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Source:

[http://soaring.aerobaticsweb.org//results/USA/flight\\_logs/fvu-1.html](http://soaring.aerobaticsweb.org//results/USA/flight_logs/fvu-1.html)

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# IGC Flight Verification Unit (FVU) Data File Standard

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Authors:

*Bob Fletcher* [cai@cerfnet.com](mailto:cai@cerfnet.com) (Cambridge Aero Instruments)

*Hans Trautenberg* [Hans.Trautenberg@physik.uni-regensburg.de](mailto:Hans.Trautenberg@physik.uni-regensburg.de) (S/W Developer)

Contributors:

*Ed Davies* [100345.3117@compuserve.com](mailto:100345.3117@compuserve.com) (EW Avionics)

*Walter Dittel* (Filser Electronic)

*John Good* (Chairman SSA Competition Committee)

*Phil Jeffery* (Chairman BGA Competition Committee)

*Tony Lauck* [tlauck@cerfnet.com](mailto:tlauck@cerfnet.com) (Computer Security Consultant)

*John Mason* [100415.1762@compuserve.com](mailto:100415.1762@compuserve.com) (EW Distribution, France)

*Dave Nadler* [76244.3577@compuserve.com](mailto:76244.3577@compuserve.com) (Borgelt Instruments)

*Mike Newman* [mike@c-c.com](mailto:mike@c-c.com) (Borgelt Instruments)

*Dave Robertson* [100327.2014@compuserve.com](mailto:100327.2014@compuserve.com) (S/W Developer)

*Graham Skelley* (S/W Developer)

*Bernald Smith* (Chairman IGC GPS Subcommittee)

*Peter Zander* (Zander Vario)

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## 1.0 Introduction

The following Data File Standard was developed by the IGC GPS Subcommittee and the Gliding Flight Data Recorder Manufacturers in association with a number of independent software developers. It is intended to facilitate the introduction of GPS technology into gliding and in particular into competition verification and the homologation of badge and record flights, using GPS, by the FAI. Care was taken to ensure that, in the future, the Standard could be used by other branches of the FAI.

The draft standard was presented to and accepted by the IGC at their September '94 meeting.

Issues relating to data security, turnpoint verification and Official Observer procedures were discussed at this meeting and will be addressed in the FAI Sporting Code. This standard facilitates all the alternatives discussed.

## 1.1 Revision Control

This standard may be modified by action of the IGC as the need arises.

Updates to this standard are published periodically in:

The Internet [rec.aviation.soaring](mailto:rec.aviation.soaring) newsgroup.

updated copies will be available by FTP from:

alternatively contact:

Bernald Smith  
Chairman IGC GPS Subcommittee  
1019 Whitmer Ct  
Fremont, CA 94539  
USA

Tel: 510-656-0434  
Fax: 510-657-1261

The standard working group may be contacted through:

Bob Fletcher           cai@cerfnet.com  
Hans Trautenberg     Hans.Trautenberg@physik.uni-regensburg.de

All suggested amendments should be directed to the working group. The IGC will review and approve amendments forwarded from the working group each year.

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## 2.0 General

### 2.1 File structure

The file will consist of three types of records: single instance records, infrequent multiple instance records and frequent multiple instance records.

All the single instance records together form the file header. The remainder of the file will consist of regular fix records and irregular other records.

All the file records are limited to 76 characters in length.

Each record starts with a unique record identifier followed by the data and a CR LF at the end.

### 2.2 Record Types

The record types are:

- [A-Record](#) - FVU identification number
- [B-Record](#) - Fix
- [C-Record](#) - Task
- [D-Record](#) - Differential GPS
- [E-Record](#) - Event
- [F-Record](#) - Constellation
- [G-Record](#) - Security
- [H-Record](#) - File header
- [I-Record](#) - Fix extension
- [J-Record](#) - Extension
- [K-Record](#) - Extension data
- [L-Record](#) - Log Book
- [M-Record](#) - Not yet assigned.

## 2.3 Record Order

The A Record is the first record in the file followed by the H, I and J Records.

If any tasks are included (C Records) they should be next in chronological order.

B, D, E, F and K Records must be logged in chronological order. Other data records may follow in any order.

The L Records may be placed anywhere after the H, I and J Records and before the G Record.

The last record in the file is the G Record.

A typical file will be in the following format:

A	-	FVU identification number
H	-	File header
I	-	Fix extension
J	-	Extension
C	-	Task
L	-	Log Book
B	-	Fix
B	-	Fix
D	-	Differential GPS
B	-	Fix
B	-	Fix
E	-	Event
B	-	Fix
B	-	Fix
K	-	Extension data
B	-	Fix
B	-	Fix
F	-	Constellation
L	-	Log Book
B	-	Fix
G	-	Security

## 2.4 Units

All the data in the flight log will comply with the following unit system:

Time	-	UTC
Distance	-	Meters
Speed	-	Kilometers per hour
Date	-	DDMMYY (day, month, year) UTC
Direction	-	True degree
Altitude	-	Meters

The representation for the above items in the flight log has to comply with the following rules:

Time	-	HHMMSSsss
HH	-	fixed to 2 digits with leading 0
MM	-	fixed to 2 digits with leading 0
SS	-	fixed to 2 digits with leading 0
sss	-	number of second decimals is computed as the number of fields reserved for the representation of the time minus 6
Distance	-	ddddddd
dddddd	-	number of digits computed from the number of fields reserved for representation, no decimals

Speed - SSSsss

SSS - fixed to 3 digits with leading 0  
 sss - number of speed decimals is computed as the number of fields reserved for the representation of the speed minus 3

Date - DDMMYY

DD - number of the day in the month, fixed to 2 digits with leading 0  
 MM - number of the month in year, fixed to 2 digits with leading 0  
 YY - number of the year modulo 100, fixed to 2 digits with leading 0

Direction - DDDddd

DDD - fixed to 3 digits with leading 0  
 ddd - number of direction decimals is computed as the number of fields reserved for the representation of the direction minus 3

Altitude - AAAAAaaa

AAAAA - fixed to 5 digits with leading 0  
 aaa - number of altitude decimals is computed as the number of fields reserved for the representation of the altitude minus 5

## 2.5 File Naming

The following unique ISO 9660 (DOS) file names will be used for all official flight logs. Use of other file names is allowed for general use, but will not be acceptable by the FAI or competition organizers.

```

Y M D C X X X F . G P S

y m d c \ / f . DOS Extension
e o a o ----- l
a n y n   s   i
r t   s   e   g
  h   t   r   h
        r   i   t
        u   a
        c   l   #
        t
        o   #
        r

        i
        d

```

All the fields are alphanumeric with 'A' representing 10, 'B' representing 11, etc. In the case of days, month and flight number the first entity is represented by 1 rather than 0.

The year is the number modulo 10. So it wraps around every 10 years.

The flight # is used to indicate the flight of the day starting with 1.

The serial # is the unique identification number of the unit generating the flight recording. There are 46656 unique identification numbers available to each manufacturer.

In the event that the flight spans multiple days the take-off date is definitive.

Example:

46AC00J2.GPS

10-June-1994 Cambridge Aero Serial # 20 Flight 2.

Manufacturer codes:

A	-	
B	-	Borgelt
C	-	Cambridge
D	-	
E	-	EW
F	-	Filser
G	-	
H	-	
I	-	Ilec
J	-	
K	-	
L	-	
M	-	Metron
N	-	
O	-	
P	-	Peschges
Q	-	
R	-	
S	-	Sky Force
T	-	PathTracker
U	-	
V	-	Varcom
W	-	Westerboer
X	-	
Y	-	
Z	-	Zander
0	-	
1	-	Collins
2	-	Honeywell
3	-	King
4	-	Garmin
5	-	Trimble
6	-	Motorola
7	-	Magellan
8	-	Rockwell
9	-	

---

## 3.0 Single Instance Data Records

### 3.1 A Record - FVU ID number

The A Record has to be the first record in an FVU Data File.

The flight verification unit identification record specifies the unique number of the equipment which recorded the flight. This is most likely the manufacturer's serial number.

Format of the A Record:

A M N N N N N T E X T S T R I N G C R L F

Description	Size	Element	Remarks
-------------	------	---------	---------

Manufacturer	1 bytes	M	Valid characters alphanumeric
Unique ID	5 bytes	NNNNN	Valid characters alphanumeric
ID extension	? bytes	TEXT STRING	Valid characters alphanumeric

### 3.2 G Record - Security

The G Record verifies that the ASCII data has not been altered during or following the flight. This is used for badge and record verification only. The FVU manufacturer will provide a method to check the integrity of the file with the security code.

The security code must be generated by the FVU, not the computer extracting the flight data. Flight analysis software from sources other than the manufacturer should ignore this record. All records except the H Records which have the O and P source, and the L Records must be included in the security mechanism.

The security code must be comprised of valid characters.

Format of G Record:

```
G S S S S S S S S S S S S S S S S CR LF
G S S S S S S S S S S S CR LF
```

Description	Size	Element	Remarks
Security code	<=75 bytes	SSSSS	Valid characters alphanumeric

The G Record may be extended to multiple lines if necessary.

The G Record should not use any non-printing character. Whitespace is often removed when ASCII files are transmitted across data communication networks.

The level of security required within this record for badges and records will be addressed by the Sporting Code.

### 3.3 H Record - File Header

Format of H Record:

```
H D D M M Y Y A A A CR LF
H S M M M P I L O T : T E X T S T R I N G CR LF
H S M M M G L I D E R T Y P E : T E X T S T R I N G CR LF
H S M M M G L I D E R I D : T E X T S T R I N G CR LF
H S M M M N N N G P S D A T U M : T E X T S T R I N G CR LF
```

Description	Size	Element	Remarks
Source	1 byte	S	F - FVU, 0 - 00, P - Pilot
Data ID	3 bytes	III	Valid characters 0-9
Date	6 bytes	DDMMYY	Valid characters 0-9
Accuracy in meters	3 bytes	AAA	Valid characters 0-9
Mnemonic	3 bytes	MMM	Valid characters 0-9

The header records may be added by the FVU or subsequently by an OO or the pilot. Each record starts with a standard mnemonic to be used by verification software. The actual data of the record starts with a title followed by a colon, then the information.

The default for the accuracy in meters is 500

Only records that have the source F are covered by the security code. The Sporting code will define the use of P and O source records.

The above fields are mandatory in the above order. The following data may be appended:

```
H D D M M Y Y A A A CR LF
H S M M M P I L O T : T E X T S T R I N G CR LF
H S M M M G L I D E R T Y P E : T E X T S T R I N G CR LF
H S M M M G L I D E R I D : T E X T S T R I N G CR LF
H S M M M N N N G P S D A T U M : T E X T S T R I N G CR LF
H S M M M C O M P E T I T I O N I D : T E X T S T R I N G CR LF
H S M M M C O M P E T I T I O N C L A S S : T E X T S T R I N G CR LF
H S M M M G P S : T E X T S T R I N G CR LF
```

It is recommended that the FVU manufacturers hardware and software revision level be included.

### 3.4 I Record - Fix Extensions

This record defines the extension of the mandatory fix B Record. Only one I record is allowed in each file.

This record has to be located before the first B Record, immediately after the H record.

Format of I Record:

```
I N N S S F F M M M S S F F M M M CR LF
```

Description	Size	Element	Remarks
# of extensions	2 bytes	NN	Valid characters 0-9
Start byte number	2 bytes	SS	Valid characters 0-9
Finish byte number	2 bytes	FF	Valid characters 0-9
Mnemonic	3 bytes	MMM	Valid characters alphanumeric

The byte count starts from the beginning of the B Record starting at 1.

Examples:

```
I 0 3 3 0 3 4 G A L 3 5 3 7 F X A 3 8 4 1 R P M CR LF
```

The above states that the fix record will be appended with the GPS Altitude, the Fix Accuracy and the Engine RPM.

```
I 0 1 3 0 3 3 R P M CR LF
```

The fix record will be appended with the Engine RPM.

```
I 0 3 3 0 3 4 G A L 3 5 3 7 F X A 3 8 4 2 T E N CR LF
```

The fix record will be appended with the GPS Altitude, the Fix Accuracy and the total energy altitude.

### 3.5 J Record - Extension Index

This record defines the extension K Record.

Format of J Record:

J N N S S F F M M M S S F F M M M CR LF

Description	Size	Element	Remarks
# of extensions	2 bytes	NN	Valid characters 0-9
Start byte number	2 bytes	SS	Valid characters 0-9
Finish byte number	2 bytes	FF	Valid characters 0-9
Mnemonic	3 bytes	MMM	Valid characters alphanumeric

The byte count starts from the beginning of the K Record starting at 1.

Example:

J 0 1 0 7 1 1 T E N CR LF

The above J Record defines a K Record which consists of the total energy altitude. The mnemonics are listed at the end of this document.

## 4.0 Multiple Instance Data Records

### 4.1 B Record - Fix

This is a fixed size record, the size of which is defined in the I Record. The mandatory data is: UTC, latitude, longitude, fix validity and pressure altitude. It is recommended to include GPS altitude and fix accuracy if they are available.

The format of the mandatory data is:

B H H M M S S D D M M M M M N D D D M M M M M E V P P P P P CR LF

Description	Size	Element	Remarks
Time	6 bytes	HHMMSS	Valid characters 0-9
Latitude	8 bytes	DDMMMMMN	Valid characters N, S, 0-9
Longitude	9 bytes	DDDDMMMMME	Valid characters E,W, 0-9
Fix valid	1 byte	V	A: valid, V:nav warning
Press Alt.	5 bytes	PPPPP	Valid characters -, 0-9

The "fix valid" byte should be taken from the NMEA GPRMC sentence. It is the "Nav receiver status flag" of that sentence. If the GPS receiver does not use the NMEA protocol, then an equivalent flag must be provided.

The format of the recommended data is:

B H H M M S S D D M M M M M N D D D M M M M M E V P P P P P  
G G G G G A A A CR LF

Description	Size	Element	Remarks
GPS Alt.	5 bytes	GGGGG	Valid characters -, 0-9
Fix Accuracy	3 bytes	AAA	Valid characters 0-9

This data may be extended by use of the I Record:

B H H M M S S D D M M M M M N D D D M M M M M E V P P P P P  
G G G G G A A A R R R R CR LF

Description	Size	Element	Remarks
-------------	------	---------	---------

Engine RPM            4 bytes            RRRR                            Valid characters 0-9

The engine data may be appended without the recommended GPS Altitude and Fix Accuracy provided that the I Record specifies that format.

## 4.2 C Record - Task

The C Record is used to specify tasks. It may also be used to make task declarations.

Format of C Record:

```
C D D M M Y Y H H M M S S F D F M F Y I I I I T T T E X T S T R I N G CR LF
C D D M M M M M N D D D M M M M M E T E X T S T R I N G CR LF
C D D M M M M M N D D D M M M M M E T E X T S T R I N G CR LF
C D D M M M M M N D D D M M M M M E T E X T S T R I N G CR LF
C D D M M M M M N D D D M M M M M E T E X T S T R I N G CR LF
C D D M M M M M N D D D M M M M M E T E X T S T R I N G CR LF
C D D M M M M M N D D D M M M M M E T E X T S T R I N G CR LF
```

Description	Size	Element	Remarks
Date	6 bytes	DDMMYY	Valid characters 0-9
Time	6 bytes	HHMMSS	Valid characters 0-9
Flight Date	6 bytes	FDFMFY	Valid characters 0-9
Task ID	4 bytes	IIII	Valid characters 0-9
# of Task TPs	2 bytes	TT	Valid characters 0-9
Take-off Lat Lon	17 bytes	DDMMMMNDDDDMMMMME	
Start Lat Lon	17 bytes	DDMMMMNDDDDMMMMME	
T/P Lat Lon	17 bytes	DDMMMMNDDDDMMMMME	
T/P Lat Lon	17 bytes	DDMMMMNDDDDMMMMME	
Finish Lat Lon	17 bytes	DDMMMMNDDDDMMMMME	
Landing Lat Lon	17 bytes	DDMMMMNDDDDMMMMME	

The text string associated with each record is optional but recommended. This is the place to refer to any local turnpoint numbers. The latitude and longitude will be definitive, in the case of confusion.

All the above latitudes and longitudes are mandatory.

The Task ID is the unique number assigned to that task on a day. The first task of the day would be task 0001 the second 0002 etc.

The number of turnpoints is the actual number of turnpoints in the task, e.g. 1 for an Out and Return and 2 for a triangle.

## 4.3 D Record - Differential GPS

This indicates that differential GPS is being used.

Format of D Record:

```
D Q S S S S CR LF
```

Description	Size	Element	Remarks
GPS Qualifier	1 byte	Q	1: GPS, 2:DGPS
Station ID	4 bytes	SSSS	

These parameters correspond to the NMEA GGA GPS quality indication. The absence of a D Record indicates that differential GPS was not used.

## 4.4 E Record - Events

The E Record must immediately precede a B Record which logs where the event occurred.

Format of E Record:

```
E H H M M S S I I I T E X T S T R I N G CR LF
E H H M M S S I I I T E X T S T R I N G CR LF
B H H M M S S D D M M M M M N D D D M M M M M E V P P P P P CR LF
```

Description	Size	Element	Remarks
Mnemonics	3 bytes	III	Valid characters alphanumeric

Official events need a B Record with the same time. It is possible to have several events at the same time.

## 4.5 F Record - Satellite Constellation

Format of F Record:

```
F H H M M S S A A B B C C D D CR LF
```

Description	Size	Element	Remarks
Time	6 bytes	HHMMSS	Valid characters 0-9
Satellite ID A	2 bytes	AA	Valid characters 0-Z

The satellite ID will be supplied for each satellite used in the fix calculation. This information corresponds to the NMEA GPGSA data.

This record is optional but will be very beneficial in proving the validity of the file. It should be recorded each time the satellite constellation in use changes.

## 4.6 K Record - Extension Data

The information in the K Record is specified by the J Record.

As an example, this J Record is used to specify the information in the following K Record:

```
J 0 7 1 1 T E N CR LF
```

```
K H H M M S S 0 0 0 1 0 CR LF
```

This K Record states that the total energy altitude is 10 meters.

## 4.7 L Record - Log Book

This record allows FVU manufacturers, users, or official observers to add multiple free format text lines to the flight data records. The Manufacturer ID will be used by the equipment manufacturers to specify data unique to them. In all other cases this field will be a space.

Format of L Record:

```
L M T E X T S T R I N G CR LF
```

Description	Size	Element	Remarks
Manufacturer	1 byte	M	Valid characters alphanumeric / space

The L Records will not be covered by the security code for the file. This allows them to be added to the file after the flight has been completed.

Example:

```
L M T H I S   F L I G H T   W A S   M Y   S E C O N D   1 0 0 0 K M
A T T E M P T C R L F
L M F R O M   E A G L E   F I E L D C R L F
```

## 5.0 Definitions:

### Airspeed

The true airspeed of the aircraft in kph.

### Alphanumeric

Valid alpha and/or numeric character from the list of valid characters.

### Competition Class

The FAI competition class of the aircraft.

### Constellation

The list of satellites used to determine the GPS fix. This may be used to verify the validity of the log.

### Course

The direction between two points expressed as degrees.

### Datum

The GPS datum in use.

### Engine Down

The engine and propeller are stowed and not in a position to generate propulsion.

### Engine Off

The engine stops generating propulsion.

### Engine On

The engine starts to generate propulsion.

### Engine RPM

This is a non-binary representation of the engine operation. It may or may not be the actual engine RPM.

### Engine Up

The engine is prepared to generate propulsion. In most aircraft this means that the motor pylon is extended or the engine doors are opened.

### Equipment Events

These are events generated solely by the FVU, as opposed to pseudo events generated by the analysis of the FVU flight data.

### Finish

The end of a task. Usually crossing a finish line or entering a finish photo sector.

### Fix Accuracy

The accuracy of the fix expressed in meters. This will be used to determine an area of uncertainty.

### FVU Serial Number

This number is allocated by the manufacturer as means of identification of his equipment and likewise be used in the heading record of all transferred data from the FVU to the computer.

The identification should consist of one alphanumeric character, which represents the manufacturer.

**Glider ID**

The registration alphanumeric of the aircraft.

**Glider Type**

The manufacturer and model number of the aircraft.

**GPS Altitude**

This is a five numeric character group indicating the GPS altitude in meters.

**GPS Connect**

The GPS is connected to the FVU.

**GPS Disconnect**

The GPS is disconnected from the FVU.

**Ground Speed** The ground speed in kph.

**Heading**

The direction in which the aircraft is pointed in degrees true.

**Latitude**

This is a seven character numeric group expressed as two figures for the degrees, two figures for the minutes and three figures representing tenths, hundredths and thousandths of minutes followed by the N or S character.

**Longitude**

This is an eight character numeric group expressed as three figures for the degrees, two figures for the minutes and three figures representing tenths, hundredths and thousandths of minutes followed by the E or W character.

**On Task**

The aircraft is attempting a Task.

**OO ID -**

This number is a number entered into the FVU prior to flight which is used to identify the individual flight on the recording. Normally this should be four alphanumeric characters. Note that this may be used as a confidential code which would be used by an Official Observer.

**Photo -**

An FAI Turnpoint photograph has been taken.

**Pilot Event -**

The pilot records an event in time and space. This may represent a number of different occurrences.

**Pressure Altitude -**

This is a five numeric group indicating the pressure altitude in meters.

**RAIM -**

Receiver Autonomous Integrity Monitoring - A numeric code is used which indicates when the conditions of RAIM are not satisfied. Normally the code should indicate 0 if RAIM is satisfied and 5 when not. This is used to indicate that the GPS navigation data is no longer valid. It is not expected to be used by glider GPS users in the near term.

**Record Extension -**

This mechanism allows manufacturers to append information to the minimum required position fix. This information may be ignored by simple flight analysis software, by truncating the analysis of each B Record after 30 characters.

**Security -**

This data is used to verify that the flight data has not be altered during or since the flight.

**Start -**

The beginning of a task. Usually crossing a start line or exiting a start photo sector.

**Supplemental Data Fix -**

The use of external non-satellite data to assist the GPS unit determine the position. Many units have the ability to input pressure altitude to increase the precision of the fix.

Task -

The description of the intended flight.

Textstring

A text string is a sequence of valid characters.

Total Energy Altitude -

The combination of the gliders potential and kinetic energy expressed in altitude in tenths of a meter.

Track -

The true track over the ground which the aircraft has achieved.

Turnpoint Confirmation-

The indication by the navigation equipment, to the pilot, that the aircraft has rounded the TP.

---

## 6.0 Valid Characters

The valid characters are the same as in the NMEA standard.

All data shall be interpreted as ASCII characters. The valid character set consists of all printable ASCII characters (Hex 20 to Hex 7E) except those defined as reserved.

The following are valid characters:

	Hex
space	20
Reserved	
"	22
#	23
Reserved	
%	25
&	26
'	27
(	28
)	29
Reserved	
+	2B
Reserved	
-	2D
.	2E
/	2F
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
:	3A
;	3B
<	3C
=	3D
>	3E
?	3F
@	40
A	41
B	42

C	43
D	44
E	45
F	46
G	47
H	48
I	49
J	4A
K	4B
L	4C
M	4D
N	4E
O	4F
P	50
Q	51
R	52
S	53
T	54
U	55
V	56
W	57
X	58
Y	59
Z	5A
[	5B
Reserved	
]	5D
Reserved	
^	5F
^	60
a	61
b	62
c	63
d	64
e	65
f	66
g	67
h	68
i	69
j	6A
k	6B
l	6C
m	6D
n	6E
o	6F
p	70
q	71
r	72
s	73
t	74
u	75
v	76
w	77
x	78
y	79
z	7A
{	7B
	7C
}	7D
Reserved.	

The following characters are reserved:

	Hex
CR	0D
LF	0A
\$	24
*	2A
,	2C
!	21
\	5C
^	5E
~	7E.

---

## 7.0 Mnemonics:

GAL	GPS Altitude	
TEN	Total Energy Altitude in meters	
HDM	Heading Magnetic	
HDT	Heading True	
ASI	Airspeed Indicated	
AST	Airspeed True	
GSP	Ground speed	
TRM	Track Magnetic	
TRT	Track True	
SUP	Supplemental data fix	- External data input to help GPS fix (pressure alt)
FXA	Fix accuracy	- Estimate of fix accuracy in meters
FXT	Fix type	- GPS or DGPS
RAI	RAIM	- GPS Parameter
CPH	Carrier phase	- GPS Parameter
EON	Engine on	
EOF	Engine off	
EUP	Engine up	
EDN	Engine down	
PHO	Photo	
PEV	Pilot event	- Pilot initiated event
TPC	Turnpoint confirmation	- Equipment generated event
STA	Start	
FIN	Finish	
DTE	Date	
PLT	Pilot	
GTY	Glider type	
GID	Glider id	
CCL	Competition class	
DTM	Datum	- GPS Datum in use
TPL	Turnpoint list	
TSK	Task	
CNS	Constellation	- Satellites used in the fix
SEC	Security	- Log security data
DGP	Differential GPS	
REX	Record extension	- Manufacturer defined data (Cloud base?)
RPM	Engine rpm	
CID	Competition ID	
GPS	GPS Engine Type & Revision	
GCN	GPS Connect	
GDC	GPS Disconnect	
OOI	OO ID	- OO equipment observation
ONT	On Task	- attempting POST
CCN	Camera Connect	

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## 8.0 Valid GPS Datums:

ID	Name
000	ADINDAN - Ethiopia, Mali, Senegal, Sudan
001	AFGOOYE - Somalia
002	AIN EL ABD 1970 - Bahrain Island, Saudi Arabia
003	ANNA 1 ASTRO 1965 - Cocos Island
004	ARC 1950 - Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe
005	ARC 1960 - Kenya, Tanzania
006	ASCENSION ISLAND 1958 - Ascension Island
007	ASTRO BEACON "E" - Iwo Jima Island
008	AUSTRALIAN GEODETIC 1966 - Australia, Tasmania Island
009	AUSTRALIAN GEODETIC 1984 - Australia, Tasmania Island
010	ASTRO DOS 71/4 - St. Helena Island
011	ASTRONOMIC STATION 1952 - Marcus Island
012	ASTRO B4 SOROL ATOLL - Tern Island
013	BELLEVUE (IGN) - Efate and Erromango Islands
014	BERMUDA 1957 - Bermuda Islands
015	BOGOTA OBSERVATORY - Colombia
016	CAMPO INCHAUSPE - Argentina
017	CANTON ASTRO 1966 - Phoenix Islands
018	CAPE CANAVERAL - Florida, Bahama Islands
019	CAPE - South Africa
020	CARTHAGE - Tunisia
021	CHATHAM 1971 - Chatham Island (New Zealand)
022	CHUA ASTRO - Paraguay
023	CORREGO ALEGRE - Brazil
024	DJAKARTA (BATAVIA) - Sumatra Island (Indonesia)
025	DOS 1968 - Gizo Island (New Georgia Islands)
026	EASTER ISLAND 1967 - Easter Island
027	EUROPEAN 1950 - Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland
028	EUROPEAN 1979 - Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland
029	FINLAND HAYFORD 1910 - Finland
030	GANAJIKA BASE - Republic of Maldives
031	GEODETIC DATUM 1949 - New Zealand
032	ORDNANCE SURVEY OF GREAT BRITAIN 1936 - England, Isle of Man, Scotland, Shetland Island, Wales
033	GUAM 1963 - Guam Island
034	GUX 1 ASTRO - Guadalcanal Island
035	HJOESEY 1955 - Iceland
036	HONG KONG 1963 - Hong Kong
037	INDIAN - Bangladesh, India, Nepal
038	INDIAN - Thailand, Vietnam
039	IRELAND 1965 - Ireland
040	ISTS 073 ASTRO 1969 - Diego Garcia
041	JOHNSON ISLAND 1961 - Johnson Island
042	KANDAWALA - Sri Lanka
043	KERGUELEN ISLAND - Kerguelen Island
044	KERTAU 1948 - West Malaysia, Singapore
045	L.C. 5 ASTRO - Cayman Brac Island

046 LIBERIA 1964 - Liberia  
047 LUZON - Mindanao Island  
048 LUZON - Philippines (excluding Mindanao Island)  
049 MAHE 1971 - Mahe Island  
050 MARCO ASTRO - Salvage Islands  
051 MASSAWA - Eritrea(Ethiopia)  
052 MERCHICH - Morocco  
053 MIDWAY ASTRO 1961 - Midway Island  
054 MINNA - Nigeria  
055 North American 1927 - Alaska  
056 North American 1927 - Bahamas (excluding San Salvador Island)  
057 North American 1927 - Central America (Belize, Costa Rica,  
El Salvador, Guatemala, Honduras, Nicaragua)  
058 North American 1927 - Canal Zone  
059 North American 1927 - Canada (including Newfoundland Island)  
060 North American 1927 - Caribbean (Barbados, Caicos Islands, Cuba,  
Dominican Republic,Grand Cayman, Jamaica,  
Leeward Islands, Turks Islands)  
061 North American 1927 - Mean Value (CONUS)  
062 North American 1927 - Cuba  
063 North American 1927 - Greenland (Haynes Peninsula)  
064 North American 1927 - Mexico  
065 North American 1927 - San Salvador Island  
066 North American 1983 - Alaska, Canada, Central America, CONUS, Mexico  
067 NAPARIMA, BWI -Trinidad and Tobago  
068 NAHRWAN - Masirah Island (Oman)  
069 NAHRWAN - Saudi Arabia  
070 NAHRWAN - United Arab Emirates  
071 OBSERVATORIO 1966 - Corvo and Flores Islands (Azores)  
072 OLD EGYPTIAN - Egypt  
073 OLD HAWAIIAN - Mean Value  
074 OMAN - Oman  
075 PICO DE LAS NIEVES - Canary Islands  
076 PITCAIRN ASTRO 1967 - Pitcairn Island  
077 PUERTO RICO - Puerto Rico, Virgin Islands  
078 QATAR NATIONAL - Qatar  
079 QORNOQ - South Greenland  
080 REUNION - Mascarene Island  
081 ROME 1940 - Sardinia Island  
082 RT 90 - Sweden  
083 PROVISIONAL SOUTH AMERICAN 1956 - Bolivia, Chile, Colombia,  
Ecuador, Guyana, Peru, Venezuela  
084 PROVISIONAL SOUTH AMERICAN 1956 - Argentina, Bolivia, Brazil,  
Chile, Colombia, Ecuador, Guyana, Paraguay, Peru,  
Venezuela, Trinidad, Tobago  
085 SOUTH ASIA - Singapore  
086 PROVISIONAL SOUTH CHILEAN 1963 - South Chile  
087 SANTO (DOS) - Espirito Santo Island  
088 SAO BRAZ - Sao Miguel, Santa Maria Islands (Azores)  
089 SAPPER HILL 1943 - East Falkland Island  
090 SCHWARZECK - Namibia  
091 SOUTHEAST BASE - Porto Santo and Madeira Islands  
092 SOUTHWEST BASE - Faial, Graciosa, Pico, Sao Jorge, Terceira Islands  
093 TIMBALI 1948 - Brunei and East Malaysia (Sarawak and Sabah)  
094 TOKYO - Japan, Korea, Okinawa  
095 TRISTAN ASTRO 1968 - Tristan da Cunha  
096 Reserved For Future Use  
097 VITI LEVU 1916 - Viti Levu Island (Fiji Islands)  
098 WAKE-ENIWETOK 1960 - Marshall Islands  
099 WORLD GEODETIC SYSTEM 1972  
100 WORLD GEODETIC SYSTEM 1984  
101 ZANDERIJ - Surinam

## 9.0 Sample File:

(CRLF - line terminator not actual data)

```
AC00069CRLF
H031194030CRLF
HFPILPILOT: BOB FLETCHERCRLF
HFGTYGLIDER TYPE: SCHLEICHER ASW-24CRLF
HFGIDGLIDER ID: N-84RCRLF
HFDAT100GPS DATUM: WGS-84CRLF
HFCIDCOMPETITION ID: 90CRLF
HFCLSCOMPETITION CLASS: STANDARDCRLF
HFGPSGPS: CAMBRIDGE GPS-NAV #0069CRLF
I033034GAL3537FXA3841RPMCRLF
J010711TENCRLF
C220694151245220694000102CRLF
C4407100N07249490WTP 101 SUGARBUSH STARTCRLF
C4407100N07249490WTP 101 SUGARBUSH STARTCRLF
C4456330N07230380WTP 15 JAY PEAKCRLF
C4310580N07303470WTP 16 MANCHESTER CENTERCRLF
C4407100N07249490WTP 101 SUGARBUSH STARTCRLF
C4407100N07249490WTP 101 SUGARBUSH STARTCRLF
B1602334407110N0724933WA00480004600200000CRLF
B1602374407121N0724934WA00480004610200000CRLF
D20331CRLF
E160241STRSTARTCRLF
E160241TPHTP PHOTOCRLF
B1602414407126N0724930WA00488004600200000CRLF
B1603044407134N0724928WA00490004760200000CRLF
B1603334407140N0724922WA00490004800200000CRLF
F1603370609123624221821CRLF
B1603374407150N0724920WA00491004810200000CRLF
B1602414407180N0724918WA00491004830200000CRLF
B1602454407212N0724917WA00493004860200000CRLF
K16024800180CRLF
B1602484407220N0724915WA00494004900200000CRLF
B1602524407330N0724912WA00496004910200000CRLF
LCUS STANDARD NATIONALS DAY 1CRLF
LCFLIGHT TIME: 4:14, TASK SPEED:58KTS CRLF
GREJNGJERJKNJKRE318954785373N4IH43982FJN9248F942389T4335093T509354T543K4FCRLF
GJNJK2489IERGNV3089IVJER5839G0398535J3894N35895498300934CRLF
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Source: <http://acro.harvard.edu/SOARING>

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