



GRAPHITE
INNOVATION & TECHNOLOGIES

IMO URN Workshop

September 19, 2023 | IMO URN Workshop

Marine coatings to improve vessel efficiency and reduce URN

Mo AlGermozi | GIT



Graphite Innovation & Technologies Inc.



- **HQ: Canada with offices in Europe**
- **Manufacturing Facilities Dartmouth, NS**
- **Distribution centers across EU and APAC**

Environmentally friendly coatings

- From Aerospace to Marine
- Graphite /Graphene based high performance paints for the under water of vessels
- Produced from a NetZero energy facilities
- Financially backed by a global syndicate of climate action, ocean health funds, and banks. In Canada, France and Norway





**4.5 million tonnes
of CO₂ avoided**

GIT's targets by 2030

**Enable reduction
of URN**

**1.1 million kg
of copper avoided**



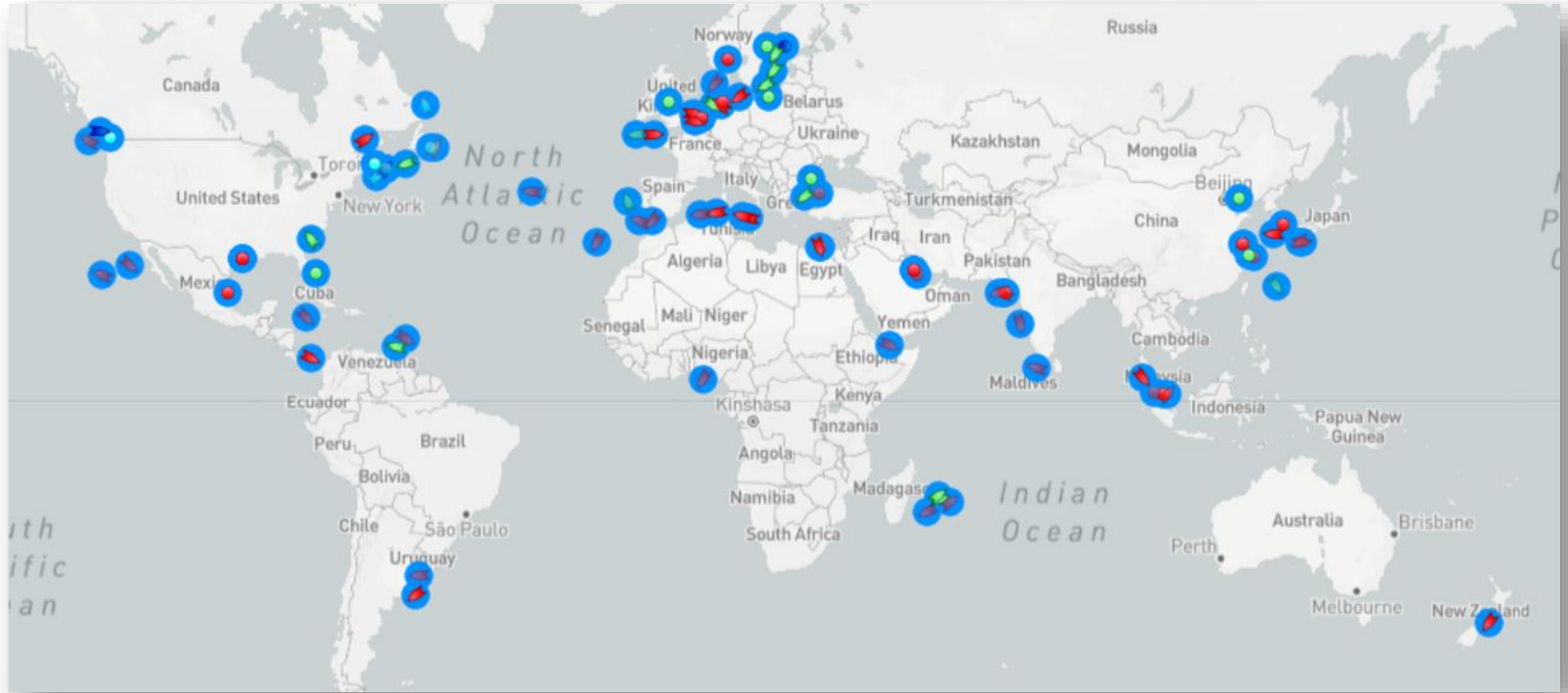
Some of the vessels we can track E&E



Atlantic Pilotage Authority



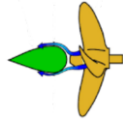
MAERSK



LPG Tankers | Oil/Chemical Tankers | Bulk Carriers | Ro-Ro | Container | General Cargo | Ice-going | Offshore Supply | Workboats



The most feasible solution to improve efficiency



Rudder Surf Bulb (5%)



Mewis Duct (3-7%)

Easy to implement



PBCF (1-3%)



XGIT-PROP (3-4%)

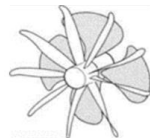
High-performance
AF Coatings (6%)

High cost

Low cost



Propeller Duct (3%)



Grim Vane Wheel (3%)

FO Homogenesis (0.5%)

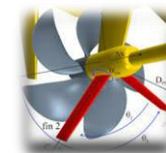


Air Lubrication (4%)



Kites and Sails (10%)

Hard to implement



Pre-Swirl Fins (2%)

*(x%) potential
fuel savings

Many recognized ways

Measure	Claimed Savings up to	Cost	Implementation Feasibility	ROI
Rudder Surf Bulb	~5%	High	Moderate	< 36 months
Rudder Surf Fins	~1%	High	Moderate	< 132 months
Propeller Boss Cap Fins	~1% - 3%	Medium	Moderate	< 14 months
Contra Rotating Propellers	3%	High	Hard	~132 months
Mewis Duct	~3% - 7%	High	Moderate	~14 months
Propeller Duct	~3%	High	Moderate	< 24 months
Wake Equalising Ducts	~2%	High	Hard	< 18 months
Pre-Swirl Fins	~2%	Medium	Hard	< 30 months
XGIT-Prop	~3-4%	Low	Easy	< 2 months
Low Friction Anti-fouling paints	~6%	High	Moderate	~9 months
Air lubrication	4%	High	Hard	< 60 months
Fuel Oil homogenisers	0.5%	Medium	Moderate	< 36 months
Kites and Sails	~10%	High	Hard	< 60 months
CLT Or Kappel Propellers	6%	High	Moderate	< 12 months
Grim Vane Wheel	3%	High	Moderate	< 60 months

***XGIT-Prop... Easy & Fast Return**





XGIT-FUEL

Flat bottom and vertical sides

- Offshore Service Vessel
- Date applied: Feb 2022
- **Shaft power reduction:10.4%**
- Payback period: 8 months
- Third vessel for this customer



Trials by Lloyds Register - ISO 15016:2015 standard, "Ships and marine technology – Guidelines for the assessment of speed and power performance by analysis of speed trial data"





XGIT-PROP

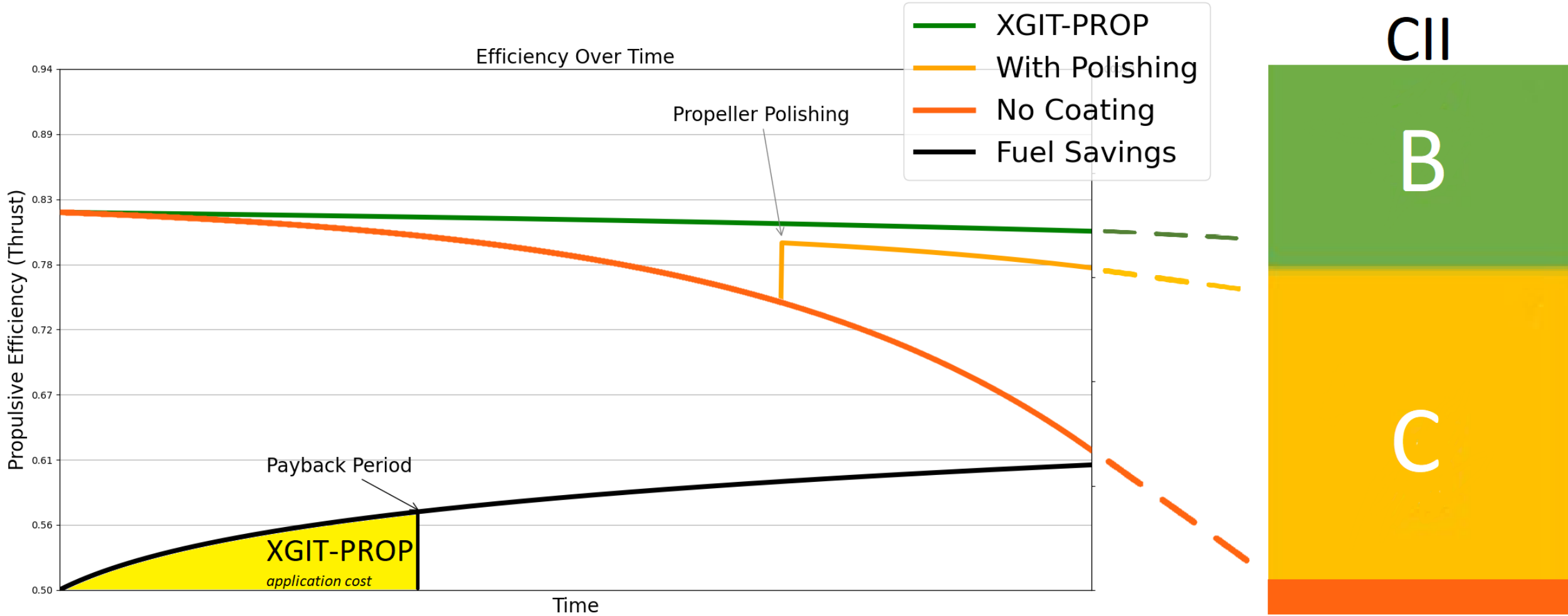




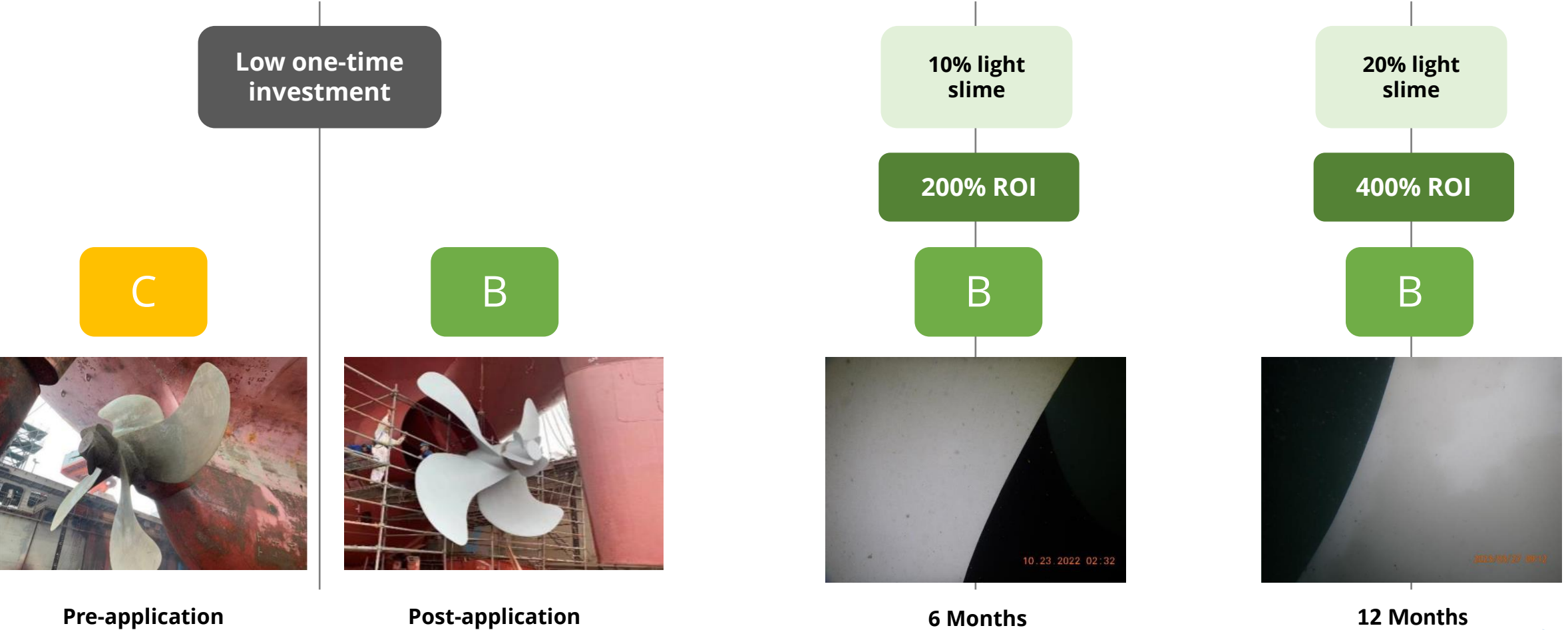
Successful applications on all Prop types



Maintain peak propeller efficiency over time



XGIT-PROP is a proactive solution that maintains CII



Propeller

- 26K DWT Oil/Chemical Tanker
- Date applied: April 2022
- **Fuel savings: 3-4%**
- Payback period: 2-3 months
- By end of 2023, vessel will have saved approximately **500 t** of CO₂ (18 months post-application)





What we know

- Hull and propeller coatings are a cost-effective way to improve the efficiency of vessels
- High performance coatings serves as a tool to improve and maintain CII ratings
- Payback period is anywhere between 3-12 months



We also know

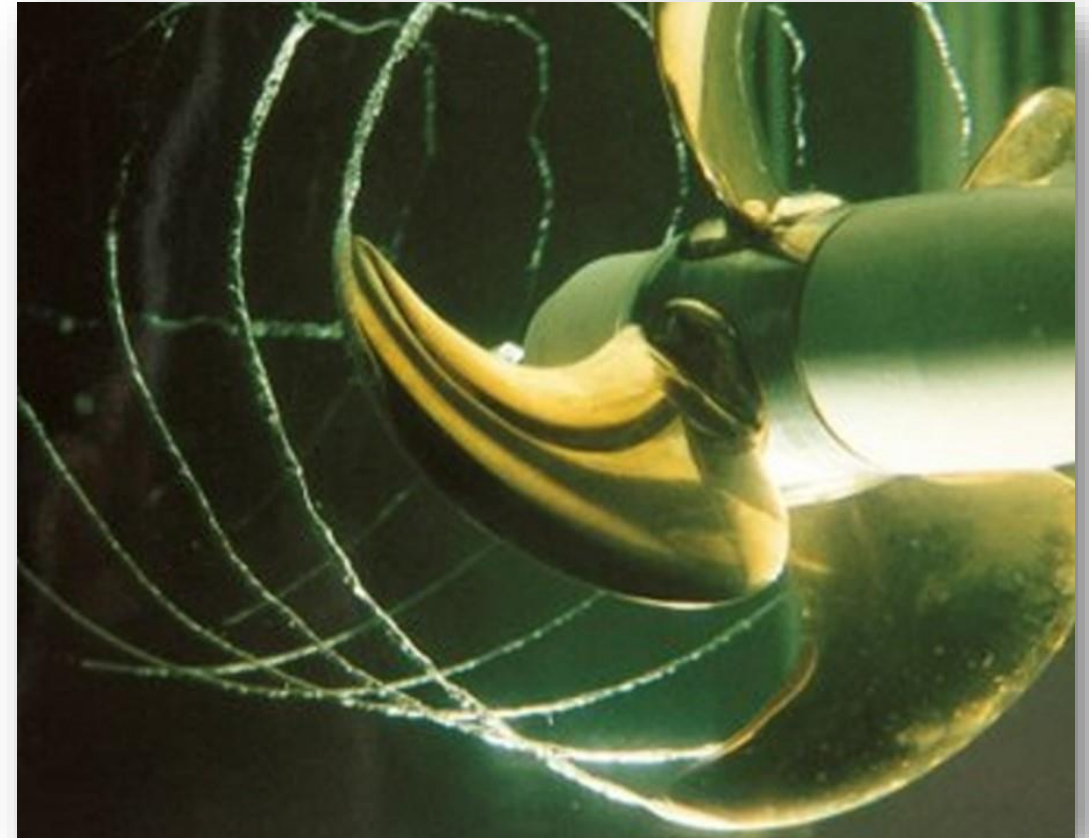
Linking Efficiency Gain to URN Reduction

- **Hull Coating**

- Maintain same speed with reduced Engine Power
- Reducing engine power lessens engine borne noise levels

- **Propeller Coating**

- Maintain Same RPM with higher speed
- Lower RPM can help vessels operate with reduced cavitation
- Maintains a cleaner propeller



Comprehensive Coating system Strategies to reduce URN



**High Performance
Hull Coating**
Improve Efficiency
Less Strain on Engine
Faster Speed through water

Propeller Coating
Improves cavitation via lower RPM
and a more polished blade surface.





XGIT-URN

XGIT-URN

- An industry first
- A primer designed to reduce URN
- Uses GIT's proprietary technology to reduce **hull borne** underwater noise levels
- Compatible primer with most top coats
- Seen a **3-5 db reduction** when coupled with XGIT-Prop and XGIT-Fuel tested on small vessels



Comprehensive Coating Strategies to reduce URN



Noise Reducing Intermediate Coating Layer

Patented Technology aimed at reducing structural and hull borne noise. Coating is applied between A/C primer and topcoat

High Performance Hull Coating
Improve Efficiency
Less Strain on Engine
Faster Speed through water

Propeller Coating

Improves cavitation via lower RPM and a more polished blade surface.



**A URN coating management solution that
is compatible with 100% of the global fleet**

Any vessel can be coated

*Many Energy Savings Devices impact a small
subset of the global fleet*



URN Projects & Initiatives 2023-> 2024

- ❖ **Transport Canada Project (TR-22-33) - URN & GHG Reduction Program** for Canada's Inshore Fishing Craft (**Lloyd's Register & GIT**). Results from underwater acoustic measurements from the application of XGIT coatings compared to the previous baseline conditions.
- ❖ **Research Vessel up to 100 meters in length** Underwater Radiated Noise Signatures (URNS) station to measure ambient noise and URNS of candidate ships. GIT will apply XGIT coatings to a research vessel to undergo pre/post comparison of URNS.
- ❖ **Offshore service vessel** – An offshore supply vessel has applied XGIT coatings to reduce URN impact during its operations in the Salish Sea.
- ❖ **Chemical Tanker** – A 160m Oil/Chemical Tanker will apply XGIT coatings to compare its URNS pre/post drydock



Biggest Challenges



- Shipping industry does not see value in reducing noise yet – **Awareness**
- Need more work quantifying URN reduction systems
- Dedicating vessels from representative categories to collect URN emissions data
- Currently we use listening stations to capture data – Availability of mobile listening
- Listening stations are limited in number, range and availability
- More research into what sources/factors contribute to URN (cavitation, engine noise, reciprocal machines...)





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INNOVATION & TECHNOLOGIES

Smart Coating Solutions



XGIT-FUEL

- High performance foul release coating
- Self Cleaning (>10kn)
- Proven Results
- No Biocides
- Easy to clean (soft brushes)
- 7 - 10% Improvement in fuel efficiency



XGIT-PROP

- Most sophisticated propeller coating
- 2 - 4% Improvement in fuel efficiency
- No need for propeller polishing
- Simple cleaning will remove fouling

Let's
Connect

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