EUROCAT 2000 E plugin for EuroScope

- version 1.1 -

EuroScope | power of control

Foreword

EuroScope, a controller client developed by Gergely Csernák for the VATSIM network, was first released for public use in September 2007. There has been continuous development ever since and the third release (version 3.1, released in December 2009) brings along many new features.

One of the biggest changes is the possibility for the user community to customize the program to an even higher degree than was possible before by writing their own plugins that can be used to alter the way information is presented and even create completely new functionality into the program. This allows creating very detailed simulations of all kinds of ATC systems without making the main program overly complex.

The EUROCAT 2000 E plugin started out as a very small project to create a couple of customized aircraft tag items, but as more information about the EUROCAT system and the possibilities with the plugin development became available, it slowly grew to include an almost complete set of tag items, tag menus, graphical elements on the radar display and some additional functionality. The plugin and its default settings are based on the Swedish “System 2000”, but many items are fully customizable making it possible to fine-tune the plugin for a large variety of needs.

This manual is based on the reader having at least a basic understanding of ATC procedures and terminology, and being familiar with the operation of the EuroScope program itself. Refer to the EuroScope documentation for the most current information on the program’s features. Because of the complexity of the plugin, some offline practice is recommended before attempting to control online traffic with it.

Have fun!

Table of Contents

1 Getting started

The plugin is usually included in a package that includes a set of compatible settings files for its operation. They usually contain everything that is needed to use the plugin except complete profile files since they contain information that is system and user specific. Starting to use the plugin is then just a matter of completing the necessary profile files by editing an existing file or starting from the one contained in the package and adding the user specific data in EuroScope (open the supplied profile file in EuroScope, set all settings in the Connect dialog, Voice hardware test and setup, Sounds setup and then save the profile).

The most obvious sign of successfully loading the plugin is that the menu bar (see section 9) is drawn on the top edge of the radar screen.

In case the plugin wasn't part of a package, there are problems with the settings files or you want to create your own setup, refer to Appendix A. It details the settings that are required in EuroScope to use the plugin the way it is supposed to.

2 Track labels

The EUROCAT 2000 E system has four types of track labels: Standard, Reduced, Extended and Uncorrelated. In addition, each label has an unselected and selected state, the selected state being shown when the mouse cursor is over the label. Basically, the Standard label is shown for aircraft that are in or will enter the active sector and the Reduced label for aircraft that will not enter the active sector. The Extended label can be opened from the Standard or Reduced label. The Uncorrelated label is shown for radar tracks that haven't correlated with a flight plan, and it doesn't show much information because of that.

In the plugin this is modeled so that the EuroScope "untagged" tag is set up as the Reduced label and the "tagged" as the Standard label. The EuroScope "detailed" tag is set up as the Standard label's selected state. The "detailed" tag is also used for the Reduced label's selected state and it has some more information than it should because of that.

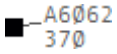
The following descriptions show the positions of the data fields in the different labels of the set that is provided with the plugin and the available mouse click areas on them. The contents and coloring rules for the data fields are explained in Appendix B. The images show typical examples, not all data fields are shown in them. Note that a primary radar track will not show a label at all.

Data fields in parentheses indicate that by default the field is not displayed on the label but can be manually toggled on from the selected track label or the extended label.

2.1 Uncorrelated label

The label for a mode C track that hasn't correlated with a flight plan

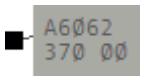
2.1.1 Unselected track



Label contents

Line 0: EMRG ALRT
Line 1: TSSR
Line 2: AFL a

2.1.2 Selected track



Label contents

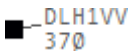
Line 0: EMRG ALRT
Line 1: TSSR
Line 2: AFL a GS

Mouse click areas

Data field	Left-click action	Right-click action
TSSR	Open correlate popup	

2.2 Reduced label

A correlated track that is not predicted to enter the active sector. The unselected state label is described below; the selected state label is the same as in the Standard label.

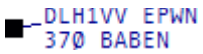


Label contents

Line 0: V EMRG ALRT
Line 1: CALLSIGN NRAC (ATYP/W)
Line 2: AFL a (GS) (ADES) SQ

2.3 Standard label

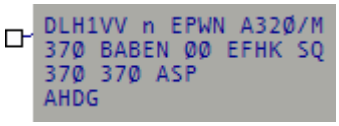
2.3.1 Unselected track



Label contents

Line 0: COM V W R Y M MARK FREQ A + C TEL I EMRG ALRT COORD OP-TEXT2
Line 1: CALLSIGN NRAC SI (ATYP/W)
Line 2: AFL a COPN/COPX (GS) (ADES) SQ
Line 3: CFL/PEL XFL ASP
Line 4: AHDG

2.3.2 Selected track



Label contents

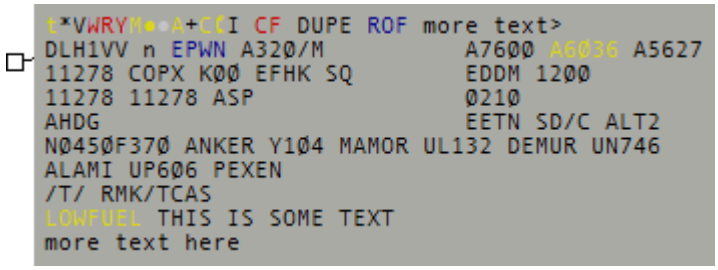
Line 0: COM * V W R Y M MARK FREQ A + C TEL I EMRG ALRT COORD OP-TEXT2
Line 1: CALLSIGN NRAC SI ATYP/W
Line 2: AFL a COPN/COPX GS ADES SQ
Line 3: CFL/PEL XFL ASP
Line 4: AHDG

Mouse click areas

Data field	Left-click action	Right-click action
*	Toggle units	
M	Toggle military coordination flag	
A		Open extended label
+		Open extended label
C	Toggle inbound clearance flag	
TEL	Accept manual coordination	
OP-TEXT2		Open extended label
CALLSIGN	Open Callsign menu	Open extended label
SI	Open next controller menu	Toggle sector ID/freq display
ATYP/W	Toggle aircraft type highlight	Toggle display in unselected label
AFL	Open AFL menu	Toggle flight leg display
COPN/COPX	Open Waypoint menu	
GS		Toggle display in unselected label
ADES	Open flight plan window	Toggle display in unselected label
SQ	Open SQ menu	
CFL/PEL	Open CFL / COPN altitude menu	
XFL	Open COPX altitude menu	
ASP	Open ASP menu	
AHDG	Open AHDG menu / AHDG vector	

2.4 Extended label

The Extended label closes automatically when the mouse pointer leaves the label area. The example label below is showing all possible fields (and also the metric units).



Label contents

Line 0:	COM * V W R Y M MARK FREQ A + C TEL I EMRG ALRT COORD OP-TEXT2	
Line 1:	CALLSIGN NRAC SI ATYP/W	TSSR ASSR PSSR
Line 2:	AFL a COPN/COPX GS ADES SQ	ADEP EOBT/ETD/ATD
Line 3:	CFL/PEL XFL ASP	EET
Line 4:	AHDG	ALT1 EQUIP ALT2
Line 5:	FIELD15 [max 6 lines of text]	
Line 6:	FIELD18 [max 6 lines of text]	
Line 7:	MALRT OP-TEXT [max 2 lines of text]	
Line 8:	OP-TEXT2	

Mouse click areas

Data field	Left-click action	Right-click action
*	Toggle units	
M	Toggle military coordination flag	
C	Toggle inbound clearance flag	
TEL	Accept manual coordination	
CALLSIGN	Open Callsign menu	
SI	Open next controller menu	Toggle sector ID/freq display
ATYP/W	Toggle aircraft type highlight	Toggle display in unselected label
ASSR	Open squawk assignment menu	
AFL	Open AFL menu	Toggle flight leg display
COPN/COPX	Open Waypoint menu	
GS		Toggle display in unselected label
ADES	Open flight plan window	Toggle display in unselected label
SQ	Open SQ menu	
CFL/PEL	Open CFL / COPN altitude menu	
XFL	Open COPX altitude menu	
ASP	Open ASP menu	
AHDG	Open AHDG menu / AHDG vector	
OP-TEXT	Edit OP-TEXT	
OP-TEXT2 (line 8)	Edit OP-TEXT2	

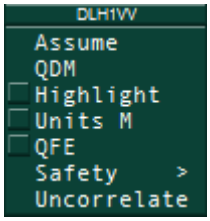
3 Custom tag menus

3.1 Callsign menu

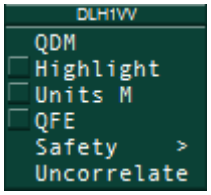
The content of the Callsign menu depends on the flight's status:

1 - Not tracked by anyone
2 - Tracked by someone else than you
3 - Incoming transfer to you
4 - Tracked by you
5 - Outgoing transfer from you
6 - Redundant

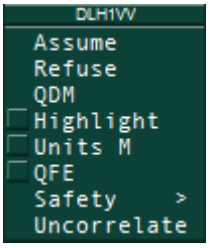
1



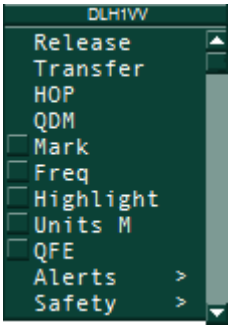
2



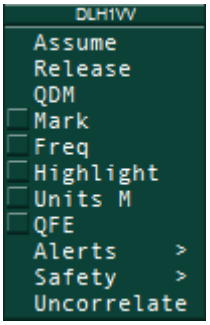
3



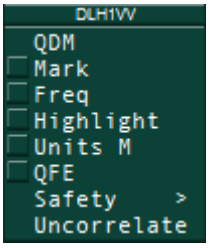
4



5



6



- Alerts > Opens the Alerts submenu (see section 3.1.2)
- Assume Assumes track
- Freq Toggles the Freq indicator
- Highlight Toggles the callsign highlight
- HOP Sends a Handover Proposal to the next sector (see section 3.1.1)
- Mark Toggles the Mark indicator
- QDM Starts drawing a QDM vector
- QFE Toggles the QFE heights option
- Refuse Refuses the incoming transfer
- Release Releases track
- Safety > Opens the Safety Nets submenu (see section 3.1.3)
- Transfer Initiates a transfer to the next sector
- Uncorrelate Uncorrelates the flightplan from the radar track
- Units M Toggles the metric units option

If there is no next controller for an assumed aircraft, the Transfer and HOP items will read "Transfer >" and "HOP >", and clicking on them will open a submenu that shows all available controllers. Clicking on one of them will then start the transfer or HOP.

None of the five selectable options in this menu will be transmitted to other controllers, but the "Mark" and "Freq" selections will be seen in your other EuroScope instances.

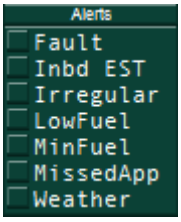
3.1.1 Handover Proposal

A Handover Proposal (HOP) can be sent from the Callsign and AHDG menus. It can be used to propose non-standard transfer parameters. To the receiving controller the HOP is identified by coloring the callsign data field with the “Proposition” color (white by default) in the label. For the sending controller the Callsign field remains “Assumed” color and the Sector Indicator field is shown in “Proposition” color. Additionally, if there are proposed parameters (assigned heading, direct and/or assigned speed) they are also colored “Proposition” color in both controllers’ labels. The receiving controller has the option to assume the aircraft or refuse the HOP just like with a normal transfer. By assuming the aircraft the downstream controller accepts all the transfer parameters.

Warning: A HOP will only be shown correctly for controllers using this plugin. To other controllers it will be shown as a normal transfer without any special coloring of any data fields.

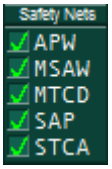
3.1.2 Alerts submenu

Here you select the manual alerts to display in the track label. Only those alerts that have an alert text defined in the Setup menu will be shown here. The alerts are stored in the scratchpad. Controllers using this plugin will see them correctly as alerts if they have the corresponding alert texts defined.



3.1.3 Safety Nets submenu

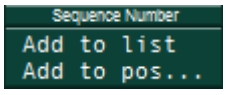
The Safety Nets menu makes it possible to disable the desired safety nets for this aircraft only. Note that in order to disable an MTCD or STCA warning between two aircraft, both of them need to have the safety net in question disabled.



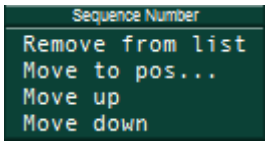
3.2 Sequence number menu

This menu is used to add the aircraft to the sequence list, to remove it or change its place within the sequence. Only a part of the options may be available depending on the situation. The sequence number will not be transmitted to other EuroScope instances or to other controllers.

not in the list yet

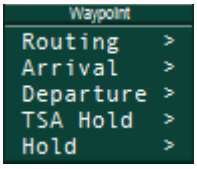


already in the list



3.3 Waypoint menu

This menu gives access to functions related to the route of the aircraft. It is used to assign direct-to clearances, departure and arrival routes, holding clearances, and to coordinate the sector exit point.

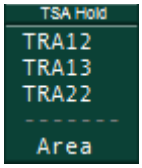


- Routing > Opens the “COPN point” or “COPX point” submenu (EuroScope default item)
- Arrival > Opens the “Assign STAR” submenu (EuroScope default item)
- Departure > Opens the “Assign SID” submenu (EuroScope default item)
- TSA Hold > Opens the TSA Hold submenu
- Hold > Opens the Hold submenu

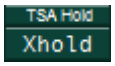
3.3.1 TSA Hold menu

The TSA Hold menu allows you to enter a clearance to enter an active military area. It displays the active and preactive TSA type areas. Additionally, the “Area” item allows to type in any area name. If a clearance already exists, the menu will only give the option to remove it with the “Xhold” item. The clearance is automatically sent to other EuroScope instances with a small delay and can be sent to other controllers by pushing the flight strip as the information is stored there. A clearance given here will exclude the aircraft from all APW and SAP processing.

no TSA clearance



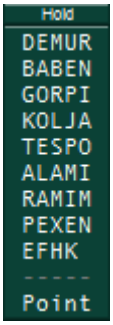
TSA clearance exists



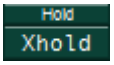
3.3.2 Hold menu

The Hold menu allows you to enter a holding clearance (add the aircraft to the holding list). It displays for selection the points in the aircraft’s route that are ahead of its current position. The “Point” item allows to type in any point. If a holding clearance already exists, the menu will only give the option to remove it with the “Xhold” item. The holding point is automatically sent to other EuroScope instances with a small delay and can be sent to other controllers by pushing the flight strip as the information is stored there.

no holding clearance

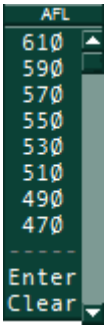


holding clearance exists



3.4 AFL menu

This menu can be used to set the AFL value (1000ft-FL610) for aircraft that don't have an altitude reporting transponder. It will look slightly different depending on the selected options (see the CFL menu below). The "Enter" option allows entering any level value in hundreds of feet and the "Clear" option removes a previously set manual AFL value. The initially highlighted value is the previously input AFL if available. If there is no previous AFL value, the CFL is highlighted instead.



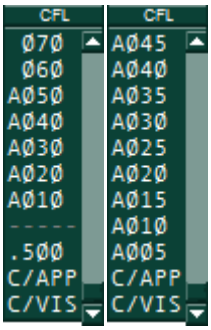
3.5 CFL menu

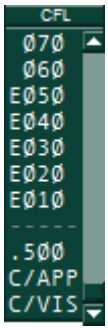
Allows setting the CFL value. In the label it is combined with the COPN altitude coordination menu and the CFL menu opens only when the aircraft is assumed. The initially highlighted value is by default the XFL, but it can be changed to the current CFL or the RFL in the Settings menu. Altitudes up to the transition altitude are prefixed with "A" in the imperial units list and with "M" in the metric units list. QFE heights are prefixed with "E" in both lists. Selectable values are from 1000ft to FL610 with 1000ft intervals up to FL410 and 2000ft above it. Selecting the ".500" item changes the intervals to 500ft and 1000ft.

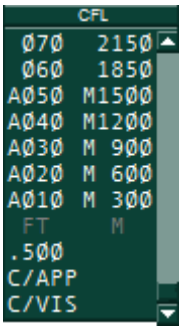
There are two fixed special items at the bottom of the list: C/APP and C/VIS. They set the CFL to "Cleared for approach" and "Cleared for visual approach" respectively.

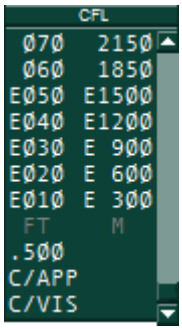
imperial units imperial units, QFE option selected metric units metric units, QFE option selected

normal 500ft







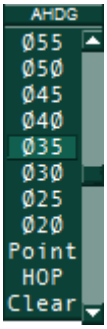


3.6 AHDG menu

This menu includes items to set or clear an assigned heading or a direct route and to send a HOP. The initially highlighted heading value will be the closest one to the assigned heading if the aircraft has one, the closest one to the aircraft ground track if not. Clicking on a heading value will set it as the assigned heading. The assigned heading can also be set using the AHDG vector, see section 4.3

Clicking on “Point” lets you pick a direct-to point from the radar screen. Left-click on any point to set it as the direct-to point (available points are VORs, NDBs and waypoints, in that priority order). Pressing the **[Esc]** key or clicking on any clickable data field will abort the operation.

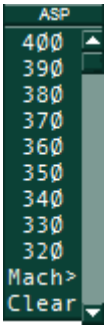
“Clear” removes an assigned heading or a direct route. For “HOP” see section 3.1



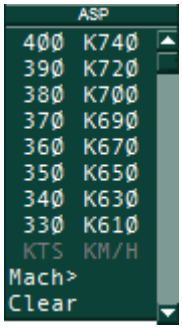
3.7 ASP menu

The ASP menu allows to set an assigned speed or Mach number or to clear a previous assignment. The default selection will be the closest value to the assigned one if set, otherwise the plugin will suggest the closest value to the aircraft’s present speed based on the ground speed (zero wind will be assumed). The menu will initially open in IAS mode if the aircraft’s CFL is below the IAS/Mach altitude value defined in the setup menu, and in Mach mode if above it. The selectable values range from 120 to 400 knots and from Ma0.50 to Ma0.99.

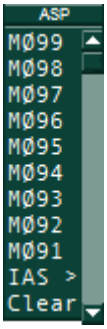
IAS mode, imperial units



IAS mode, metric units



Mach mode



4 Graphical elements on the radar display

4.1 Aircraft position symbols

The position symbol is drawn at the latest known position of the aircraft. The color of the symbol is “Track Default” (black by default) for an unselected track and “Track Highlight” (white by default) for a selected one. A number of different symbols are available. To begin with, there are three basic shapes that tell what kind of track is in question:

Primary radar track

Secondary radar track

Combined radar track

An indication of an SPI (transponder ident) can be added to either of the two latter symbols. It draws a cross over the symbol and prints the text “SPI” above and to the right of the symbol:

Combined radar track with Special Position Indication

For all the three symbols, a divergence alert will be drawn in case of a RAM or CLAM alert. This is a circle drawn around the symbol:

Combined radar track with divergence alert

In case a track has both SPI and divergence alert, only the SPI symbol will be drawn as the divergence alerts are also displayed on the label.

4.2 History dots and prediction lines

The history dots show the previous positions of the track. Any number from 0 to 19 can be shown. The color of the dots is “Track Default” for an unselected track and “Track Highlight” for a selected track.

The prediction line draws the predicted ground track of the aircraft, based on its current track and ground speed. It can be turned off by selecting the length to 0 minutes. It is a two color line, starting with “Track Default” at the position symbol and then alternating with “Track Highlight”, with every segment representing one minute of flying time. The example below shows a track with 5 history dots and a 3-minute prediction line.

4.3 AHDG vector

The AHDG vector is one way of setting an assigned heading for an aircraft. To start using the vector, open the AHDG menu by a left-click on the AHDG data field on the label. Then move the mouse pointer outside the menu to a free area on the radar display and start drawing the vector by holding the left mouse button down. When you're satisfied with the heading value, release the left mouse button, move the mouse pointer to the AHDG data field again and left-click to set the value.

Pressing the **[Esc]** key or clicking on any clickable data field will abort drawing the vector (except left-clicking on AHDG field which will set the value).

4.4 QDM vectors

Drawing a QDM vector is started from the Callsign menu. Clicking on the QDM menu item will start drawing the vector and it will stay attached to the mouse pointer until the left mouse button is clicked. At that point it is attached to the coordinates under the mouse pointer and becomes fixed. To remove it later, double-click on the end of the line. The vector can also be attached to another aircraft by clicking on its position symbol. To remove a line between two aircraft, double-click on the midpoint of the line. In case a line can't be removed by double-clicking for any reason, there are items in the FlightData menu to either delete all lines originating from the ASEL aircraft or all lines from all aircraft.

The vector's data label is located at the end of the line for currently drawn vectors and ones fixed to a location. For lines between two aircraft, the label is located at the midpoint.

Pressing the **[Esc]** key or clicking on any clickable data field will abort drawing the vector.

4.5 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.

The text notes are created and deleted from the AirSpace menu. 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 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.

5 Windows

5.1 Holding view windows

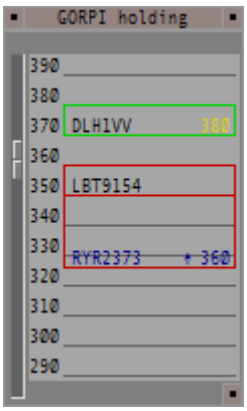
To help with controlling holding aircraft, there are two holding view windows. They give a quick look into the vertical positions of aircraft that have been given a holding clearance to the holding fix associated with the window in question. Only aircraft whose altitude is known are shown here (a manually set AFL value is also acceptable).

To open the window seen below, open either of the Holding Views from the ControlTools menu and enter "GORPI" in the text entry field as the point. The window displays the callsigns of the aircraft at their current flight levels. Also shown is an up or down arrow for an aircraft not in level flight and its cleared level if not within 50ft of it. For an aircraft with a manually set AFL, the callsign will be in "Warning" color, and the vertical speed arrow will not be shown. The CFL of an aircraft with a CLAM alert will be in "Warning" color.

For each aircraft an altitude box will be drawn that extends from AFL to CFL. Normally the color of the box is green ("Information FL"), but if it is closer than 300ft or overlaps any other aircraft's box, the box will be red ("Urgency FL").

The second holding view can be used to monitor another holding at the same time. Note that there is no conversion to altitude; all vertical positions are always shown as flight levels.

The window shows three aircraft cleared to hold at GORPI. DLH1VV is cleared to FL380 but maintaining FL370, LBT9154 is maintaining its cleared level FL350, and RYR2373 is climbing towards its cleared level of FL360, now passing FL326.



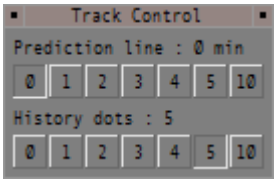
The mouse click areas of the holding view window (left mouse button unless otherwise specified):

- Top left corner: Close the window
- Top right corner: Minimize the window to show only the title bar
- Title bar (other than the two corners): Drag to move the window
- Slider: Drag to adjust the lowest shown FL
- Bottom right corner: Drag to adjust window size
- Aircraft callsigns: Open AFL menu (only for non-alt aircraft)
- CFLs (or the same area if CFL not shown) Open CFL menu (*

*) When opened from a holding view, the CFL menu highlights the current CFL regardless of the setting in the Settings menu.

5.2 Track Control Window

The Track Control Window is used to quickly change the length of the prediction line and the number of history dots. There are seven buttons for both of them to set some most commonly used values; other values can be set via the setup menu.



The mouse click areas of the Track Control Window (left mouse button unless otherwise specified):

- Top left corner: Close the window
- Top right corner: Minimize the window to show only the title bar
- Title bar (other than the two corners): Drag to move the window
- Numbered buttons: Set the value on the button (clicking on an already selected button will de-select it and set the default value)

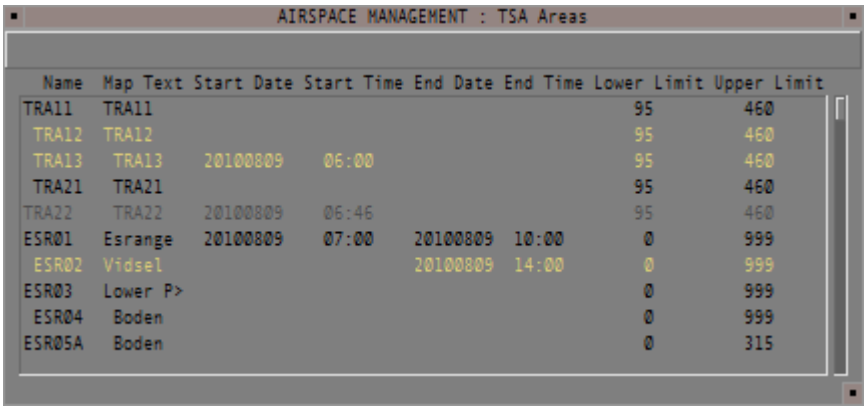
5.3 TSA Areas window

The TSA Areas window is used for the activation and deactivation of the areas for the APW and SAP functionality. Each area can have a start time and/or an end time defined for its activation, or it can be activated without any time limits, making it active until deactivated manually. Additionally, lower and upper altitude limits are given.

Dates will be shown in the format “yyyymmdd” and times in “hh:mm” and they should be entered in the same format (“hhmm” is also acceptable for the times). Entering an empty string for a date will clear it and the related time value and vice versa. When entering a time or date value to an empty field, the other value is automatically set to the current time/date value.

Altitudes are shown in hundreds of feet (or in meters+”m” if metric units chosen) if at or below the transition altitude, otherwise in flight levels (or meters standard+”m”). They should be entered in the same format (“m” character optional with meters).

An area’s activation status can be inactive, preactive or active. The default color for an inactive area is black and for an active area light yellow. A preactive area is an area that will become active within a specified time (10min by default) and is shown in grey. The APW system will not alert for a preactive area, but for the SAP system a preactive area is considered as being active.

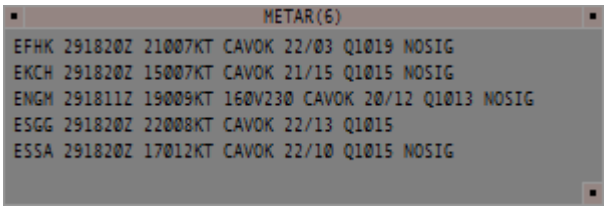


The mouse click areas of the TSA Areas window (left mouse button unless otherwise specified):

- Top left corner: Close the window
- Top right corner: Minimize the window to show only the title bar
- Title bar (other than the two corners): Drag to move the window
- Slider: Drag to scroll the area list
- Bottom right corner: Drag to adjust window size
- Name column: Activate/deactivate the area (if no times defined)
- Map Text column: Change the area label text
- Start Date column: Set/change/delete the start date
- Start Time column: Set/change/delete the start time
- End Date column: Set/change/delete the end date
- End Time column: Set/change/delete the end time
- Lower Limit column: Set/change/delete the lower altitude limit
- Upper Limit column: Set/change/delete the upper altitude limit

5.4 METAR window

Whenever a new METAR is received from the server it is added to the METAR window which displays them in alphabetical order (an old METAR is removed when a newer one is received from the same station). The window doesn't resize automatically to show all METARs in it, but the number in the title bar shows the total number of METARs in the window. To remove a METAR from the list, double-click on it.



The mouse click areas of the METAR window (left mouse button unless otherwise specified):

- Top left corner: Close the window
- Top right corner: Minimize the window to show only the title bar
- Title bar (other than the two corners): Drag to move the window
- METARs: Double-click to remove from the list
- Bottom right corner: Drag to adjust window size

6 Aircraft lists

The plugin contains two aircraft lists that can be used much like the standard lists (SIL, SEL, etc.). The default displayed items and mouse button functionality is discussed below.

6.1 SQ (Arrival sequence) List

Includes the aircraft that have been assigned an arrival sequence number. The default items are the callsign (left click opens Callsign menu) and the sequence number (left click opens the Sequence Number menu)

6.2 Holding List

Includes the aircraft that have been given a holding clearance. The default items are the callsign (left click opens Callsign menu) and the holding point name (left click opens the Holding menu)

7 Safety Nets

7.1 APW (Area Proximity Warning)

7.1.1 General

The APW system warns if an aircraft is inside or about to enter an active area it shouldn't be entering (for example active danger, restricted and TSA areas). The position of the aircraft is only predicted in 30 second intervals for performance reasons so very short future intrusions may not be noticed by the system. The areas are defined in an external text file and activated in the TSA Areas window.

7.1.2 Alert display on the radar screen

An alert is shown by displaying the text "APW" in the Alert message field on the top row of the track label. Note that an MSAW alert will have priority over an APW alert.

7.2 MSAW (Minimum Safe Altitude Warning)

7.2.1 General

The MSAW system alerts when an aircraft is flying at an altitude below the minimum safe altitude. The minimum safe altitude data is read from an external file that has to be present for the system to give any warnings. There is an adjustable buffer value in the system that allows some altitude variation below the safe altitude to inhibit nuisance alerts for aircraft flying at the minimum safe altitude and not staying exactly at that altitude.

7.2.2 Alert display on the radar screen

An alert is shown by displaying the text "MSAW" in the Alert message field on the top row of the track label.

7.3 STCA (Short Term Conflict Alert)

7.3.1 General

The STCA system is designed to alert the controller of a possible or actual loss of separation between aircraft. The alert is given a specified time (for example 90 seconds) before a loss of separation is predicted to happen, but it is dependent on the relative positions and movement of the aircraft. The alert will not be shown if both aircraft have STCA alerting selected off (via the Setup menu or Callsign menu) or when either aircraft is inside an active STCA inhibit area.

In the vertical plane there is an option to always assume that an aircraft will level off at its cleared level. This will reduce the number of nuisance alerts caused by climbing and descending aircraft in busy airspace, but will delay the alert in case an aircraft continues through its cleared level. The alert will then be given only after the failure to level off is seen by the system.

7.3.2 Alert display on the radar screen

An alert is shown by coloring the CALLSIGN item in "Urgency" color (red by default). In the Conflict And Risk Display (see section 8.1.3) an aircraft with an STCA alert will have its callsign field background in "Urgency" color.

8 FPCP (Flight Plan Conflict Probe)

8.1 MTCD (Medium Term Conflict Detection)

8.1.1 General

The MTCD system is a tool that enables the controller to predict possible future conflicts between aircraft. For performance reasons the maximum selectable look-ahead time (prediction time) is limited to 40 minutes and the separation distance that triggers the alert (prediction distance) to 20 nm. They can be set to any lower value, the defaults being 20 minutes and 8 nm.

In the lateral plane the system works by checking the aircraft's predicted route up to the defined prediction time and calculating if the separation with other aircraft will be less than the defined prediction distance during that time period.

The system does not have a vertical path prediction capability. It detects conflicts in the vertical plane by assuming the aircraft to occupy all levels between AFL and CFL. A risk would be shown for a problem between AFL and XFL that is not a conflict.

In short:

Conflict - Current clearance may lead to loss of separation

Risk
- Current clearance will not lead to loss of separation
- Clearing the aircraft to its XFL may lead to loss of separation
- Clearing the aircraft to a level between current CFL and XFL may lead to loss of separation

For the predictions to be accurate, it's very important to keep the CFL and the aircraft's route updated at all times. MTCD can be disabled for aircraft that have an assigned heading or a RAM warning, as in those cases the system can't predict the aircraft's future positions. If it is enabled for them, the system assumes that the aircraft continues on its present track and ground speed for a specified time and stops the prediction there. The system is disabled for non-altitude reporting traffic that doesn't have a manually set AFL.

8.1.2 Conflict and risk display on the track label

By default MTCD warnings will not be shown in the track labels. The plugin contains two tag items that can be added to the default tags if needed. "MTCD indicator (dot)" displays a red dot, while "MTCD indicator (MTCD text)" displays the text "MTCD" in yellow. The warning will be shown if there is a conflict (optionally warns for risks as well) with minimum separation below the warning distance within the warning time.

8.1.3 CARD (Conflict And Risk Display)

The CARD window presents the MTCD conflicts and risks. It also allows setting some of the related parameters. It is divided into two parts:

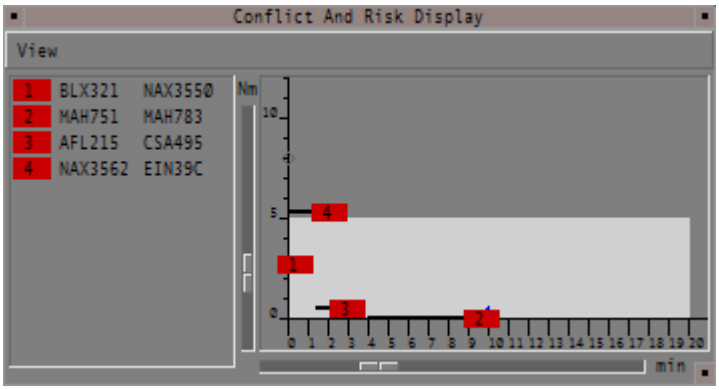
On the left is the list area which includes all the detected problems and shows the concerned aircrafts' callsigns. A conflict has a red label and a risk has a yellow one. A red background on a callsign means that the aircraft has a Short Term Conflict Alert. A highlighted callsign will be highlighted in this list as well. Hovering the mouse cursor over a problem label will display the problem on the radar screen and right-clicking on the label will highlight both callsigns to serve as a reminder. Left-clicking on the label will lowlight the problem, turning the label on both this list and on the graphical display area from a filled

rectangle into an outline. A lowlighted problem will not display the MTCD warning tag item. The problems are numbered in the order they are discovered and do not indicate any severity order.

On the right is the graphical display area that gives an overview to the severity and timeframe for each problem. On the vertical (distance) axis the problems are placed to the predicted minimum separation and on the horizontal (time) axis the label is placed so that the left edge of the conflict number is at the time of closest point of approach. A black line, extending to the left from the label, marks the time when the separation will decrease below the prediction distance. For fast closure rates the time from prediction distance to CPA will be too short to display the black line, it will be covered by the label. The problem labels have the same mouse functions as the ones in the list area.

The light grey area marks the area bounded by the prediction time and warning distance. The dim grey diamond on the distance axis marks the prediction distance and the blue triangle marks the warning time.

From the “View” menu it is possible to toggle the display of the list area, the display of risks in the CARD window and draw a nm/min grid on the graphical area.



The CARD window above shows a number of problems. In problem number three (conflict between AFL215 and CSA495) the separation is predicted to reduce below the 8 nm prediction distance in about 1.5 minutes. Their minimum separation is predicted to be about 0.5 nm, the time to closest point of approach being 2.5 minutes. Placing the mouse cursor on the problem label shows the problem on the radar screen as well. The problem display on the radar screen shows only that conflict with solid route lines for both aircraft up to the closest point of approach. Either of the two aircraft may have any number of other conflicts or risks at any time and they will not be shown here.

In addition the CARD window shows three other conflicts (no risks, they would be colored yellow). Problem number four shows a conflict between NAX3562 and EIN39C. It would not show the MTCD tag item as the predicted minimum separation in that case is over the 5nm limit.

The mouse click areas of the CARD window (left mouse button unless otherwise specified):

- Top left corner: Close the window
- Top right corner: Minimize the window to show only the title bar
- Title bar (other than the two corners): Drag to move the window
- “View” menu label: Open / close the View menu.
- Vertical slider: Drag to adjust the distance scale
- Horizontal slider: Drag to adjust the time scale

- Bottom right corner: Drag to adjust window size
- Diamond on vertical axis: Drag to adjust prediction distance
- Triangle on horizontal axis: Drag to adjust warning time
- Top left corner of prediction area: Drag to adjust warning distance
- Bottom right corner of prediction area: Drag to adjust prediction time
- Problem number labels: Left-click to toggle lowlight of this problem
  Right-click to toggle highlight of both callsigns

8.2 SAP (Segregated Area Probe)

8.2.1 General

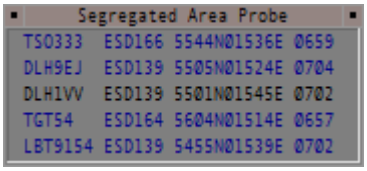
Much like the MTCD system predicts future conflicts between aircraft, the SAP system predicts future intrusions into active areas. The system uses the same look-ahead time as the MTCD system. The future position predictions are done at one minute intervals which means a very short intrusion into an active area may not be noticed by the system. The classification into risks and conflicts is the same as in MTCD: a conflict means that the current clearance may lead to the aircraft entering an active area, whereas a risk means that the current clearance will not lead to that but clearing the aircraft to its XFL or some other level beyond the current CFL may do so.

As with MTCD, keeping the CFL and the aircraft's route updated is important for the system's operation. Like MTCD, SAP can be disabled for any aircraft that has an assigned heading or a RAM warning. If enabled, the prediction logic is the same as in the MTCD case. SAP is disabled for non-altitude reporting traffic that doesn't have a manually set AFL.

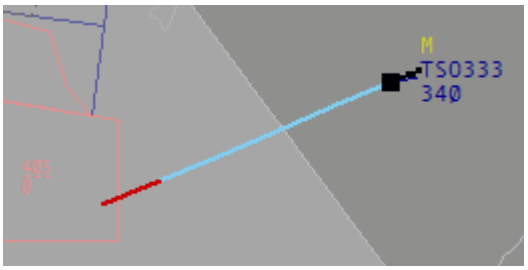
8.2.2 Conflict and Risk display on the track label

A SAP conflict is shown by displaying the Military coordination indicator ("M") on the top row of the track label. The indicator can be set to warn for risks as well. Note that once the indicator is clicked and changes to inactive state, the system will not give further warnings for that aircraft as long as the indicator is in the inactive state. Click on the inactive indicator to re-arm the system once the aircraft has passed all the areas for which crossing clearance was given.

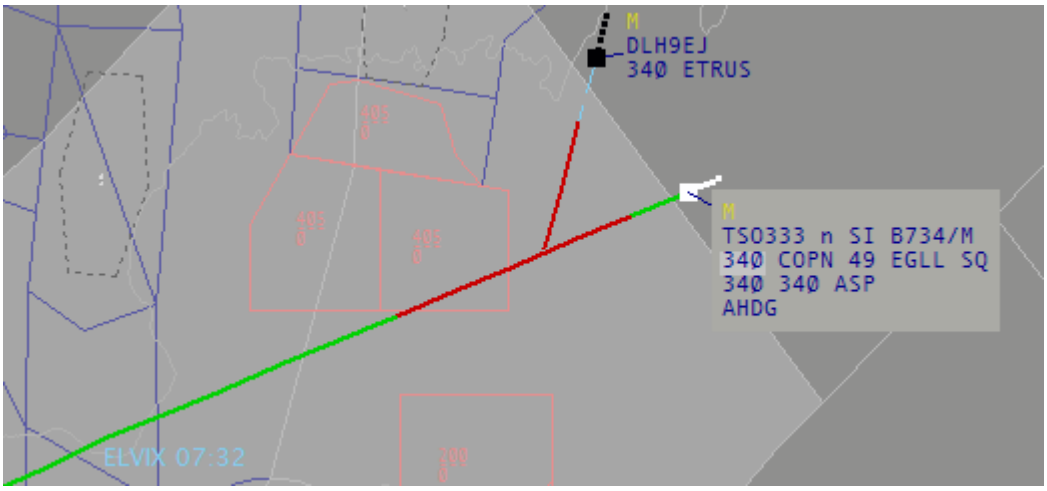
8.2.3 SAP window



The SAP window lists the aircraft that have SAP conflicts (can be set to also show risks). The list shows the aircraft callsign, the area it will enter and the coordinates and the time when it will enter it. Only the first entered area will be shown if the aircraft is predicted to enter more than one active area. Placing the mouse cursor over an aircraft line will show the aircraft's route on the radar screen up to the first point of entering an active area or the first point where there is a risk of doing so if risks are selected to be displayed on the window.



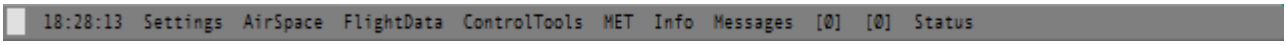
8.3 FPCP results display in the Flight Leg



The FPCP results for the aircraft are shown with different colors. Light blue color means that for that part of the route there is no MTCD or SAP coverage. On the green parts there is MTCD or SAP coverage or both, and there are no problems found. Yellow parts indicate MTCD or SAP risk and red parts conflict. By default for MTCD problems the conflicting aircrafts' routes are shown up to the next full minute after the point of minimum separation but they can be selected off. The conflicting aircrafts' routes are drawn with light blue dashed lines up to the start of the problem and do not give any information on their other possible MTCD problems.

For TSO333 in the picture above, the flight leg shows no problems for the first minute or two. Then there will be an MTCD conflict with DLH9EJ approaching from the north, followed by an SAP conflict as the route is predicted to enter an active danger area extending up to FL405. The rest of the route appears to be problem free.

9 The menu bar



9.1 Settings menu

In the submenus **[Back]** returns to the next higher menu level and **[Reset Defaults]** - available in some submenus - resets the original hardcoded values to all items in that submenu. Clicking **Save Settings** marks the current settings to be saved on exiting EuroScope. You'll still have to remember to actually save them in the dialog that's presented to you on exiting ES. Grey ("disabled menu item" color in ES Symbology dialog) text lines in the menus are either title lines or settings that will not have any effect because of some other setting. For example setting STCA off will color all other STCA settings lines grey. Those settings can still be changed and saved normally.

9.1.1 Altitudes

- QNH/QFE — Selects the reference to use in low altitudes [QNH/QFE]
- TransAlt — The transition altitude (the EuroScope TA is not used)
- AD elev — Aerodrome elevation to use in QFE based height calculation
- RVSM max — Upper limit for RVSM airspace
- RVSM min — Lower limit for RVSM airspace
- 8.33 min — Above this level 8.33kHz radios are required
- IAS/Mach — Above this level the ASP menu will first open in Mach mode
- AFL buffer — When checking if AFL=CFL (or AFL=PEL), this much error (+50ft) is allowed. Used in the track label and the holding views.

9.1.2 Colors

The plugin defined colors. Many screen colors are still set in the EuroScope Symbology dialog, the colors here are only the additional colors used for plugin specific functionality. The colors are shown as RGB values, to change them enter a new color in exactly the same format, i.e. "(RRR,GGG,BBB)", and check that the menu updates to show the new color. Appendix C contains information on which colors are used where.

9.1.3 Equipment

- Use codes — Defines whether to use or disregard the equipment codes
- S-mode XPDR — S-mode transponder (for the extended label equipment field)
- Non-alt XPDR — Non-altitude reporting transponder (altitude hidden by plugin)
- 8.33kHz — 8.33kHz channel spacing VHF radios
- Non-8.33kHz — No 8.33kHz channel spacing VHF radios
- RNAV — B-RNAV approved
- Non-RNAV — Not approved for B-RNAV operation
- RVSM — RVSM approved
- Non-RVSM — Not approved for RVSM operation

Lists of flight plan equipment suffix letters associated with certain capabilities. For example the list Non-alt XPDR determines the aircraft whose AFL will be hidden, simulating a non-altitude reporting transponder.

If "Use codes" is set to "Off" (default), the equipment suffix letters will not have any effect and all aircraft are assumed to have all needed equipment. Selecting the setting "On" will increase realism and enable

some plugin functionality but may cause a lot of extra work as the codes are not always correctly set by the pilots.

9.1.4 Manual Alerts

The setup menu for the Manual Alert texts. Here you can change what text is displayed in the tag for each alert. Clearing the text removes the alert from list of selectable alerts in the tag menu.

9.1.5 Safety Nets

9.1.5.1 APW (Area Proximity Warning)

- APW — Sets APW [On/Off] for this EuroScope instance
- APW for VFR — Enables APW also for VFR traffic [Yes/No]
- APW for uncorr. — Enables APW for uncorrelated tracks [Yes/No]
- Excluded SSR codes — Range of codes to exclude from APW processing
- Prediction time — The look-ahead time for the APW system
- Warning time — The warning time
- Prediction step — The interval of the future positions checked in the prediction
- U/L border — The altitude above which the "U" lateral buffers are used
- LatBuffer U IFR, LatBuffer L IFR — Lateral buffer to be applied to the areas for IFR traffic
- LatBuffer U VFR, LatBuffer L VFR — Same as above but for VFR traffic
- VertBuffer IFR — Vertical buffer to be applied to the areas for IFR traffic
- VertBuffer VFR — Same as above but for VFR traffic
- Use CFL — Use of CFL value for vertical position predictions [Yes/No]
- CFL Buffer — Assume all aircraft within this distance of CFL to be at CFL
- Conflict count — Number of consecutive positive results needed for alert

It is possible to enter 1-4 digits to the SSR code range. Entering for example "20" will exclude all SSR codes in the range 2000-2077.

Increasing the prediction time or decreasing the prediction step will increase the amount of calculations that are necessary and may cause performance issues.

The APW prediction will be done every time a new position is received for the aircraft and the future prediction assumes constant track and groundspeed. A warning will be shown if the system has detected that the aircraft will enter an active area or the buffer volume around it within the warning time. To avoid false alerts, a number of consecutive positive results needed for alert display can be specified (the default value of 2 meaning that for an alert to be displayed, the APW result must be positive on the current position and on the previous position as well). If the aircraft is currently inside an active area (including the buffers) the conflict count is bypassed and the alert is given immediately.

For more information on the APW system, refer to EUROCONTROL documentation at http://www.eurocontrol.int/safety-nets/gallery/content/public/gm/gmA_ReferenceAPW-10.pdf

9.1.5.2 MSAW (Minimum Safe Altitude Warning)

- MSAW — Sets MSAW [On/Off] for this EuroScope instance
- MSAW for VFR — Enables MSAW also for VFR traffic [Yes/No]
- MSAW for uncorr. — Enables MSAW for uncorrelated tracks [Yes/No]
- Excluded SSR codes — Range of codes to exclude from MSAW processing
- Prediction time — The look-ahead time for the MSAW system
- Prediction step — The interval of the future positions checked in the prediction
- Buffer below MSA — No warning until this much below MSA
- Buffer for VFR — Same as above but for VFR traffic
- Use CFL — Use of CFL value for vertical position predictions [Yes/No]
- CFL Buffer — Assume all aircraft within this distance of CFL to be at CFL
- [Reload MSAW data] — Option to reload MSAW data file in case of problems

In addition the menu shows some fault codes in case the plugin has problems reading the MSAW data file.

9.1.5.3 STCA (Short Term Conflict Alert)

- STCA — Sets STCA [On/Off] for this EuroScope instance
- STCA for VFR — Enables STCA also for VFR traffic [Yes/No]
- STCA for uncorr. — Enables STCA for uncorrelated tracks [Yes/No]
- Excluded SSR codes — Range of codes to exclude from STCA processing
- STCA floor — No alerts below this altitude
- Use CFL — Use of CFL value for vertical position predictions [Yes/No]
- Inhibit areas > — Inhibit areas menu
- Advanced > — Advanced options

The STCA alert will be shown if at least one of the concerned tracks doesn't have STCA inhibited by some setting. For example selecting "STCA for uncorr." off in this menu will still show a warning between an uncorrelated and a correlated track unless the correlated track has its STCA alerting set off.

9.1.5.3.1 Inhibit areas

This submenu allows to activate and deactivate STCA inhibit areas. Any STCA warning with one or both aircraft inside an active area will be inhibited. The altitudes are displayed in hundreds of feet (or meters+"m") at or below the transition altitude, in flight levels (or meters standard+"m") above it. To activate an area, click on it to set the altitude limits. Use the same format in which the altitudes are displayed. The minimum and maximum limits are 0 and 99900ft. Clearing the altitudes will deactivate the area. The "Inhibit in act areas" option decides whether the areas defined as being active in the TSA Areas window should be treated as STCA inhibit areas.

9.1.5.3.2 Advanced

This submenu contains the advanced settings for the STCA system. Be careful when changing these as the results may have a big effect on the operation of the system and may also cause a significant performance hit.

- LatSepU/L border — Border level for the upper and lower lateral separation minima
- CFL buffer — Assume all aircraft within this distance of CFL to be at CFL

For explanation and recommended values for the other options, see EUROCONTROL documentation at http://www.eurocontrol.int/safety-nets/gallery/content/public/gm/gmA_ReferenceSTCA-20.pdf

9.1.5.4 FPCP (Flight Plan Conflict Probe)

- AHDG/RAM time — The prediction time for aircraft not following their routes
- PredTime — The prediction time for aircraft that are following their routes

The two FPCP systems are MTCD and SAP. Both use these two parameters to define their look-ahead times. The predictions assume that the aircraft follow their routes, but if they are not (either on an assigned heading or having a RAM alert) the prediction is made assuming the aircraft continues on its current ground track.

9.1.5.5 MTCD (Medium Term Conflict Detection)

- MTCD — Sets MTCD [On/Off] for this EuroScope instance
- MTCD for VFR — Enables MTCD also for VFR traffic [Yes/No]
- MTCD for AHDG — Enables MTCD for aircraft on an assigned heading [Yes/No]
- MTCD for RAM — Enables MTCD for aircraft with a RAM alert [Yes/No]
- Tag shows risks — MTCD tag item displayed also for risks [Yes/No]
- Excluded SSR codes — Range of codes to exclude from MTCD processing
- MTCD floor — Limits MTCD processing to altitudes above this value
- PredDist — Prediction distance (separation limit that activates the alert)
- WarnDist and WarnTime — Warning distance and time (to display also on tag item)
- VertSepU and VertSepL — Vertical separation values
- ADEP inhibit dist — Inhibits MTCD within this distance from departure airport
- ADES inhibit dist — Inhibits MTCD within this distance from arrival airport

The use of VertSepU and VertSepL depends on the RVSM capability of the aircraft in question. If the aircraft is RVSM approved, VertSepL is used below the upper limit of RVSM airspace, otherwise only below the lower limit of RVSM airspace.

9.1.5.6 SAP (Segregated Area Probe)

- SAP — Sets SAP [On/Off] for this EuroScope instance
- SAP for VFR — Enables SAP also for VFR traffic [Yes/No]
- SAP for AHDG — Enables SAP for aircraft on an assigned heading [Yes/No]
- SAP for RAM — Enables SAP for aircraft with a RAM alert [Yes/No]
- Tag shows risks — Activates the “M” indicator also for SAP risks [Yes/No]
- SAP window risks — Enables the display of risks in the SAP window [Yes/No]
- Excluded SSR codes — Range of codes to exclude from SAP processing
- VertBuffer IFR — Vertical buffer to be applied to the areas for IFR traffic
- VertBuffer VFR — Same as above but for VFR traffic

9.1.6 Airspace Setup

- Areas preactive time — Sets the preactive time for the TSA areas
- Magnetic variation — Sets the variation value, positive means east variation

9.1.6.1 Clearance flag airports

Here you can define the airports for which the inbound clearance indicator (C) is shown on aircraft tags. Destination airports can be searched for in a number of ways. Separate multiple entries with a comma. For example setting “ES” on the “2 first letters” and “EKCH,EKRN” on the “Exact match” will show the indicator for all aircraft with destinations beginning with ES (all Swedish airports) and also for EKCH and EKRN.

Entering exact four-letter airport codes to the Exceptions line will force the indicator to not show for those destinations.

9.1.7 Display Setup

9.1.7.1 Vectors

9.1.7.1.1 AHDG vector

- Font — Font to use in the vector data label
- Font size — Size of the font
- Distance — Show distance in label [Yes/No]
- Direction — Show bearing in label [Yes/No]
- Time — Show flight time to point in label [Yes/No]

9.1.7.1.2 QDM vector (one that's currently being drawn)

- Font — Font to use in the vector data label
- Font size — Size of the font
- Distance — Show distance in label [Yes/No]
- Direction — Show bearing in label [Yes/No]
- Time — Show flight time to point in label [Yes/No]

9.1.7.1.3 QDM ac->ac (fixed QDM vector from one aircraft to another)

- Distance — Show distance in label [Yes/No]
- Direction — Show bearing in label [Yes/No]

9.1.7.1.4 QDM ac->pos (fixed QDM vector from aircraft to a fixed point)

- Distance — Show distance in label [Yes/No]
- Direction — Show bearing in label [Yes/No]
- Time — Show flight time to point in label [Yes/No]

9.1.7.2 Tracks

- No label SSR codes — Hide label for uncorrelated tracks squawking codes in this range
- Prediction line — Length of the track prediction line in minutes
- History dots — Number of history dots drawn
- GS samples — Number of previous positions for ground speed calculation
- GS del min/max — Exclude the min and max values from the samples [Yes/No]

A hidden label will be shown if an STCA alert must be displayed for the aircraft. Excluding the minimum and maximum values from the ground speed calculation may help to reduce the effect of spikes caused by not getting the aircraft position updates at the correct time from the network.

9.1.7.3 Misc

- System units — Sets the system units [Imperial/Metric]
- SI auto freq — Show next frequency before and during handoff [Yes/No]
- Freq time — Time before sector exit to show the next frequency
- CFL menu opens at — Sets the initial highlighted value in the CFL menu [XFL/CFL/RFL]
- Use xfer in color — Color incoming handover labels with the EuroScope "transfer to me initiated" color (only affects data fields with no special coloring) [Yes/No]
- Area labels — Items displayed in the area labels [none/Name/FLs/Name+FLs]

9.1.7.3.1 Direct-to points

- Direct-to label — Display of valid point when assigning direct from radar screen [none/O/O+name] ("O" is a circle centered on the point)
- DctPoints on — Direct points always available [Yes/No]

Having the points always available (not just when giving a direct-to clearance) makes it possible to get information on the points at any time by left-clicking on them. The information will appear in the message area on the right side of the command line.

9.1.7.3.2 Text notes

- Font — Text notes font
- Font size — Size of the font

9.1.7.3.3 Flight Legs

- Auto hide — Hide FLEG when mouse leaves label area [Yes/No]
- Show conflicts — Show MTCD conflicts on FLEG [Yes/No]
- Font — FLEG waypoint label font
- Font size — Size of the font
- Point name — Show waypoint name in label [Yes/No]
- Time — Show estimated time over point in label [Yes/No]

9.2 AirSpace menu

- TSA Areas — Opens the TSA areas window
- Text notes — Opens the Text notes submenu

9.2.1 Text notes

- Create — Creates a new text note (type in text, note placed at cursor pos)
- Delete — Deletes a single text note (click on note to be deleted)
- Delete all — Deletes all text notes

9.3 FlightData menu

- Flight Plan — Allows to enter callsign, then shows the FPL dialog for it
- QDM lines — Opens the QDM lines submenu

9.3.1 QDM lines

- Delete ASEL — Deletes all QDM lines drawn from the ASEL aircraft
- Delete all — Deletes all QDM lines

9.4 ControlTools menu

- CARD — Opens the Conflict And Risk Display
- Holding List — Opens the Holding List
- Holding View 1 — Opens the first Holding View (type in holding point name)
- Holding View 2 — Opens the second Holding View (type in holding point name)
- Segregated Area Probe — Opens the Segregated Area Probe window
- SQ List — Opens the SQ (Arrival Sequence) List
- Track Control — Opens the Track Control window

9.5 MET menu

- METAR — Opens the METAR window

10 Data stored in the flight strip annotation boxes

The plugin stores some data in the flight strip annotation boxes (the group of nine boxes in three columns on the right side of the strip). This enables you to send this data to the next controller, or any other controller by manually pushing the strip. EuroScope can be set to automatically push the strip to the next controller on handoff. In addition the plugin automatically pushes the strip when a handoff proposal (HOP) is sent.

The plugin needs to be able to use three of the nine boxes for its functions. They are the boxes in the bottom row, marked with A, B and C in the picture below. Don't manually edit those boxes or use them to store any other data. The other boxes, marked by minus signs, are not used by the plugin in any way.

Box A stores the holding point if a holding clearance has been given.

Box B stores the previous assigned transponder code, the Freq and Mark indicators, information that the inbound clearance has been given, the manually entered AFL value, military coordination status and a handoff proposal in progress indicator.

Box C stores the contents of OP-TEXT. This means that the data is not shown to any other controller unless you push the strip to him. Any changes will require the strip to be pushed again. It's best to use OP-TEXT mainly for things related only to your sector because of this.

11 External data files

The plugin can read data from external files to enable some functionality. None of them are mandatory for basic plugin operation but if used they must be in the same folder as the plugin itself. The file names must be exactly as specified.

11.1 The areas file (E2kEpluginAreas.txt)

This file contains the areas that are used for the APW and SAP functionality and the STCA inhibit areas. The syntax for the file is described in Appendix D.

11.2 The MSAW data file (E2kEpluginMSAW.txt)

This file contains the minimum safe altitude data for the MSAW functionality. The syntax is described in Appendix E.

11.3 The Direct-to points file (E2kEpluginDctPoints.txt)

To assign direct-to points by clicking on the radar screen, the plugin must know which points can be assigned. By default the plugin scans the active sector file and gets all fixes and navaids from it. If an external file is found, the sector file is not scanned and only the points in the file are used. The file can contain fixes and navaids and the syntax is the same as in the sector file so the data can be copied from there.

Reasons to use this external file could be to limit the available points, or to display additional data about the points as the sector file syntax is extended here so that if data is found on a line after the normal data, that extra data (exactly as written, and only that data) is shown as the point information. Otherwise the shown information will be the name for the fixes and the identifier and frequency for the navaids. The downside of using the file is the extra work keeping its data updated.

Examples:

ANT 113.70 N060.51.46.830 E025.07.36.550	displays “ANT 113.70”
ANT 113.70 N060.51.46.830 E025.07.36.550 Antoni	displays “Antoni”

12 Known issues

The submenus of the Settings menu need a track label on the screen

The current implementation of the menus requires there to be at least one aircraft track label visible on the radar screen for the menu to open or update its data.

Plugin data communication with multiple EuroScope instances

Some data is stored internally within the plugin for each EuroScope instance. This can cause problems when using multiple instances and not having the data transferred to the other instances.

Direct-to points blocking screen panning

If the direct-to points are selected to be on all the time (to be able to see information on any point by clicking on it), they will block some other functions, for example screen panning. If you happen to click on a point when trying to move the screen, the point info is shown and the screen will not move. With a lot of points and when zoomed out enough, this may happen quite often. Just be patient and try clicking again on a different part of the screen.

SQ and Holding lists not sorting

It's not possible to sort the data like in the default lists, and the lines change their order every once in a while, decreasing the usability of the lists.

Appendix A: EuroScope setup

This part of the document is meant for users who either didn't get the plugin as a part of a package including all the settings files, or who want to create their own setup.

To load the plugin and setup EuroScope to make the most out of it, use the following settings in the EuroScope settings dialogs. Settings not mentioned shouldn't make any difference. Remember to save the settings when exiting ES. Use of the plugin file must be saved to each profile file separately for it to be loaded automatically.

General settings

Display options

- Show route when accepting Off
- Lock show route when accepting Off
- Show CLAM warnings On
- Show RAM warnings On

The plugin uses its own route display and the default plugin tags don't offer any way of hiding the ES route display so the first two should be selected off. If both settings are left "on" and the tags not modified, the radar screen will soon be filled with aircraft routes with no way to remove them. The CLAM and RAM warning settings also affect the plugin. If they are selected off, the plugin can't show the warnings either.

TAG display options

- Allow correlated aircraft tag untagged On
- Allow concerned aircraft tag untagged Off
- Allow assumed aircraft tag untagged Off
- Show detailed over untagged On
- Show rectangle over ASEL Off

The first four are needed to display the correct type of track label for each aircraft. The last one doesn't have any effect on the functionality of the plugin and the selection is optional, but the system that the plugin represents doesn't have this feature.

Miscellaneous options

- Keep scratch pad content after direct On

The plugin stores the manual alerts in the scratch pad. If this setting is selected off and a direct clearance is given, any manual alerts are removed as a result.

Display settings

- Number of history dots 0
- Show leader lines Off

The plugin draws its own custom history dots and leader lines so the ES default ones must be selected off.

Symbology settings

Colors

Whether to use the transparency settings is up to the user, and their colors should be set as desired. The plugin colors determine the track label color but the EuroScope color is used to draw the leader line between the position symbol and the label. Appendix C shows some colors having a corresponding ES color. In those cases the plugin and ES colors should be set to the same value.

“Other/normal menu item” and “Other/disabled menu item” should be different colors to be able to see disabled menu items in the setup menus.

“Sector/active sector background” and “Sector/inactive sector background” should be chosen so that all plugin colors can be seen. Medium grey colors work well with the default plugin colors but anything can be used as long as the plugin colors are taken into account and changed accordingly. For example a black sector background color will not work well unless the “Assumed”, “Text Notes”, “Track Default” and “WM Frame” colors are changed in the plugin setup as they are also black.

Symbols

The “Aircraft primary radar only”, all entries beginning with “Aircraft corr.” and “Aircraft uncorr.”, and “History dot” are drawn by the plugin and should be set to “MOVETO 0 0” only. All other symbols are drawn by ES and should be set as desired.

Plug-ins

Load the plugin file (E2kEplugin.dll). After loading it, highlight its name (EUROCAT 2000 E plugin) in the list and move “Standard ES radar screen” from the “Forbidden to draw on types” box to the “Allowed to draw on types” box.

Short Term Conflict Alert Settings Dialog

- Show lower altitude STCA Off
- Show higher level STCA Off

The plugin has its own STCA system and doesn’t use the ES default one. Selecting these settings off will disable the ES STCA warning.

Appendix B: Track label fields description

Treatment of fields with no data

In the unselected labels, a data field that contains no data will be blank. An exception to this is the AFL field which will display “AFL” when no altitude data is available for the track. In the selected and extended labels a field with no data will still be displayed, usually displaying the field name (for example “AHDG”). Exceptions to this are all fields on line 0, the attitude indicator, FIELD15, FIELD18 and MALRT data fields.

Active and inactive indicators

Some of the indicator characters in line 0 have active and inactive states. In the inactive state the indicator is not shown on the unselected label, and on the selected and extended labels it is shown after the other indicators and in the normal flight sector color. For example when clicking the Inbound clearance indicator, it changes to inactive state. Clicking the inactive indicator in the selected or extended label will restore it to active state.

Data fields description and coloring

The table below describes the data fields used in the labels and their coloring rules. No information about the color is given if the label is always the normal flight sector color. The normal flight sector color for an uncorrelated track is always “Unconcerned”.

Flight sectors and their corresponding plugin defined colors:

- non concerned — Unconcerned
- notified — Unconcerned
- coordinated — Coordinated
- transfer to me initiated — Coordinated
- assumed — Assumed
- transfer from me initiated — Assumed
- redundant — Redundant

Data field	Description	Comments	Color
*	Unit	“*” if label units are different from the other aircraft	If metric system units chosen: Warning
+	Field 18 information	Displayed if “PER/”, “RMK/” or “STS/” found in FPL remarks field	
A	Manual alerts	“A” if Manual alert(s) active for this aircraft	Warning

Data field	Description	Comments	Color
a	Attitude indicator	Up arrow when climbing, down arrow when descending. Blank if in level flight or unknown	
ADEP	Departure aerodrome	ICAO code, 4 characters	
ADES	Destination aerodrome	ICAO code, 4 characters	
AFL	Actual Flight Level	Imperial: FL's with 3 digits, altitudes "A"+ 2 digits, heights "E"+ 2 digits, in hundreds of feet. Metric: FL's with 5 digits, altitudes "M"+max 4 digits, heights "E"+max 4 digits, leading spaces added if necessary to make 5 characters total	When manually set value: Warning
AHDG	Assigned heading	"H"+ 3 digits for a heading or the point name for a direct point	If a value is assigned and HOP: Proposition
ALRT	Alert message	"MSAW", "APW", "CLAM", "RAM" or "DUPE"	MSAW or APW: Warning
ALT1	Alternate aerodrome 1	ICAO code, 4 characters	
ALT2	Alternate aerodrome 2	Second alternate can be set by inserting "ALT2/XXXX" (where XXXX is the aerodrome ICAO code) into the FPL remarks field	
ASP	Assigned speed	Imperial: Speed with 2 digits, in tens of knots, max displayed "99". Mach "M"+ 2 digits, max displayed "M99". Metric: Speed "K"+ 2 digits, in tens of km/h, max displayed "K99". Mach "M"+2 digits, max displayed "M99".	If a value is assigned and a HOP or transfer is in progress: Proposition
ASSR	Assigned mode 3/A code	"A"+ 4 digits. If no code assigned, shows TSSR code (and if TSSR not available, "ASSR")	If different than TSSR: Warning

Data field	Description	Comments	Color
ATYP/W	Aircraft type / Wake turbulence category	Type with max 4 characters + "/" + category with 1 character	If highlighted: Warning
C	Inbound clearance	"C" if ADES is one of the defined airports -> aircraft needs inbound clearance	Active state: Warning
CALLSIGN	Callsign	If more than one aircraft, suffixed by "+"	Priority order: STCA alert: Urgency Incoming HOP: Proposition Highlight: Warning If none of the above: Notified: Coordinated Transfer in: Assumed Transfer out: Redundant
CFL/PEL	Cleared Flight Level or Planned Entry Level	PEL is shown for flights in "coordinated" and "ongoing coordination" states, CFL otherwise. See AFL field for format. Unselected label: Not shown if equal to AFL and no ongoing coordination.	PEL: Ongoing coordination: Proposition Coordination refused: Warning
COM	Communication type	"r" if voice receive only "t" if text only	Warning
COORD	Coordination message	"ROF" if aircraft already in other controller's sector and still assumed by you	Coordination
COPN/COPX	Entry point or Exit point	COPN is shown for flights in "coordinated" and "ongoing coordination" states, COPX in "assumed", "transfer initiated" and "redundant" phases. A holding clearance is displayed if there is no coordination, its format is holding point name + " H" or for lat/lon point holdings, "POS H"	Ongoing coordination: Proposition Coordination refused: Warning
EET	Estimated Elapsed Time	"HHMM"	
EMRG	Emergency	"HI" for squawk 7500, "CF" for squawk 7600, "EM" for squawk 7700	Urgency

Data field	Description	Comments	Color
EOBT/ETD/ATD	Estimated Off-Block Time or Estimated Time of Departure or Actual Time of Departure	For a departed aircraft, shows the actual departure, otherwise the estimated departure time. “HHMM”, both times taken from the FPL data	
EQUIP	Navigational equipment	A very rough conversion from the FAA equipment suffix to an ICAO equipment list	
FIELD15	Speed/Level/Route	The flight plan field 15 data (TAS, RFL and route). Max 240 characters displayed.	
FIELD18	Other information	The flight plan field 18 data (remarks). Max 240 characters displayed.	
FREQ	Frequency	“•”, set from Callsign menu	Field Highlight
GS	Ground Speed	Imperial: 2 digits, in tens of knots, max displayed “99” Metric: “K”+ 2 digits, in tens of km/h, max displayed “K99”	
I	Flight information	OP-TEXT has data	
M	Military coordination	“M” if military coordination is required	Active state: Warning
MALRT	Manual alerts	Displays alerts entered via the Callsign menu	Warning
MARK	Mark	“•”, set from Callsign menu	Warning
NRAC	Number of aircraft	Number from 2 to 99 Unselected label: blank if 1 Selected label: “n” if 1 Number can be set by prefixing the aircraft type in the FPL by “X/” where X is the number (max 99).	
OP-TEXT	Flight information message	User entered text, stored in the flight strip. See section 10 for limitations	

Data field	Description	Comments	Color
OP-TEXT2 (line 0)	OP-TEXT2 message	If over 10 characters, then shows first 9 + “>”	
OP-TEXT2 (line 8)	OP-TEXT2 message	User entered text, stored in the scratchpad	
PSSR	Previous mode 3/A code	If not known, “A”. Otherwise format as ASSR field.	
R	No B-RNAV capability	“R” if aircraft equipment is not indicating B-RNAV capability	Not approved: Urgency Unknown: Unknown
SI	Sector Indicator	For tracked aircraft, shows the next sector identifier or frequency. For other aircraft, shows the tracking controller identifier or frequency.	Priority order: Outgoing HOP: Proposition Manually changed next sector: Warning Normal next sector: Coordination
SQ	Sequence number	A number from 1 to 99	
TEL	Manual coordination flag (EuroScope default tag item)	Displays a telephone symbol when ongoing coordination has been attempted with a controller not using EuroScope. Coordinate manually (using text messages, interphone, etc.) and then click the symbol to accept the coordination values.	ES Symbology dialog -> Datablock -> information
TSSR	Aircraft transponded mode 3/A code	If not available, shows “TSSR”, otherwise format as ASSR field.	
V	Flight rules	“V” if VFR, “Y” if IFR and changing to VFR during flight, “Z” if VFR and changing to IFR during flight	
W	No RVSM capability	“W” if aircraft equipment is not indicating RVSM capability	Not approved: Urgency Exempt: Information Unknown: Unknown
XFL	Exit Flight Level	See AFL field for format. Unselected label: Not shown if equal to CFL/PEL and no ongoing coordination.	Ongoing coordination: Proposition Coordination refused: Warning
Y	No 8.33kHz capability	“Y” if aircraft equipment is not indicating 8.33kHz capability	Not approved: Urgency Exempt: Information Unknown: Unknown

Appendix C: Colors

The following table shows the plugin defined colors (and where applicable, their ES counterparts, which should be set the same for best results). The Usage column indicates where the colors are used (the list may not be complete). In the aircraft colors “Labels” means track labels and any lists where aircraft information is displayed, “Tracks” radar position symbols, history dots, prediction lines and divergence symbols.

All the ES colors in the table can be found in the Datablock group in the Symbology dialog except “active sector background” which is in the Sector group.

“N/A” in the Usage column indicates that the color is not used in this version of the plugin.

Color name	Corresponding ES color	Default color	Usage
Aircraft colors			
Assumed	assumed		Labels
Coordination	notified		Labels
Information			Labels
Proposition			Labels
Redundant	redundant		Labels
Track Default			Tracks
Track Highlight			Tracks (when selected)
Unconcerned	non concerned		Labels
Unknown			Labels
Urgency			Labels, CARD callsign STCA background
Warning			Labels
Aircraft related items on the radar screen			
Flight Leg			Part of flight leg without MTCD and SAP coverage
Heading Vector			Heading vector
Information FL			Part of flight leg with no MTCD or SAP problems, Holding view AFL-CFL boxes
QDM			QDM vector
Urgency FL			Part of flight leg with MTCD or SAP conflict, CARD conflict labels, Holding view AFL-CFL
Warning FL			Part of flight leg with MTCD or SAP risk, CARD risk labels
Map colors			
Active Map			Active TSA map border
Active RD Map			Active R or D map border
Active Text Map			Active TSA map text
Active Text RD Map			Active R or D map text
Preactive Map			Preactive map border
Preactive Text Map			Preactive map text

Color name	Corresponding ES color	Default color	Usage
Window and menu colors			
Active Sector	active sector background		Holding view background area
Background			Background
CARD Foreground			CARD aircraft callsigns (if not highlighted), line between conflict start and CPA on graphical view
CARD PredArea			CARD prediction area
CARD Triangle			CARD window warning time triangle
Field Highlight	active item background		Selected field
Flight Highlight	detailed background		Selected item
Foreground			Texts, lines, close/min/resize boxes
Foreground2			CARD nm/min grid and prediction distance diamond, holding view FL lines
Selected Period			N/A
TSA Active			Active areas in area window
TSA Preactive			Preactive areas in area window
WM Bg			Window title bar background
WM Border			Window border line
WM Frame			Window frame when dragging
WM Slider Bg			Slider area background
Other colors			
Text Notes			Text notes

Appendix D: E2kEpluginAreas.txt syntax

This file contains the areas for the APW and SAP functionality as well as the STCA inhibit areas. The following example area is used to show the syntax. To have the area filled with a color, create an area in the [REGIONS] section of the sector file with the same name as the area and it will be automatically activated with the area.

// EF D10 Kirkonmaa-Rankki SFC-23000AMSL	Comment line
AREA:D:EFD10	Name line
LABEL:N060.20.40.268:E026.58.32.611:D10	Label line
BOUND:G:60.2:60.4:26.8:27.2	Bound line
LIMITS:0:230	Limits line
N060.23.01.000 E026.48.49.000	Coordinate line
N060.23.01.000 E027.07.49.000	Coordinate line
N060.16.55.000 E027.10.36.000	Coordinate line
N060.18.55.000 E026.48.49.000	Coordinate line

Name line

AREA:AreaType:AreaName

The first line for each area definition must be a name line. Type S areas will appear in the STCA inhibit areas submenu in the Settings menu whereas the other types are in the TSA Areas window.

- AREA — Line identifier
- AreaType — Area type: D (danger), R (restricted), S (STCA inhibit area) or T (TSA)
- AreaName — Area name to identify it in the areas window (text string)

Label line

LABEL:Lat:Lon:LabelText

The label line is optional. Including it will make it possible to display the area name and altitude limits on the radar display when the area is drawn there.

- LABEL — Line identifier
- Lat — Latitude for the label (sector file format)
- Lon — Longitude for the label (sector file format)
- LabelText — The label text (text string)

Bound line

The bound line is optional but highly recommended. It reduces the amount of calculations that are needed which gives a performance gain to the plugin. There are two types of bound lines, one for areas that are circles and the other for all other area shapes.

BOUND:C:Lat:Lon:Radius

The C (Circle) type line should be used for areas that are circles. The *"Lat"* and *"Lon"* coordinates (decimal degrees) define the center point and the *"Radius"* (nautical miles, decimal number) the radius of the circle. The information is used to check if the aircraft is inside the area, but also the coordinate lines are still needed as they are used to draw the area on the screen.

BOUND:G:Lat_{min}:Lat_{max}:Lon_{min}:Lon_{max}

The G (Grid) type line should be used for other shapes. It defines the maximum dimensions of the area (in decimal degrees) and acts as a coarse filter for the system. If the aircraft is outside the bounds defined here the coordinate lines will not even be taken into consideration, saving some processing time. A more accurate check with the area coordinate lines is only done if the aircraft is inside the bounds.

Limits line

LIMITS:Alt_{min}:Alt_{max}

The limits line is optional. It defines the default vertical limits of the area (in hundreds of feet). They can be changed as required in the area windows. When an area without default vertical limits is activated, its limits will be set to 0 and 999 (from 0ft to FL999). Those are also the minimum and maximum allowed values.

Coordinate line

Lat Lon

Each area definition must have at least three coordinate lines (three points being the minimum required to create a closed area, a triangle). There is practically no upper limit for the number of coordinate points, but as the required calculations increase proportionally to the number of points, it's best to keep the areas simple. The latitude and longitude values must be in the sector file format and there must be one or more spaces between them. There may also be one or more spaces in the beginning of the line before the latitude value so it should be relatively easy to create areas from the REGIONS part of a sector file.

Appendix E: E2kEpluginMSAW.txt syntax

The file is read one line at a time and the first line that contains the aircraft position returns the minimum safe altitude, so put specific small area lines at the top and large general areas to the end of the file. Be careful to always use the correct syntax to achieve any results and use the point (.) as the decimal separator as the comma is used to separate the fields. Only define one area per line. There are five types of area definitions that are accepted:

Lat/Lon box area

A,Lat_{min},Lat_{max},Lon_{min},Lon_{max},MSA

An area bounded by the minimum and maximum latitude and longitude values

- A — Area type
- Lat_{min} — Minimum Latitude (degrees, decimal value)
- Lat_{max} — Maximum Latitude (degrees, decimal value)
- Lon_{min} — Minimum Longitude (degrees, decimal value)
- Lon_{max} — Maximum Longitude (degrees, decimal value)
- MSA — Minimum Safe Altitude within the area (feet, integer value)

Circle

C,Lat,Lon,r,MSA

A circle of radius r with center point at (Lat,Lon)

- C — Area type
- Lat — Circle center point latitude (sector file format)
- Lon — Circle center point longitude (sector file format)
- r — Radius of circle (nautical miles, decimal value)
- MSA — Minimum Safe Altitude within the circle (feet, integer value)

Lat/Lon box area list

L,Lat_{min},Lon_1,Lat_{max}, ΔLon,n,MSA_1,MSA_2,…,MSA_n

A series of latitude-longitude bounded boxes. The boxes are in a east-west direction, with the first box being the westernmost.

- L — Area type
- Lat_{min} — Minimum Latitude (degrees, decimal value)
- Lon_1 — Longitude of the west edge of first box (degrees, decimal value)
- Lat_{max} — Maximum Latitude (degrees, decimal value)
- ΔLon — Longitude size of one box (degrees, decimal value)
- n — Number of boxes
- MSA_1-MSA_n — Minimum Safe Altitudes of the boxes (feet, integer values, must be n values)

Polygon

P,n,Lat_1,Lon_1,Lat_2,Lon_2,…,Lat_n,Lon_n,MSA

A polygon with *n* vertices at given latitude-longitude points

- P — Area type
- n — Number of vertices
- Lat_1 — Latitude of vertex 1 (degrees, decimal value)
- Lon_1 — Longitude of vertex 1 (degrees, decimal value)
- Lat_2 — Latitude of vertex 2 (degrees, decimal value)
- Lon_2 — Longitude of vertex 2 (degrees, decimal value)
- Lat_n — Latitude of vertex n (degrees, decimal value)
- Lon_n — Longitude of vertex n (degrees, decimal value)
- MSA — Minimum Safe Altitude within the polygon (feet, integer value)

Sector

S,Lat,Lon,Rdl_1,Rdl_2,r_{min},r_{max},MSA

An area defined as being between two true bearings from a point (Lat,Lon) - clockwise direction from Rdl_1 to Rdl_2 - and between distances r_{min} and r_{max} from the point

- S — Area type
- Lat — Point latitude (sector file format)
- Lon — Point longitude (sector file format)
- Rdl_1 — True bearing 1 (degrees, decimal value)
- Rdl_2 — True bearing 2 (degrees, decimal value)
- r_{min} — Minimum distance from point (nautical miles, decimal value)
- r_{max} — Maximum distance from point (nautical miles, decimal value)
- MSA — Minimum Safe Altitude within the sector (feet, integer value)