

THE IMPULSE SYSTEM

ADVANCED HELICOPTER-BORNE FREQUENCY DOMAIN ELECTROMAGNETICS

Impulse is a digital helicopter-borne frequency domain electromagnetic system developed by Aeroquest and introduced in 1997. This innovative wideband system utilizes a single computer-controlled, high-output transmitter driver to power individual horizontal coplanar and vertical coaxial transmitter coils, producing a total of six frequencies (three in each coil orientation).

Impulse differs significantly from conventional multi-frequency systems in that the conventional systems use three independent coils per frequency (e.g. 18 coils for a conventional six frequency system versus 6 coils for Impulse). As a result, the Impulse approach minimizes noise from coil interaction. Furthermore, the common coil approach reduces the overall amount of drift because the drift is common across all frequencies for a given transmitter orientation and is more easily removed.

The Impulse system uses a larger diameter tubular coil platform (30" versus the traditional 20"), permitting the system to generate larger dipole moments, thereby resulting in an improved signal-to-noise ratio, which quickly translates to better integrity of the measured in-phase and quadrature data and an improved depth of exploration.



Impulse system on survey in James Bay Area, March 2004.

SPECIFICATIONS

Number of Operating Frequencies:	6 in total (3 coaxial, 3 coplanar)			
Typical Operating Frequencies:	<i>Coaxial:</i>	870 Hz	4,350 Hz	21,750 Hz
	<i>Coplanar:</i>	930 Hz	4,650 Hz	23,250 Hz
Coil Orientations:	Horizontal coplanar and vertical coaxial			
Tx-Rx Coil Separation:	6.5 m			
Data Output:	6 in-phase and 6 quadrature channels, calibrated in ppm			
Typical Transmitter Dipole Moments:		<i>Low</i>	<i>Medium</i>	<i>High</i>
	<i>Coaxial:</i>	870 Hz	4,350 Hz	21,750 Hz
		150 Am ²	150 Am ²	15 Am ²
	<i>Coplanar:</i>	930 Hz	4,650 Hz	23,250 Hz
		200 Am ²	100 Am ²	15 Am ²
	Noise Levels:	Less than 1 ppm rms under normal conditions		
Base-Line Drift:	Less than 15 ppm per hour after initial warm-up			
Output Time Constant:	0.033 seconds			
Output Sampling Rate:	30 per second			
System Power:	30 Amps maximum at 22-28 VDC			
Temperature Range:	-30 to +35 degrees Celsius			
Tow Cable:	40 m long, with Kevlar strain member and weak-link			
Overall Bird Dimensions:	76 cm diameter, 7 m length			
Overall Bird Weight:	200 kg			

