

OpusFSX

Flight Simulator Interface for FSX & Prepar3D

The OpusFSX Live Weather Engine



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Overview

The **Live Weather Engine** is a standard feature within the **OpusFSX** Flight Simulator Interface.

The **Live Weather Engine** provides live weather updates on your **OpusFSX** system. The live weather data is acquired by either downloading the current METAR reports for all Met stations within your weather horizon or importing the METAR reports contained within a user specified import file. The weather engine's horizon covers an area of 1280km by 1280km centered on your aircraft's current position, this is the size of the detailed **Dynamic Weather** region created by the engine.

As you are probably aware the use of METAR data to update the weather in the simulator leaves a lot to be desired. To adjust the weather correctly using METAR updates you are forced to clear the current weather completely and either load a totally unrealistic globalised weather pattern, resulting in the same weather horizon to horizon and false ATC and ATIS reports, or reload the new METAR data very slowly one station at a time. This METAR update process is not only totally unrealistic, but can result in a great deal of screen flicker while the simulator slowly loads the new METARs. There are also problems with METAR voids, METAR morphing, and inconsistent weather synchronization across networked systems using METAR updates. These problems are inherent within the FSX and Prepar3D simulators. On the other hand, our **Dynamic Weather** loads instantly into the simulator with no screen flicker, no disturbance to the flight, no weather morphing, and no inconsistencies with ATC or ATIS.

The **Live Weather Engine** has set a new standard for weather updates within the simulator community. OpusFSX provides the most efficient and accurate weather updates for Microsoft FSX and Lockheed Martin's Prepar3D simulators.

Live Weather Features

- **Live Weather** constructs Dynamic Live Weather from current live (or historic) METAR data.
- Accurate detailed weather as far as the eye can see throughout your flight. No more unrealistic globalized weather from horizon to horizon, with OpusFSX you can see distant weather patterns all around you. See the changing weather patterns en route as you fly.
- **Live Weather** provides instant weather updates. No more unrealistic clearing of the weather prior to updating. No more annoying screen flicker as METARs are slowly loaded into the sim.
- No more METAR voids or unrealistic METAR data morphing.
- No more inconsistencies with distant ATC and ATIS reports. Accurate Destination Weather when over 200km away, with perfect weather reports at any distance to any point en-route.
- **OpusFSX** weather reports can be used instead of ATIS, and at non-ATIS airstrips.
- **Live Weather** allows you to see low lying mist and fog patches.
- **Live Weather** creates very realistic cloud, visibility layering and an overcast effect.
- **Live Weather** lets you turn on, off, or automatically generate the cirrus cloud effect.

- The **Live Weather Engine** supervises both the turbulence and ultra-realistic **Dynamic Head Movement** utilising actual real-life captured 3D accelerometer data.
- Create your own named weather themes from the current weather.
- Load your own custom weather using a simple METAR import file.
- Load historic weather from within the last 24 hours.
- Dynamic Weather reports displayed during flight for your local area, destination, alternates, en route, lower and upper atmosphere weather.
- **Flight Plan Assistant** imports activated flight plans and provides dynamic flight plan weather reports together with detailed reports on METARs, GRIB lower and upper atmosphere weather, flight plan waypoint weather and SIDs/STARs ordered according to direction and distance.
- **Live Weather Assistant** provides maps of Surface QNH, Surface Winds, Surface Visibility, Surface Temperature, Precipitation Levels, Low Cloud Cover and Met Station Cover for the current 800 x 800 mile weather map.
- **Client Side Weather Control** enables you to edit flight parameters and display weather data on a networked client PC.
- **Live Weather** allows perfect synchronisation of dynamic weather and cloud formations on networked systems.

Sky and Cloud Textures

The Live Weather Engine does not include any sky and cloud textures. For optimum effect we strongly recommend you install sky and cloud textures from packages such as Flight Environment X (payware) or HDEv2 (freeware) for clouds with the sky upgraded by Danny Glover, and use the OpusFSX Live Weather Engine for the actual weather updates.

We would strongly recommend using lower resolution 1024 cloud textures and also not using HD cloud textures, this will be beneficial in terms of frame rates as well as looking more realistic and less harsh.

Slow and Low Flyer Configuration

If you cruise below FL200 then just set your **Destination**, **Max Cruise Altitude** and enable **Adjust Options Automatically**.

Alternatively, if you prefer to set options manually, then disable **Adjust Options Automatically** and set ALL DEFAULTS in the Weather dialogs, then you are already set for low and slow flying. Always make sure you specify your **Destination** within the Weather dialog. Low flyers should not set the **Enable Wind Stabilisation** option since the LWE will automatically stabilise the wind should you climb above the **Recovery Altitude** + 250 feet or 19250 feet whichever is the higher.

High Flyer Configuration

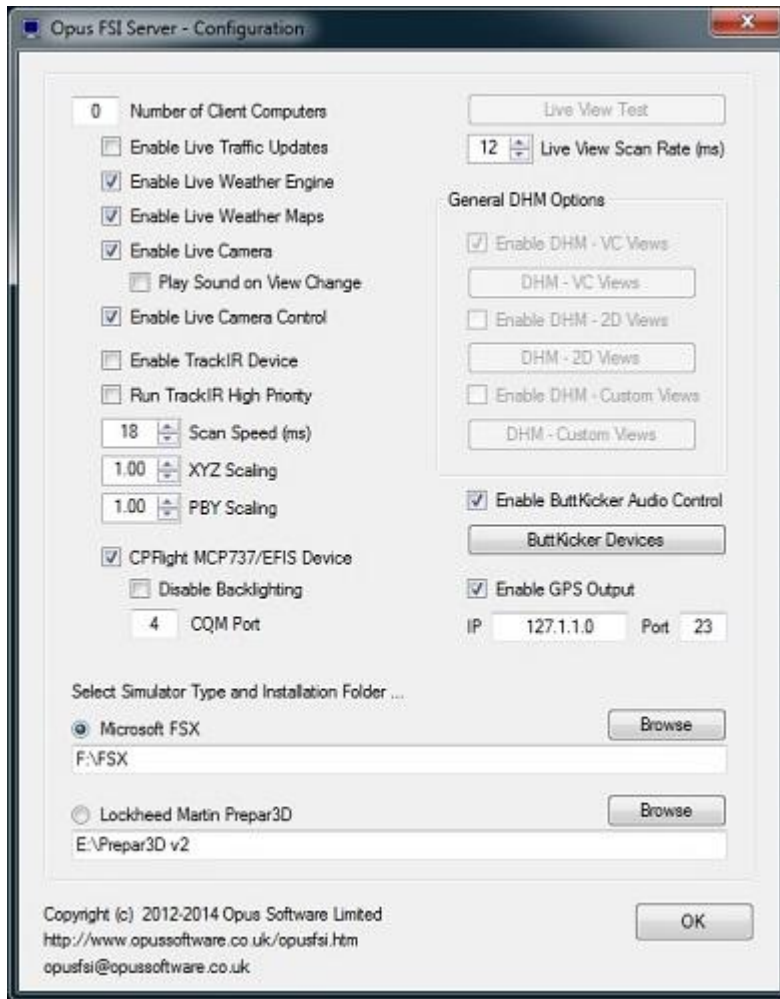
If you cruise above FL200 then just set your **Destination**, **Max Cruise Altitude** and enable **Adjust Options Automatically**. If your system has wind shifts enable the **Adjust Sim Friendly Options**, if your system has severe wind shifts then enable the **Use Maximum Stabilisation** option too. Alternatively, if you prefer to set options manually, then disable **Adjust Options Automatically** and specify your **Destination** within the Weather dialog and enable the **Download GRIB Forecast** option to get GRIB forecast data for winds and temperatures aloft. Enable the **Sim Friendly GRIB Winds** option to minimise the chance of wind shifts. If your system is well behaved and you want true forecast data at all times then turn off the **Sim Friendly GRIB Winds** option. But this option gives you winds very close if not the same as the true forecast, especially if you have specified your **Cruise Altitude**. Select the **Enable Wind Stabilisation** option in the Weather Smoothing and Stabilisation dialog to minimise the chance of wind shifts. When set the surface winds injected into the simulator will be stabilised (static) everywhere until such time as they are recovered by the LWE. Stabilised winds are indicated in the Opus weather report windows with the phrase 'Static DDD/SS' immediately after the actual surface wind.

If, and only if, your system still experiences 'major' wind shifts during the cruise then you can also set the **Stabilised GRIB Data** option, but most systems will not need this option. It is included for the few that do.

Configuration

You will need to set your FSX to run in windowed mode (i.e. press ALT+ENTER, or turn off full screen mode in the FSX View menu) in order to display the FSXSERVER form. The server and all client displays will be paused whilst the dialog is active.

The Live Weather Engine is enabled via the OpusFSX server program's Configuration dialog, accessed via the Configure button on the FSXSERVER's main form.



To enable, tick the **Enable Live Weather Engine** checkbox within the Configuration dialog. Ensure you have disabled all other weather injection from FSX/P3D, third party engines, VATSIM/IVAO etc.

You can temporarily enable and disable Live Weather updates, or force an update of the Live Weather using the OpusFSI Live Weather options within the simulator's Add-on menu.



The Live Weather update parameters and import options are specified within the Weather dialog, accessed via the Weather button on the FSXSERVER's main form.

Dynamic Live Weather



If the **Disable Weather Update on Startup** option is enabled the LWE will remain dormant until you force a weather update either via the Addon menu or via the **Update Weather** button in the dialog, or via a Shortcut Control. This option allows you to enter their flight details and adjust the weather settings prior to generating and updating the weather at the start of your flight.

You may enter (or paste) your flight plan, or a list of ICAO, nav aids and general waypoint codes into the **Flight Plan or En Route Station List** edit box. Your flight plan destination ICAO will be automatically copied to the **Destination ICAO** field. Refer to the section below for a description of the Flight Plan Options.

If you haven't entered a Flight Plan or Station List then configure a **Destination ICAO** Code and up to four alternate airfield designations. Always specify your destination ICAO, this is very important in preventing wind shifts. The specified destination and alternate airfield weather is updated automatically without the need to constantly download new METAR reports. These automatic updates ensure compliance with the current downloaded METAR reports at these locations. You can change the ICAO codes in flight. It is recommended you update the weather manually (via the dialog or add-on menu) when you change the ICAO codes, either before a flight or whilst airborne.

Weather Report windows provide accurate weather reports for the specified destination and alternate airfields. These reports can be used in place of ATIS and are accurate out to the edge of the weather map (640km about 400 miles or 345nm).

The **Cruise Altitude** setting in the weather dialog allows you to specify a reference cruise altitude. You can enter a three digit flight level, or FLnnn format (e.g. FL230), or an altitude. All altitudes less than 1000 feet are interpreted as an implied flight level. For the Sim Friendly GRIB wind adjustment, any cruise altitude less than 20000 feet will reference the forecasted tropopause height.

The **Adjust Options Automatically** option uses your specified **Max Cruise Altitude** to determine the optimum weather settings for your flight including the **Recovery Altitude** and **Forced Recovery** altitude. If your cruise altitude is below 6000 feet then GRIB will be disabled. Refer to the Automatic Settings section for further details.

If you prefer to set these manually then you can do so in the Smoothing and Stabilisation dialog, remember to disable the **Adjust Options Automatically** option first otherwise it will override your manual settings.

If you have problems with wind shifts or temperatures then enable **Adjust Sim Friendly Options**, which will select Sim friendly GRIB winds and temps, again if you prefer to set these manually then you can do so in the Weather Download Options dialog.

The **Use Maximum Stabilisation** option should be enabled for systems that suffer badly from wind shifts. Wind and pressure stabilisation is enabled together with **Stabilised GRIB Data** if appropriate. You can set Stabilised GRIB Data manually in the Weather Download Options dialog.

The **Reuse GRIB Data** option forces the LWE to reuse the previously downloaded GRIB data on your PC instead of attempting to download a new cycle. It is intended for use when the NOAA GRIB server is unavailable. The option is disabled by default on OpusFSX startup. The option is automatically enabled once airborne, this is done to prevent any new GRIB cycle data being downloaded after landing. Any new cycle data files will be downloaded only when on the ground before the very first flight.

If you have set your **Destination**, **Max Cruise Altitude** and enabled **Adjust Options Automatically** then you can go ahead and fly without setting any further options in the Weather Download, Smoothing and Stabilisation, and General User Preferences dialogs, they are provided for you to tweak the settings manually if required.

Defaults

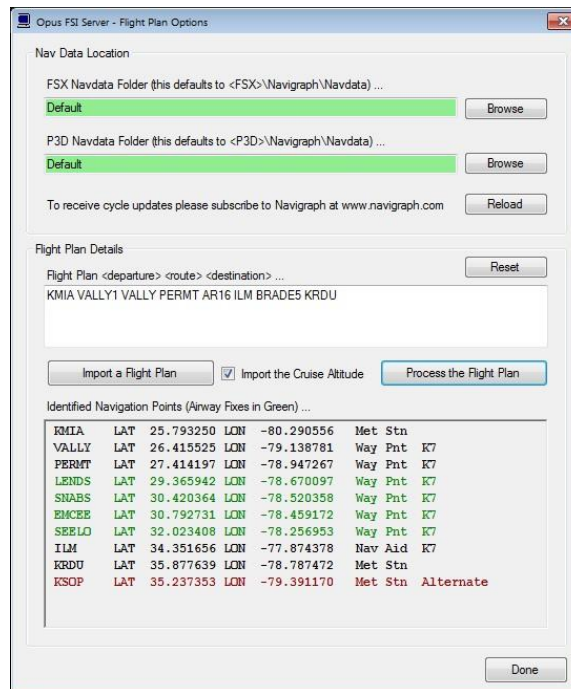
The **Defaults** button sets all recommended default options.

Update Weather

The **Update Weather** button forces a weather update and downloads METAR and GRIB data if necessary. The **OK** button reloads the current weather data according to your new settings and will not download the METAR and GRIB data again. The text in the Weather button on the

FSXSERVER form is grayed out and changed to 'Updating' whilst the LWE is busy refreshing or downloading and updating the weather.

Flight Plan Options



Identifying your Navdata Source

The flight planning assistance software decodes the standard Navigraph Navdata Nav aids and Waypoints text files for use in identifying all Nav aids and general waypoints within the your flight plan. First locate your Navdata folder.

The standard <SIM>\Navigraph\Navdata\ path is the default location for these files but you may **Browse** to different folders on FSX and Prepar3D systems should they be located elsewhere (e.g. NavDataPro folder). The Navigraph Navdata supplied for the PMDG aircraft is in your <SIM>\PMDG\NAVDATA folder in the wnavaid.txt and wnavfix.txt Navigraph files. iFLY files are in the <FSX>\iFly\Navdata folder.

If you do not have any Navigraph files then a default version of the files (apart from SIDs and STARS) are automatically installed into your <SIM>\Navigraph\Navdata folder, to update these subscribe to Navigraph's FMS data service at www.navigraph.com.

You will know if OpusFSX has extracted the Nav data because the NAVAIDS.DAT and WAYPOINTS.DAT files will be created in the OpusFSX folder.

The NavData is reloaded each time you change the folder location, or press the **Reload** or **Process the Flight Plan** buttons, or exit the dialog.

N.B. you only need to identify your Navdata folder once and it will be used for all aircraft types, you do not need to change the Navdata folder when selecting aircraft from different manufacturers.

Entering a Flight Plan

The LWE will automatically import flight plans activated via FSX. The full file specification for all FSX/P3D activated (loaded) flight plans is displayed within the main Spy window of the FSXSERVER program. However if you wish to manually import or enter and process a flight plan then you can do it via this dialog.

Entering a Flight Plan Manually

If you enter the flight plan manually then your flight plan should start and end with a station's ICAO code, i.e. in the form,

<origin> <nav aids, waypoint fixes, airways and lat/lon fixes> **<destination>**

e.g. EGCC 53.317167N2.318000W WAL33 TULIP LFST

Your departure and destination points are required in order for the software to identify the specific Nav aid or waypoint since many of them have shared names. So make sure you specify your origin and destination ICAO codes. The origin, destination and fixes can also be defined as Lat Lon fixes. The formats for Lat Lon fixes are as follows,

<sign><lat>/<sign><lon>:<code> e.g. 12-34-56/-123-45-67 or 1234/-12345 or 1.23/-1.23:ABC1
or <lat><N or S><lon> <E or W>:<code> e.g. 12-34-56N123-45-67W or 1234N12345W or 1.23N1.23W:ABC1
or <N or S><lat><E or W><lon>:<code> e.g. N12-34-56W123-45-67 or N1234W12345 or N1.23W1.23:ABC1

where

<sign> = + (optional) to indicate North or East
- to indicate South or West
<lat> = dd-mm-ss
ddmm
deg.deg
<lon> = ddd-mm-ss
dddmm
deg.deg
<code> = optional ICAO code or station name

where dd = degrees in 2 digits
ddd = degrees in 3 digits
deg = degrees represented in decimal form e.g. 30 minutes would be 0.5 degrees
mm = minutes in 2 digits

Importing a Flight Plan

You can import any Microsoft FSX or FS9 PLN formatted flight plan (with .PLN filename extension). The **Import Flight Plan** option will initialise its path to your **My Documents** folder ready for you to navigate to your actual **Flight Simulator X Files**, **Prepared3D Files**, or other folder name (for foreign language systems). Your PLN folder's location is remembered by the FPA software after

you have selected the required .PLN filename. An **Import Cruise Altitude** checkbox option is provided to enable or disable the importing of the cruise altitude from the flight plan. All flight plans activated within the simulator are decoded and processed automatically. For this to happen the FSXSERVER program must be running before the flight plan is loaded into the simulator.

Processing a Flight Plan

The software ignores all identifiers that are not listed as Nav aids and waypoints. Airways are recognised provided the entry point is specified, also if you have specified both entry and exit points in the flight plan (usually done) then the FP Assistant will replace the Airway with the list of points en route and provide weather information and upper winds/temps for each of those navigation points.

The nearest four Met stations within 128km (80 miles) of a navigation point are added to the download list. The Flight Plan Options dialog lists all identified navigation points extracted from your flight plan.

Click on the **Process the Flight Plan** button to decode the Flight Plan and display the result in the Identified Navigation Points box. The navigation aids and waypoints, where they exist, are displayed with their Lat/Lon coordinates, general type and two letter country codes. Where possible the specified label of any lat/lon waypoint fixes are shown. Airway fixes are displayed in green. Alternate Met stations are displayed in red. If you subsequently change your alternates then you will need to process the flight plan again.

Just remember to force a weather update to download the METARs. Until then there will be no METAR data since it hasn't been downloaded. After downloading, all the non-reporting Met stations are removed from the list.

The **Flight Plan En Route Weather Report** displays the navigation points associated with each listed Met station, refer to the Weather Reports section for further details.

The **OpusFlightReport** text file in the **OpusFSX\Themes** folder provides details of all cruise winds, cruise temperatures and local weather reports at each of the navigation points.

Deleting a Flight Plan

To delete a flight plan simply press the **Reset** button.

Weather Download Options



Disable the **Adjust Options Automatically** option in the Weather dialog if you wish to manually set **Download GRIB Forecast Data** or the **Weather Update on Approach** parameters. Also disable **Adjust Sim Friendly Options** and **Use Maximum Stabilisation** if you wish to set the parameters manually here.

Dynamic Weather Options

The default **Weather Update** settings are 60 minutes and/or 160km travelled. The minimum Live Weather Update frequency and distance is 5 minutes and 16km respectively. The Weather Update Period and Distance can be set to up to a maximum of 60 minutes and/or 400km (248 miles). Any distance above 175km (108 miles) will result in increasing the injected Dynamic Weather Theme size. Take into consideration your FSX cloud draw distance and your ground speed when setting your update time, if the update time is not frequent enough then you may reach the cloud draw distance before a weather update takes place. We recommend setting a Cloud Draw Distance of between 70 and 110 miles in the simulator. The lower setting of 70 or 80 miles will be adequate for low level VFR, and anything from 80 to 110 miles for high level flying. The clouds at the range of the Cloud Draw Distance will either condense into view or dissipate out of view as you fly toward or away from them.

If you do not like change and you don't fly beyond 192Km then you can disable weather updates via the simulator's OpusFSX Add-on menu but be aware that if you eventually perform another weather update, the injected targets may be completely different from the current wind and may cause one or more wind shifts.

If you want historic data then set your sim time to the required time within the last 24 hours and tick the **Download Historic Weather** checkbox.

Tick the **Download GRIB Forecast Data** option if you want to use this forecast data instead of the OpusFSX simulated winds and temperatures aloft. This is only relevant if you fly above 20,000 feet.

Refer to the Winds and Temperatures Aloft section for further details. After ticking this box you must manually download the weather using the Update Weather button in the Weather menu. Clear Air Turbulence comes into effect above FL200 when the GRIB option is enabled, note that FSX does not display wing flex for Clear Air Turbulence.

Sim Friendly GRIB Wind Targets should be enabled along with the **Wind Stabilisation** option in the Wind Smoothing dialog on any system experiencing troublesome wind shifts. The **Sim Friendly GRIB Wind Targets** option causes the LWE to adjust any 'sim unfriendly' wind changes in direction and speed.

The **Sim Friendly GRIB Temperature Targets** option causes the LWE to adjust any 'sim unfriendly' temperatures, enable this if FSX is having difficulty maintaining its targets.

If enabled the **Background GRIB Processing** option (default ON) will process GRIB data (i.e. GRIB data extraction and the data decoding) slowly in the background and does not affect the sim during this period. The GRIB data is extracted and processed at the beginning of the flight whilst on the ground.

The **Stabilised GRIB Data** option goes a step further for systems experiencing wind shifts in the cruise, and makes the GRIB forecast data static, i.e. no further GRIB upper wind/temperature forecasts are downloaded during the flight.

The possibility of wind shifts cannot entirely be ruled out, this is due to bugs in the FSX/P3D code, that's why you should always disable the '**Aircraft stress causes damage**' FSX option.

Weather Update on Approach

If you suffer from wind shifts then tick the **Disable Update on Approach** checkbox. On approach, all weather updates will be disabled for **Disable Weather Update For** minutes (default 30 minutes) on the final descent as soon as you descend through the **Disable Update when Below** height (default 1800 feet AGL). This process is cancelled whenever you climb above **Assume Cruising when Above** height (default 2000 feet AGL).

Current Data - Weather Servers

Select the required server NOAA, VATSIM or IVAO (remember to disable VATSIM/IVAO's own weather injection).

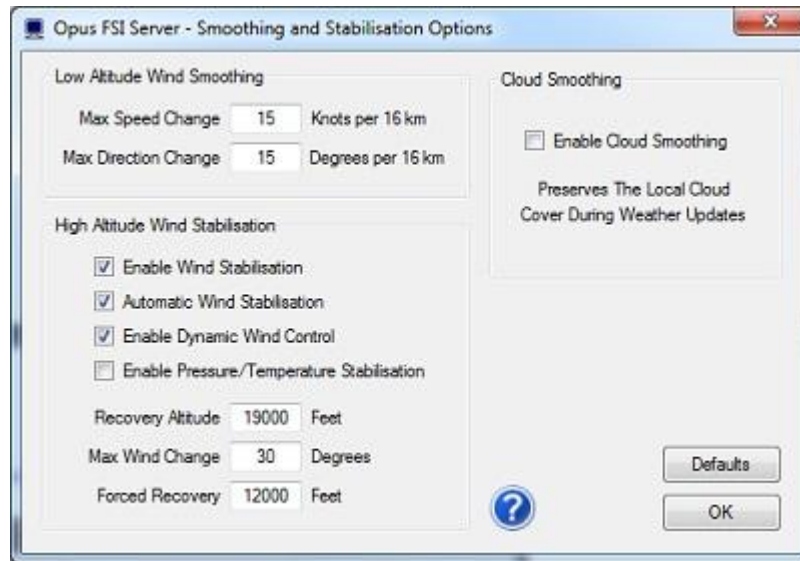
Tick the **Use VATSIM for Missing Data** checkbox if you wish to use VATSIM to fill in missing dynamic weather data (not historic) from the other servers, useful for areas such as NZ.

When the **Download NOAA TAFs** checkbox is ticked the LWE will download all available TAFs for all METAR stations. This option is only applicable when the NOAA Server is selected. The downloaded TAFs are shown within the OpusFlightReport.txt (FLIGHT PLAN) text report.

Historic Data - Weather Servers

Currently the **Secondary Server** identifies NOAA, another option for the secondary server will be implemented in the future.

Smoothing and Stabilisation



Low Altitude Wind Smoothing

If you don't suffer from wind shifts then you can just leave the default maximum values of 15 for **Max Speed Change** and **Max Direction Change**. Generally the only times when the wind shows greater variation is when it is calm or just a zephyr, so the direction isn't really important. Otherwise if you do have wind shifts at low altitudes (below 20,000 feet) the **Max Speed Change** option allows you to fine tune the surface wind smoothing by specifying the maximum allowed wind speed change every 16km. You can also specify the **Max Direction Change** (default 15 degrees).

High Altitude Wind Stabilisation

Disable the **Adjust Options Automatically**, **Adjust Sim Friendly Options** and **Use Maximum Stabilisation** options in the Weather dialog if you wish to manually set the **High Altitude Wind Stabilisation** parameters.

The **Enable Wind Stabilisation** option has been provided for users who suffer from wind shifts and mainly fly at high altitude, typically above 20,000 feet. Wind Stabilisation applies to both dynamic weather and METAR file import. Ideally set this on the ground before a flight not during. Wind variance is automatically disabled when Wind Stabilisation is enabled since this has been known to be troublesome in FSX.

Automatic Wind Stabilisation will automatically enable Wind Stabilisation once you climb above the specified Recovery Altitude + 500 feet.

Enable Dynamic Wind Control is enabled by default but can be disabled on systems that do not cope too well with the direct ambient wind controls, or in multiplayer mode if you experience a problem. Dynamic Wind Control (DWC) requires any sudden large deviation (i.e. 15 knots or 15 degrees or more) in the ambient winds to be sustained for more than 2 seconds before reacting and trying to coax the wind back to its targeted values.

Enable Pressure/Temperature Stabilisation is intended for long haul high level flyers. All weather reports indicate when a 'Static' QNH is in use. The LWE will recover the surface winds and temperatures separately to the surface pressure. The LWE always attempts to achieve a smooth recovery of the surface pressure.

The **Recovery Altitude** is where the winds will attempt to recover eventually to the true surface wind, default 19,000 feet. A lower setting is advised for those experiencing very serious wind shift problems. It will allow the stabilised winds to be maintained to a much lower altitude, probably at the expense of being able to recover the current surface winds reported in the latest METARs. Wind stabilisation is enabled automatically if the user climbs above the Recovery Altitude plus 500 feet.

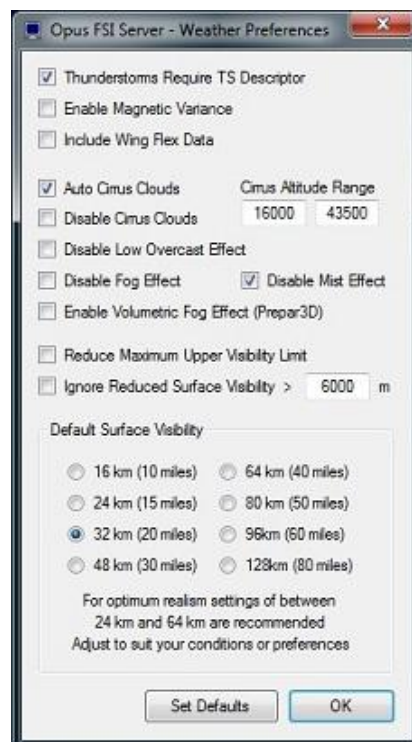
The maximum permitted wind direction change, **Max Wind Change**, can be specified (default 30 degrees change). If you do want to adhere strictly to the METARs (with a risk of wind shifts) then set the **Forced Recovery** altitude (see below).

A **Forced Recovery** altitude (default 12000 feet) forces full recovery of the reported surface winds after wind stabilisation and during the final descent from 19,000 feet. The full recovery may cause a wind shift at the configured altitude, if this is not acceptable then set the altitude to 0 feet to disable it. Any wind shift you experience here is less worrying because you are lower down and travelling slower, usually in much calmer winds.

Enable Cloud Smoothing will attempt to preserve all cloud layers and coverage surrounding the aircraft. The extent of the preservation zone increases with increased elevation. All Cloud Smoothing is disabled when the aircraft is within 64km (40 miles) of the specified Destination.

It is not possible to stop FSX re-positioning the individual clouds but the OpusFSX LWE can preserve the cloud layers, cloud types, cloud bases, cloud depths, cloud precipitation, and overall cloud coverage.

General User Preferences



The **Thunderstorms Require TS Descriptor** option when enabled only produces active thunderstorm (CB) clouds when the TS descriptor is specified within the METAR statement. When this option is disabled either TS or CB in the METAR will produce an active thunderstorm. The **Magnetic Variation** is disabled by default. When enabled, there will be a difference between the reported wind directions METAR and GRIB forecast data which always report directions with respect to True North and the current wind directions within the simulator and reported by ATIS which are always Magnetic directions. To assist the pilot, the LWE will show the current **Magnetic Variation** in the weather report windows, displayed in the form '**MagVar XX.X**' at the end of the surface wind information. You must **ADD** this value to all wind directions to convert them to Magnetic directions at the current location. Please note, OpusFSX cannot show the Magnetic Variation at the Destination or Alternate sites, only at your current location in the simulated world.

The **Include Wing Flex Data** option is disabled by default to prevent the simulator erroneously fluctuating the ASI and VSI when the simulator's turbulence and thermal setting is enabled. This simulator turbulence effect is responsible for providing wing flex and ASI fluctuations. The erroneous fluctuations interfere with and fight against the normal ambient wind target changes within the sim making them undesirable, and problematic in some aircraft sims (e.g. the MD aircraft types).

If you wish to enable the simulator's turbulence and thermal effects giving you wing flex (FSX menu option - Options, Settings, Display. Select the Weather tab, there is an option for turbulence and thermal effects on the aircraft, make sure it is not disabled), you must also tick the **Include Wing Flex Data** option. To see wing flex enable the 'Advanced Animations' option in the FSX menu option - Options, Settings, Display - Graphics tab. Note, the wing flex option can cause some aircraft simulations to loose A/T or A/P lock.

High level cirrus cloud is not included within the standard METAR reports.

The **Auto Cirrus Clouds** option automatically displays cirrus cloud whenever it determines the weather is quite changeable, possibly due to a weather front. The cirrus cloud coverage is generated randomly between the configured lower and upper **Cirrus Altitude Range** based on the aircraft's current latitude. The lower range will be adjusted to between 10,000 feet at the poles to 20,000 feet at the equator, the upper range will be adjusted to between 25,000 feet at the poles to 60,000 feet at the equator. The calculated limits are graduated throughout the polar, temperate, and tropical zones. For example, at EGNX East Midlands (latitude 52.8 degrees) the limits are set to range from 15,900 to 43,100 feet. In fairly stable conditions the cirrus cloud will be disabled. In flight, the cirrus is reassessed every 80 miles flown.

Disable Cirrus Clouds if you don't want any cirrus clouds at all, either auto or random.

If you haven't selected auto cirrus or disabled cirrus clouds then the Live Weather Engine generates a single cirrus cloud layer at a random height between the configured lower and upper **Cirrus Altitude Range**. The valid range of altitude settings are from 10,000ft up to 60,000ft (default range is 16,500ft to 45,000ft).

Low Overcast Effects come into force whenever the overcast cloud cover is less than about 6000 feet AGL. You must be IN the Low Overcast Effect to see it. Overcast by definition means 90% or more cloud coverage. Don't expect to see solid blanket type overcast when looking vertically

downward ... you WILL see transparent holes just like you do in real life until you get IN an OpusFSX Low Overcast Effect (an overcast below 6000 feet).

Disable **Fog** and **Mist effects** if required.

The mist and fog effects place a thin layer of cloud on the mist/fog layer so that it is visible from above.

In P3D simulator mode the **Enable Volumetric Fog** option is set automatically using the VolumetricFog setting within the Prepar3D.CFG file. If you change this setting during a P3D session then either change the **Enable Volumetric Fog Effect** in OpusFSX to match P3D or restart OpusFSX. This option is ignored whenever the Microsoft FSX simulator type has been selected.

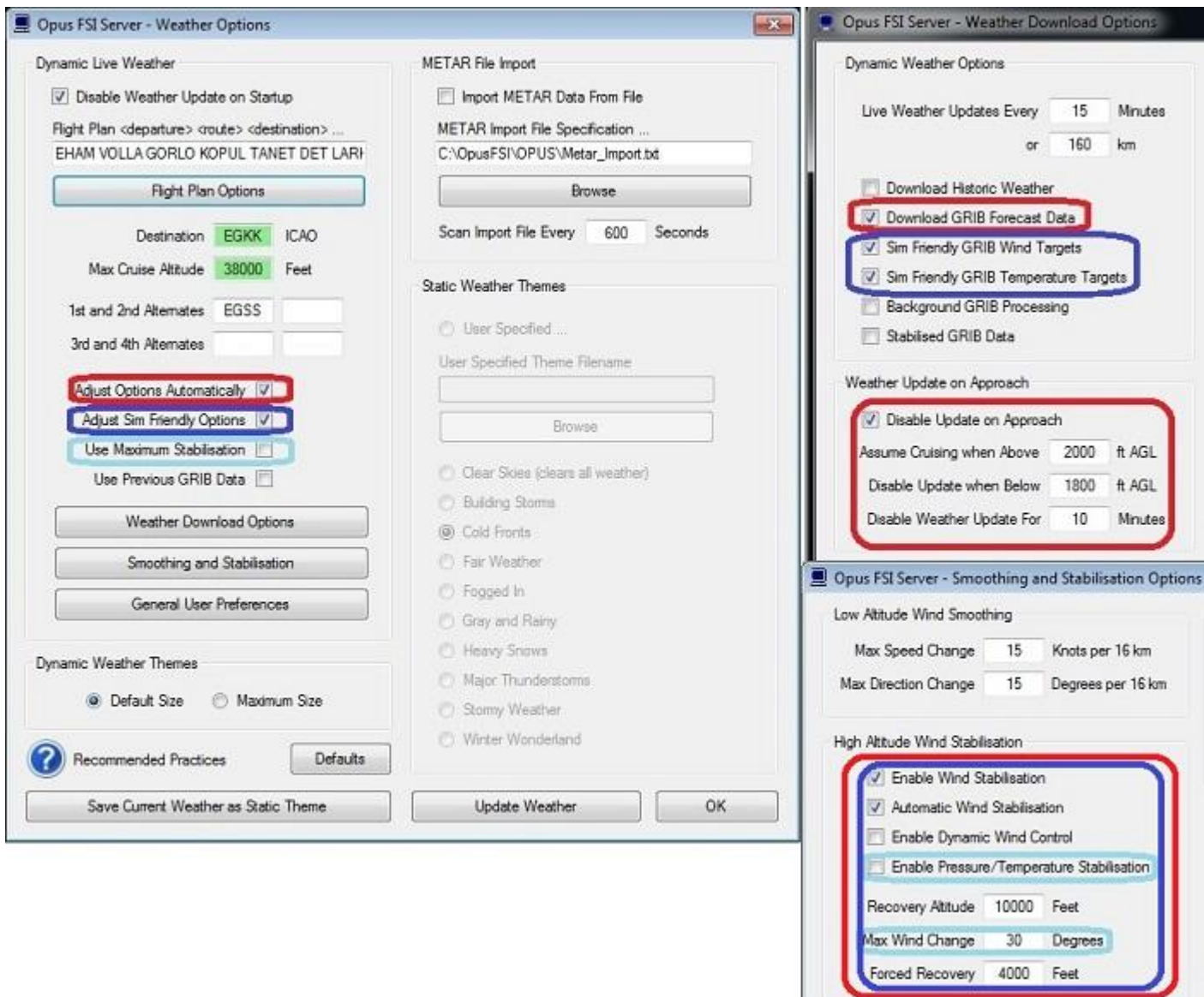
The **Reduce Maximum Upper Visibility Limit** option is for those users who prefer their upper visibility limits to be reduced a notch. The visibility at altitude (28,000 feet) is reduced from the usual 128km to 96km depending on the weather conditions.

Realistic reduced visibility is an effect seen in the real world which we have simulated for FSX. You may **ignore** (disable) realistic **reduced visibility** by configuring the distance as required, a value of zero disables reduced visibility entirely.

The **Default Surface Visibility** setting defaults to either 32km (20 miles) or 48km depending on latitude and time of year. The maximum visibility at altitude is usually 128km (80 miles) and attained at or below a target altitude of 28,000 feet. This maximum visibility can be reduced to 96km (60 miles) whenever average surface visibility is reduced below some predetermined distance depending on your Max Surface Visibility setting.

Of course when using Dynamic Weather the visibility values in the METARs will override this setting so it only comes into force when the METARs state CAVOK, 9999 or 10SM conditions.

Automatic Settings



Parameters changed by the Automatic Settings

Setting the **Adjust Options Automatically** uses your specified **Max Cruise Altitude** to set the weather related options, see the table below. Dialog settings won't be updated until after the next weather update. These options are different to the Default settings.

	Cruising Below 6000 feet	Cruising Between 6000 and Below 12000 feet	Cruising Between 12000 and Below 22000 feet	Cruising 22000 feet and Above
Weather Download Options				
Download GRIB Forecast Data	DISABLED	ENABLED	ENABLED	ENABLED
Weather Download Options - Weather Update on Approach				

Disable on Approach	ENABLED	ENABLED	ENABLED	ENABLED
Assume Cruising when Above	1750 feet	2000 feet	2000 feet	2000 feet
Disable Update when Below	1500 feet	1800 feet	1800 feet	1800 feet
Descent Disable Period	30 minutes	30 minutes	30 minutes	30 minutes
<i>Smoothing and Stabilisation - High Altitude Wind Stabilisation</i>				
Wind Stabilisation	DISABLED	DISABLED	ENABLED	ENABLED
Automatic Wind Stabilisation	ENABLED	ENABLED	ENABLED	ENABLED
Enable Pressure/Temp Stabilisation	DISABLED	DISABLED	DISABLED	DISABLED
Recovery Altitude	19000 feet	If Adjust Sim Friendly Options is ticked in the Weather dialog then, Cruise Altitude minus 2000 feet (minimum 5000 feet). Else, 19000 feet	Cruise Altitude minus 4000 feet	19000 feet
Forced Recovery	12000 feet	If Adjust Sim Friendly Options is ticked then, Cruise Altitude minus 2000 feet (minimum 5000 feet). Else, 12000 feet	Cruise Altitude minus 10000 feet	12000 feet
Max Wind Change	30 degrees	30 degrees	30 degrees	30 degrees

If **Adjust Sim Friendly Options** is ticked in the Weather dialog then the following weather related options are always adjusted with any GRIB download,
 Sim Friendly GRIB Wind Targets = ENABLED
 Sim Friendly GRIB Temperature Targets = ENABLED

If **Use Maximum Stabilisation** is ticked in the Weather dialog then the following weather related options are always adjusted with any GRIB download,
 Enable Pressure/Temperature Stabilisation = ENABLED
 Max Wind Change = 20 degrees

METAR File Import

As an alternative to the weather data collection over the Internet the software can be instructed to import its METAR data from a user specified import file. The minimum **Import METAR File** scan frequency is 5 seconds. Refer to the Weather Data Import section below for details.

Save Current Weather as Static Theme

This dialog also includes a **Save Current Weather as Static Theme** button which can be used to save the current Dynamic Weather (or METAR file import weather) as a named static theme. The theme covers an area of about 250km (160 miles) in each direction around your aircraft. You can choose to save the theme with any name provided it is not prefixed with 'Opus'. Refer to the Weather Data Import section for further details on loading the saved weather.

N.B. Take great care not to overwrite one of the standard FSX/Prepar3D themes, the software will query you if you select a theme that already exists, but will overwrite the theme if you answer Yes to the query.

Static Weather Themes

The use of static weather themes is efficient and guarantees consistent weather and cloud formations across all systems. Weather themes do not require the transfer of METAR reports from the server to client systems.

To ensure correct synchronization, the desired weather theme for the flight must be selected in the FSXSERVER's Weather dialog, and not via the usual FSX Weather menu. The **Enable Live Weather Engine** checkbox should be unchecked within the server Configuration dialog, otherwise the static themes are grayed out in the Weather dialog.

If at any time the weather or cloud formations differ on your client machines, possibly due to you manually pausing one or more of the simulators, this can happen as a result of displaying an FSX dialog, then you can quickly resynchronize the weather by displaying the Weather dialog on the FSXSERVER and clicking on the OK button to reselect and reload (i.e. synchronize) the chosen weather theme. You may of course choose to browse for a new weather theme and select that.

This procedure may also be required after the client systems have first connected. For example, when you have not prepared everything, including the weather theme, on the server system before the client connections are made. In either case, the resynchronization is almost instant.

Recommended Settings and Practice

Upgrade to the latest Release or Beta Version.

Set all Defaults in all weather dialogs. *

Specify your Destination.

Specify your Max Cruise Altitude. **

Update the Weather. ***

Check the Weather ****

* This should enable the **Adjust Options Automatically** and the **Adjust Sim Friendly** options in the Weather dialog.

** If you specify a **Cruise Altitude** of 6000 feet or more the LWE will download and process the

GRIB forecast data from NOAA.

*** If GRIB data is downloaded then the Opus **Upper Atmosphere Report** will be automatically displayed showing the progress of your GRIB data download and processing. If you have specified **Background GRIB Processing** in the Downloads dialog then the GRIB data extraction and lengthy decoding will proceed at a slower pace and can take several minutes. Otherwise the processing will be done as fast as possible at the expense of FSX performance or frame rates. The GRIB data is only downloaded once before flight and the decoded data will be valid all day or at least for nine hours so this is normally not a concern or problem. However, most users need GRIB data for flight planning and preparation.

**** Before flight you should get into the habit of checking the weather. At the very least display and check the Opus **Local, Lower, Upper, and Destination Weather reports**. You may also like to examine the various Opus text reports accessed via the FSX Addon menu. There are separate reports showing the downloaded METARs, all the GRIB wind and temperature targets from 4000 feet up to FL540, all the en route weather for any specified flight plan including TAFs if you have enabled them, and finally an easy reference to all relevant SIDs and STARs. This report gives a handy direction and bearing for each listed SID and STAR.

The Opus weather reports (e.g. The Destination Weather) should be checked during climb and descent to monitor all wind and temperature targets, compared with the actual FSX ambient conditions. This way you will know that your sim is operating as expected.

Never disable weather updates, FSX will NOT cope on its own it simply cannot contain all the necessary data.

Test Weather Reports, located in the OpusFSX\Themes folder and accessed via the FSX Addon menu ...

OpusWeather.txt ... The downloaded METARs
OpusWeatherReport.txt ... The GRIB data report
OpusFlightReport.txt ... The flight plan en route weather report
OpusSIDSTARReport.txt ... The relevant SIDs and STARs

Live Weather Assistant (LWA) and Weather Map data ...

Surface QNH
Surface Winds
Surface Temperatures
Surface Visibility
Cruise Level Winds
Cruise Level Temperatures
Precipitation
Lower Level Cloud Cover
Met Station Cover

The LWA and up to six weather maps can be displayed on the server or a networked client.

Remember ...

You should use all the various Opus weather reports and text report files to check your weather before and during flight. Especially BEFORE you fly.

At the very least examine the Opus on-screen weather reports.

BEFORE flight ...

1. Check the Local weather report and confirm the weather has been injected OK.
2. Check the Lower Atmospheric weather report to confirm you have GRIB data downloaded and decoded. It will also show you what winds and temps to expect as the LWE takes you up to FL200 and the GRIB forecasted winds and temps.
3. Check the Upper Atmospheric weather report, again to confirm the GRIB data is downloaded and in use. This will also confirm the expected upper winds and temperatures.
4. Check your Destination weather report, if not within the current weather map then check the Destination report in the En Route weather reports. Then you will be warned of any adverse weather at your Destination.
5. If you have processed a flight plan then check the OpusFlightReport.txt file. You can access this via the Addon menu or directly, you will find it in your OpusFSX\Themes folder. The file content is self explanatory.

Other Comments and Useful Hints ...

Both the Lower and Upper Atmospheric reports, and the OpusWeatherReport.txt (GRIB Data) report file contain details of the actual downloaded GRIB data cycle. In addition, each weather report contains the METAR day and time code.

There should never be any need to question the validity of the forecasted data. All the weather related information is available for you to examine, as you should do before every flight.

The OpusWeatherReport.txt (GRIB Data) text report shows ALL the forecasted and Opus 'Sim Friendly' adjusted upper wind and temperature target data from FL040 upwards. All data from FL200 and above being derived directly from the actual forecasted GRIB data.

Specify the altitude you are going to spend the most time cruising at in the Max Cruise Altitude. If you set the Adjust Sim Friendly option (Recommended to minimise weather updates amongst other things) then the software will ensure the raw GRIB forecasted data is adjusted (sim friendly adjustments) about this reference altitude. Of course the GRIB forecast is only adjusted when needed at each 500 foot level. You can see the results of this in the OpusWeatherReport.txt (GRIB Data) report file and the Upper Atmosphere Report.

From release version 3.41 onwards, the vast majority of systems can now safely use Non Sim Friendly GRIB Data if they wish but at the expense of more frequent weather updates as you climb

and descend. The choice is yours but the GRIB text report file will show you the actual GRIB forecast data for you to examine, including all raw (unaltered) GRIB forecast data.

Helpful hint ...

If the upper winds, above FL200, all veer upwards above your lowest stepped altitude then they will not be adjusted by the Sim Friendly option. This option allows veering wind directions and increasing wind strengths and only adjusts those that are backing (rotating anti clockwise as you climb) upwards.

You can compare the adjusted and raw GRIB in both the text report file and in the Upper weather report.

The actual GRIB data cycle is also identified. There is 360 hours (15 days) of global forecast data in each cycle. The cycles are never posted on time as that identifies the time of the forecast cycle and not the time of release. Cycles can in fact be posted anything up to 9 hours after the cycle time.

There should be no need to force a weather update, the LWE will update automatically to keep all the wind and temp targets appropriate to the current altitude zone. It is usually best to leave the LWE to monitor and adjust (you will need FSUIPC4 installed for this) the winds dynamically.

Use the various on screen weather reports and the shift-Z info bar to monitor your ambient conditions (wind) checking against the targeted wind in the weather report for your altitude.

Start off using all Recommended Settings including the Adjust Sim Friendly option. Get used to monitoring the targets against the current ambient wind.

I usually position the weather report window immediately below the shift-Z info line. I monitor the Lower report during the climb below FL200 then switch to the Upper report as I continue to climb up to my cruise altitude. Then I usually monitor the Destination weather report.

Never use accelerated time during the climb or descent, give your sim and the Opus DWC the best possible chance to maintain its targets. In the cruise if you must use accelerated time only use x2, x4 with supervision. Not all aircraft sims are designed to work in accelerated time.

The above weather checking and target monitoring will confirm that your sim is performing as expected. The DWC on the vast majority of systems will hold the winds within 2 degrees and 2 knots of the desired target values. Remember DWC does require FSUIPC4.

Building Live Weather

The Weather option on the main form will be disabled (grayed out) whenever the Live Weather Engine is building new weather. Dynamic Weather is constructed slowly in the background to ensure there is no adverse effect on the simulator's performance (frame rates). It generally takes between 30 and 35 seconds to construct new dynamic weather.

You can force a weather update by either opening the Weather dialog and clicking on the **Update Weather** button, or by selecting **Load Dynamic Weather** via the OpusFSI option in the simulator's Add-on menu. Alternatively if you want to revert to a static weather theme, select **Load Static Weather Theme** from the Add-on menu.

Live Weather updating can be temporarily enabled and disabled via the OpusFSI option in the simulator's Add-on menu.

Dynamic Weather Region

Dynamic Weather covers an area of 1280km by 1280km (800 x 800 miles, or 691 x 691 nm) centered on your aircraft's current location

Weather Data Collection

The METAR data can be loaded via the Internet from either the NOAA (default), VATSIM or IVAO servers. You can even specify to fill in missing data from the VATSIM server. The latest METAR reports for all Met stations within your flying area (weather horizon) are downloaded at the start of the flight, and thereafter either at the user specified update period (default 30 mins) or after you have flown the user specified distance from your previous location.

METARs of course do change periodically, most airports will issue updated METARs half hourly at 20 past and 50 minutes past the hour. However, METARs are also issued at airports any time there is a significant change, that includes changing visibility and cloud layers, especially any changes to cloud coverage and visibility. Other METARs are mostly reported hourly.

Hence, these reports will often contain different cloud coverage data (very usual since the cloud coverage does change frequently). During a weather update, any change in METAR will be reflected in the generated weather. Broken clouds may turn into few clouds, few to broken, clouds may disappear or appear where there were none before etc.

The LWE treats all METARs as gospel and generates the weather and clouds accordingly, so don't be too alarmed if after an update your cloud coverage thickens, diminishes, vanishes, or new cloud suddenly appears. So far all the METARS I have seen accurately reflect what is seen out of the window.

Also bear in mind the LWE interpolates the weather, radiating outward from every met station within the weather grid. If a met station reports broken cloud coverage, that coverage will radiate outward. If during a later update the met station is reporting just few clouds then the thick broken cloud will be replaced instantly with few clouds.

If there are no Met stations found within the current weather horizon then the weather horizon is repeatedly expanded by 50% until one or more Met stations are located. In such cases, these stations are projected onto the outer rim of the weather grid and the localized weather within the grid is interpolated from this data.

If you do not like change then either disable weather updates via the simulator's Addon menu, or set the weather update frequency and distance to something like 60 minutes and 400km then YOU decide when you want the weather updated. For example, update the weather prior to takeoff and just before descending. It's up to you.

METAR Station List Corrections and Additions

Two template text files are provided which can be renamed and edited. These new files can be used to specify any corrections or additions to the LWE met stations list.

The stations must be known to either NOAA or VATSIM in order for us to extract the METAR. The NOAA station list can be found at <http://aviationweather.gov/static/adds/metars/stations.txt>.

The two new template text files are,
OpusFSX_MetStation_Additions_Template.txt
OpusFSX_MetStation_Corrections_Template.txt

Just edit them and remove the '_Template' suffix from the filename and the LWE will read the content and update its met station data each time the FSXSERVER program is started.

Master copies of these files will eventually be kept in-house to amend and update the MetStation data file with common changes and additions to the listed NOAA station data.

OpusFSX MetStation Additions

Prior to use please rename your file to OpusFSX_MetStation_Additions.txt.

Enter a list of met station additions in the form,

ICAO "station_name" latitude longitude elevation

Where

- the ICAO code always appears at the start of a new line
- the elevation is specified in feet amsl
- the lat/lon are entered in the following exact form <compass_direction>degrees minutes (mm.mm)
- latitude = Ndd mm.mm or Sdd mm.mm (9 characters)
- longitude = Eddd mm.mm or Wddd mm.mm (10 characters)

For example,

```
EGKK "London Gatwick" N51 08.88 W000 11.42 196  
EGLL "London Heathrow" N51 28.65 W000 27.68 80
```

These additions may also be used as corrections.

OpusFSX Met Station Corrections

Prior to use please rename your file to OpusFSX_MetStation_Corrections.txt.

Enter a list of met station corrections in the form,

ICAO "station_name"

Where the ICAO code appears at the start of the line.

For example,

NZWB "Blenheim Woodbourne"

Historic Weather Data

Set your simulator time to the required time you want to load within the past 24 hours. In the **Weather** dialog select the **Weather Download Options** and tick the checkbox for **Download Historic Weather**.

Weather Data Import (current and historic)

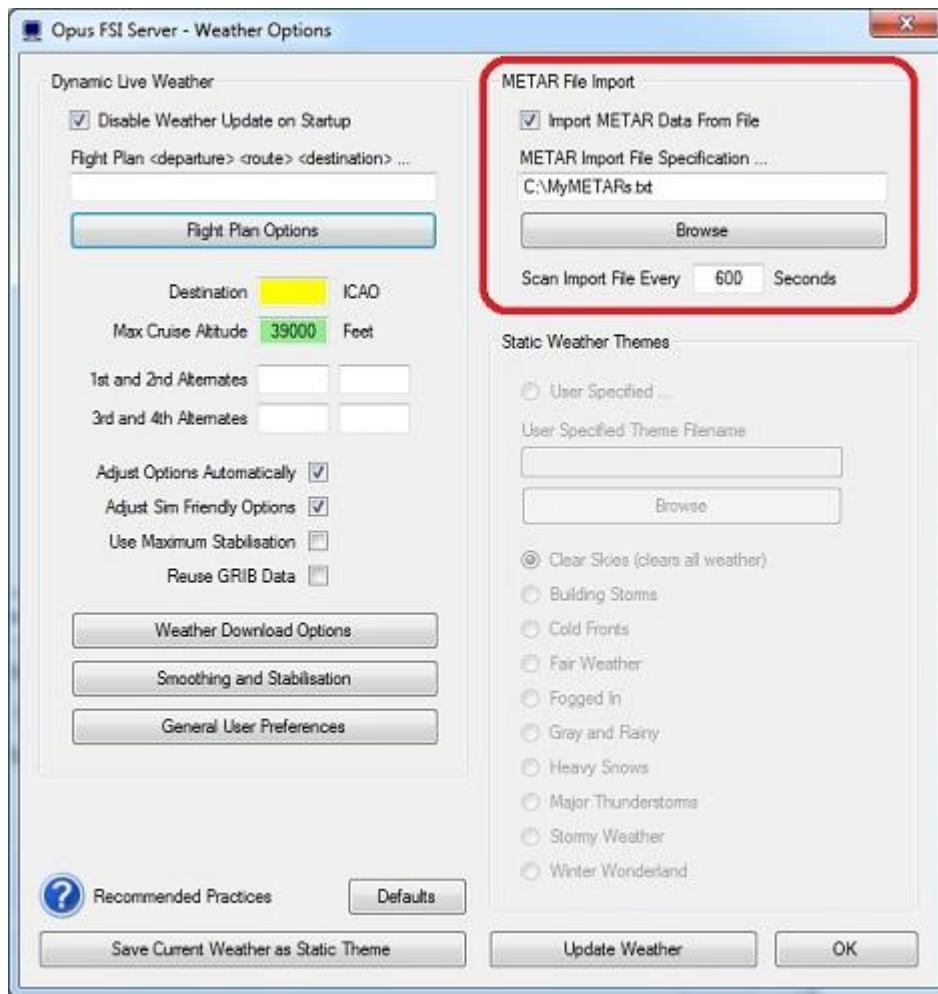
There are two methods you can use to import your own weather data,

- a text file containing a list of METARs
- a named static weather theme

Text File Import

As an alternative to the weather data collection over the Internet the software can be instructed to import its METAR data from a user specified import text file (with the file extension txt). You can create your text file in packages such as Notepad.

The **METAR Import File Specification** and file scan frequency (default 60 secs) is specified within the Weather dialog on the server.



This interface provides the means for you (or third-party software programs) to perform instant weather updates across the **OpusFSX** system with all the benefits of using our **Dynamic Weather** update. In such circumstances, the **OpusFSX** weather engine will load all METARs created by you (or the third-party engine) that are contained within the specified text file. These reports will be used to perform a weather update of the system.

This interface can also provide you with a simple means to create your own localized or global weather themes by specifying the required METAR string(s) within the import file. The global ICAO station code GLOB can be used to specify global weather and overrides any other METARs in the file.

The METAR date/time is ignored and so can be set to any date/time. Also the word METAR, MET or SPECI is ignored if present in the file. The METAR must be on a single line.

Example: KORD 010203Z 19020 6SM -SHRA BKN070 12/08
 decodes as station id KORD, wind direction 190 degrees, 20 knots, visibility 6 Statute Miles, light rain shower, broken cloud at 7000 feet, temperature 12 degrees Celcius, dewpoint 8 degrees Celcius.

If you want to use the above weather conditions at any location then substitute KORD for GLOB.

Example: GLOB 000000Z 27008KT 7000 OVC004 03/02 Q1003
sets the visibility to 7000 meters with an overcast ceiling at 400 feet.

The OpusFSX Live Weather Engine (LWE) saves all downloaded METAR statements into an OpusWeather.txt file. We use this method to reload a user's weather if they report an anomaly they want us to look into.

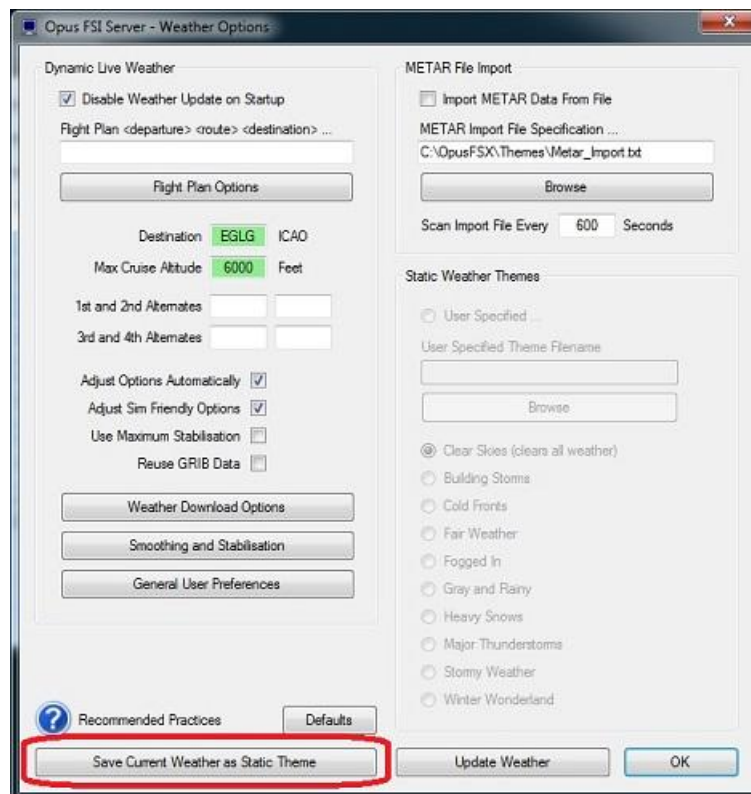
There are many websites describing the METAR format e.g.
www.wunderground.com/metarFAQ.asp

Static Weather Theme Import

The OpusFSX LWE can save the current weather map as a named static weather theme for you to reload at any time and place in the future. You can use this feature to save any interesting weather scenarios from anywhere in the world, then reload them at a later stage at any other place in the world. That way you can simply build up a library of interesting weather scenarios of your own, or even swap weather themes with others. Each named static theme covers a detailed 500km by 500km weather region. In other words, the detailed weather extends over 250km in every direction.

To save a theme ...

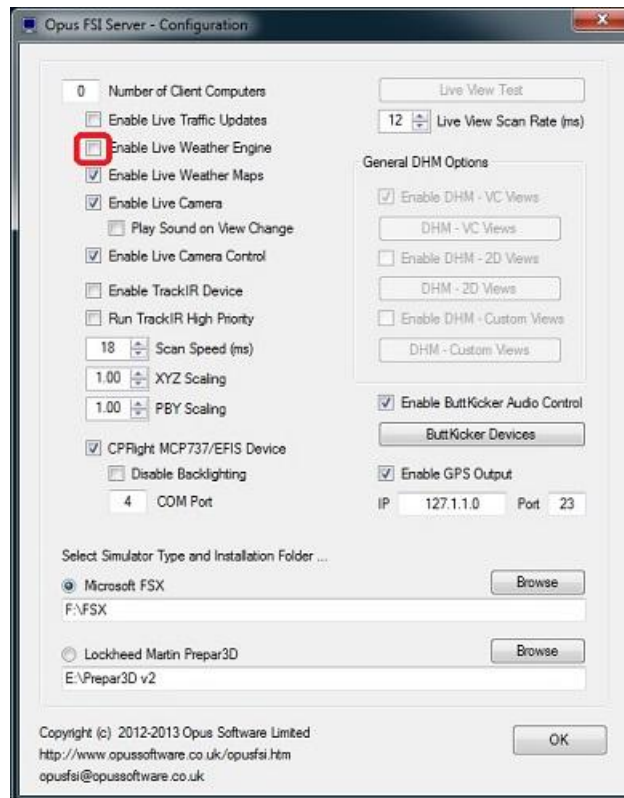
Simply look for any interesting weather anywhere in the world on the web, navigate your aircraft there, let the LWE construct the detailed weather map, after it has loaded, save it as a named weather theme using the **Save Current Weather as Static Theme** button.



To load your saved theme ...

Go to your chosen airfield.

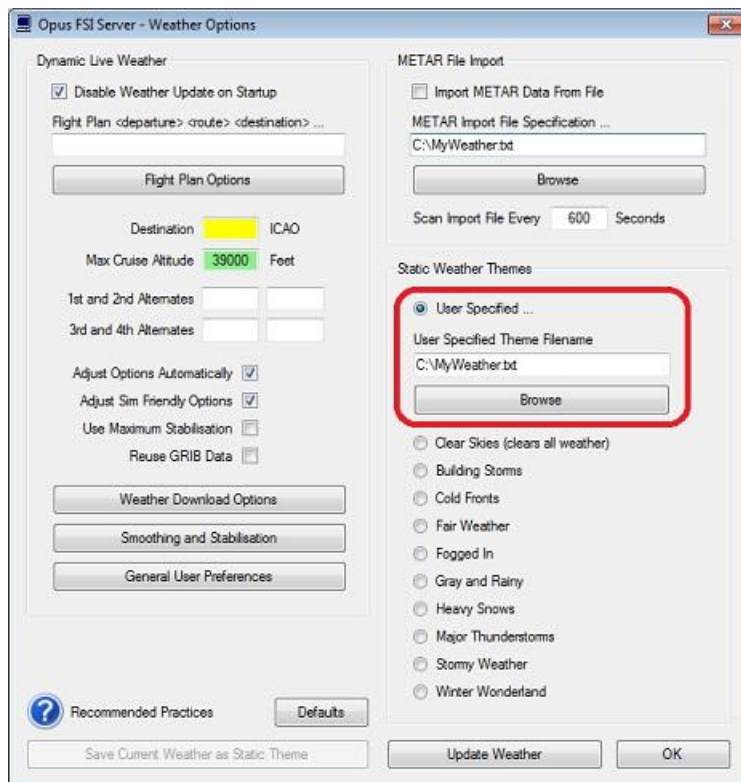
Disable the Live Weather Engine in the Configure dialog.



Open the Weather dialog.

Select **User Specified** and **Browse**.

Select your saved theme.



Many OpusFSX users like storm chasing, the saved themes can be used to repeat the experience at some other time and place of your choosing. There are numerous websites you can use to find interesting current weather to capture and reload.

We will probably eventually build a library of downloadable weather scenarios. This will also involve input from users who could email interesting scenarios for others to experience (e.g. anyone fancy a hurricane over London).

Weather Data Smoothing

Weather data smoothing prevents abrupt and sudden unrealistic changes in weather as you pass from one weather cell to another.

Mist and Fog Layers

Mist and fog is not depicted very well within FSX, in fact these layers are not apparent at all from altitude. To improve the visual effect within the simulator, the **Live Weather Engine** automatically tops the mist and fog layers with a thin layer of stratus cloud with a coverage of 8 octas for mist and fog. If you are using the P3D volumetric fog option then remember to

Low Overcast Effect

Low Overcast Effects come into force whenever the overcast cloud cover is less than about 6000 feet AGL. You must be IN the Low Overcast Effect to see it. Overcast by definition means 90% or

more cloud coverage. Don't expect to see solid blanket type overcast when looking vertically downward ... you WILL see transparent holes just like you do in real life until you get IN an OpusFSX Low Overcast Effect (an overcast below 6000 feet).

Cloud Positions and Textures

It is not possible for any software to position the clouds. The simulator does this itself and will reposition the clouds each time the weather is updated irrespective of whether there has been any changes to the cloud layering. No software can stop the cloud repositioning or control it. It is not possible for any software to select the individual cloud textures or bitmap images for rendering on the screen. This is all done by the simulator. You install the textures you prefer and the simulator selects and displays them to match the cloud layering. The cloud types used will be a mixture depending on a number of factors including weather and season.

Cloud Icing

The LWE will automatically set cloud icing within the cloud to none, low, medium, high, or severe depending on the ambient temperature within the cloud, the cloud type, and the cloud moisture level. Some icing is likely to occur when the ambient temperature is between -20C and 0C, with more noticeable effects when the ambient cloud temperature is between -12C and -8C. All calculated icing effects require valid GRIB forecast data.

Your aircraft has to be configured to handle icing. Many fuel injected aircraft in FSX have the 'carb heat bug', their real counterpart doesn't possess carb heat however FSX will still simulate carb icing and you'll see your engine power drop quite drastically within the first few minutes of flight in icing conditions. Simply pressing the H key will solve this problem.

Cirrus Cloud Layers

Since high level cirrus cloud is not included within the standard METAR reports, the **Live Weather Engine** generates a single cirrus cloud layer if the Cirrus Clouds option in the Weather dialog has not been disabled. The cirrus cloud coverage is generated randomly between the configured lower and upper **Cirrus Altitude Range**. The valid range of altitude settings are from 18,000ft up to 50,000ft (default range is 34,000ft to 44,000ft).

The **Auto Cirrus Clouds** option will automatically display cirrus cloud whenever it determines the weather is quite changeable possibly due to a weather front. In fairly stable conditions the cirrus cloud will be disabled. In flight, the cirrus is reassessed every 80 miles flown.

Winds and Temperatures Aloft

Winds and temperatures aloft may either be downloaded from the GRIB forecast or simulated by the OpusFSX LWE.

GRIB Forecast Winds and Temperatures Aloft

The GRIB forecast data is produced by NOAA and provides a global forecast of atmospheric conditions such as wind speeds, directions, and atmospheric temperatures at various altitudes along with the tropopause. It also provides a forecast of the tropopause height. The GRIB data covers the entire globe at 1 degree latitude and 1 degree longitude precision.

This data is used by the weather engine to determine all the lower and upper atmospheric conditions. The LWE uses the forecasted data to create ambient wind and temperature targets for all different altitudes from FL040 up to FL450, and even a temperature forecast for FL540.

With Automatic Settings, the LWE will use GRIB data any time you specify an intended Cruise Altitude of 6000 feet or above. The data provides realistic real world atmospheric conditions for you within the simulator.

The surface and FL200 through to FL420 targets are displayed within the Upper Atmosphere weather report along with the Tropopause forecast data (height, temp, and wind). The GRIB forecast cycle date and Zulu time code is displayed in the Upper Atmosphere Weather Report window.

Each cycle forecast contains 360 hours of forecast data and is typically made available about 9+ hours after the cycle time, on occasions the 0000Z is posted after about 6+ hours. The LWE always tries to load the most recent cycle, and requests the previous cycle if that is not available yet. The LWE will search back for the previous 6 cycles then stop searching. Please note, the world wide GRIB data forecasting cycles are updated less frequently than the North American specific (USA) forecasts. A future update may see us access a variety of GRIB forecast data depending on your current Lat/Lon coordinates, but for now the world wide data will be used as the sole source of GRIB forecasts.

You can follow the process of the GRIB data download in the Spy window and in the Opus Lower and Upper Atmosphere Report windows. The procedure will progress through the following stages,

- Connecting To The GRIB Server
- Downloading The GRIB Data
- Extracting The GRIB Data
- Decoding The GRIB Data
- Reading The GRIB Data
- Preparing The Weather Data

The last stage covers both preparing the GRIB data for use in the weather map and also downloading the weather map's METAR data. Whilst the download is in progress the Lower/Upper report windows will indicate how many bytes have been downloaded. The following errors can be reported in the Lower/Upper report windows,

- GRIB Forecast Data Disabled At Present
- Unable To Connect To The GRIB Server
- No Data Available At Present

The first message indicates that the GRIB download is disabled or not required at present. The 'No Data' message is a general error message implying there is no valid data available to prepare the Lower/Upper reports with. If the LWE is 'Unable To Connect To The GRIB Server' then no further cycle downloads will be attempted, but the LWE will attempt to download the expected current cycle during each weather update.

If the GRIB data hasn't been decoded check your \OpusFSX\FSDECODER.log file for errors.

The LWE will only download the GRIB data when it determines the current data is out of date and a new more accurate forecast cycle is available. After downloading the relatively large GRIB data file the LWE will proceed to extract all the data and then decode the extracted data before downloading the current METAR weather reports for your current 992km x 992km area. Extracting and decoding the GRIB data is a lengthy process, taking about 10 seconds to extract the GRIB data and between 25 and 35 seconds to decode the extracted data. After downloading, the LWE will assume the cycle is valid for up to 9.5 hours after its cycle time. Once older than 9.5 hours it will look for a newer posting.

OpusFSX Simulated Winds Aloft

Unless the upper winds are defined within an import file they are simulated using both the current surface conditions and the prevailing jet stream, trade winds, polar winds, equatorial winds etc. for the aircraft's current latitude. All winds generally increase in speed up to 60,000ft.

OpusFSX Simulated Temperatures Aloft

If you use the Spy facility you will notice we display the FSX Ambient Temperature and Total Air Temperature (TAT) along with the Altitude in feet each time the air temperatures change. You will therefore be able to monitor what the outside air temp is within FSX while you fly. We have tested the new version up to about 85,000 feet. The minimum air temperature within FSX/Prepar3D is always -50 C at about 37,500 feet.

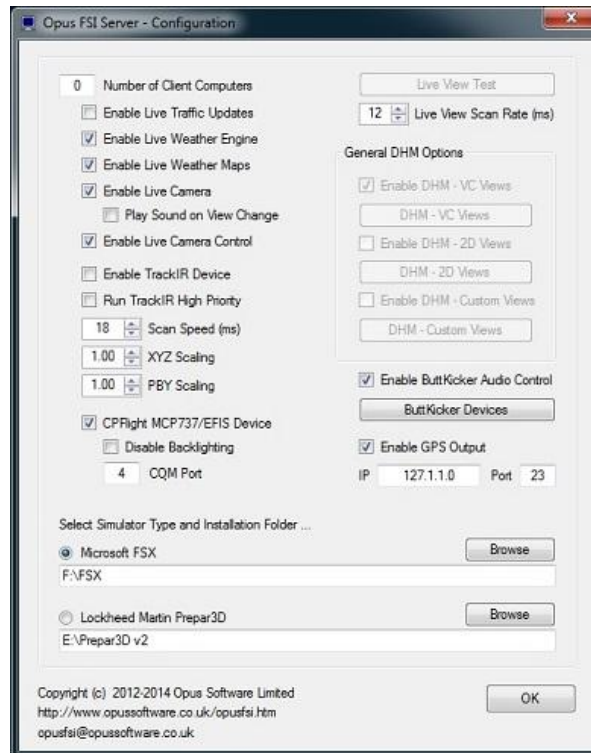
Wind Shear

There are three levels of wind shear at low elevations (< 4000 feet AGL). Wind shear is only associated with reported thunderstorm (TS) or squall (SQ) conditions and requires reported surface winds of at least 20 knots.

Where appropriate a Slight, Moderate, or Severe Wind Shear warning is appended at the end of the QNH pressure line in the Opus Local, Destination, and Alternate Weather Reports, just before the reported surface wind conditions.

Moderate wind shear levels require surface wind speeds of 30 knots or more, severe wind shear levels require surface wind speeds of at least 40 knots and warm conditions (surface temperatures of at least 20C).

Turbulence and Dynamic Head Movement (DHM)



General DHM Options can be found in the FSXSERVER's Configuration dialog. These options allow general DHM and associated 'Bump Aircraft' turbulence to be enabled for VC view modes, 2D view modes, and custom view modes without needing the Live Camera interface to set up camera views. General DHM settings are not used when Live Camera is enabled.

Separate options are provided to enable the general DHM and aircraft turbulence for VC view modes, 2D view modes, and custom view modes. Each view mode has its own configurable DHM and Bump Aircraft settings that can be adjusted by you to suit your system or personal taste. These General DHM Options employ real life captured 3D accelerometer data with options to reference either the light or heavy aircraft data sets. All turbulence effects are supervised by the Live Weather Engine (LWE) which considers numerous meteorological and ambient conditions. Refer to the Live Camera guide for a description of the DHM and aircraft turbulence settings.

OpusFSX Site Effects

The new localised Site Effects are additional effects, additional to the normal real time non-localised turbulence, clear air turbulence and wind shear which are determined solely on the basis of local meteorological conditions. All sites covered by the standard Opus Site Effects can be found listed in the OpusFSX_Site_Effects_List.txt text file.

Site Effects relate to your point of departure and destination ICAO. A future beta will also include your alternate ICAOs.

You can also specify your own Site Effects, whether real or not. You can even override the standard OpusFSX site effects if you wish. A template file is provided in **\OpusFSX\OpusFSX_User_Effects_Template.txt**, just copy this to **OpusFSX_User_Effects.txt** and add the new effects.

Comments can be added to the file by starting the line with a ; character.

N.B. If you make adjustments to this file you must restart OpusFSX for the changes to come into effect.

User Site Effects

Enter a site ICAO (e.g. `site = EGKK`) followed by a list of one or more optional conditions. You can enter multiple sets of conditions for a site, for example where you have obstacles on the approach to an airfield and also close to the runway.

e.g.

```
; EGKK Gatwick London
; Turbulence due to high ground to the S and SE, between 3 and 8 nm from the airport
; between 0 to 2000 feet AGL.
```

```
Site = EGKK
Direction = S SE
Distance = 3 8 nm
Elevation = 0 2000
Turbulence = 1
```

```
; EGKK Gatwick London
; Turbulence due to trees to the W of RW08 between 1 and 4 nm from the airport
Site = EGKK
Runway = 08 ;30 degrees either side of RW08
Distance = 1 4 nm
Turbulence = 1
```

Turbulence and Wind Shear

The Turbulence and Wind Shear factors are interpreted as follows,

- 0 = No Increased Effect
- 1 = Slight Increased Effect
- 2 = Moderate Increased Effect
- 3 = Severely Increased Effect

e.g.

```
; EGKK Gatwick London
; Turbulence due to trees to the W of RW08 between 1 and 4 nm from the airport
Site = EGKK
Runway = 08 ;30 degrees either side of RW08
Distance = 1 4 nm
Turbulence = 1
```

In the case of Wind Shear, the normal effects require thunderstorm or squalls to be reported at the location. All increased levels permit some wind shear when any TCU or rain bearing storm clouds are present. The higher the level the greater the effect. Wind shears are always relevant to the whole surrounding area. In other words, they are not restricted by the specified conditions with the possible exception of Distance.

All increased turbulence effects are graduated as you enter or leave a defined zone based on the Distance, Bearing, Elevation, Wind Speed and Temperature conditions. The graduation is based on 15% of the specified range.

For example, if you specify a temperature condition of 20 degrees C with a Severe increase in turbulence (level 3) then when the surface temperature reaches 20C there will be a slight increase, at 23C there will be a moderate increase, and at or above 26C there will be the full severe increase.

If you specify a Bearing from 0 to 90 with a Severe increase in turbulence then when your bearing gets within 0 or 90 degrees from the airport location there will be a slight increase, when you get within a bearing of 13.5 or 76.5 degrees there will be a moderate increase, and within the central bearing of between 27 and 63 degrees there will be the full severe increase.

Runway

If the effect is limited to a certain runway then enter this condition using the two digit runway designation. If you specify a Runway the software will calculate an appropriate bearing from and to the station based on the specified runway heading +/- 30 degrees.

Runway codes can be specified with an optional L (left) or R (right) suffix. In which case the resulting From and To Bearings will be biased toward the specified runway approach radial. For example, 'Runway = 16L' would be equivalent to setting 'Bearing = 150,190', and 'Runway = 16R' would be equivalent to setting 'Bearing = 130,170'.

If you specify a Runway then do not specify a Direction or Bearing.

e.g. Runway = 16 ; Bearing 130 to 190

e.g. Runway = 16L ; Bearing 150 to 190

e.g. Runway = 16R ; Bearing 130 to 170

Location of an obstacle or high ground, Distance, Direction/Bearing and Elevation

You can specify where an obstacle such as trees or high ground is by specifying a distance and either compass directions or bearings. You can also specify conditional elevations, the default range is 0 to 18,000 feet AGL.

If you specify a Direction from and to (from the station) the software will convert it to a bearing from and to. You can use compass points N,NNE,NE,ENE,E etc, for the Direction, the decoder will automatically extend the specified directions/bearings by 30 degrees either side to allow for graduation.

The distance (0 to 80) defaults to km and can also be specified in **nm** or **sm** by including the units after the distance.

e.g.

```
; EGKK Gatwick London
; Turbulence due to trees to the W of RW08 between 1 and 4 nm from the airport
Site = EGKK
Runway = 08 ;30 degrees either side of RW08
Distance = 1 4 nm
Turbulence = 1
```

Or,

```
; EGKK Gatwick London
; Turbulence due to trees to the W of RW08 between 1 and 4 nm from the airport
Site = EGKK
Bearing = 40,120 ;40 degrees either side of RW08
Distance = 1 4 nm
Turbulence = 1
```

e.g.

```
; EGKK Gatwick London  
; Turbulence due to high ground to the S and SE, between 3 and 8 nm from the airport  
; between 0 to 2000 feet AGL.
```

```
Site = EGKK  
Direction = S SE  
Distance = 3 8 nm  
Elevation = 0 2000  
Turbulence = 1
```

Conditional Wind Direction and/or Wind Speed

If the effect is conditional on the prevailing wind direction and/or wind speed then specify that using the Wind Direction and Wind Speed conditions.

You can specify two compass points as general wind directions instead of specific directions.

e.g. Wind Direction = SSW SW

The two directions, approx 202 to 235 degrees, would be converted to 172 to 265 degrees, allowing a 15% and 30% graduated effect within this specified range.

You could also enter a wind direction of SW, the decoder will convert this to a from/to a range of 205 and 265 (i.e. adding +/- 30 degrees to the general direction).

The wind speed is in knots. The speed relates to light aircraft and is automatically increased by 10 knots if heavy aircraft is specified in the DHM parameters. The effect is graduated so you will get a slight increase at that speed limit, a moderate increase at the speed + 20%, and the full severe (if specified) increase at speed + 40%.

For example assuming a setting of 15 knots and a severe turbulence level 3 specified ...

For light aircraft we would get ...

- Slight turbulence at 15 knots,
- Moderate turbulence at 18 knots,
- Severe turbulence at 21 knots and above.

For heavy aircraft we would get ...

- Slight turbulence at 25 knots,
- Moderate turbulence at 30 knots,
- Severe turbulence at 35 knots and above.

e.g.

```
; EGNX East Midlands  
; Moderate turbulence and slight wind shear on RW09 in southerly winds above 15 kts  
Site = EGNX  
Runway = 09  
Elevation = 0 3000  
Wind Direction = S ;30 degrees either side of S  
Wind Speed = 15  
Turbulence = 2  
Wind Shear = 1
```

or,

```
; EGNX East Midlands  
; Moderate turbulence and slight wind shear on RW09 in southerly winds above 15 kts  
Site = EGNX  
Runway = 09
```

```
Elevation = 0 3000
Wind Direction = 140 220 ;40 degrees either side of S
Wind Speed = 15
Turbulence = 2
Wind Shear = 1
```

Conditional Temperature

If the effect is conditional on the temperature then specify that using the Temperature condition specified in degrees C.

e.g.

```
; Turbulence in temperatures above 25 degrees C
Temperature = 25
Turbulence = 1
```

Example User Effects file <OpusFSX>\OpusFSX_User_Effects.txt

```
-----
;
;                               OpusFSX Additional Site Effects
;
; All Opus effects are stored in the OpusFSX_Site_Effects.dat data file,
; a list of all stations can be found in the OpusFSX_Site_Effects_List.txt
; file.
;
; User specified effects must be stored in the OpusFSX_User_Effects.txt
; text file, a template file is provided which must be renamed before use.
; User specified site effects will replace the standard Opus effects.
;
; Enter a list of enhanced site effects each effect must contain the Site
; description (with ICAO code) followed by any relevant conditions and
; increased effects levels,
;
; Site = ICAO code
;
; Conditions and effects ...
;
; Runway = 00 to 36
; Direction = from to
; Bearing = from to
; Distance = from to km/nm/sm
; Elevation = from to
; Wind Direction = from to
; Wind Speed = from
; Temperature = from
; Turbulence = 0 to 3
; Wind Shear = 0 to 3
;
; Defaults ...
;
; Runway = XX
; Direction = 0 360
; Bearing = 0 360
; Distance = 0 8 (Default km)
; Elevation = 0 18000
; Wind Direction = 0 360
; Wind Speed = 0
; Temperature = -99
; Turbulence = 0
; Wind Shear = 0
;
; Where,
;
```

```

; Runways are specified using their two digit designation.
; Directions from the Site are in degrees true (0,360 = all directions)
; Bearings to the Site are in degrees true (0,360 = all directions)
; Distances (in units of km, nm, or sm) can range from 0 to 80km.
; Elevations are in feet AGL (0,18000 = covers all lower levels)
; Wind Directions are in degrees true (0,360 = all wind directions)
; Wind Speeds are in knots
; Temperatures are in degrees C
;
; Directions, Bearings, and Wind Directions can also be specified using
; cardinal directions (i.e. compass points N,NNE,NE,ENE,E,etc.). In such
; cases the 'To' compass point is optional.
;
; The Turbulence and Wind Shear factors are interpreted as follows,
;
; 0 = No Increased Effect
; 1 = Slight Increased Effect
; 2 = Moderate Increased Effect
; 3 = Severely Increased Effect
;
; In the case of Wind Shear, the normal effects require thunderstorm or
; squalls to be reported at the location. All increased levels permit some
; wind shear when any TCU or rain bearing storm clouds are present. The
; higher the level the greater the effect. Wind shears are always relevant
; to the whole surrounding area. In other words, they are not restricted
; by the specified conditions with the possible exception of Distance.
;
; All increased turbulence effects are graduated as you enter or leave a
; defined zone based on the Distance, Bearing, Elevation, Wind Speed and
; Temperature conditions.
;-----
;
; Guidelines,
;
; General Turbulence ... 4 nm, 2000 ft
; General Wind Shear ... 4 nm, 3000 ft
; Buildings & Trees .... 2 nm, 1500 ft
; Final Approach ..... 3 km, 1500 ft

; EGKK Gatwick London
; Turbulence and wind shear on RW26 in strong S and SW winds

Site = EGKK
Runway = 26
Distance = 0 4 nm
Elevation = 0 1000
Wind Direction = S SW
Wind Speed = 15
Turbulence = 2
Wind Shear = 1

; EGKK Gatwick London
; Turbulence due to trees to the W of RW08

Site = EGKK
Runway = 08
Distance = 1 4 nm
Elevation = 0 1000
Wind Speed = 15
Turbulence = 1

; EGKK Gatwick London
; Turbulence due to high ground to the S and SE

Site = EGKK
Distance = 3 8 nm
Direction = S SE

```



```
Elevation = 0 2000
Wind Speed = 12
Turbulence = 1
```

```
; EGNX East Midlands
; Turbulence and wind shear on RW09 in strong southerly winds
```

```
Site = EGNX
Runway = 09
Elevation = 0 3000
Wind Direction = S
Wind Speed = 15
Turbulence = 2
Wind Shear = 1
```

Testing Site Effects

You can test any of your specified effects using a GLOB imported METAR to specify the weather, using Slew mode to raise the aircraft off the ground and position it on the approach, or simulate an approach. It is helpful to temporarily disable DHM when using slew mode. You must of course specify the Destination in the Weather dialog and Update the weather. It is best with FSX in windowed mode so you can have the Spy window open at the time. The number of Opus and User Site Effects is displayed in the Spy window immediately after the current device list. The Total number of effects takes into account any Opus effects that have been replaced by your definitions. The LWE displays the results of all site related turbulence changes in the window, identifying which site effect factored in the most.

For example, Site Effect 4: Turbulence Increase 2

You can keep refreshing the Destination Weather Report to see what the calculated bearing and distance is to the site, that will also give you some idea how far the end of the runway is from the site's defined latitude and longitude position.

Flight Planning Assistant Reports



Reports are selected from the FSX Add-ons menu. The reports include,

- Weather Reports,
- OpusWeather (METARs),
- OpusWeatherReport (GRIB Data),
- OpusFlightReport (Flight Plan),
- OpusSidStarReport (SIDs and STARs)

The Weather Report is a transparent menu displayed within a window and the other options are text reports displayed within the default text editor program. To change the default text editor program just right click on any **.txt** file and select the **Open with** option then select the **Choose**

default program.. option and select Notepad or the default program you want to be used to view the .txt files.

The Shortcut Controls in the Server dialog enable you to configure key/button assignments to display and cycle through Weather Reports. Refer to the User Guide for further details.

Weather Reports

The report selection window is a transparent menu providing links to the **Local Area Weather Report**, **Lower Atmosphere Weather Report**, **Upper Atmosphere Weather Report**, the **Flight Plan En Route Report**, the **Destination** report and four **Alternate** met station reports.



The weather report windows indicate 'No Weather Available At Present' if the LWE hasn't generated or updated the weather at the time.

The distance to the destination and alternates is displayed in both km and nautical miles, along with the compass heading and bearing. You must be within 640km (400 miles) of the station to view the report.

If you reconfigure any of the ICAO codes in the Weather dialog during flight then you must re-display the weather report window.

The report selection window can be manually undocked and re-positioned on multi-screened PCs.

Either click on an option or enter the relevant number to display the required report or exit the menu.

The **Local Area Weather Report**, **Destination** report and four **Alternate** met station reports provide an overview of the target meteorological conditions for your chosen location and, if there is room, show the targets for the upper (above FL200) ambient temperature (SAT), ambient wind direction and speed, also the current ambient air temperature and TAT inside the simulator. The idea being, you can use these report windows to monitor the temperatures and above FL200 compare the target temperatures and winds with the actual.

These reports can be used in place of ATIS and are accurate out to the edge of the weather map (640km about 400 miles or 345nm). You can use this feature to check the weather and wind direction at non-ATIS airstrips.



All weather reports have a **Live** (dynamic weather update), **Imported** (METAR File Import), **Historic** or **Disabled** (LWE currently disabled) indication in the title line. The ICAO codes and where appropriate the station names are listed within each of the weather report windows together with the distance and bearing to the station. The distances, displayed in both km and nautical miles, will update when you cross into a new weather cell. The **(m)** displayed after the ICAO code signifies a METAR is available for the location. If zero METARs are reported then it means there are no met stations in your current weather cell, that is within 5 to 10 miles of you.

Where appropriate the METAR time code (DDHHMMZ) is displayed in the first line, containing the reported QNH pressure. The METAR time code is only displayed within a weather report if there is a single METAR for the location. Stabilised pressures are depicted using the phrase '**Static**' whenever they are applicable indicating that pressure stabilization has been configured in the Weather Smoothing dialog. In those circumstances the pressures are stabilised (static) between weather updates to prevent FSX wind shift problems.

Where appropriate a Slight, Moderate, or Severe Wind Shear warning is appended at the end of the QNH pressure line in the Opus Local, Destination, and Alternate Weather Reports, just before the reported surface wind conditions.

The Destination Weather Report will have an **Actual** label appended after the QNH whenever the Destination weather has been checked and verified 'inside' the simulator. Hence, the label confirms that the Destination weather inside the simulator matches the Opus on-screen Destination Weather Report. This will generally occur once you are airborne and within 200km of your Destination.

Real surface winds are depicted as '**Wind XXX at XX knots**' within the weather reports. Stabilised winds are depicted using the phrase '**Static XXX/XX**' whenever they are applicable indicating that wind stabilization has been configured in the Weather Smoothing dialog. In those circumstances the surface winds are stabilised (static) between weather updates to prevent FSX wind shift problems. As you descend through the recovery altitude + 500 feet the LWE continues to check to see if it can recover the surface winds. This process continues and if you are still using static (stabilised) surface winds, as you descend below the 'forced' recovery altitude the LWE recovers them no matter what. Any wind shift you experience here is less worrying because you are lower down and travelling slower, usually in much calmer winds. To help you see what is going

on the weather report shows both the static surface wind injected into FSX, and the true wind as reported by the METARs.

After the true surface winds have been recovered the 'static' wind will disappear and only the true wind will be shown. At this point hopefully you have specified your destination to the LWE and it will then monitor your flight and try its utmost to make the weather spot on for you at your destination or any of your alternates.

You will see Variable and Gusting XX messages after the Wind statement indicating variable wind directions and gusty surface conditions, the XX giving the max gust wind speed in knots.

If (**pseudo effect**) is displayed after a cloud layer it's just to remind you that that cloud layer is a fake layer that has been added by the LWE to produce the fog or mist effect which tops the fog/mist layer with a thin stratus cloud so that you can see it from above, otherwise FSX is unable to depict the poor vis surface layer. So don't expect to see it in the corresponding METAR statement. Visibility is displayed in both metres and statute miles.

If **Magnetic Variation** is enabled (Weather's User Preferences dialog) then there will be a difference between the reported wind directions METAR and GRIB forecast data which always report directions with respect to True North and the current wind directions within the simulator and reported by ATIS which are always Magnetic directions. To assist the pilot, the LWE will show the current **Magnetic Variation** in the local weather report windows, displayed in the form '**MagVar XX.X**' at the end of the surface wind information. You must **ADD** this value to all wind directions to convert them to Magnetic directions at the current location. Please note, OpusFSX cannot show the Magnetic Variation at the Destination or Alternate sites, only at your current location in the simulated world.

If you have specified a Cruise Altitude then the report will include the target cruise altitude wind direction, speed and ambient temperature displayed in the form '**Cruise ddd/ss tempC**'. Unknown temperature and dew points are shown as **??**.

Reports will append an (**S**) label to all cloud descriptions to inform you that Cloud Smoothing is in force at that location and the listed cloud layers may therefore differ from what is displayed in the simulator. Cloud Smoothing can be inhibited at the specified Destination site (Weather's Smoothing and Stabilisation dialog option).

The **Local Area Weather Report** conditions are the target meteorological conditions for your current 16km square weather cell. Even though the targets are assigned to weather cells, they are in fact assigned to single points within the simulator. In flight, the defined point for the weather cell can be over 10 miles away from your aircraft's current position. Furthermore the target weather will naturally spill over into adjacent cells, hence the weather you see out of the cockpit may match more closely with the weather assigned to an adjacent cell and not the reported cell. Please keep this point in mind when using the Local Area Weather Report whilst airborne.

The **Upper and Lower Atmosphere Weather Reports** are valid if you have enabled the option to **Download GRIB Forecast Data** in the Weather dialog's **Download Weather Options**. If it is not enabled you will see the message "GRIB Forecast Data Disabled At Present".

The **Lower Atmosphere Weather Report** displays the surface and FL040 through to FL180 targets along with the current temperature and wind target. Click anywhere to return to the main report selection window.



The GRIB forecast cycle date and Zulu time code is displayed as the first item on the list. Please note, the world wide GRIB data forecasting cycles are updated at approximately the same time as the North American specific (USA) forecasts and it can take between 6 and 9 hours for them to update a cycle.

The **Upper Atmosphere Weather Report** displays the Tropopause forecast data (height, temp, and wind), surface and FL200 through to FL420 targets along with the current temperature and wind target. Click anywhere to return to the main report selection window.

The raw GRIB data is shown in the Upper Weather Report window whenever either of the Sim Friendly GRIB options are ticked (Wind or Temperature).



The **Flight Plan En Route Weather Reports** lists all identified met stations extracted from the flight plan, alternatively if you don't have a flight plan then any specified Destination and Alternate met stations are listed. Select the required station from the list to display the current reported weather at that site.

The report displays the navigation points associated with each listed Met station, these are appended to each line as [navpnt]. At present only the first associated navigation point is shown even though the same Met station may be common to a multiple, normally consecutive, group of navigation points.

If you change the flight plan the weather report may list Met stations as (Not Updated) indicating that a weather update is needed in order to request and download the new METARs.



OpusWeather (METARs)

A detailed METAR report (including TAFs if you have enabled them in the Weather Download dialog) for the weather map (800 x 800 miles) is generated each time the weather is updated. Your local Met station is displayed together with your current distance from the station. Any specified Destination and Alternate sites are appended to the OpusWeather.txt report file. The report is saved in the text file <OpusFSX>\Themes\OpusWeather.txt where <OpusFSX> identifies your OpusFSX installation folder.

Example OpusWeather.txt,

```
OpusFSX Downloaded METARs, Software Version 3.19.0 Beta
Downloaded 26 July 2013, 09:30 Hrs - Live
Simulator 26 July 2013, 06:56 Zulu

Local MetStn : EGNX, EAST MIDLANDS, Distance 1.3 km

EGNX 171120Z 08007KT CAVOK 14/09 Q1016
EBAW 171120Z 06006KT 030V090 9999 -RA NSC 20/12 Q1013 NOSIG
EBBE 171125Z 06007KT 9999 FEW080 SCT140 BKN200 20/14 Q1013 BLU BLU
...
LSZG 171120Z AUTO VRB03KT CAVOK 30/16 Q1013

344 MetStns, 211 Metars Available
```

OpusWeatherReport (GRIB Data)

A detailed weather report for the lower and upper atmosphere wind and temperature data relating to the current location is generated from the current GRIB data each time the weather is updated. The report is saved in the text file <OpusFSX>\Themes\OpusWeatherReport.txt where <OpusFSX> identifies your OpusFSX installation folder.

Example OpusWeatherReport.txt,

```
OpusFSX Weather Report at [30,30], Software Version 3.19.0 Beta
```


Generated 26 July 2013, 09:30 Hrs - Live
Simulator 26 July 2013, 06:57 Zulu

Location : EGKK (m) London/gatwick A
Cruise Altitude : 36000 Feet
World Wide GRIB Data, 28 January 2013, 0600 Zulu
Tropopause Height 36147 Feet, Temp -62, Wind 311/87
Upper Atmosphere

80 FL540 : Temp -64

79 FL435 : Temp -63, Wind 310/88 : GRIB Temp -55, Wind 288/44
78 FL430 : Temp -63, Wind 310/88 : GRIB Temp -56, Wind 289/47
77 FL425 : Temp -63, Wind 310/88 : GRIB Temp -56, Wind 290/49
...
34 FL210 : Temp -32, Wind 299/57 : GRIB Temp -32, Wind 301/57
33 FL205 : Temp -31, Wind 299/55 : GRIB Temp -31, Wind 301/55
32 FL200 : Temp -29, Wind 299/54 : GRIB Temp -29, Wind 301/54

Lower Atmosphere

31 FL195 : Temp -28, Wind 297/52
30 FL190 : Temp -27, Wind 295/51
29 FL185 : Temp -26, Wind 293/50
...
02 FL050 : Temp -3 , Wind 239/16
01 FL045 : Temp -3 , Wind 237/15
00 FL040 : Temp -2 , Wind 235/14

Surface : Temp +4, Wind 220/5, Static 220/5

OpusFlightReport (Flight Plan)

If you specify a flight plan in the weather dialog then a detailed flight plan weather report is generated each time the weather is updated. TAFs are included if you have enabled them in the Weather Download dialog. Any configured alternate Met stations are shown within the Route section of the OpusFlightReport text file and appended at the end of the Weather report section in an Alternates section. Bracketed wind and temperature averages for all altitudes ranging from 6000ft up to 44,000ft in 2000ft increments are included in the report. Unknown temperature and dew points within the flight plan report are shown as **??**. The report is saved in the text file **<OpusFSX>\Themes\OpusFlightReport.txt** where **<OpusFSX>** identifies your OpusFSX installation folder.

Example OpusFlightReport.txt,

OpusFSX Flight Plan Weather Report, Software Version 3.49.4 Beta

Generated 13 June 2014, 14:47 Hrs - Live

Simulator 13 June 2014, 13:47 Zulu

Plan:

EGNX EGSS DVR LFAT

Route:

EGNX	EAST MIDLANDS	Lat	52.831111	Lon	-1.328056	Met Stn	United Kingdom
EGSS	STANSTED AIRPORT	Lat	51.885000	Lon	0.235000	Met Stn	United Kingdom
DVR	DOVER	Lat	51.162500	Lon	1.359167	Nav Aid	Freq 114.950
LFAT	LE TOUQUET/P. PL	Lat	50.514722	Lon	1.627500	Met Stn	France
EGMD	LYDD AIRPORT	Lat	50.956111	Lon	0.939167	Met Stn	Alternate

Averages:

FL060	Wind 329/9	Temp 10C	
FL080	Wind 321/11	Temp 6C	
FL100	Wind 314/13	Temp 2C	
FL120	Wind 306/16	Temp 0C	
FL140	Wind 298/18	Temp -4C	
FL160	Wind 291/21	Temp -8C	
FL180	Wind 283/23	Temp -12C	
FL200	Wind 276/26	Temp -17C	
FL220	Wind 276/31	Temp -22C	
FL240	Wind 276/34	Temp -27C	Cruise Altitude
FL260	Wind 276/37	Temp -32C	
FL280	Wind 276/41	Temp -36C	
FL300	Wind 276/46	Temp -41C	
FL320	Wind 276/48	Temp -45C	
FL340	Wind 276/51	Temp -49C	
FL360	Wind 276/52	Temp -53C	
FL380	Wind 276/52	Temp -55C	
FL400	Wind 276/52	Temp -56C	
FL420	Wind 277/52	Temp -56C	
FL440	Wind 278/52	Temp -56C	

Weather:

EGNX EAST MIDLANDS

FL060	326/9	9C	FL080	317/12	5C	FL100	309/14	1C
FL120	300/17	-2C	FL140	291/19	-6C	FL160	283/22	-10C
FL180	274/24	-14C	FL200	266/27	-19C	FL220	266/29	-24C
FL240	266/31	-29C	FL260	266/33	-34C	FL280	266/37	-39C
FL300	266/44	-43C	FL320	266/47	-47C	FL340	266/49	-51C
FL360	266/50	-52C	FL380	266/50	-53C	FL400	266/50	-53C
FL420	268/50	-53C	FL440	272/50	-53C			

EGNX, EAST MIDLANDS, At Location, 131320Z
Wind 350/3 Temp 21/14 Vis 32000m (19.9 miles) QNH 1025mb (30.27in)
Broken at 3500 feet

EGBB, BIRMINGHAM AIRPO, 51km (27nm), SW 214, 131320Z
Wind 320/6 Temp 23/13 Vis 32000m (19.9 miles) QNH 1025mb (30.27in)
Few at 4500 feet

EGSS STANSTED AIRPORT 149km (81nm), SE 134, Total 149km (81nm)

FL060	328/10	10C	FL080	321/12	6C	FL100	313/15	2C
FL120	305/18	-1C	FL140	298/20	-5C	FL160	290/23	-9C
FL180	282/26	-13C	FL200	275/29	-17C	FL220	275/34	-22C
FL240	275/37	-27C	FL260	275/42	-32C	FL280	275/47	-36C
FL300	275/53	-42C	FL320	275/56	-46C	FL340	275/59	-50C
FL360	275/60	-53C	FL380	275/60	-55C	FL400	275/60	-56C
FL420	275/60	-56C	FL440	275/60	-56C			

EGSS, STANSTED AIRPORT, At Location, 131320Z
Wind 320/5 Temp 23/12 Vis 32000m (19.9 miles) QNH 1025mb (30.27in)

EGSC, CAMBRIDGE, 36km (19nm), N 353, 131320Z
Wind 350/6 Temp 23/11 Vis 32000m (19.9 miles) QNH 1024mb (30.24in)
Few at 4200 feet

DVR DOVER 112km (60nm), SE 135, Total 261km (141nm)

FL060	331/9	10C	FL080	324/11	6C	FL100	317/13	2C
FL120	310/15	0C	FL140	303/18	-4C	FL160	296/20	-8C
FL180	289/22	-12C	FL200	283/25	-16C	FL220	283/30	-21C
FL240	283/33	-26C	FL260	283/36	-31C	FL280	283/39	-35C
FL300	283/42	-40C	FL320	283/44	-44C	FL340	283/46	-49C
FL360	283/47	-53C	FL380	283/48	-56C	FL400	283/48	-58C
FL420	283/48	-58C	FL440	283/48	-58C			

EGMD, LYDD AIRPORT, 37km (20nm), SW 232, 131320Z
Wind 220/7 Temp 21/12 Vis 32000m (19.9 miles) QNH 1025mb (30.27in)

Few at 4600 feet

LFAT	LE TOUQUET/P. PL		74km (40nm), SSE 165,	Total 336km (181nm)				
FL060	331/9	10C	FL080	324/11	6C	FL100	317/13	2C
FL120	310/15	0C	FL140	303/18	-4C	FL160	296/20	-8C
FL180	289/22	-12C	FL200	283/25	-16C	FL220	283/30	-21C
FL240	283/33	-26C	FL260	283/36	-31C	FL280	283/39	-35C
FL300	283/42	-40C	FL320	283/44	-44C	FL340	283/46	-49C
FL360	283/47	-53C	FL380	283/48	-56C	FL400	283/48	-58C
FL420	283/48	-58C	FL440	283/48	-58C			

LFAT, LE TOUQUET/P. PL, At Location, 131330Z
Wind 320/10 Temp 20/12 Vis 32000m (19.9 miles) QNH 1024mb (30.24in)
Scattered at 4800 feet
Broken at 5600 feet

EGMD, LYDD AIRPORT, 69km (37nm), NW 315, 131320Z
Wind 220/7 Temp 21/12 Vis 32000m (19.9 miles) QNH 1025mb (30.27in)
Few at 4600 feet

Alternates:

EGMD	LYDD AIRPORT		69km (37nm), NW 315,	Total 405km (219nm)				
FL060	328/8	10C	FL080	321/10	6C	FL100	313/12	2C
FL120	305/14	-1C	FL140	298/16	-5C	FL160	290/18	-9C
FL180	282/20	-13C	FL200	275/22	-17C	FL220	275/27	-22C
FL240	275/32	-26C	FL260	275/37	-31C	FL280	275/42	-35C
FL300	275/45	-40C	FL320	275/47	-45C	FL340	275/50	-49C
FL360	275/51	-53C	FL380	275/51	-56C	FL400	275/51	-58C
FL420	275/51	-58C	FL440	275/51	-58C			

EGMD, LYDD AIRPORT, At Location, 131320Z
Wind 220/7 Temp 21/12 Vis 32000m (19.9 miles) QNH 1025mb (30.27in)
Few at 4600 feet

N.B. The OpusFlightReport.rep text file is a simplified text report intended to supply weather and upper wind and temperature data for external flight planning packages.

OpusSidStarReport (SIDs and STARs)

The Opus SID (Standard Instrument Departure) and STAR (Standard Terminal Arrival Route) Reports are generated for your departure and specified destination stations. The SIDs are only included if you are on the ground at an airport. Both SIDs and STARs are listed in normal order to match the GPS and FMC listings. The SIDs show the headings you would be departing to, the STARs show the directions you would be arriving from.

A report is generated when you click on the **Reload** or **Process the Flight Plan** buttons in the Flight Plan dialog, or the aircraft is relocated, or a different destination is specified. You can force a new report to be generated using the **Show SIDSTAR Report** option in the Addon Menu. The point of departure is always assumed to be the local airport, where your aircraft is located.

The report is saved in the text file <OpusFSX>\Themes\OpusSidStarReport.txt where <OpusFSX> identifies your OpusFSX installation folder.

Example OpusSidStarReport.txt,

OpusFSI SID and STAR Report, Software Version 3.19.0 Beta
 Generated 26 July 2013, 09:33 Hrs - Live
 Simulator 26 July 2013, 06:59 Zulu

EGCC MANCHESTER INTL, SIDs (Standard Instrument Departures)

Name	Rwy	Fix	Latitude	Longitude	Distance	Heading
DESI1R	23R	DESIG	53.527222	-1.892778	32km (17nm)	NE 052
DESI1S	05L	DESIG	53.527222	-1.892778	32km (17nm)	NE 052
DESI1Y	23L	DESIG	53.527222	-1.892778	32km (17nm)	NE 052
DESI1Z	05R	DESIG	53.527222	-1.892778	32km (17nm)	NE 052
HON1R	23R	HON	52.356678	-1.663725	118km (64nm)	SSE 159
HON1Y	23L	HON	52.356678	-1.663725	118km (64nm)	SSE 159
LIST2R	23R	LISTO	53.143333	-2.199167	24km (13nm)	SSE 167
LIST2S	05L	LISTO	53.143333	-2.199167	24km (13nm)	SSE 167
LIST2Y	23L	LISTO	53.143333	-2.199167	24km (13nm)	SSE 167
LIST2Z	05R	LISTO	53.143333	-2.199167	24km (13nm)	SSE 167
MONT1R	23R	MONTY	52.892778	-3.173889	79km (43nm)	SW 229
MONT1S	05L	MONTY	52.892778	-3.173889	79km (43nm)	SW 229
MONT1Y	23L	MONTY	52.892778	-3.173889	79km (43nm)	SW 229
MONT1Z	05R	MONTY	52.892778	-3.173889	79km (43nm)	SW 229
NOKI1R	23R	NOKIN	53.076667	-2.882778	51km (27nm)	SW 232
NOKI1S	05L	NOKIN	53.076667	-2.882778	51km (27nm)	SW 232
NOKI1Y	23L	NOKIN	53.076667	-2.882778	51km (27nm)	SW 232
NOKI1Z	05R	NOKIN	53.076667	-2.882778	51km (27nm)	SW 232
POL1Y	23L	POL	53.743767	-2.103328	45km (24nm)	NNE 014
POL1Z	05R	POL	53.743767	-2.103328	45km (24nm)	NNE 014
POL4S	05L	POL	53.743767	-2.103328	45km (24nm)	NNE 014
POL5R	23R	POL	53.743767	-2.103328	45km (24nm)	NNE 014
WAL1R	23R	WAL	53.391936	-3.134461	57km (31nm)	W 274
WAL1S	05L	WAL	53.391936	-3.134461	57km (31nm)	W 274
WAL1Y	23L	WAL	53.391936	-3.134461	57km (31nm)	W 274
WAL1Z	05R	WAL	53.391936	-3.134461	57km (31nm)	W 274

EGKK LONDON/GATWICK A, STARS (Standard Terminal Arrival Routes)

Name	Rwy	Fix	Latitude	Longitude	Distance	Direction
ASTR1F		ASTRA	50.865556	-0.146389	32km (17nm)	S 174
ASTR2B		ASTRA	50.865556	-0.146389	32km (17nm)	S 174
ASTR2H		ASTRA	50.865556	-0.146389	32km (17nm)	S 174
ASTR3A		ASTRA	50.865556	-0.146389	32km (17nm)	S 174
ASTR3J		ASTRA	50.865556	-0.146389	32km (17nm)	S 174
ASTR4C		ASTRA	50.865556	-0.146389	32km (17nm)	S 174
ASTR4D		ASTRA	50.865556	-0.146389	32km (17nm)	S 174
LUMB1C		LUMBA	50.945556	0.261667	39km (21nm)	SE 125
LUMB1D		LUMBA	50.945556	0.261667	39km (21nm)	SE 125
LUMB1G		LUMBA	50.945556	0.261667	39km (21nm)	SE 125
LUMB2F		LUMBA	50.945556	0.261667	39km (21nm)	SE 125
LUMB2H		LUMBA	50.945556	0.261667	39km (21nm)	SE 125
LUMB3B		LUMBA	50.945556	0.261667	39km (21nm)	SE 125
LUMB3E		LUMBA	50.945556	0.261667	39km (21nm)	SE 125
TIMB1C		TIMBA	50.945556	0.261667	39km (21nm)	SE 125
TIMB1D		TIMBA	50.945556	0.261667	39km (21nm)	SE 125
TIMB1G		TIMBA	50.945556	0.261667	39km (21nm)	SE 125
TIMB2F		TIMBA	50.945556	0.261667	39km (21nm)	SE 125
TIMB2H		TIMBA	50.945556	0.261667	39km (21nm)	SE 125
TIMB3B		TIMBA	50.945556	0.261667	39km (21nm)	SE 125
TIMB3E		TIMBA	50.945556	0.261667	39km (21nm)	SE 125
WILO1F		WILLO	50.985000	-0.191667	18km (10nm)	S 180
WILO2H		WILLO	50.985000	-0.191667	18km (10nm)	S 180
WILO3A		WILLO	50.985000	-0.191667	18km (10nm)	S 180
WILO3B		WILLO	50.985000	-0.191667	18km (10nm)	S 180
WILO3D		WILLO	50.985000	-0.191667	18km (10nm)	S 180
WILO3J		WILLO	50.985000	-0.191667	18km (10nm)	S 180
WILO4C		WILLO	50.985000	-0.191667	18km (10nm)	S 180

FSX/P3D Limitations

There are some limitations in P3D, in full screen mode the window is not transparent. Also you must close the text window before exiting FSX/P3D otherwise the sim crashes.

Spy Messages

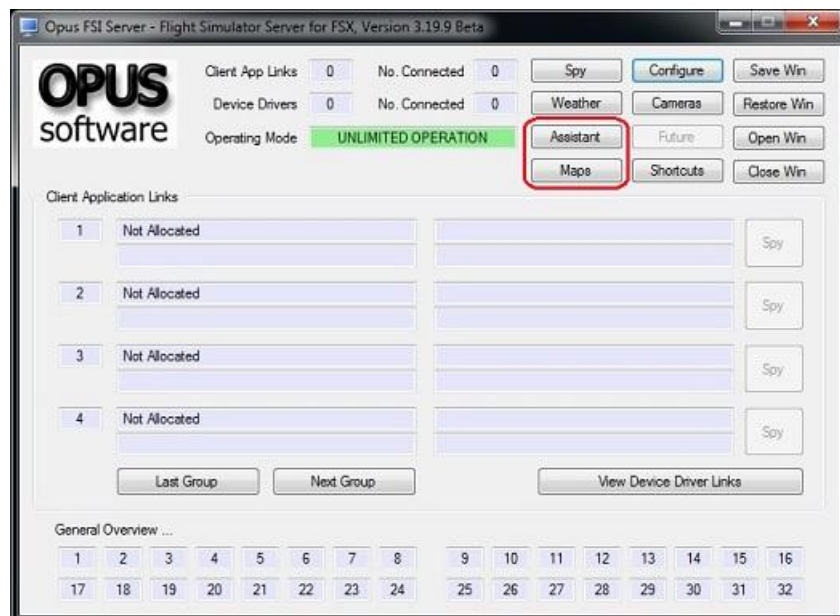
Spy messages can be seen by clicking on the top right-hand Spy button on the server's main form. The **Live Weather Engine** will report its nearest weather station along with all METAR downloaded reports.

The Spy window automatically clears after ten minutes.

Live Weather Assistant

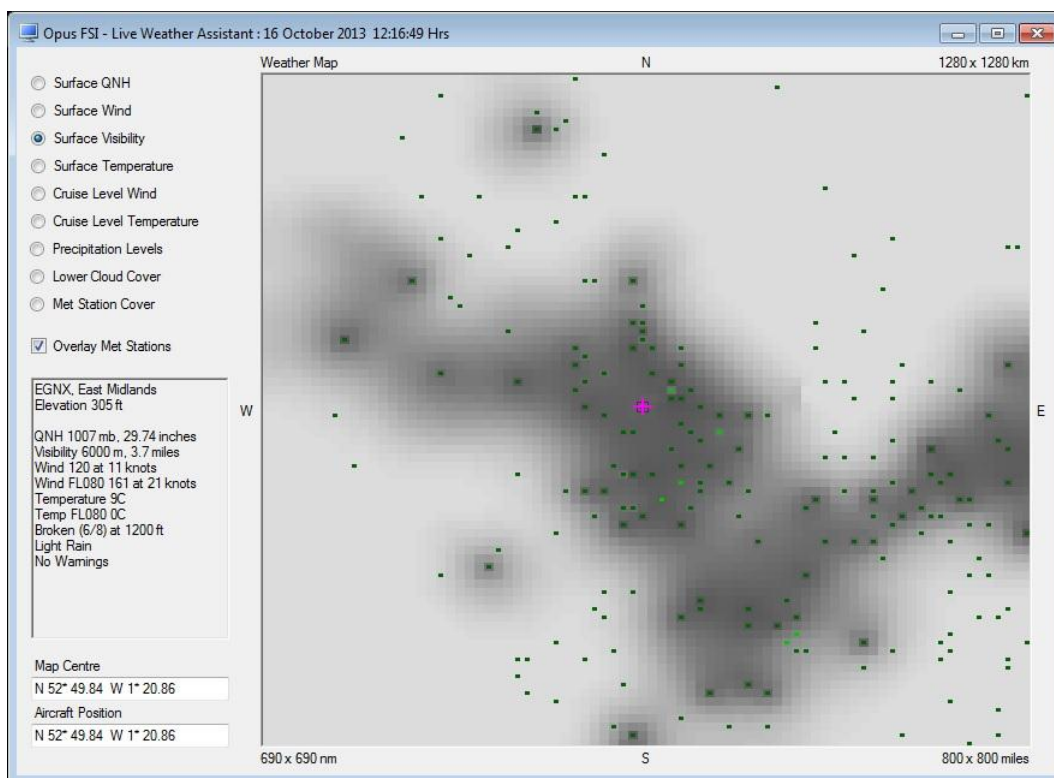
Ensure **Enable Live Weather Maps** is enabled in the Configuration dialog, it is enabled by default. The **Live Weather Assistant** provides useful weather information for the current Opus 800 x 800 mile weather map displayed graphically as a mosaic of 6400 weather cells in either a large or small footprint map.

To display the larger LWA map then select the **Assistant** button from the server or client main forms. You can display the smaller map using the **Maps** button. Up to six Weather Maps can be opened and positioned on the screen, just click on the **Maps** button to open each new map.



The **Live Weather Assistant** option displays a large dialog containing a graphic weather map in which various types of weather data can be displayed using radio buttons to toggle between

Surface QNH, Surface Wind, Surface Visibility, Surface Temperature, Cruise Level Wind, Cruise Level Temperature, Precipitation Levels, Low Cloud Cover and Met Station Cover.



The LWA and Weather Maps show your current aircraft's location using a cross hair cursor, the location of your departure and destination points (if known) using thick lined rectangular boxes, and your alternate sites using thin lined rectangular boxes. The captions also show the date (LWA only) and time of the last weather update. When the weather is updated and the maps refreshed your aircraft is located in the centre of the map.

Moving the mouse cursor about the screen displays the weather at that point, if the location identifies a Met station then the ICAO, station name, and elevation in feet AMSL are also displayed.

The **Overlay Met Stations** checkbox enables you to overlay the Met station locations, dark green implies a single Met station, lighter green signifies two Met stations, bright green signifies three or more.

The **Surface QNH** (or Surface Pressure) map is colour coded about the average surface pressure for the region, blue and green tints indicate areas of lower than average pressure, orange and red tints indicate areas of higher than average pressure. The full range extends +/- 15mb about the regional average.

The **Surface Wind** speeds are colour coded using blue - green - yellow - orange - red tints to indicate calm (2 knots) to strong (32 knot plus) winds.



All wind directions are displayed in the LWA Information box.

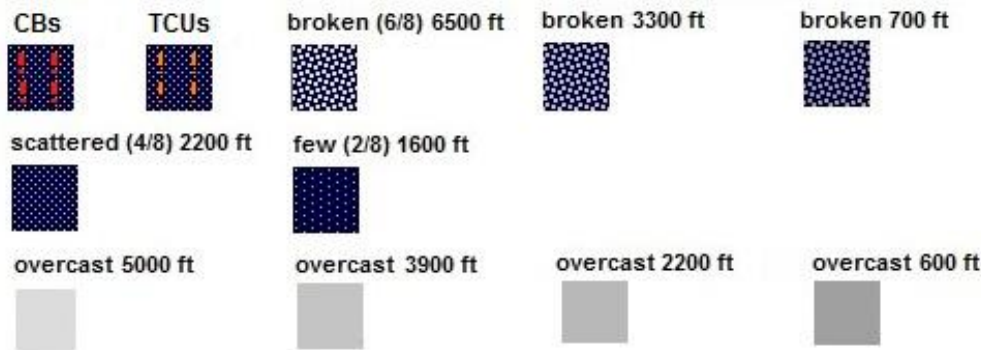
Various shades of grey, from light to dark, represent the areas of reduced **Surface Visibility**.

All Met Stations on the **Temperature** map are displayed in black as the full spectrum of colours are used to represent temperature ranges from -15C and below (blue) through to 42C and above (red).



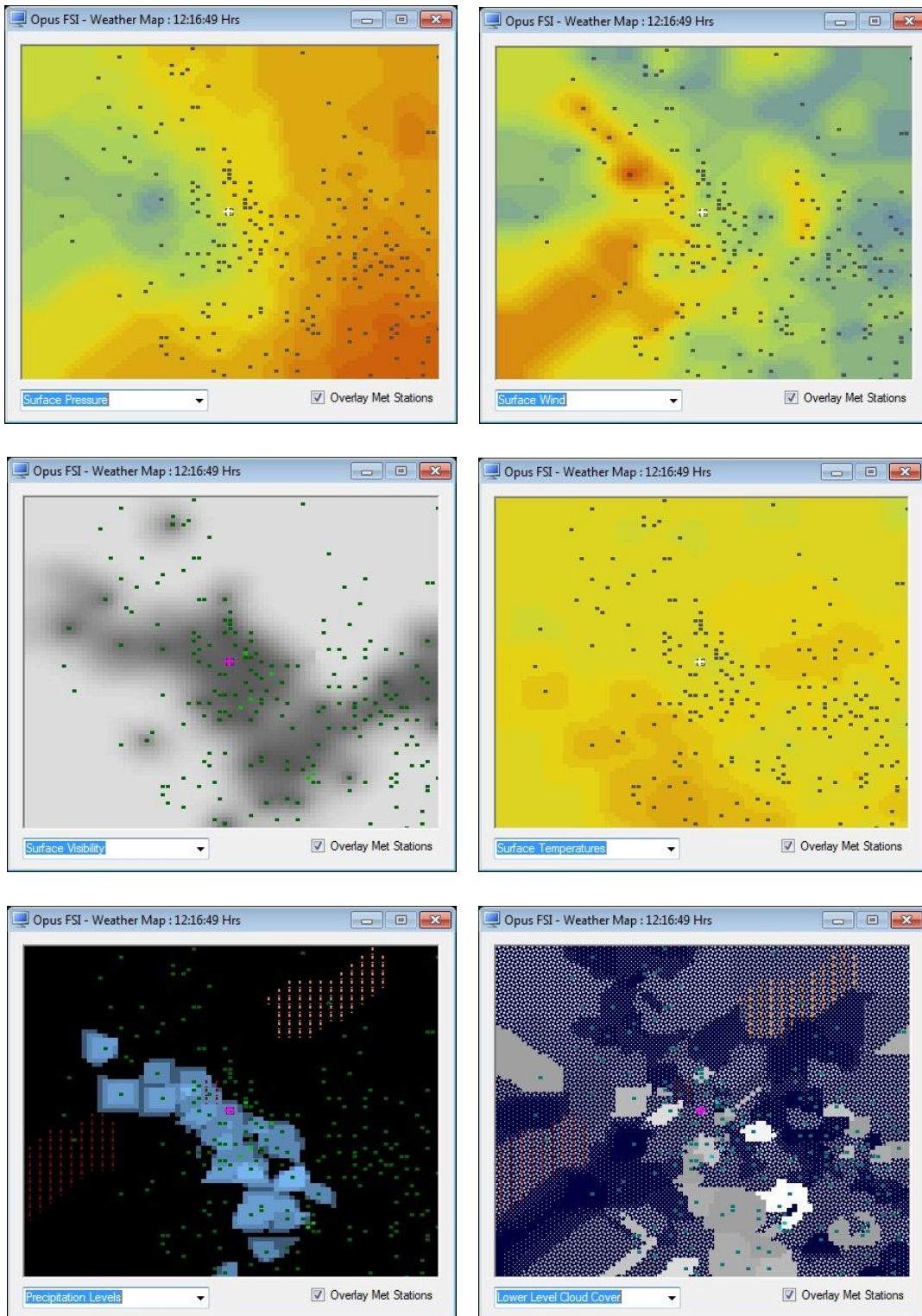
Four shades of light blue represent rain and four shades of grey to white are used for snow fall. The **Precipitation Levels** map also shows the approximate location of any cumulonimbus and towering cumulus cloud formations. Active thunderstorms are identified using a red exclamation mark **!**, towering cumulus cloud formations are identified using an orange exclamation mark **!**

The **Lower Cloud Cover** map shows the maximum cloud cover under 10,000 feet along with an indication of the reported cloud base, cloud cover in octas, and any thunderstorm and towering cumulus warnings. Therefore the map does not show all the cloud layers, it reports the most significant low level cloud layer that has the greatest cloud cover. Lower cloud bases are depicted in darker shades of grey and various brush patterns have been used to indicate areas of few, scattered, or broken cloud. Solid colour fills indicate areas of overcast conditions.



The Live Weather Assistant (LWA) dialog can be resized and maximised on the screen. If the map is not displayed then it is possible that your map may be hidden behind the FSX window, if so minimise FSX, reposition the Weather Map and continue.

The **Weather Map** option displays the same weather data as the larger map but with a much smaller screen footprint. Select the options from the dropdown menu.

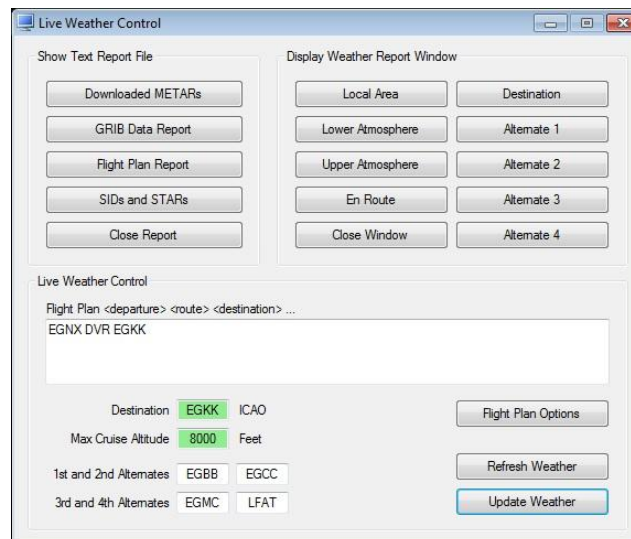


Live Weather Assistant can also be used on networked client PCs/laptops. If you are using a networked client only for Live Weather Assistant (and/or Client Side Live Weather Control) then NO license, FSX, or FSUIPC4 is needed on the client, they are only required if you are using Live View.

Client Side Live Weather Control

If you are using the networked client PC only for live weather control (i.e. entering weather or flight plan data, or requesting reports via the client dialogs) then NO license, FSX, or FSUIPC4 is needed on the client. Configure your client PC in accordance with the Getting Started Networked PCs guide.

On the Client main form there is a button labelled **Live Weather Control**. Select this to display the Live Weather Control dialog.



You are presented with options to display the text reports, weather report windows, edit the flight plan and other flight parameters. Text reports are displayed on the client, weather report windows are displayed on the server.

Update Weather always checks the GRIB for currency and downloads all required METARs from your specified Weather Server (the NOAA site is the Primary source).

Refresh Weather updates the weather using the previously downloaded METARs, it builds a new weather map and refreshes the weather within FSX. If no previous weather data has been downloaded then the Refresh option does the same as the Update option.

N.B You can also use the client for displaying weather maps.

PMDG FMC Wind/Temp Data Request

You must have a PMDG aircraft selected.

Enable GRIB data. You must enter or Import your flight plan into Opus, then the FP must be activated either via the OpusFSX Process option in the Flight Plan dialog or via the FSX options. Specify your Destination and Cruise Altitude, then Update the weather.

Only after this will Opus be able to generate the file. There is no need to cut and paste anything. In the airplane on the LEGS page select WIND DATA, press WIND DATA REQUEST and the data will automatically load the values into the FMC, press EXECUTE to finish. Note that it is best if your

cruise altitude is already entered on the PERF INIT page before you do this as it helps the PMDG algorithm narrow down the correct altitudes to use.

If you are using PFPX to generate your flight plan then it must be exported in two formats, one for the PMDG to its dedicated folder, and one in FSX .pln format to your docs/<SIM>/ folder so Opus can read it.

Trouble shooting ...

Make sure the GRIB data has been downloaded and decoded, if not check your \OpusFSX\FSDECODER.log file.

Check the content of your OpusPMDGData.txt text file in the OpusFSX\Themes folder. Is your wx data in this file? If so then it's a simple case of not being able to copy this file into your <FSX>\PMDG\WX folder. Perhaps it's a sharing and permissions issue.

OpusFSX uses the English (GB) culture for the decoding format, do not change any settings in this culture especially the decimal separator type.

FSUIPC4 Settings

FSUIPC4 is not required on the FSXSERVER system unless you intend to run FSX at increased simulation rates or enable the CPFlight MCP737/EFIS device driver. FSUIPC4 is required on Live View FSXCLIENTs that are used to display camera views.

You can download a free copy from <http://www.schiratti.com/dowson.html>

Turn everything off in FSUIPC4, we recommend disabling all settings. We do not use FSUIPC4 for any weather or turbulence related effects.

If you choose not to install/activate FSUIPC4 then at the moment Opus will not be able to pause the sim, it is normally paused when opening certain Opus dialogs. Hence you will have to pause and unpaue the sim manually.

To disable FSUIPC4 simply remove the associated <Launch.Addon>...</Launch.Addon> entries within the simulator's dll.xml file.

```
<Launch.Addon>
  <Name>FSUIPC 4</Name>
  <Disabled>False</Disabled>
  <Path>Modules\FSUIPC4.dll</Path>
</Launch.Addon>
```

Reporting Anomalies and Errors

Please email your **c:\OpusFSX\Themes\OpusWeather.txt** file along with any report. This text file contains a copy of all the downloaded METAR data along with the identity of your nearest weather

station. We can use this file to import the same meteorological conditions into our system and check the results.

Please email reports to opusfsi@opussoftware.co.uk

FAQ

I can't get the dynamic weather to work

If you don't have OpusFSX options within the add-on menu then it hasn't been installed correctly. Follow the Getting Started Guide for Single PCs very carefully. Ensure you have identified your FSX installation folder and have sharing enabled, and set security and permissions. Make sure your internet connection is working. Ensure you have **Enable Live Weather Engine** checked in the Configure dialog. Ensure you have unchecked **METAR File Import** in the Weather dialog. If you open the spy window and force a weather update via the FSX add-on menu then you should see the weather being generated. Also if you open the weather report window via the FSX add-on menu it will show the last time of update.

Do not install OpusFSX in a sub-folder of **Opus Software**, **FSX** or **Program Files** since it causes permission problems.

Run your sim before running OpusFSX.

Unable to view Live Weather or "Unable To Update Dynamic Weather" spy message

This error most likely results from a failure to copy the generated OpusWeather.WTB file. The software needs to copy this from ... c:\OpusFSX\Themes\OpusWeather.WTB to ... <fsx_install_folder>\Weather\Themes\OpusWeather.WTB

So, you have either,

not specified the FSX option and identified your FSX installation folder correctly within the OpusFSX Configuration dialog,

or,

your system does not have sharing enabled, or security and permissions set to allow OpusFSX to write to the FSX installation folder.

You can check the first by confirming there is a Weather\themes sub-folder.

You can check the second using the Command Prompt, navigating to c:\OpusFSX\Themes and trying to manually copy the file. Most probably you have installed FSX in the Program Files folder and there is no sharing or access rights to this folder. Refer to our Getting Started guide for details on how to set up sharing and security permissions.

I can't load or decode GRIB data

If you have Adjust Options Automatically enabled in the weather dialog and have configured a Max Cruise Altitude greater than 6000 feet then GRIB data will be downloaded. If you don't have Adjust Options Automatically enabled then enable Download GRIB Forecast Data in the Weather Download Options dialog. Check the Upper Atmosphere Weather Report window, it will notify you if there is no GRIB data.

Check your \OpusFSX\FSDECODER.log file for errors.

If you use a proxy server or have configured Internet Explorer to use a proxy server (IE settings, Internet options, Connections tab) then it may not allow you to download files in which case you will not get GRIB data.

If your GRIB data is not decoding then it may be caused by a setting in the Windows operating system culture setting. OpusFSX automatically selects and uses a generic English (GB) culture to ensure correct floating point number conversion. We have had problems where people have edited the English culture setting and changed the Windows Number format decimal separator from a dot to a comma. Ensure the dot character is assigned as the decimal separator in the Windows Number format, not the comma.

If you can't extract or decode GRIB data then delete everything except the degrib.exe program from your OpusFSX\GRIB folder. If this doesn't work delete the GRIB folder and reinstall OpusFSX since the degrib.exe program may be corrupted.

Ensure you don't have more than one copy of OpusFSX installed via Control Panel. If you do then uninstall all versions and reinstall the latest version. Do not install OpusFSX in a sub-folder of **Opus Software, FSX or Program Files** since it causes permission problems.

Never run antivirus software when using FSX, all AV software will adversely affect the FSX performance.

Weather keeps changing erratically

Ensure you don't have any other software packages injecting the weather. In FSX Free Flight, Weather, set your FSX Current Weather to any weather theme, just don't enable the real world weather options. Check that no other weather engines are running. If flying online don't inject weather from FSInn etc.

Too much haze or bad visibility in P3D

If you have a pea soup fog around your aircraft when flying with P3D then you most likely have Volumetric Fog enabled in P3D and do NOT have the option enabled within the OpusFSX Weather Preferences dialog.

FSX can't load weather theme error message

It could be that you are loading a saved flight which is referring to a non-existent static theme. Click OK to that FSX error message, update the weather once more, then resave your flight.

FSX crashes when I load a saved flight

Load the flight without running OpusFSX, save the flight, then run OpusFSX.

I see horizontal 'bands' of haze with clear areas between

This is a known issue with 3rd party packages, make sure you have disabled your 3rd party weather engines and in addition disabled/removed all their visibility, haze and fog effects.

A way to remove it with AS2012 is:

- 1: Start AS2012
 - 2: Start FSX, load a flight
 - 3: Once you are at airport of choice, open AS WX Options / Visibility
 - 4: Make sure the following options are ticked;
 - a: fog layer generator
 - b: Untick 'Use stratus for fog'
 - c: Tick 'Enable Visibility Graduation and Smoothing' and set to 9000ftThe sliders should be set from top to bottom 0,65,65
Save and Apply.
Do this in the Status page also.
 - 5: Shut down AS and FSX
- Now repeat steps 1-3.
This time you will do the reverse,
- a: Untick fog layer generator
 - b: Untick 'Use stratus for fog'
 - c: Untick 'Enable Visibility Graduation and Smoothing'

Save and Apply as above.

I get a consistent static cloud layer that forms above the aircraft

This is not an OpusFSX problem, we have just provided a solution to a problem that occasionally occurs on some systems due to a corrupt or faulty cirrus overcast bitmap mask file in the FSX/P3D Texture folder. If your system has a faulty bitmap file it will be quite obvious, there will be a thick cloud hovering above you wherever you fly.

Betas 2.70.2 onwards automatically fix the problem on a restart of OpusFSX, but if you have an older version and your system suffers from this problem then please follow the instructions below for the cure.

Make sure you have disabled your 3rd party weather engines and in addition disabled/removed all their visibility, haze and fog effects. You must replace the cirrus_overcast03.bmp file within your flight simulator's Texture folder as follows,

1. Navigate to your simulator's texture folder, either <FSX>\Texture or <Prepar3D>\Texture
2. Rename your cirrus_overcast03.bmp file to cirrus_overcast03_foggy.bmp.
3. Truncate our cirrus_overcast03_Opus.bmp filename to cirrus_overcast03.bmp.
4. Restart your FSX or P3D simulator.

I tried importing METAR data from a user specified import file but it didn't work.

METARs are specific to a location unless you use the GLOB ICAO code which is global. If you use a METAR for a specific station and try to import it when you are outside the 1280km x 1280km area of the weather region then the Live Weather Engine will not accept the report since the met station is not within your area. The met station must also coincide with one used within FSX so that OpusFSX, which has a list of all valid FSX met stations, can identify its lat/long coordinates, and hence its location relative to your aircraft's current location. If you only have one METAR then change the ICAO code to GLOB and import that.

Overspeed and Underspeed warnings

If you are flying with the sim rate speeded up, especially above x2 then it is possible to get overspeeds or underspeeds. Even at x2 speed, your auto pilot or FSX may oscillate the air speed repeatedly causing repeated overspeeds. You should disable the FSX stress causes damage option.

Overcast

Low Overcast Effects come into force whenever the overcast cloud cover is less than about 6000 feet AGL. You must be IN the Low Overcast Effect to see it. Overcast by definition means 90% or more cloud coverage. Don't expect to see solid blanket type overcast when looking vertically downward ... you WILL see transparent holes just like you do in real life until you get IN an OpusFSX Low Overcast Effect (an overcast below 6000 feet).

Wind shifts

Wind shifts should not be a problem from Beta 3.39.2 onwards which includes the new Dynamic Wind Targeting software.

The possibility of wind shifts cannot entirely be ruled out, this is due to bugs in the FSX/P3D code, that's why you should always disable the '**Aircraft stress causes damage**' FSX option.

If you are flying with the sim rate speeded up, especially above x2 then it is possible to get wind shifts. Certain aircraft sims are more susceptible to wind shifts.

If FSX is struggling to cope due to the number of add-on packages, detailed scenery, high definition high resolution cloud textures (we recommend non HD low resolution textures) etc then wind shifts are more likely.

The easiest configuration is to set your **Destination, Max Cruise Altitude** and enable **Adjust Options Automatically**. If your system has wind shifts enable the **Adjust Sim Friendly Options**, if your system has severe wind shifts then enable the **Use Maximum Stabilisation** option too.

Alternatively, if you prefer to set options manually, If you are flying low level (below 20,000 feet) then tick the **Disable Update on Approach** (Weather Download options) checkbox. On approach, all weather updates will be disabled for **Disable Weather Update For** minutes (default 30 minutes) on the final descent as soon as you descend

through **Disable Update when Below AGL** (default 1800 feet AGL). This process is cancelled whenever you climb above **Assume Cruising when Above AGL** (default 2000 feet AGL). The **Max Speed Change** option (Smoothing Options) allows you to fine tune the surface wind smoothing by specifying the maximum allowed wind speed change every 32km. You can also specify the **Max Direction Change**. The default values are 30 for speed and direction change. If you do want to adhere strictly to the METARs (with a risk of wind shifts) then set the **Forced Recovery** altitude.

A Forced Recovery altitude allows full recovery of the reported surface winds during the final descent. The full recovery may cause a wind shift at the configured altitude, if this is not acceptable then set the altitude to 0 feet to disable it.

If you are flying high level (above 20,000 feet) then disable **Adjust Options Automatically** and specify your **Destination** within the Weather dialog and enable the **Download GRIB Forecast** option to get GRIB forecast data for winds and temperatures aloft. Enable the **Sim Friendly GRIB Winds** option to minimise the chance of wind shifts. If your system is well behaved and you want true forecast data at all times then turn off the **Sim Friendly GRIB Winds** option. But this option gives you winds very close if not the same as the true forecast, especially if you have specified your **Cruise Altitude**. Select the **Enable Wind Stabilisation** option in the Weather Smoothing and Stabilisation dialog to minimise the chance of wind shifts. When set the surface winds injected into the simulator will be stabilised (static) everywhere until such time as they are recovered by the LWE. Stabilised winds are indicated in the Opus weather report windows with the phrase 'Static DDD/SS' immediately after the actual surface wind.

If, and only if, your system still experiences 'major' wind shifts during the cruise then you can also set the **Stabilised GRIB Data** option, but most systems will not need this option. It is included for the few that do.

PMDG 737 NGX Problems

Problems with "S" turns, auto pilot disconnects, wind shear alerts at cruise altitude and severe wind shifts may be cured by putting in an assumed temp in the NGX FMC Perf page, which you can get from your GRIB report (OpusWeatherReport.txt or Upper Atmosphere weather report window), for cruising altitude, ensure you don't omit the minus sign if appropriate.

My temperatures are too high

Make sure you put in an assumed temp where possible for your aircraft sim (e.g. in the NGX FMC Perf page), which you can get from your GRIB report (OpusWeatherReport.txt or Upper Atmosphere weather report window), for cruising altitude, ensure you don't omit the minus sign if appropriate.

Ambient temperature = SAT (Static Air Temp) = OAT (Outside Air Temp)

SAT = Static Air Temp ... i.e. what the air temp would be if it were static (or when your airspeed is zero).

TAT = Total Air Temp ... the effective air temp taking into account your airspeed.

The TAT is a calculated value, it is calculated within FSX or the aircraft sim and is always warmer than the SAT due to compressional heating of the air molecules. The air has to be slowed down to be measured and hence gets heated. Hence the TAT is dependent on your airspeed (actually the square of your airspeed as a Mach number) and also on the ratio of specific heats of the ambient

air (i.e. how dry or moist the air is - which effects air density - which determines the number of air molecules being heated).

At the typical airliner cruise speeds (0.75+ Mach) a TAT of 20 to 28 degrees warmer than SAT is perfectly normal.

I don't have any turbulence

If you are not using Live Camera then enable DHM in the Server's Configuration dialog.

For turbulence on the aircraft itself select both the **Bump Aircraft** and Turbulence Effects options (**Turbulent Motion** and/or **Turbulent Bump**) within DHM. Unless you want to see wing flex disable FSX turbulence (which is set via the FSX menu option - Options, Settings, Display. Select the Weather tab, there is an option for turbulence and thermal effects on the aircraft).

If you can't see the DHM effect on your aircraft then set the "\\OpusFSX\FSXSERVER.EXE" file properties (compatibility tab) to "Run as Administrator". This can be done by right clicking on the program in Windows Explorer or right clicking on the desktop shortcut.

I don't have any wing flex

To see wing flex enable FSX turbulence, also the 'Advanced Animations' option in the FSX menu option - Options, Settings, Display - Graphics tab and you must also enable **Include Wing Flex Data** in the OpusFSX Weather dialog's General User Preferences.

Cloud popping

*We have introduced our new **Cloud Smoothing** software in Beta 3.38. This software preserves all localised cloud coverage during weather updates and hence prevents all major cloud popping during the weather updates.*

You should note that,

- FSX is responsible for positioning all clouds on the screen, the weather engine cannot do this, it can only specify the cloud coverage and associated parameters such as cloud type, cloud base, depth etc.
- FSX will reposition all clouds each time the weather is injected, nothing can stop this.
- FSX selects all cloud bitmap textures and renders them on the screen, the weather engine specifies the cloud coverage, type, and other parameters, but it is FSX that does the rest.
- FSX will, for good reasons, extend patterns of cloud coverage, including areas of clear sky, across cell boundaries, each weather cell being 10 x 10 miles in size. If FSX strictly adhered to the cellular pattern then the weather would look completely phoney and unreal. So it 'bleeds' the weather across the cell boundaries, extending or retreating areas of cloud coverage as it see fit.

This last effect is what most people refer to when they talk about cloud popping, really as a result of not knowing how FSX depicts the weather and wrongly assuming the weather engine is causing it or can stop it.

If you don't have Cloud Smoothing enabled and after a weather update you see the cloud around you disappear then take a look behind you, its odds on that FSX had previously decided to extend this cloud cover all around you and after the weather update it gives more precedence to the new weather and cloud cover that is either in front or around you. It is also possible to notice cloud that is around you retreating away into the distance some miles in front of you. Again this is just FSX extending or retreating the cloud boundaries as it sees fit in an attempt to eliminate the cellular structure and prevent a mosaic effect in the sky.

If you actually monitor the Opus Lower Cloud Cover weather map you will see that the map and the cloud coverage is very stable, it obviously will change to reflect the reported cloud coverage in the METAR reports, so if they change the map will change but in a very predictable way. However you may notice that during weather updates or refreshes FSX has decided to reposition the cloud boundaries, extending some and retracting others, so that the cloud coverage around you changes drastically. Nothing much can be done about this as no engine has control over the FSX code.

You can try setting the 'Cloud Smoothing' Opus weather option, this guarantees to preserve the cloud cover surrounding your aircraft whenever it can. This can help minimise cloud popping although nothing can stop it altogether bar rewriting the FSX code.

Error message "access denied" when trying to display reports on the client LWE Control PC

You must set the sharing, sharing permissions, and security permissions on your server for the OpusFSX installation drive and folder so that the client will be able to access the files in your OpusFSX\Themes folder on your server. See the **Getting Started Guide for Networked PCs** for details.

In the client configuration dialog when specifying the network identity (name or IP address) of your main FSX server machine if you are using *Computer Names* in the configuration then try using *IP addresses* and vice versa.

Error message " The network name cannot be found" when trying to display reports on the client LWE Control PC

All drives should be shared using their same letter code (drive share name of C or D etc) otherwise the remote software will not be able to build its correct file specifications.

Why can't I run the Live Weather Engine on a client PC?

The LWE does not affect the performance of the simulator at all so does not need to be offloaded onto a client. If it were offloaded it would actually be far less efficient and may even impact on the simulators performance since all data would not only have to be communicated via the LAN but it would also make it more difficult to supervise the real world intelligent turbulence in real time. Hence, the clients can be used to control and monitor weather related data but the LWE itself runs on the main server system.