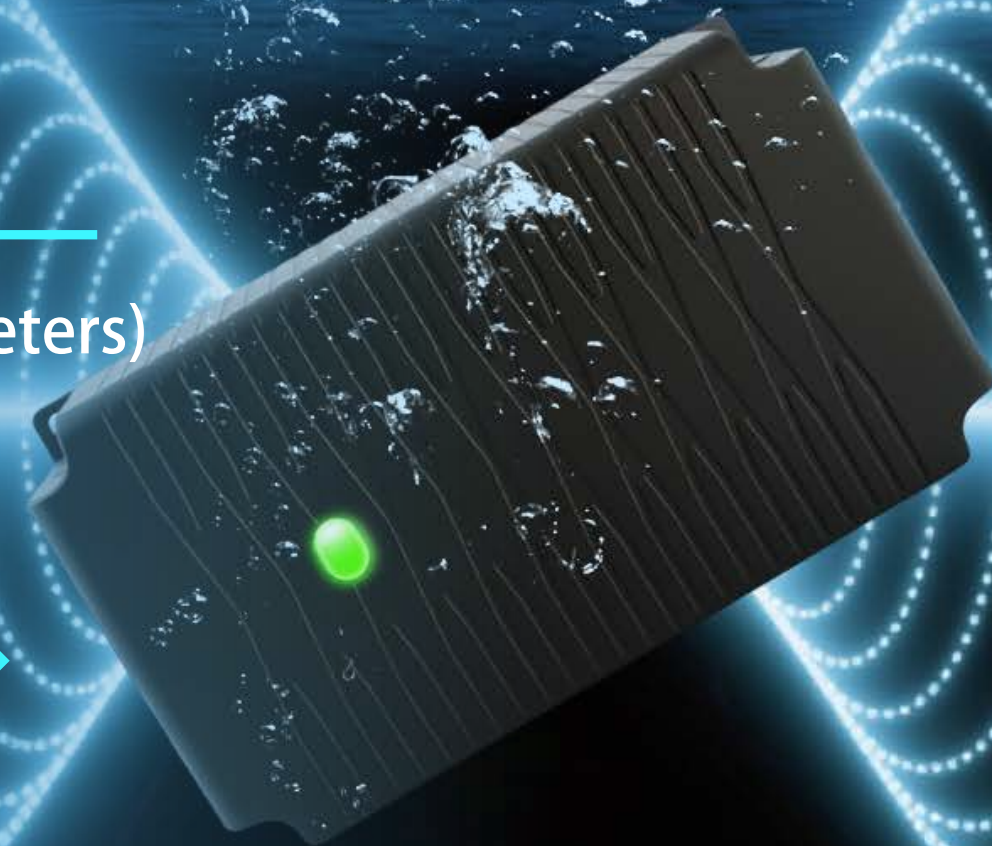


Vector Wireless Communication

❑ Cross Media ❑ Zero-Latency ❑ Near-field high-speed (100 meters)

Global Leader in Underwater & Underground Wireless Communications.

Addressing the critical pain points in underwater and underground environments: invisibility, inaccessibility, and slow data transmission.





Comparison of Key Performance Indicators for the Four Major Communication Technologies

✓ Magnetic field communication is insensitive to water quality and enables cross-medium communication

✓ Magnetic field communication is the only technical means for underground wireless communication.

✓ The magnetic field is a vector and can be used for positioning underwater and underground.

Core Comparison Table

Metric Dimension	Acoustic Communication	optical communication	Radio Frequency Communication	Magnetic Field Communication
transmission distance	✓ Dozens of kilometers	A few meters to over a hundred meters	✗ Negligible in seawater	Near-field: within 100 meters
Data Rate	✗ dozens of bps	✓ Several Mbps to Gbps	✗ Very Low bps	Several tens of kilobits per second to several megabits per second
Physical Latency	✗ Second-scale	✓ Microsecond-scale	✓ Very low	✓ Millisecond-scale
Water Quality Impact	✗ The impact is extremely significant.	✗ Extremely sensitive	Only freshwater is available	✓ Almost no impact
Cross-media penetration (Water/Air/Metal)	✗ Very poor	✗ Very poor	Poor	✓ Excellent

✓ The only wireless communication technology that combines strong penetration, low latency, and environmental robustness for both underwater and underground applications.

✓ The only reliable means of communication in extreme scenarios such as ground collapses.



Principles of Magnetic Field Communication

—the ideal solution for harsh underwater/underground environments

01/ The emission coil is driven by alternating current → A quasi-static alternating magnetic field is generated

02/ The receiving coil induces an electrical signal through magnetic coupling → Demodulation

Principle in one sentence: Information is transmitted via near-field magnetic induction, not electromagnetic waves.

WHY ARE UNDERWATER AND UNDERGROUND ENVIRONMENTS SO FAVORABLE FOR MAGNETIC FIELDS?

1. The magnetic permeability of materials such as biological tissues, water, non-magnetic metals, and concrete is close to that of vacuum ($\mu \approx 1$).
2. Magnetic fields do not propagate in water as electromagnetic waves and do not experience significant attenuation due to the medium's electrical conductivity.
3. Low-frequency magnetic fields exhibit minimal attenuation in seawater, and their magnetic field lines penetrate seawater as easily as they do air.
4. The magnetic field naturally forms a closed loop with extremely low side lobes, combining both confidentiality and anti-interference capabilities.

KEY FORMULA:

The induced voltage attenuation at the receiver is proportional to $1/d^3$ (where d is the coil spacing).



Magnetic field communication underwater

core advantage

01

Extreme environmental robustness.

The transmission characteristics remain nearly unchanged regardless of clear/turbid seawater, freshwater, sediment content, temperature gradients, or bubble clusters, ensuring reliable performance throughout all weather conditions.

03

Seamless connection across media

It can easily penetrate ship hulls, pipelines, human bodies, and water-air interfaces, achieving "through-wall" sealed communication without drilling.

05

minimalist hardware

Without the need for bulky transducers or precise optical alignment, the hollow coil can be flexibly conformally mounted.

02

Zero-latency experience

Magnetic fields propagate without inertia, with latency determined by the circuitry, supporting real-time voice, video, and control commands.

04

Stealthy operation & no electromagnetic-interference

The near-field boundary is sharply defined, making it difficult to detect in the far field and preventing interference with the operation of acoustic or optical sensors.





APPLICATION SCENARIOS ①

Underground emergency rescue services (irreplaceable)

The only reliable wireless communication lifeline in a collapse scenario

01

Traditional Pain Points

- Radio frequency/acoustic signals are completely blocked by the rock formation
- Communication cannot be established within 72 hours.
- Rescue operations are highly unpredictable, posing severe risks of casualties.

02

Magnetic Communication Solution

- Penetrates through several dozen meters of collapsed rock, soil, or concrete
- Real-time transmission of instructions, injury details, and rescue progress
- Covers all underground scenarios including mines, tunnels, and utility corridors

03

core value

Overcoming the final 100-meter barrier to survival | Increasing rescue success rate by 70%.

No base station required; establishes connection in seconds; resistant to extreme damage conditions; supports military-specific communication needs.





APPLICATION SCENARIOS ②

AUV Underwater Docking and Swarm Coordination

01 Traditional Pain Points

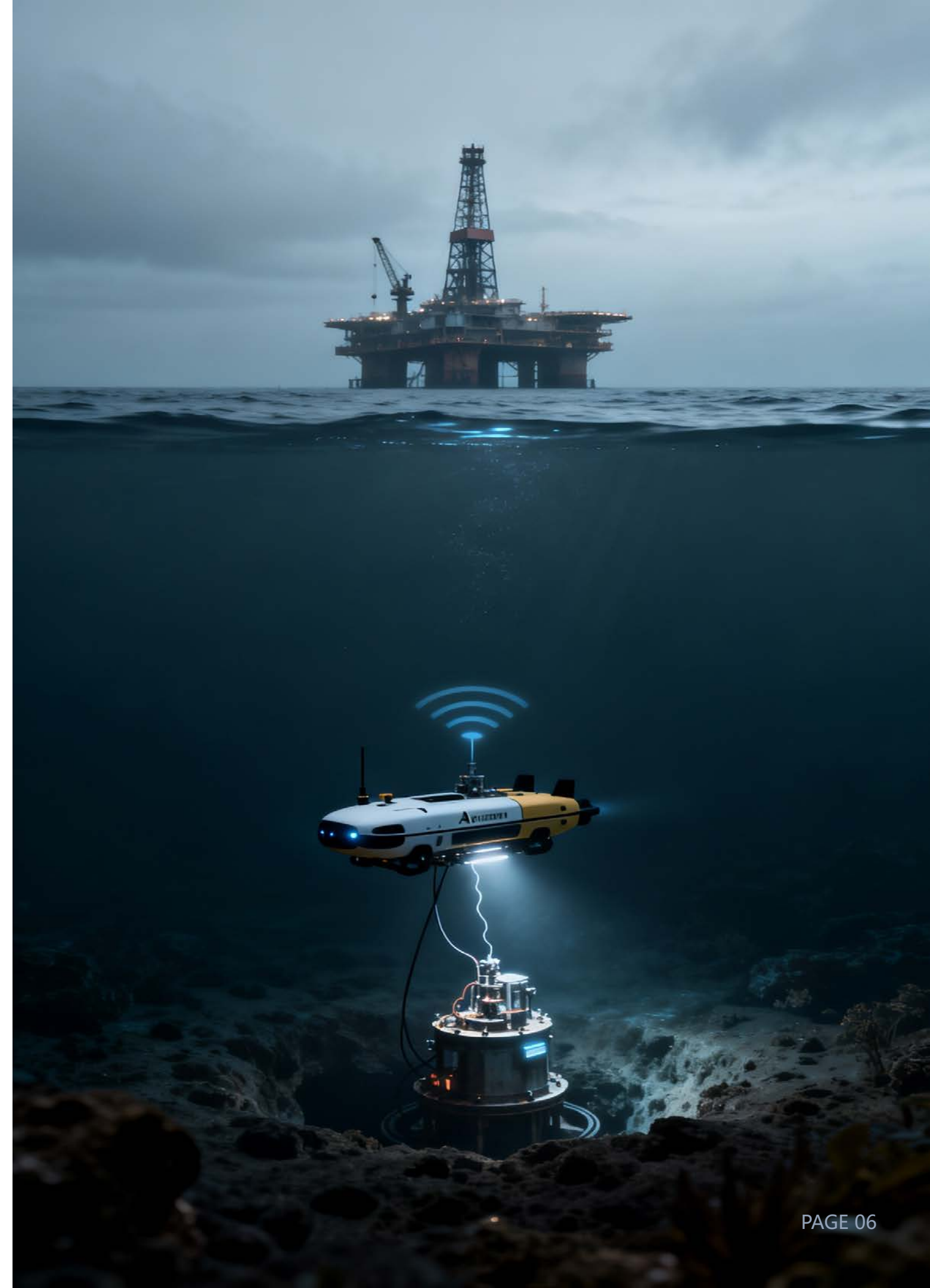
each docking operation taking over 30 minutes.

02 Rx

Magnetic field communication enables contactless docking, eliminating the need for precise alignment.

03 core value

The connection success rate has been increased to 100%, connection time reduced to within 10 seconds, and operational costs decreased by 60%.





APPLICATION SCENARIOS ③

Divers Voice and Safety Communication Systems

Solving the critical challenges of underwater communication—where signals are unresponsive, connections are unstable, and visibility is poor.

01

Traditional Pain Points

- Relying solely on gestures for communication results in a high error rate in commands.
- Inoperative in turbid water or dark water scenarios.
- Device openings are prone to leaks, and wired components tend to become tangled

02

Magnetic Communication Solution

- Fully enclosed mask with integrated real-time voice communication over hundreds of meters
- Wireless networking for diving equipment, completely sealed without wiring
- Zero visibility / Stable transmission across obstacles

03

core value

Communication efficiency improved by 10x | Rescue response time slashed from 15 minutes to 10 seconds | Leakage risk reduced by 100%.

No optical alignment required • No plug corrosion • Compatible with existing equipment





APPLICATION SCENARIOS ④

Health monitoring of underwater structures

Drilling-free eliminates potential structural sealing risks

01

Traditional Pain Points

- Sensors require drilled mounting holes, compromising structural integrity. ●
- Underwater wiring is complex and prone to corrosion and fracture.
- Cannot access internal data from concrete/metal collection

02

Magnetic Communication Solution

- Built-in sensors within the structure; magnetic fields penetrate reinforced concrete ● Non-destructive inspection of hull/pipes without disassembly
- Data is relayed across air and water media, allowing it to reach the shore station directly.

03

core value

Operating costs reduced by 50%; inspection efficiency increased by 80%; structural lifespan extended by 30%.

No openings required; no wiring needed;
reliable performance around the clock.





Product Specifications

Product Model:	VWC-01501
Size:	71.34 mm×71.34 mmx12.28 mm
Weight:	200g
Total Power Consumption:	1.2W
Standby Power Consumption:	100 mW
Communication Range:	15m-50m
Communication Interface:	UART
Communication Mode:	Half-duplex
Data Rate:	1Kbps



FOUNDING TEAM

Founding Team

A top-tier team that embodies the deep integration of industry, academia, and research.

SHENZHEN MAGLOO TECHNOLOGY CO., LTD.

He Shida

Co-founder/Chairman of a listed company

- ◆ Resource industry integration and commercial implementation

Ren Yong

Professor, Department of Electronic Engineering, Tsinghua University

- ◆ Cutting-edge scientific research and theoretical support

Yang Tao

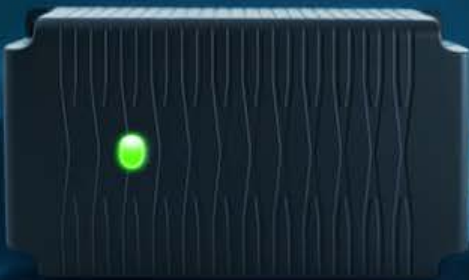
Doctor of Engineering (EngD) in Innovation Leadership from Tsinghua University

- ◆ Technological Innovation and Product Engineering Development

Zhang Minglun

Professor at Beijing University of Posts and Telecommunications

- ◆ Communication and Intelligent Systems Technology Empowerment



Thank you for watching!