

## AIRLAFONIA ANT2017/18 Weekly Report

*Report 1: 9<sup>th</sup> November 2017 to 16<sup>th</sup> November 2017*

### *Summary*

During this period, Polar 6 and its crew assembled at Mount Pleasant airport (MPA) to configure the aircraft for its task of gathering magnetic, gravity, and other data for interpretation of the geodynamic history of Antarctica's separation from the supercontinent Gondwana. Polar 6, its two pilots and engineer, arrived first at MPA via Punta Arenas, establishing good working contacts with MPA. The three-man science and science technical team from AWI arrived from Europe on November 9<sup>th</sup>. Work to configure Polar 6 started on November 10<sup>th</sup>. A combination of unsuitable weather and technical difficulties mean that there were no flying activities in this first week.

### *Equipment*

The gravity system was installed and configured according to expectations. The magnetic system was quickly installed and tested for the presence of a fault that had been apparent during the test flight shortly before Polar 6 left Bremen. Tests in Bremen and communication with the manufacturer had led to the diagnosis of an electrical ground loop, which the team and the equipment manufacturer had been confident of finding and correcting. Despite this, extensive further tests at MPA have revealed the presence of a deeper-lying problem that will require some time and the acquisition of specialist spare parts to correct.

### *Flight operations*

There were no flight operations during this reporting period.

### *Outlook*

Our attention towards the end of this week has turned towards the possibility of using the permanently-installed AIMMS-20 instrument, which also contains a three-component magnetometer, to gather the desired magnetic data in place of the faulty equipment. Initial assessment of an old AIMMS-20 data set suggest that its magnetometer is strongly affected by aircraft-induced fields and the data recorded using it will require large corrections. Contact with the AIMMS-20 manufacturer has been sought to find out the exact specifications and capabilities of the magnetometer. We also intend to complete a test flight with the AIMMS-20 to try and reproduce a known magnetic anomaly pattern.

We are grateful to the team at MPA for the ongoing support throughout the reporting period. Despite the difficult start, the AIRLAFONIA team remains motivated, and sends their greetings to loved ones and friends at home.

With our best regards,

The POLAR 6 Team

Mount Pleasant Airport, 16.11.2017

## AIRLAFONIA ANT2017/18 Weekly Report

Report 2: 17<sup>th</sup> November 2017 to 24<sup>th</sup> November 2017

### Summary

During this period, Polar 6 and its crew started flight operations from Mount Pleasant airport. An improvement in the weather saw the completion of five flights. In spite of low expectations of success, the scientific team was able to fix and/or bypass problems with the magnetometer system, meaning collection of a near-full resolution data set could be started.

### Equipment

An initial test flight with the AIMMS-20 instrument returned magnetometer data with some resemblance to known field variations, but also with the expected very large aircraft-induced field effects that will require a great deal of work to remove even partially. Despite advice from the manufacturer that the main magnetometer system will require specialist spare parts to be fully repaired once returned to Bremen, the science team continued to work on making the system work at near full resolution. After many hours spent disassembling, cleaning, reassembling, and testing, the system started returning data without compensation for the effects of the aeroplane's own magnetic fields. Despite the lack of compensation, these are considerably more reliable and detailed than the AIMMS-20 system data, and easier to correct for aircraft effects.

### Flight operations

<i>AIRLAFONIA*</i> <i>Flight #</i>	<i>Date</i>	<i>Purpose</i>	<i>Hours Flown</i>
2	17.11.2017	AIMMS-20 test flight	3.5
3	22.11.2017	AIRLAFONIA Survey with AIMMS-20	4.3
4	23.11.2017	AIRLAFONIA Survey with Scintrex magnetometer	5.0
5	24.11.2017	AIRLAFONIA Survey with Scintrex magnetometer	5.0
6	25.11.2017	AIRLAFONIA Survey with Scintrex magnetometer	5.0
		<b>Total</b>	<b>22.8</b>

\*NB. Flight 1 was a ground test involving aircraft taxi only

### Outlook

With much time lost to changeable weather, the team hopes for a continuation of the more recent stable conditions into the final week of AIRLAFONIA. As only 23 of the planned 100 hours have been flown, there is much still to do for the survey to meet its aims.

As before, we are grateful to our hosts at MPA for their support.

With our best regards,

The POLAR 6 Team

Mount Pleasant Airport, 24.11.2017

## AIRLAFONIA ANT2017/18 Weekly Report

*Final Report: 25<sup>th</sup> November 2017 to 2<sup>nd</sup> December 2017*

### *Summary*

During this period, Polar 6 and its crew continued flight operations from Mount Pleasant airport. Stable weather allowed for six flights. Deconfiguration work on Polar 6 has started.

### *Equipment*

With no air traffic control support at Mount Pleasant airport on Sundays, the AIRLAFONIA team took a day to rest, visiting Polar 6 for checks only briefly in the late morning. Some time later the same day, the petrol generator that supplied the gravimeter with power failed. The backup batteries will have maintained power to the gravimeter for around another 12 hours, after which the gravimeter lost power and cooled down, only to be discovered the next morning. Unfortunately, a cold restart of the gravimeter will have taken 48 hours or more, robbing us of at least two of our remaining six flying days. To save these days, the decision was quickly taken to continue AIRLAFONIA without any further gravity measurements. This was justifiable given that the main aims of the survey involve the interpretation of magnetic anomaly data.

### *Flight operations*

<i>AIRLAFONIA Flight #</i>	<i>Date</i>	<i>Purpose</i>	<i>Hours Flown</i>
7	27.11.2017	AIRLAFONIA survey	5.3
8	28.11.2017	AIRLAFONIA survey	5.2
9	29.11.2017	AIRLAFONIA survey	5.2
10	30.11.2017	AIRLAFONIA survey	5.3
11	01.12.2017	AIRLAFONIA survey	5.3
		<b>Total</b>	<b>26.3</b>

### *Outlook*

Survey work came to an end on December 1<sup>st</sup>, with freight deadlines and flights home for the team looming. The team is already working on deconfiguring Polar 6, ready for the next stage of its season in Antarctica.

### *Review*

Owing to numerous difficulties with equipment and bad weather, AIRLAFONIA managed just half of the total planned 100 hours of survey work. Despite this, the magnetic data gathered show very promising prospects for the survey's aims of interpreting the earliest stages in the fragmentation of the supercontinent Gondwana.

With this positive aspect in mind, we express our gratitude to our hosts at Mount Pleasant airport and in the surrounding community for the support and hospitality.

With our best regards,

The POLAR 6 Team

Mount Pleasant Airport, 02.12.2017