Application Note
AN112-181

Data Interface
Specification Document
Asterix CAT181

Title	Description	Version	Date
Asterix Category (CAT) 181 (B5$_h$)	**Aircraft and Flight Plan Data**	**1.0**	**August 27, 2017**

Planevision
SYSTEMS

Table of Contents

1. General

The purpose of this Asterix Pseudo Category ist to transmit data that are not contained in CAT021 protocol, but are made available by the ADS-B receiver.

1.1 User Application Profile and Data Blocks

CAT = 181 (B5$_h$)	LEN	FSPEC	Items of the first record		FSPEC	Items of the last record
1 octet	2 octets	1 or 2 octets			n.a.	n.a.

Note: only 1 record will be sent for each airframe

1.2 Standard Data Items

Data Item Reference Number	Description	Resolution	Octets (Bytes)	Remark
I181/010	Data Source Identifier	n.a.	2	mandatory
I181/080	Target Address	n.a.	3	mandatory
I181/090	Country of registration	n.a.	4	mandatory
I181/100	Flight origin	n.a.	4	optional
I181/101	Flight destination	n.a.	4	optional
I181/105	Aircraft type	n.a.	5	optional
I181/106	Aircraft registration	n.a.	8	optional
I181/107	Aircraft operator	n.a.	3	optional

2.   Description of Standard Data Items

2.1   Data Item I181/010, Data Source Identifier

Data Item	Name	Definition	Format	Remark
I181/010	Data Source Identifier	Identification of the system sending the data	Two-octet fixed length	This Item shall be present in every ASTERIX record

Encoding Rule

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

bits-16/9   (SAC)   System Area Code

bits 8/1   (SIC)   System Identification Code
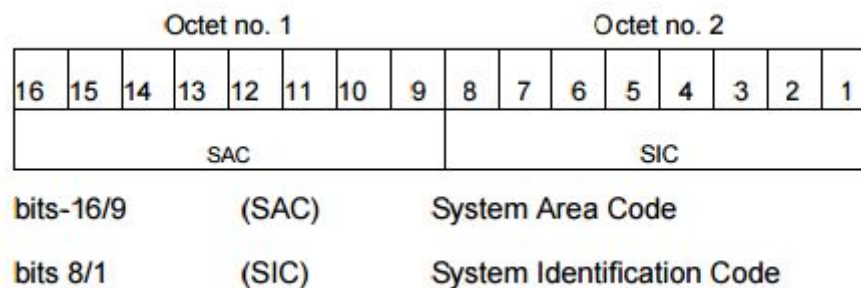
2.2   Data Item I181/080, Target Address

Data Item	Name	Definition	Format	Remark
I181/080	Target Address	Target address (emitter identifier) assigned uniquely to each target. (ICAO 24 Bit)	Three-octet fixed length	This Item shall be present in every ASTERIX record

Encoding Rule

bits-24/1   24-Bits address, A23 to A0
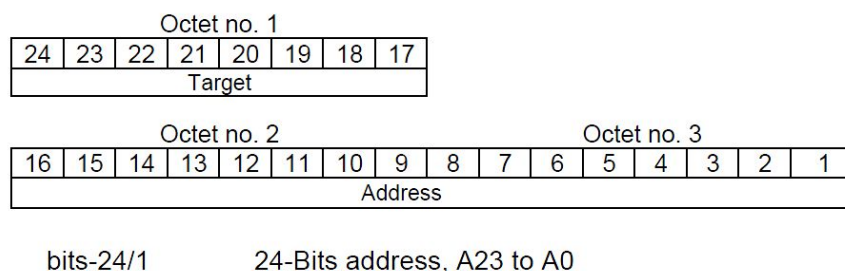
2.3   Data Item I181/090, Country of Registration

Data Item	Name	Definition	Format	Remark
I181/090	Country	Country of registration as first four letters of plain language name, e.g. "Germ"	Four-octet fixed length, encoded in ASCII	This Item is mandatory

Encoding Rule

Octet no. 1								Octet No. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
First letter in ASCII								Second letter in ASCII							

Octet no. 3								Octet No. 4							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Third letter in ASCII								Fourth letter in ASCII							

2.4   Data Item I181/100, Flight Origin

Data Item	Name	Definition	Format	Remark
I181/100	Flight Origin	Flight origin as ICAO code (four characters), e.g. EDDF	Four-octet fixed length, encoded in ASCII	This Item is optional

Encoding Rule

Octet no. 1								Octet No. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
First ICAO-code character in ASCII, e.g. E=45h								Second ICAO-code character in ASCII, e.g. D=44h							

Octet no. 3								Octet No. 4							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Third ICAO-code character in ASCII, e.g. D=44h								Fourth ICAO-code character in ASCII, e.g. F=46h							

Note: this item is only present if database entries are available from flightroutes.sqb

2.5   Data Item I181/101, Flight Destination

Data Item	Name	Definition	Format	Remark
I181/101	Flight Destination	Flight destination as ICAO code (four characters), e.g. EDDF	Four-octet fixed length, encoded in ASCII	This Item is optional

Encoding Rule

Octet no. 1								Octet No. 2							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
First ICAO-code character in ASCII, e.g. E=45h								Second ICAO-code character in ASCII, e.g. D=44h							

Octet no. 3								Octet No. 4							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Third ICAO-code character in ASCII, e.g. D=44h								Fourth ICAO-code character in ASCII, e.g. F=46h							

Note: this item is only present if database entries are available from flightroutes.sqb

2.6   Data Item I181/105, Aircraft Type

Data Item	Name	Definition	Format	Remark
I181/105	Aircraft Type	Aircraft Type as ICAO code (four characters), e.g. B744	Five-octet fixed length, encoded in ASCII	This Item is optional

Encoding Rule

Octet no. 1								Octet No. 2							
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
First ICAO-code character in ASCII, e.g. B=42h								Second ICAO-code character in ASCII, e.g. 7=37h							

Octet no. 3								Octet No. 4							
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
Third ICAO-code character in ASCII, e.g. 4=34h								Fourth ICAO-code character in ASCII, e.g. 4=34h							

Octet no. 5							
8	7	6	5	4	3	2	1
Fifth ICAO-code character in ASCII, e.g. blank=00h							

Note: Characters not present are filled by 00h
Note: this item is only present if database entries are available from basestation.sqb

2.7   Data Item I181/106, Aircraft Registration

Data Item	Name	Definition	Format	Remark
I181/106	Aircraft Registration	Aircraft Registration as ICAO code (max eight characters), e.g. RA123456	Eight-octet fixed length, encoded in ASCII	This Item is optional

Encoding Rule

Octet no. 1								Octet No. 2							
64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
First ICAO-code character in ASCII, e.g. R=52h								Second ICAO-code character in ASCII, e.g. A=41h							

Octet no. 3								Octet No. 4							
48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33
Third ICAO-code character in ASCII, e.g. 1=31h								Fourth ICAO-code character in ASCII, e.g. 2=32h							

Octet no. 5								Octet No. 6							
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
Fifth ICAO-code character in ASCII, e.g. 3=33h								Sixth ICAO-code character in ASCII, e.g. 4=34h							

Octet no. 7								Octet No. 8							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Seventh ICAO-code character in ASCII, e.g. 5=35h								Eigth ICAO-code character in ASCII, e.g. blank=00h							

Note: Characters not present are filled by 00h
Note: this item is only present if database entries are available from basestation.sqb

2.8   Data Item I181/107, Aircraft Operator

Data Item	Name	Definition	Format	Remark
I181/107	Aircraft Operator	Aircraft Operator as ICAO code (four characters), e.g. AFR	Three-octet fixed length, encoded in ASCII	This Item is optional

Encoding Rule

Octet no. 1								Octet No. 2							
24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9
First ICAO-code character in ASCII, e.g. A=41h								Second ICAO-code character in ASCII, e.g. F=46h							

Octet no. 3							
8	7	6	5	4	3	2	1
Third ICAO-code character in ASCII, e.g. R=52h							

Note: Characters not present are filled by 00h
Note: this item is only present if database entries are available from basestation.sqb

3.   User Application Profile for Category 181

Data Block Header

		Information	Length (octets)
		CAT Identifier of Data Block (181 = B5$_h$)*	1
		Length of Data Block in Octets (Bytes)*	2
		FSPEC*	1 or 2

FSPEC contents

FRN	Data Item	Information	Length (octets)
1	I181/010	Data Source Identification* (always 1)	2
2	I181/080	Target Address* (always 1)	3
3	I181/090	Country of registration	4
4	I181/100	Flight Origin (0 or 1)	4
5	I181/101	Flight Destination (0 or 1)	4
6	I181/105	Aircraft Type (0 or 1)	5
7	I181/106	Aircraft Registration (0 or 1)	8
FX	-	Field Extension Indicator (0 or 1)	
8	I181/107	Aircraft Operator (0 or 1)	3
9		reserved	
10		reserved	
11		reserved	
12		reserved	
13		reserved	
14		reserved	
FX	-	Field Extension Indicator (always 0)	

Note: * these items are mandatory

Record of Revisions

0.1	Aug 03, 2017	Initial issue
0.2	Aug 21, 2017	Added: I181/090; Revised: UAP
1.0	Aug 28, 2017	Renumbered