

MiniUAC-1402

2.5D Forward Looking Sonar

Overview



The **MiniUAC-1402A** 2.5D forward-looking sonar is a multibeam imaging sonar that provides forward-looking acoustic vision in both clear and turbid waters. It enables target detection and identification, obstacle avoidance, and hazard detection.

The sonar is characterized by its compact size, low weight, and low power consumption. Unlike conventional forward-looking sonars, the MiniUAC-1402A allows software-controlled adjustment of both the vertical steering angle and vertical beam width. This capability enables observation of objects at different depth layers, or within a selected portion of the water column, without the use of a mechanical pan-tilt unit. As a result, the sonar achieves an additional **0.5-dimensional vertical information acquisition**, extending beyond traditional 2D imaging.

The center frequency of the MiniUAC-1402A is **1 MHz** (Other frequencies are available upon request). The standard model supports a maximum operating depth of **300 m**. For deeper operating depth requirements, please contact the manufacturer.

Technical Specifications

Specification	A1000
Frequency	1 MHz
Horizontal Center Beamwidth ⁽¹⁾	1.2°
Min Horizontal FOV ⁽²⁾	120°
Vertical Beam Steering Range ⁽³⁾	1.5° to 45°
Vertical Beam Width Adjustment Range ⁽³⁾	-22.5° to +22.5°
Maximum Detection Range ⁽⁴⁾	40 m
Range Resolution	2.5 mm
Range setting	2–150 m, continuously adjustable
Refresh Rate	up to 20 Hz (at ranges ≤ 15 m)
Number of Beams	256
Transmit signal	CW or CHIRP, automatic or manual selection
Max operating depth	300 m
Max Operating Speed	6 kn; (Operation above this speed is possible but may reduce detection range; design specification)
Blind zone	≤ 0.3 m
Input Voltage	18–50 VDC
Power consumption	Average: ~ 9 W; Peak: < 20 W
Communication interface	1 × 100 Mbps Ethernet (sonar data and control)
External Connector	1 waterproof connector for power and Ethernet
Dimensions(W×H×D)	Approx. 84 (±1) × 84 (±1) × 110 (±3) mm (excluding connector and cable)
Weight (air / water)	Approx. 1100 g / 400 (gexcluding cable)
Housing material	Aluminum alloy;Hard anodized;
Environmental Adaptability	Operating Temperature: -10 °C to +50 °C; Storage Temperature: -40 °C to +70 °C

Notes:

- (1) The horizontal -3 dB beam width measured at the target located at the horizontal and vertical center of the sonar beam. A tolerance of +10% / -30% is allowed.
- (2) Refers to the sonar field of view. Large targets within this angular range can be detected, though resolution, image clarity, and detection range may be reduced near the edges compared to the center.
- (3) 0° corresponds to the forward direction of the sonar. The maximum vertical coverage is -22.5° to +22.5°. Within this range, the beam steering angle can be freely configured, resulting in a trade-off between vertical steering angle and beam width. For example, when the vertical beam width is set to 10°, the available steering range is -17.5° to +17.5°.
- (4) Detection range measured in seawater under favorable acoustic conditions for high-reflectivity targets such as embankments and bridge piers. In freshwater, the maximum detection range is approximately 1–2 times that in seawater under similar conditions. As the beam width increases, acoustic energy is dispersed and the maximum detection range decreases significantly.

Data Interface & Display Control

Users can control and monitor the sonar through the following methods:

1. **SapphireViewer**, proprietary control and display software supporting **Windows, Linux, and macOS**
 2. Direct access to the sonar's **built-in Web server** via IE, Chrome, Firefox, Safari, etc., supporting computers, smartphones, and tablets (note: local data recording and playback are not supported in this mode)
 3. Playback via standard **streaming media players**
 4. **SDK provided** for custom software development
- **Optional Internal Storage:**
Built-in large-capacity storage capable of recording **hundreds of hours of sonar data**