



Introduction

In a first review written in May 2015ⁱ, we found some discrepancies between the content of two navigation databases provided by two different companies dedicated to flight simulation software.

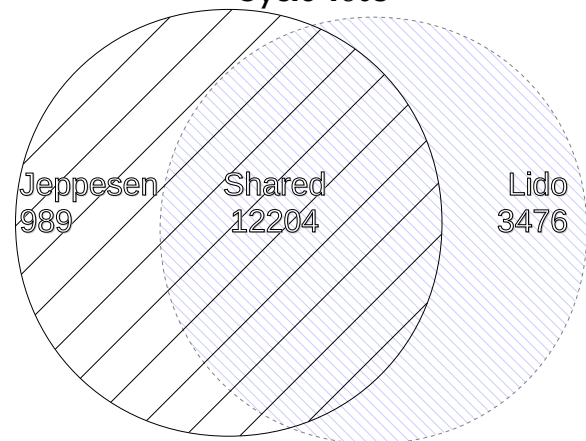
In this 2015 review we found 13 007 airports and 14 752 navaids in Navigraph data sourced at Jeppesen (cycle 1505). We found 9490 airports and 15 393 navaids in Aerosoft data published under the NavDataPro brand (and sourced at Lufthansa Systems LIDO) – cycle 1413. 9005 airports were shared in common by the two dataset.

In a more recent assessmentⁱⁱ (cycle 1605) we refined and updated those results. We found 13193 airports (6283 associated with IFR procedures), 17312 navaids and 248 817 waypoints in Navigraph set. We found 15680 airports (6902 with IFR procedures), 18087 navaids and 256 732 waypoints in Aerosoft set.

On the qualitative side, in this later study we found RF-legs for PMDG NGX (emulated with pseudo-waypoints), multiple ILS for the same runway and GLS approaches, to be only present in the Navigraph set

In this paper, we are going to turn our attention toward the cycle of October 2018 (AIRAC 1811).

**Distincts and shared airports
Cycle 1605**



Results



Statistical assessment

| Number of... | Navigraph FMS Data / Jeppesen | Aerosoft NavDataPro / Lido |
|------------------------------------|---|--|
| euros for one year | 31,08 (auto-renew) | 30,24 |
| euros for one cycle incl. VAT (FR) | 9,96 (auto-r.) then unsubscribe | 9,07 |
| waypoints | 265 046 | 277 371 |
| runways | 34 610 / 2 = 17 305 | 27 308 / 2 = 13 654 |
| airports | 13 543 | 17 040 |
| airports in common | 11 917 | |
| airports with IFR procedures | 2558 jeppesen-with-SID 1986 jeppesen-with-STAR 6818 jeppesen-with-APP So that's 6 818 airports with at least one IFR approach. | 2673 ndp-with-SID 2089 ndp-with-STAR 6458 ndp-with-APP So that's 6 458 airports with at least one IFR approach. |
| airports only in one set | 1 626 | 5 123 |
| Available under GNU/Linux ? | Yes | No |

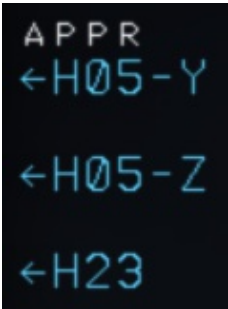
The values found in the cycle 1811 stay similar to the numbers found in the previous assessments. The fact that in Jeppesen we have more runways than airports signs that Jeppesen focuses on bigger airports than the LIDO dataset which has a lot of airports, but less runways, meaning some airports do not have runways registered or declared by Lufthansa Systems as suitable for an airliner.

We can notice that for X-Plane users under GNU/Linux, we cannot easily install NavDataPro.



Procedures

At Madeira, the LIDO charts tell that we have 3 RNP AR, 2 RNAV and 2 VOR approaches.

| | Navigraph FMS Data / Jeppesen | Aerosoft NavDataPro / Lido | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|---|---|-----|--------------------------|----------|-----|--------------------------|----------|-----|------------------------|----------|-----|-----------------------------|------------|-----|-----------------------------|-----------|-----|--------------------------------|-----------|-----|--------------------------------|-----------|-----|------------------------------------|---------|-----|-------------------------------------|----------|-----|---------------------------------|-----------|-----|---------------------------------|--|
| List of procedures iFly 737 | <p>11 approach procedures:</p> <p><i>[[list]]</i></p> <p>Procedure.0=D05-A.05 VDMA05 Procedure.1=D05-B.05 VDMB05 Procedure.2=D23-A.23 VDMA23 Procedure.3=D23-B.23 VDMB23 Procedure.4=R05-A.05 RNVA05 Procedure.5=R05-B.05 RNVB05 Procedure.6=R05-Y.05 RNVY05 Procedure.7=R05-Z.05 RNVZ05 Procedure.8=R23.23 RNV23 Procedure.9=R23-A.23 RNVA23 Procedure.10=R23-B.23 RNVB23</p> | <p>3 approach procedures : we only have the RNP AR procedures.</p> <p><i>[[list]]</i></p> <p>Procedure.0=H05-Y.05 Procedure.1=H05-Z.05 Procedure.2=H23.23</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FFA320 | <table border="1"> <tr><td>VOR 05 A</td><td>IAC</td><td>[7-10] IAC RNP Z 05 (AR)</td></tr> <tr><td>VOR 05 B</td><td>IAC</td><td>[7-20] IAC RNP Y 05 (AR)</td></tr> <tr><td>VOR 23 A</td><td>IAC</td><td>[7-30] IAC RNP 23 (AR)</td></tr> <tr><td>VOR 23 B</td><td>IAC</td><td>[7-50] IAC RNAV (GNSS) A 05</td></tr> <tr><td>RNV 05 A /</td><td>IAC</td><td>[7-60] IAC RNAV (GNSS) B 23</td></tr> <tr><td>RNV05 B *</td><td>IAC</td><td>[7-70] IAC VOR DME 05 Circling</td></tr> <tr><td>RNV05 Y /</td><td>VAC</td><td>[7-80] IAC VOR DME 23 Circling</td></tr> <tr><td>RNV05 Z /</td><td>VAC</td><td>[7-90] VAC RNAV (GNSS) 05 (Visual)</td></tr> <tr><td>RNV23 /</td><td>VAC</td><td>[7-100] VAC RNAV (GNSS) 23 (Visual)</td></tr> <tr><td>RNV23 A*</td><td>VAC</td><td>[7-110] VAC VOR DME 05 (Visual)</td></tr> <tr><td>RNV23 B /</td><td>VAC</td><td>[7-120] VAC VOR DME 23 (Visual)</td></tr> </table> <p>Some of those approaches aren't obviously linked to any charted approach available in LIDO or JEPP charts. They might be airline specific or filtered Portuguese AIP approaches.</p> | VOR 05 A | IAC | [7-10] IAC RNP Z 05 (AR) | VOR 05 B | IAC | [7-20] IAC RNP Y 05 (AR) | VOR 23 A | IAC | [7-30] IAC RNP 23 (AR) | VOR 23 B | IAC | [7-50] IAC RNAV (GNSS) A 05 | RNV 05 A / | IAC | [7-60] IAC RNAV (GNSS) B 23 | RNV05 B * | IAC | [7-70] IAC VOR DME 05 Circling | RNV05 Y / | VAC | [7-80] IAC VOR DME 23 Circling | RNV05 Z / | VAC | [7-90] VAC RNAV (GNSS) 05 (Visual) | RNV23 / | VAC | [7-100] VAC RNAV (GNSS) 23 (Visual) | RNV23 A* | VAC | [7-110] VAC VOR DME 05 (Visual) | RNV23 B / | VAC | [7-120] VAC VOR DME 23 (Visual) | <p>Also the same 3 approaches are found in the FFA320. We find only the RNP AR approaches, and no more RNAV(GNSS) nor VOR approaches.</p>  |
| VOR 05 A | IAC | [7-10] IAC RNP Z 05 (AR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VOR 05 B | IAC | [7-20] IAC RNP Y 05 (AR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VOR 23 A | IAC | [7-30] IAC RNP 23 (AR) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VOR 23 B | IAC | [7-50] IAC RNAV (GNSS) A 05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RNV 05 A / | IAC | [7-60] IAC RNAV (GNSS) B 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RNV05 B * | IAC | [7-70] IAC VOR DME 05 Circling | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RNV05 Y / | VAC | [7-80] IAC VOR DME 23 Circling | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RNV05 Z / | VAC | [7-90] VAC RNAV (GNSS) 05 (Visual) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RNV23 / | VAC | [7-100] VAC RNAV (GNSS) 23 (Visual) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RNV23 A* | VAC | [7-110] VAC VOR DME 05 (Visual) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RNV23 B / | VAC | [7-120] VAC VOR DME 23 (Visual) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



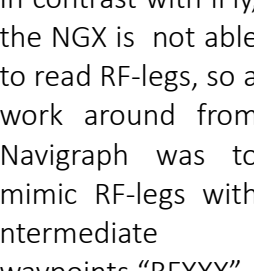

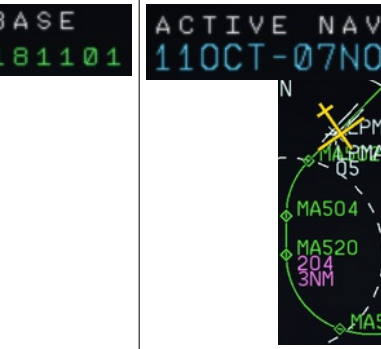


RF-legs for RNP AR approaches

| | Navigraph FMS Data / Jeppesen | Aerosoft NavDataPro / Lido |
|---------------------------------|---|---|
| RF-segments description | [R05-Y.05.5] Leg=RF Name=MA552 | [H23.23.3] Leg=RF Name=MA406 |
| Recent add-on (iFly 747 v2 set) | Latitude=32.724428 Longitude=-16.728939 Heading=78.9 TurnDirection=R Speed=210B NavDist=2.1 CenterLat=32.658650 CenterLon=-16.706469 | Latitude=32.660897222222 Longitude=-16.8004055555556 Heading=192 TurnDirection=L Speed=210B NavBear=230 Dist=2 CenterLat=32.6547055555556 CenterLon=-16.7416333333333 |


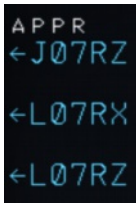
In our precedent review, we wrote “Radius to Fix legs are present only in the Navigraph data”. That can be corrected now : both dataset do handle RF-legs with add-ons of recent conception (like iFly 747 v2) which speak RF-legs !

In our previous review however, we did show RF-legs were not encoded for the PMDG NGX dataset and it's still true :

| | | |
|--|---|--|
| RF-segments description RNP Z 05 | FIX <u>MA522</u> 2000 SPEED 160 FIX RF008 FIX RF009 FIX <u>MA520</u> AT OR ABOVE 1200 FIX <u>MA504</u> ... | FIX OVERFLY MA522 AT 2000 SPEED 160 FIX OVERFLY MA520 AT 1200 FIX MA504... |
|  (NGX set) |  In contrast with iFly, the NGX is not able to read RF-legs, so a work around from Navigraph was to mimic RF-legs with intermediate waypoints “RFXXX”. |  NavDataPro doesn't add a work-around using pseudo waypoints like Navigraph. Non-native RF-legs are not supported by Aerosoft NavDataPro. With the PMDG NGX and Aerosoft data we can only see MA522 MA520 and MA504. The path is not correct. |
| FF/STS A320 Ultimate |  The path looks correct. |  The path looks correct. |

To sum up, both Aerosoft and Navigraph source the information like RF-Legs but they don't bring it to the various aircraft add-ons the same way. For instance, the Aerosoft Parser is able to produce RF-legs in the iFly 747 set as well as in the FF A320U but does not produce pseudo-RFXXX waypoints like Navigraph does for the PMDG NGX.

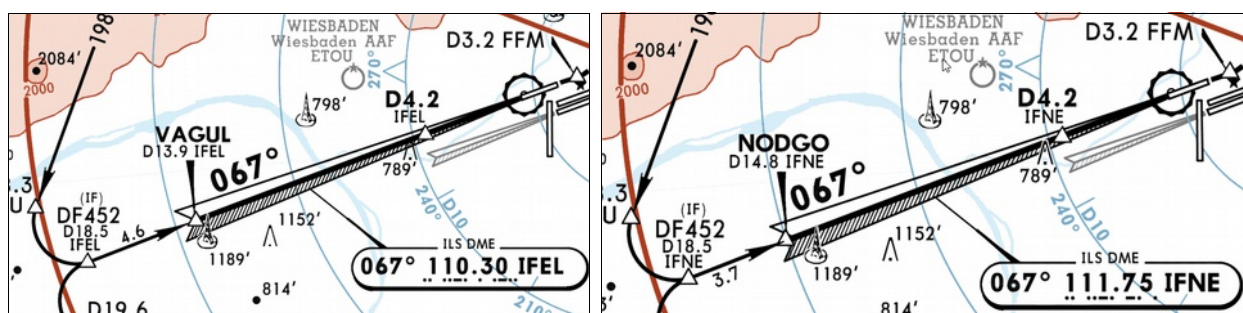
Ground Landing System (GBAS or SBAS)

| | Navigraph FMS Data / Jeppesen | Aerosoft NavDataPro / Lido |
|---|--|--|
| GLS approaches present ? EDDF ... in the iFly | <i>Procedure.11=J07CY.07C</i> <i>Procedure.12=J07CZ.07C</i> <i>Procedure.13=J07LY.07L</i> The Navigraph data includes GLS approaches in EDDF for the iFly 747 v2. | No "J" procedures/ The Aerosoft data does not include the GLS approach type. |
| GLS approaches present ? EDDF ... in the FFA320 |  It is confirmed with the FFA320. | J procedures are found in the Flight Factor A320 : Also LOC approaches can be found in the Aerosoft set and not in the Navigraph set which only keep the ILS.  |

To sum up, both Aerosoft and Navigraph source all the relevant information from their real-world providers. But, like in this case GLS missing in the iFly 747 v2 but not the FF A320 U, there are variations in the parsers and filters which bring the information to the various add-ons dataset.

Multiple ILS for one runway end

| | Navigraph FMS Data / Jeppesen | Aerosoft NavDataPro / Lido |
|--|--|---|
| Multiple ILS frequencies for the same runway end ? iFly 747 | <i>[I07LY.07L]</i> <i>Frequency=IFEL</i> <i>Slope=3.20</i> <i>[I07LZ.07L]</i> <i>Frequency=IFNE</i> <i>Slope=3.00</i> | <i>[I07LY.07L]</i> <i>Frequency=IFEL</i> <i>Slope=-3.2</i> <i>[I07LZ.07L]</i> <i>Leg=CF</i> <i>Frequency=IFNE</i> <i>Slope=-3</i> |



Source : At EDDF, the CAT III ILS is 110.3 IFEL (ILS Y on the left picture) and the CAT I is 111.75 IFNE (ILS Z on the right) for the same runway 07L.
 Navigraph charts (Jeppesen) This is OK in the iFly 747 v2 dataset from Navigraph. This step shows that Aerosoft LIDO does have this information about multiple ILS frequencies as well as Navigraph.

We did a quick check with a different aircraft as other add-ons might not support different ILS frequencies for the same runway end. We did the crosscheck with the FF A320U.

Multiple ILS : crosscheck with the FF/STS A320 Ultimate in X-Plane 11

Navigraph FMS Data / Jeppesen



In the FF A320 Ultimate with Navigraph data, we get both ILS freq. but both are reported as CAT III.

Aerosoft NavDataPro / Lido



In the FF A320 Ultimate with NavDataPro, we have both ILS frequencies for runway 07L at EDDF. Moreover both are correctly referenced as CAT I or CAT III.

How are they linked to the approach ? The answer doesn't look very satisfactory because :

- with **Navigraph** we have both Z and Y approaches but they are associated with IFNE (incorrect);



- with **NavDataPro** we have both ILS Z and Y but they are associated with 110.30 (incorrect).

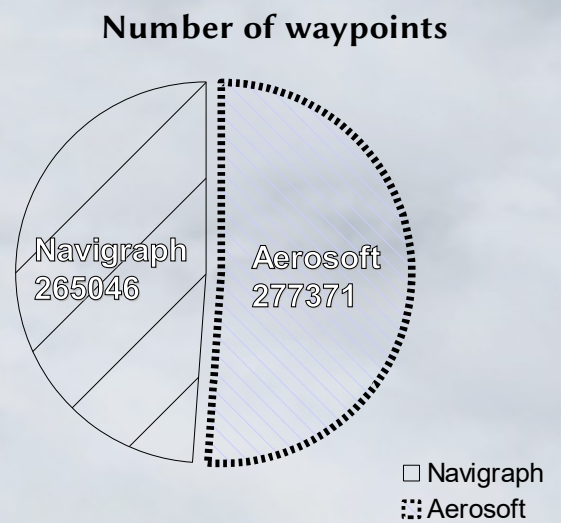
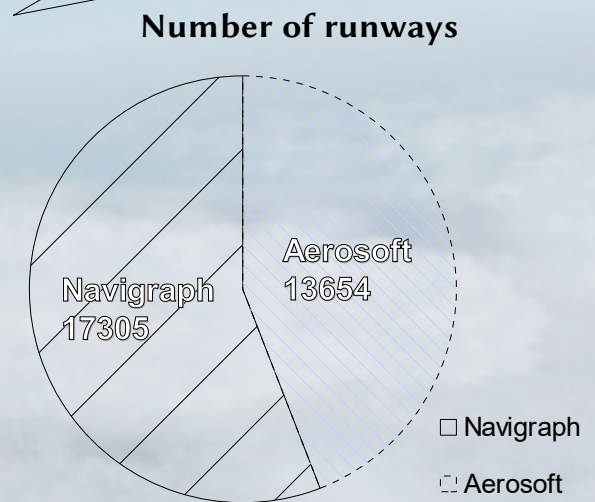
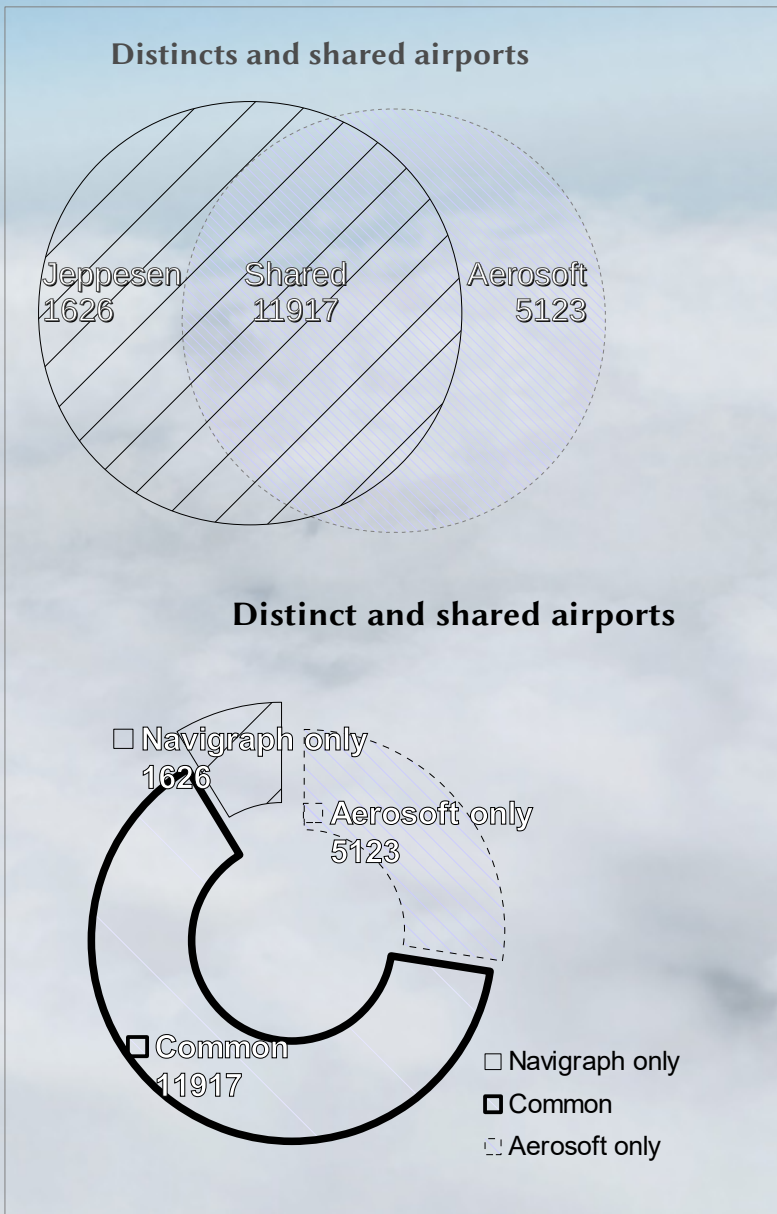
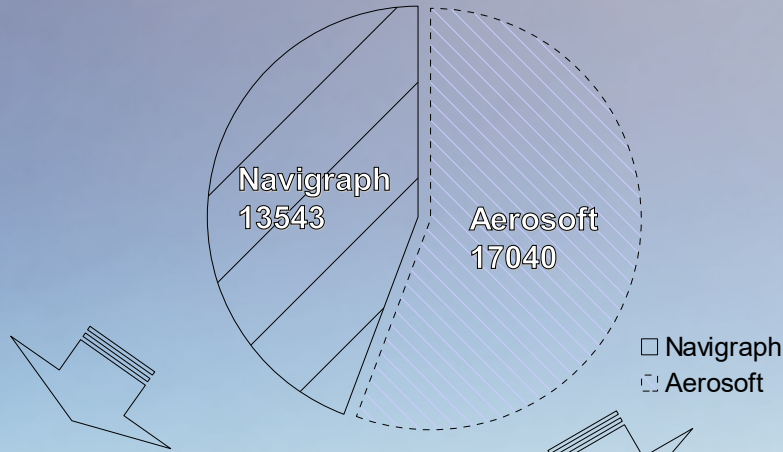


To sum up, both Aerosoft and Navigraph source all the relevant information from their real-world providers. But, like in this case of different frequencies for the same runway, they don't bring it to the various aircraft add-ons the same way. For instance, the Aerosoft Parser is able to associate the correct frequency to the correct approach in the iFly 747 v2 but not in the FF A320U Ultimate. Neither can the Navigraph parser.

At this stage, we cannot tell if it is a bug from FF A320 Ultimate, a database structure not ready to carry that information or an incomplete data parser at the provider Aerosoft or Navigraph.

Navigraph (Jeppesen) and Aerosoft (Lido) 1811 cycle

Raw data - Based on iFly 747 v2 dataset **Number of airports**



Material and Methods

The iFly 747 v2 dataset was chosen because it is of a relatively recent conception. To crosscheck some results we also used the PMDG NGX dataset. We used the cycle 1611. We installed the data from Navigraph using GNU/Linux Navigraph software then each file was parsed using bash command lines. The data from Aerosoft was installed under the Windows 10 installation software then analyzed under GNU/Linux with bash as well.

We made complementary tests on the Flight Factor A320 Ultimate 0.8.188-2151 under X-Plane 11.

Methods

| Number of... | Navigraph | NavDataPro |
|--|---|---|
| runways | <pre>sed '/;.*\$/d' WPNAVAPT.txt wc -l</pre> | <pre>sed '/;.*\$/d' wpNavAPT.txt wc -l</pre> |
| waypoints | <pre>sed '/;.*\$/d' WPNAVFIX.txt wc -l</pre> then divide by two. | <pre>sed '/;.*\$/d' wpNavFIX.txt wc -l</pre> then divide by two. |
| airports | <pre>sed '/;.*\$/d' AIRPORTS.dat wc -l</pre> | <pre>sed '/;.*\$/d' airports.dat wc -l</pre> |
| airports in common | <pre>diff -y lido-airports.liste jeppesen-airports.liste sed '/.*<.*\$/d' sed '/.*>.*\$/d' sed '/.* .*/d' wc -l</pre> | |
| airports with IFR procedures | <pre>ls -x1 sed -s 's/^\(....\)sid\$/\1/i' sed '/.*trs\$/d' > ../jeppesen-with-SID.liste</pre> | <pre>ls -x1 sed -s 's/^\(....\)sid\$/\1/i' sed '/.*trs\$/d' > ../ndp-with-SID.liste</pre> |
| Extraction of SID, STAR and approaches from a file sharing them all. | <pre>ls -x1 sed -s 's/^\(....\)star\$/\1/i' sed '/.*trs\$/d' sed '/.*app\$/d' > ../jeppesen-with-STAR.liste</pre> | <pre>ls -x1 sed -s 's/^\(....\)star\$/\1/i' sed '/.*trs\$/d' sed '/.*app\$/d' > ../ndp-with-STAR.liste</pre> |
| | <pre>ls -x1 sed -s 's/^\(....\)app\$/\1/i' sed '/.*trs\$/d' sed '/.*star\$/d' > ../jeppesen-with-APP.liste</pre> | <pre>ls -x1 sed -s 's/^\(....\)app\$/\1/i' sed '/.*trs\$/d' sed '/.*star\$/d' > ../ndp-with-APP.liste</pre> |
| counting airports with IFR procedures | <pre>wc -l jeppesen-with-SID.liste</pre> <pre>wc -l jeppesen-with-STAR.liste</pre> <pre>wc -l jeppesen-with-APP.liste</pre> | <pre>wc -l ndp-with-SID.liste</pre> <pre>wc -l ndp-with-STAR.liste</pre> <pre>wc -l ndp-with-APP.liste</pre> |
| airports only one set | <pre>diff -y --suppress-common-lines lido-airports.liste jeppesen-airports.liste sed '/.*<.*\$/d' wc -l</pre> | <pre>diff -y --suppress-common-lines lido-airports.liste jeppesen-airports.liste sed '/.*>.*\$/d' wc -l</pre> |

Material

Navigraph FMS data

AIRAC cycle : 1811

Version : 1

Valid (from/to): 11/OCT/2018 - 07/NOV/2018

Data provided by Navigraph - www.navigraph.com - Source data copyright (c) 2018 Jeppesen

Parser-Version : DFD v1.0 18.1003 (c) Richard Stefan

Files parsed on: 03/10/2018

Aerosoft NavDataPro

AIRAC cycle : 1811

Revision : 1

Valid (from/to): 11/OCT/2018 - 07/NOV/2018

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website: www.aerosoft.com



- i "Navigraph and NavDataPro raw data", May 2015 [ONLINE] http://ifly.flight1.net/forums/forum_posts.asp?TID=134450&PID=1164671�
- ii Navigraph versus NavDataPro, May 2016 [ONLINE] <http://gf3.myriapyle.net/aero/Fichiers/paper-cycle-1605.pdf>