



OVER 45 YEARS SOLVING VIBRATIONS AND NOISE PROBLEMS



# SILENT SHIP SOLUTIONS (S<sup>3</sup>)

## FOR CONTROLLING UNDERWATER RADIATED NOISE BELOW LIMITS

*Integrated methodology for IMO-compliant, quieter and more sustainable vessels*

### CONTEXT

**URN (Underwater Radiated Noise)** is one of **IMO's key** environmental concerns  
It affects marine life and vessels might need to reduce it down to safe levels

**Revised Guidelines MEPC.1/Circ.906 (2023)** define a new  
framework for quieter and sustainable ships



### What is S<sup>3</sup>?

Silent Ship Solutions (S<sup>3</sup>) integrates TSI's experience, technology and methodology to design, measure and validate quieter ships for both new and existing vessels

### How can we improve?

- URN measurement under real conditions
- Identification of noise sources
- Acoustic modeling and simulation
- Validation in sea trials

### NEW VESSELS

From the earliest design stage, TSI supports shipyards and owners in embedding Noise, Vibration and URN requirements into contractual and design specifications, enabling vessels that are compliant, quieter and more efficient

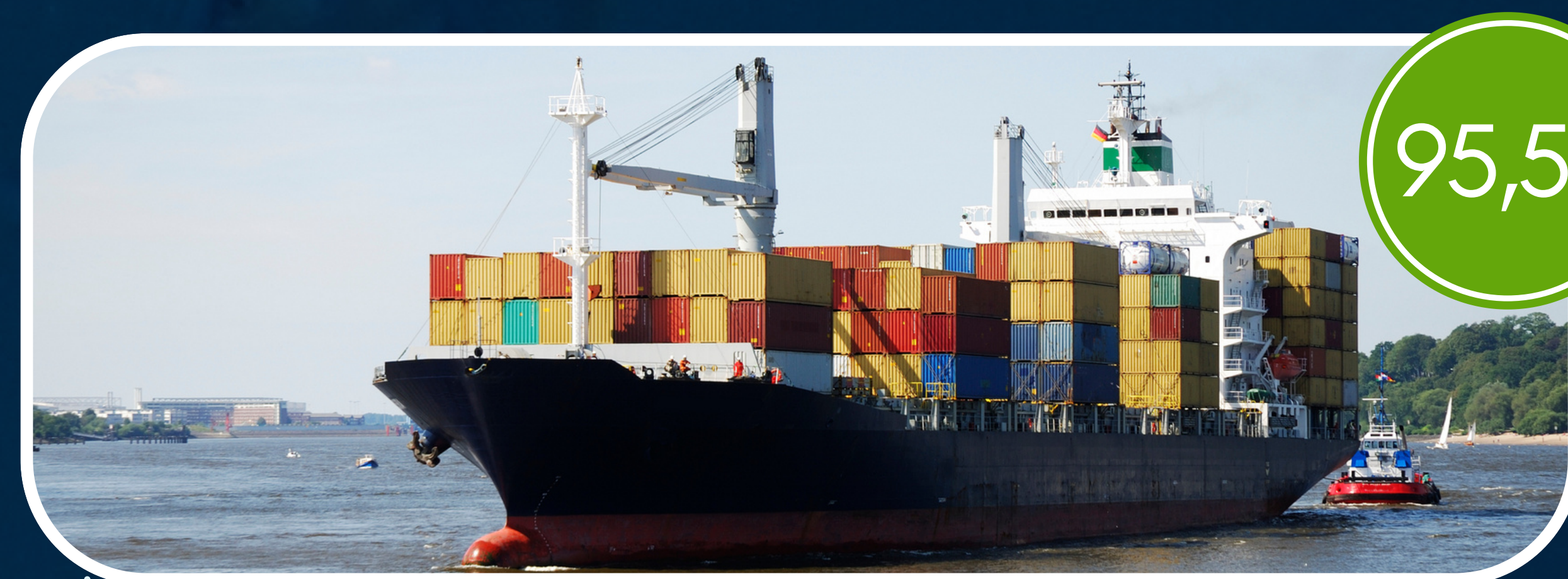
### EXISTING VESSELS

Even in-service ships can achieve significant **URN reduction**. Through targeted assessments and tailored engineering solutions, TSI optimizes performance while ensuring technical and economic feasibility



#### MAIN ACTIVITIES

- 1 Noise, Vibration and URN Specifications
- 2 Specific dynamic and acoustical Requirements for the main supplies
- 3 FAT- Factory Acceptance Tests for contractual validation
- 4 Engineering Tool "Noise & Vibration Comprehensive Management" N&V CM
- 5 Integral sea trials services



#### MAIN ACTIVITIES

- 1 Structural Borne Noise Assessment
- 2 Underwater Radiated Noise Baseline Measurement
- 3 Propeller Cavitation Assessment (Ni-CDS)
- 4 Ship performance: Power & Speed



### KEY TOOLS & PRODUCTS

- Ni-CDS (Non-intrusive Cavitation Detection System)
- N&V CM (N&V CM Noise & Vibration Comprehensive Management).
- ADVANCED MODELLING SUITE: FEM/BEM/SEA



### TSI EXPERIENCE

- 3.700 international projects and 1.500 professionals.
- Well-prepared company with all the International authorizations and certifications

### R&D&I PROJECTS

Since 2009, TSI has been actively involved in European research projects focused on reducing noise, vibrations, and URN (Underwater Radiated Noise).

- SILENV (Ships oriented Innovative soLutions to rEduce Noise & Vibrations)
- AQUO (Achieve QUIeter Oceans by shipping noise footprint reduction)
- SATURN (Solutions @ Underwater Radiated Noise)
- LOWNOISER (LOWering underwater NOISE Radiation from waterborne transport)

Our participation reinforces TSI's commitment to innovation, sustainability and the development of advanced solutions for a quieter ocean.



+34 913 459 730 [www.tsisl.es](http://www.tsisl.es) [infotsi@tsisl.es](mailto:infotsi@tsisl.es)

AVDA. PÍO XII, 44 - EDIFICIO PYOMAR TORRE 2 - BAJO IZDA. 28016 MADRID, ESPAÑA.

