Report on a Helicopter-Borne AeroTEM System
Electromagnetic and Magnetic Survey, Deer Park Property,
Southern British Columbia

(tenure nos. 520928, 522128, 542340, 542341, 546401, 554711)

NTS map sheet 082E08 and 082F05
1:20,000 trim map sheets 82E050 and 82F041
centered at UTM 5478500N, 424000E

Trail and Nelson Mining Divisions

by
Trygve Höy, P.Eng, Ph.D
2450 Dixon Road, Sooke, B.C., V9Z 0X6

and
Jonathan Rudd, P.Eng. (Ont.)
Aeroquest International,
7687 Bath Road, Mississauga, Ontario, L4T 3T1

claim owner: T.P. Kennedy
claim operator: Kootenay Gold Inc.
550-999 W. Hastings Street
Vancouver, B.C., V6C 2W2

January 8, 2008

(tenure nos. 520928, 522128, 542340, 542341, 546401, 554711)

Table of contents

Introduction……………………………………………………………… 3
Location…………………………………………………………………… 3
Property history………………………………………………………… 3
Summary of work……………………………………………………… 7
Technical data and interpretation……………………………………….. 7
References……………………………………………………………… 8
Appendices……………………………………………………………… 9

Appendices
1. Statement of costs………………………………………………. 9
2a. Statement of qualifications: Trygve Höy……………………... 10
2b. Statement of qualifications: Jonathan Rudd………………….. 11
3. Report on a helicopter-borne aeroTEM system electromagnetic
and magnetic survey, by Aeroquest International Ltd……….. 12

List of Figures
1. Location map, Deer Park property………………………………. 2
2. Claim map, Deer Park property…………………………………. 5
3. Extent of airborne geophysical survey, Deer Park area…………. 6
4. Coloured total magnetic intensity (TMI) map with line contours
and EM anomaly symbols………………………………… (pocket disc)
5. AeroTEM Z1 off-time with line contours and EM anomaly
symbols……………………………………………………. (pocket disc)
6. AeroTEM off-time profiles Z2-Z16 and EM anomaly
symbols…………………………………………………… (pocket disc)

Tables
1. Assessment reports, Deer Park property…………………………. 3
2. List of claims……………………………………………………… 6
Introduction

This report describes a helicopter-borne geophysical survey carried out on behalf of Kootenay Gold Inc. on their Deer Park property near Castlegar in southeastern British Columbia. The report summarizes a considerable part of the data that is included as Appendix 3, authored by Jonathon Rudd of Aeroquest International based in Mississauga, Ontario.

Location

The Deer Park area is located in the northeast corner of 1:50,000 topographic map 082E08, within the Valkyr Range immediately east of Lower Arrow Lake (Figure 1). Topography is relatively steep, rising from 425 meters on the shore of Upper Arrow Lake to approximately 1300 meters on ridges in the eastern part of the property. The area is deeply incised by the south-flowing Deer Creek and its tributaries. Well maintained gravel roads follow most creeks, commonly extending to the heights of land, and a considerable part of the area has been logged.

The Deer Park property can be accessed from the town of Castlegar, located approximately 30 km to the southeast. A paved, then gravel road, follows the north shore of the Columbia River and Upper Arrow Lake to the central part of the claim group. The airport at Castlegar served as the base for the helicopter geophysical survey.

Property history

The Deer Park area is included within the regional geological map by Little (1957) and in the regional compilation by Tempelman-Kluit (1989). However, little relatively detailed mapping (1:50,000 scale or less) has been done in the area.

The property has had little recorded exploration, though evince of workings are common throughout the area. Only one occurrence is listed in BC Minfile, Broadwater (082ESE211), a small past producer of limestone located near the shore of Upper Arrow Lake (BC Minister of Mines Annual Report, 1959, p. 174). Two assessment reports also record work in the area, as summarized below (Table 1). One (29003) is a prospecting report by the current owner of the claims (Tom Kennedy), and an earlier report (14328) describes the general geology around a reverted crown granted claim called the Bluebird, and some historical claims referred to as the Valkyr claim group. The latter report includes some rock sampling but gold and base metal values were low in all reported samples.

<table>
<thead>
<tr>
<th>Report No.</th>
<th>Author</th>
<th>Date</th>
<th>Claims</th>
<th>Work done</th>
</tr>
</thead>
<tbody>
<tr>
<td>14328</td>
<td>D.J. Brownlee</td>
<td>1985</td>
<td>Valkyr group Bluebird CG</td>
<td>geological mapping, sampling, geochemistry</td>
</tr>
<tr>
<td>29003</td>
<td>T.P. Kennedy</td>
<td>2007</td>
<td>current property</td>
<td>prospecting mineral occurrence examinations</td>
</tr>
</tbody>
</table>

Table 1: Assessment reports, Deer Park property
Figure 1: Location map, Deer Park property
Tom Kennedy has spent considerable time, from 2005 through to 2007, prospecting and sampling in the Deer Park claim area. He has discovered, and describes (Kennedy, 2007) two main styles of mineralization, “massive sulphide stringers and replacements and sulphides in quartz veins”. Many of these occurrences have been sampled and submitted for analyses, but analytical results have not been published. The author spent approximately 10 days on the property in 2007, producing a map for Kootenay Gold Inc. that outlines the geology of the property and evaluates many of the recently discovered showings (Höy, 2008, in preparation).

Claims on the property that are under option to Kootenay Gold Inc. (Table 2) are owned by T.P. Kennedy. They cover an area of approximately 420 hectares. One claim group that underlies the survey area is owned by M.R. Weisner (Figure 2, Table 2). The extent of the airborne survey is shown in Figure 3.

Figure 2: Claim map, Deer Park property; see Table 2 for list of claims
<table>
<thead>
<tr>
<th>Tenure</th>
<th>Name</th>
<th>Owner</th>
<th>Good to</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>520928</td>
<td>Dyno</td>
<td>T. Kennedy</td>
<td>2009/02/18</td>
<td>251</td>
</tr>
<tr>
<td>522128</td>
<td>Deer 2</td>
<td>T. Kennedy</td>
<td>2009/02/18</td>
<td>420</td>
</tr>
<tr>
<td>542340</td>
<td>Deer 3</td>
<td>T. Kennedy</td>
<td>2009/02/18</td>
<td>503</td>
</tr>
<tr>
<td>542341</td>
<td>Deer 4</td>
<td>T. Kennedy</td>
<td>2009/02/18</td>
<td>482</td>
</tr>
<tr>
<td>546401</td>
<td>Deer 06</td>
<td>T. Kennedy</td>
<td>2009/02/18</td>
<td>105</td>
</tr>
<tr>
<td>548862</td>
<td>Blue Jay</td>
<td>M.R. Wiesner</td>
<td>2008/01/07</td>
<td>419</td>
</tr>
<tr>
<td>554711</td>
<td>Deer 3</td>
<td>T. Kennedy</td>
<td>2009/02/18</td>
<td>504</td>
</tr>
</tbody>
</table>

Table 2: List of claims underlying airborne geophysical survey

Figure 3: Extent of airborne geophysical survey, Deer Park area
Summary of work

The helicopter-borne geophysical survey, as described in Appendix 3, included 323.3 line kilometers. The survey was flown on May 9\textsuperscript{th} and 10\textsuperscript{th}, 2007, at 100 meter line spacing in an E-W survey flight direction. The geophysical sensor is Aeroquest’s “AeroTEM II time domain helicopter electromagnetic system which is employed in conjunction with a high-sensitivity caesium vapour magnetometer”. The summary data is presented in the form of digital and hard-copy maps, at 1:10,000 scales, and include a contoured, coloured total magnetic intensity map (Figure 4), a contoured electromagnetic and anomaly map (Figure 5) and an “aeroTEM off-time profile map (Figure 6).

Technical Data and Interpretation

The airborne geophysical survey was done on the Deer Park area in order to help determine the extent of main lithologic units, in areas underlain by overburden and in areas that have not been mapped geologically at a detailed scale. Furthermore, it was hoped that the survey would help define and determine the extent of structures that controlled much of the known mineralization.

Prospecting (Kennedy, 2007) and preliminary mapping (Höy, in preparation) have identified a suite of generally north-trending felsic dikes, of probable Eocene age, that cut late Paleozoic metavolcanics and metasediments, and Jurassic to probable Cretaceous intermediate to felsic intrusions. Prominent faults and shears locally parallel the north-trending dikes. Mineralization, typically comprising quartz veinlets with variable but generally minor pyrite, pyrrhotite and rare chalcopyrite, and elevated gold, locally occurs within the north-trending structures, occasionally cutting the parallel felsic dikes. These veinlets also occur within dilation zones at oblique angles to the veins. More massive sulphide mineralization, comprising variable pyrite, pyrrhotite, with less chalcopyrite or arsenopyrite, occurs locally within the metavolcanic sequence or more mafic intrusions.

The total magnetic intensity map (Fig. 4) helps define major lithologic units throughout the area. The extent of the granitic (granodiorite) intrusion in the northern part of the area is more clearly defined by a large, irregular magnetic high. The circular southeastern part of a northwest trending high, located near the west-central part of the survey area, coincides with a prominent, early mafic amphibolite-hornblende-rich intrusive assemblage. The trend of this high, to the northwest, suggests that this mafic assemblage underlies, at shallow depth, metasediments that are exposed at surface. It is difficult to explain the magnetic high that occurs along trend to the southeast, an area that has not been mapped in detail, but appears to be underlain mainly by carbonate and minor metavolcanic units.

A prominent north-trending linear that truncates the southwest-trending magnetic high described above, coincides with prominent north-trending mineralized structures. Irregular magnetic highs along the western edge of this zone coincide with and help define a north-trending granitic dike that parallels the structural zone. One of the more prominent features of the magnetic intensity map, the northwest-trending magnetic low that transects the central part of the survey area, does not appear to coincide with known geological features. It approximately parallels the trend of metavolcanic and
metasedimentary units in the west, and coincides with a cross-cutting, overburden filled valley in the central part. As lithologic units cannot be easily projected across the zone, it is probable that it records a major fault structure.

The electromagnetic (EM) anomalies (Figures 5 and 6) are largely concentrated along the edge of or within the northwest-trending magnetic high in the southwestern part of the survey area. These are fairly prominent but cannot be correlated readily with known structures or lithologies at surface. The two most southern circular anomalies are in areas that have not been mapped. The two small northwestern anomalies are in areas that are underlain mainly by siliceous sediments. These locally are very rusty-weathering, and contain variable disseminated sulphide, and may therefore have high conductance. A linear, northwest-trending EM anomaly located east of the circular anomalies parallels faults mapped in this area. Quartz-gold veins that are associated with many of these faults are the main exploration targets in the eastern part of the Deer Park area.

In summary, the airborne magnetic and EM surveys have helped define lithologic units and structures in areas that are poorly exposed or have not been mapped. The EM anomalies need to be evaluated further and field checked, as at least one of these parallels prominent mineralized structures.

References


Appendix 1:  
Statement of Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeroquest airborne survey</td>
<td></td>
</tr>
<tr>
<td>309 line kms @ $145.00/km</td>
<td>$44,805.00</td>
</tr>
<tr>
<td>mobilization charge</td>
<td>1,816.45</td>
</tr>
<tr>
<td>Report Preparation</td>
<td></td>
</tr>
<tr>
<td>T. Höy and W. Jackaman @ $600.00/day</td>
<td>1,200.00</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$47,821.45</td>
</tr>
</tbody>
</table>
Appendix 2a
STATEMENT OF QUALIFICATIONS: Trygve Hoy

I, Trygve Höy, PhD., P. Eng. do hereby certify that:

1. I attained the degree of Doctor of Philosophy (PhD) in geology from Queens University, Kingston, Ontario in 1974.

2. I have an MSc. in Geology from Carleton University, Ottawa, Ontario (1970), and a BSc. in Geology from the University of British Columbia (1968).

3. I am a member of the Association of Professional Engineers and Geoscientists of BC. and a member of the Society of Economic Geologists.

4. I have worked as a geologist for a total of 32 years since my graduation from university, 27 years as a project geologist with the B.C. Geological Survey Branch and 5 years as an independent consulting geologist.

5. I have spent 14 days on the Deer Park property, mainly doing geological mapping, and was involved in setting up and contracting out the geophysical survey to Aeroquest International.


Dated this 8th Day of January, 2008.

______________________________

Trygve Höy, P.Eng.
Appendix 2b

STATEMENT OF QUALIFICATIONS: Jonathan Rudd

I, Jonathan Rudd, P.Eng. do hereby certify that:

7. I attained the degree of Bachelor of Science in Engineering (BScE) in geophysics from Queens University, Kingston, Ontario in 1988.

8. I am a member of the Association of Professional Engineers of Ontario and an associate member of the Society of Exploration Geophysicists.

9. I have worked as an exploration geophysicist continuously for a total of 19 years since my graduation from university, 5 years with MPH Consulting, 6 years with Dighem, 2.5 years with the Ontario Geological Survey, 2 years with Wallbridge Mining Company Limited and 3.5 years with Aeroquest Limited as manager and Senior Geophysicist.

10. I had oversight of the data acquisition, data processing and logistical reporting for the AeroTEM survey over this property.


Dated this 8th Day of January, 2008.

Jonathan Rudd, P.Eng.
Appendix 3:

Report on a helicopter-borne aero-Tem system electromagnetic and magnetic survey by Aeroquest International

by

Jonathan Rudd, P.Eng. (Ontario)

Aeroquest International
7687 Bath Road
Mississauga, Ontario
L4T 3T1
Report on a Helicopter-Borne AeroTEM System Electromagnetic & Magnetic Survey

Aeroquest Job # 07100

Deer Park Property
BC, Canada
NTS 082E08, 082F05

For

Kootenay Gold Inc.

By

Aeroquest International
7687 Bath Road, Mississauga, ON, L4T 3T1
Tel: (905) 672-9129
Fax: (905) 672-7083
www.aeroquest.ca

Report date: October 2007
Report on a Helicopter-Borne AeroTEM System Electromagnetic & Magnetic Survey

Aeroquest Job # 07100

Deer Park Property
BC, Canada
NTS 082E08, 082F05

For

KOOTENAY GOLD INC.

By

7687 Bath Road,
Mississauga, ON, L4T 3T1
Tel: (905) 672-9129
Fax: (905) 672-7083
www.aeroquest.ca

Report date: October 2007
TABLE OF CONTENTS

TABLE OF CONTENTS .......................................................................................................................... i
LIST OF FIGURES .................................................................................................................................. 2
LIST OF MAPS ...................................................................................................................................... 2
1. INTRODUCTION ................................................................................................................................ 1
2. SURVEY AREA ..................................................................................................................................... 1
3. SURVEY SPECIFICATIONS AND PROCEDURES ............................................................................. 3
   3.1. Navigation ................................................................................................................................. 4
   3.2. System Drift .............................................................................................................................. 4
   3.3. Field QA/QC Procedures ......................................................................................................... 4
4. AIRCRAFT AND EQUIPMENT ............................................................................................................... 5
   4.1. Aircraft ...................................................................................................................................... 5
   4.2. Magnetometer .......................................................................................................................... 5
   4.3. Magnetometer II ....................................................................................................................... 5
   4.4. Electromagnetic System ......................................................................................................... 6
   4.5. AeroDAS Acquisition System ............................................................................................... 7
   4.6. RMS DGR-33 Acquisition System .......................................................................................... 8
   4.7. Magnetometer Base Station .................................................................................................... 9
   4.8. Radar Altimeter ....................................................................................................................... 10
   4.9. Video Tracking and Recording System .................................................................................. 10
   4.10. GPS Navigation System .................................................................................................... 10
   4.11. Digital Acquisition System ................................................................................................. 11
5. PERSONNEL ....................................................................................................................................... 11
6. DELIVERABLES ................................................................................................................................. 11
   6.1. Hardcopy Deliverables .......................................................................................................... 11
   6.2. Digital Deliverables .............................................................................................................. 12
      6.2.1. Final Database of Survey Data (.GDB, .XYZ) ................................................................. 12
      6.2.2. Geosoft Grid files (.GRD) ............................................................................................ 12
      6.2.3. Digital Versions of Final Maps (.MAP, .PDF) ............................................................ 12
      6.2.4. Free Viewing Software ............................................................................................... 12
      6.2.5. Digital Copy of this Document (.PDF) ....................................................................... 12
7. DATA PROCESSING AND PRESENTATION ..................................................................................... 12
   7.1. Base Map .............................................................................................................................. 12
   7.2. Flight Path & Terrain Clearance ......................................................................................... 13
   7.3. Electromagnetic Data ......................................................................................................... 13
   7.4. Magnetic Data .................................................................................................................... 14
8. General Comments ............................................................................................................................ 14
   8.1. Magnetic Response .............................................................................................................. 14
   8.2. EM Anomalies ..................................................................................................................... 14
APPENDIX 1: Survey Boundaries ......................................................................................................... 17
APPENDIX 2: Mining Claims ............................................................................................................... 18
APPENDIX 3: Description of Database Fields ................................................................. 19

APPENDIX 4: AEROTEM ANOMALY LISTING ................................................................. 20

APPENDIX 5: AeroTEM Design Considerations ............................................................... 21

APPENDIX 6: AeroTEM Instrumentation Specification Sheet ............................................. 27

LIST OF FIGURES

Figure 1. Project Area ........................................................................................................ 2
Figure 2. Deer Park Fight Path and Mining Claims ............................................................. 3
Figure 3. Helicopter registration number C-FPTG .............................................................. 5
Figure 4. AeroTEM II EM bird. Arrow indicates the location of the second cesium magnetometer sensor. ................................................................. 6
Figure 5. The magnetometer bird (A) and AeroTEM II EM bird (B) ..................................... 7
Figure 6. Schematic of Transmitter and Receiver waveforms ............................................. 7
Figure 7. AeroTEM II Instrument Rack, including AeroDAS and RMS DGR-33 systems, AeroTEM power supply, data acquisition computer and AG-NAV2 navigation system ............................................. 9
Figure 8. Digital video camera typical mounting location ................................................... 10
Figure 9. AeroTEM response to a ‘thin’ vertical conductor ............................................... 15
Figure 10. AeroTEM response for a ‘thick’ vertical conductor ........................................ 15
Figure 11. AeroTEM response over a ‘thin’ dipping conductor ......................................... 16

LIST OF MAPS

- TMI – Coloured Total Magnetic Intensity (TMI) with line contours and EM anomaly symbols.
- ZOFF1 – AeroTEM Z1 Off-time with line contours and EM anomaly symbols.
- EM – AeroTEM off-time profiles Z2 – Z16 and EM anomaly symbols.
1. INTRODUCTION

This report describes a helicopter-borne geophysical survey carried out on behalf of Kootenay Gold Inc. for their Deer Park project near Castlegar, BC.

The principal geophysical sensor is Aeroquest's exclusive AeroTEM II (Bravo) time domain helicopter electromagnetic system which is employed in conjunction with a high-sensitivity caesium vapour magnetometer. Ancillary equipment includes a real-time differential GPS navigation system, radar altimeter, video recorder, and a base station magnetometer. Full-waveform streaming EM data is recorded at 36,000 samples per second. The streaming data comprise the transmitted waveform, and the X component and Z component of the resultant field at the receivers. A secondary acquisition system (RMS) records the ancillary data.

The total survey coverage is 323.3 line-km, of which 309.2 line-km fell within the defined project area (Appendix 1). The survey was flown at 100 metre line spacing and in an E-W survey flight direction. The survey flying described in this report took place from May 9th to May 10th, 2007. This report describes the survey logistics, the data processing, presentation, and provides the specifications of the survey.

2. SURVEY AREA

The Project area (Figure 1) is located in southern British Columbia. Deer Park block is located 35 km NW of Castlegar, on the eastern bank of Lower Arrow Lake. The survey block makes up a total survey area of approximately 28.7 km² in mountainous terrain (Figure 2). The property was easily accessible by local roads and logging roads running through the area.

There are 7 mining claims in the area most of various ownership. They are outlined in Appendix 2.

The base of survey operations for the Deer Park block was at Castlegar.
Figure 1. Project Area
3. SURVEY SPECIFICATIONS AND PROCEDURES

The survey specifications are summarised in the following table:

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Line Spacing (metres)</th>
<th>Line Direction</th>
<th>Survey Coverage (line-km)</th>
<th>Date flown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deer Park</td>
<td>100</td>
<td>E-W (90°)</td>
<td>323.3</td>
<td>May 9 – 10, 2007</td>
</tr>
</tbody>
</table>

Table 1. Survey specifications summary.

The survey coverage was calculated by adding up the along-line distance of the survey lines and control (tie) lines as presented in the final Geosoft database. The survey was flown with a line spacing of 100 metres. The control (tie) lines were flown perpendicular to the survey lines with a spacing of 1000 metres.
The nominal EM bird terrain clearance is 30 metres, but can be higher in more rugged terrain due to safety considerations and the capabilities of the aircraft. The magnetometer sensor is mounted in a smaller bird connected to the tow rope 17 metres above the EM bird and 21 metres below the helicopter (Figure 4). A second magnetometer is installed on the tail of the EM bird. Nominal survey speed over relatively flat terrain is 75 km/hr and is generally lower in rougher terrain. Scan rates for ancillary data acquisition is 0.1 second for the magnetometer and altimeter, and 0.2 second for the GPS determined position. The EM data is acquired as a data stream at a sampling rate of 36,000 samples per second and is processed to generate final data at 10 samples per second. The 10 samples per second translate to a geophysical reading about every 1.5 to 2.5 metres along the flight path.

3.1. NAVIGATION

Navigation is carried out using a GPS receiver, an AGNAV2 system for navigation control, and an RMS DGR-33 data acquisition system which records the GPS coordinates. The x-y-z position of the aircraft, as reported by the GPS, is recorded at 0.2 second intervals. The system has a published accuracy of less than 3 metres. A recent static ground test of the Mid-Tech WAAS GPS yielded a standard deviation in x and y of under 0.6 metres and for z under 1.5 metres over a two-hour period.

3.2. SYSTEM DRIFT

Unlike frequency domain electromagnetic systems, the AeroTEM II system has negligible drift due to thermal expansion. The operator is responsible for ensuring the instrument is properly warmed up prior to departure and that the instruments are operated properly throughout the flight. The operator maintains a detailed flight log during the survey noting the times of the flight and any unusual geophysical or topographic features. Each flight included at least two high elevation ‘background’ checks. During the high elevation checks, an internal 5 second wide calibration pulse in all EM channels was generated in order to ensure that the gain of the system remained constant and within specifications.

3.3. FIELD QA/QC PROCEDURES

On return of the pilot and operator to the base, usually after each flight, the AeroDAS streaming EM data and the RMS data are carried on removable hard drives and Flashcards, respectively and transferred to the data processing workstation. At the end of each day, the base station magnetometer data on Flashcard is retrieved from the base station unit. Data verification and quality control includes a comparison of the acquired GPS data with the flight plan; verification and conversion of the RMS data to an ASCII format XYZ data file; verification of the base station magnetometer data and conversion to ASCII format XYZ data; and loading, processing and conversion of the streaming EM data from the removable hard drive. All data is then merged to an ASCII XYZ format which is then imported to an Oasis database for further QA/QC and for the production of preliminary EM, magnetic contour, and flight path maps.

Survey lines which show excessive deviation from the intended flight path are re-flown. Any line or portion of a line on which the data quality did not meet the contract specification was noted and re-flown.
4. AIRCRAFT AND EQUIPMENT

4.1. AIRCRAFT
A Eurocopter (Aerospatiale) AS350B/A "A-Star" helicopter - registration C-FPTG was used as survey platform. The helicopter was owned and operated by Hi Wood Helicopters, Calgary, Alberta. Installation of the geophysical and ancillary equipment was carried out by Aeroquest Limited personnel in conjunction with a licensed aircraft. The survey aircraft was flown at a nominal terrain clearance of 220 ft (65 metres).

![Helicopter registration number C-FPTG](image)

4.2. MAGNETOMETER
The AeroTEM II airborne survey system employs the Geometrics G-823A caesium vapour magnetometer sensor installed in a two metre towed bird airfoil attached to the main tow line, 17 metres below the helicopter (Figure 4). The sensitivity of the magnetometer is 0.001 NanoTesla at a 0.1 second sampling rate. The nominal ground clearance of the magnetometer bird is 51 metres (170 ft.). The magnetic data is recorded at 10 Hz by the RMS DGR-33.

4.3. MAGNETOMETER II
In addition to the main magnetometer bird on the main tow line, the AeroTEM II system includes an additional G-828A magnetometer installed on the tail of the EM bird (Figure 4). The sensor is located 37 metres below the helicopter and has a superior nominal terrain clearance of 31 m. Data is recorded at 300 samples a second and down sampled to 10 Hz by the AeroDAS acquisition system.
4.4. ELECTROMAGNETIC SYSTEM

The electromagnetic system is an Aeroquest AeroTEM II time domain towed-bird system (Figure 4, Figure 5). The current AeroTEM II transmitter dipole moment is 38.8 kNIA. The AeroTEM bird is towed 38 metres (125 ft) below the helicopter. More technical details of the system may be found in Appendix 4.

The wave-form is triangular with a symmetric transmitter on-time pulse of 1.10 ms and a base frequency of 150 Hz (Figure 5). The current alternates polarity every on-time pulse. During every Tx on-off cycle (300 per second), 120 contiguous channels of raw X and Z component (and a transmitter current monitor, itx) of the received waveform are measured. Each channel width is 27.78 microseconds starting at the beginning of the transmitter pulse. This 120 channel data is referred to as the raw streaming data. The AeroTEM system has two separate EM data recording streams, the conventional RMS DGR-33 and the AeroDAS system which records the full waveform (Figure 6).
4.5. **AERO DAS ACQUISITION SYSTEM**

The 120 channels of raw streaming data are recorded by the AeroDAS acquisition system (Figure 7) onto a removable hard drive. The streaming data are processed post-survey to yield 33 stacked and binned on-time and off-time channels at a 10 Hz sample rate. The timing of the final processed EM channels is described in the following table:
### Average TxOn

-11.4221 us

### Average TxSwitch

574.7094 us

### Average TxOff

1118.4859 us

<table>
<thead>
<tr>
<th>Channel</th>
<th>Sample Range</th>
<th>Time Width (us)</th>
<th>Time Center (us)</th>
<th>Time after TxOn (us)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On1</td>
<td>3 - 3</td>
<td>27.778</td>
<td>69.444</td>
<td>80.867</td>
</tr>
<tr>
<td>On2</td>
<td>4 - 4</td>
<td>27.778</td>
<td>97.222</td>
<td>108.644</td>
</tr>
<tr>
<td>On3</td>
<td>5 - 5</td>
<td>27.778</td>
<td>125.000</td>
<td>136.422</td>
</tr>
<tr>
<td>On4</td>
<td>6 - 6</td>
<td>27.778</td>
<td>152.778</td>
<td>164.200</td>
</tr>
<tr>
<td>On5</td>
<td>7 - 7</td>
<td>27.778</td>
<td>180.556</td>
<td>191.978</td>
</tr>
<tr>
<td>On6</td>
<td>8 - 8</td>
<td>27.778</td>
<td>208.333</td>
<td>219.755</td>
</tr>
<tr>
<td>On7</td>
<td>9 - 9</td>
<td>27.778</td>
<td>236.111</td>
<td>247.533</td>
</tr>
<tr>
<td>On8</td>
<td>10 - 10</td>
<td>27.778</td>
<td>263.889</td>
<td>275.311</td>
</tr>
<tr>
<td>On9</td>
<td>11 - 11</td>
<td>27.778</td>
<td>291.667</td>
<td>303.089</td>
</tr>
<tr>
<td>On10</td>
<td>12 - 12</td>
<td>27.778</td>
<td>319.444</td>
<td>330.867</td>
</tr>
<tr>
<td>On11</td>
<td>13 - 13</td>
<td>27.778</td>
<td>347.222</td>
<td>358.644</td>
</tr>
<tr>
<td>On12</td>
<td>14 - 14</td>
<td>27.778</td>
<td>375.000</td>
<td>386.422</td>
</tr>
<tr>
<td>On13</td>
<td>15 - 15</td>
<td>27.778</td>
<td>402.778</td>
<td>414.200</td>
</tr>
<tr>
<td>On14</td>
<td>16 - 16</td>
<td>27.778</td>
<td>430.556</td>
<td>441.978</td>
</tr>
<tr>
<td>On15</td>
<td>17 - 17</td>
<td>27.778</td>
<td>458.333</td>
<td>469.755</td>
</tr>
<tr>
<td>On16</td>
<td>18 - 18</td>
<td>27.778</td>
<td>486.111</td>
<td>497.533</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Channel</th>
<th>Sample Range</th>
<th>Time Width (us)</th>
<th>Time Center (us)</th>
<th>Time after TxOff (us)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off0</td>
<td>45 - 45</td>
<td>27.778</td>
<td>1236.111</td>
<td>117.625</td>
</tr>
<tr>
<td>Off1</td>
<td>46 - 46</td>
<td>27.778</td>
<td>1263.889</td>
<td>145.403</td>
</tr>
<tr>
<td>Off2</td>
<td>47 - 47</td>
<td>27.778</td>
<td>1291.667</td>
<td>173.181</td>
</tr>
<tr>
<td>Off3</td>
<td>48 - 48</td>
<td>27.778</td>
<td>1319.444</td>
<td>200.959</td>
</tr>
<tr>
<td>Off4</td>
<td>49 - 49</td>
<td>27.778</td>
<td>1347.222</td>
<td>228.736</td>
</tr>
<tr>
<td>Off5</td>
<td>50 - 50</td>
<td>27.778</td>
<td>1375.000</td>
<td>256.514</td>
</tr>
<tr>
<td>Off6</td>
<td>51 - 52</td>
<td>55.556</td>
<td>1416.667</td>
<td>298.181</td>
</tr>
<tr>
<td>Off7</td>
<td>53 - 54</td>
<td>55.556</td>
<td>1472.222</td>
<td>353.736</td>
</tr>
<tr>
<td>Off8</td>
<td>55 - 56</td>
<td>55.556</td>
<td>1527.778</td>
<td>409.292</td>
</tr>
<tr>
<td>Off9</td>
<td>57 - 58</td>
<td>55.556</td>
<td>1583.333</td>
<td>464.847</td>
</tr>
<tr>
<td>Off10</td>
<td>59 - 61</td>
<td>83.333</td>
<td>1652.778</td>
<td>534.292</td>
</tr>
<tr>
<td>Off11</td>
<td>62 - 64</td>
<td>83.333</td>
<td>1736.111</td>
<td>617.625</td>
</tr>
<tr>
<td>Off12</td>
<td>65 - 68</td>
<td>111.111</td>
<td>1833.333</td>
<td>714.847</td>
</tr>
<tr>
<td>Off13</td>
<td>69 - 73</td>
<td>138.889</td>
<td>1958.333</td>
<td>839.847</td>
</tr>
<tr>
<td>Off14</td>
<td>74 - 81</td>
<td>222.222</td>
<td>2138.889</td>
<td>1020.403</td>
</tr>
<tr>
<td>Off15</td>
<td>82 - 94</td>
<td>361.111</td>
<td>2430.556</td>
<td>1312.070</td>
</tr>
<tr>
<td>Off16</td>
<td>95 - 114</td>
<td>555.556</td>
<td>2888.889</td>
<td>1770.403</td>
</tr>
</tbody>
</table>

### 4.6. RMS DGR-33 Acquisition System

In addition to the magnetic, altimeter and position data, six channels of real time processed off-time EM decay in the Z direction and one in the X direction are recorded by the RMS DGR-33 acquisition system at 10 samples per second and plotted real-time on the analogue chart recorder. These channels are derived by a binning, stacking and filtering procedure on
the raw streaming data. The primary use of the RMS EM data (Z1 to Z6, X1) is to provide for real-time QA/QC on board the aircraft.

The channel window timing of the RMS DGR-33 6 channel system is described in the table below.

<table>
<thead>
<tr>
<th>RMS Channel</th>
<th>Start time (μs)</th>
<th>End time (μs)</th>
<th>Width (μs)</th>
<th>Streaming Channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1, X1</td>
<td>1269.8</td>
<td>1322.8</td>
<td>52.9</td>
<td>48-50</td>
</tr>
<tr>
<td>Z2</td>
<td>1322.8</td>
<td>1455.0</td>
<td>132.2</td>
<td>50-54</td>
</tr>
<tr>
<td>Z3</td>
<td>1428.6</td>
<td>1587.3</td>
<td>158.7</td>
<td>54-59</td>
</tr>
<tr>
<td>Z4</td>
<td>1587.3</td>
<td>1746.0</td>
<td>158.7</td>
<td>60-65</td>
</tr>
<tr>
<td>Z5</td>
<td>1746.0</td>
<td>2063.5</td>
<td>317.5</td>
<td>66-77</td>
</tr>
<tr>
<td>Z6</td>
<td>2063.5</td>
<td>2698.4</td>
<td>634.9</td>
<td>78-101</td>
</tr>
</tbody>
</table>

Figure 7. AeroTEM II Instrument Rack., including AeroDAS and RMS DGR-33 systems, AeroTEM power supply, data acquisition computer and AG-NAV2 navigation system.

4.7. MAGNETOMETER BASE STATION

The base magnetometer was a Geometrics G-859 cesium vapour magnetometer system with integrated GPS. Data logging and UTC time synchronisation was carried out within the magnetometer, with the GPS providing the timing signal. The data logging was configured to
measure at 1.0 second intervals. Digital recording resolution was 0.001 nT. The sensor was placed on a tripod in an area of low magnetic gradient and free of cultural noise sources. A continuously updated display of the base station values was available for viewing and regularly monitored to ensure acceptable data quality and diurnal variation.

4.8. RADAR ALTIMETER
A Terra TRA 3500/TRI-30 radar altimeter is used to record terrain clearance. The antenna was mounted on the outside of the helicopter beneath the cockpit. Therefore, the recorded data reflect the height of the helicopter above the ground. The Terra altimeter has an altitude accuracy of +/- 1.5 metres.

4.9. VIDEO TRACKING AND RECORDING SYSTEM
A high resolution digital colour 8 mm video camera is used to record the helicopter ground flight path along the survey lines. The video is digitally annotated with GPS position and time and can be used to verify ground positioning information and cultural causes of anomalous geophysical responses.

Figure 8. Digital video camera typical mounting location.

4.10. GPS NAVIGATION SYSTEM
The navigation system consists of an Ag-Nav Incorporated AG-NAV2 GPS navigation system comprising a PC-based acquisition system, navigation software, a deviation indicator in front of the aircraft pilot to direct the flight, a full screen display with controls in front of the operator, a Mid-Tech RX400p WAAS-enabled GPS receiver mounted on the instrument rack and an antenna mounted on the magnetometer bird. WAAS (Wide Area Augmentation System) consists of approximately 25 ground reference stations positioned across the United States that monitor GPS satellite data. Two master stations located on the east and west coasts collect data from the reference stations and create a GPS correction message. This correction accounts for GPS satellite orbit and clock drift plus signal delays caused by the atmosphere and ionosphere. The corrected differential message is then broadcast through one of two geostationary satellites, or satellites with a fixed position over the equator. The corrected position has a published accuracy of less than 3 metres.

Survey co-ordinates are set up prior to the survey and the information is fed into the airborne navigation system. The co-ordinate system employed in the survey design was WGS84 [World] using the UTM zone 11N projection. The real-time differentially corrected GPS
positional data was recorded by the RMS DGR-33 in geodetic coordinates (latitude and longitude using WGS84) at 0.2 s intervals.

4.11. **Digital Acquisition System**

The AeroTEM received waveform sampled during on and off-time at 120 channels per decay, 300 times per second, was logged by the proprietary AeroDAS data acquisition system. The channel sampling commences at the start of the Tx cycle and the width of each channel is 27.78 microseconds. The streaming data was recorded on a removable hard-drive and was later backed-up onto DVD-ROM from the field-processing computer.

The RMS Instruments DGR33A data acquisition system was used to collect and record the analogue data stream, i.e. the positional and secondary geophysical data, including processed 6 channel EM, magnetic, radar altimeter, GPS position, and time. The data was recorded on 128 Mb capacity Flashcard. The RMS output was also directed to a thermal chart recorder.

5. **Personnel**

The following Aeroquest personnel were involved in the project:

- Manager of Operations: Bert Simon
- Manager of Data Processing: Jonathan Rudd
- Field Data Processor: Geoff Plastow
- Field Operator: Rafal Starmach
- Data Interpretation and Reporting: Sean Walker, Marion Bishop, Eric Steffler

The survey pilot, Colby Terrell, was employed directly by the helicopter operator – Hi Wood Helicopters.

6. **Deliverables**

6.1. **Hardcopy Deliverables**

The report includes a set of three 1:10,000 maps products as outlined below.

- TMI – Coloured Total Magnetic Intensity (TMI) with line contours and EM anomaly symbols.
- ZOFF1 – AeroTEM Z1 Off-time with line contours and EM anomaly symbols.
- EM – AeroTEM off-time profiles Z2 – Z16 and EM anomaly symbols.

The coordinate/projection system for the maps is NAD83 – UTM Zone 11N. For reference, the latitude and longitude in WGS84 are also noted on the maps.

All the maps show flight path trace, skeletal topography, and conductor picks represented by an anomaly symbol classified according to calculated off-time conductance. The anomaly symbol is accompanied by postings denoting the calculated off-time conductance, a thick or thin classification and an anomaly identifier label. The anomaly symbol legend is given in the margin of the maps. The magnetic field data is presented as superimposed line contours with a minimum contour interval of 10 nT. Bold contour lines are separated by 500 nT.
6.2. DIGITAL DELIVERABLES

6.2.1. Final Database of Survey Data (.GDB, .XYZ)
The geophysical profile data is archived digitally in a Geosoft GDB binary format database. A description of the contents of the individual channels in the database can be found in Appendix 2. A copy of this digital data is archived at the Aeroquest head office in Mississauga.

6.2.2. Geosoft Grid files (.GRD)
Levelled Grid products used to generate the geophysical map images. Cell size for all grid files is 25 metres.
- Total Magnetic Intensity (TMI)
- AeroTEM Z Offtime Channel 1 (ZOFF1)

6.2.3. Digital Versions of Final Maps (.MAP, .PDF)
Map files in Geosoft .map and Adobe PDF format.

6.2.4. Free Viewing Software
- Geosoft Oasis Montaj Viewing Software
- Adobe Acrobat Reader
- Google Earth Viewer

6.2.5. Digital Copy of this Document (.PDF)

7. DATA PROCESSING AND PRESENTATION
All in-field and post-field data processing was carried out using Aeroquest proprietary data processing software and Geosoft Oasis Montaj software. Maps were generated using 36-inch wide Hewlett Packard ink-jet plotters.

7.1. BASE MAP
The geophysical maps accompanying this report are based on positioning in the NAD83 datum. The survey geodetic GPS positions have been projected using the Universal Transverse Mercator projection in Zone 11 North. A summary of the map datum and projection specifications is given following:
- Ellipse: GRS 1980
- Ellipse major axis: 6378137m eccentricity: 0.081819191
- Datum: North American 1983 - Canada Mean
- Datum Shifts (x,y,z) : 0, 0, 0 metres
- Map Projection: Universal Transverse Mercator Zone 11 (Central Meridian -117ºW)
- Central Scale Factor: 0.9996
- False Easting, Northing: 500,000m, 0m
For reference, the latitude and longitude in WGS84 are also noted on the maps.
The background vector topography was obtained from Natural Resources Canada 1:50,000 National Topographic Database (NTDB). The background shading was derived from NASA Shuttle Radar Topography Mission (SRTM) 90 metres resolution DEM data.

7.2. FLIGHT PATH & TERRAIN CLEARANCE
The position of the survey helicopter was directed by use of the Global Positioning System (GPS). Positions were updated five times per second (5 Hz) and expressed as WGS84 latitude and longitude calculated from the raw pseudo range derived from the C/A code signal. The instantaneous GPS flight path, after conversion to UTM co-ordinates, is drawn using linear interpolation between the x/y positions. The terrain clearance was maintained with reference to the radar altimeter. The raw Digital Terrain Model (DTM) was derived by taking the GPS survey elevation and subtracting the radar altimeter terrain clearance values. The calculated topography elevation values are relative and are not tied in to surveyed geodetic heights.

Each flight included at least two high elevation ‘background’ checks. These high elevation checks are to ensure that the gain of the system remained constant and within specifications.

7.3. ELECTROMAGNETIC DATA
The raw streaming data, sampled at a rate of 36,000 Hz (120 channels, 300 times per second) was reprocessed using a proprietary software algorithm developed and owned by Aeroquest Limited. Processing involves the compensation of the X and Z component data for the primary field waveform. Coefficients for this compensation for the system transient are determined and applied to the stream data. The stream data are then pre-filtered, stacked, binned to the 33 on and off-time channels and checked for the effectiveness of the compensation and stacking processes. The stacked data is then filtered, levelled and split up into the individual line segments. Further base level adjustments may be carried out at this stage. The filtering of the stacked data is designed to remove or minimize high frequency noise that can not be sourced from the geology.

The final field processing step was to merge the processed EM data with the other data sets into a Geosoft GDB file. The EM fiducial is used to synchronize the two datasets. The processed channels are merged into ‘array format; channels in the final Geosoft database as Zon, Zoff, Xon, and Xoff.

Apparent bedrock EM anomalies were interpreted with the aid of an auto-pick from positive peaks and troughs in the off-time Z channel responses correlated with X channel responses. The auto-picked anomalies were reviewed and edited by a geophysicist on a line by line basis to discriminate between thin and thick conductor types. Anomaly picks locations were migrated and removed as required. This process ensures the optimal representation of the conductor centres on the maps.

At each conductor pick, estimates of the off-time conductance have been generated based on a horizontal plate source model for those data points along the line where the response amplitude is sufficient to yield an acceptable estimate. Some of the EM anomaly picks do not display a Tau value; this is due to the inability to properly define the decay of the conductor usually because of low signal amplitudes. Each conductor pick was then classified according to a set of seven ranges of calculated off-time conductance values. For high conductance sources, the on-time conductance values may be used, since it provides a more accurate measure of high-conductance sources. Each symbol is also given an identification letter label, unique to each flight line. Conductor picks that did not yield an acceptable estimate of off-time conductance due to a low amplitude response were classified as a low conductance source. Please refer to the anomaly symbol legend located in the margin of the maps.
7.4. MAGNETIC DATA

Prior to any levelling the magnetic data was subjected to a lag correction of -0.1 seconds and a spike removal filter. The filtered aeromagnetic data were then corrected for diurnal variations using the magnetic base station and the intersections of the tie lines. No corrections for the regional reference field (IGRF) were applied. The corrected profile data were interpolated on to a grid using a random grid technique with a grid cell size of 25 metres. The final levelled grid provided the basis for threading the presented contours which have a minimum contour interval of 10 nT.

8. GENERAL COMMENTS

The survey was successful in mapping the magnetic and conductive properties of the geology throughout the survey area. Below is a brief interpretation of the results. For a detailed interpretation please contact Aeroquest Limited.

8.1. MAGNETIC RESPONSE

The magnetic data provide a high resolution map of the distribution of the magnetic mineral content of the survey area. This data can be used to interpret the location of geological contacts and other structural features such as faults and zones of magnetic alteration. The sources for anomalous magnetic responses are generally thought to be predominantly magnetite because of the relative abundance and strength of response (high magnetic susceptibility) of magnetite over other magnetic minerals such as pyrrhotite.

8.2. EM ANOMALIES

The EM anomalies on the maps are classified by conductance (as described earlier in the report) and also by the thickness of the source. A thin, vertically orientated source produces a double peak anomaly in the z-component response and a positive to negative crossover in the x-component response (Figure 8). For a vertically orientated thick source (say, greater than 10 metres), the response is a single peak in the z-component response and a negative to positive crossover in the x-component response (Figure 9). Because of these differing responses, the AeroTEM system provides discrimination of thin and thick sources and this distinction is indicated on the EM anomaly symbols (N = thin and K = thick). Where multiple, closely spaced conductive sources occur, or where the source has a shallow dip, it can be difficult to uniquely determine the type (thick vs. thin) of the source (Figure 10). In these cases both possible source types may be indicated by picking both thick and thin response styles. For shallow dipping conductors the ‘thin’ pick will be located over the edge of the source, whereas the ‘thick’ pick will fall over the down dip ‘heart’ of the anomaly.
Figure 9. AeroTEM response to a ‘thin’ vertical conductor.

Figure 10. AeroTEM response for a ‘thick’ vertical conductor.
Figure 11. AeroTEM response over a ‘thin’ dipping conductor.

All cases should be considered when analyzing the interpreted picks and prioritizing for follow-up. Specific anomalous responses which remain as high priority should be subjected to numerical modeling prior to drill testing to determine the dip, depth and probable geometry of the source.

Respectfully submitted,

Sean Walker
Aeroquest Limited
October, 2007
APPENDIX 1: SURVEY BOUNDARIES

The following table presents the survey block boundaries. All geophysical data presented in this report have been windowed to these outlines. X and Y positions are in NAD83 UTM Zone 11N.

Deer Park

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>422512.94</td>
<td>5482191.96</td>
</tr>
<tr>
<td>427473.39</td>
<td>5482155.78</td>
</tr>
<tr>
<td>427406.19</td>
<td>5475638.49</td>
</tr>
<tr>
<td>424702.65</td>
<td>5475638.51</td>
</tr>
<tr>
<td>424712.46</td>
<td>5477528.06</td>
</tr>
<tr>
<td>422464.75</td>
<td>5477546.78</td>
</tr>
</tbody>
</table>
## APPENDIX 2: MINING CLAIMS

<table>
<thead>
<tr>
<th>Tenure Number</th>
<th>Claim Name</th>
<th>Owner</th>
<th>Good To Date</th>
<th>Mining Division</th>
<th>Area (Ha)</th>
<th>Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>520928</td>
<td>DYNO</td>
<td>KENNEDY, THOMAS PETER JAMES</td>
<td>2008/nov/30</td>
<td>Deer</td>
<td>251.886</td>
<td>Park</td>
</tr>
<tr>
<td>522128</td>
<td>DEER 2</td>
<td>KENNEDY, THOMAS PETER JAMES</td>
<td>2007/nov/08</td>
<td>Deer</td>
<td>420.133</td>
<td>Park</td>
</tr>
<tr>
<td>542340</td>
<td>DEER 3</td>
<td>KENNEDY, THOMAS PETER JAMES</td>
<td>2007/dec/02</td>
<td>Deer</td>
<td>503.993</td>
<td>Park</td>
</tr>
<tr>
<td>542341</td>
<td>DEER 4</td>
<td>KENNEDY, THOMAS PETER JAMES</td>
<td>2007/dec/02</td>
<td>Deer</td>
<td>482.844</td>
<td>Park</td>
</tr>
<tr>
<td>546401</td>
<td>DEER 06</td>
<td>KENNEDY, THOMAS PETER JAMES</td>
<td>2007/dec/02</td>
<td>Deer</td>
<td>105.051</td>
<td>Park</td>
</tr>
<tr>
<td>554711</td>
<td>DEER 3</td>
<td>KENNEDY, THOMAS PETER JAMES</td>
<td>2008/feb/19</td>
<td>Deer</td>
<td>504.139</td>
<td>Park</td>
</tr>
<tr>
<td>548862</td>
<td>BLUEJAY</td>
<td>WIESNER, MAX ROBERT</td>
<td>2008/jan/07</td>
<td>Deer</td>
<td>419.952</td>
<td>Park</td>
</tr>
</tbody>
</table>
APPENDIX 3: DESCRIPTION OF DATABASE FIELDS

The GDB file is a Geosoft binary database. In the database, the Survey lines and Tie Lines are prefixed with an "L" for "Line" and "T" for "Tie".

<table>
<thead>
<tr>
<th>COLUMN</th>
<th>UNITS</th>
<th>DESCRIPTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line</td>
<td>Line number</td>
<td></td>
</tr>
<tr>
<td>Flight</td>
<td>Flight #</td>
<td></td>
</tr>
<tr>
<td>emfid</td>
<td>AERODAS Fiducial</td>
<td></td>
</tr>
<tr>
<td>utctime</td>
<td>hh:mm:ss.ss</td>
<td>UTC time</td>
</tr>
<tr>
<td>x</td>
<td>m</td>
<td>UTM Easting (NAD83, Zone 11N)</td>
</tr>
<tr>
<td>y</td>
<td>m</td>
<td>UTM Northing (NAD83, Zone 11N)</td>
</tr>
<tr>
<td>bheight</td>
<td>m</td>
<td>Terrain clearance of EM bird</td>
</tr>
<tr>
<td>dtm</td>
<td>m</td>
<td>Digital Terrain Model</td>
</tr>
<tr>
<td>magf</td>
<td>nT</td>
<td>Final levelled total magnetic intensity</td>
</tr>
<tr>
<td>Basemagf</td>
<td>nT</td>
<td>Base station total magnetic intensity</td>
</tr>
<tr>
<td>Zoff</td>
<td>nT/s</td>
<td>Processed Streaming Off-Time Z component Channels 0-16</td>
</tr>
<tr>
<td>Xoff</td>
<td>nT/s</td>
<td>Processed Streaming Off-Time X component Channels 0-16</td>
</tr>
<tr>
<td>Anom_labels</td>
<td></td>
<td>Alphanumeric label of conductor pick</td>
</tr>
<tr>
<td>Off_Con</td>
<td>S</td>
<td>Off-time conductance at conductor pick</td>
</tr>
<tr>
<td>Off_Tau</td>
<td>μs</td>
<td>Off-time decay constant at conductor pick</td>
</tr>
<tr>
<td>Anom_ID</td>
<td></td>
<td>Anomaly Character (K= thick, N = thin)</td>
</tr>
<tr>
<td>grade</td>
<td></td>
<td>Classification from 1-7 based on conductance of conductor pick</td>
</tr>
<tr>
<td>pwrline</td>
<td></td>
<td>powrline monitor data channel</td>
</tr>
<tr>
<td>Off_allcon</td>
<td>S</td>
<td>Off-time conductance</td>
</tr>
<tr>
<td>Off_AllTau</td>
<td>μs</td>
<td>Off-time decay constant</td>
</tr>
</tbody>
</table>
## APPENDIX 4: AEROTEM ANOMALY LISTING

<table>
<thead>
<tr>
<th>line</th>
<th>emfid</th>
<th>utctime</th>
<th>x</th>
<th>y</th>
<th>bheight</th>
<th>magf</th>
<th>Anom Labels</th>
<th>Off Con</th>
<th>Off Tau</th>
<th>Anom ID</th>
<th>Grade</th>
<th>pwrlin</th>
</tr>
</thead>
<tbody>
<tr>
<td>2280</td>
<td>574080</td>
<td>20.962</td>
<td>424383.17</td>
<td>5479692.12</td>
<td>57.09</td>
<td>56001.77</td>
<td>A</td>
<td>0.387</td>
<td>62.21</td>
<td>K</td>
<td>1</td>
<td>-41</td>
</tr>
<tr>
<td>2270</td>
<td>410100</td>
<td>20.810</td>
<td>424380.78</td>
<td>547960.91</td>
<td>56.23</td>
<td>55999.36</td>
<td>A</td>
<td>0.545</td>
<td>73.826</td>
<td>K</td>
<td>1</td>
<td>-44</td>
</tr>
<tr>
<td>2280</td>
<td>330060</td>
<td>20.736</td>
<td>424411.95</td>
<td>5479489.15</td>
<td>57.65</td>
<td>55945.17</td>
<td>A</td>
<td>0.377</td>
<td>61.373</td>
<td>K</td>
<td>1</td>
<td>-39</td>
</tr>
<tr>
<td>2290</td>
<td>150270</td>
<td>20.570</td>
<td>422946.97</td>
<td>5473973.33</td>
<td>52.68</td>
<td>56197.25</td>
<td>A</td>
<td>11.755</td>
<td>342.855</td>
<td>K</td>
<td>4</td>
<td>-4</td>
</tr>
<tr>
<td>2290</td>
<td>178650</td>
<td>20.596</td>
<td>424430.03</td>
<td>5479382.12</td>
<td>66.03</td>
<td>55915.17</td>
<td>B</td>
<td>0.263</td>
<td>51.243</td>
<td>K</td>
<td>1</td>
<td>-40</td>
</tr>
<tr>
<td>2300</td>
<td>153327</td>
<td>0.346</td>
<td>422904.71</td>
<td>5479824.23</td>
<td>44.66</td>
<td>56254.86</td>
<td>B</td>
<td>72.715</td>
<td>852.729</td>
<td>K</td>
<td>7</td>
<td>-4</td>
</tr>
<tr>
<td>2310</td>
<td>151044</td>
<td>0.325</td>
<td>423023.25</td>
<td>5479196.42</td>
<td>51.98</td>
<td>56176.13</td>
<td>A</td>
<td>0.596</td>
<td>77.194</td>
<td>K</td>
<td>1</td>
<td>-42</td>
</tr>
<tr>
<td>2310</td>
<td>151209</td>
<td>0.327</td>
<td>422923.69</td>
<td>5479197.43</td>
<td>42.75</td>
<td>56110.34</td>
<td>B</td>
<td>3.923</td>
<td>198.067</td>
<td>K</td>
<td>2</td>
<td>-41</td>
</tr>
<tr>
<td>2330</td>
<td>132090</td>
<td>0.150</td>
<td>423303.02</td>
<td>5478985.86</td>
<td>68.38</td>
<td>56098.57</td>
<td>A</td>
<td>16.459</td>
<td>405.696</td>
<td>K</td>
<td>4</td>
<td>-46</td>
</tr>
<tr>
<td>2370</td>
<td>910560</td>
<td>23.770</td>
<td>424327.64</td>
<td>5478577.21</td>
<td>70.14</td>
<td>56116.70</td>
<td>A</td>
<td>2.306</td>
<td>151.863</td>
<td>K</td>
<td>2</td>
<td>-41</td>
</tr>
<tr>
<td>2380</td>
<td>776550</td>
<td>23.646</td>
<td>424356.71</td>
<td>5478490.36</td>
<td>63.25</td>
<td>56044.35</td>
<td>A</td>
<td>4.29</td>
<td>207.122</td>
<td>K</td>
<td>2</td>
<td>-42</td>
</tr>
<tr>
<td>2390</td>
<td>701370</td>
<td>23.576</td>
<td>424360.81</td>
<td>5478389.87</td>
<td>55.81</td>
<td>56012.33</td>
<td>A</td>
<td>2.545</td>
<td>159.524</td>
<td>K</td>
<td>2</td>
<td>-58</td>
</tr>
<tr>
<td>2400</td>
<td>580650</td>
<td>23.464</td>
<td>424400.14</td>
<td>5478297.38</td>
<td>48.89</td>
<td>56003.17</td>
<td>A</td>
<td>8.878</td>
<td>297.956</td>
<td>K</td>
<td>3</td>
<td>-39</td>
</tr>
<tr>
<td>2410</td>
<td>383790</td>
<td>23.202</td>
<td>424567.94</td>
<td>5478092.48</td>
<td>56.76</td>
<td>56005.44</td>
<td>A</td>
<td>8.321</td>
<td>288.454</td>
<td>K</td>
<td>3</td>
<td>-40</td>
</tr>
<tr>
<td>2430</td>
<td>264660</td>
<td>23.172</td>
<td>425980.92</td>
<td>5477995.09</td>
<td>43.03</td>
<td>55853.93</td>
<td>A</td>
<td>2.527</td>
<td>158.971</td>
<td>K</td>
<td>2</td>
<td>-42</td>
</tr>
<tr>
<td>2440</td>
<td>196330</td>
<td>23.108</td>
<td>426073.99</td>
<td>5477910.12</td>
<td>45.74</td>
<td>55805.93</td>
<td>A</td>
<td>4.221</td>
<td>205.455</td>
<td>K</td>
<td>2</td>
<td>-52</td>
</tr>
<tr>
<td>2450</td>
<td>153370</td>
<td>22.351</td>
<td>426024.37</td>
<td>5477790.92</td>
<td>51.75</td>
<td>55903.73</td>
<td>A</td>
<td>14.048</td>
<td>374.802</td>
<td>K</td>
<td>4</td>
<td>-41</td>
</tr>
<tr>
<td>2450</td>
<td>157932</td>
<td>22.375</td>
<td>424428.23</td>
<td>5477809.46</td>
<td>57.10</td>
<td>55889.11</td>
<td>B</td>
<td>4.143</td>
<td>203.535</td>
<td>K</td>
<td>2</td>
<td>-40</td>
</tr>
<tr>
<td>2480</td>
<td>128190</td>
<td>22.099</td>
<td>426248.25</td>
<td>5477495.19</td>
<td>49.62</td>
<td>55946.64</td>
<td>A</td>
<td>12.971</td>
<td>360.159</td>
<td>K</td>
<td>4</td>
<td>-47</td>
</tr>
<tr>
<td>2490</td>
<td>121986</td>
<td>22.042</td>
<td>426285.40</td>
<td>5477395.07</td>
<td>40.00</td>
<td>55896.48</td>
<td>A</td>
<td>5.331</td>
<td>230.889</td>
<td>K</td>
<td>3</td>
<td>-39</td>
</tr>
<tr>
<td>2500</td>
<td>115152</td>
<td>21.979</td>
<td>424994.35</td>
<td>5477294.06</td>
<td>48.07</td>
<td>56054.24</td>
<td>A</td>
<td>0.85</td>
<td>92.201</td>
<td>K</td>
<td>1</td>
<td>-39</td>
</tr>
<tr>
<td>2500</td>
<td>115461</td>
<td>21.982</td>
<td>425194.65</td>
<td>5477299.60</td>
<td>58.55</td>
<td>56096.90</td>
<td>B</td>
<td>1.181</td>
<td>108.657</td>
<td>K</td>
<td>2</td>
<td>-44</td>
</tr>
<tr>
<td>2510</td>
<td>110391</td>
<td>21.935</td>
<td>426393.35</td>
<td>5477186.64</td>
<td>50.40</td>
<td>55836.67</td>
<td>A</td>
<td>4.245</td>
<td>206.035</td>
<td>K</td>
<td>2</td>
<td>-42</td>
</tr>
<tr>
<td>2510</td>
<td>111753</td>
<td>21.947</td>
<td>425507.86</td>
<td>5477193.14</td>
<td>58.90</td>
<td>56036.45</td>
<td>B</td>
<td>0.943</td>
<td>97.128</td>
<td>K</td>
<td>1</td>
<td>-45</td>
</tr>
<tr>
<td>2510</td>
<td>112518</td>
<td>21.954</td>
<td>424997.67</td>
<td>5477213.60</td>
<td>54.79</td>
<td>56054.92</td>
<td>C</td>
<td>1.006</td>
<td>100.286</td>
<td>K</td>
<td>2</td>
<td>-47</td>
</tr>
<tr>
<td>2520</td>
<td>103140</td>
<td>21.868</td>
<td>425001.20</td>
<td>5477091.71</td>
<td>63.16</td>
<td>56026.23</td>
<td>A</td>
<td>3.755</td>
<td>193.783</td>
<td>K</td>
<td>2</td>
<td>-42</td>
</tr>
<tr>
<td>2520</td>
<td>104210</td>
<td>21.878</td>
<td>425568.66</td>
<td>5477094.92</td>
<td>49.18</td>
<td>55988.86</td>
<td>B</td>
<td>1.226</td>
<td>110.742</td>
<td>K</td>
<td>2</td>
<td>-45</td>
</tr>
<tr>
<td>2930</td>
<td>449490</td>
<td>19.446</td>
<td>424977.77</td>
<td>5477121.83</td>
<td>76.55</td>
<td>56051.74</td>
<td>A</td>
<td>2.773</td>
<td>186.52</td>
<td>K</td>
<td>2</td>
<td>-43</td>
</tr>
<tr>
<td>2930</td>
<td>450840</td>
<td>19.447</td>
<td>424982.59</td>
<td>5477212.94</td>
<td>74.48</td>
<td>56043.39</td>
<td>B</td>
<td>1.139</td>
<td>108.735</td>
<td>K</td>
<td>2</td>
<td>-42</td>
</tr>
</tbody>
</table>
APPENDIX 5: AEROTEM DESIGN CONSIDERATIONS

Helicopter-borne EM systems offer an advantage that cannot be matched from a fixed-wing platform. The ability to fly at slower speed and collect data with high spatial resolution, and with great accuracy, means the helicopter EM systems provide more detail than any other EM configuration, airborne or ground-based. Spatial resolution is especially important in areas of complex geology and in the search for discrete conductors. With the advent of helicopter-borne high-moment time domain EM systems the fixed wing platforms are losing their only advantage – depth penetration.

Advantage 1 – Spatial Resolution

The AeroTEM system is specifically designed to have a small footprint. This is accomplished through the use of concentric transmitter-receiver coils and a relatively small diameter transmitter coil (5 m). The result is a highly focused exploration footprint, which allows for more accurate “mapping” of discrete conductors. Consider the transmitter primary field images shown in Figure 1, for AeroTEM versus a fixed-wing transmitter.

The footprint of AeroTEM at the earth’s surface is roughly 50 m on either side of transmitter

The footprint of a fixed-wing system is roughly 150 m on either side of the transmitter

Figure 1. A comparison of the footprint between AeroTEM and a fixed-wing system, highlights the greater resolution that is achievable with a transmitter located closer to the earth’s surface. The AeroTEM footprint is one third that of a fixed-wing system and is symmetric, while the fixed-wing system has even lower spatial resolution along the flight line because of the separated transmitter and receiver configuration.

At first glance one may want to believe that a transmitter footprint that is distributed more evenly over a larger area is of benefit in mineral exploration. In fact, the opposite is true; by energizing a larger surface area, the ability to energize and detect discrete conductors is reduced. Consider, for example, a comparison between AeroTEM and a fixed-wing system over the Mesamax Deposit (1,450,000 tonnes of 2.1% Ni, 2.7% Cu, 5.2 g/t Pt/Pd). In a test survey over three flight lines spaced 100 m apart, AeroTEM detected the Deposit on all three flight lines. The fixed-wing system detected the Deposit only on two flight lines. In exploration programs that seek to expand the flight line spacing in an effort to reduce the cost of the airborne survey, discrete conductors such as the Mesamax Deposit can go undetected. The argument often put forward in favour of using fixed-wing systems is that because of their larger footprint, the flight line spacing can indeed be widened. Many fixed-wing surveys are flown at 200 m or 400 m. Much of the survey work performed by Aeroquest has been to survey in areas that were previously flown at these wider line spacings. One of the reasons for AeroTEM’s impressive discovery record has been the strategy of flying closely spaced lines and finding all the discrete near-surface conductors. These higher resolution surveys are being flown within existing mining camps, areas that improve the chances of discovery.
Figure 2. Fixed-wing (upper) and AeroTEM (lower) comparison over the eastern limit of the Mesamax Deposit, a Ni-Cu-PGE zone located in the Raglan nickel belt and owned by Canadian Royalties. Both systems detected the Deposit further to the west where it is closer to surface.

The small footprint of AeroTEM combined with the high signal to noise ratio (S/N) makes the system more
suitable to surveying in areas where local infrastructure produces electromagnetic noise, such as power lines and railways. In 2002 Aeroquest flew four exploration properties in the Sudbury Basin that were under option by FNX Mining Company Inc. from Inco Limited. One such property, the Victoria Property, contained three major power line corridors.

The resulting AeroTEM survey identified all the known zones of Ni-Cu-PGE mineralization, and detected a response between two of the major power line corridors but in an area of favorable geology. Three boreholes were drilled to test the anomaly, and all three intersected sulphide. The third borehole encountered 1.3% Ni, 6.7% Cu, and 13.3 g/t TPMs over 42.3 ft. The mineralization was subsequently named the Powerline Deposit.

The success of AeroTEM in Sudbury highlights the advantage of having a system with a small footprint, but also one with a high S/N. This latter advantage is achieved through a combination of a high-moment (high signal) transmitter and a rigid geometry (low noise). Figure 3 shows the Powerline Deposit response and the response from the power line corridor at full scale. The width of power line response is less than 75 m.

**Figure 3.** The Powerline Deposit is located between two major power line corridors, which make EM surveying problematic. Despite the strong response from the power line, the anomaly from the Deposit is clearly detected. Note the thin formational conductor located to the south. The only way to distinguish this response from that of two closely spaced conductors is by interpreting the X-axis coil response.

**Advantage 2 – Conductance Discrimination**

The AeroTEM system features full waveform recording and as such is able to measure the on-time response due to high conductance targets. Due to the processing method (primary field removal), there is attenuation of the response with increasing conductance, but the AeroTEM on-time measurement is still superior to systems that rely on lower base frequencies to detect high conductance targets, but do not measure in the on-time.

The peak response of a conductive target to an EM system is a function of the target conductance and the EM system base frequency. For time domain EM systems that measure only in the off-time, there is a drop in the peak response of a target as the base frequency is lowered for all conductance values below the peak system.
response. For example, the AeroTEM peak response occurs for a 10 S conductor in the early off-time and 100 S in the late off-time for a 150 Hz base frequency. Because base frequency and conductance form a linear relationship when considering the peak response of any EM system, a drop in base frequency of 50% will double the conductance at which an EM system shows its peak response. If the base frequency were lowered from 150 Hz to 30 Hz there would be a fivefold increase in conductance at which the peak response of an EM occurred.

However, in the search for highly conductive targets, such as pyrrhotite-related Ni-Cu-PGM deposits, a fivefold increase in conductance range is a high price to pay because the signal level to lower conductance targets is reduced by the same factor of five. For this reason, EM systems that operate with low base frequencies are not suitable for general exploration unless the target conductance is more than 100 S, or the target is covered by conductive overburden.

Despite the excellent progress that has been made in modeling software over the past two decades, there has been little work done on determining the optimum form of an EM system for mineral exploration. For example, the optimum configuration in terms of geometry, base frequency and so remain unknown. Many geophysicists would argue that there is no single ideal configuration, and that each system has its advantages and disadvantages. We disagree.

When it comes to detecting and discriminating high-conductance targets, it is necessary to measure the pure in-phase response of the target conductor. This measurement requires that the measured primary field from the transmitter be subtracted from the total measured response such that the secondary field from the target conductor can be determined. Because this secondary field is in-phase with the transmitter primary field, it must be made while the transmitter is turned on and the transmitter current is changing. The transmitted primary field is several orders of magnitude larger than the secondary field. AeroTEM uses a bucking coil to reduce the primary field at the receiver coils. The only practical way of removing the primary field is to maintain a rigid geometry between the transmitter, bucking and receiver coils. This is the main design consideration of the AeroTEM airframe and it is the only time domain airborne system to have this configuration.

Figure 4. The off-time and on-time response nomogram of AeroTEM for a base frequency of 150 Hz. The on-time response is much stronger for higher conductance targets and this is why on-time measurements are more important than lower frequencies when considering high conductance targets in a resistive environment.

Advantage 3 – Multiple Receiver Coils

AeroTEM employs two receiver coil orientations. The Z-axis coil is oriented parallel to the transmitter coil and both are horizontal to the ground. This is known as a maximum coupled configuration and is optimal for detection. The X-axis coil is oriented at right angles to the transmitter coil and is oriented along the line-of-flight.
This is known as a minimum coupled configuration, and provides information on conductor orientation and thickness. These two coil configurations combined provide important information on the position, orientation, depth, and thickness of a conductor that cannot be matched by the traditional geometries of the HEM or fixed-wing systems. The responses are free from a system geometric effect and can be easily compared to model type curves in most cases. In other words, AeroTEM data is very easy to interpret. Consider, for example, the following modeled profile:

![AeroTEM Response Diagram](image)

**Figure 5.** Measured (lower) and modeled (upper) AeroTEM responses are compared for a thin steeply dipping conductor. The response is characterized by two peaks in the Z-axis coil, and a cross-over in the X-axis coil that is centered between the two Z-axis peaks. The conductor dips toward the higher amplitude Z-axis peak. Using the X-axis cross-over is the only way of differentiating the Z-axis response from being two closely spaced conductors.

**HEM versus AeroTEM**

Traditional helicopter EM systems operate in the frequency domain and benefit from the fact that they use narrowband as opposed to wide-band transmitters. Thus all of the energy from the transmitter is concentrated in
a few discrete frequencies. This allows the systems to achieve excellent depth penetration (up to 100 m) from a transmitter of modest power. The Aeroquest Impulse system is one implementation of this technology.

The AeroTEM system uses a wide-band transmitter and delivers more power over a wide frequency range. This frequency range is then captured into 16 time channels, the early channels containing the high frequency information and the late time channels containing the low frequency information down to the system base frequency. Because frequency domain HEM systems employ two coil configurations (coplanar and coaxial) there are only a maximum of three comparable frequencies per configuration, compared to 16 AeroTEM off-time and 12 AeroTEM on-time channels.

Figure 6 shows a comparison between the Dighem HEM system (900 Hz and 7200 Hz coplanar) and AeroTEM (Zaxis) from surveys flown in Raglan, in search of highly conductive Ni-Cu-PGM sulphide. In general, the AeroTEM peaks are sharper and better defined, in part due to the greater S/N ratio of the AeroTEM system over HEM, and also due to the modestly filtered AeroTEM data compared to HEM. The base levels are also better defined in the AeroTEM data. AeroTEM filtering is limited to spike removal and a 5-point smoothing filter. Clients are also given copies of the raw, unfiltered data.

Figure 6. Comparison between Dighem HEM (upper) and AeroTEM (lower) surveys flown in the Raglan area. The AeroTEM responses appear to be more discrete, suggesting that the data is not as heavily filtered as the HEM data. The S/N advantage of AeroTEM over HEM is about 5:1.

Aeroquest Limited is grateful to the following companies for permission to publish some of the data from their respective surveys: Wolfden Resources, FNX Mining Company Inc, Canadian Royalties, Nova West Resources, Aurogin Resources, Spectrem Air. Permission does not imply an endorsement of the AeroTEM system by these companies.
APPENDIX 6: AEROTEM INSTRUMENTATION SPECIFICATION SHEET

AEROTEM Helicopter Electromagnetic System

System Characteristics

- Transmitter: Triangular Pulse Shape Base Frequency 150 Hz
- Tx On Time - 1,150 (150 Hz) µs
- Tx Off Time - 2,183 (150 Hz) µs
- Loop Diameter - 5 m
- Peak Current - 250 A
- Peak Moment - 38,800 NIA
- Typical Z Axis Noise at Survey Speed = 5 nT peak to peak
- Sling Weight: 270 Kg
- Length of Tow Cable: 40 m
- Bird Survey Height: 30 m nominal

Receiver

- Two Axis Receiver Coils (x, z) positioned at centre of transmitter loop
- Selectable Time Delay to start of first channel 21.3, 42.7, or 64.0 ms

Display & Acquisition

- AERODAS Digital recording at 120 samples per decay curve at a maximum of 300 curves per second (27.778 µs channel width)
- RMS Channel Widths: 52.9, 132.3, 158.7, 158.7, 317.5, 634.9 µs
- Recording & Display Rate = 10 readings per second.
- On-board display - six channels Z-component and 1 X-component

System Considerations

Comparing a fixed-wing time domain transmitter with a typical moment of 500,000 NIA flying at an altitude of 120 m with a Helicopter TDEM at 30 m, notwithstanding the substantial moment loss in the airframe of the fixed wing, the same penetration by the lower flying helicopter system would only require a sixty-fourth of the moment. Clearly the AeroTEM system with nearly 40,000 NIA has more than sufficient moment. The airframe of the fixed wing presents a response to the towed bird, which requires dynamic compensation. This problem is non-existent for AeroTEM since transmitter and receiver positions are fixed. The AeroTEM system is completely portable, and can be assembled at the survey site within half a day.

Survey flown: May 9 - 10, 2007
Nominal EM bird height: 30 metres
Aircraft: Aerospatiale A-Star 350B2 (C-FPTG)
Installation: Towed bird 17 m above EM bird
Sensitivity: .001 nanoTesla

MAP PROJECTION
Central Scale Factor: 0.9996
False Easting/Northing: 500,000m/0m
Scale 1:10,000,000

Total Magnetic Intensity
Deer Park Block

Canada NTDB data.

Kootenay Gold Inc.
Tel: (905) 672-9129  Fax: (905) 672-7083

T2910 E T2910 E
T2930 E T2930 E

00365