# TECHNICAL REPORT ON A FIXED WING AEROMAGNETIC SURVEY

## NISLING RIVER, YUKON
## AERO-MGM064862W

**for**

## Geological Survey of Canada

**by**

## GOLDAK AIRBORNE SURVEYS

**January to March, 2011**

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## 1. INTRODUCTION

This report describes an aeromagnetic survey conducted in the Nisling River area in the Yukon Territory. This high sensitivity aeromagnetic survey was carried out by Goldak Airborne Surveys (Goldak) on behalf of the Geological Survey of Canada (GSC) between January 25th and March 26th, 2011.

Aircraft equipment operated included three cesium vapour magnetometers, a GPS real-time and post-corrected differential positioning system, a flight path recovery camera, VHS titling and recording system, as well as radar and barometric altimeters. All data were recorded digitally in GEDAS binary file format.

Reference ground equipment included two GEM Systems GSM-19W Overhauser magnetometers and a Novatel 12 channel GPS base station which was set up at the base of operations for differential post-flight corrections.

All installations are described in more detail in Section 4 of this report. Equipment specifications can be found in Section 6.

Eighty two flights (including test and calibration sorties) were required to complete the survey block. A total of 37,999 line kilometres of high resolution magnetic data were collected, processed and plotted.

The traverse lines were flown at a spacing of 400 metres with control lines flown at a separation of 2400 metres. Nominal terrain clearance was specified at 100 metres above ground. Whitehorse, Yukon was used as the base of operations throughout the entire survey.

## 2. SURVEY AREA LOCATION

The Nisling River block is centered approximately 210 kilometers northwest of Whitehorse YT with the midpoint roughly at 62° 00’ N, 138° 15’ W. This block contained 37,999 line kilometers of data (32,429 km of traverse lines and 5,570 of control lines).

Coordinates of the block are posted in Appendix A.

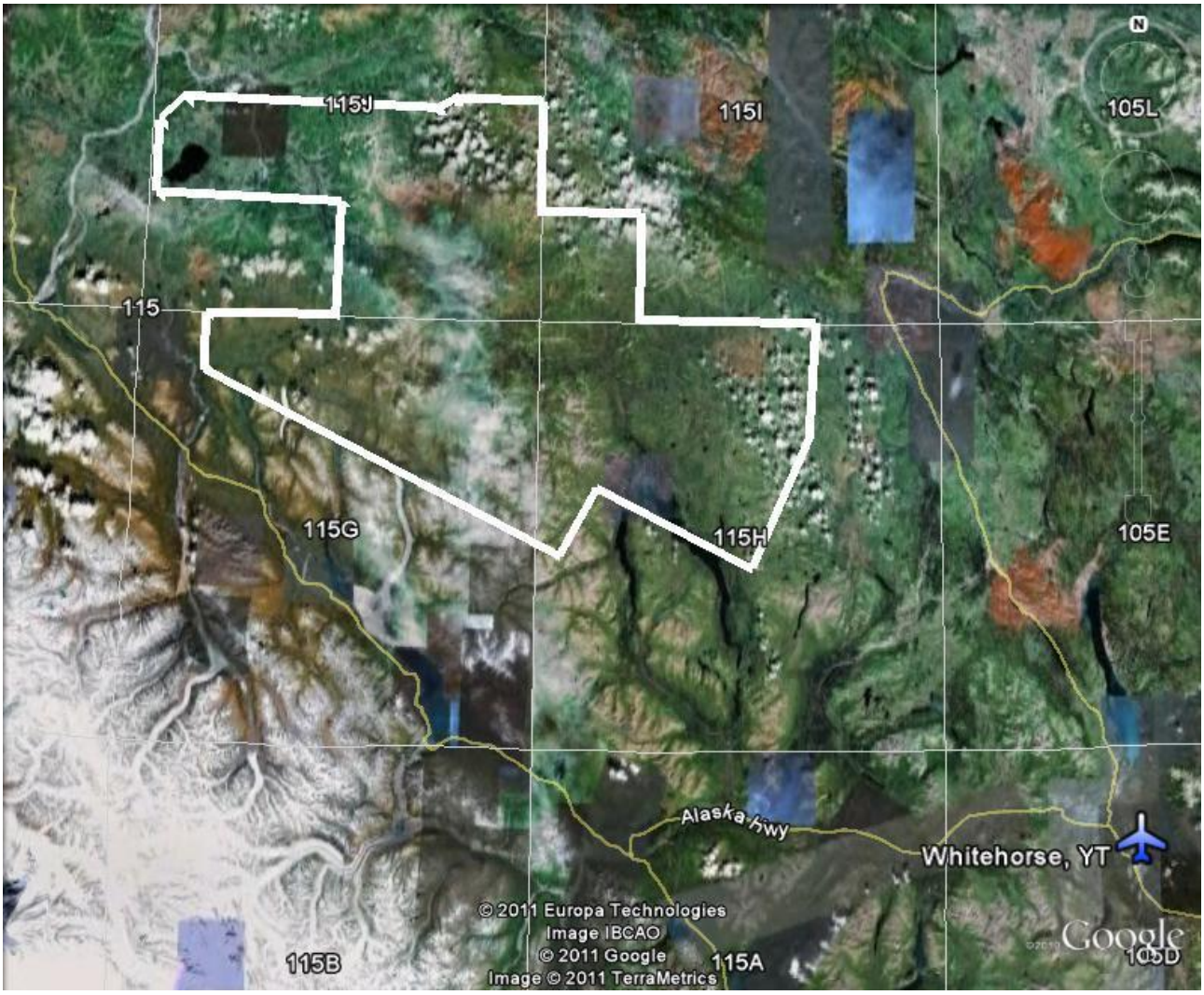


Figure 1 - Location of the Nisling River Survey Block

## 3. CONTRACT SPECIFICATIONS

### *3.1 Line Spacing*

| | | |
|---|---|---|
| Traverse Lines | bearing: | N 35°E UTM |
| | spacing: | 400 metres |
| | allowed min separation: | 300 metres |
| | allowed max separation | 500 metres |
| Control Lines | bearing | N 125°E UTM |
| | nominal spacing: | 2400 metres |

### *3.2 Altitude*

Altitude control was accomplished via a smooth drape calculated using topographic data available from the GeoBase website (http://www.geobase.ca).

> Nominal altitude: 100 m NTC (nominal terrain clearance)
> tolerance: a maximum 30m difference between traverse lines and control lines. To accomplish this, actual height deviations from the drape surface were not to exceed an envelope of +/- 15 metres at all times.

### *3.3 Diurnal*

A maximum tolerance of 3 nT (peak to peak) deviation from a long chord equivalent to a period of 60 seconds was not to be exceeded. Additionally, the diurnal was not to exceed a 0.5 nT deviation over 15 seconds.

### *3.4 Magnetic Noise*

The magnetic noise was not to exceed 0.1 nT in the $4^{th}$ digital difference.

All data was fully examined in the field and was deemed to have met the above specifications.

## 4. AIRCRAFT AND EQUIPMENT

### *4.1 Aircraft*

Three aircraft were used on this survey. A single Piper PA-31 Navajo, C-GJBG, began the survey on Jan 25th and was joined by another Navajo (C-GJBA) and a Cessna Caravan 208 (C-GLDX) on the 7th of March. All aircraft are owned and operated by Goldak Airborne Surveys. Each aircraft is fitted with a 3-meter stinger attached to the rear fuselage on the centerline of the aircraft. The attitude sensing fluxgate magnetometer is positioned at the midpoint of the stinger. The Navajos also have magnetometers installed in composite pods on each wingtip. The pods mount the sensors 1.2 metres outboard of the aircraft wingtip. The three magnetometers form a two-axis gradiometer with following dimensions:

| | |
|---|---|
| Lateral separation | 14.865m |
| Longitudinal separation | 9.754 m |

The aircraft have been extensively modified, both mechanically and electrically, to minimize the effects of maneuvering on the measured magnetic field. All aircraft have demonstrated a Figure of Merit of less than 0.7 nT as measured to Geological Survey of Canada (GSC) specification. Typical FOMs under less than ideal calibration environments are 0.9 nT for the tail magnetometer.


*Figure 2 - Aircraft C-GJBG at Whitehorse*

### *4.2 Magnetometer and Compensation*

The airborne magnetometers used are a matched set of Geometrics G-822A optically pumped cesium vapour types with sensitivity of 0.005 nT. The Navajos are equipped with AADCII compensators and the

Caravan with an AARC compensator, all by RMS Instruments. The magnetometer's Larmor signal is decoupled and counted by the compensator, and data are produced at a rate of 10 Hz with a resolution of 0.001 nT. The data bandwidth is from 0 to 0.9 Hz with an internal noise level of less than 0.002 nT.

The compensator mathematically "corrects" the magnetic data for noise due to aircraft motion and heading. Prior to the survey, the aircraft is taken to an area of low magnetic gradient at a high altitude (7000' AGL +) and put through a series of rolls, pitches and yaws on each of the survey's cardinal headings. This is done so that the instrument can form a model of the aircraft's magnetic characteristics without the near influence of the local geology. The remaining magnetic distortion is quantified by a term known as the Figure of Merit, or FOM. The Geological Survey of Canada uses a figure of merit of 1.5 or less as standard survey criteria. As stated above, this aircraft has a typical FOM of approximately 0.9 nT.

Seven compensation flights were over the course of the survey. The results of these flights are posted in Appendix B. Several other compensation flights were undertaken early in the survey in an effort to improve some high frequency maneuver noise, however no data was acquired with those compensations and they are not included.

### *4.3 Magnetic Base Station*

For this survey two magnetic base stations were installed. Multiple stations are useful both as a hardware back up and to discern any cultural effects from either unit. In both installations the base station employed was a GEM Systems GSM19W Overhauser type proton precession magnetometer with GPS time base. Each setup was configured to log data both internally and externally to a compact flash card using an Acumen DataBridge SDR serial data recorder. The station closest to the base of operations (Basemag1) was also equipped with a VHF radio link to the processing office so that diurnal conditions could be monitored in real time.

| Name | Easting | Northing | Reference Value | Comment |
|---|---|---|---|---|
| Basemag1 | 497473 | 6731934 | 56660 nT | On hillside behind 102 Wickstram Rd. |
| Basemag2 | 488046 | 6747461 | 56960 nT | back end of Lot 47 Boreal Rd. |

*Table 1 - Magnetic base station details*

*Figure 3 - Basemag setup*

### *4.4 GPS Positioning System*

The GPS receiver in the survey aircraft was a Novatel OEM4 ProPak 12 channel dual-frequency differential unit that communicates directly with the GEDAS system. This unit is used for navigation purposes and also logs data for post-flight differential corrections. The base station GPS was also a Novatel OEM4 dual-frequency ProPak whose data were logged by a battery-powered, industrial portable computer. A survey-grade GPS base antenna designed to minimize multi-path errors was used.

GPS signals can be affected by atmospheric and ionospheric effects which typically reduce the accuracy of the non-differential positioning to approximately 10 metres RMS. If a suitable stationary GPS receiver, on a known or assumed position, is used to record the apparent errors in the satellite range data, those errors can be used to correct the moving receiver in the aircraft to an accuracy of 1 meter RMS. This compensation process is called differential correction and can be applied to the moving receiver in real time for higher dynamic accuracy, or applied later to find out where the aircraft *was* with high accuracy. These are called real-time and post-corrected differential positioning respectively.

The base GPS antenna used for post flight differential corrections was set up on the roof of the Gold Rush Inn in Whitehorse. The precise position of the antenna was determined by collecting 9 hours of data then submitting the data to the NRCan's online Precise Point Positioning (PPP) service. The following coordinate was delivered:

| | |
|---|---|
| Latitude | 60°43' 06.2889" N |
| Longitude | 135° 03 27.9052" W |
| Ellipsoidal height | 658.31 m |

*Table 2 – GPS Base Location*

### *4.5 Radar Altimeter*

Each aircraft had two radar altimeters installed. The primary unit was a Thompson ERT-160 with a range of 0 – 8000 feet, one meter resolution and an accuracy of 2%. A Terra TRA-30 with an accuracy of 5-7% over a range of 40 to 2500 feet was the secondary altimeter. The primary radar became intermittent on LDX on all or parts of flights 59, 62, 65, 77 and 78.

### *4.6 Barometric Altimeter*

All aircraft are equipped with a Setra model 270 barometric altimeter. This instrument has an accuracy of ±1 meter.

### *4.7 Flight Path Camera*

The flight path was captured by a Panasonic GP-KR222 SV hi-resolution color video camera located in the lower rear fuselage of each aircraft. The video was recorded to a removable hard drive by a Toronto Micro Systems MDVR digital recorder, and then burned to dual layer DVD post flight.

### *4.8 GEDAS Digital Recorder*

All magnetic and positioning data are processed and recorded digitally by our GEDAS system. The GEDAS is an industrial rack-mount Intel Pentium based PC computer with multiple hard-drives, IO ports and ADAC devices.

The GEDAS system records GPS navigation records at 1Hz and magnetic data at 10 Hz. Data files are organized on a flight-by-flight basis in a proprietary binary format. The data is then imported directly into Geosoft via a custom gx.

## 5. DATA PROCESSING AND PRESENTATION

All latitude/longitude positions in the databases are represented in the original WGS84 datum. All projected positions are expressed in the NAD83 datum. UTM coordinates are calculated in Zone 8 N.

### *5.1 Positioning Data*

All position GPS position data was post processed in the field using Novatel Grafnav software. This step, depending on baseline distance and ionospheric activity, improves the accuracy of the data to the sub meter level.

### *5.2 Total Field Processing*

#### 5.2.1 Quality Control

The first steps in verifying the magnetic data took place in the field. The base station data was monitored to ensure compliance with the contract specification. The fourth difference was also monitored carefully to find any sudden offsets or other problems in the data.

#### 5.2.2 High Frequency Filtering

A filtering algorithm was developed by Frank Kiss of the GSC to remove undesirable high frequency noise components that were not removed by compensation. A script was provided which calculates the high frequency component of the data (~ < 1.5 seconds) without affecting real features. The resulting noise channel has a mean of zero and varies from -0.20 to plus 0.19 with a standard deviation of 0.009 nT.

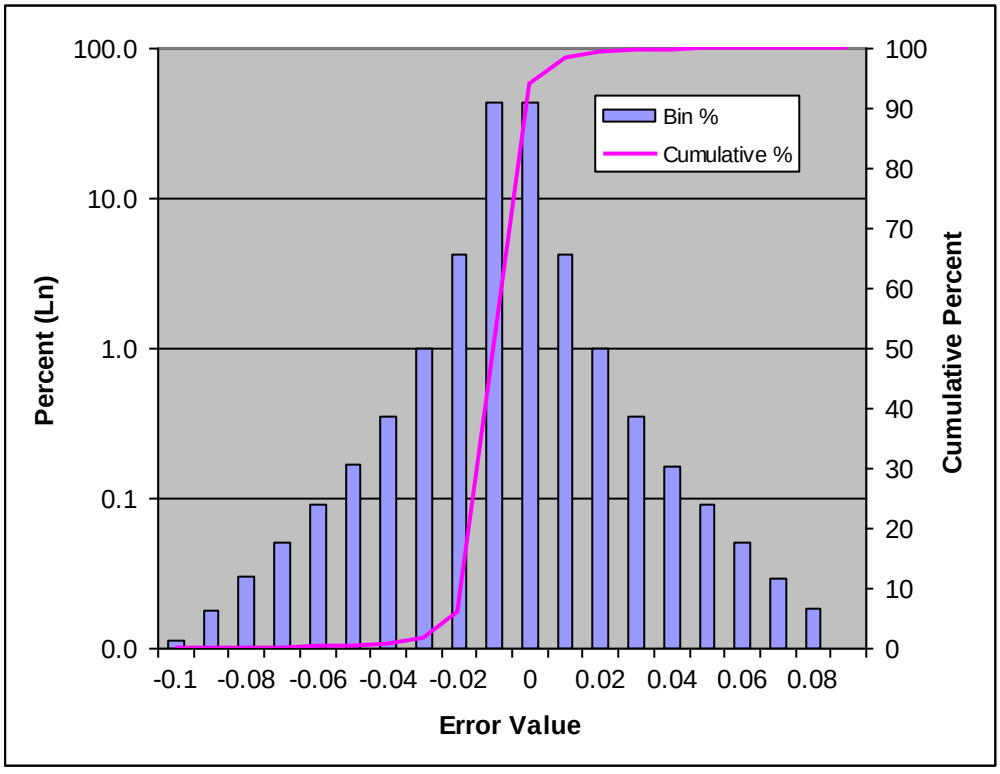


*Figure 4 - Magnitude of noise corrections*

### 5.2.3 Tieline Levelling

The first steps in verifying the magnetic data took place in the field. The base station data was monitored to ensure compliance with the contract specification. The fourth difference was also monitored carefully to find any sudden offsets or other problems in the data.

The intention of tie line leveling is to apply a smoothly varying function to the measured data which results in near identical values at the intersections of traverse and control lines. The most significant component of the correction is to accommodate the diurnal variation of the magnetic field. Other sources of error are altitude errors, GPS positioning errors, and system drift.

Leveling of the total field magnetic data consists of the following steps:

1. Iterative application of best fit, zero, first and second order trends (with outliers removed) on traverse and control lines, recursively, until resulting correction approaches zero.

2. The final levelling step involves manual inspection of the remaining intersection mismatches and reducing it to zero where appropriate by applying the necessary amounts to either the survey or tie lines. Special attention is paid to ensuring that the overall correction profiles are as smooth as possible and that there is no line to line correlation in the correction profiles, which implies a misapplied correction. The correction channel (when applied to the unleveled raw magnetic total field magnetic channel (produces the final levelled total field magnetic channel).

3. The second vertical derivative of the total field grid is analyzed to ensure that the corrections are sufficient and appropriate. Features which appear along the survey lines in the second vertical derivative may be the result of overcorrection or undercorrection. In either case the solution is to revise the correction profile at those intersections.

4. The International Geomagnetic Reference Field was subtracted from the final leveled total field channel. A fixed date of February 24, 2010 (2010.15) and a fixed altitude of 1433.5 metres ASL was used as input for this calculation.

## *5.3 Altitude Data*

Part of the GPS positioning processing involves calculation of the aircraft height above sea level. This component of the position is the least reliable, however with suitable care should be accurate to within 2-3 metres.

The barometric altimeter is calibrated for the air pressure at the beginning of each flight. Barometric drift, which is very similar to the magnetic diurnal in that it varies both in time and in space, is corrected for by periodically synchronizing the barometric altimeter with GPS altitude.

Because of the rugged topography radar 2 was not suitable for use when radar 1 became intermittent on C-GLDX. For the periods where the primary radar was unavailable a pseudo radar channel was derived from the difference between the DEM and the differentially corrected GPS height.

The derived topography was generated by subtracting the radar altitude from the post-processed GPSZ, gridding the result and comparing it with the known topography. Some striations that showed in the resultant gridded data were removed by microlevelling.

## *5.4 Gridded Data*

The residual total field and digital elevation grids were created using the minimum curvature method. Grid cell size for all grids is 100 m. The first vertical derivative grid was calculated directly from the residual total field grid.

## *5.5 Digital Data Files*

Digital data has been provided on DVD-ROM in Geosoft .GDB format. The fields included are as follows:

| Goldak Channel Name | GSC Channel Name | Description | Format | Units | Sample Rate |
|---|---|---|---|---|---|
| Line | LINE | Line number | I10 | - | 0.1 |
| GTime | TIME | GPS Time (seconds of the day, dbl prec.& rounded) | F10.2 | sec | 0.1 |
| fiducial | FIDUCIAL | Acquisition System time increment | F10.2 | sec | 0.1 |
| DLon | LONG | Longitude [WGS84] | F13.6 | deg | 0.1 |
| DLat | LAT | Latitude [WGS84] | F13.6 | deg | 0.1 |
| X | EASTING | UTM Easting (NAD83, zone **8N**) | F10.2 | m | 0.1 |
| Y | NORTHING | UTM Northing (NAD83, zone **8N**) | F10.2 | m | 0.1 |
| RAlt1a | RALTRAW | Raw Primary Radar Altimeter; before corrections | F10.2 | m | 0.1 |
| Radar_Alt | RALT | Lagged Radar Altimeter – final; with corrections | F10.2 | m | 0.1 |
| CBaro | BALT | Barometric altimeter corrected for drift and lag | F10.2 | m | 0.1 |
| SurfAlt | SURFACE | Ideal Surface altitude (drape) | F10.2 | m | 0.1 |
| GPSZ0 | GPSALTR | Uncorrected GPS Altitude (real-time) | F10.2 | m | 0.1 |
| DGPSZ | GPSALT | Differentially Corrected GPS Altitude | F10.2 | m | 0.1 |
| RadarTopo | DEMRAW | Raw digital Topography [GPSALT - RALT] | F10.2 | m | 0.1 |
| radartopo_Final | DEMLEV | Levelled digital Topography [GPSALT - RALT] | F10.2 | m | 0.1 |
| MBU | MAGUNCOM | Raw uncompensated, unlagged Lower Tail Mag | F10.2 | nT | 0.1 |
| MBC | MAGCOM | Raw compensated, unlagged Lower Tail Mag | F10.2 | nT | 0.1 |
| MBc_Lag | MAGRAW | Raw compensated, lagged Lower Tail Mag | F10.2 | nT | 0.1 |
| MBC_ed_lag | MAGHFCOR | HF_ noise removal corr. applied L.Tail | F10.2 | nT | 0.1 |
| BaseMag1R | DIURNRAW | Raw Basemag1 | F10.2 | nT | 0.1 |
| BaseMag2R | DIUR2RAW | Raw Basemag2 | F10.2 | nT | 0.1 |
| BaseMag1 | DIURNAL | Basemag 1 | F10.2 | nT | 0.1 |
| BaseMag2 | DIURNAL2 | Basemag2 | F10.2 | nT | 0.1 |
| tlcorr | MAGTLCOR | Tie-line levelling corrections to mag | F10.2 | nT | 0.1 |
| Mag_level | SRVMGLEV | Final tie-line levelled mag | F10.2 | nT | 0.1 |
| Igrf | IGRF | IGRF correction calculated at altitude of **1433.5** m, **2011/02/24** | F10.2 | nT | 0.1 |
| Magres | SRVMGRES | Levelled residual magnetic field | F10.2 | nT | 0.1 |
| VMl | FLUXLONG | Longitudinal Vector Mag (fluxgate) | F10.2 | nT | 0.1 |
| VMt | FLUXTRAN | Transverse Vector Mag (fluxgate) | F10.2 | nT | 0.1 |
| VMv | FLUXVERT | Vertical Vector Mag (fluxgate) | F10.2 | nT | 0.1 |
| Gsc_date | DATE | Local date **(YYYYMMDD)** | I10 | - | 0.1 |
| Flight | FLIGHT | Flight number | I10 | - | 0.1 |

*Table 3 - Final Database Channels*

**SRVMGLEV = MAGRAW – MAGHFCOR + MAGTLCOR**

### *5.6 Final Maps*

Maps were delivered in hard copy (5 copies of each) and digitally in both Geosoft .Map and .PDFX format. For each NTS sheet residual total magnetic field (rtf) and first vertical derivative (VDR1) of the magnetic field maps were produced. The products delivered are as follows:

| No | NTS | Theme | GSC-OF | YGS-OF |
|---|---|---|---|---|
| 1 | NTS 115 G/9, 115 H/5 & Parts of 115 G/8 &115 H/5 | RTF | 6891 | 2011-5 |
| 2 | NTS 115 G/9, 115 H/5 & Parts of 115 G/8 &115 H/5 | VDR1 | 6892 | 2011-6 |
| 3 | NTS 115 G/10 & 115 G/11 | RTF | 6893 | 2011-7 |
| 4 | NTS 115 G/10 & 115 G/11 | VDR1 | 6894 | 2011-8 |
| 5 | NTS 115 G/13 | RTF | 6895 | 2011-9 |
| 6 | NTS 115 G/13 | VDR1 | 6896 | 2011-10 |
| 7 | NTS 115 G/15 & 115 G/14 | RTF | 6897 | 2011-11 |
| 8 | NTS 115 G/15 & 115 G/14 | VDR1 | 6898 | 2011-12 |
| 9 | NTS 115 G/16 & 115 H/13 | RTF | 6899 | 2011-13 |
| 10 | NTS 115 G/16 & 115 H/13 | VDR1 | 6900 | 2011-14 |
| 11 | NTS 115 H/10, 115 H/11 & Parts of 115 H/6 & 115 H/7 | RTF | 6901 | 2011-15 |
| 12 | NTS 115 H/10, 115 H/11 & Parts of 115 H/6 & 115 H/7 | VDR1 | 6902 | 2011-16 |
| 13 | NTS 115 H/14 & 115 H/15 | RTF | 6903 | 2011-17 |
| 14 | NTS 115 H/14 & 115 H/15 | VDR1 | 6904 | 2011-18 |
| 15 | NTS 115-I/4 & 115 J/1 | RTF | 6905 | 2011-19 |
| 16 | NTS 115-I/4 & 115 J/1 | VDR1 | 6906 | 2011-20 |
| 17 | NTS 115 J/2 & 115 J/3 | RTF | 6907 | 2011-21 |
| 18 | NTS 115 J/2 & 115 J/3 | VDR1 | 6908 | 2011-22 |
| 19 | NTS 115 J/5 & 115 J/6 | RTF | 6909 | 2011-23 |
| 20 | NTS 115 J/5 & 115 J/6 | VDR1 | 6910 | 2011-24 |
| 21 | NTS 115 J/7 & 115 J/8 | RTF | 6911 | 2011-25 |
| 22 | NTS 115 J/7 & 115 J/8 | VDR1 | 6912 | 2011-26 |

*Table 4 - Final Maps Divisions*

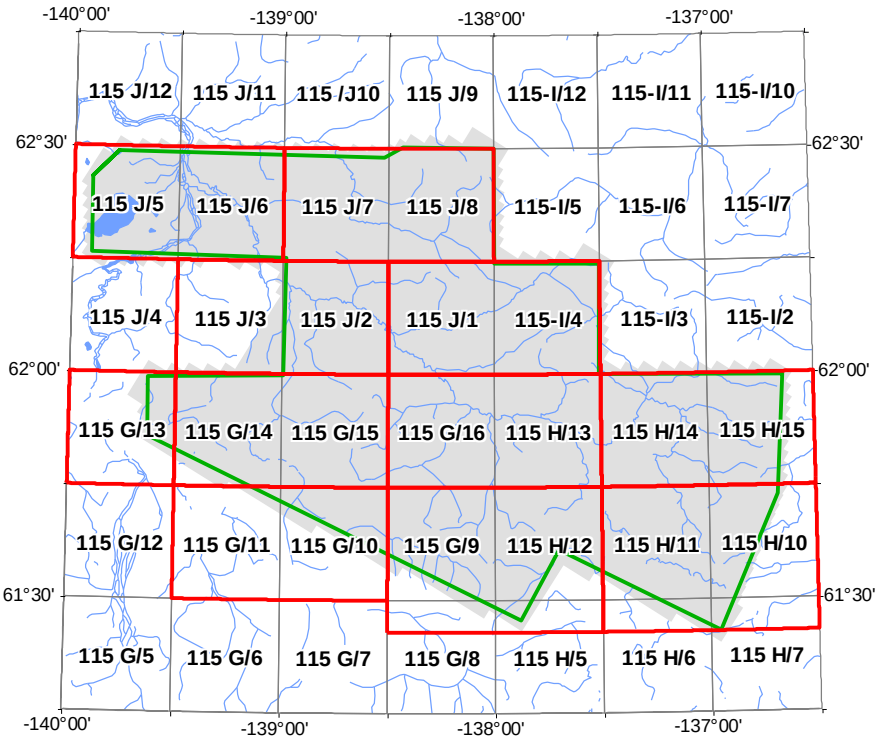


*Figure 5- Map Sheet Boundaries*

### *5.7 Flight Path Video*

Flight path video for this survey is supplied on dual layered DVD, one per flight in a proprietary format. Software required to view the video is included on each disk. Times, positions, direction and speed are overlain on the tape for detailed flight path recovery if required.

## 6. DETAILED EQUIPMENT SPECIFICATIONS

Our detailed equipment technical specifications are as follows:

**Aircraft**

| | | |
|---|---|---|
| C-GJBA, C-GJBG | Piper PA-31 Navajo | |
| 4m composite tail stinger | | |
| Demonstrated Figure of Merit | 0.9nT | |
| Sensor Separation | | |
| Lateral | 584" | 14.865 m |
| Longitudinal | 384" | 9.754 m |
| C-GLDX | Cessna Caravan 208 | |
| 4m composite tail stinger | | |

**Aircraft Magnetometers:**

| | |
|---|---|
| Manufacturer: | Geometrics |
| Type and Model Number: | Cesium G-822A |
| Range in nT: | 20,000 to 90,000 |
| Sensitivity in nT: | 0.005 |
| Sampling Rate: | 10 Hz |

**Base Station Magnetometers:**

| | |
|---|---|
| Manufacturer: | GEM Systems |
| Type and Model Number: | Overhauser GSM-19W |
| Range in nT: | 20,000 to 120,000 |
| Sensitivity in nT: | 0.01 |
| Sampling Rate: | 1 Hz (5 Hz maximum) |

**Base Station Data Loggers:**

| | |
|---|---|
| Manufacturer: | Acumen |
| Type and Model Number: | Data Bridge SDR-CF Serial Data Recorder |
| Media Type: | Compact Flash |

**Real-time Magnetic Compensator:**

| | |
|---|---|
| Manufacturer: | RMS Instruments |
| Type and Model Number: | AADCII or AARC |
| Range in nT: | 20,000 to 100,000 |
| Resolution in nT: | 0.001 |
| Sampling Rate: | 20Hz |

**Data Acquisition System:**

| | |
|---|---|
| Manufacturer: | Goldak Exploration Technology |
| Type and Model Number: | GEDAS |
| Sampling Rate: | 10 Hz |
| Data Format: | GEDAS binary |

**Positioning Cameras:**

| | |
|---|---|
| Manufacturer: | Panasonic |
| Model: | GPKR402 HRSV |
| Lens: | WV-LR4R5 4.5mm |
| | FOV at 1000 feet AGL is 1040 x 1300 feet |

**Barometric Altimeter:**

| | |
|---|---|
| Manufacturer: | Setra |
| Type and Model Number: | 270 |

| | |
|---|---|
| Range: | -1000 to 10,000 feet |
| Resolution: | 1 meter |

**Radar Altimeter 1:**

| | |
|---|---|
| Manufacturer | Thompson |
| Type and Model Number: | CFS 530A |
| Range: | 0-8000 feet |
| Resolution: | 1 meter |
| Accuracy: | 2% |

**Radar Altimeter 2:**

| | |
|---|---|
| Manufacturer | Terra |
| Type and Model Number: | TRA3000 – TRI40 |
| Range: | 40-2500 feet |
| Resolution: | 3 metres |
| Accuracy: | 5-7% |

**Positioning System:**

| | |
|---|---|
| Manufacturer: | Goldak Exploration Technology Ltd. |
| Type and Model Number: | GEDAS |
| Displays: | 10” color LCD graphical display<br>Graphic LCD pilot indicator |

**GPS Subsystem:**

| | |
|---|---|
| Manufacturer | Novatel |
| Type and Model Number: | OEM4 dual-frequency ProPaks (x3) |
| System Resolution: | <1 meter |
| Overall accuracy: | 3 m in real-time, <1m post-corrected |

**Software**

| | |
|---|---|
| Manufacturer: | Geosoft |
| Function: | Geophysical data processing |
| Type and Model Number: | Oasis Montaj v 7.2 |
| Manufacturer: | Waypoint Consulting |
| Function: | GPS post-processing |
| Type and Model Number: | GrafNav 8.20, GrafMov 8.20 |

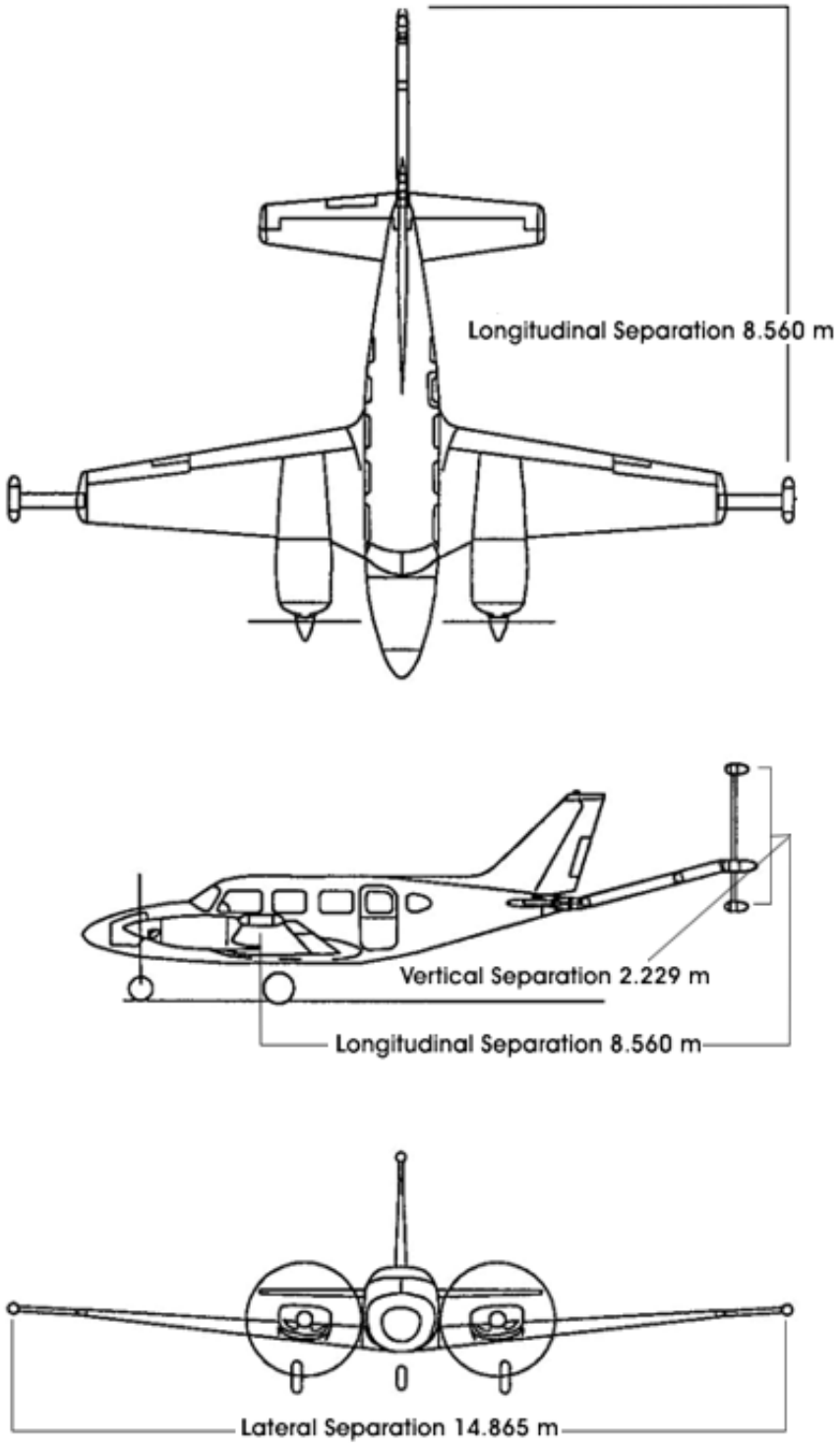


*Figure 6 - Survey Aircraft Layout*

## 7. STATEMENT OF QUALIFICATIONS

I, Marc Pelletier of the city of Saskatoon, Saskatchewan, certify that:

I am a member in good standing of the Association of Professional Engineers and Geoscientists of Saskatchewan (member number 10037).

I hold a B.Sc. Adv. in Geophysics from the University of Saskatchewan.

I have been practicing geophysics since 1986.

I am presently employed by Goldak Airborne Surveys as chief geophysicist.

I have supervised or performed all of the work in this report and find that it was performed with regards to normal best practices in the industry. Furthermore I feel it to be suitable for geologic interpretation.

Marc Pelletier, P.Geo

## APPENDIX A: SURVEY AREA COORDINATES

The Nisling River area was defined by the following NAD83, UTM zone 8N, coordinates:

| Corner | Easting | Northing |
|---|---|---|
| 1 | 293014 | 6909199 |
| 2 | 245261 | 6913206 |
| 3 | 246502 | 6931927 |
| 4 | 253208 | 6937751 |
| 5 | 318587 | 6932557 |
| 6 | 323226 | 6934927 |
| 7 | 345494 | 6933479 |
| 8 | 344317 | 6905145 |
| 9 | 370001 | 6903814 |
| 10 | 368739 | 6876577 |
| 11 | 413926 | 6874593 |
| 12 | 411299 | 6845117 |
| 13 | 395763 | 6812191 |
| 14 | 356661 | 6833822 |
| 15 | 346534 | 6816866 |
| 16 | 256584 | 6867201 |
| 17 | 257422 | 6881751 |
| 18 | 290879 | 6880289 |
| 19 | 293014 | 6909199 |
| 20 | 293014 | 6909199 |
| 21 | 245261 | 6913206 |
| 22 | 246502 | 6931927 |
| 23 | 253208 | 6937751 |

*Table 5 – Survey Area Coordinates*

## APPENDIX B: CALIBRATION FLIGHTS

### *B.1 Compensation Flights*

| | |
|---|---|
| **Aircraft** | Piper PA-31 Navajo |
| **Registration** | C-GJBG |
| **Date** | Jan. 26, 2011 |
| **Crew** | Langevin/Vinzenz |
| **Reason for Compensation** | Start of Survey |

| | North | East | South | West | Sum |
|---|---|---|---|---|---|
| **Pitch** | 0.16 | 0.09 | 0.05 | 0.09 | **0.39** |
| **Roll** | 0.03 | 0.08 | 0.03 | 0.02 | **0.16** |
| **Yaw** | 0.08 | 0.07 | 0.06 | 0.10 | **0.31** |
| **Sum** | **0.27** | **0.24** | **0.14** | **0.21** | **0.86** |

*Table 6 - Figure of Merit C-GJBG Jan 26, 2011*

| | |
|---|---|
| **Aircraft** | Piper PA-31 Navajo |
| **Registration** | C-GJBG |
| **Date** | Feb. 5, 2011 |
| **Crew** | Langevin/Vinzenz |
| **Reason for Compensation** | Changed/ Reoriented Mag |

| | North | East | South | West | Sum |
|---|---|---|---|---|---|
| **Pitch** | 0.16 | 0.09 | 0.05 | 0.09 | **0.39** |
| **Roll** | 0.03 | 0.08 | 0.03 | 0.02 | **0.16** |
| **Yaw** | 0.08 | 0.07 | 0.06 | 0.10 | **0.31** |
| **Sum** | **0.27** | **0.24** | **0.14** | **0.21** | **0.86** |

*Table 7 - Figure of Merit C-GJBG Feb 5, 2011*

| | |
|---|---|
| **Aircraft** | Piper PA-31 Navajo |
| **Registration** | C-GJBG |
| **Date** | Feb. 18, 2011 |
| **Crew** | Langevin/Vinzenz |
| **Reason for Compensation** | Changed battery and fuel solenoid in heater |

| | North | East | South | West | Sum |
|---|---|---|---|---|---|
| **Pitch** | 0.14 | 0.17 | 0.18 | 0.15 | **0.64** |
| **Roll** | 0.03 | 0.04 | 0.03 | 0.06 | **0.16** |
| **Yaw** | 0.05 | 0.11 | 0.10 | 0.10 | **0.36** |
| **Sum** | **0.22** | **0.32** | **0.31** | **0.31** | **1.16** |

*Table 8 - Figure of Merit C-GJBG Feb 18, 2011*

| | |
|---|---|
| **Aircraft** | Piper PA-31 Navajo |
| **Registration** | C-GJBG |
| **Date** | Feb. 24, 2011 |
| **Crew** | Langevin/Vinzenz |
| **Reason for Compensation** | Changed battery and fuel solenoid in heater |

***Heater OFF***

| | North | East | South | West | Sum |
|---|---|---|---|---|---|
| **Pitch** | 0.10 | 0.11 | 0.09 | 0.08 | **0.38** |
| **Roll** | 0.03 | 0.05 | 0.03 | 0.04 | **0.15** |
| **Yaw** | 0.04 | 0.09 | 0.07 | 0.05 | **0.25** |
| **Sum** | **0.17** | **0.25** | **0.19** | **0.17** | **0.78** |

***Heater ON***

| | North | East | South | West | Sum |
|---|---|---|---|---|---|
| **Pitch** | 0.10 | 0.08 | 0.09 | 0.09 | **0.36** |
| **Roll** | 0.07 | 0.07 | 0.06 | 0.05 | **0.25** |
| **Yaw** | 0.05 | 0.11 | 0.07 | 0.08 | **0.31** |
| **Sum** | **0.22** | **0.26** | **0.22** | **0.22** | **0.92** |

*Table 9 - Figure of Merit C-GJBG Feb 24, 2011*

| | |
|---|---|
| **Aircraft** | Piper PA-31 Navajo |
| **Registration** | C-GJBA |
| **Date** | March 7, 2011 |
| **Crew** | Mathieson/Yu |
| **Reason for Compensation** | Initial Compensation before commencement of survey |

| | North | East | South | West | Sum |
|---|---|---|---|---|---|
| **Pitch** | 0.12 | 0.11 | 0.08 | 0.10 | **0.41** |
| **Roll** | 0.05 | 0.06 | 0.05 | 0.05 | **0.21** |
| **Yaw** | 0.08 | 0.07 | 0.04 | 0.06 | **0.25** |
| **Sum** | **0.25** | **0.24** | **0.17** | **0.21** | **0.87** |

*Table 10 - Figure of Merit C-GJBA March 7, 2011*

| | |
|---|---|
| **Aircraft** | Cessna Caravan 208 |
| **Registration** | C-GLDX |
| **Date** | March 7, 2011 |
| **Crew** | Lebrun |
| **Reason for Compensation** | Initial Compensation before commencement of survey |

| | North | East | South | West | Sum |
|---|---|---|---|---|---|
| **Pitch** | 0.07 | 0.10 | 0.10 | 0.12 | **0.39** |
| **Roll** | 0.03 | 0.03 | 0.04 | 0.05 | **0.15** |
| **Yaw** | 0.05 | 0.08 | 0.04 | 0.08 | **0.25** |
| **Sum** | **0.15** | **0.21** | **0.18** | **0.25** | **0.79** |

*Table 11 - Figure of Merit C-GLDX March 7, 2011*

### *B.2 Radar Altimeter Calibrations*

| Test Location | Saskatoon Airport (YXE) |
|---|---|
| Test Date | January 22, 2011 |
| Aircraft | C-GJBG |
| Radar1 Type | Thompson CFS530 A |
| Radar2 Type | Terra TRA-30 |
| Avg. Runway height | 504 |

| Pass | GPS Alt | Baro Alt | Height above Runway | Radar1 | Radar 1 Scale Factor | Radar2 | Radar 2 Scale Factor |
|---|---|---|---|---|---|---|---|
| 200 | 564.3 | 569.1 | 56.8 | 58.7 | 0.968 | 56.7 | 1.002 |
| 300 | 598 | 602.3 | 90.5 | 93.6 | 0.967 | 90.3 | 1.002 |
| 400 | 626.7 | 630.8 | 119.2 | 120.9 | 0.986 | 118.5 | 1.006 |
| 400 | 623.7 | 627.9 | 116.2 | 118.4 | 0.981 | 115.6 | 1.005 |
| 500 | 650.1 | 654.2 | 142.6 | 144.5 | 0.987 | 141.8 | 1.006 |
| 600 | 685.5 | 689.3 | 178 | 180.7 | 0.985 | 176.8 | 1.007 |
| 700 | 708.3 | 711.7 | 200.8 | 203.3 | 0.988 | 198.8 | 1.010 |
| | | | | **AVERAGE** | **0.982** | | **1.006** |

*Table 12 - C-GJBB Radar Altimeter Scaling Factors*

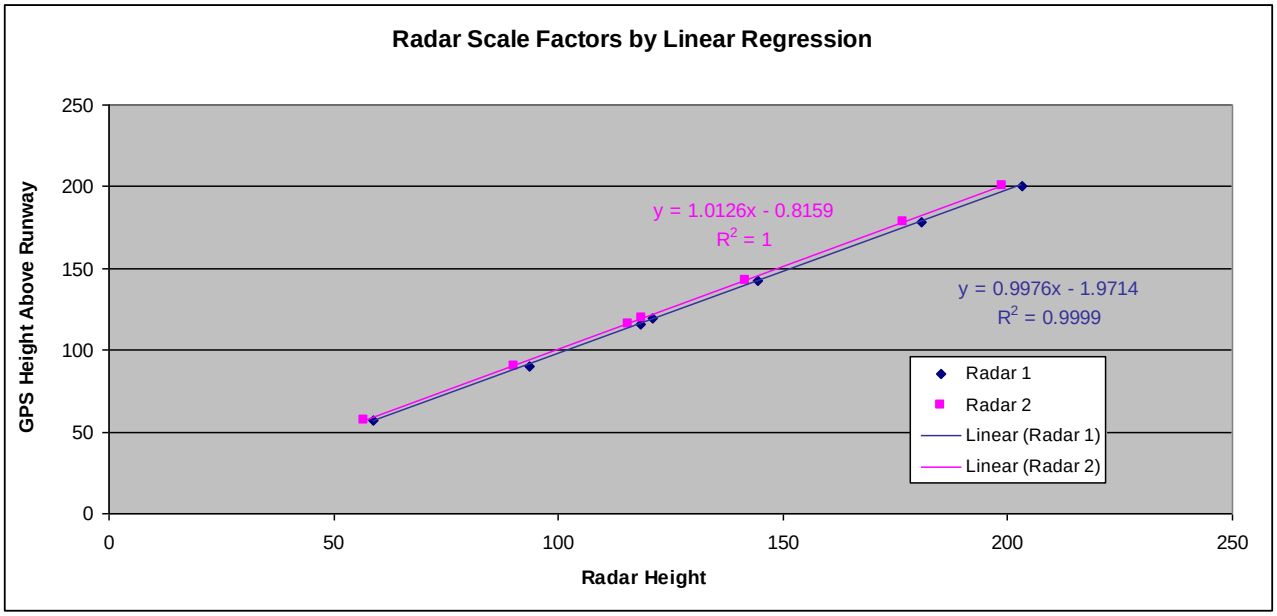


*Figure 7 – C-GJBG Radar Altimeter Scaling Factors Jan 22, 2011*

| | |
|---|---|
| Test Location | Saskatoon Airport (YXE) |
| Test Date | March 5, 2011 |
| Aircraft | C-GJBA |
| Radar1 Type | Thompson CFS530 A |
| Radar2 Type | Terra TRA-30 |
| Avg. Runway height | 504 |

| Pass | GPS Alt | Baro Alt | Height above Runway | Radar1 | Radar 1 Scale Factor | Radar2 | Radar 2 Scale Factor |
|---|---|---|---|---|---|---|---|
| 200 | 568.9 | 575.8 | 61.4 | 63.5 | 0.967 | 59.6 | 1.030 |
| 300 | 593.6 | 603.3 | 86.1 | 88.9 | 0.969 | 82.2 | 1.047 |
| 400 | 625.1 | 637.7 | 117.6 | 120 | 0.980 | 110.6 | 1.063 |
| 500 | 650.3 | 666.2 | 142.8 | 144.3 | 0.990 | 134.2 | 1.064 |
| 600 | 676 | 695.2 | 168.5 | 170.1 | 0.991 | 157.9 | 1.067 |
| 700 | 702.2 | 724.7 | 194.7 | 196.2 | 0.992 | 182.3 | 1.068 |
| 800 | 730.3 | 755.8 | 222.8 | 223.8 | 0.996 | 208.4 | 1.069 |
| | | | | **AVERAGE** | **0.983** | | **1.058** |

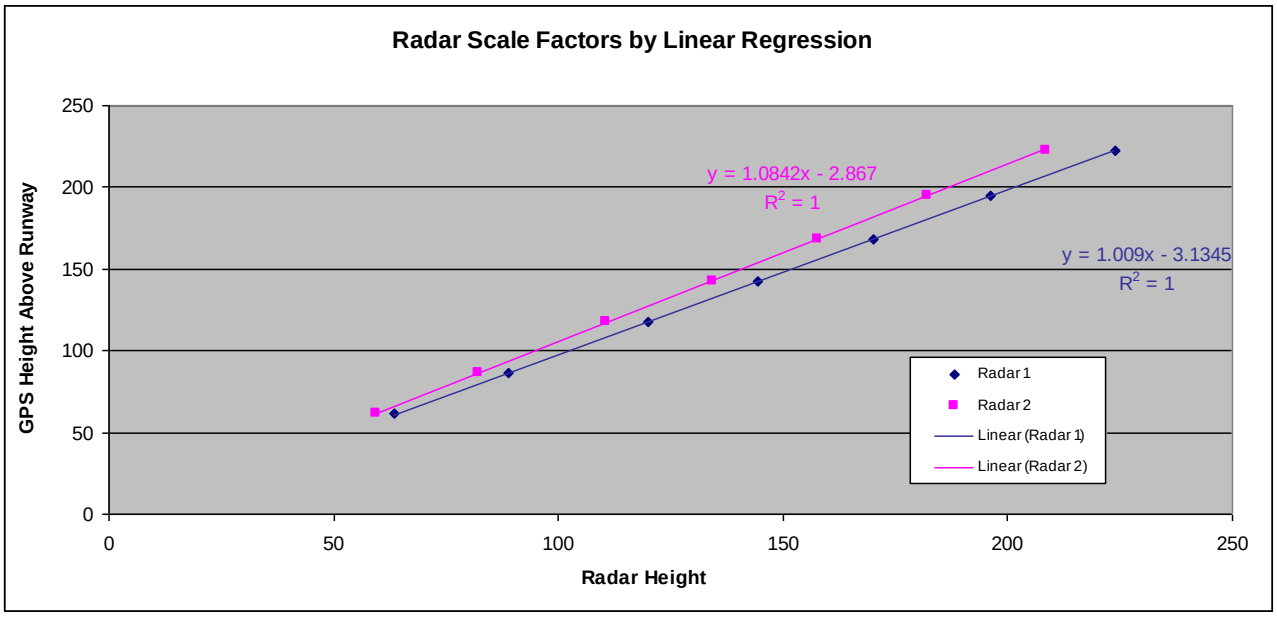


*Figure 8 – C-GJBA Radar Altimeter Scaling Factors March 5, 2011*

| Test Location | Saskatoon Airport (YXE) |
|---|---|
| Test Date | March 5, 2011 |
| Aircraft | C-GLDX |
| Radar1 Type | Thompson CFS530 A |
| Radar2 Type | Terra TRA-30 |
| Avg. Runway height | 504 |

| Pass | GPS Alt | Baro Alt | Height above Runway | Radar1 | Radar 1 Scale Factor | Radar2 | Radar 2 Scale Factor |
|---|---|---|---|---|---|---|---|
| 200 | 581.1 | 607.9 | 75.5 | 78.6 | 0.961 | 76.8 | 0.983 |
| 300 | 610 | 640.3 | 104.4 | 108.9 | 0.959 | 106.1 | 0.984 |
| 400 | 634.2 | 666.3 | 128.6 | 130.3 | 0.987 | 129.3 | 0.995 |
| 500 | 662.4 | 697 | 156.8 | 158.5 | 0.989 | 158 | 0.992 |
| 600 | 693 | 731.5 | 187.4 | 190.3 | 0.985 | 189.7 | 0.988 |
| 700 | 722.2 | 764.1 | 216.6 | 219.2 | 0.988 | 219.6 | 0.986 |
| | | | | **AVERAGE** | **0.978** | | **0.988** |

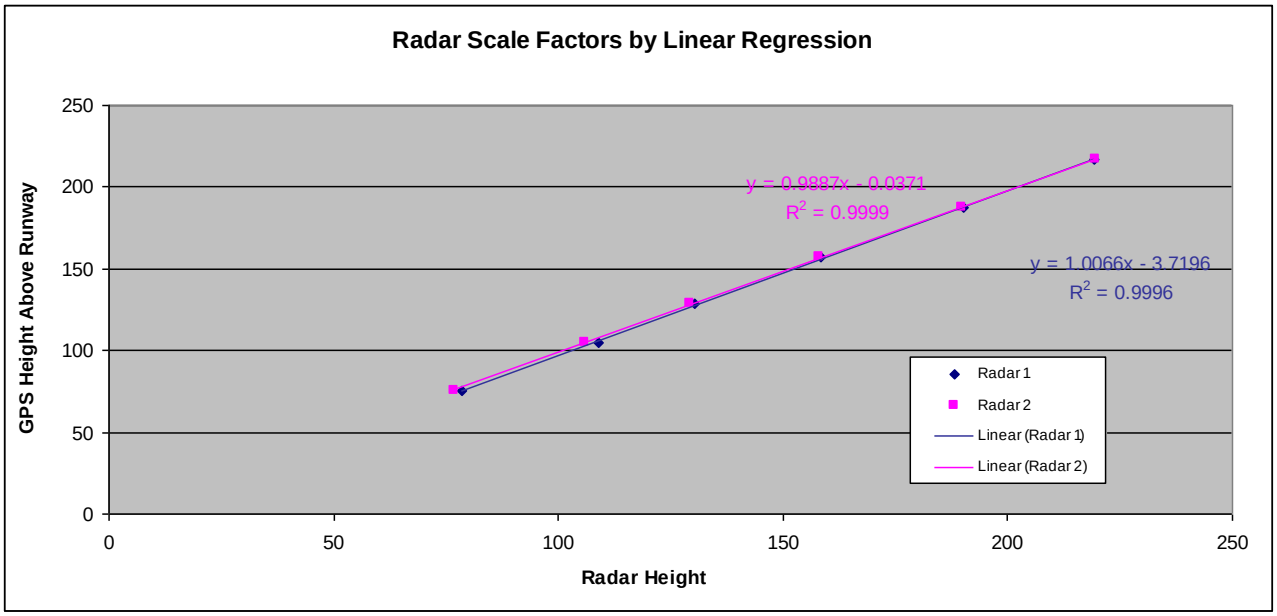


*Figure 9 – C-GLDX Radar Altimeter Scaling Factors March 5, 2011*

***Lag Test***

A test to verify the system lag on the survey aircraft was conducted on over a radio tower located 22 km southwest of Saskatoon. This test involved flying two passes in each of the four cardinal headings over the tower and comparing the position of the observed magnetic peaks with the know position of the target.

| | |
|---|---|
| **Aircraft** | C-GJBG |
| **Date** | January 22,2011 |
| **Location** | 22 km SW of YXE |
| **Target Easting** | 370599 |
| **Target Northing** | 5767235 |

| Pass | Direction | Peak X | Peak Y | Velocity | Distance From Tower | Lag |
|---|---|---|---|---|---|---|
| 1 | S | 370594 | 5767207 | 72.5 | 31.3 | **0.43** |
| 2 | N | 370608 | 5767269 | 83.9 | 32.1 | **0.38** |
| 3 | S | 370592 | 5767210 | 71.1 | 28.4 | **0.40** |
| 4 | N | 370609 | 5767270 | 83.3 | 33.0 | **0.40** |
| 5 | S | 370592 | 5767207 | 72.1 | 31.5 | **0.44** |
| 6 | N | 370615 | 5767261 | 84.7 | 27.6 | **0.33** |
| 7 | W | 370572 | 5767242 | 79.8 | 29.3 | **0.37** |
| 8 | E | 370630 | 5767228 | 77.2 | 29.5 | **0.38** |
| 9 | W | 370574 | 5767245 | 76.7 | 29.0 | **0.38** |
| 10 | E | 370633 | 5767233 | 79.4 | 32.2 | **0.41** |
| 11 | W | 370570 | 5767245 | 77.7 | 32.4 | **0.42** |
| 12 | E | 370628 | 5767230 | 79.2 | 27.4 | **0.35** |
| | | | | | **AVERAGE LAG** | **0.39** |

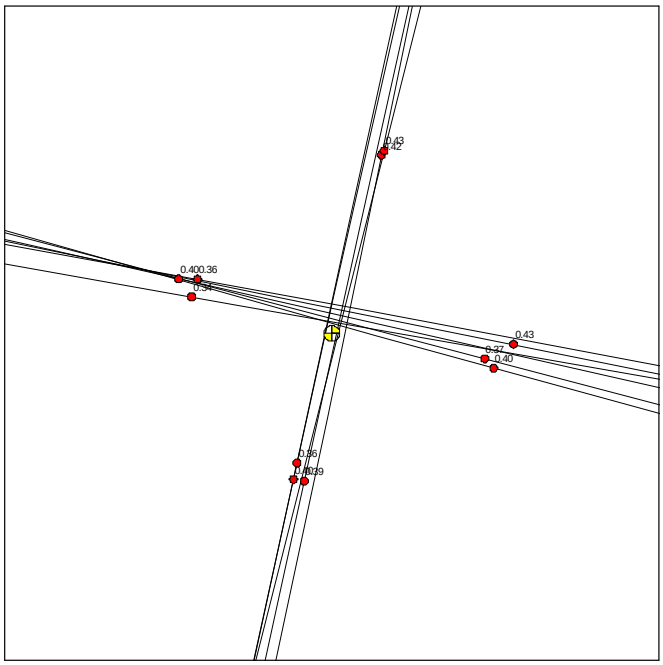


*Table 13 – C-GJBG Lag Test Results Jan 22, 2011*

| | |
|---|---|
| **Aircraft** | C-GJBA |
| **Date** | March 5,2011 |
| **Location** | 22 km SW of YXE |
| **Target Easting** | 370599 |
| **Target Northing** | 5767235 |

| Pass | Direction | Peak X | Peak Y | Velocity | Distance From Tower | Lag |
|---|---|---|---|---|---|---|
| 1 | S | 370587 | 5767203 | 83.77 | 35.4 | 0.42 |
| 2 | N | 370604 | 5767264 | 80.32 | 28.8 | 0.36 |
| 3 | S | 370588 | 5767208 | 83.02 | 30.3 | 0.37 |
| 4 | N | 370606 | 5767266 | 80.18 | 31.0 | 0.39 |
| 5 | S | 370593 | 5767203 | 83.51 | 33.6 | 0.40 |
| 6 | N | 370607 | 5767267 | 77.55 | 32.4 | 0.42 |
| 7 | W | 370568 | 5767248 | 85.3 | 32.6 | 0.38 |
| 8 | E | 370633 | 5767230 | 74.53 | 35.4 | 0.48 |
| 9 | W | 370570 | 5767246 | 83.65 | 29.5 | 0.35 |
| 10 | E | 370633 | 5767231 | 76.94 | 35.0 | 0.45 |
| 11 | W | 370571 | 5767247 | 85.58 | 29.2 | 0.34 |
| 12 | E | 370627 | 5767231 | 76.47 | 29.1 | 0.38 |
| | | | | | **AVERAGE LAG** | **0.39** |

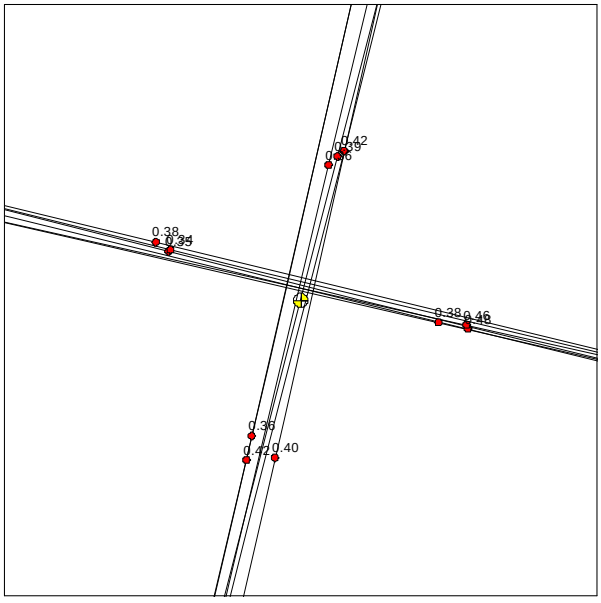


*Table 14 – C-GJBA Lag Test Results March 5, 2011*

| | |
|---|---|
| **Aircraft** | C-GLDX |
| **Date** | March 5,2011 |
| **Location** | 22 km SW of YXE |
| **Target Easting** | 370599 |
| **Target Northing** | 5767235 |

| Pass | Direction | Peak X | Peak Y | Velocity | Distance From Tower | Lag |
|---|---|---|---|---|---|---|
| 1 | S | 370588 | 5767194 | 73.12 | 44.50 | **0.61** |
| 2 | N | 370607 | 5767272 | 74.06 | 36.31 | **0.49** |
| 3 | S | 370586 | 5767201 | 75.84 | 38.30 | **0.50** |
| 4 | N | 370609 | 5767278 | 72.68 | 42.10 | **0.58** |
| 5 | S | 370591 | 5767200 | 75.07 | 38.03 | **0.51** |
| 6 | N | 370609 | 5767277 | 73.24 | 41.61 | **0.57** |
| 7 | W | 370558 | 5767246 | 78.09 | 41.11 | **0.53** |
| 8 | E | 370638 | 5767229 | 70.42 | 40.33 | **0.57** |
| 9 | W | 370554 | 5767248 | 79.22 | 44.98 | **0.57** |
| 10 | E | 370642 | 5767228 | 72.46 | 45.00 | **0.62** |
| 11 | W | 370559 | 5767246 | 81.08 | 40.22 | **0.50** |
| 12 | E | 370638 | 5767231 | 70.3 | 40.03 | **0.57** |
| | | | | | **AVERAGE LAG** | **0.55** |

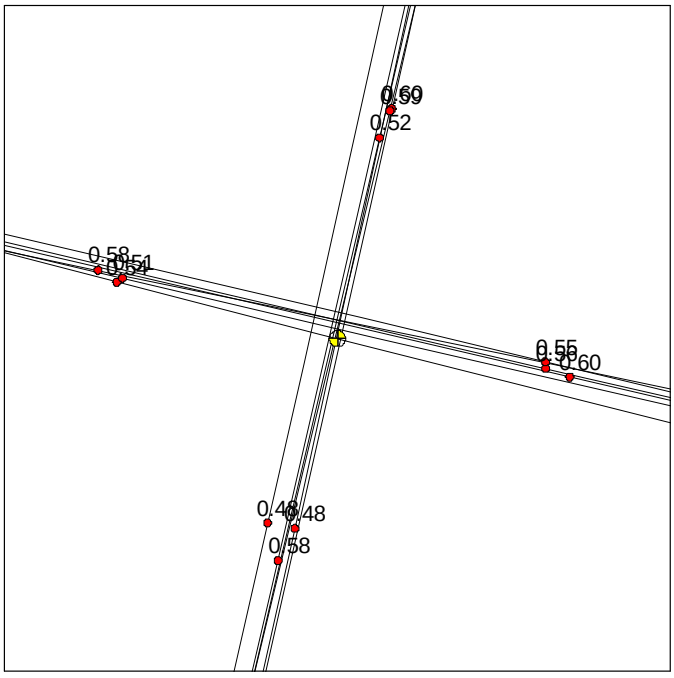


*Table 15 – C-GLDX Lag Test Results March 5, 2011*

### *B.3 Meanook Heading Test*

Each aircraft conducted a heading test both pre and post survey. Flying of the post survey tests was delayed for several days because of work being done at the site. Subsequently the “Mean Offset” value has changed rather dramatically. Previous to the work Goldak’s aircraft consistently had a mean offset of approximately 3 nT below the station value. This value has been consistent for several years. In the most recent set of tests, however, 3 aircraft over 2 days had positive offsets of 8, 9 and 11 nT.

**Pre-Survey**

| | |
|---|---|
| **Aircraft** | Piper Navajo |
| **Registration** | C-GJBG |
| **Date** | January 23, 2011 |
| **Location** | Meanook |

| Pass | Direction | Time | Meas. TF | Base TF | Error (nT) | Heading Error |
|---|---|---|---|---|---|---|
| **1** | N | 19:12:00 | 57898.51 | 57903.00 | **-4.49** | **0.02** |
| **2** | S | 4:48:00 | 57898.49 | 57903.00 | **-4.51** | |
| **3** | N | 9:36:00 | 57898.80 | 57903.00 | **-4.20** | **0.39** |
| **4** | S | 12:00:00 | 57898.11 | 57902.70 | **-4.59** | |
| **5** | W | 14:24:00 | 57898.51 | 57902.90 | **-4.39** | **-0.15** |
| **6** | E | 16:48:00 | 57898.46 | 57902.70 | **-4.24** | |
| **7** | W | 12:00:00 | 57898.66 | 57903.20 | **-4.54** | **-0.18** |
| **8** | E | 12:00:00 | 57899.04 | 57903.40 | **-4.36** | |

| | |
|---|---|
| **Mean Offset** | **-4.41** |
| **Mean N/S Err** | **0.02** |
| **Mean E/W Err** | **-0.15** |
| **Mean Err** | **0.02** |

**Post-Survey**

| | |
|---|---|
| **Date** | January 23, 2011 |
| **Location** | Meanook |

| Pass | Direction | Time | Meas. TF | Base TF | Error (nT) | Heading Error |
|---|---|---|---|---|---|---|
| **1** | N | 1:33:24 | 57882.37 | 57873.70 | **5.67** | **0.18** |
| **2** | S | 1:35:48 | 57882.99 | 57874.50 | **5.49** | |
| **3** | N | 1:37:49 | 57883.03 | 57874.40 | **5.63** | **0.19** |
| **4** | S | 1:40:18 | 57882.94 | 57874.50 | **5.44** | |
| **5** | N | 1:42:50 | 57882.03 | 57873.30 | **5.73** | **0.37** |
| **6** | S | 1:45:21 | 57881.46 | 57873.10 | **5.36** | |
| **7** | W | 1:49:17 | 57883.16 | 57874.70 | **5.46** | **0.05** |
| **8** | E | 1:51:54 | 57882.71 | 57874.30 | **5.41** | |
| **9** | W | 1:54:02 | 57881.42 | 57873.00 | **5.42** | **0.35** |
| **10** | E | 1:56:17 | 57879.77 | 57871.70 | **5.07** | |
| **11** | W | 1:58:52 | 57881.79 | 57873.30 | **5.49** | **0.10** |
| **12** | E | 2:01:05 | 57881.39 | 57873.00 | **5.39** | |

| | |
|---|---|
| **Mean Offset** | 8.52 |
| **Mean N/S Err** | 0.18 |
| **Mean E/W Err** | 0.05 |
| **Mean Err** | 0.20 |

*Table 16 – Pre & Post Survey Meanook results C-GJBG*

**Pre-Survey**

| | |
|---|---|
| **Aircraft** | Piper Navajo |
| **Registration** | C-GJBA |
| **Date** | March 5, 2011 |
| **Location** | Meanook |

| Pass | Direction | Time | Meas. TF | Base TF | Error (nT) | Heading Error |
|---|---|---|---|---|---|---|
| **1** | W | 85680.8 | 57898.71 | 57902.00 | **-3.29** | **-0.56** |
| **2** | E | 85839.7 | 57898.37 | 57901.10 | **-2.73** | |
| **3** | W | 85966.9 | 57897.96 | 57900.80 | **-2.84** | **0.02** |
| **4** | E | 86093.1 | 57897.44 | 57900.30 | **-2.86** | |
| **5** | W | 86236.2 | 57899.03 | 57901.90 | **-2.87** | **-0.44** |
| **6** | E | 86352.8 | 57896.97 | 57899.40 | **-2.43** | |
| **7** | N | 114.5 | 57899.34 | 57902.00 | **-2.66** | **0.90** |
| **8** | S | 223.9 | 57898.64 | 57902.20 | **-3.56** | |
| **9** | N | 339.9 | 57898.62 | 57901.80 | **-3.18** | **-0.14** |
| **10** | S | 453.9 | 57898.66 | 57901.70 | **-3.04** | |
| **11** | N | 580.1 | 57897.33 | 57900.30 | **-2.97** | **0.18** |
| **12** | S | 710.6 | 57897.95 | 57901.10 | **-3.15** | |

| | |
|---|---|
| **Mean Offset** | **-2.91** |
| **Mean N/S Err** | **-0.56** |
| **Mean E/W Err** | **0.54** |
| **Mean Err** | **-0.02** |

**Post-Survey**

| | |
|---|---|
| **Date** | March 30, 2011 |
| **Location** | Meanook |

| Pass | Direction | Time | Meas. TF | Base TF | Error (nT) | Heading Error |
|---|---|---|---|---|---|---|
| **1** | N | 19:56:28 | 57870.64 | 57861.10 | **9.54** | **0.42** |
| **2** | S | 19:59:07 | 57869.72 | 57860.60 | **9.12** | |
| **3** | N | 20:01:31 | 57870.06 | 57860.50 | **9.56** | **0.35** |
| **4** | S | 20:03:46 | 57870.01 | 57860.80 | **9.21** | |
| **5** | N | 20:05:51 | 57870.58 | 57861.00 | **9.58** | **0.52** |
| **6** | S | 20:08:07 | 57870.66 | 57861.60 | **9.06** | |
| **7** | E | 20:14:28 | 57871.27 | 57862.70 | **8.57** | **-0.72** |
| **8** | W | 20:16:45 | 57871.39 | 57862.10 | **9.29** | |
| **9** | E | 20:18:44 | 57870.43 | 57862.40 | **8.03** | **-0.59** |
| **10** | W | 20:21:20 | 57871.12 | 57862.50 | **8.62** | |
| **11** | E | 20:23:24 | 57871.66 | 57862.50 | **9.16** | **0.17** |
| **12** | W | 20:25:53 | 57871.69 | 57862.70 | **8.99** | |

| | |
|---|---|
| **Mean Offset** | **9.24** |
| **Mean N/S Err** | **0.42** |
| **Mean E/W Err** | **0.52** |
| **Mean Err** | **0.14** |

*Table 17 – Pre & Post Survey Meanook results C-GJBA*

**Pre-Survey**

| | |
|---|---|
| **Aircraft** | Cessna Caravan |
| **Registration** | C-GLDX |
| **Date** | March 5, 2011 |
| **Location** | Meanook |

| Pass | Direction | Time | Meas. TF | Base TF | Error (nT) | Heading Error |
|---|---|---|---|---|---|---|
| **1** | W | 894.6 | 57895.89 | 57899.90 | **-4.01** | **-0.66** |
| **2** | E | 1017.3 | 57898.55 | 57901.90 | **-3.35** | |
| **3** | W | 1133.2 | 57895.20 | 57898.70 | **-3.50** | **0.06** |
| **4** | E | 1250.7 | 57896.34 | 57899.90 | **-3.56** | |
| **5** | W | 1364.1 | 57897.18 | 57900.30 | **-3.12** | **0.42** |
| **6** | E | 1477.6 | 57895.76 | 57899.30 | **-3.54** | |
| **7** | N | 1634.7 | 57896.18 | 57899.40 | **-3.22** | **0.22** |
| **8** | S | 1748.2 | 57895.66 | 57899.10 | **-3.44** | |
| **9** | N | 1860 | 57895.56 | 57898.70 | **-3.14** | **0.50** |
| **10** | S | 1972.2 | 57894.56 | 57898.20 | **-3.64** | |
| **11** | N | 2086.3 | 57895.58 | 57898.80 | **-3.22** | **0.35** |
| **12** | S | 2195.9 | 57895.23 | 57898.80 | **-3.57** | |

| | |
|---|---|
| **Mean Offset** | **-3.47** |
| **Mean N/S Err** | **-0.66** |
| **Mean E/W Err** | **0.28** |
| **Mean Err** | **-0.01** |

**Post-Survey**

| | |
|---|---|
| **Date** | March 29, 2011 |
| **Location** | Meanook |

| Pass | Direction | Time | Meas. TF | Base TF | Error (nT) | Heading Error |
|---|---|---|---|---|---|---|
| **1** | N | 23:35:22 | 57887.95 | 57876.80 | **11.15** | **0.28** |
| **2** | S | 23:37:47 | 57888.67 | 57877.80 | **10.87** | |
| **3** | N | 23:39:53 | 57891.45 | 57880.00 | **11.45** | **0.53** |
| **4** | S | 23:42:02 | 57891.22 | 57880.30 | **10.92** | |
| **5** | N | 23:43:57 | 57895.90 | 57884.10 | **11.80** | **1.11** |
| **6** | S | 23:46:12 | 57893.69 | 57883.00 | **10.69** | |
| **7** | W | 23:51:43 | 57893.80 | 57882.90 | **10.90** | **-0.44** |
| **8** | E | 23:53:56 | 57892.24 | 57880.90 | **11.34** | |
| **9** | W | 23:56:01 | 57892.67 | 57881.20 | **11.47** | **0.23** |
| **10** | E | 23:58:05 | 57889.84 | 57878.60 | **11.24** | |
| **11** | W | 0:00:02 | 57887.57 | 57877.40 | **10.17** | **-1.12** |
| **12** | E | 0:01:59 | 57885.49 | 57874.20 | **11.29** | |

| | |
|---|---|
| **Mean Offset** | **11.14** |
| **Mean N/S Err** | **0.69** |
| **Mean E/W Err** | **-0.78** |
| **Mean Err** | **0.37** |

*Table 18 – Pre & Post Survey Meanook results C-GLDX*

## APPENDIX C: WEEKLY PROGRESS REPORTS

**Goldak Airborne Surveys**

**WEEK BEGINNING**
January 23, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG
**Pilot:** Langevin
**Co Pilot:** Vinzenz
**Data Processor:** Heath
**Project total** 37897

## GSC - Nisling

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 867-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | | | | | | | | | 37897 | | | | | |
| Jan 23 | | | | | | | | | | | | | | |
| DOY :23 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Mon** | | | | | | | | | | | | | | Crew Arrives in Whitehorse |
| Jan 24 | | | | | | | | | | | | | | |
| DOY :24 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Tues** | | | | | | | | | | | | | | |
| Jan 25 | | | | | | | | | | | | | | Base GPS set up |
| DOY :25 | | | | | | | | | | | | | | BM1 set up - no radio link |
| | | | | | | | | | | | | | | |
| **Wed** | 4 | JBG | | 0.5 | | 0.5 | | | | | | | 100 | Poor Wx unable to enter comp block |
| Jan 26 | | | | | | | | | | | | | | BM2 Established |
| DOY :26 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | | | | | | | | | | | | | 100 | Low cloud no flying |
| Jan 27 | | | | | | | | | | | | | | Attempt new BM1 Radio link site |
| DOY :27 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Fri** | 5 | JBG | | 1.6 | | 1.6 | | | | | | | | Comp Flight |
| Jan 28 | | | | | | | | | | | | | | |
| DOY :28 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Sat** | 6 | JBG | 1.2 | | 3.3 | 4.5 | 805 | 805 | 37092 | | | | | |
| Jan 29 | | | | | | | | | | | | | | |
| DOY :29 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **TOTAL FOR WEEK** | | | 1.2 | 2.1 | 3.3 | 6.6 | 805 | 805 | | | | | | |
| **CARRIED OVER** | | | 0 | 0 | 0 | 0 | 0 | 0 | 37897 | | | | | |
| **TOTAL FOR JOB** | | | 1.2 | 2.1 | 3.3 | 6.6 | 805 | 805 | 37092 | | | | | |

**Goldak Airborne Surveys**

**WEEK BEGINNING**
January 30, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG
**Pilot:** Langevin
**Co Pilot:** Vinzenz
**Data Processor:** Heath
**Project total** 37897

## GSC - Nisling

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | 7 | JBG | 1.3 | | 3.7 | 5 | 854 | 854 | 36238 | | | | 20 | high winds - aborted early |
| Jan 30 | | | | | | | | | | | | | | |
| DOY :30 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Mon** | | | | | | | | | | | | | 100 | high winds 60 kmh+ |
| Jan 31 | | | | | | | | | | | | | | |
| DOY :31 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Tues** | | | | | | | | | | | | | 100 | high winds 60 kmh+ |
| Feb 01 | | | | | | | | | | | | | | |
| DOY :32 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Wed** | | | | | | | | | | | | | 100 | reoriented tail mag 45° |
| Feb 02 | | | | | | | | | | | | | | high winds, overcast |
| DOY :33 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | 8 | JBG | | 1.4 | | 1.4 | | | | | | | | Comp failed mag lost lock on turns |
| Feb 03 | 9 | JBG | | 0.3 | | 0.3 | | | | | | | | Changed mags, still unlocked on turns |
| DOY :34 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Fri** | 10 | JBG | | 0.3 | | 0.3 | | | | | | 75 | | tested with counterclockwise turns, |
| Feb 04 | | | | | | | | | | | | | | tail mag failed and replaced. Dx became |
| DOY :35 | | | | | | | | | | | | | | active mid morning |
| | | | | | | | | | | | | | | |
| **Sat** | 11 | JBG | | | | 1.5 | | | | | | | | COMP => OK used 4 single line solutions |
| Feb 05 | 12 | JBG | 1.2 | | 3.3 | 4.5 | 612 | 612 | 35626 | | | | | |
| DOY :36 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **TOTAL FOR WEEK** | | | 2.5 | 2 | 7 | 13 | 1466 | 1466 | | | | | | |
| **CARRIED OVER** | | | 1.2 | 2.1 | 3.3 | 6.6 | 805 | 805 | 37092 | | | | | |
| **TOTAL FOR JOB** | | | 3.7 | 4.1 | 10.3 | 19.6 | 2271 | 2271 | 35626 | | | | | |

**Goldak Airborne Surveys**

**WEEK BEGINNING**
February 6, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG
**Pilot:** Langevin
**Co Pilot:** Vinzenz
**Data Processor:** Heath
**Project total** 37897

## GSC - Nisling

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | 13 | JBG | 1.2 | | 4.7 | 5.9 | 1115 | 1115 | 34511 | | | | | most of the block clouded in |
| Feb 06 | | | | | | | | | | | | | | |
| DOY :37 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Mon** | 14 | JBG | 1.2 | | 5.1 | 6.3 | 1288 | 1288 | 33223 | | | | | |
| Feb 07 | | | | | | | | | | | | | | |
| DOY :38 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Tues** | 15 | JBG | 1.4 | | 4.5 | 5.9 | 1147 | 1147 | 32076 | | | | | |
| Feb 08 | | | | | | | | | | | | | | |
| DOY :39 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Wed** | | | | | | | | | | | | | 100 | high winds |
| Feb 09 | | | | | | | | | | | | | | |
| DOY :40 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | 16 | JBG | 0.9 | | 5.5 | 6.4 | 1368 | 1300 | 30776 | | | | | |
| Feb 10 | | | | | | | | | | | | | | |
| DOY :41 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Fri** | | | | | | | | | | | | | 100 | low cloud |
| Feb 11 | | | | | | | | | | | | | | |
| DOY :42 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Sat** | | | | | | | | | | | | | 100 | low cloud |
| Feb 12 | | | | | | | | | | | | | | |
| DOY :43 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **TOTAL FOR WEEK** | | | 4.7 | 0 | 19.8 | 24.5 | 4918 | 4850 | | | | | | |
| **CARRIED OVER** | | | 3.7 | 4.1 | 10.3 | 19.6 | 2271 | 2271 | 35626 | | | | | |
| **TOTAL FOR JOB** | | | 8.4 | 4.1 | 30.1 | 44.1 | 7189 | 7121 | 30776 | | | | | |

**Goldak Airborne Surveys**

**WEEK BEGINNING**
February 13, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG
**Pilot:** Langevin
**Co Pilot:** Vinzenz
**Data Processor:** Heath
**Project total** 37897

## GSC - Nisling

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | 17 | | 0.4 | | | 0.4 | | | 30776 | | 50 | | 100 | RTB => block clouded in AND |
| Feb 13 | | | | | | | | | | | | | | aircraft heater broken. Heater now |
| DOY :44 | | | | | | | | | | | | | | working. |
| | | | | | | | | | | | | | | |
| **Mon** | | | | | | | | | | | | 25 | 100 | |
| Feb 14 | | | | | | | | | | | | | | |
| DOY :45 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Tues** | | | | | | | | | | | 100 | | | Heater u/s |
| Feb 15 | | | | | | | | | | | | | | |
| DOY :46 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Wed** | | | | | | | | | | | 100 | | | Heater u/s |
| Feb 16 | | | | | | | | | | | | | | |
| DOY :47 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | | | | | | | | | | | | | | |
| Feb 17 | | | | | | | | | | | 100 | | | Heather u/s |
| DOY :48 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Fri** | | | | | | | | | | | 75 | | | Heater repaired by mid-afternoon |
| Feb 18 | 19 | | | 1.6 | | 1.6 | | | | | | | | Comp |
| DOY :49 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Sat** | | | | | | | | | | | | | 100 | |
| Feb 19 | | | | | | | | | | | | | | |
| DOY :50 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **TOTAL FOR WEEK** | | | 0.4 | 1.6 | 0 | 2 | 0 | 0 | | | | | | |
| **CARRIED OVER** | | | 8.4 | 4.1 | 30.1 | 44.1 | 7189 | 7121 | 30776 | | | | | |
| **TOTAL FOR JOB** | | | 8.8 | 5.7 | 30.1 | 46.1 | 7189 | 7121 | 30776 | | | | | |

**Goldak Airborne Surveys**

**WEEK BEGINNING**
February 20, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG
**Pilot:** Langevin
**Co Pilot:** Virzenz
**Data Processor:** Heath
**Project total** 37897

## GSC - Nisling

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | 20 | | 1.1 | | 0.2 | 1.3 | 30 | 0 | 30776 | 95 | | | | Aborted flight, heater not cycling off, too |
| Feb 20 | | | | | | | | | | | | | | hot in cockpit |
| DOY :51 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Mon** | | | | | | | | | | 100 | | | 60 | heater u/s |
| Feb 21 | | | | | | | | | | | | | | |
| DOY :52 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Tues** | | | | | | | | | | 100 | | | | |
| Feb 22 | | | | | | | | | | | | | | |
| DOY :53 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Wed** | | | | | | | | | | 100 | | | | |
| Feb 23 | | | | | | | | | | | | | | |
| DOY :54 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | 21 | JBG | | 2 | | 2 | | | | | | | | COMP Flight. Flew 2 passes; heater off |
| Feb 24 | | | | | | | | | | | | | | then heater on |
| DOY :55 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Fri** | 22 | JBG | 1 | | 5.1 | 6.1 | 1203 | 1203 | 29573 | | | | | |
| Feb 25 | | | | | | | | | | | | | | |
| DOY :56 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Sat** | | | | | | | | | | | | | 100 | low cloud, high winds, turbulence |
| Feb 26 | | | | | | | | | | | | | | |
| DOY :57 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **TOTAL FOR WEEK** | | | 2.1 | 2 | 5.3 | 9.4 | 1233 | 1203 | | | | | | |
| **CARRIED OVER** | | | 8.8 | 5.7 | 30.1 | 46.1 | 7189 | 7121 | 30776 | | | | | |
| **TOTAL FOR JOB** | | | 10.9 | 7.7 | 35.4 | 55.5 | 8422 | 8324 | 29573 | | | | | |

**Goldak Airborne Surveys**

**WEEK BEGINNING**
February 27, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG
**Pilot:** Langevin
**Co Pilot:** Vinzenz / Ando
**Data Processor:** Heath/ Carson
**Project total** 37897

**GSC - Nisling**

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | | | | | | | | | 29573 | | | | 100 | low cloud, high winds, turbulence |
| Feb 27 | | | | | | | | | | | | | | |
| DOY :58 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Mon** | 23 | | 1.1 | | 4.9 | 6 | 1216 | 1216 | 28357 | | | | | |
| Feb 28 | | | | | | | | | | | | | | |
| DOY :59 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Tues** | | | | | | | | | | | | 100 | | severe diurnal all day |
| Mar 01 | | | | | | | | | | | | | | |
| DOY :60 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Wed** | | C-GJBG | | | | | | | | 100 | | 100 | | Diurnal activity / aircraft inspection |
| Mar 02 | | | | | | | | | | | | | | |
| DOY :61 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | | C-GJBG | | | | | | | | 100 | | 50 | | Morning diurnal act. / aircraft inspection |
| Mar 03 | | | | | | | | | | | | | | Waiting on new aircraft heater |
| DOY :62 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Fri** | 24 | C-GJBG | 1 | 0.6 | | 1.6 | | | | | | 50 | | FOM rejected - incorrectly flown |
| Mar 04 | 25 | C-GJBG | 0.7 | 0.5 | | 1.3 | | | | | | | | FOM rejected - incorrectly flown |
| DOY :63 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Sat** | 26 | C-GJBA | | | | | | | | | | | | Radar Stack |
| Mar 05 | 27 | C-GJBA | | | | | | | | | | | | Lag Test |
| DOY :64 | 28 | C-GLDX | | | | | | | | | | | | Radar Stack |
| | 29 | C-GLDX | | | | | | | | | | | | Lag Test |
| | 30 | C-GJBG | 0.7 | 0.6 | | 1.3 | | | | | | | 50 | Comp-FOM result: 0.9 |
| | 31 | C-GJBA | | | | | | | | | | | | Heading Test |
| | 32 | C-GLDX | | | | | | | | | | | | Heading Test |
| **TOTAL FOR WEEK** | | | 2.8 | 1.1 | 4.9 | 8.9 | 1216 | 1216 | | | | | | |
| **CARRIED OVER** | | | 10.9 | 7.7 | 35.4 | 55.5 | 8422 | 8324 | 29573 | | | | | |
| **TOTAL FOR JOB** | | | 13.7 | 8.8 | 40.3 | 64.4 | 9638 | 9540 | 28357 | | | | | |

Goldak Airborne Surveys

**WEEK BEGINNING**
March 6, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG / C-GJBA / C -GLDX
**Pilot:** Langevin / Mathieson / Lebrun
**Co Pilot:** Ando / Yu / Armstrong
**Data Processor:** Carson
**Project total** 37897

**GSC - Nisling**

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | 33 | C-GJBG | 1.2 | | 6.4 | 7.6 | 1321 | 1321 | 27036 | | | | | |
| Mar 06 | | | | | | | | | | | | | | JBA arrives in Whitehorse |
| DOY :65 | | | | | | | | | | | | | | LDX arrives in Whitehorse |
| | | | | | | | | | | | | | | |
| **Mon** | 34 | C-GJBG | 0.8 | | 4.5 | 5.3 | 972 | 972 | 26064 | | | | | |
| Mar 07 | 35 | C-GJBG | 0.6 | | 1.7 | 2.3 | 422 | 422 | 25642 | | | | | |
| DOY :66 | 36 | C-GJBA | | | | | | | | | | | | Aborted Comp-FOM flight |
| | 37 | C-GLDX | | | | | | | | | | | | Aborted Comp-FOM flight |
| | 38 | C-GLDX | | | | | | | | | | | | Comp-FOM result: 0.79 |
| | 39 | C-GJBA | | | | | | | | | | | | Comp-FOM rejected |
| | 40 | C-GLDX | 1 | | 3.3 | 4.3 | 789 | 789 | 24853 | | | | | |
| | 41 | C-GJBA | | | | | | | | | | | | Comp-FOM result: 0.87 |
| **Tues** | 42 | C-GJBG | 1.1 | | 3.9 | 5 | 805 | 745 | 24108 | | | | | |
| Mar 08 | 43 | C-GLDX | 1.1 | | 4 | 5.1 | 961 | 961 | 23147 | | | | | |
| DOY :67 | 44 | C-GJBA | 2.2 | | 3.7 | 5.9 | 836 | 836 | 22311 | | | | | |
| | 45 | C-GJBG | 1 | | 1.7 | 2.7 | 436 | 436 | 21875 | | | | | |
| **Wed** | 46 | C-GLDX | 1.1 | | 3.8 | 4.9 | 826 | 826 | 21049 | | | | | |
| Mar 09 | 47 | C-GJBG | 1.2 | | 2.8 | 4 | 581 | 490 | 20559 | | | | | |
| DOY :68 | 48 | C-GJBA | 1.9 | | 2.8 | 4.7 | 744 | 744 | 19815 | | | | | |
| | 49 | C-GJBG | 1.2 | | 2.6 | 3.8 | 660 | 660 | 19155 | | | | | |
| **Thurs** | 50 | C-GLDX | 1.5 | | 2.2 | 3.7 | 534 | 308 | 18847 | | | 50 | | Aborted flight - Mag storm |
| Mar 10 | 51 | C-GJBG | 1.4 | | 1.6 | 3 | 363 | 82 | 18765 | | | 50 | | Aborted flight - Mag storm |
| DOY :69 | | C-GJBA | | | | | | | | | 100 | 50 | | Aircraft inspection |
| | | | | | | | | | | | | | | |
| **Fri** | | C-GLDX | | | | | | | | | 100 | 100 | | Aircraft inspection |
| Mar 11 | | C-GJBG | | | | | | | | | | 100 | | Mag storm |
| DOY :70 | | C-GJBA | | | | | | | | | | 100 | | |
| | | | | | | | | | | | | | | |
| **Sat** | 52 | C-GJBG | 1.1 | | 4 | 5.1 | 867 | 867 | 17898 | | | | | |
| Mar 12 | 53 | C-GJBA | 1.1 | | 3.6 | 4.7 | 851 | 851 | 17047 | | | | | |
| DOY :71 | 54 | C-GJBG | 1.2 | | 2 | 3.2 | 498 | 498 | 16549 | | | | | |
| | 55 | C-GJBA | 1.4 | | 2.4 | 3.8 | 638 | 638 | 15911 | | | | | |
| | | C-GLDX | | | | | | | | | 100 | | | Aircraft inspection |
| **TOTAL FOR WEEK** | | | 22.1 | 0 | 57 | 79.1 | 13104 | 12446 | | | | | | |
| **CARRIED OVER** | | | 13.7 | 8.8 | 40.3 | 64.4 | 9638 | 9540 | 28357 | | | | | |
| **TOTAL FOR JOB** | | | 35.8 | 8.8 | 97.3 | 143.5 | 22742 | 21986 | 15911 | | | | | |

**Goldak Airborne Surveys**

**WEEK BEGINNING**
March 13, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG / C-GJBA / C -GLDX
**Pilot:** Langevin / Mathieson / Lebrun
**Co Pilot:** Ando / Yu / Armstrong
**Data Processor:** Carson
**Project total** 37897

## GSC - Nisling

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | 56 | C-GJBG | 1.6 | | 4.7 | 6.3 | 1201 | 1100 | 14811 | | | | | |
| Mar 13 | 57 | C-GJBA | 1.3 | | 2.3 | 3.6 | 619 | 619 | 14192 | | | | | |
| DOY :72 | 58 | C-GJBA | 1.4 | | 2.6 | 4 | 687 | 687 | 13505 | | | | | |
| | | C-GLDX | | | | | | | | | 100 | | | Aircraft inspection |
| **Mon** | | C-GLDX | | | | | | | | | | | 100 | Low cloud in block |
| Mar 14 | | C-GJBG | | | | | | | | | | | 100 | |
| DOY :73 | | C-GJBA | | | | | | | | | | | 100 | |
| | | | | | | | | | | | | | | |
| **Tues** | | C-GLDX | | | | | | | | | | | 100 | Low cloud in block |
| Mar 15 | | C-GJBG | | | | | | | | | | | 100 | |
| DOY :74 | | C-GJBA | | | | | | | | | | | 100 | |
| | | | | | | | | | | | | | | |
| **Wed** | 59 | C-GLDX | 1.6 | | 3.2 | 4.8 | 804 | 804 | 12701 | | | | | |
| Mar 16 | 60 | C-GJBG | 1.2 | | 4.4 | 5.6 | 950 | 923 | 11778 | | | | | |
| DOY :75 | 61 | C-GJBA | 1.4 | | 3.7 | 5.1 | 952 | 952 | 10826 | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | | C-GLDX | | | | | | | | | | | 100 | Low cloud in block |
| Mar 17 | | C-GJBG | | | | | | | | | | | 100 | |
| DOY :76 | | C-GJBA | | | | | | | | | | | 100 | |
| | | | | | | | | | | | | | | |
| **Fri** | | C-GLDX | | | | | | | | | | | 100 | Low cloud in block |
| Mar 18 | | C-GJBG | | | | | | | | | | | 100 | |
| DOY :77 | | C-GJBA | | | | | | | | | | | 100 | |
| | | | | | | | | | | | | | | |
| **Sat** | 62 | C-GLDX | 1.4 | | 3.5 | 4.9 | 817 | 817 | 10009 | | | | | |
| Mar 19 | 63 | C-GJBG | 0.8 | | 4.7 | 5.5 | 1015 | 981 | 9028 | | | | | |
| DOY :78 | 64 | C-GJBA | 1.3 | | 2.9 | 4.2 | 575 | 575 | 8453 | | | | | |
| | 65 | C-GLDX | 1.3 | | 3.8 | 5.1 | 915 | 915 | 7538 | | | | | |
| | 66 | C-GJBG | 1.3 | | 2.5 | 3.8 | 557 | 557 | 6981 | | | | | |
| | 67 | C-GJBA | 0.9 | | 3.9 | 4.8 | 976 | 976 | 6005 | | | | | |
| **TOTAL FOR WEEK** | | | 15.5 | 0 | 42.2 | 57.7 | 10068 | 9906 | | | | | | |
| **CARRIED OVER** | | | 35.8 | 8.8 | 97.3 | 143.5 | 22742 | 21986 | 15911 | | | | | |
| **TOTAL FOR JOB** | | | 51.3 | 8.8 | 139.5 | 201.2 | 32810 | 31892 | 6005 | | | | | |

**Goldak Airborne Surveys**

**WEEK BEGINNING**
March 20, 2011

# WEEKLY OPERATIONS REPORT

**Aircraft:** C-GJBG / C-GJBA / C -GLDX
**Pilot:** Langevin / Mathieson / Lebrun
**Co Pilot:** Ando / Yu / Armstrong
**Data Processor:** Carson
**Project total** 37897

## GSC - Nisling

**Project #:** 2011-01

**Base:** Gold Rush Inn
**Phone:** 897-668-4500

| | | | Flight Times | | | | Kilometers | | | Unservicability | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | **Flt** | **Aircraft** | **Ferry** | **Test** | **Prod** | **Total** | **Flown** | **Accept** | **Remain** | **A/C** | **Eqt** | **Diur** | **Wx** | **Comments** |
| **Sun** | 68 | C-GLDX | 1.4 | | 306 | 5 | 847 | 847 | 5158 | | | | | |
| Mar 20 | 69 | C-GJBG | 1 | | 1.6 | 2.6 | 349 | 349 | 4809 | | 50 | | | Aborted flight, aircraft control malfunction |
| DOY :79 | 70 | C-GJBA | 1 | | 4.3 | 5.3 | 1055 | 1055 | 3754 | | | | | |
| | | | | | | | | | | | | | | |
| **Mon** | 71 | C-GLDX | 1.3 | | 1.3 | 2.6 | 320 | 320 | 3434 | | | | | |
| Mar 21 | 72 | C-GJBA | 1.2 | | 2.7 | 3.9 | 620 | 609 | 2825 | | | | | |
| DOY :80 | 73 | C-GJBA | 1.4 | | 2.3 | 3.7 | 604 | 604 | 2221 | | | | | |
| | 74 | C-GLDX | 1.4 | | 2.8 | 4.2 | 677 | 677 | 1544 | | | | | |
| **Tues** | 75 | C-GLDX | 1.6 | | 3.6 | 5.2 | 742 | 742 | 802 | | | | | |
| Mar 22 | 76 | C-GJBA | 1.7 | | 2.9 | 4.6 | 810 | 810 | -8 | | | | | |
| DOY :81 | 77 | C-GLDX | 0.7 | | 0.8 | 1.5 | 203 | 203 | -211 | | | | | |
| | 78 | C-GLDX | 1.1 | | 1.7 | 2.8 | 406 | 406 | -617 | | | | | Project Complete |
| **Wed** | | | | | | | | | | | | | | Awaiting de-mob clearance |
| Mar 23 | | | | | | | | | | | | | | Tear Down |
| DOY :82 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Thurs** | | | | | | | | | | | | | | Tear Down |
| Mar 24 | | | | | | | | | | | | | | |
| DOY :83 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Fri** | | | | | | | | | | | | | | JBA, JBG, LDX Depart |
| Mar 25 | | | | | | | | | | | | | | |
| DOY :84 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **Sat** | | | | | | | | | | | | | | |
| Mar 26 | | | | | | | | | | | | | | |
| DOY :85 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| **TOTAL FOR WEEK** | | | 13.8 | 0 | 330 | 41.4 | 6633 | 6622 | | | | | | |
| **CARRIED OVER** | | | 51.3 | 8.8 | 139.5 | 201.2 | 32810 | 31892 | 6005 | | | | | |
| **TOTAL FOR JOB** | | | 65.1 | 8.8 | 469.5 | 242.6 | 39443 | 38514 | -617 | | | | | |