



FIELAX Gesellschaft für wissenschaftliche Datenverarbeitung mbH
Schleusenstr. 14, D-27568 Bremerhaven, GERMANY
Fon: +49 (0)471 30015-0, Fax: +49 (0)471 30015-22, Mail: info@fielax.de

Processing Logbook

Master track creation of Polar 5 / 6

Contact:

FIELAX Gesellschaft für wissenschaftliche Datenverarbeitung mbH
Schleusenstraße 14, D-27568 Bremerhaven, GERMANY
Fon: +49 (0)471 30015-0, Fax: +49 (0)471 30015-22, Mail: info@fielax.de

Ref.: 2012_2015_Processing_Logbook_Polar5_6.pdf	Vers.: 1	Date: 17/02/2016	Status: final
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Bank Account: Sparkasse Bremerhaven, IBAN: DE17 2925 0000 0004 0162 20, BIC: BRLADE21BRS
VATIN: DE221948243, Tax No: 75 570 10941, FA Bremerhaven
Comm. Reg.: HRB 3506, AG Bremen, Managing Director: Dr. Regina Usbeck



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1 Introduction

The aircrafts Polar 5 and Polar 6 are equipped with a GPS sensor for scientific equipment which continuously records the position of the aircraft. However, this sensor may vary in accuracy or fail completely for a certain time. Thus, the position data needs to be examined and processed to form a “master track”, which can be used for the geographical positioning of further data.

2 Workflow

The different steps of processing and validation are visualized in Figure 1.

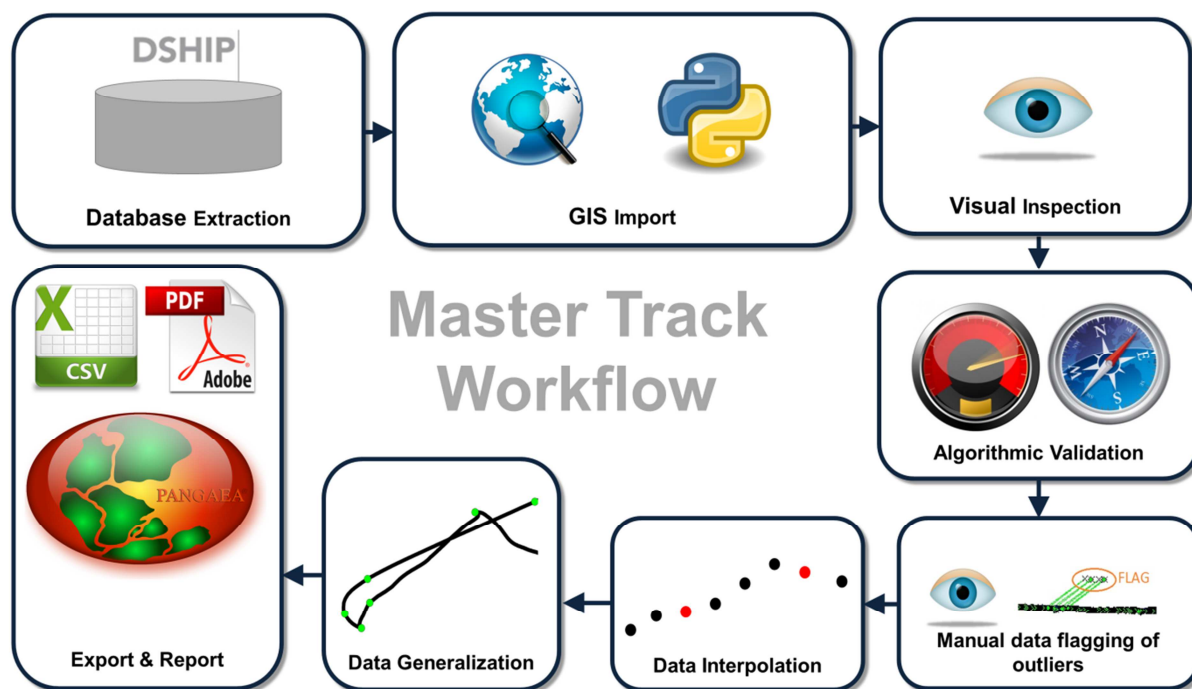


Figure 1: Workflow of master track data processing

Unvalidated NMEA telegrams of the GPS sensor are extracted from the DAVIS SHIP data base (<https://dship.awi.de>) in a 1-second interval. They are converted to ESRI point shapefiles and imported to ArcGIS.

After a first visual screening of the resulting position tracks, a quality check is performed using a speed filter, an acceleration filter and a course filter. Filtered positions are flagged. In addition, a manual check is performed to flag obvious outliers. All flagged positions are removed from the track. Missing data up to a time span of 60 seconds are interpolated linearly.

To reduce the amount of points for overview maps, the master track is generalized by using the Ramer-Douglas-Peucker algorithm^{1,2}. This algorithm returns only the most significant

¹ Ramer, U. (1972). An iterative procedure for the polygonal approximation of plane curves. *Computer Graphics and Image Processing*, (1) 3, 244-256

² Douglas, D., & Peucker, T. (1973). Algorithms for the reduction of the number of points required to represent a digitized line or its caricature. *The Canadian Cartographer*, (10) 2, 112-122



points from the track. Full master track and generalized master track are written to text files and imported to PANGAEA (<http://www.pangaea.de>).

3 Sensor Configuration

The aircrafts Polar 5 & 6 currently host one GPS sensor for scientific purposes (Table 1).

Table 1: Sensor specifications of Polar 5 & 6

Sensor Name	NovAtel FlexPak6, short: FlexPak6
Description	GPS1 - GPS receiver used for all scientific equipment
Horizontal position accuracy	Single point L1 1.5 m, Single point L1/L2 1.2 m, SBAS 0.6 m, DGPS 0.4 m, OmniSTAR <ul style="list-style-type: none">• VBS 0.6 m• XP 0.15 m• HP 0.1 m RT-20 0.2 m, RT-2 1 cm+1 ppm
Time accuracy	20 ns
Velocity accuracy	0.03 m/s
Data rate	Used: 1Hz, max: 100Hz
Installation point	Antenna on cabin roof



4 Extracted Data

Navigation data (NMEA telegrams) of the Polar 5 & 6 campaigns between 2012 and 2015 was extracted from the DAVIS SHIP data base (dship.awi.de). The data of the positioning sensor for scientific purposes was extracted in a 1-second interval. Flight information was gathered from DAVIS SHIP if available.

Each campaign with the number of exported flights and the percentage of available position data within the exported time frame is shown in Table 2.

Table 2: Extracted flights per campaign and mean data availability

Year	Campaign	#	Availability [%]
2012	NGT	13	51.6
2012	PAMARCMIP	19	98.1
2012	TIFAX	11	82.5
2012	VERDI	18	93.2
2013	AIRMETH	19	100.0
2013	DOMECair	21	93.0
2013	MaBaJu	2	100.0
2013	PAMARCMIP	9	99.9
2013	STABLE	15	99.9
2013	TOP79.5	6	100.0
2013	WEGAS	40	99.9
2014	ANTR	68	99.8
2014	LEAST	11	99.6
2014	NETCARE	20	99.1
2014	RACEPAC P5	16	99.8
2014	RACEPAC P6	20	100.0
2014	SMOSice	4	99.8
2015	ANTR	39	98.8
2015	MABANG P6	4	99.9
2015	MELTEXII P5	27	100.0
2015	NETCARE P5	18	99.4
2015	NETCARE P6	14	96.6
		414	



5 Processing

5.1 Data quality and manual flagging

The extracted data is converted to ESRI point shapefiles and imported to ArcGIS. The tracks are inspected visually, to evaluate data quality. After that, a quality check is performed using a speed filter, an acceleration filter, and a change of course filter. A second visual screening is then carried out to remove obvious outliers manually. Filtered positions are flagged.

5.2 Master track creation

During the master track creation all previously flagged positions are omitted. To keep the occurrence of data gaps as low as possible, all missing data points with a timespan smaller than 60 seconds are interpolated. Data gaps larger than 60 seconds are marked as such within the final master track.

5.3 Generalization

The master track is generalized to receive a reduced set of the most significant positions of the track using the Ramer-Douglas-Peucker algorithm and allow a maximum tolerated distance between points and generalized line of 4 arcseconds.

5.4 Typical errors in the dataset

NovAtel FlexPak 6

The errors of the scientific GPS sensor can be summarized in 4 groups:

1. 'Stuttering' of the GPS sensor. Many dropouts in a short interval (Figure 2).

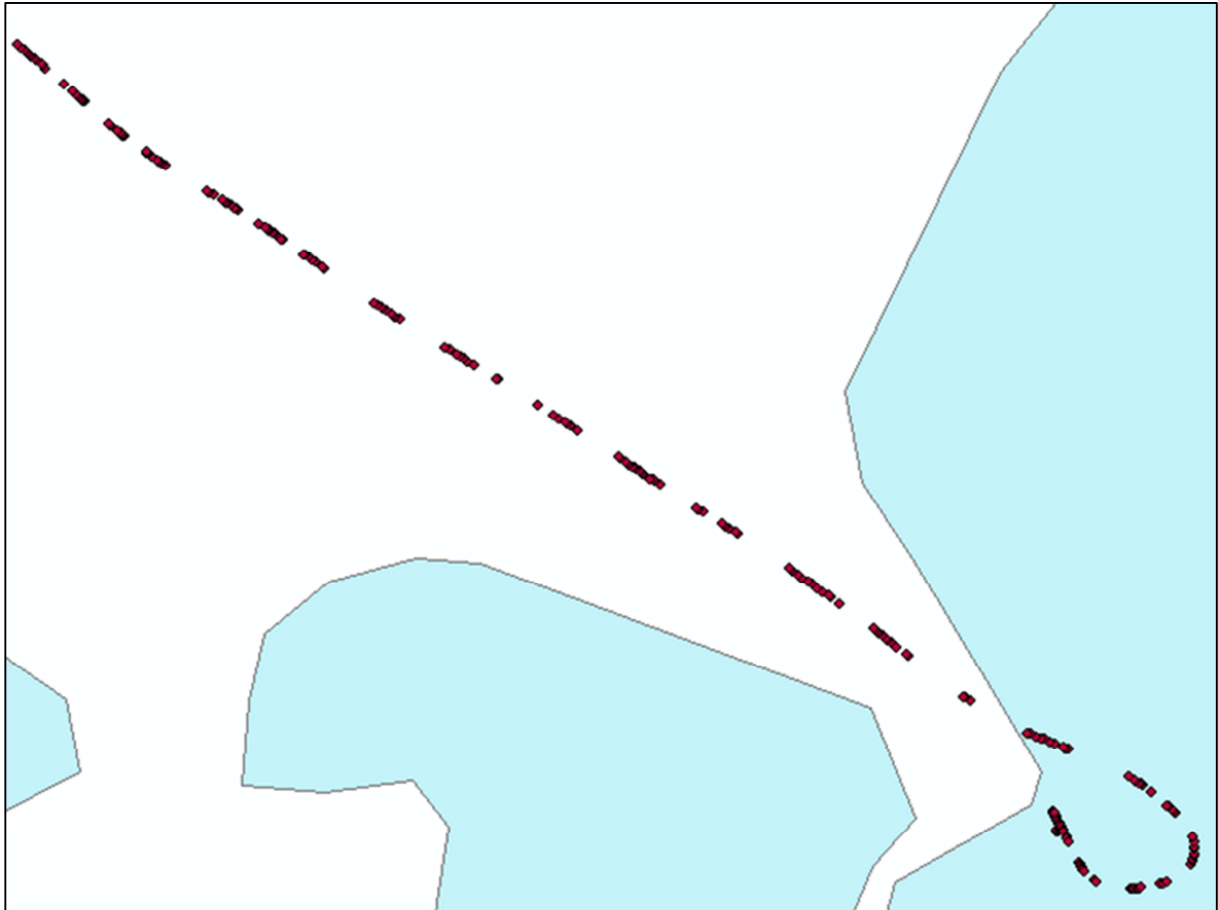


Figure 2: Example of GPS dropouts from TIFAX (2012) – 1206080101 The GPS drops out in short intervals over a long period of time.

- Dropouts of the GPS sensor in longer intervals (Figure 3).

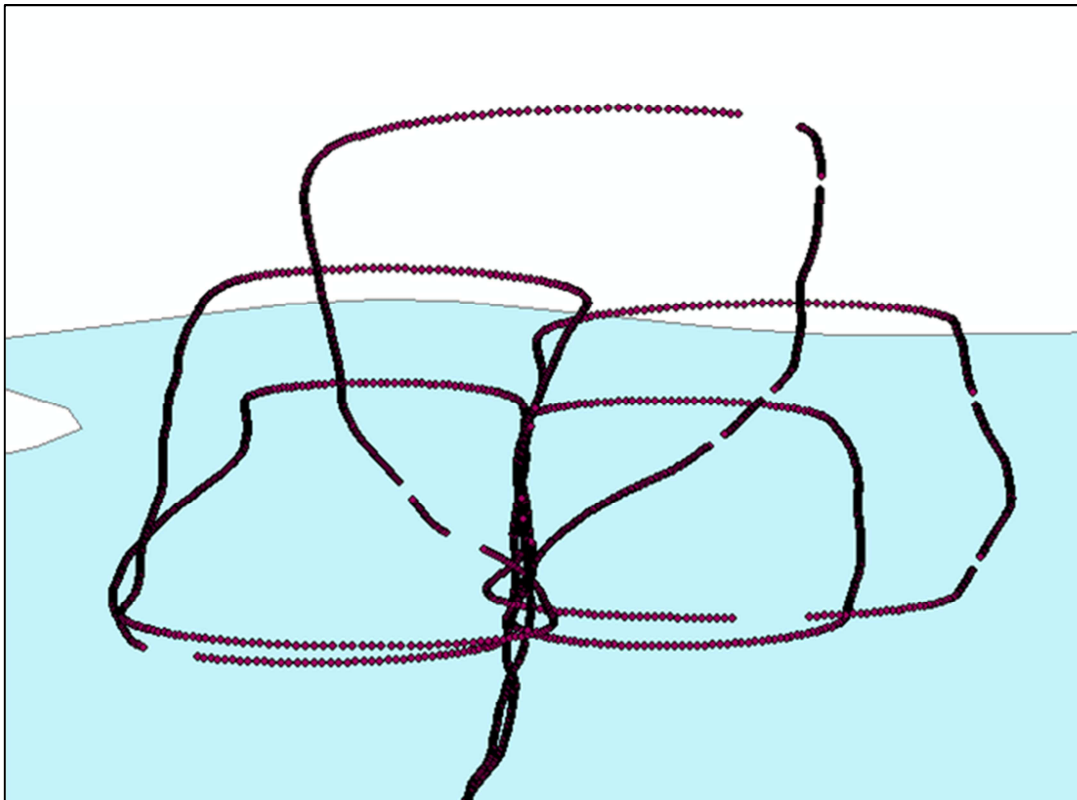


Figure 3: Dropouts of the GPS sensor from PAMARCMIP (2012) - 1203260211.

- GPS not available at takeoff or before touchdown of the aircraft. Commonly caused by an early shutdown / late startup of the GPS sensor (Figure 4).



Figure 4: Early shutdown of the GPS sensor from VERDI (2012) - 12030601.

4. Single outliers (Figure 5)

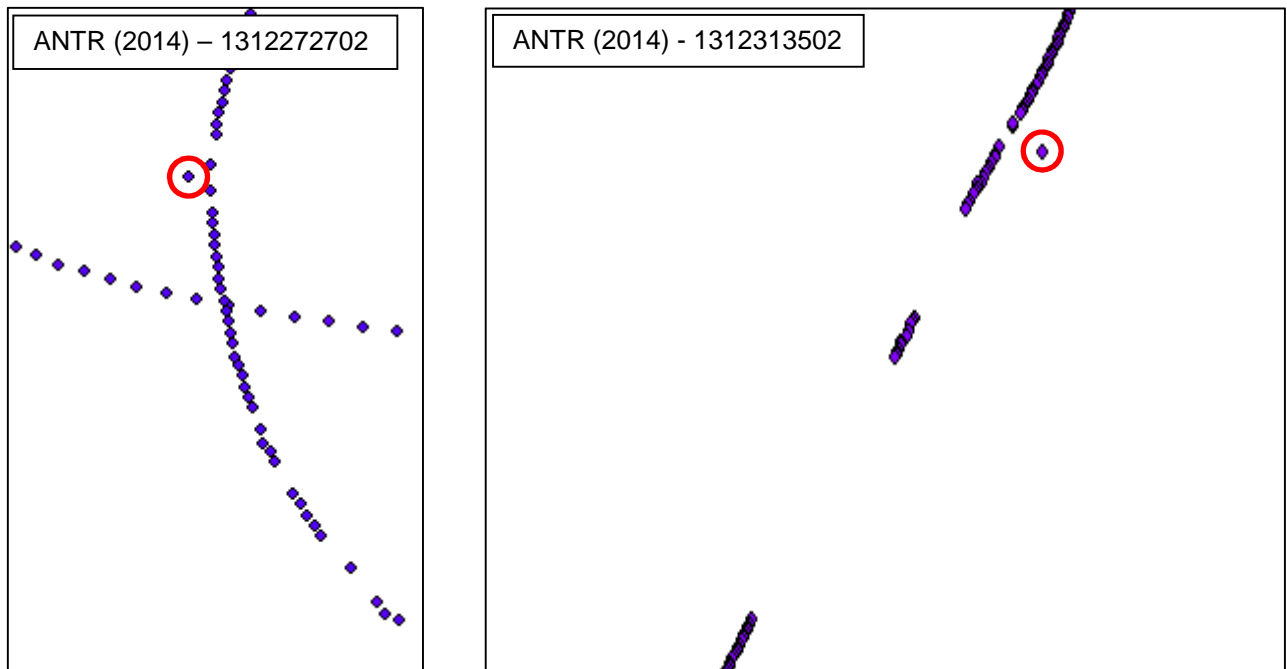


Figure 5: Single outliers that deviate from the track.



6 Scores

6.1 Calculation

In order to evaluate the quality of a created master track, a single score value is calculated using the raw dataset, the automated and manual filters flagging, and the resulting master track.

First, a score value for the existing data is calculated. The equation 1 is applied for all flights. The availability of raw position data is also shown in Table 1.

$$raw_{score} = \frac{available\ points}{datapoints} \quad (1)$$

Secondly, the flagging score is calculated for all automatic filters and the manual inspection. The equation 2 is applied for all flights.

$$flagging_{score} = \frac{flagged\ points}{datapoints} \quad (2)$$

The value of all valid and non-interpolated track positions is calculated (3). This is done including also gaps and interpolated values of the final master track.

$$track_{score} = 1 - \frac{interpolated\ points + gaps + datapoints - points\ in\ track}{datapoints} \quad (3)$$

The single score-value is then derived calculating the mean of these three values scaled from 0 to 100 (4).

$$score = \frac{raw_{score} + (1 - flagging_{score}) + track_{score}}{3} * 100 \quad (4)$$



6.2 Resulting score-values

For the campaigns, the following mean score values were calculated (Table 3). A value of 100 means a perfect dataset. The score value of each individual flight can be found in the appendix.

Table 3: Calculated score values for all processed Polar 5 and Polar 6 flights.

Year	Campaign	#	Mean Score Value
2012	NGT	13	51
2012	PAMARCMIP	19	98
2012	TIFAX	11	83
2012	VERDI	18	93
2013	AIRMETH	19	100
2013	DOMECair	21	93
2013	MaBaJu	2	100
2013	PAMARCMIP	9	100
2013	STABLE	15	100
2013	TOP79.5	6	100
2013	WEGAS	40	100
2014	ANTR	68	100
2014	LEAST	11	100
2014	NETCARE	20	99
2014	RACEPAC P5	16	100
2014	RACEPAC P6	20	100
2014	SMOSice	4	100
2015	ANTR	39	99
2015	MABANG P6	4	100
2015	MELTEXII P5	27	100
2015	NETCARE P5	18	99
2015	NETCARE P6	14	97



7 Reports

For each processed flight, a report is created and uploaded to the electronic Publication Information Center (ePIC; <http://epic.awi.de>). These reports include all metadata of the flight (duration, takeoff and touchdown locations, and start/end of extracted DSHIP data) and all information of the navigation sensor used.

The report also gives detailed descriptions of the data quality, the result of automated and manual filtering, the filter and generalization settings of the master track creation and the composition of the created track.

Additionally, the generalized track is shown on a map and the calculated score value is given.

8 Remarks

While working with the metadata extracted from DAVIS SHIP it became clear, that there were some wrong entries in those files.

For several flights wrong start and/or end locations were entered into the metadata-file. See Table 3 for detailed information (fixed airports in yellow).

Table 3: Wrong airport locations in DSHIP

Year	Campaign	Flight #	Start location	End location	DSHIP Source
2014	NETCARE	1407020101	Muskoka	Pickle Lake	Picked Lake
2014	NETCARE	1407020201	Pickle Lake	Churchill	Picked Lake
2014	NETCARE	1407231601	Resolute	Baker Lake	Resolute Bay
2014	NETCARE	1407231701	Baker Lake	Churchill	Resolute Bay / Resolute Bay
2014	NETCARE	1407241901	Pickle Lake	Muskoka	Resolute Bay / Resolute Bay
2014	NETCARE	1497241801	Churchill	Pickle Lake	Resolute Bay / Resolute Bay
2015	NETCARE P5	1504060501	Longyearbyen	Station Nord	Alert
2015	NETCARE P5	1504171103	Eureka	Inuvik	Inuvik



9 Appendix

9.1 Flight list

Campaign	Flight #	Availability [%]	Score Value
NGT (2012)	1205110406	51.5	51
NGT (2012)	1205110507	51.3	51
NGT (2012)	1205140001	51.7	52
NGT (2012)	1205160101	51.5	51
NGT (2012)	1205170201	51.2	51
NGT (2012)	1205220301	51.2	51
NGT (2012)	1205230401	51.6	52
NGT (2012)	1205240501	52	52
NGT (2012)	1205250601	51.4	51
NGT (2012)	1205260701	50.8	51
NGT (2012)	1205270801	51.9	52
NGT (2012)	1205270901	52.3	52
NGT (2012)	1205281001	52	52
PAMARCMIP (2012)	1203150202	99.7	100
PAMARCMIP (2012)	1203160103	97.8	98
PAMARCMIP (2012)	1203190104	92.7	93
PAMARCMIP (2012)	1203200105	99.9	100
PAMARCMIP (2012)	1203210106	97.5	98
PAMARCMIP (2012)	1203220107	99.9	100
PAMARCMIP (2012)	1203240108	98.7	99
PAMARCMIP (2012)	1203250109	97.4	97
PAMARCMIP (2012)	1203260110	99.1	99
PAMARCMIP (2012)	1203260211	95	95
PAMARCMIP (2012)	1203280113	99.9	100
PAMARCMIP (2012)	1203290114	95.6	96
PAMARCMIP (2012)	1203300115	99.9	100
PAMARCMIP (2012)	1204020116_1	99.9	100
PAMARCMIP (2012)	1204030117	96.8	97
PAMARCMIP (2012)	1204040118	97.6	98
PAMARCMIP (2012)	1204050119	97.6	98
PAMARCMIP (2012)	1204060120	99.6	100
PAMARCMIP (2012)	1204070121	98.4	98
TIFAX (2012)	1206070101	49.8	50
TIFAX (2012)	1206080101_1	29.5	29
TIFAX (2012)	1206080101	29.7	30
TIFAX (2012)	1207180101	99.8	100
TIFAX (2012)	1207180202	99.9	100
TIFAX (2012)	1207190103_1	99.8	100
TIFAX (2012)	1207190103	99.8	100
TIFAX (2012)	1207200104	99.9	100
TIFAX (2012)	1207210105	99.9	100
TIFAX (2012)	1207240106	99.8	100



Campaign	Flight #	Availability [%]	Score Value
TIFAX (2012)	1207260107	99.7	100
VERDI (2012)	12030601	92.3	92
VERDI (2012)	1204170101	96	96
VERDI (2012)	1204210102_1	98.2	98
VERDI (2012)	1204220103	97.4	97
VERDI (2012)	1204230104	95.9	96
VERDI (2012)	1204250105	96.3	96
VERDI (2012)	1204270106	98.3	98
VERDI (2012)	1204270206	55.7	56
VERDI (2012)	1204290108	99.6	100
VERDI (2012)	1204300109	99.9	100
VERDI (2012)	1205030110	96.9	97
VERDI (2012)	1205050111	99.9	100
VERDI (2012)	1205080112	97.7	98
VERDI (2012)	1205100113	99.4	99
VERDI (2012)	1205140114	94.8	95
VERDI (2012)	1205150115	99.9	100
VERDI (2012)	1205160116_1	60.2	60
VERDI (2012)	1205170117	99.9	100
AIRMETH (2013)	1306250101	100	100
AIRMETH (2013)	1306250202	100	100
AIRMETH (2013)	1306260301	99.6	100
AIRMETH (2013)	1307040101	100	100
AIRMETH (2013)	1307060201	100	100
AIRMETH (2013)	1307070301	100	100
AIRMETH (2013)	1307080401	100	100
AIRMETH (2013)	1307100501	100	100
AIRMETH (2013)	1307110601	100	100
AIRMETH (2013)	1307120701	100	100
AIRMETH (2013)	1307130801	100	100
AIRMETH (2013)	1307140901	100	100
AIRMETH (2013)	1307191001	100	100
AIRMETH (2013)	1307201101	100	100
AIRMETH (2013)	1307211201	100	100
AIRMETH (2013)	1307221301	100	100
AIRMETH (2013)	1307231401	100	100
AIRMETH (2013)	1307251501	100	100
AIRMETH (2013)	1307261601	100	100
DOMECair (2013)	1209240101	99.5	100
DOMECair (2013)	1301123801	100	100
DOMECair (2013)	1301133901	100	100
DOMECair (2013)	1301134001	92.9	93
DOMECair (2013)	1301134002	38.2	38
DOMECair (2013)	1301134003	100	100
DOMECair (2013)	1301154101	82.5	82
DOMECair (2013)	1301154102	81.7	82



Campaign	Flight #	Availability [%]	Score Value
DOMECair (2013)	1301154103	78.5	78
DOMECair (2013)	1301174201	100	100
DOMECair (2013)	1301174301	100	100
DOMECair (2013)	1301184401	99.9	100
DOMECair (2013)	1301184501	99.9	100
DOMECair (2013)	1301194601	99.9	100
DOMECair (2013)	1301194701	100	100
DOMECair (2013)	1301214801	99.9	100
DOMECair (2013)	1301224901	100	100
DOMECair (2013)	1301225001	100	100
DOMECair (2013)	1301235101	100	100
DOMECair (2013)	1301235201	79.5	79
DOMECair (2013)	1301245301	100	100
MaBaJu (2013)	1302015401	100	100
MaBaJu (2013)	1302025501	100	100
PAMARCMIP (2013)	1304120100	100	100
PAMARCMIP (2013)	1304120101	100	100
PAMARCMIP (2013)	1304180200	99.7	100
PAMARCMIP (2013)	1304190300	100	100
PAMARCMIP (2013)	1304190400	100	100
PAMARCMIP (2013)	1304200500	100	100
PAMARCMIP (2013)	1304210600	100	100
PAMARCMIP (2013)	1304300700	99.7	100
PAMARCMIP (2013)	1304300801	100	100
STABLE (2013)	1302280101	99.8	100
STABLE (2013)	1303040102	100	100
STABLE (2013)	1303060103	100	100
STABLE (2013)	1303070104	100	100
STABLE (2013)	1303080105	100	100
STABLE (2013)	1303100106	100	100
STABLE (2013)	1303110107	100	100
STABLE (2013)	1303150108	100	100
STABLE (2013)	1303170109	100	100
STABLE (2013)	1303180110	100	100
STABLE (2013)	1303190111	99	99
STABLE (2013)	1303200112	99.9	100
STABLE (2013)	1303220113	100	100
STABLE (2013)	1303250114	100	100
STABLE (2013)	1303260115	100	100
TOP79.5	1308020101	100	100
TOP79.5	1308040201	100	100
TOP79.5	1308060301	100	100
TOP79.5	1308080401	100	100
TOP79.5	1308080501	100	100
TOP79.5	1308090601	100	100
WEGAS (2013)	1209180101	99.1	99



Campaign	Flight #	Availability [%]	Score Value
WEGAS (2013)	12091902	99.6	100
WEGAS (2013)	1211240101	99.9	100
WEGAS (2013)	1211250201	100	100
WEGAS (2013)	1211260301	99.7	100
WEGAS (2013)	1211270401	100	100
WEGAS (2013)	1211280501	100	100
WEGAS (2013)	1211290601	98.9	99
WEGAS (2013)	1212010701	100	100
WEGAS (2013)	1212020801	99.3	99
WEGAS (2013)	1212030901	99.8	100
WEGAS (2013)	1212041001	100	100
WEGAS (2013)	1212051101	100	100
WEGAS (2013)	1212071201	100	100
WEGAS (2013)	1212081301	99.9	100
WEGAS (2013)	1212091401	100	100
WEGAS (2013)	1212091501	99.9	100
WEGAS (2013)	1212101601	100	100
WEGAS (2013)	1212111701	100	100
WEGAS (2013)	1212131801	100	100
WEGAS (2013)	1212131901	100	100
WEGAS (2013)	1212152001	100	100
WEGAS (2013)	1212152101	99.7	100
WEGAS (2013)	1212192201	99.4	99
WEGAS (2013)	1212192301	100	100
WEGAS (2013)	1212202401	100	100
WEGAS (2013)	1212212501	100	100
WEGAS (2013)	1212222601	100	100
WEGAS (2013)	1212272701	100	100
WEGAS (2013)	1212272801	100	100
WEGAS (2013)	1212282901	100	100
WEGAS (2013)	1212293001	100	100
WEGAS (2013)	1212293002	100	100
WEGAS (2013)	1212303101	100	100
WEGAS (2013)	1301053201	100	100
WEGAS (2013)	1301063301	100	100
WEGAS (2013)	1301063401	99.9	100
WEGAS (2013)	1301083501	100	100
WEGAS (2013)	1301093601	99.8	100
WEGAS (2013)	1301093701	100	100
ANTR (2014)	1309120101	97.7	98
ANTR (2014)	1309120202	100	100
ANTR (2014)	1309190103	100	100
ANTR (2014)	1309190204	100	100
ANTR (2014)	1310300101	100	100
ANTR (2014)	1311040201	100	100
ANTR (2014)	1311070301	100	100



Campaign	Flight #	Availability [%]	Score Value
ANTR (2014)	1311080401	100	100
ANTR (2014)	1311090501	100	100
ANTR (2014)	1311100601	100	100
ANTR (2014)	1311150701	100	100
ANTR (2014)	1311160801	100	100
ANTR (2014)	1311280901	100	100
ANTR (2014)	1311281001	100	100
ANTR (2014)	1311291101	100	100
ANTR (2014)	1312011201	100	100
ANTR (2014)	1312081301	91.7	92
ANTR (2014)	1312081401	100	100
ANTR (2014)	1312091501	100	100
ANTR (2014)	1312091601_1	100	100
ANTR (2014)	1312091603	99.4	99
ANTR (2014)	1312111801	100	100
ANTR (2014)	1312121901	100	100
ANTR (2014)	1312132001	100	100
ANTR (2014)	1312152101	100	100
ANTR (2014)	1312222201	100	100
ANTR (2014)	1312242302	99.9	100
ANTR (2014)	1312252402	100	100
ANTR (2014)	1312252502	100	100
ANTR (2014)	1312262603	100	100
ANTR (2014)	1312272702	99.9	100
ANTR (2014)	1312282802	100	100
ANTR (2014)	1312282902	100	100
ANTR (2014)	1312283001	100	100
ANTR (2014)	1312283101	100	100
ANTR (2014)	1312283201	100	100
ANTR (2014)	1312293301	99.9	100
ANTR (2014)	1312303402	96.7	97
ANTR (2014)	1312313502	98.1	98
ANTR (2014)	1401023602	100	100
ANTR (2014)	1401023702	100	100
ANTR (2014)	1401043802	100	100
ANTR (2014)	1401043902	100	100
ANTR (2014)	1401054002	100	100
ANTR (2014)	1401074102	100	100
ANTR (2014)	1401114202	100	100
ANTR (2014)	1401154302	100	100
ANTR (2014)	1401154401	100	100
ANTR (2014)	1401174501	100	100
ANTR (2014)	1401174601	100	100
ANTR (2014)	1401204701	100	100
ANTR (2014)	1401214801	100	100
ANTR (2014)	1401225101	100	100



Campaign	Flight #	Availability [%]	Score Value
ANTR (2014)	1401235101	100	100
ANTR (2014)	1401235301	100	100
ANTR (2014)	1401245401	100	100
ANTR (2014)	1401245501	100	100
ANTR (2014)	1401255601	100	100
ANTR (2014)	1401255701	100	100
ANTR (2014)	1401265801	100	100
ANTR (2014)	1401275901	100	100
ANTR (2014)	1401286001	100	100
ANTR (2014)	1401286101	100	100
ANTR (2014)	1402016201	100	100
ANTR (2014)	1402026301	100	100
ANTR (2014)	1402026401	100	100
ANTR (2014)	1402036501	100	100
ANTR (2014)	1402036601	100	100
LEAST (2014)	1402190101	99.8	100
LEAST (2014)	1402210101	99.7	100
LEAST (2014)	1402210202	99.9	100
LEAST (2014)	1403040101	96	96
LEAST (2014)	1403050201	99.9	100
LEAST (2014)	1403100301	99.9	100
LEAST (2014)	1403130401	100	100
LEAST (2014)	1403140501	100	100
LEAST (2014)	1403160601	100	100
LEAST (2014)	1403180701	99.9	100
LEAST (2014)	1403190801	100	100
NETCARE (2014)	1406260001	99.9	100
NETCARE (2014)	1407020101	87.3	87
NETCARE (2014)	1407020201	99.5	99
NETCARE (2014)	1407030301	99.9	100
NETCARE (2014)	1407030401	99.9	100
NETCARE (2014)	1407040501	99.9	100
NETCARE (2014)	1407050601	99.9	100
NETCARE (2014)	1407070701	99.9	100
NETCARE (2014)	1407080801	99.9	100
NETCARE (2014)	1407100901	99.9	100
NETCARE (2014)	1407121001	99.9	100
NETCARE (2014)	1407171101	97.6	98
NETCARE (2014)	1407191201	99.9	100
NETCARE (2014)	1407201301	99.9	100
NETCARE (2014)	1407211401	99.9	100
NETCARE (2014)	1407211501	99.9	100
NETCARE (2014)	1407231601	99.9	100
NETCARE (2014)	1407231701	99.9	100
NETCARE (2014)	1407241901	99.9	100
NETCARE (2014)	1497241801	99.9	100



Campaign	Flight #	Availability [%]	Score Value
RACEPAC P5 (2014)	1310300101	100	100
RACEPAC P5 (2014)	1404280101	99.9	100
RACEPAC P5 (2014)	1404300201	99.9	100
RACEPAC P5 (2014)	1405010301	99.9	100
RACEPAC P5 (2014)	1405030401	99.9	100
RACEPAC P5 (2014)	1405060501	99.9	100
RACEPAC P5 (2014)	1405080601	99.9	100
RACEPAC P5 (2014)	1405100701	99.8	100
RACEPAC P5 (2014)	1405110801	99.7	100
RACEPAC P5 (2014)	1405140901	99.7	100
RACEPAC P5 (2014)	1405161002	99.5	100
RACEPAC P5 (2014)	1405171101	98.9	99
RACEPAC P5 (2014)	1405201201	99.7	100
RACEPAC P5 (2014)	1405221301	99.7	100
RACEPAC P5 (2014)	1405221401	99.9	100
RACEPAC P5 (2014)	1405231501	99.8	100
RACEPAC P6 (2014)	1311110101	100	100
RACEPAC P6 (2014)	1404170101	100	100
RACEPAC P6 (2014)	1404260101	100	100
RACEPAC P6 (2014)	1404260201	100	100
RACEPAC P6 (2014)	1404280301	100	100
RACEPAC P6 (2014)	1404300401	100	100
RACEPAC P6 (2014)	1405010501	100	100
RACEPAC P6 (2014)	1405030601	100	100
RACEPAC P6 (2014)	1405060702	100	100
RACEPAC P6 (2014)	1405080801	100	100
RACEPAC P6 (2014)	1405100902	100	100
RACEPAC P6 (2014)	1405111002	100	100
RACEPAC P6 (2014)	1405131101	100	100
RACEPAC P6 (2014)	1405141201	100	100
RACEPAC P6 (2014)	1405161302	100	100
RACEPAC P6 (2014)	1405171401	100	100
RACEPAC P6 (2014)	1405201501	100	100
RACEPAC P6 (2014)	1405221601	100	100
RACEPAC P6 (2014)	1405221701	100	100
RACEPAC P6 (2014)	1405231801	100	100
SMOSice (2014)	1403230101	99.9	100
SMOSice (2014)	1403240201	99.9	100
SMOSice (2014)	1403260301	99.9	100
SMOSice (2014)	1403260402	99.6	100
ANTR (2015)	1410240001	99	99
ANTR (2015)	1411300101	100	100
ANTR (2015)	1412010201	100	100
ANTR (2015)	1412020301	100	100
ANTR (2015)	1412030401	100	100
ANTR (2015)	1412040501	100	100



Campaign	Flight #	Availability [%]	Score Value
ANTR (2015)	1412060601	100	100
ANTR (2015)	1412080701	100	100
ANTR (2015)	1412090801	100	100
ANTR (2015)	1412100901	100	100
ANTR (2015)	1412141001	74.6	75
ANTR (2015)	1412171101	84.5	85
ANTR (2015)	1412181201	100	100
ANTR (2015)	1412181302	100	100
ANTR (2015)	1412191401	100	100
ANTR (2015)	1412201501	100	100
ANTR (2015)	1412211601	99.8	100
ANTR (2015)	1412221701	100	100
ANTR (2015)	1412231801	100	100
ANTR (2015)	1412241901	100	100
ANTR (2015)	1412262001	100	100
ANTR (2015)	1412272101	100	100
ANTR (2015)	1412282201	100	100
ANTR (2015)	1412292301	100	100
ANTR (2015)	1412302401	100	100
ANTR (2015)	1501022501	100	100
ANTR (2015)	1501032601	100	100
ANTR (2015)	1501082701	100	100
ANTR (2015)	1501092801	100	100
ANTR (2015)	1501092902	99.8	100
ANTR (2015)	1501103001	99.9	100
ANTR (2015)	1501113101	100	100
ANTR (2015)	1501123201	100	100
ANTR (2015)	1501143301	100	100
ANTR (2015)	1501143402	100	100
ANTR (2015)	1501153501	100	100
ANTR (2015)	1501153602	95.2	95
ANTR (2015)	1501213701	99.9	100
ANTR (2015)	1501213802	100	100
MABANG P6 (2015)	1506170101	99.9	100
MABANG P6 (2015)	1506180201	99.9	100
MABANG P6 (2015)	1506190301	99.9	100
MABANG P6 (2015)	1506210401	99.9	100
MELTEXII P5 (2015)	1507060701	100	100
MELTEXII P5 (2015)	1506180101_1	100	100
MELTEXII P5 (2015)	1506180101	100	100
MELTEXII P5 (2015)	1506230101	100	100
MELTEXII P5 (2015)	1506290101	100	100
MELTEXII P5 (2015)	1506300201	100	100
MELTEXII P5 (2015)	1507020301	100	100
MELTEXII P5 (2015)	1507030401	100	100
MELTEXII P5 (2015)	1507030502	100	100



Campaign	Flight #	Availability [%]	Score Value
MELTEXII P5 (2015)	1507050601	100	100
MELTEXII P5 (2015)	1507070801	100	100
MELTEXII P5 (2015)	1507090901	100	100
MELTEXII P5 (2015)	1507101001	100	100
MELTEXII P5 (2015)	1507111101	100	100
MELTEXII P5 (2015)	1507151201	100	100
MELTEXII P5 (2015)	1507161301	100	100
MELTEXII P5 (2015)	1507171401	100	100
MELTEXII P5 (2015)	1507211501	100	100
MELTEXII P5 (2015)	1507271601	100	100
MELTEXII P5 (2015)	1507271701	100	100
MELTEXII P5 (2015)	1507281801	100	100
MELTEXII P5 (2015)	1507301901	100	100
MELTEXII P5 (2015)	1507312001	100	100
MELTEXII P5 (2015)	1508012101	100	100
MELTEXII P5 (2015)	1508022201	100	100
MELTEXII P5 (2015)	1508032301	100	100
MELTEXII P5 (2015)	1508052401	100	100
NETCARE P5 (2015)	1503220101	100	100
NETCARE P5 (2015)	1504010101	100	100
NETCARE P5 (2015)	1504020201	100	100
NETCARE P5 (2015)	1504030301	100	100
NETCARE P5 (2015)	1504050401	100	100
NETCARE P5 (2015)	1504060501	100	100
NETCARE P5 (2015)	1504060502	90	90
NETCARE P5 (2015)	1504070601	100	100
NETCARE P5 (2015)	1504080701	100	100
NETCARE P5 (2015)	1504090801	100	100
NETCARE P5 (2015)	1504100901	100	100
NETCARE P5 (2015)	1504111001	100	100
NETCARE P5 (2015)	1504171101	100	100
NETCARE P5 (2015)	1504171102	100	100
NETCARE P5 (2015)	1504171103	100	100
NETCARE P5 (2015)	1504201201	100	100
NETCARE P5 (2015)	1504221301	100	100
NETCARE P5 (2015)	1504231401	100	100
NETCARE P6 (2015)	1503260100	53.1	53
NETCARE P6 (2015)	1503280101	100	100
NETCARE P6 (2015)	1504050102	100	100
NETCARE P6 (2015)	1504070105	100	100
NETCARE P6 (2015)	1504080106	100	100
NETCARE P6 (2015)	1504080207	100	100
NETCARE P6 (2015)	1504090108	100	100
NETCARE P6 (2015)	1504100109	100	100
NETCARE P6 (2015)	1504110110	100	100
NETCARE P6 (2015)	1504130111_1	100	100



Campaign	Flight #	Availability [%]	Score Value
NETCARE P6 (2015)	1504130111	98.9	99
NETCARE P6 (2015)	1504200118	100	100
NETCARE P6 (2015)	1504200214	100	100
NETCARE P6 (2015)	1504210115	100	100