

X-PLANE

NAVIGATION DATA FOR MINIMUM OFF ROUTE ALTITUDES (EARTH_MORA.DAT) FILE SPECIFICATION

VERSION 1150

REVISION HISTORY

21 Mar 2020 Initial Specification

APPLICABILITY

This specification (XP MORA1150) 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 calculated minimum off route grid altitudes (grid MORAs) in X-Plane (AS-records in ARINC424 data). The effect of this data is to:

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

BASIC CONCEPTS

- A minimum off-route altitude is defined for each 1 degree latitude by 1 degree longitude grid sector. Sectors are referred to by their bottom left corner, i.e. the sector +4 -150 covers the area from N04 W150 to N05 W149. The MORA clears both terrain and man-made obstacles by 1000ft if the underlying terrain is up to 5000ft, and by 2000ft if the underlying terrain is 5001ft or higher. Note that the FAA defines OROCA slightly differently, so it is expected that MORA differs from OROCA on FAA low enroute charts in some areas.

FILE CHARACTERISTICS

The earth_mora.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 grid segment collection. Sequence is not important, but by default this file is sorted lexicographically by latitude.

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 off route altitudes:

```
+47 +000 035 035 035 044 044 044 078 085 121 123 137 140 150 136 110 100 070 040 052 060 060 040 043
068 096 090 061 029 033 029
```

DEFINITION OF DATA FIELDS

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

Row	Meaning <i>Example value</i>	Comment <i>Explanation</i>	<i>Valid values</i>
[none]	MORA	Minimum off route altitude	No row codes are used, since all data refers to holdings
	+47	Latitude of lower left corner	Integer, positive north
	+000	Longitude of first lower left corner of the following grid	Integer, positive east
	035	Grid Mora	See 424.18 5.143
	...	29 more grid MORA fields, so the lower left corner of the last field is at +47,+029	See above

FURTHER INFORMATION

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