X-PLANE

NAVIGATION DATA FOR FIXES (USER_FIX.DAT & EARTH_FIX.DAT) FILE SPECIFICATION

VERSION 1101

REVISION HISTORY

12 July 2009	Spec converted to this new format to support new web site (http://data.x-plane.com).
10 Aug 2016	Spec updated for X-Plane 11
03 Jan 2017	Added optional field for Waypoint Type

APPLICABILITY

This specification (XP FIX1101) is supported in X-Plane 11.00pb4 and later. It is identified in the data files as "1101 Version" on the second row of the file. The prior specification for fix data was XP FIX1000, which is compatible with X-Plane 11.00 and later.   Changes in the spec for XP FIX1101 were:

- New optional column for waypoint type

OVERVIEW & SCOPE

This specification defines all fixes (also known as waypoints or intersections) in X-Plane. This includes both enroute waypoints (EA-records in ARINC424 data) and terminal waypoints (PC-records in AINC424 data). The effect of this data is to:

- Allow these fixes to be selected in X-Plane's GPS and FMC systems.
- Display the fixes on X-Plane's charts.

BASIC CONCEPTS

- Latitudes and longitudes are described in a decimal notation (e.g. 20.12345678).
  - A latitude of 50 degrees 30 minutes south would be defined as -50.50000000
- North latitudes and east longitudes are positive. South latitudes and west longitudes are negative.
- Terminal waypoints must specify the airport whose terminal area they belong to
- Enroute waypoints must specify the ICAO region code as per ICAO document No. 7910

- The non-existing country code "ZZ" is used for user-defined waypoints that are not published in the AIP of any country.
- User-defined waypoints with country code "ZZ" must have a globally unique idenitifer
- User-defined waypoints with country code "ZZ" must not appear in earth_fix.dat, but only in user_fix.dat

FILE CHARACTERISTICS

The earth_fix.dat files are plain text files:

- Fields in the data can be separated by one or more white space (space, tab) characters.
- By default, the files are generated so that columns of data are consistently aligned, but this is not required.

FILE STRUCTURE

In common with most other X-Plane data file specification, header rows of data define the origin ("I" = Intel byte order or "A" = Motorola byte order) of a particular copy of a file, and define the file specification version. The file specification must include the four-digit AIRAC cycle date (e.g. 1602 for the AIRAC cycle effective 4-Feb-16, refer to https://www.nm.eurocontrol.int/RAD/common/airac_dates.html for cycle dates), an 8-digit build date and the reference to this document. A copyright message may be added, while the total length of this line is not to exceed 1024 characters:

```
I
1101 Version – data cycle 1602, build 20160204, metadata FixXP1100. Copyright © 2016, Robin A. Peel (robin@xsquawkbox.net)...
```

Subsequent rows of data define each waypoint. Sequence is not important, but by default this file is sorted alphabetically by fix name.

The file is terminated by a '99':

```
99
```

ROW CODES

Unlike other data files, no 'row codes' are used for fix data, since the file contains just one type of data.

EXAMPLE DATA

Here is example data for a fixes:

```
46.646819444 –123.722388889   AAYRR KSEA K1 4530263
37.770908333 –122.082811111   AAAME ENRT K2 4530263
```

DEFINITION OF DATA FIELDS

Each column in each row is defined below, using the example data from shown above. Note that:

Row	Meaning	Comment	
	Example value	*Explanation*	*Valid values*
[none]	Fix	Fix or IFR intersection	No row codes are used, since all data refers to fixes
	46.64641944	Latitude of fix in decimal degrees	Eight decimal places supported
	–123.72238889	Longitude of fix in decimal degrees	Eight decimal places supported
	AAYRR	ID of fix	Usually five characters. Unique within an ICAO region.
	KSEA	ID of airport terminal area or "ENRT" for enroute fixes	Must be either airport identifier or "ENRT"
	K1	ICAO region code of enroute fix or terminal area airport	Must be region code according to ICAO document No. 7910. For terminal waypoints, the region code of the airport is used
	4530263	Waypoint type as defined by the 3 columns of ARINC 424.18 field definition 5.42	32bit representation of the 3-byte field defined by ARINC 424.18 field type definition 5.42, with the 4th byte set to 0 in Little Endian byte order. This field is optional and can be left empty.

FURTHER INFORMATION

Resources are available for airport and navaid designers at the X-Plane Scenery Gateway at http://gateway.x-plane.com/