JENTEK® Sensors

- Since 1992
- Eddy Current MWM-Array® sensors
- Instrumentation and GridStation Software

Goldfine
Serviços Tecnológicos do Brasil

- Since 2023
- R&D – Applied engineering, Data science, AI
- JENTEK Sensors Authorized Distributors and Consultants





TOPSIDE

- **PIPE – EXTERNAL CORROSION (ANP)**
- **PIPE – CUCR (Consultancy)**
- Pipe – weld cracks in HAZ
- 3D printting of metal parts

SUBSEA

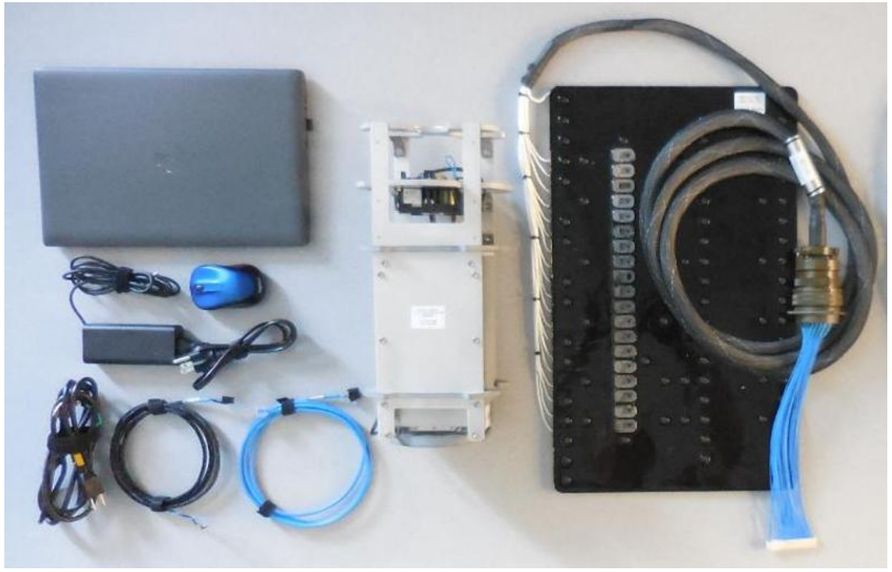
- **FLEXIBLE PIPES – BROKEN WIRES (ANP)**
- (cracks, corrosion, torsion)
- Connectors

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MWM-Array Capabilities

CAPABILITY	TYPICAL APPLICATIONS
Broken wires in tensile armor layer of flexible pipes	Subsea, topside, land-based tests
Corrosion Imaging	Topside pipes, vessels, corrosion pitting, general corrosion,
Corrosion under composite repair	Refineries, Topside
Corrosion under insulation or coatings	Refineries, Topside, (potential for subsea)
Crack detection (surface and subsurface)	SCC, fatigue, cracks under hydrogen blisters, bolt-hole cracks, welds, circumferential and axial cracks, tight cracks
Cladding quality and defects detection	Refineries, Vessels, Pipes, Offshore
Creep Damage	Refineries, Reformer Tubes & Pigtails
Structural health monitoring	Government / Navy / Nuclear / O&G
In situ 3D printing of metal parts	LPBF and DED

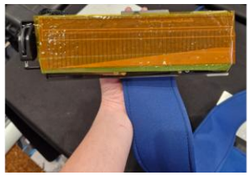


MWM-Array 7ch (jET) – Cracks





MWM-Array 39ch (GS9000) – Corrosion

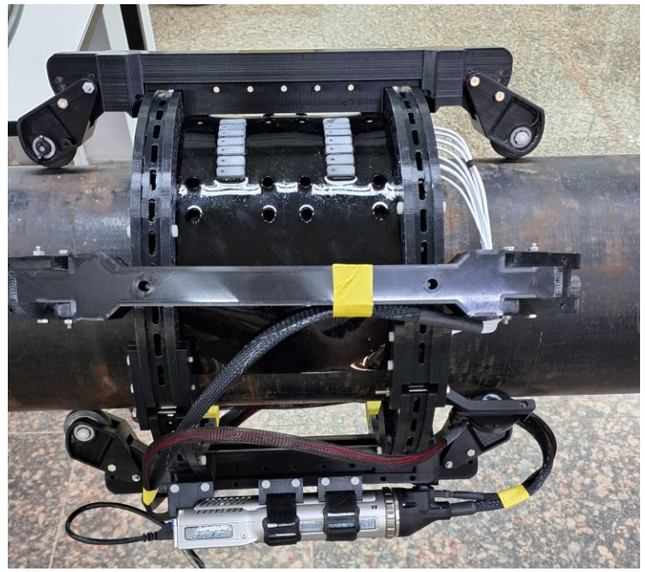


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MWM-Array Capabilities

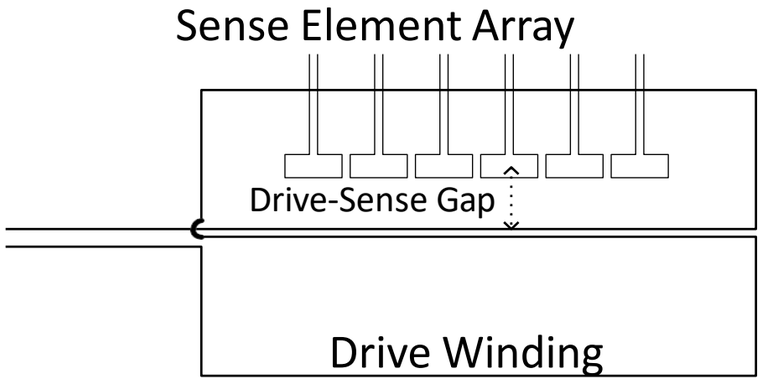
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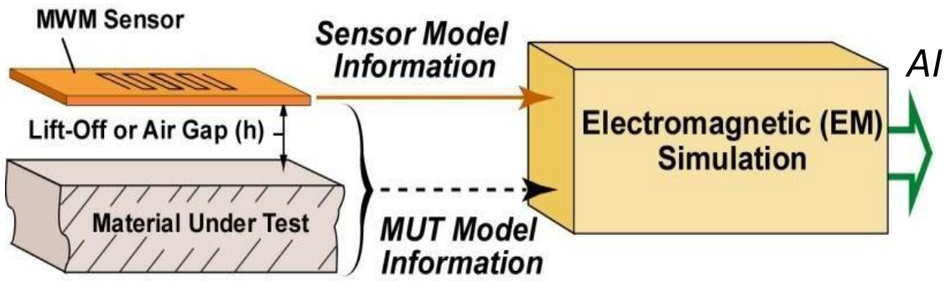


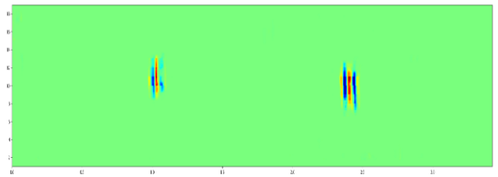


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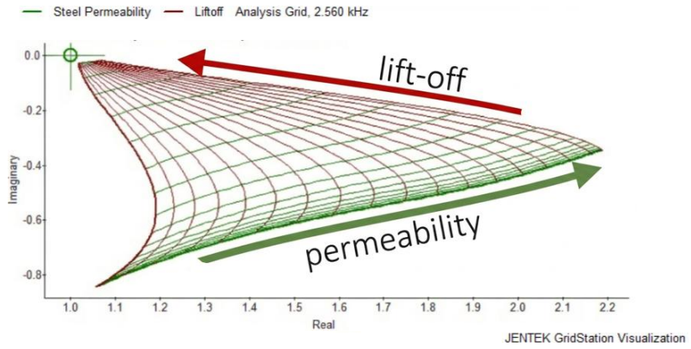
Physics-based models, Inverse Methods and AI











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REAL DEMAND: BROKEN WIRE INSPECTION

PROBLEM

The lack of direct, fast, and effective inspection leads to premature replacement of critical assets, reducing operational and economic efficiency.

Complex geometry

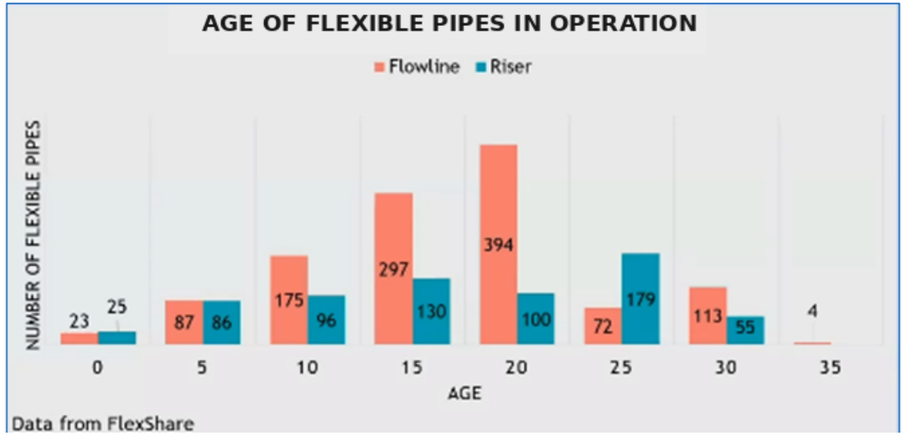
7,000 km
flexible pipes
(2020–2024)
in Brazil alone

High-value critical asset

~US$75mi
per replacement
US$15m per km of pipe
+ operating costs

~40 FPSOs operating in Brazil

+10 to +15 new FPSOs expected by 2030



BH PETRÓLEO BRASILEIRO S.A.
PETROBRAS

UNIT PRICE SHEET
SUBSEA / ABOVE-WATER SECTIONS

OBJECT: Inspection service to detect breaks in tensile armor wires of flexible pipes, with or without insulation.

ITEM	SERVICE	UNIT	QTY.
1.0	BROKEN-WIRE INSPECTION SERVICE - SUBMERGED SECTION	Daily	96
2.0	BROKEN-WIRE INSPECTION SERVICE - ABOVE-WATER SECTION	Daily	31

TOTAL ESTIMATED VALUE (R$)

2026 tender – revised to:

BH PETRÓLEO BRASILEIRO S.A.
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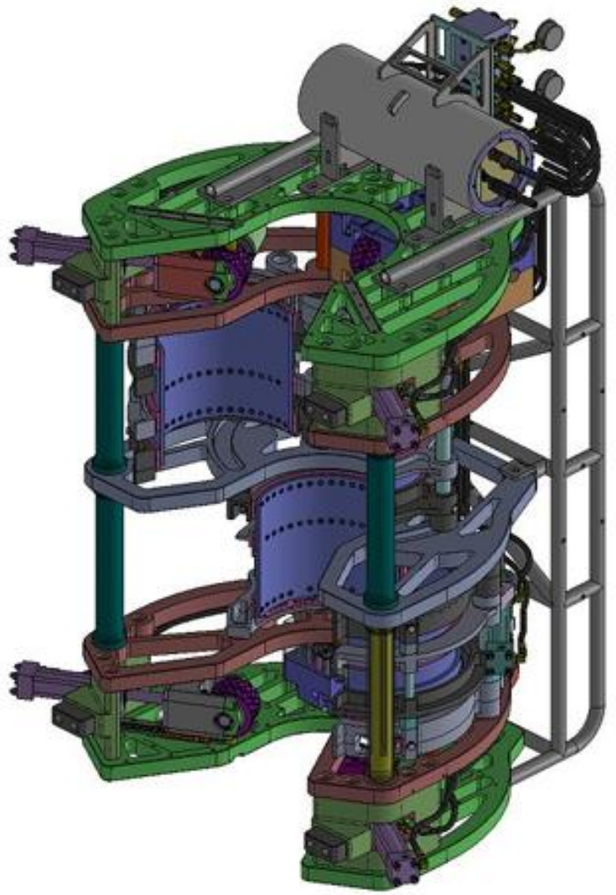
ITEM	SERVICE	UNIT	QTY.
1.0	BROKEN-WIRE INSPECTION SERVICE - SUBMERGED SECTION	Daily	17
2.0	BROKEN-WIRE INSPECTION SERVICE - ABOVE-WATER SECTION	Daily	71

TOTAL ESTIMATED VALUE (R$)

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REAL DEMAND: BROKEN WIRE INSPECTION

Item	Status
Sponsor	Petrobras/ANP
Technology	MWM-Array Eddy Current
Application	Broken wire detection in tensile armor of flexible pipes
Fatigue samples	Validated
Blind test	Successful
Relevant environment	Completed
Field Test	Ready for 2027

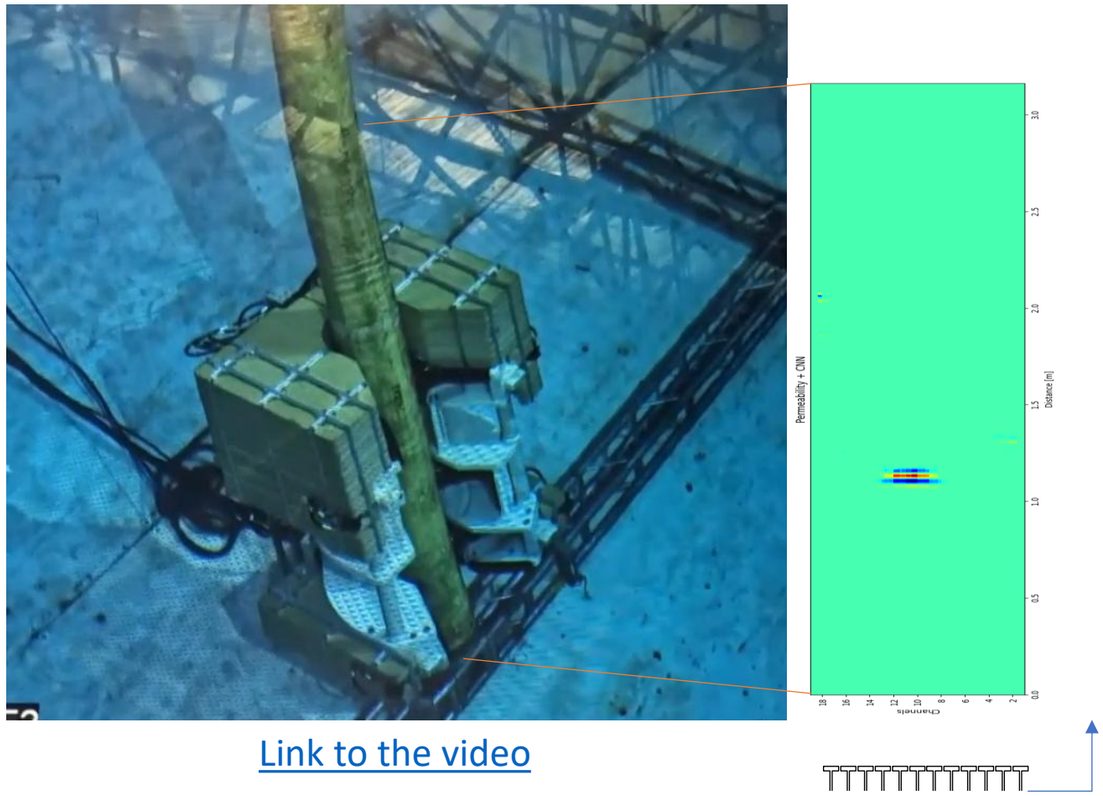


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SOLUTION: INSPECTION TOOL (TRL 7)

- Risk-based inspection (RBI);
- Structural integrity assessment;
- Riser integrity management;
- Life extension assessment;

Technology advantages	
360º covarage	Full circumferential coverage in a single pass
Axial inspection	Up to 36x faster than other solutions
Sensor	Wide range of lift-off supported, up to 43mm
Water calibration	No reference parts or load conditions required
Potential CO_2 emissions reduction	Shorter offshore inspection time and prevention of premature asset replacement through improved integrity assessment.

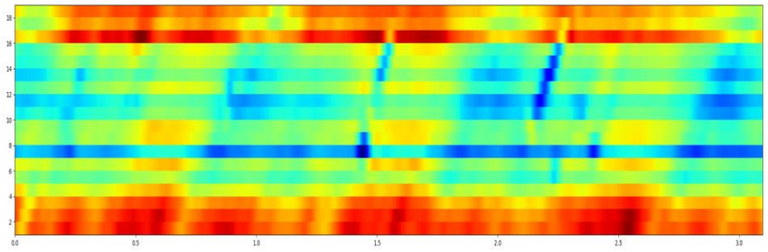


Link to the video

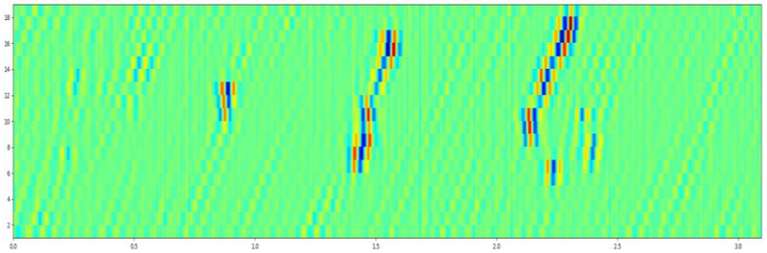
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Background Subtraction & AI

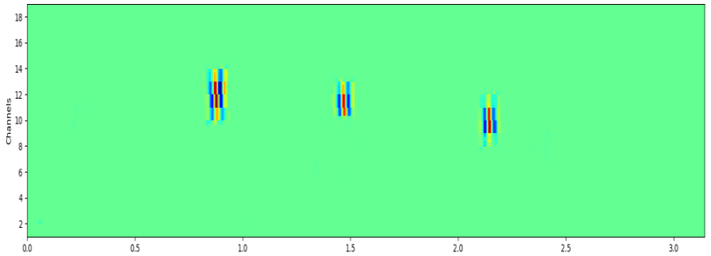
Raw magnetic permeability response



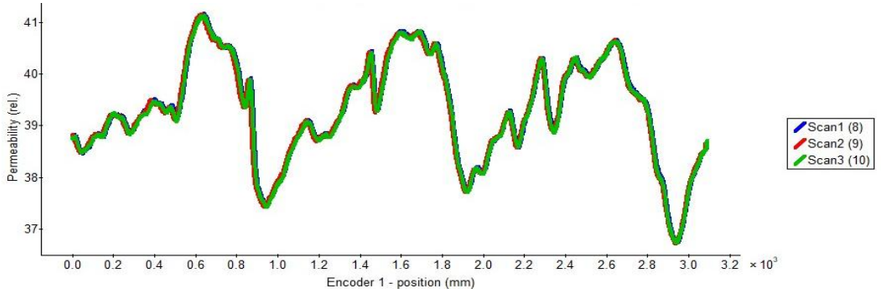
Background Subtraction



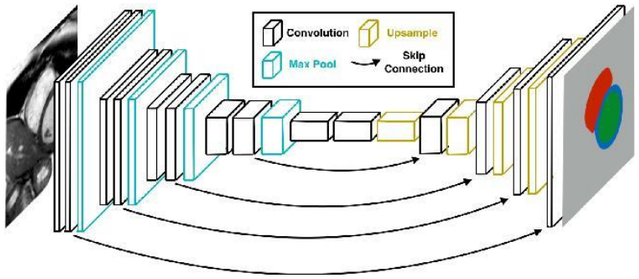
AI-based classifier



Dedicated processing workflow



Training AI model

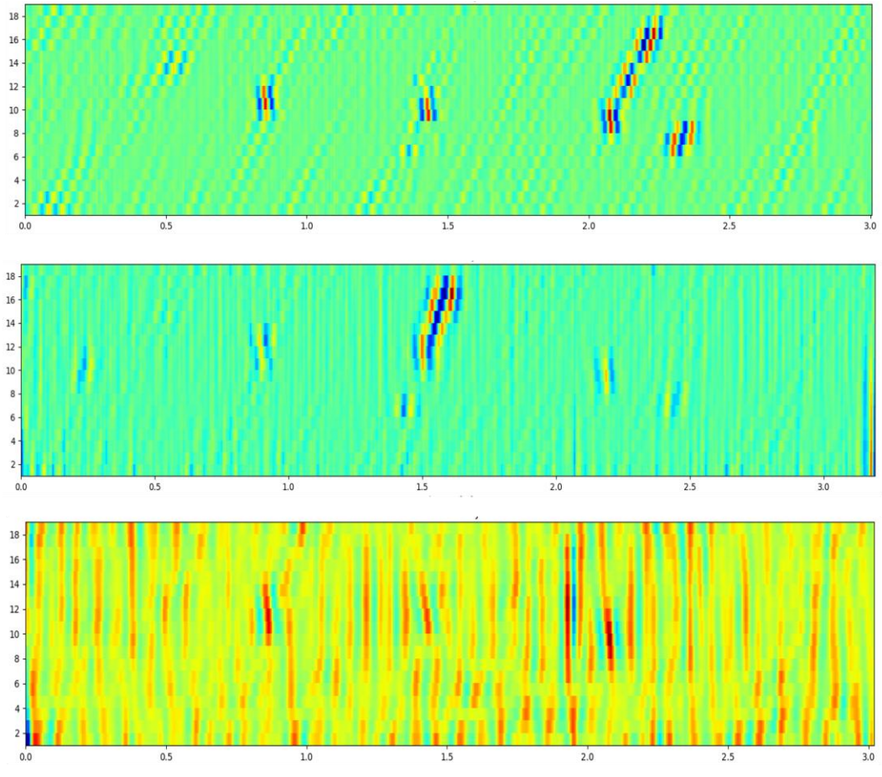


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BROKEN WIRE DETECTION

Background subtraction

AI-based classifier



17mm lift-off

30mm lift-off

42mm lift-off

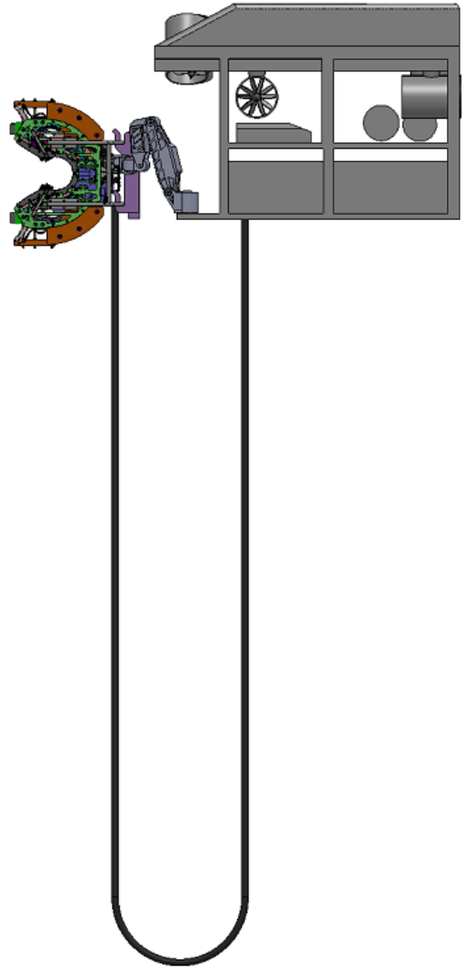
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Licensing Structure – Know-how Transfer

Controlled technology deployment, supplier base expansion, technical support and continuous asset improvement, service delivery by qualified personnel, and revenue generation through royalties and inspection data analysis

- Initial licensing fee + royalties
- Tool* manufacturing (Rights to manufacture, modify, use, and commercial exploitation)
- Procurement of the JENTEK inspection system

*Tool: The apparatus for moving and deploying the sensors, not including the JENTEK electronics or MWM-Array sensors or the associated measurement methods or any background JENTEK IP



Hardware & Technology Inspection

JENTEK Sensors

proprietary sensor technology and instrumentation

Inspection Operations

Service Provider

operational capability, performs offshore deployment and inspection services

Data & Intelligence

Goldfine Brasil

delivers data management, advanced analytics, AI, and digital reporting.

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OBJECTIVE AND PATH TO COMMERCIALIZATION

From Development to Commercial Operations

Objective: Complete technology maturation and prepare to launch offshore inspection services.

WHERE WE WANT TO BE

TRL 7 → TRL 9

Technology qualified for operational use under real-world conditions.

Next Milestone: Launch inspection services using the technology

WHAT IS STILL NEEDED

1. ROV Adaptation
Adaptation to the specific ROV

2. Testing and Qualification
Validate the system at 250 bar

3. Operational Demonstration
Build an operational track record

4. Operational Readiness
Develop operational plans for inspection campaigns

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Soluções em testes não destrutivos utilizando correntes parasitas | Goldfine Serviços Tecnológicos ...

Empresa de engenharia em Porto Alegre focada em inspeção e monitoramento de ativos de alto valor em diversas indústrias críticas como energia, óleo e gás, petroquímica, aeronáutica e automotiva.

Daiane Pioli, daiane.pioli@goldfinebrazil.com

www.jenteksensors.com

Resource Center - JENTEK Sensors, Inc.

"In-situ Sensing and Post-production Inspection for Additive Metal Parts Using Eddy Current Arrays," MilAM Summit, February 10, 2025.

Neil Goldfine, neil.goldfineoverseas@jenteksensors.com

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