LIDAR Report

NO06705 Aamosen

BLOM GEOMATICS
SUBSIDIARY OF THE BLOM GROUP

CONTENTS

Appendix:

> 1. *Flight plan, Appendix_1_Flight_plan-NO06705.pdf.*

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Project Manager

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1. INTRODUCTION

This document summarizes the flights, decoding and processing of the "Aamosen" project. The Blom Geomatics internal reference number for this project is NO06705.

2. FLIGHT MISSIONS

The project was flown in two flights. The LIDAR flights were flown with a Piper Navajo PA 31 airplane (LN-AEY).

Crew	Name
Pilot	John Wiese
Operator	Hicham Boudden

2.1. LIDAR flight

The flying height was 3500ft AGL.

The LIDAR survey was executed with the following settings:

Project	Vargön
Altitude	3500 ft AGL
PRF	70000Hz
Scanner freq	43deg
Half angle	20deg
Speed	150kts
GPS day	082

3. FIELD SURVEYING OF CONTROL SURFACES

Control surfaces have been delivered by the client.

4. LIDAR - DATA COLLECTION
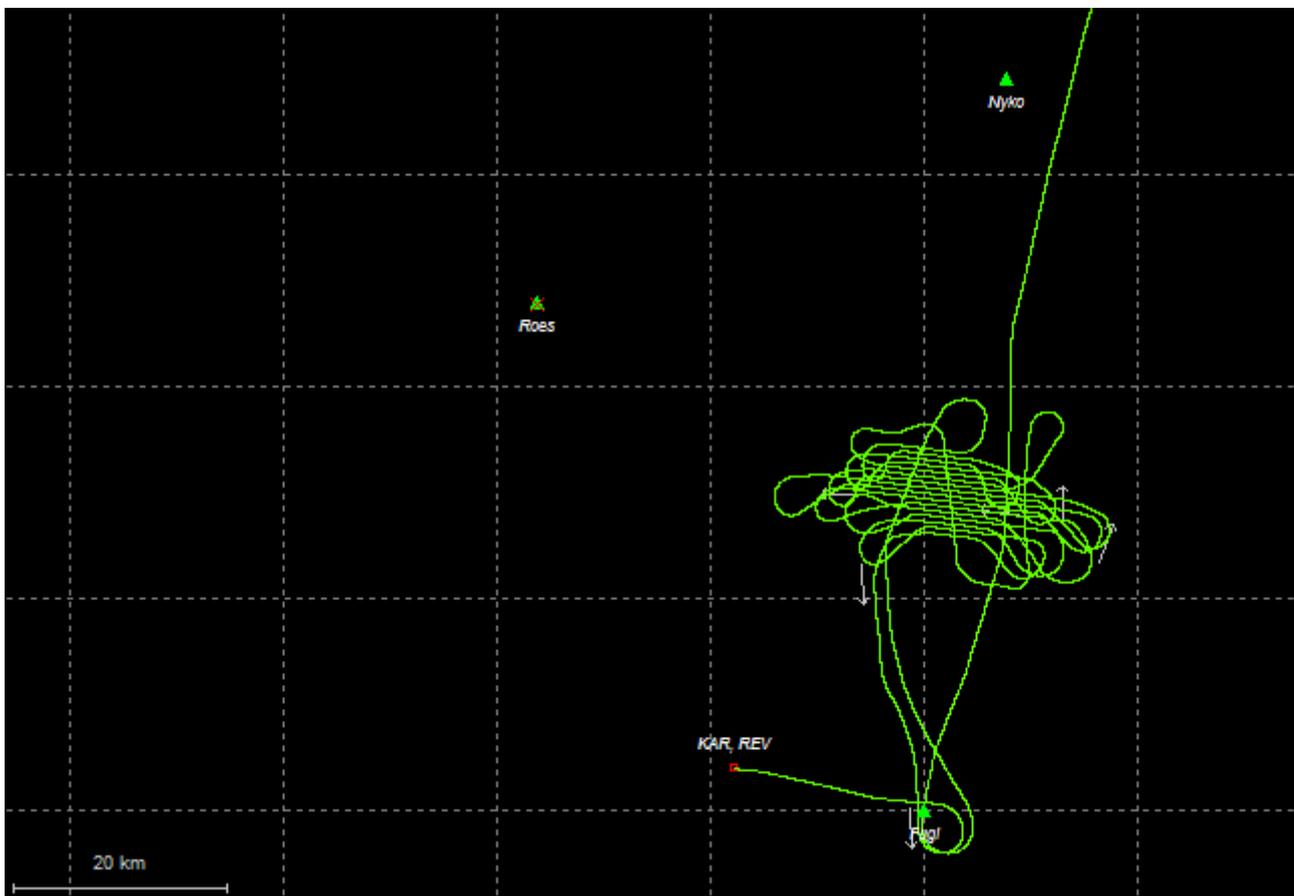
4.1. Flight – LIDAR 2006-03-23, flight 08206

Flight name:	08206
Date:	2006-03-23
Period (UTC):	10:58-12:51
Weather conditions:	OK

Solution using ground stations Fuglebjerg +Nykoebing

Ground station:	Fuglebjerg	Coordinate	WGS84
GPS antenna:	trm33429.20+gp	North	6131709.33
ARP- L1	72.9	East	661105.965
ARP - L2	75.0	Height el.	92.141

Ground station:	**Nykoebing**	**Coordinate**	NYKO
GPS antenna:	trm33429.20+gp	North	6200685.85
ARP- L1	72.9	**East**	666357.011
ARP - L2	75	**Height el.**	57.794

Flight map

Flight 08206, displaying the location of ground stations

DOP plot

08206a MB [1] [Combined] - PDOP, HDOP, VDOP Plots

PDOP — HDOP — VDOP

Number of satellites

08206a MB [1] [Combined] - Number of Satellites Bar Plot

Too Few — Minimal — Acceptable — Good — Exceptional
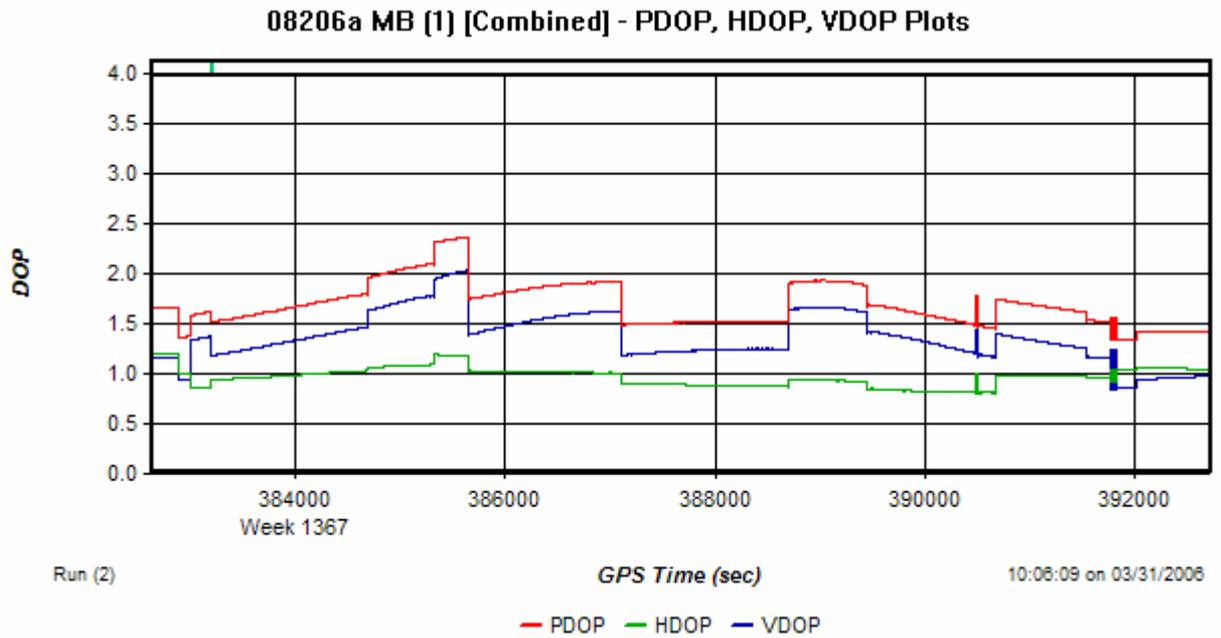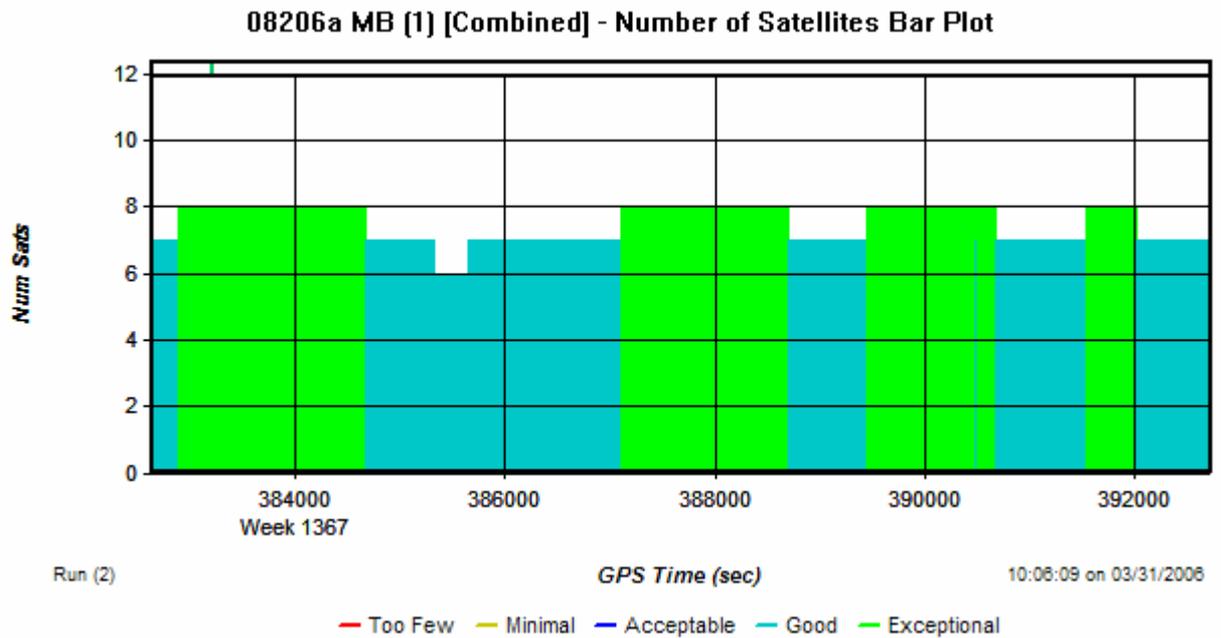
Separation plot between forward and reverse solution
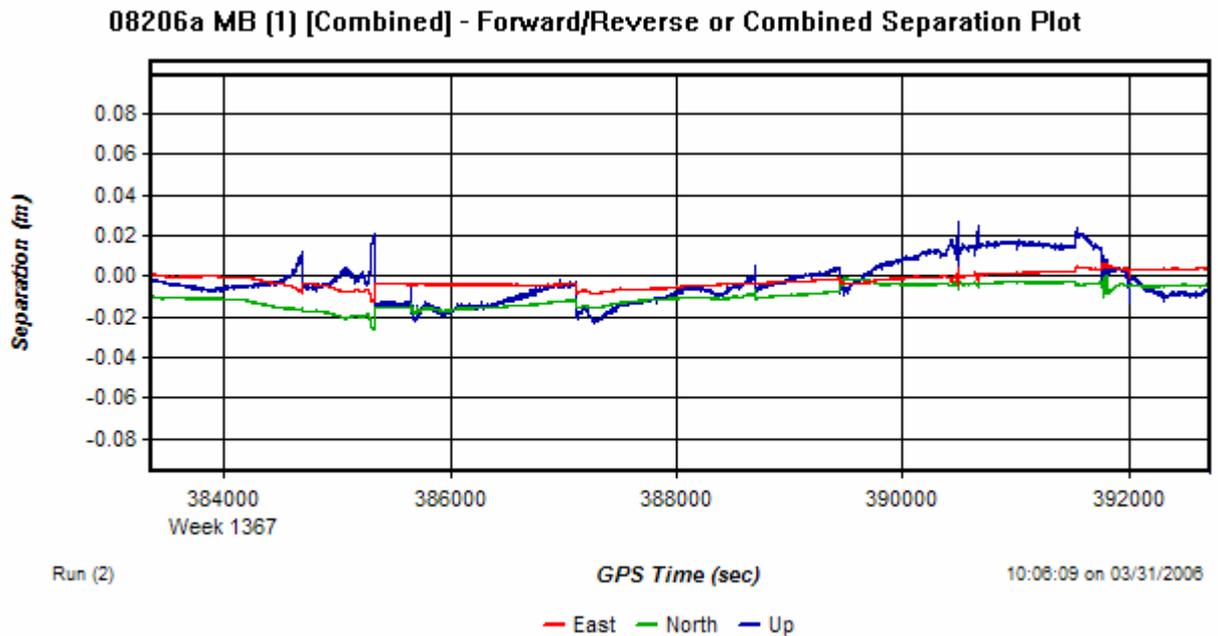
Conclusion

The solutions are calculated in PosGPS from Applanix. Two separate solutions with different kinematics ambiguity resolution were calculated. The "separation plot" shows the difference between the solutions.

The solutions are combined weighted on distance and standard deviation.

The separation plot combined with the Pdop plot indicates that the GPS solution is very good.

GPS/INS Calculation

The calculation was done with PosProc from Applanix.
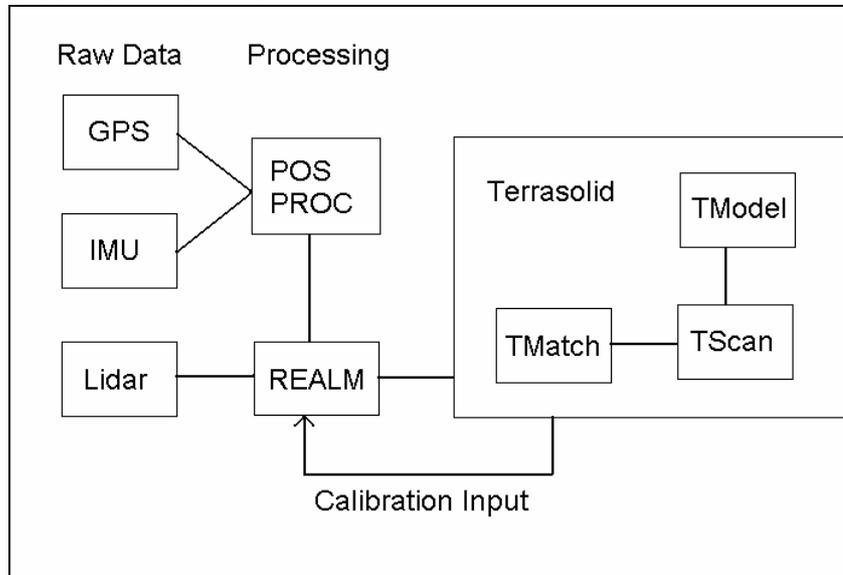
IMU report:	Start	end
Time interval	10:58	12:51
Nr. of interpolation	0	
Nr. of gaps	0	
Correct time types	yes	

The result is within the specification of the instrument.

4.2.   LIDAR XYZ calculation and control

Overview Workflow

Simplified workflow diagram

The following software has been used:

Name	Product by	Tasks
REALM	Optech	Tape decoding, XYZ processing
POSPAC	Applanix	GPS/INS processing
TerraScan	TerraSolid	Point data management, QC
TerraModel	TerraSolid	Terrain Modelling, QC
TerraMatch	TerraSolid	System calibration, QC

Calibration

Systematic errors were found using TerraSolid utilities, such as dRoll, dPitch and mirror scale factor. The result was reset to the final XYZ process in Realm, according to the plot above.

Model offset

From previous calibrations we have experienced that there is a height offset between laser points and "true ground".

Control points were delivered from the client. These points were collected at different locations and in different types of terrain.

Height deviations Z shift analysis:

Control area no.	Average dHeight (m)	St. deviation (m)
Aamosen	*-0.006*	*0.039*

It was therefore decided NOT to shift the Lidar data with a constant Z shift.

The major part of the control points are measured on hard surfaces. The standard deviation on hard surfaces is always significant better than softer, and we expect the Standard deviation on hard surfaces to be under 5 cm.

5. PRODUCTS

5.1. Point cloud

The point cloud was delivered on 2006-04-26.
Data outside the project boundary is included and automatically classified. However, this data is not manually edited as thorough as the data inside the perimeter. The data are delivered as TerraScan binary files. The table below gives a description of the different classes in the preliminary delivery.

Class	Class name	Content
1	-	Noground
5	-	ground