

# *Autoland*

Version 1.0

Original XML programming by Nick Pike, 2001/2003  
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Operating instructions for Flight Simulator 2004 and 2002.



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## **OVERVIEW:**

MS Flight Simulator has evolved to a state where it is a true simulator rather than a game. There are so many things in it that mirror what happens in real aviation. However there is one aspect of the airliner flying experience that has not been simulated – that is the type of full autoland capability that modern airliners have. This small package provides that capability for FS2004 and also for FS2002, which uses the same type of XML coding that forms the engine of this add-on.

Firstly I must thank Nick Pike, as it is he that wrote the original XML that is used in the control gauge. Nick put together what he called ‘autoflare’ as part of the panel he constructed for his fictional C4-SST aircraft, originally for FS2002 but now updated for FS2004. Having seen a number of requests for autoland gauges on the forums at Simviation (where I am frequently to be found), I remembered the autoflare button in the C4 panel and contacted Nick via his website ([www.FS2x.com](http://www.FS2x.com)) to find out if he would be willing for me to try to adapt it for use as a general autoland gauge. Nick was only too happy for me to use the XML, so thanks very much, Nick. The original FS2002 C4-SST can still be downloaded as freeware from [www.simviation.com](http://www.simviation.com), and the updated FS2004 version is available from [www.FS2x.com](http://www.FS2x.com).

The original autoflare gauge was written specifically for the C4-SST, a delta-winged supersonic transport, so it was a great learning experience for me to see how XML programming ticked, and to learn enough to be able to adapt and amend the gauge to fit today’s airliners.

## **COMPONENTS**

The gauge is small in size but does a lot of things during the landing process. The gauge actually consists of three similar gauges, each tailored for aircraft size and landing characteristics:

- autoland\_small.xml
- autoland\_medium.xml
- autoland\_large.xml

The differences between the gauges are very small, related mainly to approach speed and height above the runway that the engines are cut. A listing of which aeroplanes should be used with which gauge is to be found towards the end of the manual. Additionally, there are two bitmap files that serve to provide the icon that displays in the airliner’s 2D panel in FS.



Autoland icon

The following pictures show the icon in place in a 777 panel: the first in its non-activated condition (grey) and the second, activated (green):



The icon is here in its grey, non-active state.



The icon here is activated.

The five system files are grouped into a folder within the FS 'gauges' folder. The only other additional work required is the editing of the particular panel.cfg file for the aircraft that you wish to add autoland capability to. The installation instructions assume some familiarity with editing these configuration files.

## **SUMMARY OF INSTALLATION PROCESS:**

Unzip the 'autoland\_v1.zip' file to a temporary folder. You must have already done this to be reading this file! :

- create a folder called 'Autoland' in the FS 'gauges' folder
- copy all 5 files indicated above to this new folder
- copy and paste appropriate control lines (see below) to the panel.cfg files

## **DETAILED DESCRIPTION:**

The autoland gauge provides a fully-automated hands-off autoland system for your passenger aeroplanes that is controlled by a single on/off icon on the panel. The XML gauge operates such that all the control inputs that the pilot would normally make are simulated so that the landing will happen automatically with no input from you, the pilot, once the icon is clicked.

The gauge operation is controlled by the following parameters in the panel.cfg file for the plane you are flying:

The XML gauge itself is activated by placing control lines in the panel.cfg for the panel you are using. The control lines are placed in the [window00] section of the panel.cfg, normally as the last numbered line with sequential gauge numbers. So if the last line of this section in your file is, for example;

```
gauge33=737-400!Autobrake, 581, 134
```

then add another line, as follows. Cut and paste this line into your panel.cfg, incrementing the number after 'gauge' by 1:

```
gaugeXX+1=Autoland!Autoland_small, W,X,Y,Z
```

where W and X are the positional coordinates for the top-left-hand corner of the icon on the panel, and Y and Z are the size coordinates for the icon itself. I normally position the icon adjacent to the default icons so that it is easy to find and to locate in the panel.cfg – see the pictures above.

In this example, they would be;

```
gauge34=Autoland!Autoland_small, W,X,20,20
```

as 20 pixels is about the normal size for an icon, but you may need to experiment to find what's best for you.

Remember to increment the control line, and change 'small' to 'medium' or 'large' depending on the plane that you are flying. This may all sound a little complicated but is easy to work through if you are systematic. The final effect is worth it!

The landing parameters set in the gauges are:

Small: approach speed 135 kts, full flaps minus one increment.

Medium: approach speed 125 kts, full flaps.

Large: approach speed 145 kts, full flaps.

These parameters provide a slight nose-up attitude on approach that assists the flare. The values may be changed manually on the autopilot at any stage of the descent. Also, the autoland system can be switched off at any time, leaving the controls as set by the system.

File list:

*Gauges/Autoland:*

Autoland\_small.xml

Autoland\_medium.xml

Autoland\_large.xml

Autoflare\_on.bmp

Autoflare\_off.bmp

### **GAUGE OPERATION:**

Fly the plane normally making a normal descent. If you are flying IFR and wish to use the autoland feature, it is best to cancel the IFR at about 7-8,000 feet, as the approach instructions given to you by the FS ATC will not be the same as the approach that the autoland system will make.

Set the altitude for around 6,000 feet AGL (above ground level), the airspeed to around 200 kts IAS with flaps set accordingly. Set your approach vector to intercept the localizer for the chosen runway in the normal way, at a distance of about 20-25 miles. Set the ILS frequency in NAV1 and the airport VOR in NAV2.

Click on the autoland icon, which will glow green. From this point until you taxi off the runway, the operation is fully hands-off and completely automated. As you make the approach, the gauge:

- Sets the approach altitude for 3,500 feet AGL. The gauge tracks the plane's height via the radar altimeter so that you will always be targeting the set height above ground level, regardless of the altitude of the airport. This will mean that the plane may rise and fall as the land rises and falls. This is normal.
- Reduces speed to around 180-5 kts IAS at a distance of >14 miles as measured by the ILS DME.
- Reduces speed to around 160-5 kts IAS at a distance of <14 miles as measured by the ILS DME.
  - o Flaps are lowered by one notch.
- Carries out the following operations when the localizer is captured:
  - o Activates the 'approach' hold on the autopilot.
  - o Switches on the landing and taxi lights.
- Carries out the following operations when the glideslope is captured:
  - o Reduces airspeed for approach to 135 +/- 10 kts IAS (gauge-dependent – see below).
  - o Applies landing flaps.
  - o Lowers landing gear.
  - o Arms the autobrake.
  - o Sets trim for landing – the plane will flare as it nears the runway.
- At 5-10 feet above the runway:
  - o Cuts the throttle.
  - o Switches off autopilot functions.

- Engages wing leveler until touchdown.
- On touchdown:
  - Applies reverse thrust.
  - Applies autobrakes.
  - Deploys the spoilers.
- At 55-60 kts:
  - Cuts reverse thrust.
  - Releases autobrakes.
  - Raises flaps.
  - Lowers spoilers.
  - Switches off the yaw damper, pitot heat, ice detection and landing lights.
  - Switches off the autopilot master.
  - Switches itself off.

At this point, you are slowing down on the runway below 55 kts, with the autoland system switched off and all controls except one returned to you so that you can taxi off the runway. The auto-throttle is still active, set at 5 kts so that you maintain minimal taxi speed. Switch this control off when you want to take manual control of the taxi speed – or adjust it upwards if you wish to maintain taxi speed control via the auto-throttle.

### **LIMITATIONS:**

The only real limitation is that the runway you are heading for must have DME (distance measuring equipment) for the gauge to work properly in the initial stages of auto-operation. The gauge will still work if there is no DME, but you will need to make some manual inputs regarding speed and flap setting until the localizer is captured. Otherwise you might have a bit of a shock when the system drops to approach speed and lowers the flaps fully when the glideslope is captured! You can normally tell if there is a DME by looking at the main flight display which will be counting down the distance.

This is a generic gauge, and as such may not work ideally with all planes but works well enough with most. Sometimes the auto-throttle remains on as described, and sometimes it will switch itself off – even within the same aircraft/panel combination. It seems to be dependent on the coding of the autopilot in the panel you use. In any event, you have plenty of time to turn it off or on manually, since the gauge is set to taxi the aircraft at 5 kts in the event that the autothrottle doesn't turn off. This situation could of course be solved by designing a specific autoland gauge for a particular aircraft and panel, which could be done – but don't write and ask me to do it! What you see is what you get. I'll try to see if there's anything further I can do with the generic gauges and will include it in a future release, if there is one.

As is normal with the FS autopilot you should be below the glideslope for it to be captured successfully, but this should not be an issue if you make the approach as defined before switching on the autoland.

### **APPROPRIATE GAUGE TO USE:**

*Autoland\_small: (approach speed 135 kts)*

Tested to work with:

Boeing 737-600 (AI Aardvark) and -700 (737 Experience and Kittyhawk)  
Airbus A319 (iFDG)  
Airbus A318 (AeroDesigns)

Not tested but should also be usable with:

Boeing 717, 727, 737 (all series)  
Airbus 320, 321  
DC9/MD80-97  
Avro RJ85 and 100

*Autoland\_medium: (approach speed 125 kts)*

Tested to work with:

Boeing 757-200, 767-300ER (both Project OpenSky)  
Boeing 777-200ER (Meljet)\*  
Airbus A300B4 (SGA), A330-200 (Project OpenSky)

Not tested but should be usable with:

Boeing 707, 787  
Airbus A310, A340

*Autoland\_large: (approach speed 145 kts)*

Tested to work with:

Boeing 747-400 (Project OpenSky)  
Airbus A380 (Versluys)  
McDonnell-Douglas DC10-30 (SGA)

Not tested but should be usable with variants of the above, plus other heavies such as the Lockheed TriStar.

\*You'd think that the 777 would be in the 'large' category, but it actually works best with the 'medium' gauge.

## **NOTES**

Please note that these are recommendations only. If the specified gauge doesn't work for you; if your plane stalls on approach or thumps down so hard that your undercarriage collapses, try one of the other two gauges as the main difference is with approach speed.

I included the 707 and 727 in the list of potential planes that the gauges can be used with – except that I don't think these planes had auto-throttles (same for the 737-100 and -200). The gauge may still be usable with the pilot controlling the throttle manually according to the sequence described, but I have not tested it.

The gauge is not perfect because it is being applied to many different planes/panels of different sizes from different sources. It should do pretty well for most of them however, so enjoy!

Please contact me if you have a suggestion for further improvement.

**ACKNOWLEDGEMENTS:**

Nick Pike for his generous permission to modify the XML code from his C4-SST Autoflare gauge and use it for this gauge set. The FS2004 version of the C4-SST can be found on Nick's website, [www.FS2x.com](http://www.FS2x.com).



Thanks, Nick.

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