X-PLANE

NAVIGATION DATA FOR MINIMUM SECTOR ALTITUDES (EARTH_MSA.DAT) FILE SPECIFICATION

VERSION 1150

REVISION HISTORY

21 Mar 2020   Initial Specification

APPLICABILITY

This specification (XP MSA1150) is supported in X-Plane 11.50 and later. It is identified in the data files as "1150 Version" on the second row of the file.
No prior specification for this type of file exists.

OVERVIEW & SCOPE

This specification defines all published minimum sector altitudes for navaids, fixes, airports and runway thresholds in X-Plane (PS-records in ARINC424 data).
The effect of this data is to:

- Allow ATC to keep AI aircraft at or above published MSAs for vectoring

BASIC CONCEPTS

- A minimum sector altitude can only be defined at a point that is either listed in the enroute portions of earth_nav.dat or earth_fix.dat or an airport or runway threshold in the Resources/default scenery/default apt dat/Earth nav data/apt.dat – third party sceneries are not scanned for airports.

FILE CHARACTERISTICS

The earth_msa.dat file is plain text file:

- 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
1140 Version – data cycle 1602, build 20160204, metadata HoldXP1140. 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 hold data, since the file contains just one type of data.

EXAMPLE DATA

Here is example data for minimum sector altitudes:

```
 3   BOS K6 KBOS M 035 025 25 125 020 25 000 000  0
11 CRAAB K6 KBOS M 180 025 25 000 000  0
10 RW04R K6 KBOS M 180 025 25 000 000  0
```

DEFINITION OF DATA FIELDS

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

Row	Meaning	Comment	Valid values
	Example value	*Explanation*	
[none]	MSA	Published MSA around fix, intersection or navaid	No row codes are used, since all data refers to holdings
	3	Type of Fix, Navaid, Airport or Runway Threshold	11 = Fix, 2 = enroute NDB, 3 = VHF navaid (VOR, TACAN, DME), 1=ARP (airport reference point), 10=runway threshold
	BOS	Identifier of fix, navaid, airport or runway threshold	One to five character valid identifier of known fix or navaid
	K6	ICAO region code of fix or navaid	Must be region code according to ICAO document No. 7910
	KBOS	Terminal region identifier - mandatory	Airport code for terminal procedure use. The same point can have different sector altitudes when used by a procedure at a different airport. This field cannot be empty.
	M	Sector Bearing Mag/True Indicator	See 424.18 5.165
	035	Sector Bearing	See 424.18 4.1.20.1, 5.146
	025	Sector Altitude	See 424.18 4.1.20.1, 5.147
	25	Radius Limit	See 424.18 4.1.20.1, 5.145
	…	Up to six more Bearing/Altitude/Radius triplets	See above
	000 000 0	Terminator after a maximum of seven sectors.	Must be all zero values

FURTHER INFORMATION

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