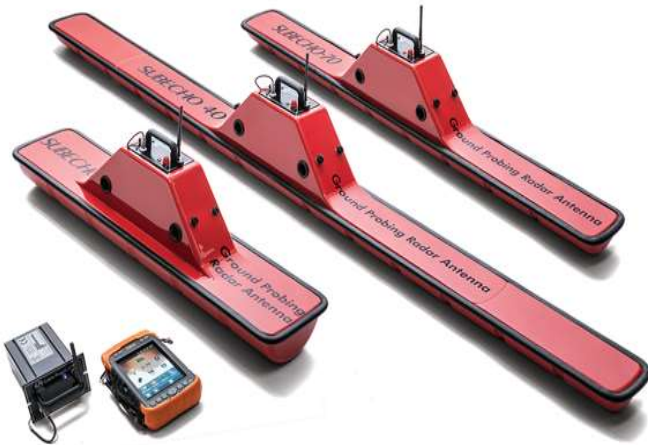


## COBRA PLUG-IN GPR KIT

Real time sampling, 120 m deep



The Cobra Plug-In GPR uses Real Time Sampling of the radar signal. Today major manufacturers use conventional interleaved sequential sampling, giving only a down converted replica of the real signal.

The Real Time Sampling allows for 32,000 stacks/second resulting in an amazing 45 dB increased signal-to-noise ratio.

Note that only a 30 dB increased S/N-ratio roughly double the penetration ability of a typical conventional GPR-system.

A low voltage transmitter reduces power consumption and eliminates ringing. The use of power-hungry, high voltage transmitters is no longer needed; in such case transmitter power must be increased 32,000 times to be comparable.

### ADVANTAGES

- **LESS RINGING:** Explained by wireless operation, no cables and lower transmitter output voltage (40V vs. 1200V)
- **LESS HIGH FREQUENCY NOISE:** Seen as “snow” or “speckle” in the lower sample SIR-3000 data. (45 dB increased S/N-ratio)
- **BETTER RESOLUTION:** Monostatic antenna for Cobra Plug-in GPR and Bistatic for SIR-3000 (Smearred reflections with SIR-3000)
- **WIRELESS:** Bluetooth connection between GPR and control unit replaces interfering coax-cables and fragile fibre optic links. An Ultra Rugged Mesa PDA with embedded software is used for data collection. Data is stored in standard SEG Y geophysical format. The complete GPR-unit plugs into a single SUBECHO Antenna, any selectable model. No need for bistatic configuration. The SUBECHO-antennas can all be used air- borne and in air-coupled operation and in any type of terrain. No need to cut trail paths any- more, not even in dense bush vegetation were ground coupled snake antennas have problems passing. Just lift the antenna above the bushes or in worst case use an octocopter UAV to carry the small and compact Cobra Plug-In.

## **APPLICATIONS**

### **GEOTECHNICAL SAFETY:**

- Geotechnical stratigraphy and soil structure studies. Depth to bedrock;
- Identify voids under: roads, airports, tunnels, railways;
- Safety control of embankment dams (piping/voids in core and fractures in bedrock under dam);
- Control of remaining barrier distance to abandoned water filled tunnels in coal mines (must exceed 60 m for safety);
- Airborne mapping of fragile ice build up in water;
- Tunnel & rock quality inspection;
- Karst caves and sinkhole mapping;
- Mapping of frost sensitive soils under roads and railways.

### **SNOW & ICE RESEARCH:**

- Airborne and ground based mapping of glacier ice thickness;
- Airborne detection of dangerous crevasses before passing.

### **GROUNDWATER AND MINERAL PROSPECTING:**

- Groundwater supply from sand and gravel deposits. Detection of water bearing fracture zones in bedrock;
- Locate gemstone pockets in pegmatite, nickel laterite, bauxite delineation. Kimberlite exploration;
- Mineral placer exploration-paleochannels;
- Sand & gravel deposits exploration;
- Peat bog investigation and mapping;
- Marble prospecting and quality inspection.

### **ENVIRONMENTAL SURVEYS:**

- Locate hazardous waste;
- Delineation of landfills, contaminant plumes and product spills;
- Mapping of water and sediment depths of lakes and rivers.

### **ARCHEOLOGY:**

- Mapping of deep buried structures, pyramids, tunnels and chambers.

### **MILITARY & SECURITY:**

- Locate deep clandestine tunnels/bunkers in militarized zones and around borderlines and prisons.

## TECHNICAL FEATURES:

• Model:	COBRA PLUG-IN GPR
• Technology:	High penetration; “Real Time Sampling GPR”
• Antenna:	Monostatic
• Airborne & Air-Coupled:	Easy to operate, even in non-walkable terrain
• Performance:	45 dB increased SNR versus conventional GPR
• Control unit:	palmar IP65 with DGPS
• Operation:	Bluetooth
• Power consumption:	Low; 16 h continuous usage
• Weight [kg ]:	< 7 (complete system)
• Penetration:	down to 120 m
• Post-processing software:	Included

• Model:	COBRA PLUG-IN GPR UNIT
• Dynamic Range [dB]:	192 (a 32 bit)
• Transmitter output [V]:	40
• Time interval [ns] :	0 - 1,600
• Max depth range [m]:	120 (RDP = 4)
• Sampling interval [ns]:	3.125 (320 MHz)
• PRF-rate [kHz]:	156
• Stacking:	32,000 samples/s, 45 dB increased SNR
• Power supply:	Integrated 11.1 V/ 6.6 Ah, 73 Wh Li-Ion battery
• Battery charger:	Mascot 2241 3-cell Li-Ion
• Battery life [h]:	16 (continuous usage)
• Mechanics:	
Size [mm]:	190 x 140 x 80;
Weight [kg]:	1.0 (battery included)

• Model:	COBRA PLUG-IN CENTRALINA / CU
• Control unit:	
Getac T800 Rugged tablet PC:	Intel Pentium Processor N3530 2.16 GHz; Windows 8 Professional; MIL-STD-810G; IP65 certified;
Software:	Cobra DAQ-software; Prism Post-processing; GPS software included
• Operative temperature [°C]:	-21 ~ +50

• Display:	8.1 "LCD HD TFT (1280 x 800); 600 nits LumiBond display with Getac sunlight multi-touch technology
• Size [mm]:	227 x 151 x 24
• Weight [kg]:	0,88
• Accessories:	Antenna handle; Hand strap for T800
• Model:	COBRA PLUG-IN SUBECHO ANTENNA- BW (10 dB)
• Band Width [MHz]:	
SE-40 model:	15-105 (90 MHz);
SE-70 model:	20-140 (120 MHz);
SE-150 model:	20-280 (260 MHz)
• Central frequencies @ $\xi_r = 9$ [MHz]:	
SE-40 model:	52;
SE-70 model:	80;
SE-150 model:	124
• BW/CF-ratio [%]:	
SE-40 model:	173;
SE-70 model:	150;
SE-150 model:	210
• Resolution [cm]:	
Vertical @ $\xi_r = 9$ ( $\lambda/4$ ):	
SE-40 model:	48;
SE-70 model:	31;
SE-150 model:	21
Horizontal @ depth = $\lambda$ :	
SE-40 model:	141;
SE-70 model:	88;
SE-150 model:	59
• Size [mm]:	
SE-40 model:	200 x 15 x 21;
SE-70 model:	139 x 15 x 21;
SE-150 model:	92 x 22 x 22
• Weight [kg]:	
SE-40 model:	4.7;
SE-70 model:	3.7;
SE-150 model:	3.5

## ACCESSORIES

<ul style="list-style-type: none"> <li>Air-coupled and ground-coupled operation:</li> </ul>	
SUBECHO-40 MHz Antenna:	. For maximum penetration. Depth Range 2-35+m. Use Very high power transmitter, bistatic with 2 antennas, for even deeper surveys. (Uses Plug-In Electronics, not included);
SUBECHO-70 MHz Antenna:	For high penetration and improved resolution. Depth Range 1-25m. (Uses Plug-In Electronics, not included);
SUBECHO-150 MHz Antenna:	For highest resolution. Depth Range. 5-20m. (Uses Plug-In Electronics, not included).
<ul style="list-style-type: none"> <li>Antenna Plug-in Electronics:</li> </ul>	
Transmitter Mod.501:	SW-encoder function, for above antennas;
Transmitter Mod.501:	Very High Power transmitter for optional bistatic operation of above antennas

## Standard:

- Cobra Plug-In real time 32-bit GPR, wireless operation, depth range up to 1,600 ns, 32,000 stacks/s (increased SNR 45 dB). S/N-ratio 144.4 dB. Weight: 1 kg;
- Integrated 73 Wh Li-Ion battery (16 h operating time);
- Control Unit: Getac T800 Fully Rugged tablet PC;
- Data Acquisition Software-DAQ. Cobra DAQ;
- HBC Rugged Transport Case for items: GPR + Antenna + Control Unit;
- Post Processing Software, PRISM with 3D export module;
- USB disk with DAQ/Post Processing software;
- External Mascot 2240 Battery Charger;
- Operating Manual.

## Optionals:

- CAR-KIT: Car kit containing armed fibre glass rods, survey wheel encoder on 12" plastic rim wheels and 50 mm trailer connection. Mono or bistatic operation;
- SE-HANDLE: Handle for stable leveling of antenna with marker switch. For monostatic use;
- CARRYING FRAME: Carrying frame assembly specially developed for use in Bistatic mode with all antennas above and with holder for SIR-3000;
- BELT-CHAIN ENCODER: Digital belt-chain encoder for surveys in rough terrain. Same function as survey wheel;
- GPR-FLEXICART: Very flexible cart with 4 wheels and encoder for SIR-3000. Adapt to all our antennas. Includes survey wheel encoder, SW-encoder, on 12" plastic rim wheels. Frame holder for SIR-3000. Quick mount of complete GPR including antennas.
- PRFPLUS-600: Unit enabling VHP Transmitters to run with SIR-systems at high PRF and scan rates.(Note: Required for SIR-3000 using VHP Transmitter).