

Application Note - AN112

Overview of *PlaneTRack* data output of Eurocontrol Asterix formats - Specifics of CAT048, CAT181 and CAT182 data formats

0. General

This Application Note provides an overview about the Asterix output data formats that are available by *PlaneTRack* ADS-B and Mode-S surveillance receivers.

This application note is supplemented by the following documents that are available from <http://appnotes.planevision.de> :

AN101 - Application Note - Asterix CAT021, CAT023, CAT247 output formats

AN112-048 - Data Interface Specification Document - Asterix CAT048

AN112-181 - Data Interface Specification Document - Asterix CAT181

AN112-182 - Data Interface Specification Document - Asterix CAT182

0.1 Applicability of Application Note

Planevision Systems device	Applicable	Remark
<i>PlaneTRack</i> , all types	Yes	with Asterix Output Option and/or Extended Asterix Output Option enabled only

0.2 Record of Revisions

Version	Date of issue	Revision
1.0	31 Aug 2017	Initial release

1. Overview of Asterix output formats on *PlaneTRack* ADS-B surveillance receivers

1.1 Reference documents

CAT	Title of format	Version	Original EUROCONTROL standard document	<i>PlaneTRack</i> reference document
021	ADS-B Target Reports	V0.23	http://www.eurocontrol.int/sites/default/files/service/content/documents/nm/asterix/part1-cat021-asterix-ads-b-messages-part-12.pdf	http://planevision.systems/customer/appnotes/AN101-PlaneTRack_Asterix_formats-ApplicationNote.pdf
021	ADS-B Target Reports	V0.26	https://www.eurocontrol.int/sites/default/files/content/documents/nm/asterix/archives/asterix-cat021-asterix-ads-b-messages-part-12-v0.10-to-v0.26.zip	http://planevision.systems/customer/appnotes/AN101-PlaneTRack_Asterix_formats-ApplicationNote.pdf
023	CNS/ATM Ground Station and Service Status Reports	V1.2	http://www.eurocontrol.int/sites/default/files/service/content/documents/nm/asterix/cat247-asterix-version-number-exchange-part-20.pdf	http://planevision.systems/customer/appnotes/AN101-PlaneTRack_Asterix_formats-ApplicationNote.pdf
247	Version Number Exchange	V1.2	http://www.eurocontrol.int/sites/default/files/content/documents/nm/asterix/cat023-asterix-cns-atm-ground-station-service-messages-part-16.pdf	http://planevision.systems/customer/appnotes/AN101-PlaneTRack_Asterix_formats-ApplicationNote.pdf
048	Monoradar target reports (Mode-S Data)	V1.23	http://www.eurocontrol.int/sites/default/files/publication/files/Cat048pt4ed123.pdf	http://planevision.systems/customer/appnotes/AN112-048.pdf
181	Aircraft and Flight Plan Data	V1.0		http://planevision.systems/customer/appnotes/AN112-181.pdf
182	Flight Extended State Data	V1.0		http://planevision.systems/customer/appnotes/AN112-182.pdf

1.2 Format type and sources and required option

CAT	Title of format	Format type/ source	Description	Required <i>PlaneTRack</i> Option
021	ADS-B Target Reports	Native EUROCONTROL	Standard format for ADS-B messages; ADS-B dataset as received from DO-260 Transponders. Please refer to AN101 for a discussion on compatibility to standards and ED-129. - Flights with transmitted position only	Standard Asterix
021	ADS-B Target Reports	Native EUROCONTROL	Standard format for ADS-B messages; dataset as received from DO-260 Transponders; enhanced airborne and ground position resolution over V0.23; signal level and SSR code added. Please refer to AN101 for a discussion on compatibility to standards and ED-129 - Flights with transmitted position only	Standard Asterix
023	CNS/ATM Ground Station and Service Status Reports	Native EUROCONTROL	Ground station status report for the <i>PlaneTRack</i> ADS-B surveillance receiver operating status..	Standard Asterix
247	Version Number Exchange	Native EUROCONTROL	Ground station status report for the <i>PlaneTRack</i> ADS-B surveillance receiver Asterix format versions of CAT021, CAT023 and CAT247	Standard Asterix
048	Monoradar target reports (Mode-S Data)	Native EUROCONTROL	Format for transmission of Mode-S ELS (DF4/5) data as received by the <i>PlaneTRack</i> surveillance receiver. flights WITHOUT transmitted position only	Extended Asterix
181	Aircraft and Flight Plan Data	Proprietary Planevision Systems	Format for transmission of aircraft and flight database data.	Extended Asterix
182	Flight Extended State Data	Proprietary Planevision Systems	Format for transmission of Mode-S EHS (DF20/21) data as received by the <i>PlaneTRack</i> surveillance receiver.	Extended Asterix

2. General comments

2.1 Compliance with standards

For the *PlaneTRack* implementation of CAT021 V0.23/V0.26 please refer to AN101 for a comprehensive discussion about compatibility with Eurocontrol standards, DO-260/A/B and ED-129.

The *PlaneTRack* implementation of CAT048 has a minor format deviation that is discussed in AN112-048.

CAT023 and CAT247 packets are transmitted at the selected interval rate of CAT021 or their transmission can be switched off completely.

Version information for CAT048, CAT181 and CAT182 is not contained in CAT247 transmissions.

The timestamp resolution for CAT048 and CAT182 is 1 second, while the data item's LSB is 1/128 seconds. The timestamp resolution for the other formats (except CAT181, which has no timestamp) is 1/128 seconds.

2.2 Transmission Modes

PlaneTRack ADS-B receivers are compliant with the provisions of ED-129 Chapter 3.10.2.3, i.e. Asterix Periodic Reports are transmitted at a user configurable rate between 0.5 and 15 seconds.

For CAT048, CAT181 and CAT182 the reporting interval is off, 1, 2, 5 or 10 seconds as selectable from the configuration page..

For CAT048, CAT181 and CAT182 multiple target IP:port addressing for destination servers is not available. These data are always transmitted in UDP frame mode, i.e. every data packet corresponds to an Asterix frame. UDP block mode is not available.

2.3 Station Identification

The SAC/SIC station identification must be entered separately for CAT021/023/247 and CAT048, CAT181 and CAT182. Enter the station identifier as a two-character hex string ("00" to "FF"). The SAC/SIC setting is usually obtained from the radar network operator. A general guidance about usage of the System Area Code (SAC) in ECAC international radar networks can be found here: <https://www.eurocontrol.int/services/system-area-code-list>


For CAT021/023/247 the higher two bits of the SIC define certain options. These options are not available for CAT048, CAT181 and CAT182.

2.4 Asterix Settings

For CAT021/023/247 configuration data are accessible in the *Configuration | Settings* menu > *Output Settings* section, that the user can configure as described in detail in AN101.

For CAT048, CAT181 and CAT182 configuration data are accessible through a web page when calling port 9040 from a web browser:

http://<planetrack-ip>:9040



PlaneTRack Extended GUI (port 9040)

Data output (UDP)

IP or URL

Port

Interval

- Off
- 1 sec
- 2 sec
- 5 sec
- 10 sec

Asterix CAT 048/181/182 input

CAT 048 Enabled	<input checked="" type="checkbox"/> Mode-S Data (ELS)
CAT 181 Enabled	<input checked="" type="checkbox"/> Aircraft and Flight Plan Data
CAT 182 Enabled	<input checked="" type="checkbox"/> Flight Extended State Data (EHS)
SAC	<input type="text" value="01"/>
SIC	<input type="text" value="01"/>

Each of the categories can be enabled/disabled as desired. After changes are complete press the Save Changes button.

If changes are accepted, a confirmation messages appears:



If changes are not accepted, please verify the correctness of the data entered, specifically the destination port (must be in range 1...65535) and the SIC/SAC data (must be hexadecimal in range 00 .. FF).



Invalid data entry. Values saved as default.

[Back](#)

3. Web Browser Test Interface

The *PlaneTRack* device offers access to a pseudo-Asterix CSV-formatted output via a web browser port 80 for test purposes.

For CAT021/023/247 to access this output call ***http://<planetrack-ip>/asterix-021.0.23.txt***

For CAT048/181//182 to access this output call ***http://<planetrack-ip:9040>/asterix***

The output is an ASCII hex representation of the binary Asterix output:

```
Planevision Systems Asterix CAT-021 V0.23 CAT-023 V1.2 CAT-247 V1.2 CSV
Output,3.0.160124,1453634027,,10.1669,53.5446,23.5363
F7,0014,*F0,1000,00,053F97,03150017170102F70102,<crLf>
17,000B,*D8,1000,01,053F97,00,<crLf>
17,000F,*F5,1000,02,02,053F97,0000,00,00,<crLf>
15,0025,*FF,*A1,*CA,1000,0030,053F97,25020207BB36,3C6307,1680,0006,08,05A0,FFF6,0638FDDD,00,00,<crLf>
15,0025,*FF,*A1,*CA,1000,0030,053F96,275EB07E8DD,4CA761,0D58,0006,08,0351,FF0B,06062C16,00,00,<crLf>

PlaneTRack Asterix CAT-048 CAT-181 CAT-182 CSV Output,2.1.170829,1504184117,,10.1669,53.5446,23.5363
B5,0024,*E6,6431,4040AB,U.K.,GLST,G-SKUA,<crLf>
30,002C,*C5,*81,*02,6431,5ADC00,00A4,4040AB,0000,<crLf>
B5,0036,*FF,*80,6431,344508,Spai,EKCH,LEBL,B763,EC-LZO,PVG,<crLf>
B6,0067,*F7,*FF,*F8,6431,344508,5ADC00,04A1,0-2,0-2,01,0460,71,01AC,0000,0000,0162,00D7,0133,02B0,0C60,0C8
0,<crLf>
B5,0036,*FF,*80,6431,3C4B31,Germ,EDDF,KLAX,B748,D-ABYQ,DLH,
B6,001F,*F0,6431,3C4B31,5AD880,03B6<crLf>,
B5,002C,*E7,*80,6431,471F4E,Hung,A320,HA-LWG,WZZ,<crLf>
B6,0063,*E7,*FF,*F8,6431,471F4E,5ADC00,0-3,0-2,0-1,0578,75,01BE,0000,0000,01CC,0074,0105,0304,00C0,0000,<c
rLf>
30,002C,*C5,*81,*02,6431,5ADC00,0578,471F4E,0040,<crLf>
```

First line: Header line, with data items:

- 1) Plain language format descriptor
- 2) Format version

- 3) Unix time of output
- 4) left blank
- 5) GPS longitude of receiver
- 6) GPS latitude of receiver
- 7) GPS altitude of receiver (mtrs)

Further lines are ASCII hex representations of binary values with the following additions

"*"	FSPEC field
", "	delimiter after data items
<crLf>	delimiter between different categories/data sets/flights

4. UDP test transmissions

For test purposes a single UDP test transmission can be triggered from a web browser call:

For CAT021/023/247: ***http://<planetrack-ip>/axudp.txt***

For CAT048/181/182: ***http://<planetrack-ip:9040>/axudp***

5. Database maintenance (requires Internet Connection)

The user interface on port 9040 offers an update feature for the databases implemented in the *PlaneTRack* device. The remote file is the current database file held on a Planevision Systems server. The local file is the database file on the *PlaneTRack* device.

Whenever the local file is older than the remote file it is recommended to initiate an update process. After the update is completed execute a Radar Client Restart.

Database Maintenance

[Download Aircraft Database](#)

Remote file: Wed, 23 Aug 2017 10:01:04 GMT
Local file : Wed, 23 Aug 2017 19:15:14 GMT

[Download Flight Routes](#)

Remote file: Sun, 27 Aug 2017 19:36:32 GMT
Local file : Sun, 27 Aug 2017 19:37:18 GMT

After downloads are completed Restart Radar Client and allow 1 min to restore normal operations

[Restart Radar Client](#)

DISCLAIMER AND WARNING

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.

Planevision Systems ADS-B equipment Asterix data output 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.

For the use of Mode-S ELS and EHS data the following warning applies:

Mode-S data items transmitted by CAT 048 are decoded by using a heuristic method, because the Mode-S UF interrogation packets are not known to the *PlaneTRack* surveillance receiver and the response aircraft identity is not CRC secured. However, this method yields 99% correct results, but

identity and data items cannot be verified and therefore must not be use for operational purposes. Planevision Systems cannot warrant the correctness of the data transmitted, nor can it be held liable for any malfunction or damages by the use of these data. By using these data the user holds harmless Planevision Systems from any claims with regard to the use of these data.

Mode-S data items transmitted by CAT 182 are decoded by using a heuristic method, because the Mode-S UF interrogation packets are not known to the *PlaneTRack* surveillance receive, the aircraft identity is not CRC secured and the MB/BDS type of response must be determined by estimation according to certain bit patterns. This method yields 95% correct results, but the data items cannot be verified and therefore must not be use for operational purposes. Planevision Systems cannot warrant the correctness of the data transmitted, nor can it be held liable for any malfunction or damages by the use of these data. By using these data the user holds harmless Planevision Systems from any claims with regard to the use of these data.