

# Data Acquisition Rates of the New GSSI Model SIR-30 GPR Controller

Ground penetrating radar (GPR) has been used in high-speed applications for several decades. Technological advances in each generation of GPR units have led to increasingly faster data collection rates. This translates to higher density data (i.e. scans per meter or scans per foot) and greater data collection speed. Consequently, GPR data can be obtained more safely and efficiently for investigation of transportation infrastructure such as roads, bridges, and railroads. GSSI's newest generation control unit, the SIR-30, offers unsurpassed scanning rates and most importantly, these scanning rates are independent of the number of antennas used to obtain data.

This is an important distinction. Many GPR manufacturers specify the maximum transmit rate of a GPR control unit as the sum of the transmit rates of all the channels. This implies the per channel scan density decreases with each additional channel of data.

The SIR-30 has a maximum, channel-independent, transmit rate of up to 800 KHz†. At this transmit rate, one 2 GHz horn antenna\* can obtain data at a scan spacing of 4 cm (1.5 in) while traveling at 142 km/hr (88 miles/hr). And, because the transmit rate is independent of the number of channels, the same 4 cm (1.5 in) scan density can be obtained on each antenna whether collecting with 1, 2, 3, or 4 antennas at the same time.

Consequently, with the SIR-30, four 2 GHz antennas\* can be mounted side-by-side and each antenna can obtain 256 sample/scan data at a 2 cm (0.8 inch) spacing at 104 km/hour (64 miles/hr) or 208 km/hr (129 miles/hr) at a spacing of 4 cm. This amounts to a total of about 5,792 scans per second.

Scan Spacing per Channel cm (in)	Maximum Speed Km/Hr (MPH)	Samples/Scan	Channel Transmit Rate (KHz)	Typical Applications	Number of Antennas
12 (4.8)	625 (388)	256	800†	Railroad	1-4
12 (4.8)	427 (264)	512	800†	Railroad	1-4
6 (2.4)	213 (132)	512	800†	Railroad	1-4
6 (2.4)	141 (87)	512	450†	Railroad	1-4
12 (4.8)	283 (175)	512	450†	Railroad	1-4
4 (1.5)	142 (88)	512	800†	Highway	1-4
4 (1.5)	94 (58)	512	450†	Highway	1-4
2.5 (1.0)	94 (58)	256	450†	Bridge	1-4
5.0 (2.0)	188 (116)	256	450†	Bridge	1-4

\*Model 42000S, †In North America maximum transmit rates are dictated by antenna type and model.

