Janus Systems, S.L.

Plaza Moro Almanzor, 2
28523 Rivas-Vaciamadrid (MADRID)
Phones: + 34 916 661 403 & + 34 679 967 155
E-mails: info@janus-systems,es
Web: www.janus-systems.es

JANUS, Integrated Maritime Safety and Ship Efficiency Computer

Information in real time and option in "The Cloud"

For all types of ships: Fast-ferries, Ferries, Oceanographic, Oil Tankers, Chemical tankers, Gas tankers, etc.

Expert System in Maritime Safety and Ship Efficiency (complies with IMO and EU regulations)**:**

- **I. Static calculations of the intact ship** (Stabilities and resistances).
- **II. Dynamic calculations of the intact ship** (real-time stability).
- **III. Static calculations of the damaged ship**.
- **IV. Safe Return to Port with Damaged Ship** (with emergency responses)
- **V. Control and Optimization of Energy Efficiency** (in real-time)
- **VI. Control and Prediction of Machinery Failures** (Not intrusive & real-time)

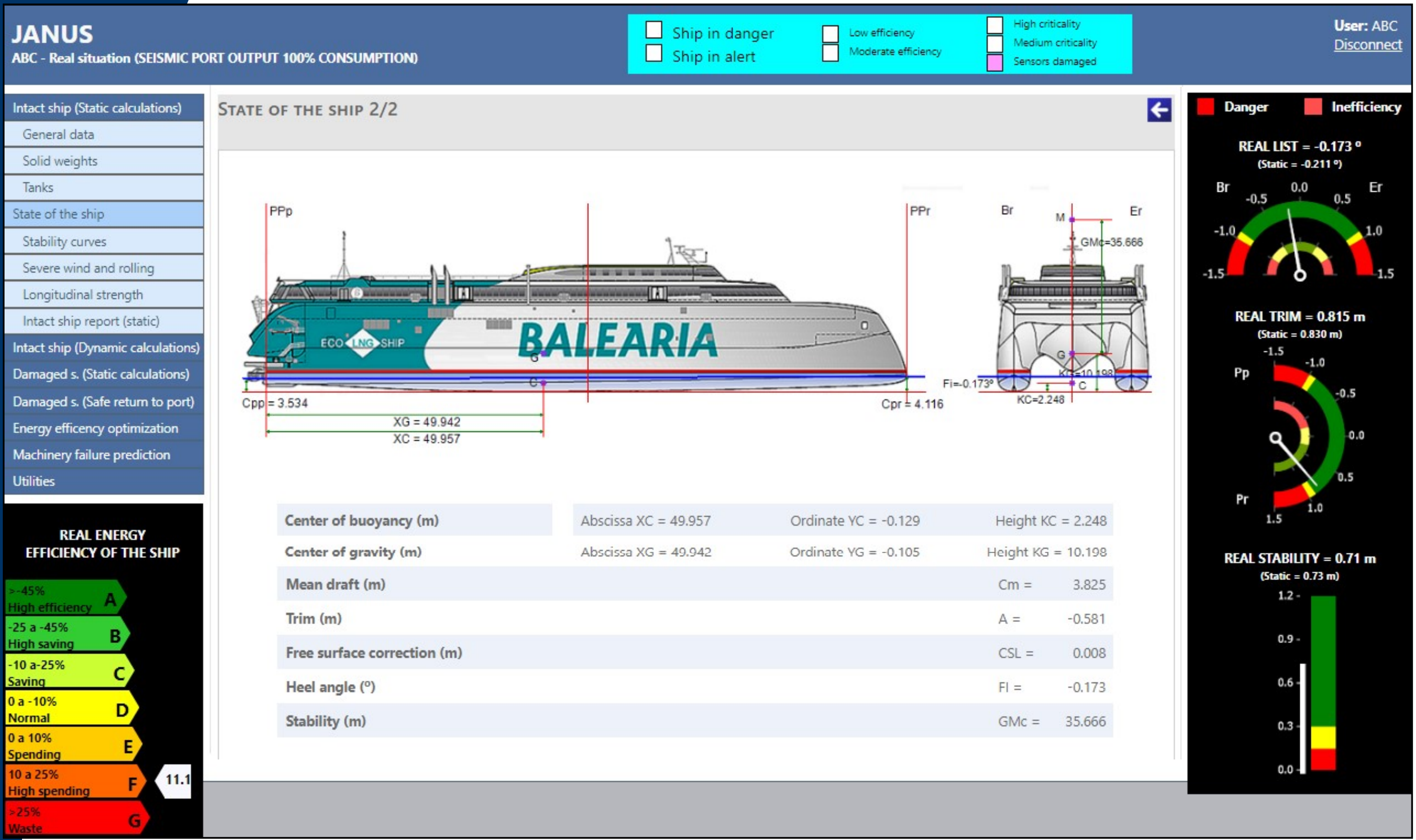
As it is designed by modules, the client can choose the desired module (s)

With our ship tracking system, the user will be able to stay in contact with the ship, and receive instant data on weights, loads, stabilities, resistance, consumption, pollution, predictions, etc.

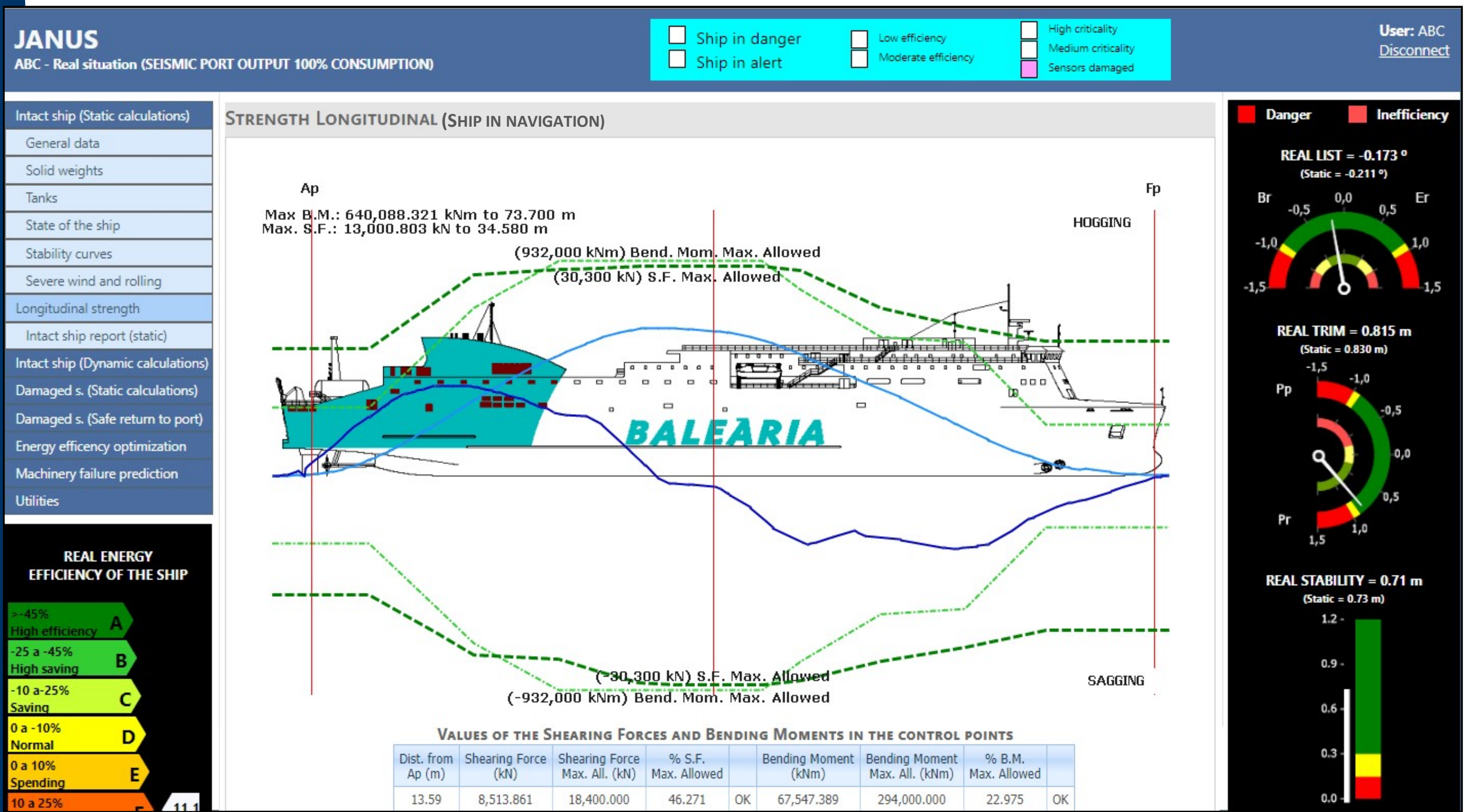
NOTE: All the data in this brochure are fictitious and do not correspond to any vessel or real case.

I. Static calculations of the intact ship (Stabilities and resistances).

Classic Loading Computer for calculating weights, tanks, stabilities, resistances, etc.



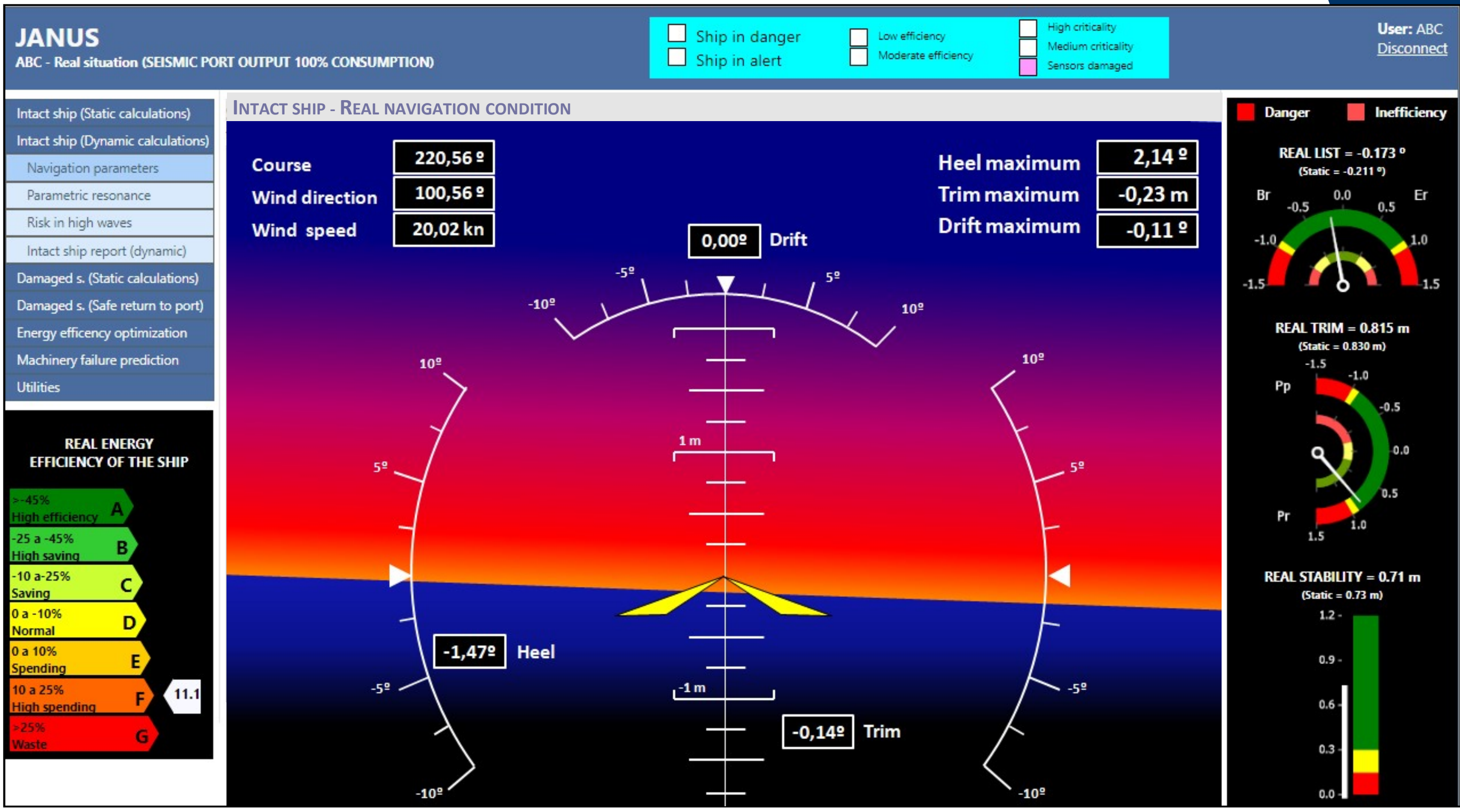
The System has a menu in which you can enter all types of solid weights (specific weights for all vessels, irregular weights in oceanographic and others, vehicles and passengers in ferries, containers, etc.) and tanks, to obtain the status end of the vessel. It also makes it possible to calculate the stability curves, wind curve, longitudinal resistance curve and torsional curve (container ship).



The user has up to 19 loading conditions: Real Load and 18 Simulated.

II. Dynamic calculations of the intact ship (real-time stability)

The so-called Second Generation Stability Calculations perform the intact stability control in real time and alert to the anomalies that may occur during navigation.

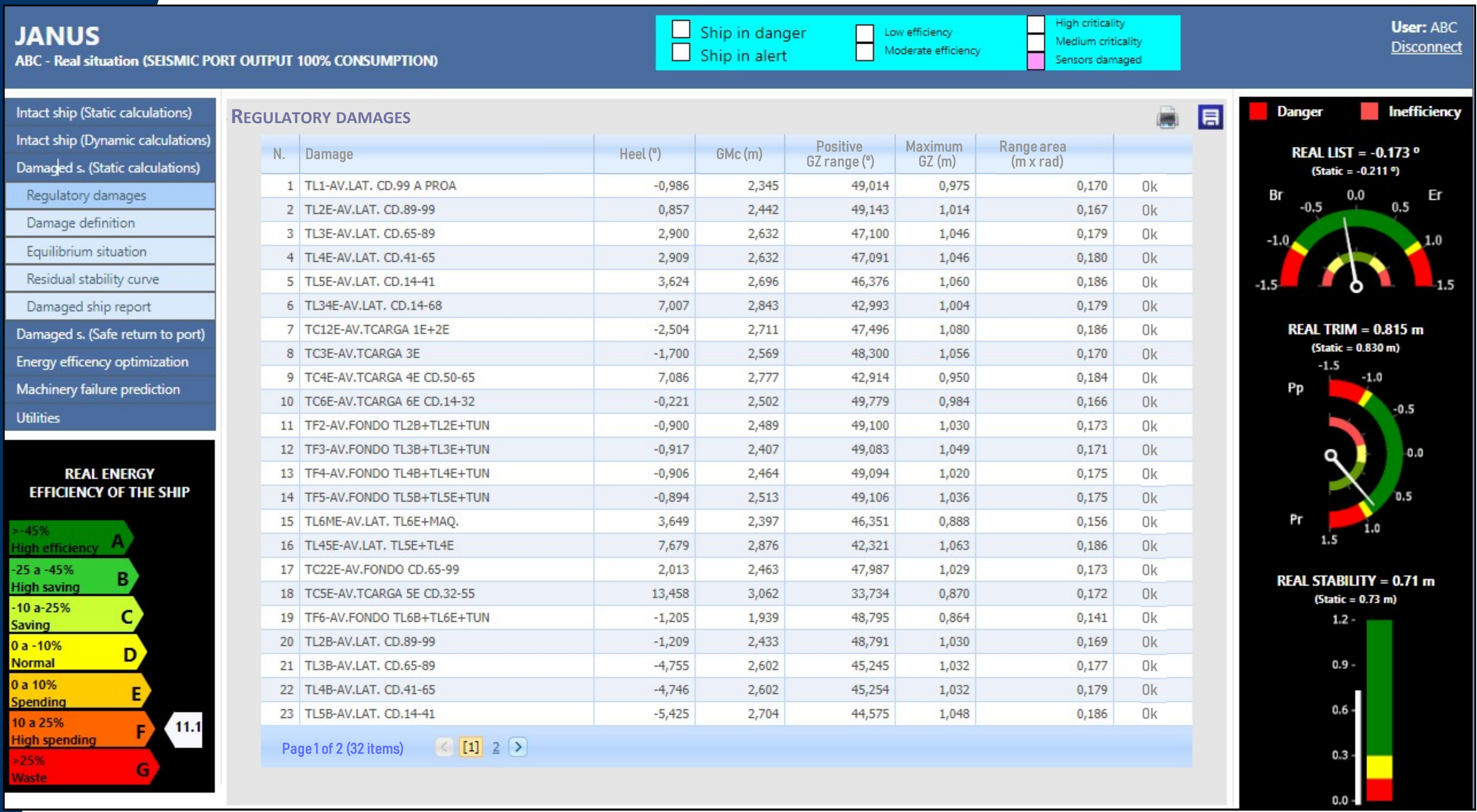


When think about ship stability you seldom stop to think about parametric roll or parametric roll resonance, but if navigate in Ro-ro, container, oceanographic or fishing ships, which are characterized by having bulky shapes in the master section of the living work, but fore and aft tunings in that same living work, and pronounced bow flares in the dead work, it is possible to find the phenomenon, which can even lead to the capsize of the ship by bell twist.

The parametric roll is produced by sailing in waters with a groundswell and a wavelength close to the length of the ship.

III. Static calculations of the damaged ship

For ships that do not transport liquid cargoes, it makes it possible to perform probabilistic stability calculations using the envelopes of the maximum KG. For ships with liquid cargoes (chemical tankers, oil tankers, gas carriers, etc.) it makes it possible to calculate deterministic stability, since it is the mandatory



N.	Damage	Heel (º)	GMc (m)	Positive GZ range (º)	Maximum GZ (m)	Range area (m x rad)	
1	TL1-AV.LAT. CD.99 A PROA	-0,986	2,345	49,014	0,975	0,170	Ok
2	TL2E-AV.LAT. CD.89-99	0,857	2,442	49,143	1,014	0,167	Ok
3	TL3E-AV.LAT. CD.65-89	2,900	2,632	47,100	1,046	0,179	Ok
4	TL4E-AV.LAT. CD.41-65	2,909	2,632	47,091	1,046	0,180	Ok
5	TL5E-AV.LAT. CD.14-41	3,624	2,696	46,376	1,060	0,186	Ok
6	TL34E-AV.LAT. CD.14-68	7,007	2,843	42,993	1,004	0,179	Ok
7	TC12E-AV.TCARGA 1E+2E	-2,504	2,711	47,496	1,080	0,186	Ok
8	TC3E-AV.TCARGA 3E	-1,700	2,569	48,300	1,056	0,170	Ok
9	TC4E-AV.TCARGA 4E CD.50-65	7,086	2,777	42,914	0,950	0,184	Ok
10	TC6E-AV.TCARGA 6E CD.14-32	-0,221	2,502	49,779	0,984	0,166	Ok
11	TF2-AV.FONDO TL2B+TL2E+TUN	-0,900	2,489	49,100	1,030	0,173	Ok
12	TF3-AV.FONDO TL3B+TL3E+TUN	-0,917	2,407	49,083	1,049	0,171	Ok
13	TF4-AV.FONDO TL4B+TL4E+TUN	-0,906	2,464	49,094	1,020	0,175	Ok
14	TF5-AV.FONDO TL5B+TL5E+TUN	-0,894	2,513	49,106	1,036	0,175	Ok
15	TL6ME-AV.LAT. TL6E+MAQ.	3,649	2,397	46,351	0,888	0,156	Ok
16	TL45E-AV.LAT. TL5E+TL4E	7,679	2,876	42,321	1,063	0,186	Ok
17	TC22E-AV.FONDO CD.65-99	2,013	2,463	47,987	1,029	0,173	Ok
18	TC5E-AV.TCARGA 5E CD.32-55	13,458	3,062	33,734	0,870	0,172	Ok
19	TF6-AV.FONDO TL6B+TL6E+TUN	-1,205	1,939	48,795	0,864	0,141	Ok
20	TL2B-AV.LAT. CD.89-99	-1,209	2,433	48,791	1,030	0,169	Ok
21	TL3B-AV.LAT. CD.65-89	-4,755	2,602	45,245	1,032	0,177	Ok
22	TL4B-AV.LAT. CD.41-65	-4,746	2,602	45,254	1,032	0,179	Ok
23	TL5B-AV.LAT. CD.14-41	-5,425	2,704	44,575	1,048	0,186	Ok

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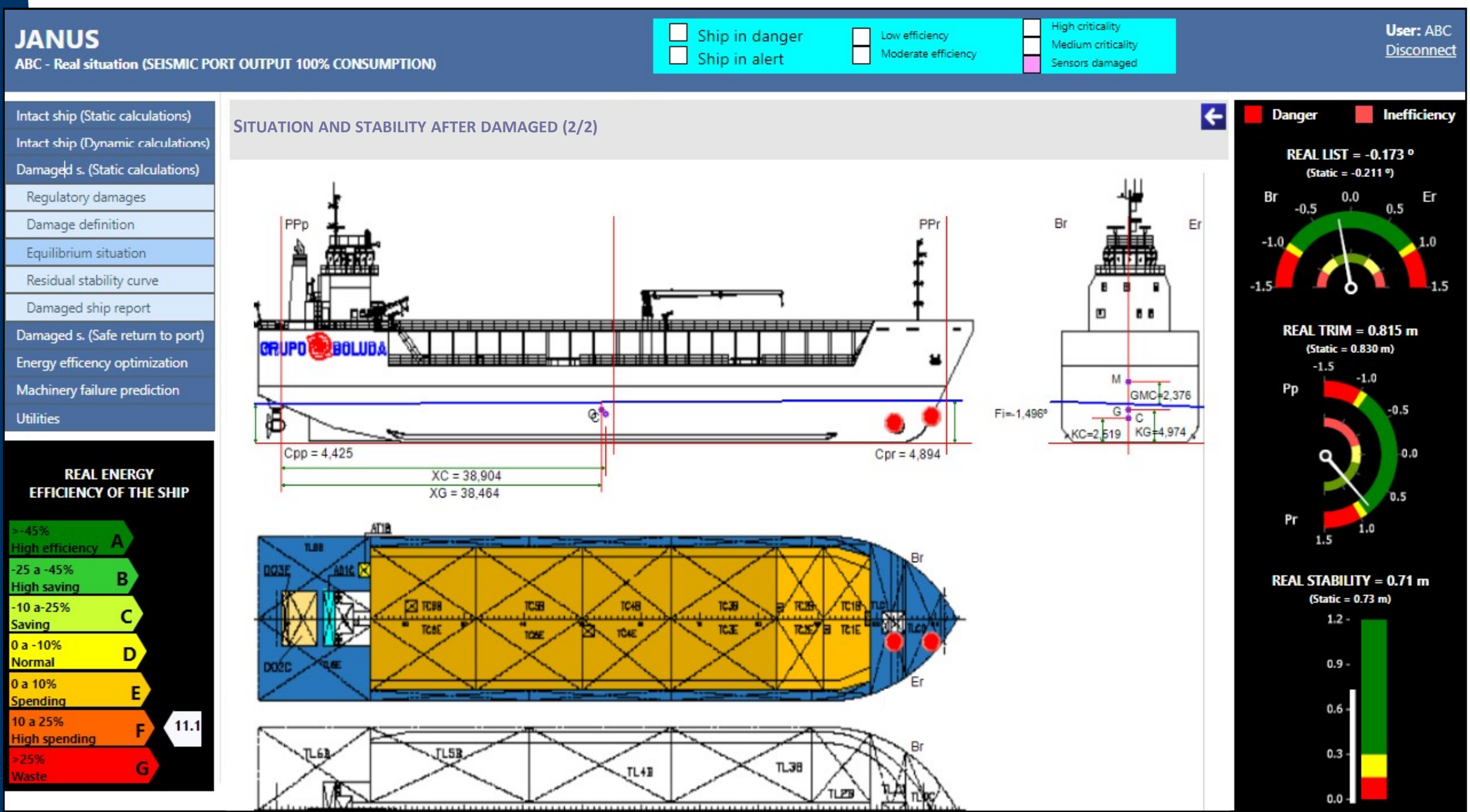
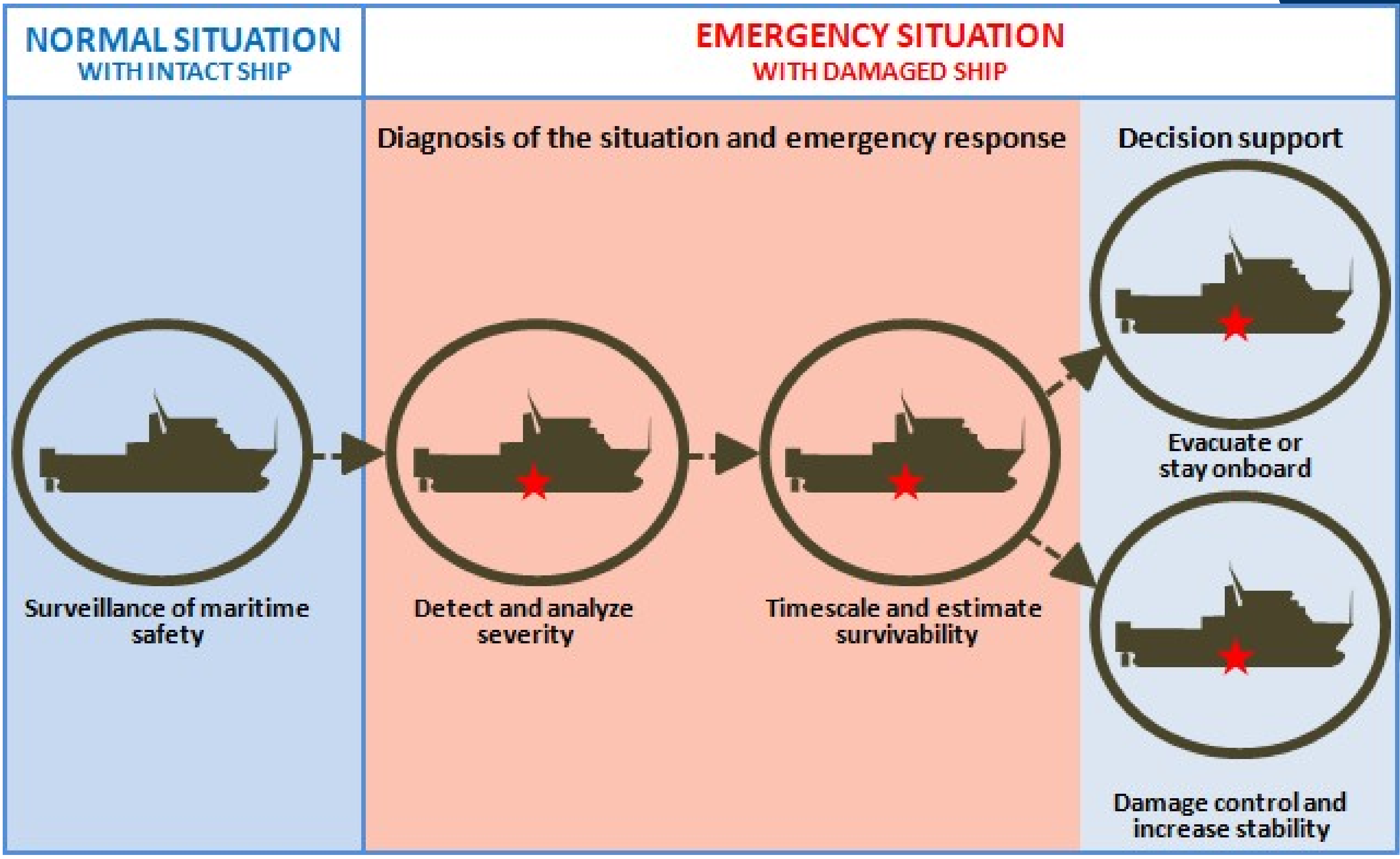
Automatically performs the calculation of all regulatory damages each time an intact ship loading condition is introduced, and issues a message of all possible breaches in each damaged..

In addition, the user can define a specific damage, from which a message will be issued with the possible breaches..

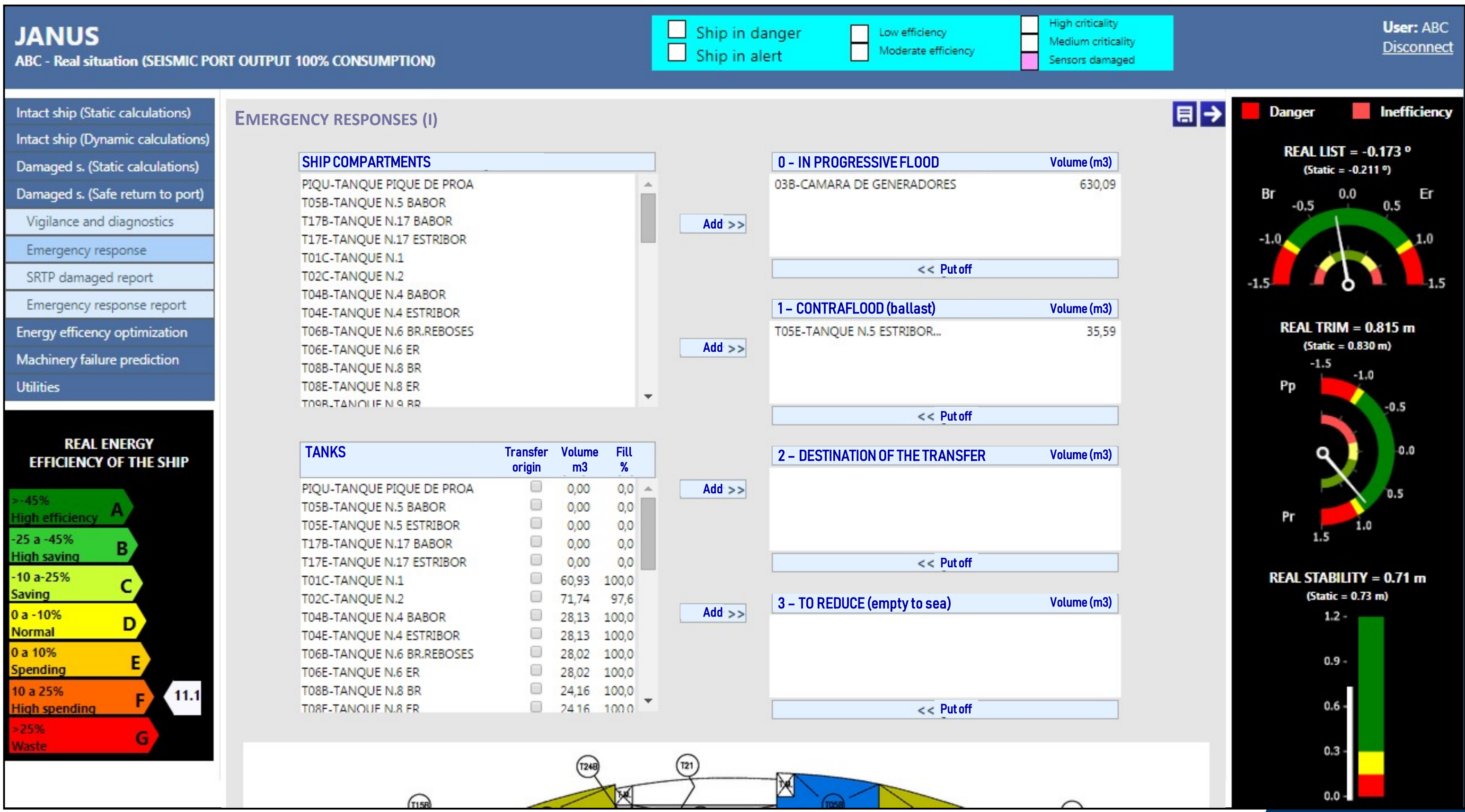


IV. Safe Return to Port with Damaged Ship

The Emergency Response and the Decisions Support of this module tries to eliminate human errors, warn in real time of the anomalies of ship, and provide solutions to correct them. It acts as a "sentinel" that warns of any anomaly, since it continuously analyzes stability and as is an "expert" because it provides solutions to restore normality.



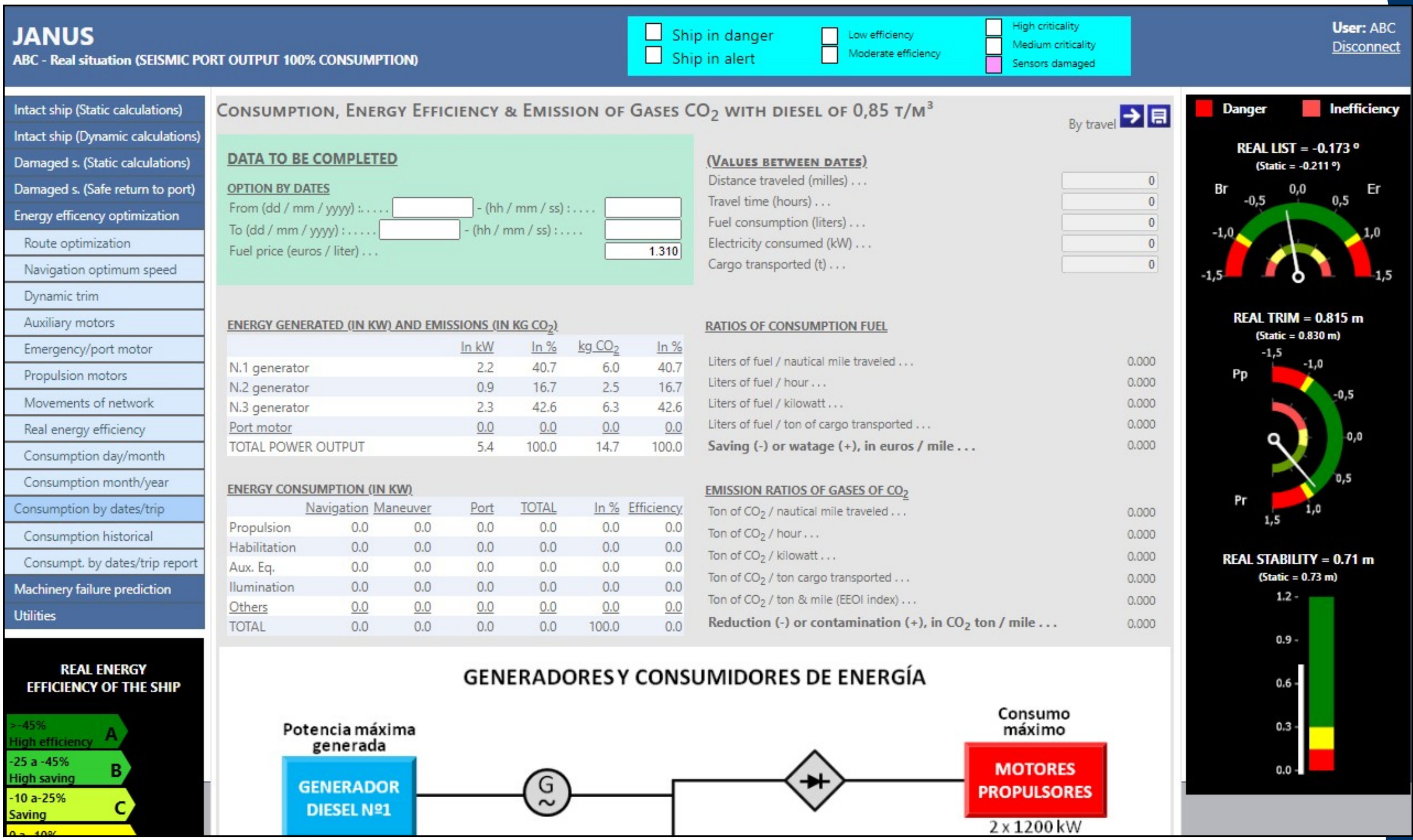
Many times the classical solutions are not enough to solve a high risk damage situation. Therefore, the system indicates how and how much: a) .- To fill the tanks with sea water; b) .- To transfer water or fuel from one tank to another; c) .- To pump liquid and / or cargo into the sea (only in extreme cases).



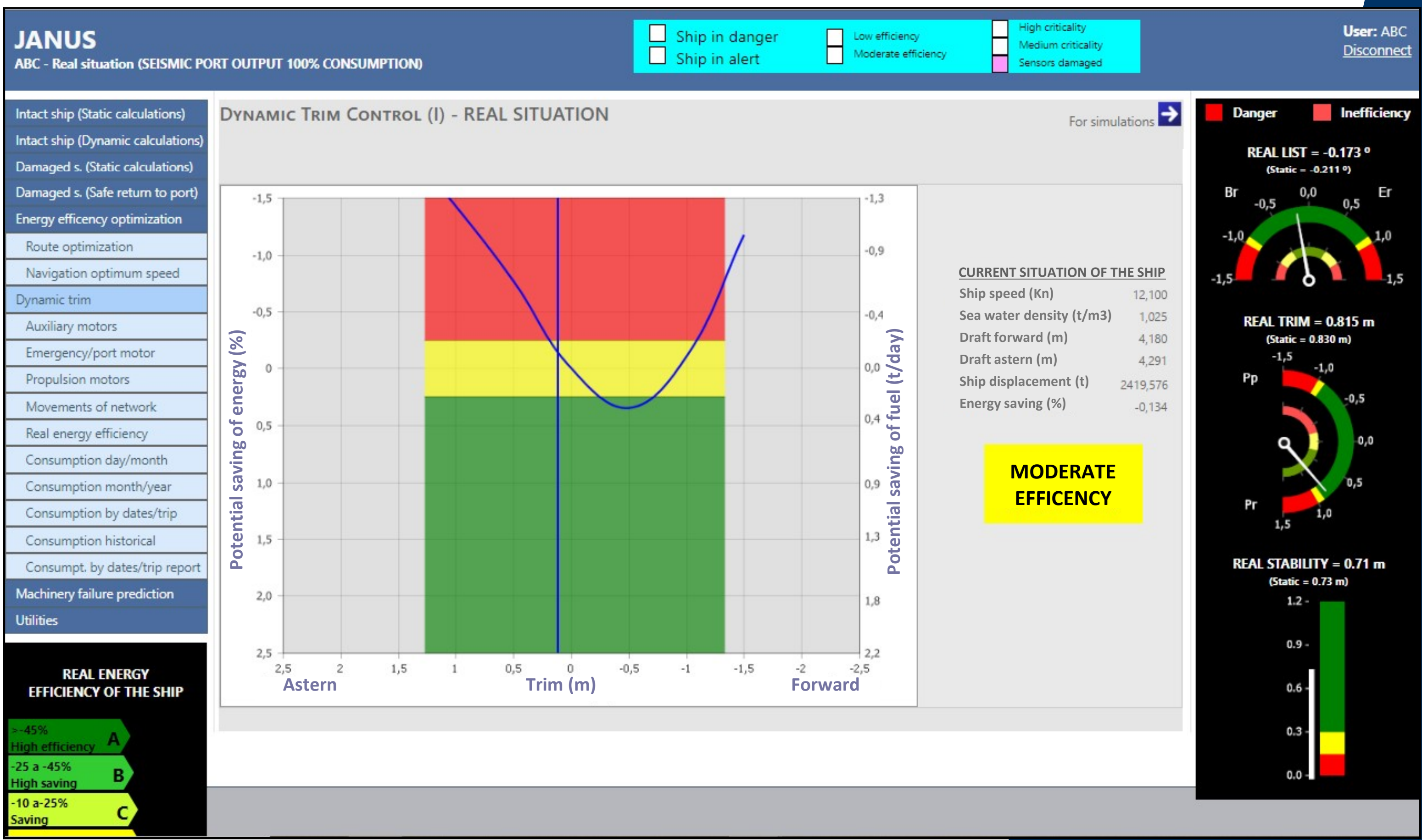
V. Control and Optimization of Energy Efficiency (in real-time)

Janus System Module V consists of two parts:

1. Monitoring of fuel consumption and gas emission of the ship, complying with the MRV regulations of the EU and DCS of the IMO.

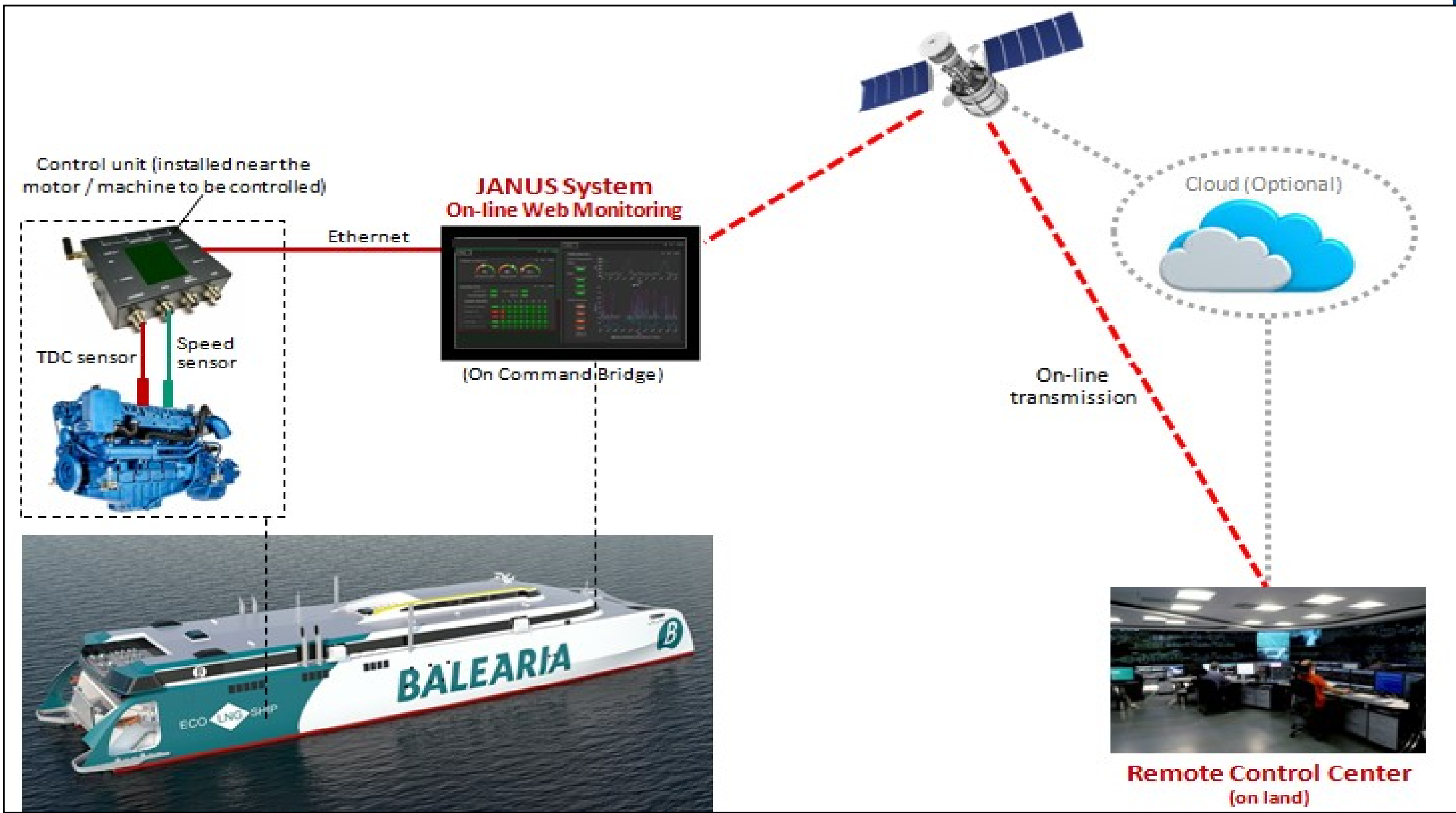


2. Optimizing Energy Efficiency and of Gas Emissions is a tool for optimizing ship functioning, saving fuel, improving the EEOI energy efficiency index, and reducing the emission of polluting gases. Average fuel savings can exceed 7% and € 250,000 / year, depending on the type of boat and its routes.



VI. Control and Prediction of Machinery Failures (Not intrusive & real-time)

The productivity of the ship increases as its failures decreases over time. It is interesting to have an automatic or "online" diagnosis to detect them months in advance, especially the most serious ones, with non-intrusive sensors based on the instantaneous analysis of angular velocity (opticals and magnetics). This predictive strategy moves the control room to a computer on the Command Bridge, with which maintenance personnel on board (which in most ships is around 30%) is replaced by a single multipurpose sailor. This replacement is only possible in its entirety if the most frequently used machines are sensorized.



The benefit of this system is translated into the immediate detection and identification of failures to prepare a precise schedule of interventions, thus reducing the costs derived from unforeseen stops or an excess of preventive maintenance. This optimizes the life of motors, bearings, gears and other elements.