BREAK-THROUGH TECH-NOLOGY

Confirmation of SkyTEM516 over Caber Deposits

The on-going development of SkyTEM MultiMoment® TEM systems has been driven by specific exploration objectives. First, to increase the power and depth of penetration. Second, to reduce the noise level and enhance detection of subtle contrast at depth. The result of a 5 year development program, SkyTEM516 has recently demonstrated its accomplishment of these objectives over the Caber Deposit in Québec, Canada. SkyTEM516, with a transmitter area of 536 m^2 and 16 turns, is capable of delivering a dipole moment of more than 1,000,000 NIA. In addition, a unique receiver design has been engineered to reduce the noise level by a factor of 20.

The Caber North deposit is particularly suitable for testing a helicopter-borne EM system's signal-to-noise as it is a challenging target and one that conventional ground EM systems have difficulty detecting. The deposit (1.3 Mt @ 4.0% Zn, 1.7% Cu) is buried under more than 300 meters of conductive overburden. SkyTEM516 and SkyTEM512 (launched in 2014) are both proven to successfully detect the Caber North deposit.

Detection of this target is difficult because its response ranges from 2 to 10 fV/Am^4 where 1 fV=10^{-15} V. Hence, detection of Caber North and similar targets requires a dipole moment in the range of 1,000,000 NIA and, above all, an exceedingly low noise level.

The SkyTEM516 has an un-normalized target responses range between 2-10 nV/m^2. Therefore, in order to detect this target the noise level must be markedly lower than 0.5 nV/m^2. Few airborne EM systems are capable of achieving this since systems with a high dipole moment typically have a corresponding high noise level due to limitations of the receiver system. As a result, many systems are incapable of detecting the Caber North Deposit due to an inferior signal-to-noise ratio.

All SkyTEM MultiMoment® systems are capable of mapping the near surface concurrently with depth. A range of systems is available to provide solutions for varying exploration objectives.

SKYTEM AIRBORNE SURVEYS WORLDWIDE

Comparing 2015 data from SkyTEM516 to 2014 data from SkyTEM512 acquired over the Caber North deposit

Over 1,000,000 NIA

Overview

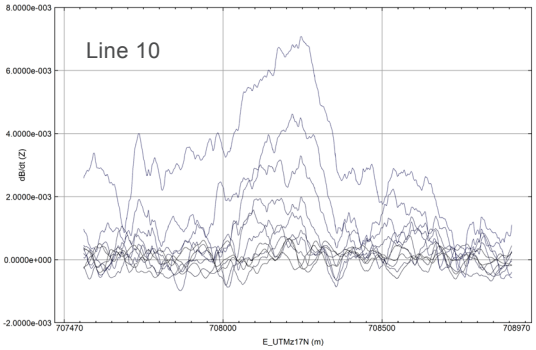
In January 2015 SkyTEM re-flew the well-known Caber deposit 30 km west of Matagami in Québec, Canada. The deposit is buried under more than 300 m of conductive overburden. The test was flown with the recently developed SkyTEM516 system, which has the highest dipole moment of all SkyTEM systems.

The presented improvements demonstrate the substantial and ongoing R&D commitment at SkyTEM, which aims at constantly pushing the limits of Airborne Geophysics.

Key Facts

- 536 m^2 transmitter area
- 16 turns transmitter coil
- >1,000,000 NIA peak dipole moment
- Superior late-time signal to noise ratio and depth of penetration

SkyTEM512 (2014)



SkyTEM516 (2015)

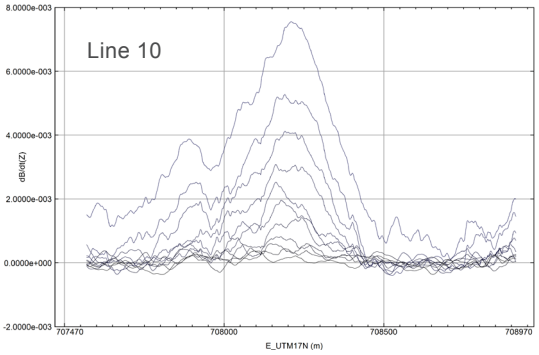
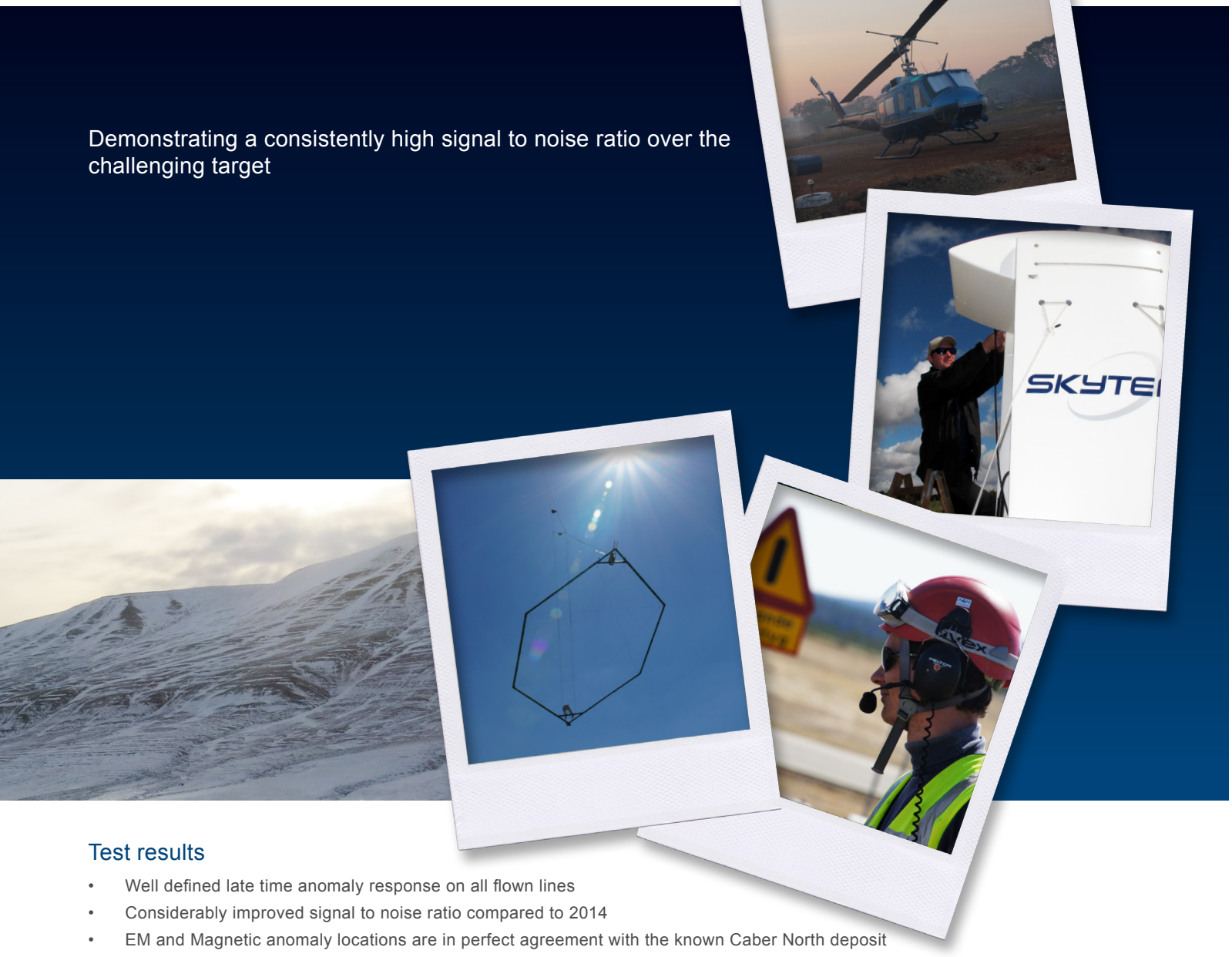


Figure 1: Comparison of SkyTEM512 (2014) and SkyTEM516 (2015) data over the Caber North deposit. The gates shown are late time dB_z/dt responses in units of pV/Am⁴ covering the time interval from 1.2 ms to 9.4 ms.

Demonstrating a consistently high signal to noise ratio over the challenging target



Test results

- Well defined late time anomaly response on all flown lines
- Considerably improved signal to noise ratio compared to 2014
- EM and Magnetic anomaly locations are in perfect agreement with the known Caber North deposit

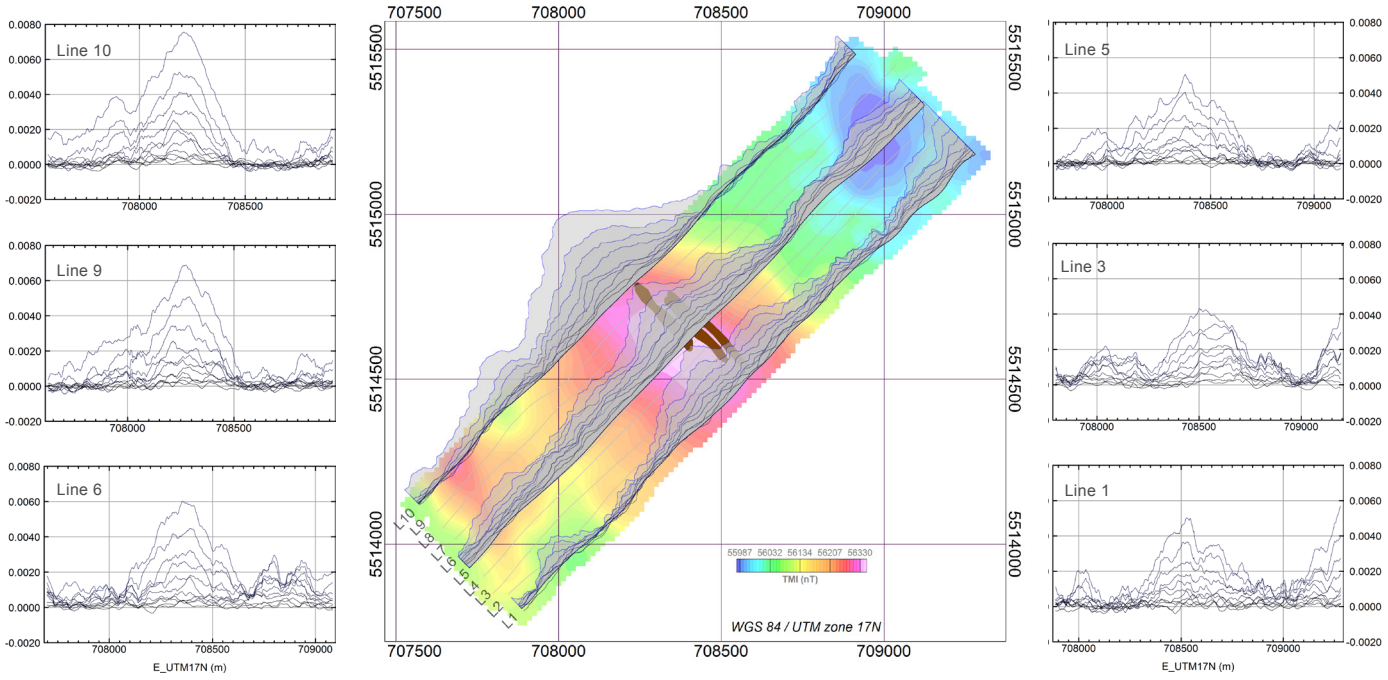


Figure 2: The central panel shows the location of the Caber North deposit (brown) on top of the Total Magnetic Intensity. Late time dB_z/dt responses are shown as grey shaded curves for three of the six lines presented in the surrounding panels.

BREAK-THROUGH TECH-NOLOGY

Transmitter specifications of each 60 Hz SkyTEM configuration

	SkyTEM304		SkyTEM312	
	LM	HM	LM	HM
No of transmitter turns	1	4	2	12
Transmitter area per turn	341 m^2	341 m^2	341 m^2	341 m^2
Transmitter current	~9 Amp	~110 Amp	~5 Amp	~120 Amp
Peak moment	~3,000 NIA	~150,000 NIA	~3,000 NIA	~490,000 NIA
Repetition frequency	270 Hz	22.5 Hz	270 Hz	30 Hz
On time	800 µs	10 ms	800 µs	4 ms
Off time	1052 µs	12.222 ms	1052 µs	12.666 ms

	SkyTEM508		SkyTEM516	
	LM	HM	LM	HM
No of transmitter turns	1	8	2	16
Transmitter area per turn	536 m^2	536 m^2	536 m^2	536 m^2
Transmitter current	~7 Amp	~120 Amp	~3.5 Amp	~120 Amp
Peak moment	~4,000 NIA	~500,000 NIA	~4,000 NIA	~1,000,000 NIA
Repetition frequency	270 Hz	30 Hz	270 Hz	30 Hz
On time	800 µs	4 ms	800 µs	4 ms
Off time	1052 µs	12.666 ms	1052 µs	12.666 ms

SKYTEM AIRBORNE SURVEYS WORLDWIDE

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