MATS
Acoustic modem

Long range – Noisy environment IoUT

March 2022

1. MATS 3G
2. MATS LT

MATS range (since 1992)

MATS 3G

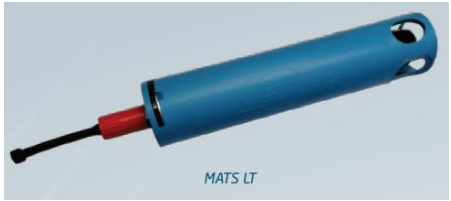
- Long range/ Noisy Environment

TRIDENT

- High bit rate/ Shallow water/ Dynamic environment

MATS LT

- IoUT (Internet of Underwater Things)



1. MATS 3G

MATS3G

Long range/ Noisy Environment

〉 Main characteristics:

	12 kHz	26kHz *(preliminary)*	34 kHz
Secured bit rates *(with coding)*	20, 100 & 200bit/s	20, 150 & 300bit/s	20, 150 & 300bit/s
High bit rates *(without coding, optional)*	From 850bit/s to 7400bit/s	From 1000bit/s to 14000bit/s	From 1000bit/s to 16500bit/s
Maximal range at 185dB ref. 1µPa/1m *(low noise environment)*	15 km	7 km	5 km
Power consumption	< 40mW standby, 0.6W reception, 10W –75W transmission		

- AUV mode: secured transmission on high bit rate link
- Channel analysis tools
- Additional functions (rangemeter, release)

MATS3G

High performance signal processing:

- Rejection of out-of-band noise
- Modulations optimised for multi-paths environments
- Processing in reception uses multi-paths (equalizer)
- Robustness towards Doppler
- Sercel Proprietary Signal Processing

MATS3G

Mechanical versions

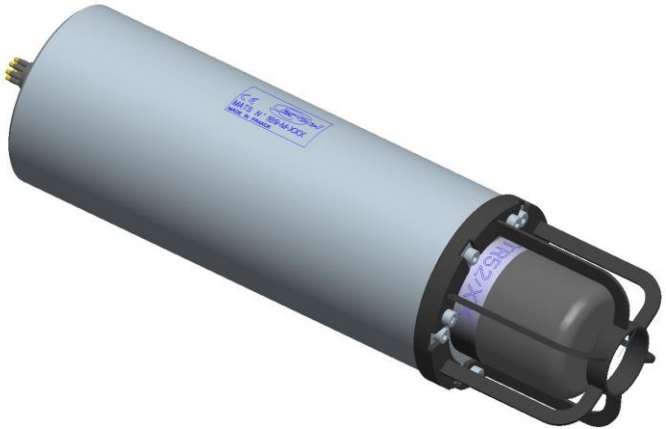
- Ship modem :

- Stainless steel container
- Rack 19'' / 2U
- Deck cable *(standard or electro-mechanical cable)*

MATS3G

〉 Mechanical versions

- Undersea modem :

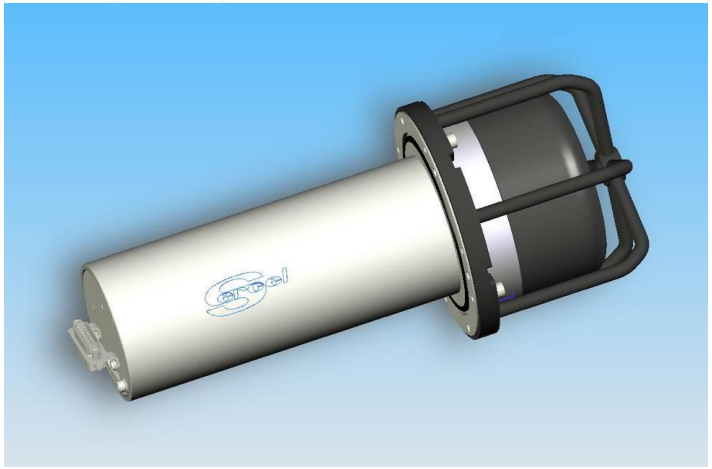


- Titanium container
- Max. immersion : 6000m
- Weight (34kHz):
  - 6.5kg in air
  - 4.5kg in water
- Dimensions (34kHz):
  - diameter: 100mm
  - length: 380mm

MATS3G

Mechanical versions

- « OEM » modem :

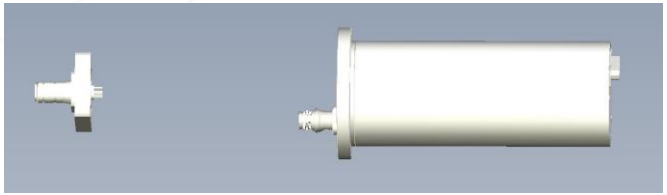


- Titanium end plate
- Weight : 2,7kg
- Dimensions of electronic box :
  - diameter : 80mm
  - length : 200mm

MATS3G

〉 Mechanical versions

- « Remote head OEM » modem :

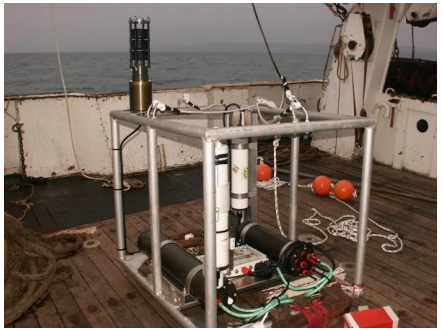


- Watertight transducer (titanium, 5000m)
- Non watertight electronic box
- Weight : 4.5kg
- Electronic box dimensions :
  - Diameter : 100mm
  - Length : 207mm

MATS3G – Applications

- Command transmission, status, navigation data between an AUV and support ship

- Sensor data transmission in low and high bit rates between a benthic station and a buoy or ship
- Remote control of actuators or valves

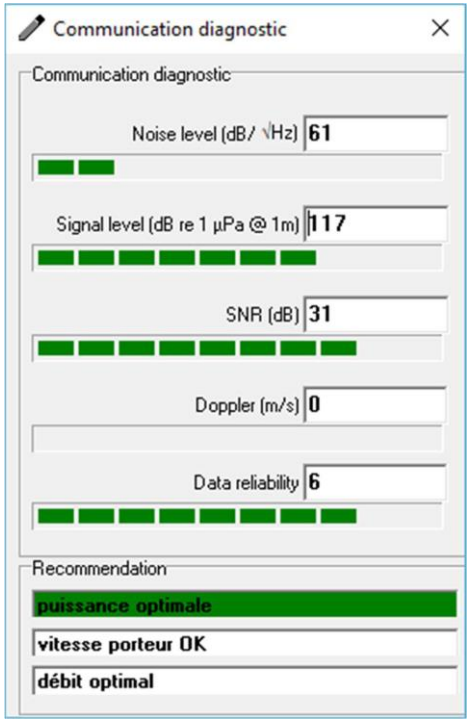


MATS3G – USBL compatibility

- MATS3G-26 compatible with GAPS USBL
- Responds to USBL interrogations to localize the modem
- Compatible with MATS3G data transmission

MATS3G – Diagnostics

- All versions can supply diagnostics on transmissions
- Available diagnostics:
  - Signal level, noise level, SNR
  - Quality of transmission
  - Doppler
- Recommendations:
  - Optimal power
  - Optimal data rate
  - speed



TRIDENT

Multi-sensor receiver for high bit rate transmission

- Dedicated to high bit rate transmission in harsh environments (multi-paths, doppler…)

VITAC

〉 Image transmission by acoustics

- High level interface for MATS3G/Trident
- Image compression
- Robustness towards transmission errors
- Retransmission of erroneous blocks

Adaptive capacities of MATS3G

Setting according to the environment and customer's need

- 5 modulations : Chirp / DSSS / FHSS / MFSK / QPSK
  - Depending on the environment and customer's need
  - Depending on constraints of discretion and multi-user needs
- Diagnostics on the communication link:
  - Received signal level, noise level, SNR
  - Reliability of demodulated data
  - Doppler
- Automatic power adjustment support & modulation

In preparation, 1 extra modulation: JANUS

- For interoperability

Adaptive capacities of MATS3G

On the hardware

- Several frequencies available : 12kHz, 26kHz, 34kHz, 48kHz
- Can be instantiated to other sensors
- SDM (Software Defined Modem): Compatibility OS (Windows, Linux)

2. MATS LT

MATS LT

Cost-effective acoustic communication & positioning solution

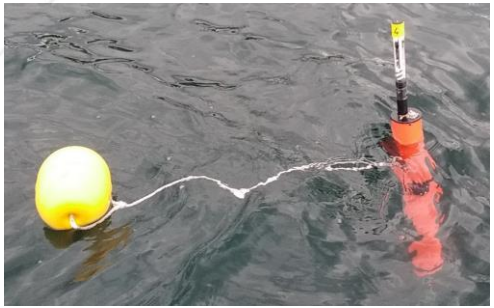
MATS LT

Main characteristics:

	MATS LT	MATS LT-OEM
Function	Underwater communication & positioning	
Maximal range	3000m	
Positioning accuracy	0.2m typical after processing	
Bit rate	50bit/s	
Operating Frequency Range	38kHz - 48kHz	
Power supply	10VDC - 15VDC standard	
Power consumption	400mW in reception ; 50W in emission	15mW in reception ; 50W in emission
User link	USB	1.8V LVTTL standard
Depth rating	500m	
Dimensions	370mm x 60mm	
Operating temperature	-20°C to +60°C	
Weight	800g in air, 100g in water	260g in air

MATS LT

〉 Applications



- AUV

- Ocean Bottom Observatory

- Underwater IoT


Sercel