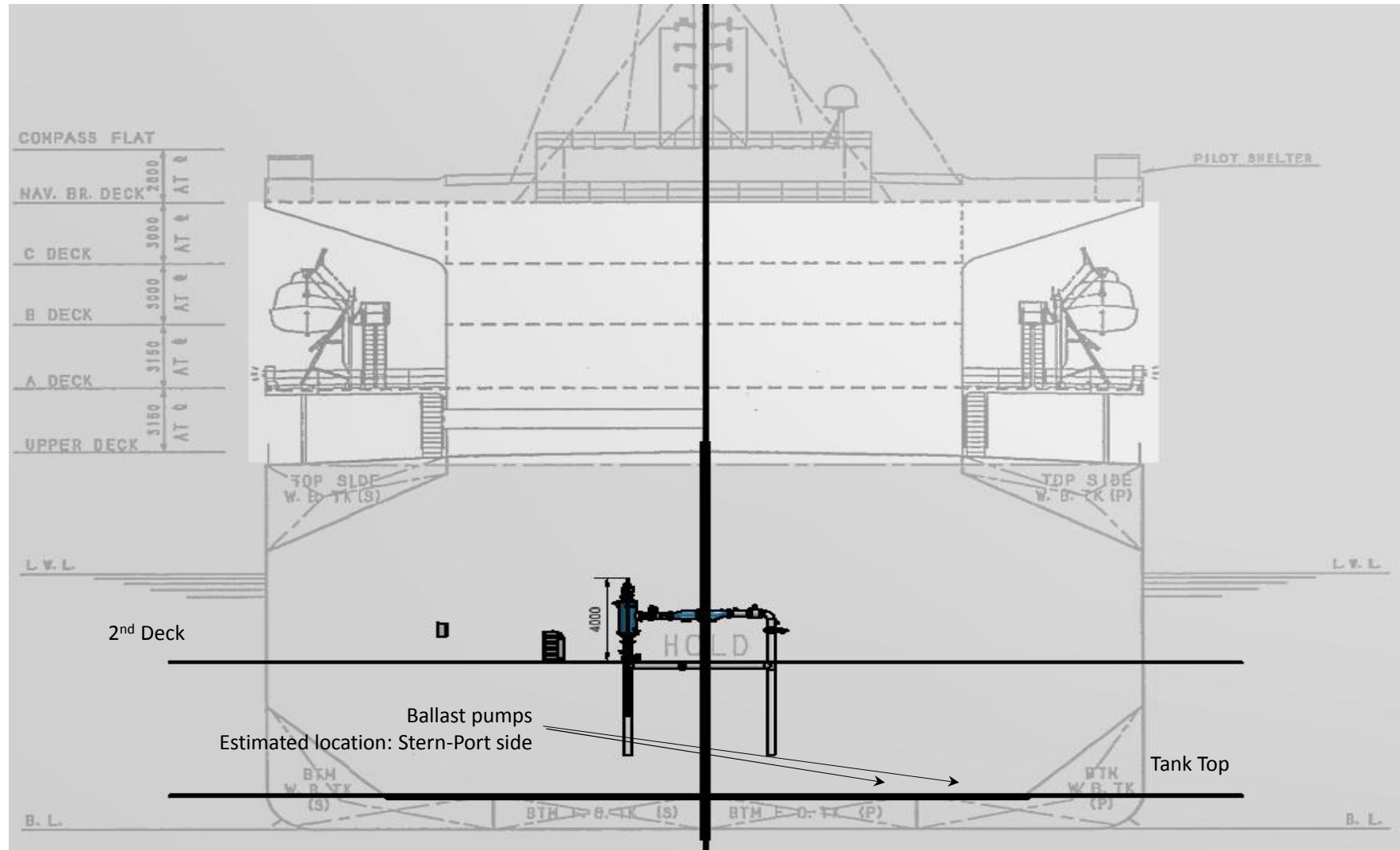


Suggested ERMA FIRST FIT arrangement

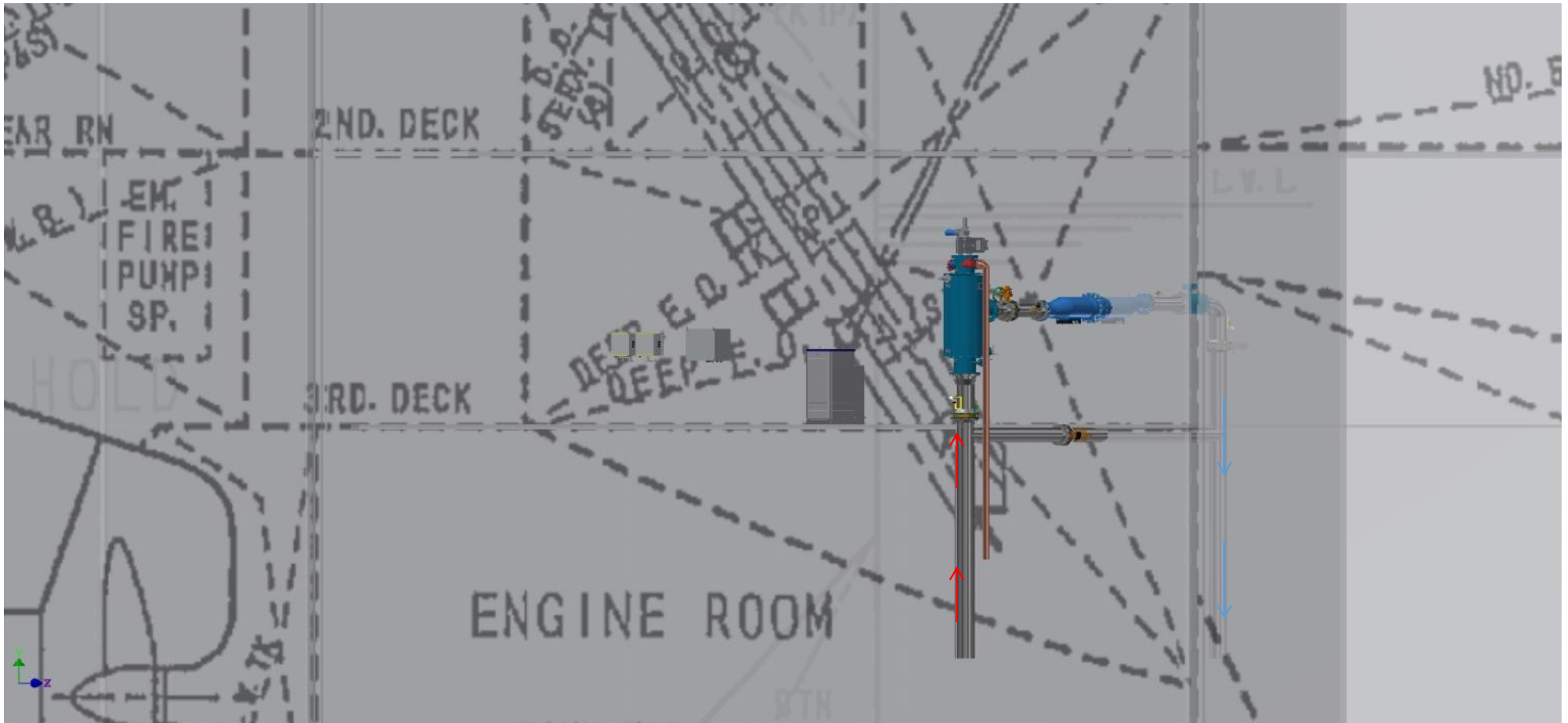


Suggested arrangement of ERMA FIRST FIT on vessel

2nd Flat



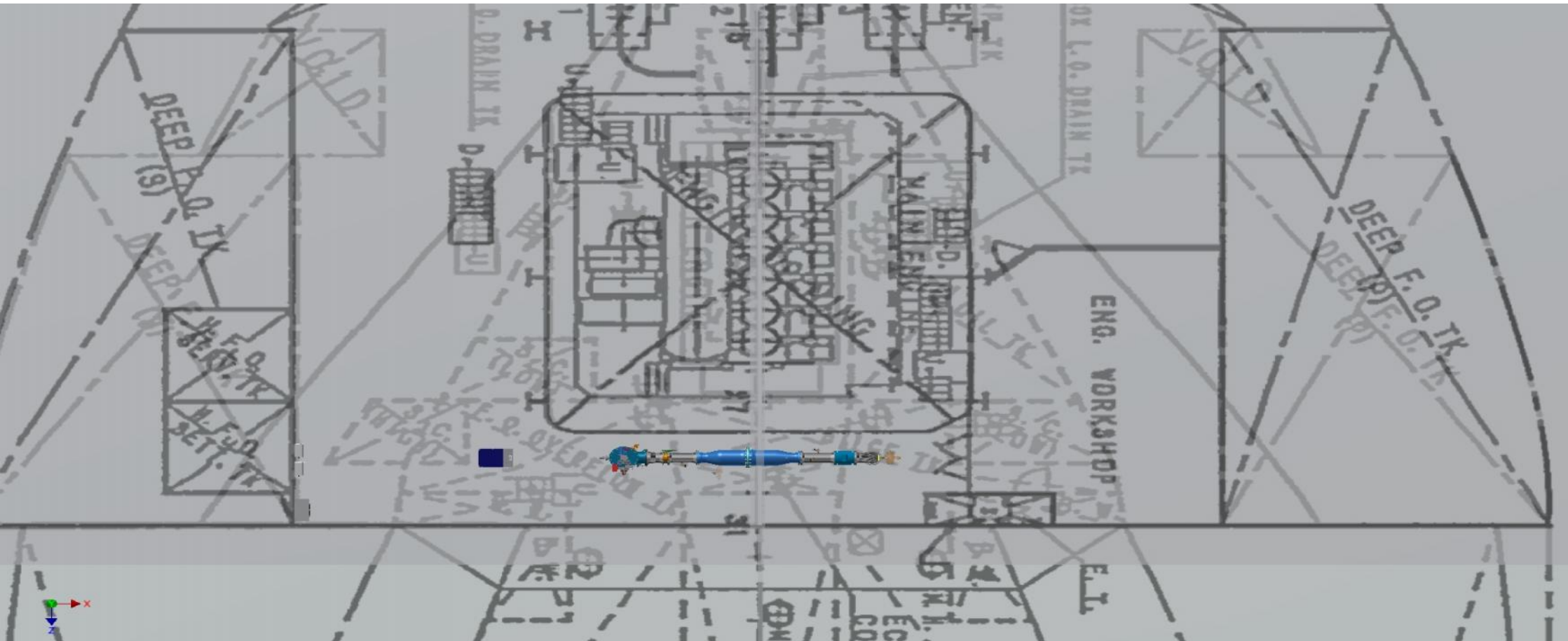
Suggested arrangement of ERMA FIRST FIT on vessel



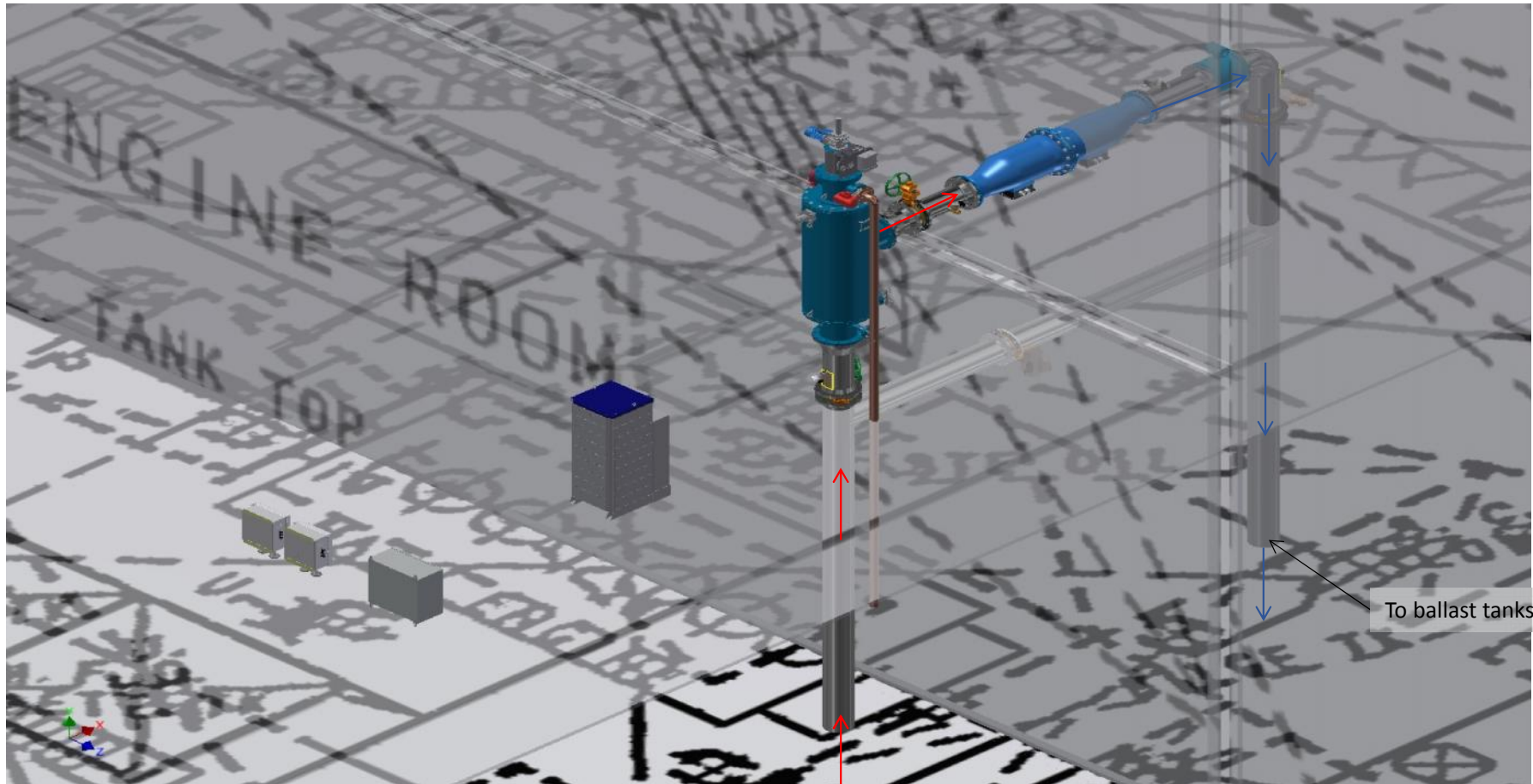
→ Untreated water to BWTS

→ Treated water to ballast tanks

Suggested arrangement of ERMA FIRST FIT on vessel



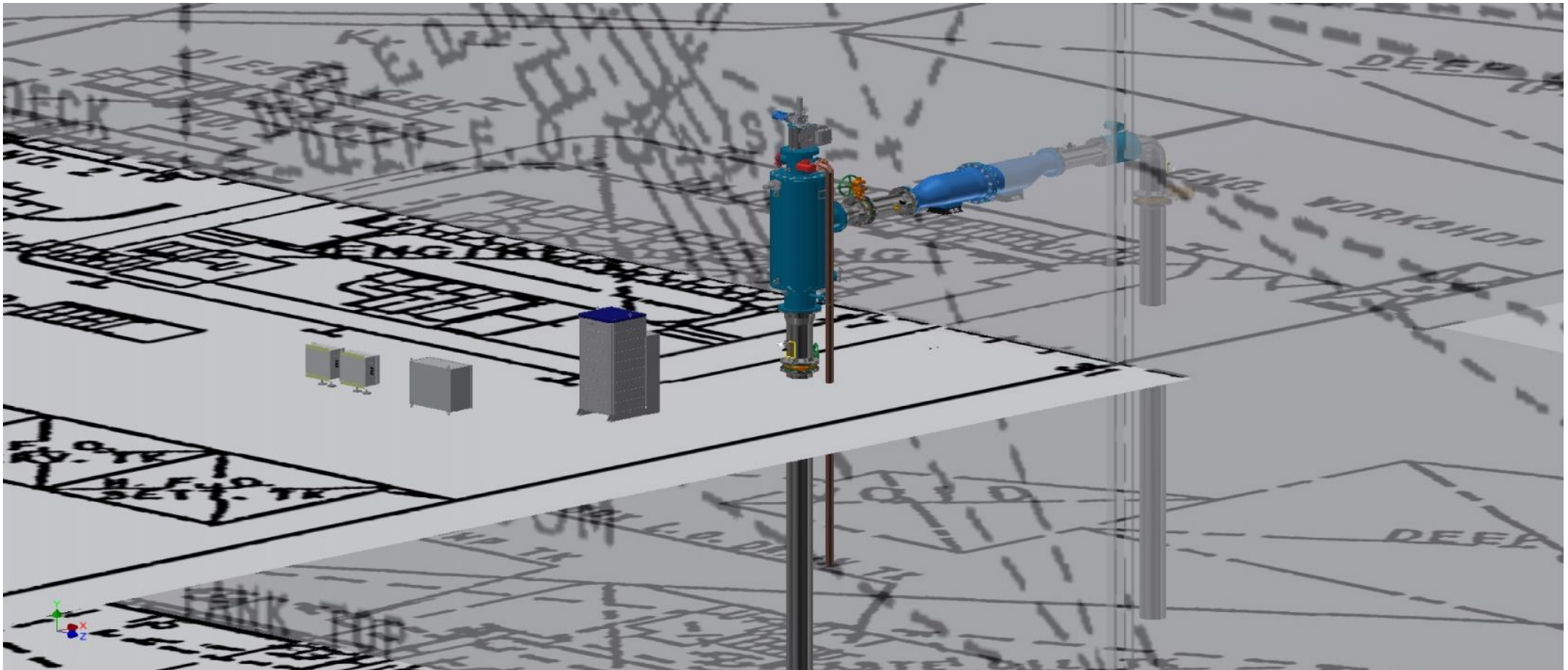
Suggested arrangement of ERMA FIRST FIT on vessel



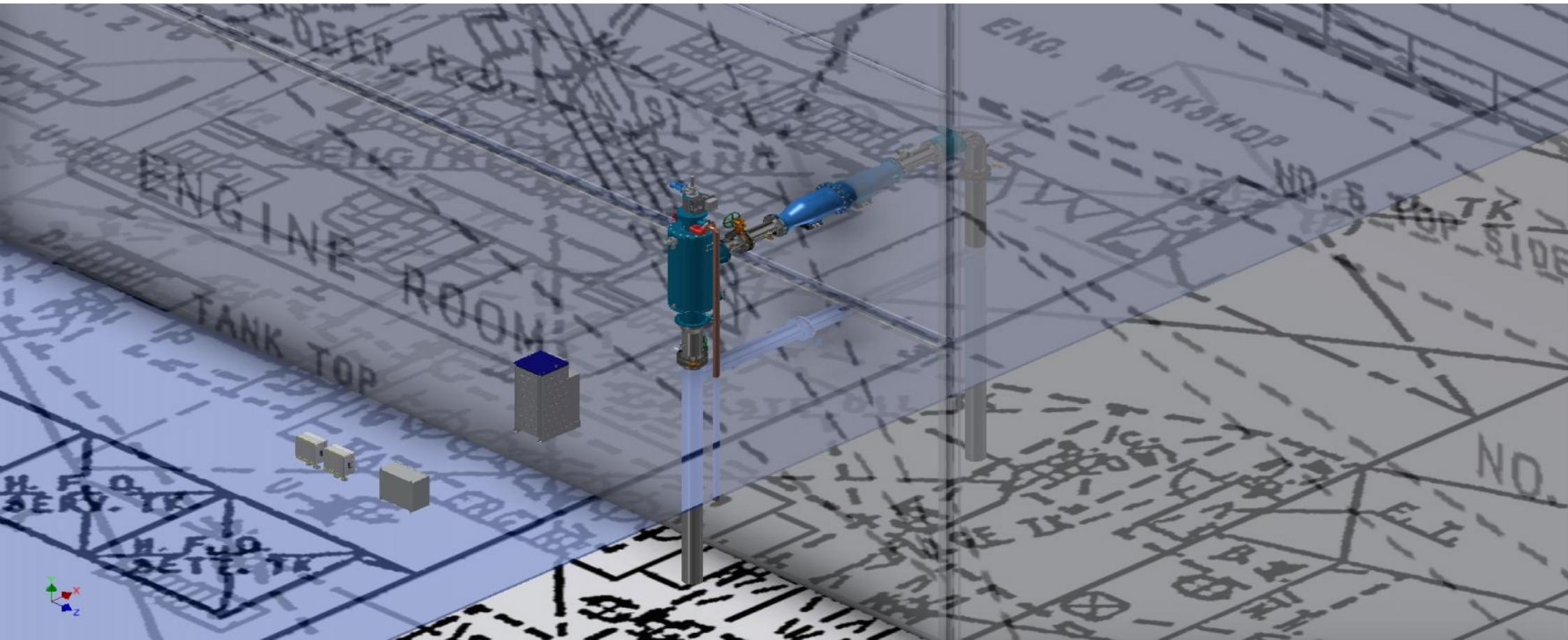
→ Untreated water to BWTS

→ Treated water to ballast tanks

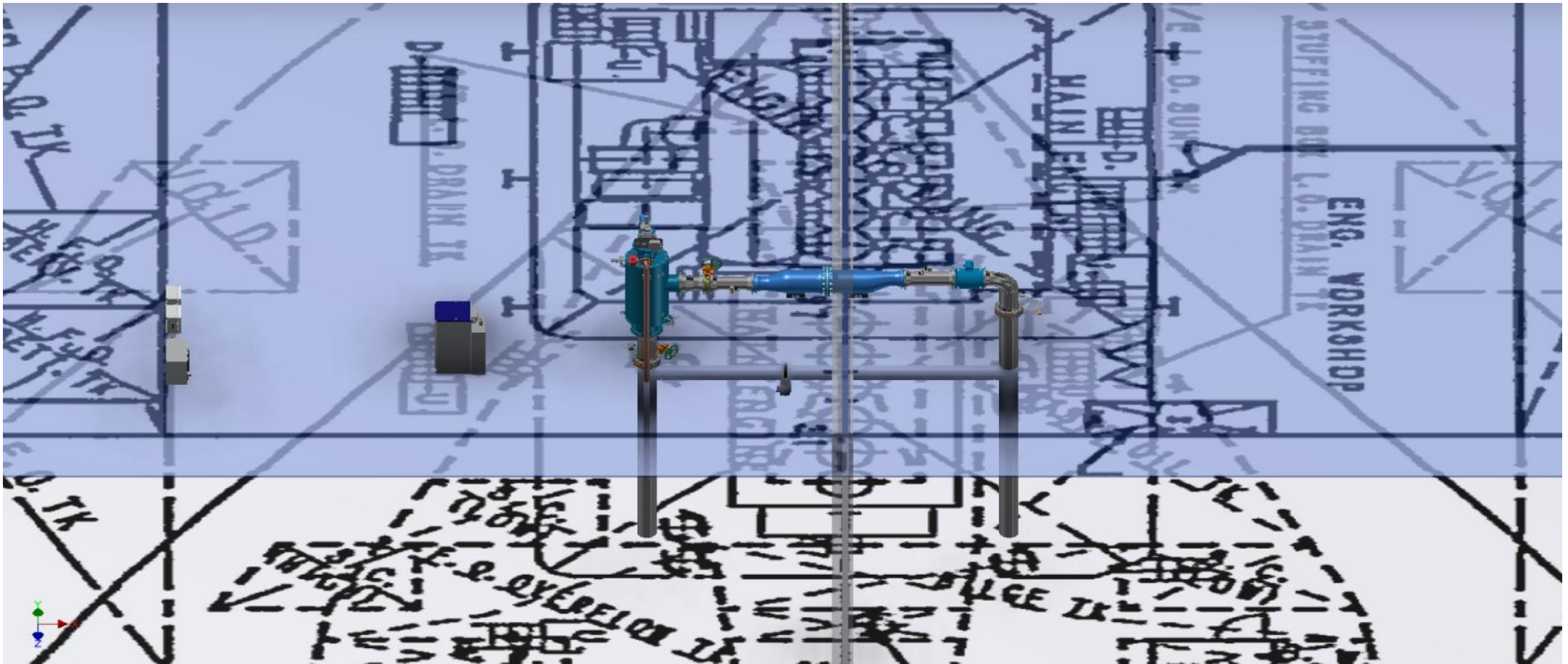
Suggested arrangement of ERMA FIRST FIT on vessel



Suggested arrangement of ERMA FIRST FIT on vessel



Suggested arrangement of ERMA FIRST FIT on vessel



[Retrofit Services](#)

BWTS Timeline

		Phase 1					Phase 2																Phase 3		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Sequence of Events	Kick-off meeting	(1 w)																							
	Technical review			(1 w)																					
	On board Survey (3D Scanning)				(1 w)																				
	Technical & Commercial Offer					(2 w)																			
	Proposal acceptance & contract							(2 weeks)																	
	Drawings submission to Class								(3 weeks)																
	System's fabrication									(9 weeks)															
	FAT																								
	Shippment & Delivery to Shipyard																								
	Supports & foundation (steelwork)																							(1 week)	
	BWTS Peripherals Installation																							(1 week)	
	Pipping																							(1 week)	
	Cabling																							(1 week)	
	System Installation																							(1 week)	
Final Tests & Commissioning																								(1 week)	
Planning		1	2	3	4	5	6																		
Phase 1	Kick-off meeting																								
	Technical review																								
	On board Survey (3D Scanning)																								
	Technical & Commercial Offer																								
Preparation		1	2	3	4	5	6	7	8	9															
Phase 2	Proposal acceptance & contract																								
	Drawings submission to Class																								
	System's fabrication																								
	FAT																								
	Installation lay out in detail																								
	Shippment & Delivery to Shipyard																								
Installation		1	2	3																					
Phase 3	Supports & foundation (steelwork)																								
	BWTS Peripherals Installation																								
	Pipping																								
	Cabling																								
	System Installation																								
	Final Tests & Commissioning																								

Reference List

ERMA FIRST REFERENCE LIST MARCH 2016									CONTAINER SHIPS									OTHER										
VESSEL	TYPE OF VESSEL	NEW BUILDING / RETROFIT	SHIPYARD	COUNTRY OF BUILT	SHIPOWNER	NO. OF UNITS	TYPE OF UNIT	VESSEL'S CLASS	HULL NOS.: HN2121, HN2122, HN2123, HN2124, HN2125	11000 TEU CONTAINER VESSEL	NB	SAMSUNG HEAVY INDUSTRIES CO.	KOREA	COSTAMARE SHIPPING CO., S.A.	5	ERMA FIRST 1000	DNV-GL	HULL NOS: 1361, 362, 363, 364, 365, 366	OFFSHORE SUPPLY VESSEL	NB	ABC SHIPYARD LTD.	INDIA	NA	7	ERMA FIRST 200	DNV-GL		
TANKER SHIPS									28									7										
43									18									151										
HULL NO.57004	157K COT SHUTTLE	NB	SUNGDOONG SHIPBUILDING & MARINE ENGINEERING CO., LTD.	KOREA	TSAKOS ENERGY NAVIGATION LTD	3	ERMA FIRST FIT 2500 EX & ERMA FIRST FIT 300	DNV		11000 TEU CONTAINER VESSEL	NB		KOREA	COSTAMARE SHIPPING CO., S.A.	10	ERMA FIRST 1000	DNV-GL											
HN.5010 - 5018	112 000 DWT COT	NB	SC DAEWOO MANGALIA HEAVY INDUSTRIES S.A.	ROMANIA	TSAKOS ENERGY NAVIGATION LTD	27	ERMA FIRST FIT 2000EX & 300	DNV-GL		11000 TEU CONTAINER VESSEL	NB		KOREA	OCEANBULK MARITIME S.A.	2	ERMA FIRST 1000	DNV-GL											
HULL NOS:53116, 53117	75000 DWT TSH	NB	SUNGDOONG SHIPBUILDING & MARINE ENGINEERING CO., LTD.	KOREA	TSAKOS ENERGY NAVIGATION LTD	6	ERMA FIRST FIT 1500EX & ERMA FIRST FIT 500	ABS		COSCO GUANGZHOU	RF	EXISTING VESSEL	KOREA	COSTAMARE SHIPPING CO., S.A.	1	ERMA FIRST 500	DNV-GL											
HULL NOS:1584, 1585	74000 DWT PT	NB	STX OFFSHORE & SHIPBUILDING CO., LTD.	KOREA	ANDRIAKI SHIPPING CO., LTD	6	2x ERMA FIRST FIT 1200EX & ERMA FIRST FIT 300	DNV-GL		HULL NOS: 654, 655	NB	ZHEJIANG OUHUA SHIPBUILDING CO., LTD.	CHINA	EVALEND SHIPPING COMPANY S.A.	2	ERMA FIRST 800	DNV-GL											
HULL NO.107	7000 DWT CHEMICAL/OIL TANKER	NB	RMK MARINE SHIPYARD	TURKEY	PRITCHARD GORDON TANKERS	1	ERMA FIRST FIT 300	NK		IRENES REMEDY	RF	LISNAVE ESTALEIROS NAVAIS SA	PORTUGAL	TSAKOS COLUMBEA SHIPMANAGEMENT ("TCM") SA	1	ERMA FIRST FIT 1000	LR											
										HULL NOS: 1388, 1389, 1390	NB	SHANGHAI WAIGAOQIAO SHIPBUILDING CO LTD	CHINA	STARBUK S.A.	3	ERMA FIRST FIT 800	DNV-GL											
										4614 TEU CONTAINER VESSEL	RF	EXISTING VESSEL	SOUTH KOREA		1	ERMA FIRST FIT 600	ABS											
BULK CARRIERS									LIQUEFIED PETROLEUM GAS									103										
47									18									151										
HULL NO: DY6006	82000 DWT BULK CARRIER	NB	YANGZHOU DAYANG SHIPBUILDING CO., LTD.	CHINA	DEANA SHIPPING SERVICES S.A.	2	ERMA FIRST FIT 1200	NK		HULL NOS: 578, 580, 585, 586, 587, 588	NB	KITA-NIHON SHIPBUILDING CO., LTD	JAPAN	STEALTH MARITIME CORP. S.A.	6	ERMA FIRST 300	ABS											
HULL NOS: DY6003, DY6004, DY6005	82000 DWT BULK CARRIER	NB	YANGZHOU DAYANG SHIPBUILDING CO., LTD.	CHINA	ALPHA SIGMA SHIPPING CORP.	6	ERMA FIRST FIT 1200	NK		HULL NOS:8184, 8185, 8186, 8187	NB	HYUNDAI HIPO DOCKYARD CO., LTD. (HMD)	KOREA	STEALTH MARITIME CORP. S.A.	4	ERMA FIRST FIT 800	LR											
HULL NO: DY6011	82000 DWT BULK CARRIER	NB	SINOPACIFIC SHIPBUILDING GROUP	CHINA	SAINT MICHAEL SHIPPING CO., LTD	2	ERMA FIRST FIT 1200	NK		SCF TOBOLSK	RF	26424 DWT LPG		SCF UNICOM MANAGEMENT SERVICES (CYPRUS) LTD	2	ERMA FIRST FIT 600	LR											
HULL NOS.: 1804, 1909, 1881, 1878	66000 DWT BULK CARRIER	NB	MTSUE ENGINEERING & SHIPBUILDING CO., LTD.	JAPAN	NIOVIS SHIPPING CO. S.A.	4	ERMA FIRST 900	NK		SCF TOMSK	RF	26200 DWT LPG		SCF UNICOM MANAGEMENT SERVICES (CYPRUS) LTD	2	ERMA FIRST FIT 600	LR											
HULL NOS: 1061, 1062, 1063, 1064, 1080, 1081, 1082, 1083	64000 DWT BULK CARRIER	NB	JANGSU YANGZIJIAN SHIPBUILDING CO., LTD.	CHINA	OCEANBULK MARITIME S.A.	16	ERMAFIRST 900	BV		HULL NOS: 5529/30/32/33	NB	KYOKUYO SHIPYARD CORPORATION	JAPAN	PARADISE NAVIGATION SA	4	ERMA FIRST FIT 300	BV / NK											
HULL NO.GY601, GY602	63800 DWT BULK CARRIER	NB	YANGZHOU GUOYU SHIPBUILDING CO., LTD	CHINA	KYMA SHIP MANAGEMENT INC.	2	ERMA FIRST FIT 1000	LR							7													
HULL NO.S838	85,000 DWT BULK CARRIER	NB	SASEBO HEAVY INDUSTRIES CO., LTD	JAPAN	ALEXANDRIA SHIPPING S.A.	2	ERMA FIRST FIT 1500	NK		HULL NOS: 8129, 8130	NB	HYUNDAI HIPO DOCKYARD CO., LTD. (HMD)	KOREA	NEPTUNE LINES SHIPPING & MANAGING ENTERPRISES SA	2	ERMA FIRST 400	DNV-GL											
HULL NO: 1882	66000 DWT BULK CARRIER	NB	MTSUE ENGINEERING & SHIPBUILDING CO., LTD.	JAPAN	NIOVIS SHIPPING CO. S.A.	1	ERMA FIRST FIT 1000	NK		HULL NO. 513, 514, 515, 524, 526	NB	ULJANIK SHIPYARD JSC	CROATIA	SIEM CAR CARRIERS	5	ERMA FIRST FIT 400	BV											
HULL NOS: Q543000-1/2/3/4	43000 DWT BULK CARRIER	NB	QINGSHAN SHIPYARD	CHINA	PHOENIX SHIPPING & TRADING S.A.	8	ERMA FIRST FIT 1000	RINA							4													
HULL NOS.:395, 396	376500W BULK CARRIER	NB	AVIC WEIHAI SHIPYARD CO., LTD	CHINA	LAMDA MARITIME S.A.	2	ERMAFIRST 700	NK		CZAR	RF	MEGA YACHT	GREECE	NA	1	ERMA FIRST 100	LR											
HULL NO. 838-19, 838-20	37,400 DWT BULK CARRIER	NB	AVIC WEIHAI SHIPYARD CO., LTD	CHINA	HST MINERALIEN SCHIFFAHRT SPEDITION UND TRANSPORT GMBH	2	ERMA FIRST FIT 1500	LR		ELEMENTS	NB	YACHTLEY EXCLUSIVE YACHTS	TURKEY	NA	1	ERMA FIRST 100	LR											
										FB 272	NB	AZIMUT - BENETTI SPA	ITALY	NA	1	ERMA FIRST FIT 100	LR											
										FB 277	NB	AZIMUT - BENETTI SPA	ITALY	NA	1	ERMA FIRST FIT 100	LR											

[Reference list](#)

ERMA FIRST BWTS
Worldwide Network

WORLD WIDE STATIONS AFTER SALES SUPPORT

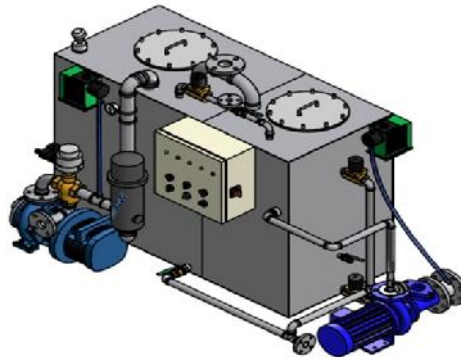
SERVICE ENGINEERS
SUPERVISION

COMMISSIONING
SPARE PARTS

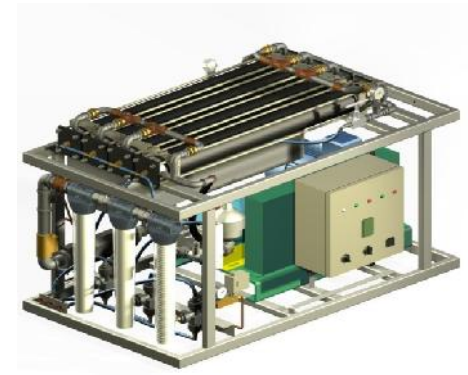
Our Group can provide a “Water & Waste Water Package”



POSEIDON EVO
Bilge Water Separator,
Acc. to MEPC.107(49)



TRITON μ
Sewage Treatment Plant
Acc. to MEPC.159(55)



ALIOS EVO
RO Fresh Water Generator

Poseidon Evo, Bilge Water Separator



POSEIDON EVO



- Manufactured since **1983**
- **POSEIDON EVO** Bilge water separator is the 3rd generation unit
- Installed on more than **3.500** ships
- Chosen by the largest shipyards worldwide
- Poseidon FIT (5ppm) available on Jan 2015

Main advantages:

- Fully automatic unattended operation
- Self-cleaning through backwash
- Minimum maintenance
- No chemicals required
- Effluent oil content under 5ppm under all test conditions
- Easy installation and reliable operation
- Minimum volume & footprint

Models (m3/hr):

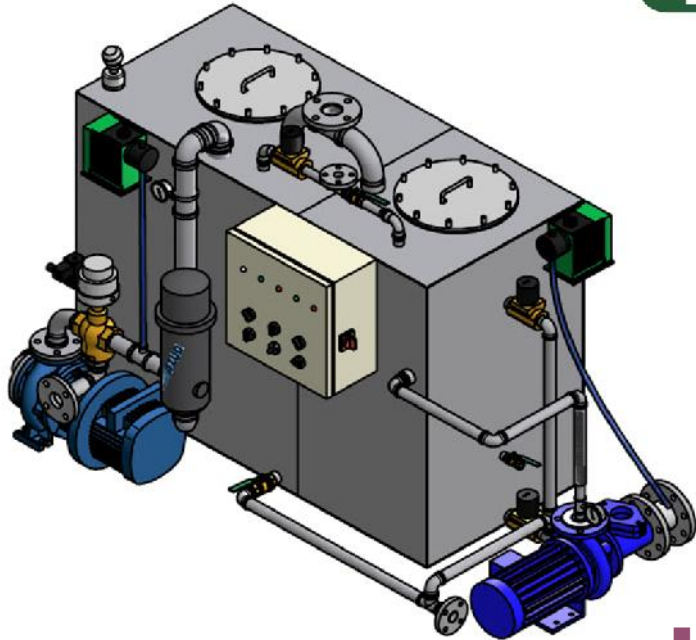
0.25 / 0.5 / 1.0 / 2.5 / 5.0 / 7.5 / 10.0



TRITON μ

Advantages

- Certified Acc to MEPC.159(55)
- High manufacturing quality
- Low purchasing and installation cost
- Compact unit with small footprint
- Compact unit with simple and automatic operation
- Safe and flexible operation
- Low operation and maintenance cost



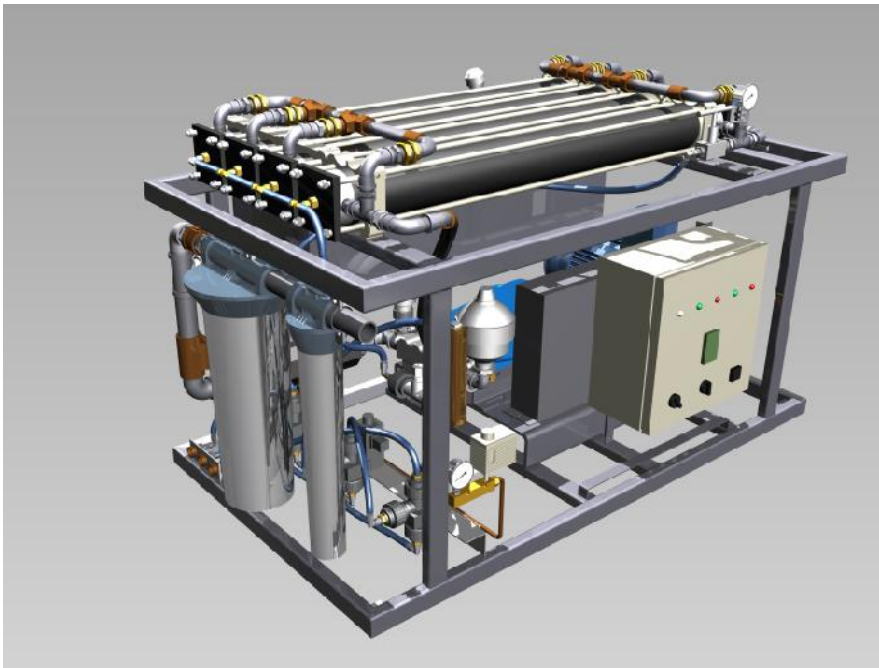
- PHYSICAL METHODS
- Maceration
- Sedimentation
- Dilution
- Filtration

- CHEMICAL METHODS
- Coagulation
- Oxidation

Alios Evo, Fresh Water Generator



ALIOS EVO



Standard features:

- Sea water feed pump
- Pre-treatment fine filters
- High pressure pump made by stainless steel grade 316
- High rejection efficiency spiral wound membrane modules
- Robust and long lasting pressure vessels
- Pressure safety valve
- Stainless steel pressure regulator
- On line TDS measurement
- 3-way valves for automatic operation when the effluent quality is out of the set limits
- Control panel with PLC for fully automatic operation
- Fresh water flow meter
- Sea water flow meter
- Automatic Clean In Place (CIP) procedure

Models (m³/day):

1.5 / 3.5 / 6.0 / 7.5 / 10.0 / 13.0 / 20.0 / 30.0 / 80.0 / *

**Design upon customer requests.*

Thank you for your kind attention

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See us @ https://www.youtube.com/channel/UCXX7xnHtH7qEZZA_XXyPlmQ