AquaPix[®] MINSAS

Seeing with Sound



Kraken's AquaPix[®] MINSAS Miniature Interferometric Synthetic Aperture Sonar is an off-the-shelf, easily customizable Synthetic Aperture Sonar (SAS) payload that offers a cost-effective alternative to high-end side scan sonar systems. MINSAS provides significantly enhanced resolution, extended range, 3D Bathymetry, and best in class Area Coverage Rates (ACR).

MINSAS provides 3.3 cm x 3.0 cm or 2.1 cm x 1.9 cm Ultra High Definition (UHD) constant resolution to ranges of 200 meters per side, along with simultaneous 6 cm x 6 cm coregistered bathymetry.

What sets MINSAS apart is its versatility. MINSAS is engineered to integrate seamlessly with various underwater platforms and vehicles. The MINSAS modular array system is adaptable to your vehicle size and unique mission requirements. With array lengths available from 60 cm to 180 cm, MINSAS is suitable for any vehicle size.

Another unique feature of Kraken's sonars is our Real-Time SAS (RTSAS) Processing Module. This industry-first capability processes raw sonar data into high-resolution, fully beamformed SAS tiles in real-time, during the mission, to the internal storage hard drive or optional removable data pod, while retaining all raw data for reprocessing. RTSAS sets the framework for embedded Automatic Target Recognition (ATR) and data exfiltration capabilities of processed SAS data, along with reduced post-mission analysis.

Traditionally, SAS technology was reserved for expensive military platforms, Kraken's MINSAS now makes SAS available to commercial and research-based surveyors empowering them to enhance their survey capabilities while reducing operational cost and survey time. Across Track (m) 70 60 50 40 30

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| System Specifications | MINSAS 60 | MINSAS 120 | | |
|---|--|------------------|--|--|
| Platform Speed | 2-5 kn | 2-6 kn | | |
| Receiver Array Dimensions - L/W/H | 53.0/6.1/9.5 cm | 109.0/6.1/9.5 cm | | |
| Receiver Array Weight - Air / Water | 6.4 kg/3.2 kg | 12.8 kg/6.4 kg | | |
| Transmit Array Weight - Air / Water | 0.5 kg/0.19 kg | | | |
| Electronics Module Dimensions | 47 cm x 17 cm dia. | | | |
| Electronics Module Weight - Air / Water | 12.4 kg/1.4 kg (1000 m) | | | |
| Total System Weight - Air / Water | 19.3 kg/4.79 kg | 25.7 kg/7.99 kg | | |
| Depth Rating | 1000 m / 6000 m | | | |
| System Idle | 60 W | 75 W | | |
| System Real Time Processing | 80 W | 94 W | | |
| Power Supply | 48 VDC (24 VDC optional), 250 W peak power | | | |
| Real Time Image Processing | 3.3 cm | | | |
| UHD Image Processing | 2.1 cm x 1.9 cm | | | |
| Real Time SAS Bathymetry Resolution | 25 cm x 25 cm | | | |
| Post Proc. SAS Bathymetry Resolution. | 6 cm x 6 cm | | | |
| SAS Bathymetry Vertical Uncertainty | <15 cm at 100 m range at 95% confidence | | | |
| Source Level | 210 dB dB re 1µPa @ 1m | | | |
| PRF | 8 Hz | 4 Hz | | |
| Center Frequency | 337 kHz | | | |
| Pulse Length | configurable 1 ms -> 10 ms | | | |
| Pulse Bandwidth | 40 kHz | | | |
| Pulse Type | Linear FM | | | |
| SAS Robustness Against Yaw | ±4° over 20 m Track Length | | | |
| SAS Robustness Against Sway | ±10 m | | | |
| Max Crab Angle | 20° | | | |

| Speed | | MINSAS 60 | | | MINSAS 120 | | |
|-------|------|-------------------------------|---------------------------------|-----------------------------------|-------------------------------|---------------------------------|--------------------------------|
| Knots | m/s | Range meters (per side) | ACR w/o Gap Filler km²/hr | ACR w/ Gap Filler km²/hr | Range meters (per side) | ACR w/o Gap Filler km²/hr | ACR w/ Gap Filler km²/hr |
| 3.00 | 1.54 | 118 | 0.92 | 1.31 | 200 | 1.56 | 2.22 |
| 3.50 | 1.80 | 100 | 0.91 | 1.30 | 200 | 1.81 | 2.59 |
| 4.00 | 2.06 | 87 | 0.91 | 1.29 | 181 | 1.88 | 2.68 |
| 4.50 | 2.32 | 77 | 0.90 | 1.29 | 160 | 1.87 | 2.66 |
| 5.00 | 2.57 | 69 | 0.90 | 1.28 | 143 | 1.86 | 2.65 |
| 6.00 | 3.09 | 57 | 0.89 | 1.27 | 118 | 1.84 | 2.62 |



The image above demonstrates MINSAS combined SAS and 3D Bathymetry Imaging.

To achieve the same level of resolution, conventional survey sonars require a lower altitude which limits the area coverage rate in a single survey pass. In contrast, AquaPix[®] can fly at higher altitudes and achieve high resolution SAS and bathymetry data across the entire swath when compared to conventional survey sonars.



Above: AquaPix[®] MINSAS 120 1000 m rated system shown with RTSAS processor

Left: Typical ACR of AquaPix[®] MINSAS based on speed and array length.

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