

Introduction:

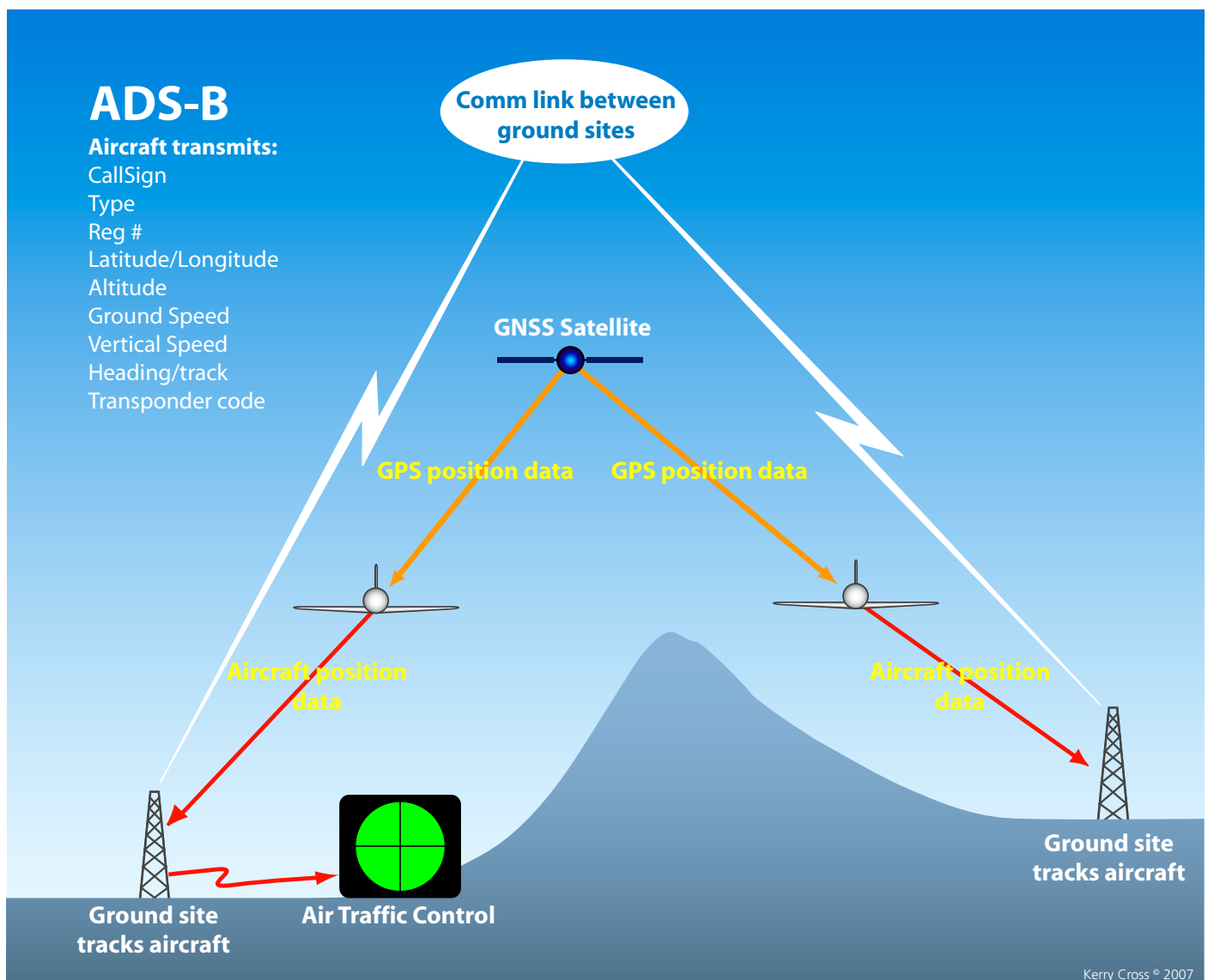
XOpenATC is a plugin that enables real world air traffic to be represented in X-Plane. It does this by downloading [ADS-B](#) data (Automatic Dependence Surveillance Broadcast) from the [OpenATC.com](#) website.

OpenATC.com (Open Air Traffic Control) is a worldwide network of ADS-B receiver stations, permitting anyone to see where airplanes were located 5 minutes ago - Air Traffic gone Open Source!

ADS-B is a GPS driven Air Traffic Control system that transmits an aircraft's identity, location, speed, altitude, heading, vertical speed to ground receiver stations, which then relay this data to air traffic control centres.



Many aircraft tracking enthusiasts around the world have been setting up [SBS-1](#) scanners to pick up these transmissions and track flights on their personal computer. The OpenATC.com site in Sydney was set up last August by Balthasar Indermuehle to link all this data together and form a world wide network of air traffic tracking that can be displayed in Google Earth and Google Maps via the OpenATC.com website.



How ADS-B works

Setup:

The plugin is called **XOpenATCxxx.xpl** where xxx is **win**, **lin** or **mac** depending on the OS the plugin was built for. This goes in the plugin directory.

A directory called **XOpenATC** must be created in the **plugins folder**. This is where the INI file "**XOpenATC.ini**" is located. If this directory does not exist then the plugin can still be used but no files will be used or created.

These are the files that can be found there depending on what is set up in the INI file:

If **LogFile** is set to **1** in the INI file a **XOpenATCLog.txt** will be created. This will log any problems etc.

If **SaveATCData** is set to **1** in the INI file, a "**XOpenATCSavedData.txt**" will be created.

This will save the data in the same format that came from the web server. When the location is changed the new airport code is written to the XOpenATCSavedData.txt file. This only happens if this file has been enabled in the INI file.

To use this file to replay recorded air traffic, you need to set the **UseFileData** to **1** in the INI file.

FileReadDelay can be set to speed up the read interval of this file.

You also need to rename the file to "**XOpenATCData.txt**" so that the plugin can read it.

Using XOpenATC:

Step 1.

Open the **XOpenATC** plugin screen.

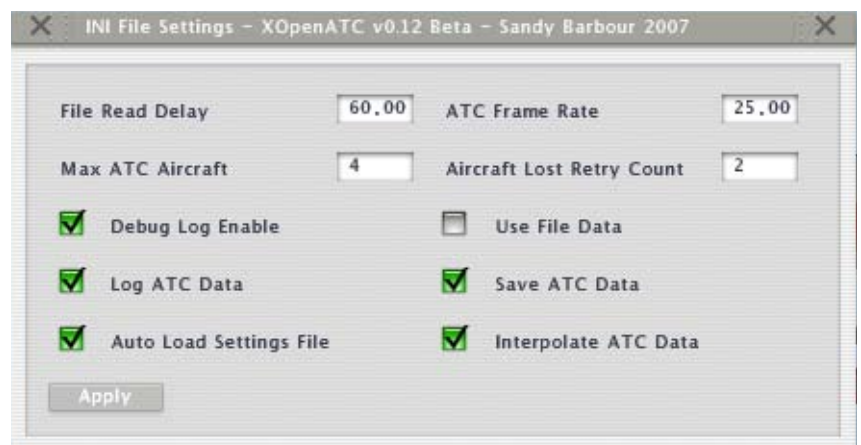
Select **INI File Settings**.



Leave **File Ready Delay** set to 60.00

Set the **Max ATC Aircraft** to the number you want to display in X-Plane. By default, the INI file is set to track 3 aircraft, you can change this number using the **INI Settings Widget**. You can track up to 19 Real World flights in X-Plane version 8.50+, and up to 9 aircraft in versions prior to 8.50.

The XOpenATC plugin uses the AI aircraft in the **Aircraft & Situations** menu to represent the real world aircraft. You need to set the number of aircraft in the **INI File Settings Widget** to match the number of aircraft in **Aircraft & Situations** menu.



[Click Here](#) for a detailed description of all the settings.

The first aircraft the plugin finds will select the first aircraft selected in the **Aircraft & Situations** list. As more aircraft are acquired by the plugin, other aircraft in the list will be used sequentially. You can improve performance by selecting less complex AI aircraft models, ones that don't have 3D cockpits for instance.

Changing the INI settings:

The INI file properties are read and stored in internal variables, and the **INI File Settings Widget** allows these internal variables to be changed without having to restart X-Plane which is quite time consuming.

The **Apply** button is disabled when the plugin is running. When you stop the plugin the **Apply** button will be enabled so that new settings can be applied.

When the plugin is **Started** the new settings will take effect.

Using XOpenATC (cont.)

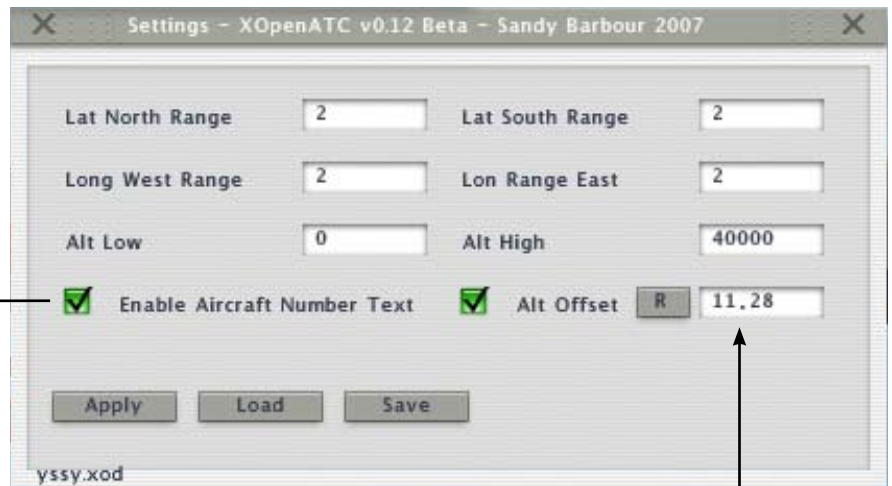
Step 2.

Under the **Plugins** menu, select **XOpenATC**. Click on **Settings**.



Set the **Latitude/Longitude** range (in degrees) from your current location that air traffic will be picked up by the plugin. i.e. 1 degrees will give you a range of approximately 60Nm. Use a small number to reduce the load on the server.

Set the min and max **Altitude** range (in feet) that you want to track aircraft.



Enable Aircraft Number Text:

Applies a label to the aircraft making it easier to find and identify aircraft.

Altitude Offset:

This consists of the current airport altitude plus the cockpit height. When this is enabled the aircraft will not sink below the ground when the aircraft altitude data is at zero altitude. At the moment this is hard coded for the stock 747 and this aircraft should be used for the AI aircraft if proper altitude is to be maintained.

Load/Save:

You can Load and Save these settings using a **.xod** extension.

Apply:

Apply settings and exit.



Using XOpenATC (cont.)

Step 3.



Click **Start** and the plugin will start downloading data from the OpenATC.com server.
Click on either the **Aircraft Data Normal** or **Transparent Screen** to see what aircraft are being tracked. It will take a minute for available flights to appear in the **Aircraft Data** widget.

A/C	Hexident	CallSign	Type	Reg	Lat	Lon	Alt	Speed	Track	VS	XPDR	G	A	E	I
1	7C6C9D	JST747	A320	VH-VQN	-34.2344	151.1379	10550	326.2	213.2	2880	0	0	0	0	0
2	7C6D21	VOZ942	B738	VH-VUB	-33.6723	151.1068	7507	269.7	187.3	-1536	0	0	0	0	0
3	7C6DB4	QFA616	B738	VH-VYE	-31.8913	150.1538	37000	493.7	35.8	0	0	0	0	0	0
4	7C6DB6	QFA859	B738	VH-VYG	-32.6948	151.1899	26153	397.3	192.8	-2112	0	0	0	0	0

Aircraft Data Normal Screen

A/C	Hexident	CallSign	Type	Reg	Lat	Lon	Alt	Speed	Track	VS	XPDR	G	A	E	I
1	7C6C9D	JST747	A320	VH-VQN	-34.2344	151.1379	10550	326.2	213.2	2880	0	0	0	0	0
2	7C6D21	VOZ942	B738	VH-VUB	-33.6723	151.1068	7507	269.7	187.3	-1536	0	0	0	0	0
3	7C6DB4	QFA616	B738	VH-VYE	-31.8913	150.1538	37000	493.7	35.8	0	0	0	0	0	0
4	7C6DB6	QFA859	B738	VH-VYG	-32.6948	151.1899	26153	397.3	192.8	-2112	0	0	0	0	0

Aircraft Data Transparent Screen

Displays which mode of data retrieval is being used, either "OpenATC Web Server" or "Data File" (saved data).

Data Retrieval Mode is :- OpenATC Web Server
Aircraft Coverage Area is :- Lat1 -31 : Lat2 -35 : Lon1 149 : Lon2 153
Altitude Filter is :- 0 to 40000
Current Position is :- Lat -33.961 : Lon 151.180
Seconds To Next Data Retrieval = 17

A/C	Hexident	CallSign	Type	Reg	Lat	Lon	Alt	Speed	Track	VS	XPDR	G	A	E	I
1	7C6C9D	JST747	A320	VH-VQN	-34.2344	151.1379	10550	326.2	213.2	2880	0	0	0	0	0
2	7C6D21	VOZ942	B738	VH-VUB	-33.6723	151.1068	7507	269.7	187.3	-1536	0	0	0	0	0
3	7C6DB4	QFA616	B738	VH-VYE	-31.8913	150.1538	37000	493.7	35.8	0	0	0	0	0	0
4	7C6DB6	QFA859	B738	VH-VYG	-32.6948	151.1899	26153	397.3	192.8	-2112	0	0	0	0	0

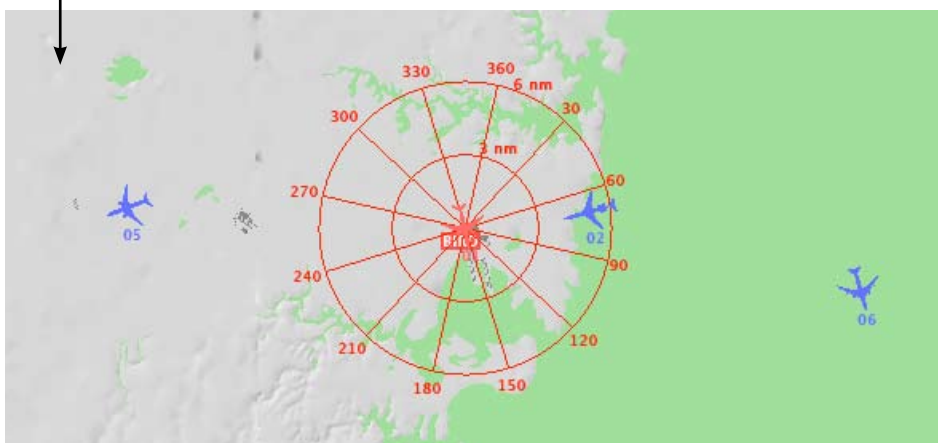
Situational data

Aircraft Registration Number

Type - i.e. B738 = Boeing 737-800

CallSign - i.e. QFA859 = Qantas flight 859

Aircraft number, as represented in the local map view



You can use the **local map** to locate flights in the vicinity. Click on an aircraft to display its heading, altitude, and speed.

Additionally, you can use **Google Maps** or **Google Earth** from the OpenATC.com website for a global picture of current flights.

How XOpenATC works:

The plugin polls the OpenATC.com server every minute. On the next poll it interpolates the data between the 2 polls. This interpolated data is then used to move the aircraft. As it is an interpolation of the data over a minute, discrepancies can occur.

The only known data that is used by the plugin are Lat, Lon, Alt, Track and Vertical Speed. Lat, Lon, Alt, and Track are smoothed so that there is no sudden jump when new interpolation data is used.

The Pitch and Roll are calculated from the Vertical Speed and Track increments respectively. The aircraft control surfaces are calculated in a similar manner.

Once there is enough data to be able to move the aircraft, the movement code is enabled. When data flow for an aircraft stops, the plugin starts a countdown based on the INI file value for retries. A label is displayed - **L1** for first retry, **L2** for second and subsequent retries.

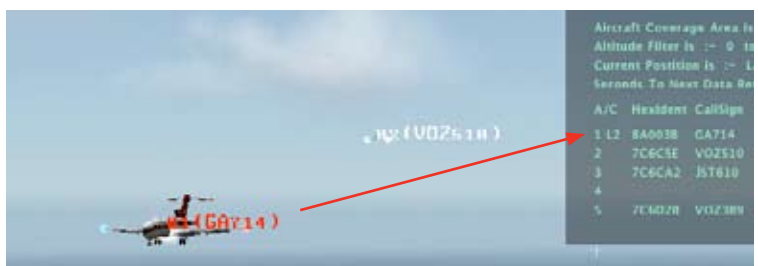
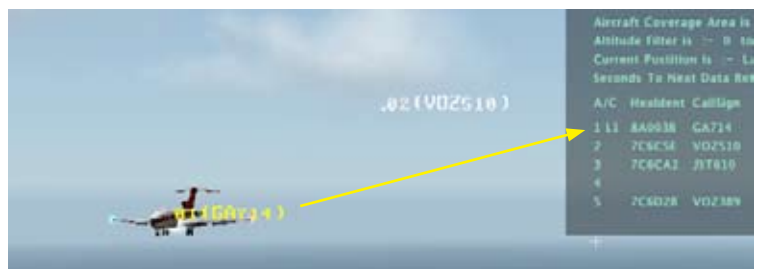
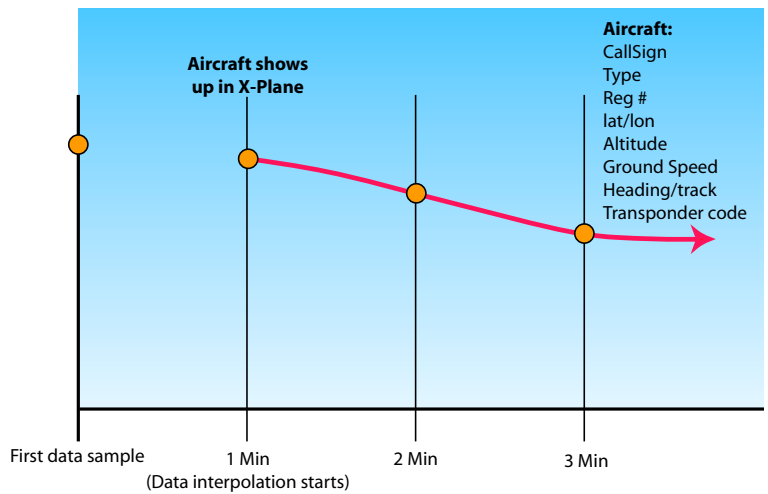
The aircraft number text colour changes from White to Yellow on a first retry and to Red on a second or subsequent retry. After the maximum retries is reached, the aircraft is deleted. The colour change can only be seen if labels are enabled in the settings widget.

You can control the number of aircraft in 2 ways. The lat/lon are used to limit the data that is received from the server, this will reduce the load on the server.

The other way is done by limiting the aircraft by only storing aircraft that fall between a minimum and maximum altitude. These are controlled in the settings widget.

The aircraft that are being tracked can be seen in the "Aircraft Data Screen". This shows various data and also indicates the limits and when a poll is due. There are 2 versions of this widget, one solid and one transparent. The transparent one is less intrusive on the screen.

If you have set the UseFileData to = 1 in the "XOpenATC.ini" file, you can play back previously recorded air traffic sessions. You will need to change the "XOpenATCSavedData.txt" to "XOpenATCData.txt" (take the word "Saved" out of the file name). As the amount of real world air traffic can vary depending on time of day and/or location, you can use previously recorded sessions to give you air traffic when little is available in real time.



XOpenATC.ini

An INI file called **"XOpenATC.ini"** and is used to change **debug** and **config** settings on startup. If the file does not exist, an error will be logged and default values will be used.

The following can be set in the **XOpenATC.ini** file from within X-Plane using the **INI File Settings** widget. You can also edit these values, using a text editor prior to starting X-Plane (the values are case sensitive):

[DEBUG]

DebugLogEnabled 1 to enable
 0 to disable
If enabled, error and other info is written to the "XOpenATCLog.txt" log file

InterpolateATCData 1 to enable
 0 to disable
If disabled, no interpolation will be carried out on the aircraft data.
However the aircraft update will be every minute.

[CONFIG]

UseFileData 1 to enable
 0 to disable
Will read from the "XOpenATCData.txt" data file rather than access the web server.

FileReadDelay Delay in seconds between file reads
Only active if UseFileData is set to 1

LogATCData 1 to enable
 0 to disable
If enabled incoming ATC data is written to the "XOpenATCLog.txt" log file

SaveATCData 1 to enable
 0 to disable
If enabled incoming ATC data is written to the "XOpenATCSavedData.txt" log file. When the location is changed the new airport code is written to the file. This only happens if this file has been enabled.

This can be renamed to "XOpenATCData.txt" and used as a data source. UseFileData has to be set to 1 for this to work.

ATCFrameRate This is the frame rate that the aircraft is moved at.
25 will give the best results but reduce this on slower machines.

MaxATCAircraft Can be 1 to 19 (prior to X-Plane version 8.50, max = 9 aircraft).
This is used to size the Aircraft Data Widget only and does not change any aircraft in Xplane.

AircraftLostRetryCount Set this to the number of times that you want the plugin to retry for lost aircraft.

AutoLoadSettingsFile 1 to enable
 0 to disable
If enabled the plugin will look for a setting file for the airport the aircraft is at. e.g. if at EGPB it will look for EGPB.xod in the XOpenATC directory.

XOpenATC.ini (cont.)

If none of the above are present or there is no XOpenATC.ini file the plugin will default to:

[DEBUG]

```
DebugLogEnabled = 0  
InterpolateATCData = 1
```

[CONFIG]

```
UseFileData = 0;  
FileReadDelay = 60.0;  
ATCFrameRate = 10;  
LogATCData = 0;  
SaveATCData = 0;  
MaxATCAircraft = 3;  
AircraftLostRetryCount = 2;  
AutoLoadSettingsFile = 0;
```

Limitations:

Firstly, ADS-B is a new technology, predominantly only modern commercial jets are fitted with it currently. As ADS-B is adopted more broadly by smaller aircraft, they too will start to appear through the XOpenATC plugin.

As data is downloaded and interpolated once a minute, it is not possible to show commercial aircraft taxiing around an airport and docking at a terminal accurately. Currently there are few airports where ground traffic coverage is being fed into the network.

As the plugin depends mostly on individuals feeding their SBS-1 data to the OpenATC.com server, inconsistencies in data flow can occur. Their scanners may not be on line 24/7, the scanners work using line of sight, therefore, if an aircraft is over the horizon or shadowed by mountains, then the signal will be lost.

Finally, the dataflow can be interrupted for up to an hour from 2:40 UTC when the data archival and database index optimizations run on the OpenATC.com server.

Credits:

Sandy Barbour - developer and programmer of the XOpenATC plugin

Balthasar Indermuehle - founder and operator of OpenATC.com

Kerry Cross - originator of the plugin request, beta tester and User Guide designer.

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