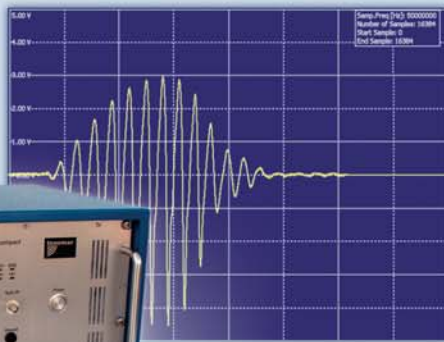


# use of parametric acoustics gives **five** essential advantages

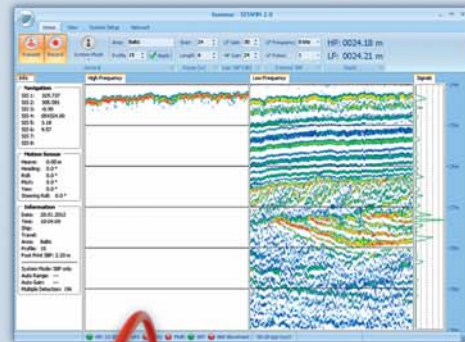
## No Ringing Effect

during transmission for increased resolution and shallow water operations



## High Resolution

at low frequencies due to small footprint and short transmission signals



## Mobile Systems

for shallow water, deep sea and ROV/AUV/USV applications



## Narrow Sound Beam

at low frequencies with small transducer sizes

## Bathymetry and Sub-Bottom Profiling

plus side scan option in one device



[www.innomar.com](http://www.innomar.com)

# SES-2000 Shallow Water Models

	<i>compact</i>	<i>light</i>	<i>light plus</i>	<i>standard</i>	<i>standard plus</i>	<i>quattro New</i>
Mean Primary Frequency PF (kHz)	approx. 100	approx. 100	approx. 100	approx. 100	approx. 100	approx. 100
PF Total Frequency Band @ 3dB (kHz)	85 – 115	85 – 115	85 – 115	85 – 115	85 – 115	85 – 115
PF Source Level (dB/μPa re 1m)	> 238	> 238	> 238	> 240	> 240	> 242 / > 236
Transmit Beam Width @ 3dB (°)	± 2	± 2	± 2	± 2	± 2	± 1.5 / ± 2.5
Secondary Low Frequencies SLF (kHz)	4, 5, 6, 8, 10, 12, 15	4, 5, 6, 8, 10, 12, 15	4, 5, 6, 8, 10, 12, 15	4, 5, 6, 8, 10, 12, 15	4, 5, 6, 8, 10, 12, 15	4, 5, 6, 8, 10, 12, 15
SLF Total Frequency Band @ 3dB (kHz)	2 – 22	2 – 22	2 – 22	2 – 22	2 – 22	2 – 22
Pulse Type: CW / Ricker / Chirp / Barker	✓ / ✓ / - / -	✓ / ✓ / - / -	✓ / ✓ / - / -	✓ / ✓ / ✓ / -	✓ / ✓ / ✓ / -	✓ / ✓ / - / -
Pulse Width (ms)	0.07 – 1.0	0.07 – 1.0	0.07 – 1.0	0.07 – 1.3	0.07 – 1.3	0.07 – 1.0
Pulse Rate (pulses per second)	up to 40	up to 50	up to 50	up to 60	up to 60	up to 60
Heave / Roll / Pitch Compensation	✓ / - / -	✓ / - / -	✓ / - / -	✓ / ✓ / -	✓ / ✓ / -	✓ / - / -
Depth Rating (m)	surface	surface	surface	surface	surface	surface
Depth Range Below Transducer (m)	0.5 – 400	0.5 – 400	0.5 – 400	0.5 – 500	0.5 – 500	0.5 – 500
Sediment Penetration (m)	up to 40	up to 40	up to 40	up to 50	up to 50	up to 50
Resolution: Range / Layer (cm)	1 / up to 5	< 1 / up to 5	< 1 / up to 5	< 1 / up to 5	< 1 / up to 5	< 1 / up to 5
Sample Rate (kHz)	70 @ 24 bit	96 @ 24 bit	96 @ 24 bit	96 @ 24 bit	96 @ 24 bit	96 @ 24 bit
Envelope / Full Waveform Data	✓ / option	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓
Transceiver Size (WHD; m)	0.30 x 0.30 x 0.40	0.52 x 0.35 x 0.40	0.52 x 0.35 x 0.40	0.52 x 0.44 x 0.40	0.52 x 0.44 x 0.40	0.52 x 0.30 x 0.40
Weight (kg)	19	31	34	39	42	32
Transducer Size (WHD; m)	0.34 x 0.08 x 0.26	0.34 x 0.08 x 0.26	0.34 x 0.08 x 0.26	0.34 x 0.08 x 0.26	0.34 x 0.08 x 0.26	4 x (0.21 x 0.06 x 0.21)
Weight (in air; kg)	22 (incl. 20 m cable)	22 (incl. 20 m cable)	22 (incl. 20 m cable)	30 (incl. 30 m cable)	30 (incl. 30 m cable)	4 x 5 kg (excl. cable)
Control PC	external, not incl.	internal	internal	internal	internal	internal
Remote Control	Ethernet (UDP)	KVM (option)	KVM (option)	KVM (option)	KVM (option)	KVM (option)
Power Supply 100-240V AC / 50-60Hz	✓	✓	✓	✓	✓	✓
Power Supply 12V or 24V DC	option	option	option	option	option	option
Power Consumption (W)	< 200	< 250	< 300	< 350	< 400	< 350
Sidescan Frequency (kHz)	100 (option)	100 (option)	250 / 410 / 600	100 (option)	250 / 410 / 600	-
Beam Width @ 3dB (°)	1.8 x 55	1.8 x 55	0.8 x 58	1.8 x 55	0.8 x 58	-
Size (WHD; m)	0.60 x 0.10 x 0.15	0.60 x 0.10 x 0.15	2 x 0.50 x 0.06 x 0.06	0.60 x 0.10 x 0.15	2 x 0.50 x 0.06 x 0.06	-
Weight (in air; kg)	20 (incl. 20 m cable)	20 (incl. 20 m cable)	2 x 10 (20 m cable)	20 (incl. 20 m cable)	2 x 12 (30 m cable)	-
Software: SESWIN / Data Converter / ISE	✓ / ✓ / option	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓



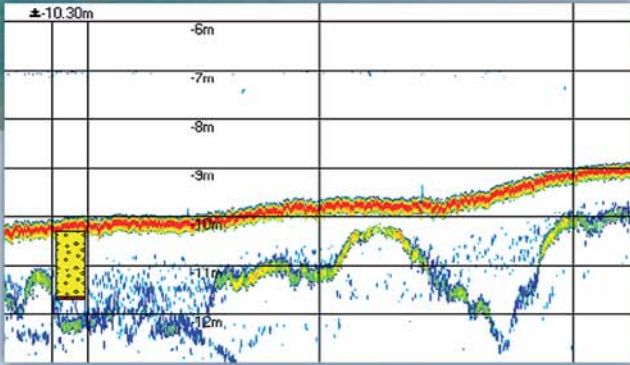
# SES-2000 Medium Water and Deep Water Models

	<i>medium-100</i>	<i>medium-70</i>	<i>deep-36</i>	<i>deep-15 New</i>	<i>ROV Updated</i>	<i>AUV New</i>
Mean Primary Frequency PF (kHz)	approx. 100	approx. 70	approx. 36	approx. 15	approx. 115	approx. 115
PF Total Frequency Band @ 3dB (kHz)	85 – 115	60 – 80	30 – 42	10 – 20	100 – 130	100 – 130
PF Source Level (dB// $\mu$ Pa re 1m)	> 247	> 244	> 245	> 240	> 240	> 238
Transmit Beam Width @ 3dB (°)	$\pm$ 1	$\pm$ 1.5	$\pm$ 1.5	$\pm$ 2.3	$\pm$ 2	$\pm$ 2
Secondary Low Frequencies SLF (kHz)	4, 5, 6, 8, 10, 12, 15	3, 4, 5, 6, 8, 10, 12	2, 3, 4, 5, 6, 7	1, 2, 3, 4, 5, 6	5, 6, 8, 10, 12, 15	4, 5, 6, 8, 10, 12, 15
SLF Total Frequency Band @ 3dB (kHz)	2 – 22	1.5 – 15	1 – 10	0.5 – 8	4 – 22	2 – 22
Pulse Type: CW / Ricker / Chirp / Barker	✓ / ✓ / ✓ / –	✓ / ✓ / ✓ / –	✓ / ✓ / ✓ / –	✓ / ✓ / ✓ / ✓	✓ / ✓ / ✓ / –	✓ / ✓ / – / –
Pulse Width (ms)	0.07 – 2.0	0.1 – 2.5	0.15 – 5.0	0.2 – 25.0	0.07 – 1.3	0.07 – 0.5
Pulse Rate (pulses per second)	up to 40	up to 40	up to 40	up to 30	up to 40	up to 40
Heave / Roll / Pitch Compensation	✓ / ✓ / option	✓ / ✓ / option	✓ / ✓ / option	✓ / ✓ / ✓	✓ / – / ✓	✓ / – / –
Depth Rating (m)	surface	surface	surface	surface	1,000 / 2,000	1,000 / 2,000
Depth Range Below Transducer (m)	2 – 2,000	5 – 2,500	5 – 6,000 (10,000)	10 – 11,000	1 – 500	1 – 400
Sediment Penetration (m)	up to 70	up to 100	up to 150	up to 200	up to 50	up to 40
Resolution: Range / Layer (cm)	< 1 / up to 5	< 1 / up to 8	< 2 / up to 12	< 2 / up to 15	1 / up to 5	1 / up to 5
Sample Rate (kHz)	96 @ 24 bit	96 @ 24 bit	48 @ 24 bit	48 @ 24 bit	70 @ 24 bit	70 @ 24 bit
Envelope / Full Waveform Data	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓	✓ / ✓
Transceiver Size (WHD; m)	0.52 x 0.74 x 0.50	0.52 x 0.74 x 0.50	0.52 x 0.74 x 0.50	3 x (0.52 x 0.92 x 0.50)	$\emptyset$ 0.3 x 0.75	$\emptyset$ 0.25 x 0.4
Weight (kg)	90	90	95	280	49 (1,000 m)	10
Transducer Size (WHD; m)	0.60 x 0.15 x 0.50	0.60 x 0.25 x 0.60	0.90 x 0.30 x 0.90	1.50 x 0.30 x 1.50	$\emptyset$ 0.47 x 0.06	$\emptyset$ 0.47 x 0.06
Weight (in air, kg)	90 (incl. 30 m cable)	150 (with frame)	335 (with frame)	450 (with frame)	32 (excl. cable)	32 (excl. cable)
Control PC	internal	internal	internal	internal	external (topside)	N/A
Remote Control	KVM (included)	KVM (included)	KVM (included)	KVM (included)	Ethernet (UDP)	N/A
Power Supply 100-240V AC / 50-60Hz	✓	✓	✓	✓	✓	option
Power Supply 24V DC	–	–	–	–	option	✓
Power Consumption (W)	< 700	< 800	< 1,200	< 1,500	< 250	< 150
Sidescan (kHz)	–	–	–	–	–	–
Software: SESWIN / Data Converter / ISE	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓





Sand borrow area



## ◀ Dredging Applications

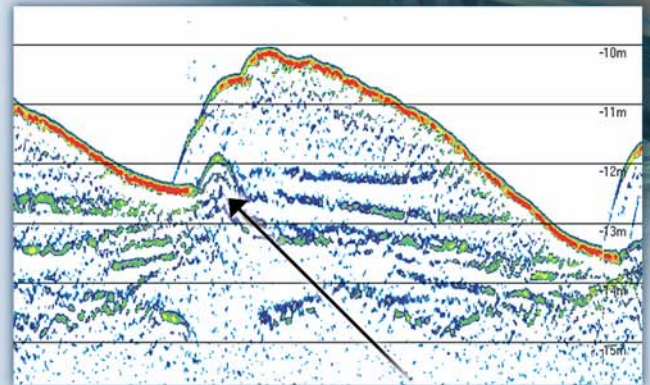
- sand search campaigns
- monitoring of sand borrow areas and dump sites
- channel maintenance dredging
- fluid mud detection

## Many other applications are possible, such as ...

- geophysical and geological surveys
- foundation exploration
- archaeological investigations
- climate research and environmental monitoring
- water column imaging



Foundation exploration for offshore constructions



Buried pipeline monitoring



## Pipelines and Cables

- cable and pipeline route surveys
- monitoring of burial depth
- wind park development
- oil & gas industry
- offshore installation and construction work

**Innomar Technologie GmbH**  
 Schutower Ringstraße 4  
 D-18069 Rostock  
**Phone (Fax) +49 381 44079-0 (-299)**  
**E-Mail info@innomar.com**



[www.innomar.com](http://www.innomar.com)