

## Application Note - AN103

### ADS-B, Mode-S and ACAS flight data analysis with "ExtFlightData" function

#### 0. General

This Application Note describes the ExtFlightData output format of Planevision Systems *PlaneTRack* and *Radarcape* devices with ExtFlightData Output Option enabled.

#### 0.1 Applicability of Application Note

Planevision Systems device	Applicable	Remark
<i>PlaneTRack</i> , all types	Yes	with ExtFlightData Output Option enabled only

#### 0.2 Record of Revisions

Version	Date of issue	Revision
1.0	05 May 2015	Initial release
1.1	26 Jan 2016	revision of caller URL
1.2	19 Feb 2016	"all" parameter added

## 1. Introduction

Besides the basic ADS-B parameters (Flight level, track, ground speed, call sign, vertical rate, etc. ), that are derived from DO-260 compatible transponders, a number of flight data can be derived from aircraft equipped with modern aircraft transponders that follow the newer standards DO-260A and DO-260B. As of beginning of 2016 the equipage rate of these transponders is very low, though. Typically only new deliveries of type A380, B747-8, B787 and some A320 derivatives transmit these data yet.

Also available are data that are derived from transponder replies that are triggered by ground radars or adjacent aircraft:

Mode-S replies: altitude and SSR squawk (requires Mode-S interrogator in vicinity)

ACAS: altitude (requires ACAS interrogator in vicinity)

Mode-S EHS DAP parameters: TAS, heading, IAS, MACH and others (requires Mode-S EHS interrogator in vicinity)

Compared to ADS-B the latter three data are derived from non secured data frames, i.e. the sender ICAO address cannot be verified by a CRC computation. Therefore there is an inherent uncertainty about these data and this must be acknowledged when using them.

About 180 additional parameters plus further internal data sets are available from this function.

## 2. Access and Calling format

Extended Flight Data ("ExtFlightData") are available by means of a HTTP call to the PlaneTRack or Radarcape receivers at port 80. The call contains certain parameters that address "chapters" in a data dictionary.

Basic call format:

***http://<ip>/extflightdata.txt?<param>&<param>&,,,,***

All <param> are optional.

A default chapter of BASIC DATA is replied when no <param> is sent. This chapter is replied with any other requested chapter, too.

### 3. Reply format

All replies are in CSV format with ,(comma) as a delimiter

Every reply line of entry is terminated with a <CR><LF>

#### 3.1 Reply header

All replies carry a first line of receiver status and other data.

Sample of a reply header:

Planevision Systems CSV output

```
extflightdata.txt,1.0.150510,1455555154,,10.239,54.3446,27.3251
```

Field references:

(1) - Format description

(2) - Format version

(3) - Time (UNIX) of generation of report (RPTTIME)

(4) - Command line parameters if any

(5) - Longitude of receiver position

(6) - Latitude of receiver position

(7) - Height above ellipsoid of receiver position in meters

#### 3.2 Data reply

The BASIC DATA set is replied on every request.

If at least one data chapter is requested every available data chapter other than BASIC DATA is started with \*X, (asterisk plus a capital letter plus comma), where X is a descriptor for the data chapter following.

However, only those data chapters that were requested are filled with data.

Every reply line is terminated with \*\* (two asterisks) plus the <CR><LF> characters..

Sample of a reply of BASIC DATA only:

```
Planevision Systems CSV output extflightdata.txt,1.0.150510,1455555154,10.239,54.3446,27.3251
4A08E2,0,28,,0,5,0,1,,,,,,,,,36025,36025,0,1,1,0,36025,,0,,+64,300,,413,,,0,0,0,,0,0,0,0,24,
0,**
3C5EE2,1,0,A3,GWI9T,0,5,0,1,7757,,52.4434,12.5855,,8,2,0,15275,15075,0,1,1,-525,14750,,0,,+24
96,253,,336,,,0,0,1,0,0,0,0,0,71,3,**
49D055,0,1,,,0,5,0,1,,,,,,,,,38000,,0,1,,-975,37025,,0,,0,297,,438,,,1,0,1,,0,0,0,0,2,0,**
```

Sample of a reply of BASIC DATA and DATABASE ITEMS CHAPTER only:

Planevision Systems CSV output

extflightdata.txt,1.0.150510,1455555638,?db,10.239,54.3446,27.3251

4B1A67,0,0,A0,EZS89BH,0,5,0,0,2725,,55.1526,12.2142,,8,0,0,20525,20475,0,1,1,-750,19775,,0,,+  
1664,216,,364,,,0,0,1,0,0,0,1,0,48,2,\*D,Swit,,,,,\*A,\*T,\*E,\*V,\*I,\*\*

### 3.3 Data chapters

The following sections describes the data chapters available.

For a detailed descriptions of the parameters included in a chapter and their origin please refer to the Appendix of this Application Note.

#### 3.3.1 BASIC DATA

Caller sample	Reply sample
http://<ip>/extflightdata.txt	4B9902,0,0,A0,FHY258,0,5,0,0,7775,,53.7466,1 0.1974,,8,0,0,10350,10350,0,1,1,-275,10075,, 0,,+2688,113,,294,,,0,0,1,0,0,0,0,0,1238,150 ,**

This data set contains the basic data of ADS-B replies.

Caller sample	Reply sample
http://<ip>/extflightdata.txt?all	4B9902,0,0,A0,FHY258,0,5,0,0,7775,,53.7466,1 0.1974,,8,0,0,10350,10350,0,1,1,-275,10075,, 0,,+2688,113,,294,,,0,0,1,0,0,0,0,0,1238,150 .....

This data set contains all data from all chapters.

#### 3.3.2 DATABASE DATA

Caller sample	Reply sample
http://<ip>/extflightdata.txt?db<param>&,, ,	3CB424,0,6,,,5,,,,,,,,,,,,,,,,,,,,,,,,,,,,, ,,,,0,8,0,*D,Germ,,,,,*A,*T,*E,*V,*I,**

This data set contains aircraft and flight route data that are derived from internal databases.

### 3.3.3 AGE DATA

Caller sample	Reply sample
http://<ip>/extflightdata.txt?age<param>&,, ,,	406BBB,0,0,A0,BAW995,0,5,0,1,1375,,52.4471,1 1.8092,,8,0,0,25625,25600,0,1,1,-900,24725,, 0,,+2176,264,,369,,,0,0,1,0,0,0,0,0,1298,40, *D,*A,0,0,5,,,10,,,1,0,1,1,,,0,,1,,,,,,,,, ,,,0,0,*T,*E,*V,*I,**

This data set contains information about the time elapsed (in seconds) since a certain set of data was received.

### 3.3.4 ACAS DATA

Caller sample	Reply sample
http://<ip>/extflightdata.txt?acas<param>&,, ,,,	44010D,0,0,A0,AUA171,0,5,0,1,6602,,52.4299,1 2.3029,,8,0,0,33200,33225,0,1,1,-1025,32175, ,0,,-960,320,,444,,,0,0,1,0,0,0,0,0,3212,96, *D,*A,*T,0,1,0,7,*E,*V,*I,**

This data set contains information derived from ACAS replies.

### 3.3.5 EHS DATA

Caller sample	Reply sample
<pre>http://&lt;ip&gt;/extflightdata.txt?ehs&lt;param&gt;&amp;, , ,,</pre>	<pre>484B90,0,0,A0,KLM1396,0,5,0,1,3526,,54.862,1 0.9279,,7,0,0,38000,38000,0,1,1,-1250,36750, ,0,,0,239,,416,,,0,0,0,0,0,0,0,2997,86,*D, *A,*T,*E,118,KLM1396,,,,,,430,0,0,416,3,23 8,235,748,8,-64,8,0,8,*V,*I,**</pre>

This data set contains information derived from Mode-S EHS replies

### 3.3.6 ADVANCED DATA

Caller sample	Reply sample
<pre>http://&lt;ip&gt;/extflightdata.txt?adv&lt;param&gt;&amp;, , ,,</pre>	<pre>45D069,2,0,A3,VKG3624,0,5,0,1,2361,1010,53.3 085,7.32764,,8,1,0,34975,34975,0,1,1,-950,34 025,,1,0,,43,,429,,,0,0,0,0,0,0,0,2289,53, *D,*A,*T,*E,*V,,2,0,,,,,2,,,,,0 ,0,35008,1013,-1,9,1,3,0,0,0,0,1,0,1,2,0,0 ,0,0,2,0,9,3,0,0,1,1,0,,1,1,0,1,,,,, ,,,,,*,I,**</pre>

This data set contains flight data transmitted from aircrafts with advanced DO-260A or DO-260B compliant transponders.

### 3.3.7 INTERROGATOR CODES

Caller sample	Reply sample
<pre>http://&lt;ip&gt;/extflightdata.txt?ic&lt;param&gt;&amp;,,, ,</pre>	<pre>4D00D5,0,0,,LGL545C,0,5,0,1,5654,,,,,2300 0,,0,1,,,,,0,0,1,0,1097,20,*D,*A ,*T,*E,*V,*I,,,564,,,22,,,,, ,,,,,1098,,,,, ,,,,,*,I,**</pre>

This data set contains counts of the IC codes received from Mode-S replies for each aircraft.

### **3.4 HTTP request speed**

In general there is no limit for the request frequency. However internal computation of replies may slow down the central processing unit and it is recommended to request all data at their lowest possible frequency only.

## **4. DISCLAIMER**

Planevision Systems ADS-B equipment is not intended and not certified for air traffic control, navigational or other aircraft on-board services or other life critical services and in no case may be used for any other but sole information purposes.