

# Ground Radar plugin for EuroScope

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*- version 1.1.2 -*

General

# 1 Getting started

The Ground Radar plugin has two modes. “Ground” mode is based on the SAAB A3000 A-SMGCS system, and “Tower” mode on the SAAB RDP air situation display. Some settings are required in the used ASR file to determine which mode to use, and to set up some of the necessary parameters.

If the plugin was provided in a package, all the necessary settings are most likely set already. If not, refer to the Developer Guide for information on how to install and set up the plugin.

## 1.1 Plugin updates

On startup, the plugin will attempt to check for updates. If the check fails or a new version is available, a message box will be presented. In case a mandatory update exists and the latest date to update has already passed, the plugin features will be blocked until it is updated.

When an update is available, the message box will show where to download the current version. The update package contains the plugin dll, the current manual set and the plugin data files that are common to all setups. Replace the existing files with the new ones but do not delete any files unless specifically asked to do so.

# 2 Global Menu

## 2.1 Settings menu

- |                 |  |
|-----------------|--|
| - Display...    | Opens the Display submenu                      |
| - Labels...     | Opens the Labels submenu                       |
| - Raw Video...  | Opens the Raw Video submenu (Ground mode only) |
| - Load Settings | Reloads the information in the settings file   |

### 2.1.1 Display submenu

#### 2.1.1.1 Ground mode

- |                 |   |
|-----------------|---|
| - Pro mode      | Toggles the Pro mode on/off   |
| - Tracks        |   |
| o Display       | Toggles the label, track symbol, history dots and heading line on/off. Can't be set off if Settings->Raw Video...->Raw Video is also off. |
| o History       | Selects the number of history dots to display (0-19)  |
| o HDG line      | Toggles the heading line on/off   |
| - APP Window    |   |
| o History       | Selects the number of history dots to display (0-19)  |
| o Prediction    | Selects the length of the prediction line in minutes (0-99)   |
| o Scale         | Selects the APP Window scale in pixels/nm (1.0-100.0)   |
| o Rotation      | Rotates the view (-360.0 to 360.0 degrees)  |
| o Extensions    | Toggles extended centerlines display  |
| - Stands Window |   |
| o Items         | Number of stands to display   |

With 'Pro mode' off, all the aircraft are shown correctly correlated. When 'Pro mode' is selected on, the displayed information depends on the flight plan equipment suffix (mode S availability), correlation state and transponder mode selection.

The heading line is a 10 pixels long line drawn from the position symbol showing the heading of the aircraft. It can be used as a cheat to find out which way the aircraft's nose is pointing when the aircraft is stationary.

#### 2.1.1.2 Tower mode

- Tracks
  - o History Selects the number of history dots to display (0-19)
  - o Prediction Selects the length of the prediction line in minutes (0-99)

#### 2.1.2 Labels submenu

##### 2.1.2.1 Ground mode

- Inbound Windows
  - o WTC Toggles the WTC column on/off
  - o ETA Toggles the ETA column on/off
  - o STAND Toggles the STAND column on/off
- Ground
  - o PosX Sets the default label position x-offset in pixels (positive right)
  - o PosY Sets the default label position y-offset in pixels (positive down)
  - o SID Toggles the SID field on/off
  - o ATYP Toggles the ATYP field on/off
  - o WTC Toggles the WTC field on/off
  - o RMK Toggles the RMK field on/off
- APP Window
  - o PosX Sets the default label position x-offset in pixels (positive right)
  - o PosY Sets the default label position y-offset in pixels (positive down)
  - o AFL+VS Toggles the AFL and VS fields on/off
  - o GS Toggles the GS field on/off

##### 2.1.2.2 Tower mode

- Tower
  - o PosX Sets the default label position x-offset in pixels (positive right)
  - o PosY Sets the default label position y-offset in pixels (positive down)
  - o AFL+VS Toggles the AFL and VS fields on/off
  - o GS Toggles the GS field on/off

#### 2.1.3 Raw Video submenu

- Raw Video Toggles the raw video display on/off. Can't be set off if Settings->Display...->Tracks->Display is also off.
- Brightness Adjusts the general brightness of the radar returns (1-100). Note that if the Ground Label is set "off", having a low brightness setting may make it very hard to see the traffic.
- Afterglow Controls how fast the returns fade (0-100)
- History Sets the maximum number of history positions (0-10)

## 2.2 Window menu

- APP Window Opens the [Approach Window](#)
- Stands Window Opens the [Stands Window](#)
- Inbounds... Opens the [Inbound Window](#) (select runway in the list)

The items in the Window menu are active only in the ground mode of the plugin

## 2.3 Functions menu

- Flight Plan Opens the Flight plan setting dialog (enter callsign)
- Text notes... Opens the Text notes submenu
- Maps... Opens the Maps submenu

### 2.3.1 Text notes submenu

- Create... Creates a new text note
- Delete... Deletes a single text note
- Delete all Deletes all text notes

It is possible to insert text notes on the radar screen to act as reminders. They will stay fixed at the geographical coordinates they are inserted to, the coordinates defining the center point of the note.

When creating a note, a text entry field opens to enter the note text. When the **[Enter]** key is pressed, the note will be created at the current mouse cursor position.

The notes can be deleted one by one or all of them at the same time. When deleting one by one, the notes are boxed to display their click areas. Clicking on one will delete the note. Pressing the **[Esc]** key or selecting the “Delete...” menu item again will abort the operation.

### 2.3.2 Maps submenu

The maps submenu displays a list of all map folders found in the maps data file. Left-clicking on a folder name displays the maps in that folder on the right side of the folder list. The selected folder is displayed in reverse video. Each map’s display state can be selected on or off. Additionally, those maps that have automatic activation rules defined in the data file can be selected to activate and deactivate automatically. The default state is “Auto” for all maps with that possibility, and “Off” for other maps.

## 2.4 Safety Nets

- APM Toggle APM alerts on/off
- ECM Toggle ECM alerts on/off
- OSM Toggle OSM alerts on/off
- RIM Toggle RIM alerts on/off
- SRM Toggle SRM alerts on/off



When a safety net is switched off, its button is shown with a yellow background.

### 3 Track presentation

In both the ground and tower modes, the track symbols and labels are colored according to the flight's status (arrival, departure or overflight/unknown). By default the arrivals are yellow, departures light blue and overflight/unknown tracks light grey. In the tower mode also the history dots and prediction lines use the same coloring. In the ground mode all history dots use the overflight/unknown color and there is no prediction line available.

#### 3.1 Ground mode

##### 3.1.1 Track symbol

-  Primary track
-  Secondary (mode A or S) or combined track

Right-clicking on the track symbol toggles the heading line

##### 3.1.2 Uncorrelated track label

ALRT
TSSR

- ALRT Safety net alert indicator
- TSSR Transponded SSR code ("----" for primary only tracks)

Left-clicking on the label opens a menu with the following options:

- Correlate Correlate the radar track with a flight plan (enter the callsign)

##### 3.1.3 Correlated track label

Departure

Arrival

Overflight/unknown

ALRT ASSR
CALLSIGN DRWY AHDG/SID
ATYP WTC RMK

ALRT ASSR
CALLSIGN STAND
ATYP WTC RMK

ALRT ASSR
CALLSIGN
ATYP WTC RMK

- ALRT Safety net alert indicator
- ASSR Assigned SSR code if different from the transponded code
- CALLSIGN Callsign
- DRWY Departure runway identifier, displayed when either:
  - there is more than one active departure runway, or
  - the assigned runway is not an active departure runway
- AHDG/SID Assigned heading or SID designator (selectable field)
- STAND Assigned arrival stand. Highlighted after a change until acknowledged.
- ATYP Aircraft type (selectable field)
- WTC Wake turbulence category (selectable field)
- RMK Scratchpad contents (selectable field)

Left-click on the label opens a menu with the following options (unavailable ones shown with grey text):

- Assume                      Assumes the track
- Trans <ID>                Transfers the track to the next controller
- Man Tfr                    Opens a menu to manually transfer the track to any controller
- Free                        Drops the track
- FPL                        Opens the Flight plan setting dialog
- Stand                      Opens the Stand assignment menu
- Uncorrelate                Uncorrelates the flight plan from the radar track

Right-click on the label acknowledges a changed stand assignment.

#### **3.1.3.1 Stand assignment menu**

The Stand assignment menu is used for various tasks related to arrival stand assignment. It will not open if another controller is tracking the aircraft. The menu contains the following options:

- Auto                        Assigns a new arrival stand automatically
- Manual                    Opens the Manual stand assignment menu
- Publish                    Communicates the current stand assignment to other controllers
- Clear                      Clears the stand assignment

In addition to the manual “publish” method to communicate stand assignments, an assignment is automatically communicated to all controllers in range when the assignment is made, and also to the next controller when the track is transferred (the information is stored in the flight strip).

##### **3.1.3.1.1 Manual stand assignment menu**

This menu lists the stands at the airport for manual assignment. Stands that are occupied, blocked or already assigned are displayed in grey color. The “[---]” item allows to manually type in the stand designator.

## 3.2 Tower mode

### 3.2.1 Track symbol

- ○ Primary track
- □ Uncorrelated secondary or combined track
- ◇ Correlated secondary track
- ◆ Correlated combined track

### 3.2.2 Uncorrelated track label

TSSR
AFL+VS GS

- TSSR Transponded SSR code
- AFL+VS Actual flight level and an arrow to indicate climb or descent. At or below the transition altitude the displayed value is the altitude in hundreds of feet, prefixed by "A". (selectable field)
- GS Groundspeed in tens of knots (selectable field)

Left-clicking on the label opens a menu with the following options:

- Correlate Correlate the radar track with a flight plan (enter the callsign)

### 3.2.3 Correlated track label

CALLSIGN
AFL+VS GS

- CALLSIGN Callsign
- AFL+VS Actual flight level and an arrow to indicate climb or descent. At or below the transition altitude the displayed value is the altitude in hundreds of feet, prefixed by "A". (selectable field)
- GS Groundspeed in tens of knots (selectable field)

Left-click on the label opens a menu with the following options:

- FPL Opens the Flight plan setting dialog
- Stand Opens the Stand assignment menu
- Uncorrelate Uncorrelates the flight plan from the radar track

## 4 Windows

To move the windows, drag them from the title bar. To close them, click on the [X] button in the top right corner. To resize, drag the box in the bottom right corner where applicable.

### 4.1 Approach Window



The Approach Window displays traffic around the airport (traffic on the ground at the airport is hidden). The window displays the runway centerlines, and optionally extended centerlines out to 10nm.

To pan the view, drag somewhere on the display area. The panning is limited so that the airport reference point must stay within the display area.

Left-clicking on the “1nm” text label zooms the display in, right-clicking zooms it out. The available zoom range is 1-100 pixels/nm, the initial value being 10 pixels/nm. Each click increases or decreases the scale by 25%.

The arrow below the scale points to true north.

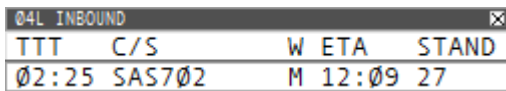
The labels display the following information:

CALLSIGN	STAND
AFL+VS	GS

- CALLSIGN                      Callsign  
                                      (TSSR code for uncorrelated SSR tracks, “----” for uncorrelated primary tracks)
- STAND                         Assigned arrival stand. Highlighted after a change until acknowledged.
- AFL+VS                        Actual flight level and an arrow to indicate climb or descent. At or below the transition altitude the displayed value is the altitude in hundreds of feet, prefixed by “A”. (selectable field)
- GS                              Groundspeed in knots (selectable field)



## 4.2 Inbound Windows



TTT	C/S	W	ETA	STAND
02:25	SAS702	M	12:09	27

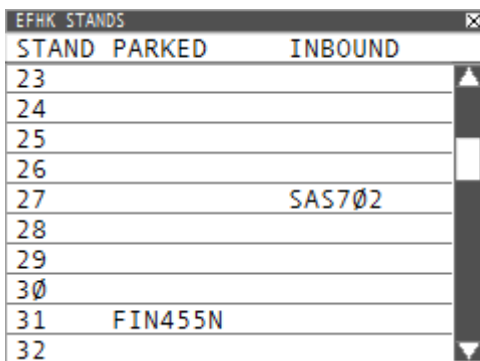
The Inbound Window displays a list of aircraft approaching that runway. The aircraft are added to the list when they are established on the extended centerline (less than 0.6nm cross track error and ground track within 10 degrees of the runway heading), are less than 30nm from the threshold and at an altitude not more than 5000ft above the airport elevation.

When an aircraft is on final to a runway other than the one it is supposed to land on, it will added to the list when it is a bit closer to the threshold, when the plugin code assumes that it will land on the runway regardless of the runway assignment (less than 0.3nm cross track error, ground track within 10 degrees of the runway heading and less than 4nm from the runway threshold).

The list is sorted according to distance from the threshold, with the closest aircraft at the top.

- TTT Time to threshold (mm:ss) assuming current groundspeed
- C/S Callsign
- W Wake turbulence category (selectable field)
- ETA Estimated time of arrival (hh:mm) (selectable field)
- STAND Assigned arrival stand (selectable field)

## 4.3 Stands Window



STAND	PARKED	INBOUND
23		
24		
25		
26		
27		SAS702
28		
29		
30		
31	FIN455N	
32		

The Stands Window shows an overview of the stand allocation status at the airport. It also allows to manually assign arrival stands, mark stands as occupied by a specific aircraft, or to block stands from automatic allocation. Blocked stands are displayed with red text.

- STAND Left-click to toggle blocked/unblocked status
- PARKED Left-click to open a menu to mark the stand occupied by an aircraft, or to clear the information when it exists
- INBOUND Left-click to open a menu to manually assign the stand for an aircraft

The “Parked” menu shows all aircraft within 5nm of the airport reference point, and the “Inbound” menu all aircraft arriving at that airport regardless of distance to the airport. When assigning a stand, it may take a couple of seconds until it shows in the window as the stand assignments are refreshed every 5 seconds within the plugin.

## 5 Safety Nets

In the ground mode of the plugin, the following potentially unsafe situations are highlighted by presenting an alert indication in the track label. Unless otherwise mentioned, the alerts are only displayed in the main radar screen (not in the APP Window or any lists). If more than one alert is active simultaneously, the first one in the below order is shown.

### 5.1 Runway Incursion Monitoring (RIM)

Runway Incursion Monitoring approach alert ( **RIM APP** )

- the runway is occupied and an approaching aircraft is less than 2 nm from the threshold

Runway Incursion Monitoring runway alert ( **RIM RWY** )

- there is more than one aircraft on a runway simultaneously

Runway Incursion Monitoring alert ( **RIM** )

- a departing aircraft is on:
  - o its departure runway with a ground state other than “DEPA”
  - o a runway other than its departure runway with a ground state other than “TAXI”
  - o any runway with a ground state other than “TAXI” or “DEPA” with no departure runway set

The Approach Window and Inbound Windows provide RIM approach alerts, and present them by a red background on the callsign item.

### 5.2 Emergency Code Monitoring (ECM)

When an aircraft is squawking one of the pre-defined emergency codes, an alert is displayed:

- **HIJACK** for squawk 7500
- **COMFAIL** for squawk 7600
- **EMERG** for squawk 7700

### 5.3 Area Penetration Monitoring (APM)

An **APM** alert is displayed when an aircraft is inside an active “no-entry” area.

### 5.4 Occupied Stand Monitoring (OSM)

A **STAND** alert is displayed for an arriving aircraft if its assigned stand is currently occupied.

### 5.5 SID/Runway Monitoring (SRM)

If an aircraft’s assigned departure runway is not active for departures and there is at least one runway that is, the DRWY item is shown with red background color.