FLS 3D & FLS 3D – 30 Degree Forward Looking Sonar Systems

For Coast Guard & Maritime Security Vessel Operations

1. Introduction

Forward Looking Sonar (FLS) is an increasingly critical navigational technology for modern Coast Guard, Police, and Search-and-Rescue (SAR) fleets. Unlike traditional depth sounders, which only measure directly beneath the vessel, Forward Looking Sonar provides a real-time visual map of the underwater environment ahead of the vessel. This allows operators to detect hazards, navigate poorly charted areas, conduct search operations, and maneuver confidently in challenging coastal environments.

Daniamant's EchoPilot FLS 3D and the new FLS 3D – 30 Degree represent the most advanced real-time forward looking sonar solutions available, within its price range, today. These systems are designed for professional maritime operations where reliability, situational awareness, and real-time seabed intelligence are essential.

The FLS 3D is already deployed on French Coast Guard vessels, Hong Kong Police boats, and Scandinavian Search & Rescue vessels, where it has proven its value in day-to-day and high-risk missions. Their adoption reflects a strong operational need: a dependable tool to visualize shallow areas, seabed obstacles, uncharted rivers, reefs, and submerged hazards long before they come into danger range.

2. The EchoPilot FLS 3D – Dual-Transducer Forward Looking Sonar

Product Link: https://echopilot.com/products/fls-3d/

The EchoPilot FLS 3D is a commercial-grade, dual-transducer system that provides a fully rendered 3D visualization of the seabed up to 200 meters ahead and 100 meters in depth, updating approximately once per second .

Key Characteristics:

- Dual-transducer architecture for wide 60 degree horizontal coverage
- Up to 10 knots operational speed
- 200 kHz operating frequency — ideal for coastal and riverine operations
- 200 m forward range and 20× depth-to-range ratio in real conditions
- New "Average Forward Depth" (AFD) technology for digital depth ahead of vessel
- Real-time screen refresh every 0.8–1.5 seconds
- HDMI and VGA outputs for integration into virtually any maritime bridge system
- Raymarine Axiom Direct Integration via RJ45→RayNet
- Simrad, B&G and Lawrence Direct Integration

How the FLS 3D Works

The system transmits a high-frequency “ping” through a 90° vertical arc and a wide horizontal beam. Echoes returning from the seabed, rocks, debris, or vertical structures are processed into a 3D topographical projection displayed live on screen.

It sees 10–20 times the depth ahead depending on seabed composition .

The FLS 3D is a real-time sonar, meaning images are constantly refreshed rather than stored in a historical scroll. This ensures that operators are always looking at what is immediately ahead of the vessel—critical for coastal patrol vessels operating in unfamiliar waters.

Why Coast Guard & SAR Agencies Use the FLS 3D

1. **Safe Navigation in Poorly Charted or Dynamic Waters**

Coast Guard vessels often operate in shallow rivers, tidal channels and shifting sandy or muddy areas. Traditional charts may be outdated or unreliable. The FLS 3D provides live seabed visualization, allowing operators to avoid running aground.

2. **Enhanced Search & Rescue Situational Awareness**

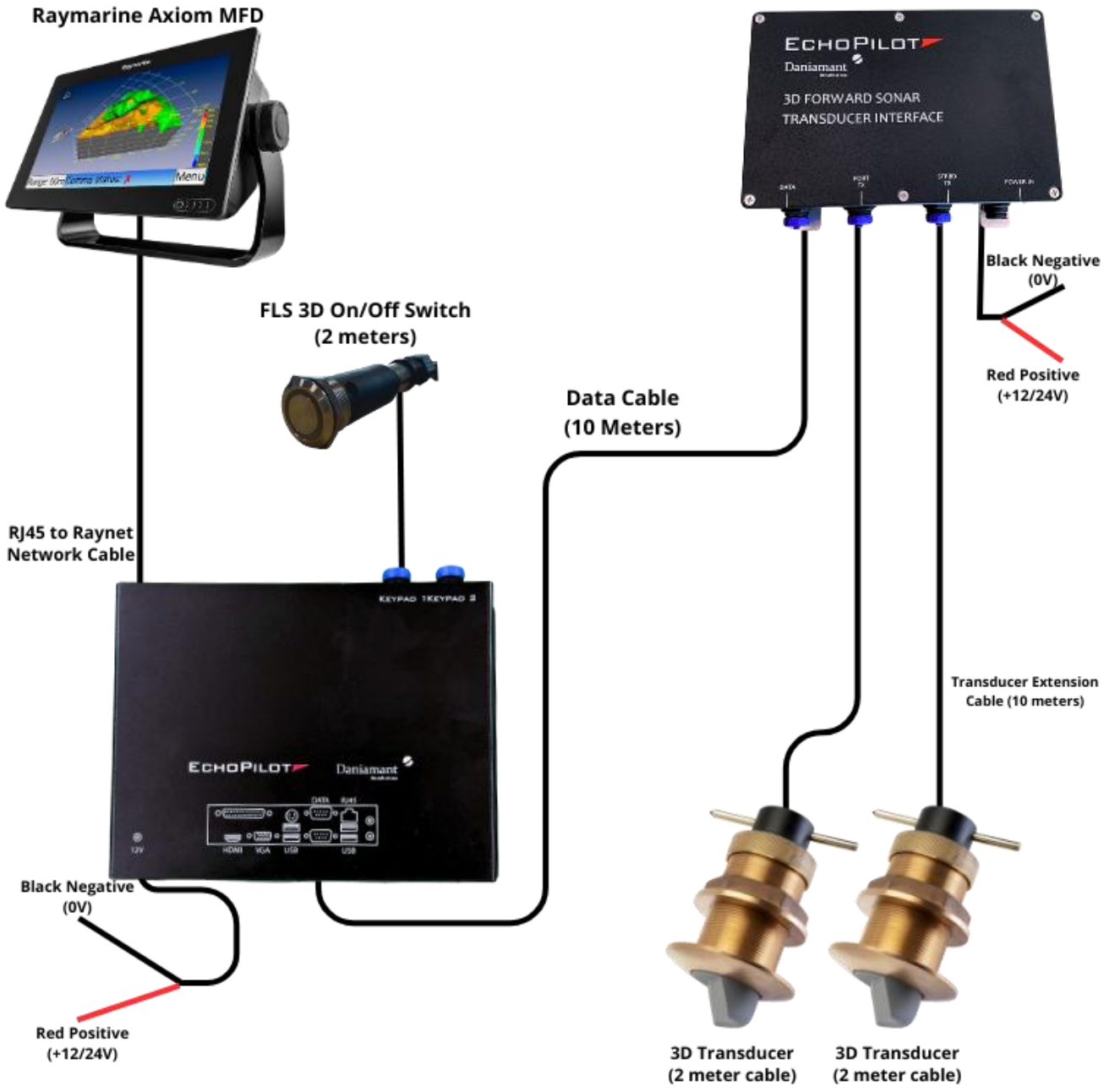
SAR units in Scandinavia deploy the FLS 3D because it helps identify underwater hazards while maneuvering close to rocks, cliffs, or shoals — ensuring safer approach to casualties.

3. **Adoption by Major Agencies**

- French Coast Guard
- Hong Kong Police Marine Division
- Nordic Search & Rescue Organizations

These agencies operate in challenging environments — rocky coasts, fast-changing seabeds, heavy traffic — and require the best available forward sonar technology.

FLS 3D Hardware Overview



3. The FLS 3D – 30 Degree: The New Generation Single-Transducer Forward Looking Sonar

Product Link: https://echopilot.com/products/fls-3d-30-degree/

The FLS 3D – 30 Degree is Daniamant's latest development and represents a major evolution of EchoPilot technology — reducing the system to a single-transducer, making installation easier and lowering cost while maintaining professional-grade performance.

It provides a 30° forward viewing cone (15° port / 15° starboard) and 90° vertical coverage, delivering a 3D visual of the terrain ahead.

Key Specifications:

- 30° horizontal beam / 90° vertical
- Up to 200 m forward range and 100 m depth
- Real-time update every 1–1.5 seconds
- New "Average Forward Depth" (AFD) technology for digital depth ahead of vessel
- Single transducer — simpler installation, fewer hull penetrations, fewer interference sources
- Raymarine Axiom Direct Integration via RJ45→RayNet
- Simrad, B&G, Lowrance Direct Integration
- HDMI / VGA for integration to any third-party display

Average Forward Depth (AFD)

AFD is an industry-first Daniamant innovation that provides a numerical depth reading of the water ahead, not just beneath the keel. It uses all valid seabed returns within the 30° forward sonar cone to calculate an averaged forward depth value.

AFD enhances the operator's ability to make rapid decisions in unfamiliar or dangerous waters.

Why the 30 Degree Version Is Ideal for Coast Guard & Police Fleets

1. **Fast, Simplified Installation**
   Only one transducer is required, reducing hull modifications and time in dry dock.

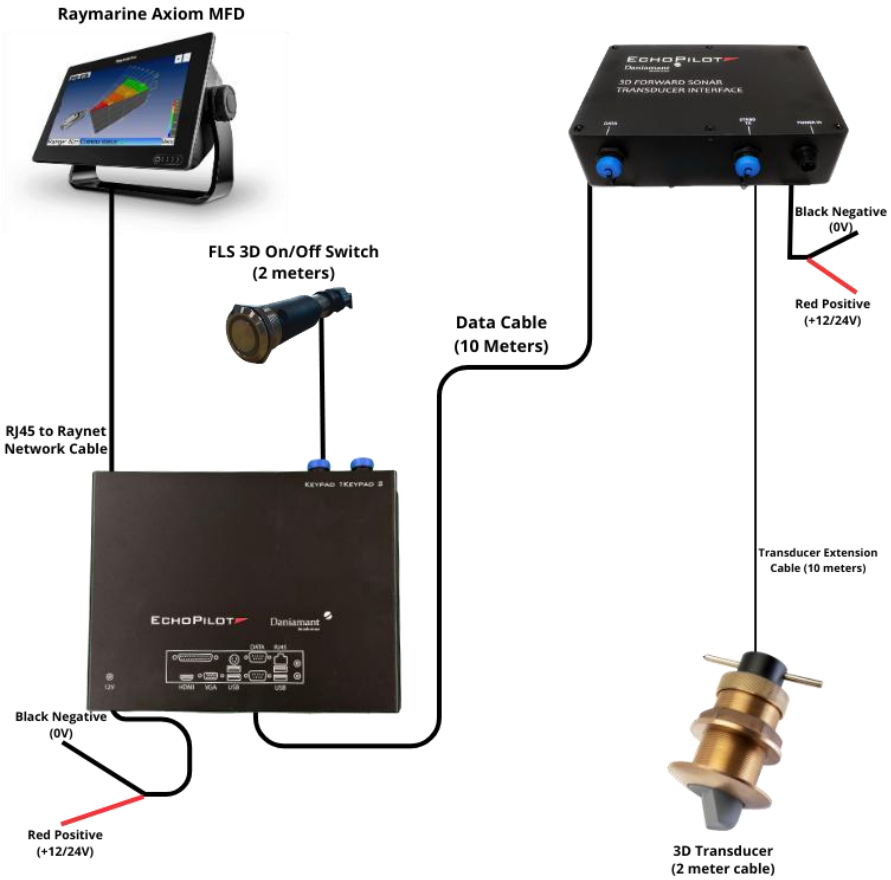
2. **Ideal for Boats 29–60 ft, including:**

- RIBs
- Interceptor vessels
- Fast patrol craft
- Inshore SAR vessels
- Riverine and shallow-water patrol boats

3. **Commercial-Grade Capability at Lower Cost**
   Offers 20× depth-to-range capability — the highest ratio in the industry.
   Even with 5 m depth, operators can see approx. 100 m ahead.

4. **Rugged, Operationally Proven Hardware**
   The bronze, steel, or aluminium thru-hull fitting provides compatibility with any hull type. All components are designed for marine environments and professional workflows.

FLS 3D – 30 Degree Hardware Overview



4. Why Forward Looking Sonar Is a Valuable Tool for Coast Guard Operations

A. Shallow Water Navigation & Grounding Prevention

Coast Guard vessels frequently patrol:

- deltas
- river mouths
- tidal flats
- near-shore reefs

In these areas, charts are often unreliable or seabeds shift rapidly. Forward Looking Sonar gives real-time, ahead-of-vessel depth awareness — preventing groundings during patrol, rescue, or engagement operations.

B. High-Risk Close-Quarters Maneuvering

During interception, boarding, or rescue operations, vessels often operate close to:

- harbour walls
- jetties
- rocks
- piers
- ships

The FLS systems help detect underwater structures or unexpected rises in seabed before they become hazards.

C. SAR (Search and Rescue) Operations

FLS gives crews the confidence to approach victims, wrecks, or grounding sites safely — even when visibility is low or charts are unreliable.

D. Law Enforcement & Security Patrols

Marine Police and Coast Guards can use FLS to:

- navigate rivers or shallow estuaries during pursuit
- avoid obstacles in low-light operations
- perform patrols around critical infrastructure

E. Coastal Disaster Response

After storms, bottom conditions change dramatically. submerged debris, newly shifted sandbars, or erosion can create unpredictable hazards. Real-time FLS reduces operational risk.

5. Why Major Agencies Chose EchoPilot Systems

French Coast Guard

Operates in harsh, rocky coastal environments requiring dependable hazard awareness. The FLS 3D provides live seabed visualization during patrol and interception missions.

Hong Kong Police Marine Division

Patrols high-traffic urban waterways where underwater structures and seabed complexity make traditional depth sounders insufficient.

Scandinavian Search & Rescue

SAR boats navigate rocky archipelagos, narrow channels, and uncharted areas in extreme weather. Real-time seabed awareness helps crews approach cliffs, islands, and grounding sites safely.

These agencies chose EchoPilot because:

1. It is simple to operate ("just switch on and it will work").
2. It provides a true, real-time forward view, not a historical display.
3. It offers the best depth-to-range ratio in the FLS market.
4. It is robust, proven, and has minimal user adjustments.
5. It integrates with existing bridge electronics with HDMI/VGA, Raymarine Axiom, B&G, SIMRAD or Lowrance.

6. Summary: Why the FLS 3D and FLS 3D – 30 Degree Are Ideal for Coast Guard Fleets

FLS 3D Advantages

- Best for larger vessels, offshore patrol boats, SAR vessels
- Dual-transducer wide beam, maximum coverage
- 20× depth-to-range in real use
- Full 3D rendering at speeds up to 10 knots

- Ideal for demanding, professional maritime operations

FLS 3D – 30 Degree Advantages

- Ideal for small to mid-size patrol craft (29–60 ft)
- Simple installation, single transducer
- Lower cost while maintaining commercial-grade performance

Shared Operational Benefits

- Real-time forward sonar (no lag, no history scroll)
- Exceptional situational awareness
- Reduced risk of grounding or collision
- Proven performance with major Coast Guard and Police forces worldwide

EchoPilot FLS 3D vs FLS 3D – 30 Degree Comparison Sheet

Category	FLS 3D	FLS 3D – 30 Degree
System Configuration	Dual transducers (Port + Starboard)	Single transducer system
Horizontal Beam Width	60° (dual 30° each)	30° (single transducer)
Vertical Beam	90°	90°
Maximum Forward Range	200 m	200 m
Maximum Depth Detection	100 m	100 m
Bottom Mapping Range	Up to 20× water depth	Up to 20× water depth
Operating Frequency	200 kHz	200 kHz
Operating Speed (max)	Up to 20 knots	Up to 10 knots
Power Requirement	12/24 V DC, ~20 W	12/24 V DC, ~20 W
Output Power	28 W	28 W
Angular Accuracy	±1.5°	±1.5°
Display Output Options	HDMI / VGA	HDMI / VGA
Raymarine Integration	Direct Axiom integration via RJ45–RayNet	Direct Axiom integration via RJ45–RayNet
Transducer Type	Two through-hull transducers	Single through-hull transducers
Hull Fitting Material	Bronze / Aluminium / Steel	Bronze (std.), Steel or Aluminium (opt.)
Control Options	Keypad or On/Off Button	Keypad or On/Off Button
Average Forward Depth (AFD)	Included	Included
Display Compatibility	Any HDMI/VGA or Raymarine Axiom display	Any HDMI/VGA or Raymarine Axiom display
Ideal Vessel Size	50 – 120 ft	29 – 60 ft