

# TopSky plugin for EuroScope

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*- version 2.5 -*

Developer Guide

## Table of Contents

<b>1</b>	<b>EuroScope setup</b>	<b>3</b>
1.1	General Settings	3
1.1.1	Display options	3
1.1.2	TAG display options	3
1.1.3	Miscellaneous options	3
1.2	Display settings dialog	4
1.3	Symbology dialog	4
1.3.1	Colors	4
1.3.2	Symbols	5
1.4	Plug-ins Dialog	5
1.5	Conflict Alert Settings Dialog	5
1.5.1	STCA Lower altitude	5
1.5.2	STCA Higher level	5
1.5.3	MTCA options	5
1.6	Plugin data files and internal settings	6
1.7	Tag families and flight lists setup	7
1.7.1	Tag families	7
1.7.2	Flight lists	7
1.7.3	CPDLC	8
1.7.4	Oceanic	9
<b>2</b>	<b>Plugin data files</b>	<b>10</b>
2.1	TopSkyAirspace.txt	11
2.2	TopSkyAreas.txt	16
2.2.1	AUP activation	26
2.2.2	Remote activation	27
2.3	TopSkyCPDLC.txt	28
2.4	TopSkyMaps.txt & TopSkyMapsLocal.txt	31
2.5	TopSkyMSAW.txt	44
2.5.1	MSAW areas	44
2.5.2	APM areas	46
2.6	TopSkyRadars.txt	48
2.7	TopSkySettings.txt & TopSkySettingsLocal.txt	51
2.8	TopSkySSRcodes.txt	52
2.9	TopSkySTCA.txt	61
2.10	TopSkySymbols.txt	64
2.11	TopSkyViews.txt	67
2.12	ICAO_Aircraft.txt	67
2.13	ICAO_Aircraft.json	68
2.14	ICAO_Airlines.txt & ICAO_Airlines_Virtual.txt	69
2.15	ICAO_Airports.txt	69
2.16	isec.txt	69
<b>3</b>	<b>Sound files</b>	<b>70</b>
<b>4</b>	<b>Cursor files</b>	<b>70</b>
<b>5</b>	<b>External access</b>	<b>70</b>

# 1 EuroScope setup

This chapter is meant as a guide 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.

## 1.1 General Settings

### 1.1.1 Display options

- Show route when accepting Off
- Lock show route when accepting Off
- Rotate radar target symbol Off
- Rotate flight plan track symbol Off
- Show CLAM warnings Off
- Show RAM warnings Off

The plugin uses its own route display and the default plugin track labels 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 track labels are not modified, the radar screen will soon be filled with aircraft routes with no way to remove them. The plugin also has its own CLAM and RAM functions.

### 1.1.2 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

These settings are needed to display the correct type of track label for each aircraft.

### 1.1.3 Miscellaneous options

- Keep scratch pad content after direct On
- Highlight ASEL AC in lists Off (see note)

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

If the second setting is selected on, the "Toggle Route draw (with autohide)" tag function will not work in flight lists for any flights that have a label displayed on the radar screen.

## 1.2 Display settings dialog

- |                                 |     |      |
|---------------------------------|-----|------|
| • Number of history dots        | 0   |      |
| • Do not display aircraft below | 0   | feet |
| • Do not display aircraft above | 0   | feet |
| • Show leader lines             | Off |      |

The plugin draws its own custom history dots and leader lines so the ES default ones must be selected off. Similarly, the plugin has its own altitude filtering settings, so the ES filters should be off.

## 1.3 Symbology dialog

### 1.3.1 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 defined color is used to draw the leader line between the position symbol and the label. Some EuroScope colors have a corresponding plugin color setting as listed below. They should be set to the same value.

<u>EuroScope color</u>	<u>Plugin color</u>
------------------------	---------------------

Aircraft colors:

- |                                    |                        |
|------------------------------------|------------------------|
| • Datablock/non concerned          | Color_Unconcerned      |
| • Datablock/notified               | Color_Coordination     |
| • Datablock/assumed                | Color_Assumed          |
| • Datablock/redundant              | Color_Redundant        |
| • Datablock/information            | Color_Warning          |
| • Datablock/detailed background    | Color_Flight_Highlight |
| • Datablock/active item background | Color_Field_Highlight  |

List colors

- |   |                        |
|---|------------------------|
| • Datablock/AC list background          | Color_Background       |
| • Datablock/AC list selected background | Color_Flight_Highlight |
| • Other/list header                     | Color_Foreground       |

Background colors:

- |                                     |                    |
|-------------------------------------|--------------------|
| • Sector/active sector background   | Color_Map_Bright   |
| • Sector/inactive sector background | Color_Radar_Win_Bg |

If adjusted from the default ones, the background colors should be chosen so that all plugin colors can be seen. Medium grey colors work well with the default plugin colors (dark colors with the “COOPANS” version activated), but anything can be used as long as the plugin colors are taken into account and changed accordingly.

“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.

### 1.3.2 Symbols

The “Aircraft primary radar only”, “Aircraft flight plan track”, “Aircraft coasting”, “History dot” and all entries beginning with “Aircraft corr.” or “Aircraft uncorr.” 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.

## 1.4 Plug-ins Dialog

Load the plugin file (TopSky.dll). After loading it, highlight its name (“TopSky 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.

## 1.5 Conflict Alert Settings Dialog

The plugin has its own STCA and MTCD systems and doesn’t use the ES default ones. Selecting the below settings will disable the warnings from the ES default systems.

### 1.5.1 STCA Lower altitude

- Show lower altitude STCA Off

### 1.5.2 STCA Higher level

- Show higher level STCA Off

### 1.5.3 MTCA options

- Show MTCA Off
- Warn if vertical separation is less 0 feet
- Warn if horizontal separation is less 0 nm

## 1.6 Plugin data files and internal settings

The plugin comes with some pre-defined setups, but it is possible to adjust hundreds of different settings using the [settings files](#). This makes it possible to update the existing setups and to create completely new ones. Even though the ranges of acceptable values have been limited to prevent major problems, care should be taken when adjusting any settings as the results can be unexpected.

When creating a new setup, only the **ICAO** data files can be used from an old setup, as they contain only general data that can be used anywhere. All the other data files contain information specific to the original setup, and should not be used.

Some setup-specific plugin settings are listed below. At least these settings should be looked at when creating a new setup, but many of the others are important too. However, never change a setting without understanding what it does.

Setup_COOPANS	Specify if the “COOPANS” version of the plugin is to be activated
Airspace_C_Flag	Define the list of clearance flag airports
Airspace_C_No_Flag	
Airspace_P_Flag	Define the list of P-RNAV airports (applicable to “COOPANS” version only)
Airspace_P_No_Flag	
Airspace_ASSR_Type	Define the transponder code ranges
Airspace_ASSR_StartCode	
Airspace_ASSR_EndCode	
Airspace_No_DUPE_Codes	Define the transponder codes that do not produce a DUPE alert
Airspace_SIGMET_Areas	Define airspace information for the SIGMET/NOTAM functions
Airspace_NOTAM_Add	
Airspace_NOTAM_Remove	
HTTP_SIGMET_Pages	
Airspace_AOR_Airports	Define airport identifiers in the AOR
Airspace_AOR_Airports_Exclude	
Airspace_AOR_Positions	Define controller login callsigns in the AOR
Airspace_AOR_Positions_Exclude	
WXR_Latitude	Define the weather radar tile center point
WXR_Longitude	(for performance reasons, look into the ..._Min and ..._Max settings as well)

## 1.7 Tag families and flight lists setup

To make the plugin work as it's supposed to, there are some rules that need to be followed when creating the tag families and flight lists:

### 1.7.1 Tag families

Items beginning with “**List**” should not be used in tag definitions (“List” items are not hidden when a label is subject to filtering, the other ones are). Tags should be constructed only from TopSky plugin items. If this is not possible, the plugin's label filtering functionalities may not work as they can only toggle the visibility of its own tag items

#### 1.7.1.1 General

- For every correlated and flight plan track tag type:
  - The *untagged* and *tagged* tags must contain the “**Dummy item – not detailed tag**” item
  - The *detailed* tag must contain the “**Dummy item – detailed tag**” item
- Tag items marked “**(0-1)**” are only displayed when the track is unconcerned or notified, items with “**(2+)**” when the track is in any other state. Other items are shown in all states.
- A couple of the indicator items have an “**(inactive)**” version as well. Both can be used in the same tag, as only one of them will be shown (the inactive version can then be used to toggle the indicator back to active state if required).

#### 1.7.1.2 Tagging levels

- When a tag item has an “**(unselected track)**” variant, it should be used in the *untagged* and *tagged* tagging levels, and the normal variant in the *detailed* tagging level. For tag items without specific variants, the normal variant can be used in all tagging levels.
- Items beginning with “**ET**” should be used in the *detailed* tagging level (they are only displayed in the extended label which is a sublevel of the *detailed* tagging level in the plugin, displayed by the “**Open extended tag**” function). Items with “**(not ET)**” will not be shown in the extended label. Other items are displayed in both the normal *detailed* tag and the extended label.

### 1.7.2 Flight lists

Of the plugin tag items, only the ones beginning with “**List**” should be used in flight lists (“List” items are not hidden when a label is subject to filtering, the other ones are).

The “List\_CALLSIGN” item is used by the plugin for display of flight legs. If that item is not set up to be used in the flight lists, adjust the plugin's “FlightLeg\_Refresh\_TagItem” setting value to another item that is used.

### 1.7.3 CPDLC

The following tag items (all variants – List, ET, etc. unless otherwise specified) and functions have CPDLC related features, and should be incorporated in the relevant tag definitions and flight lists to provide the intended functionality when the plugin’s datalink features are used.

#### 1.7.3.1 Tag items

- AHDG Displays heading uplink status
- ASSR Displays squawk code uplink status
- CALLSIGN Displays CPDLC connection status
- CFL Displays level uplink status
- CPDLC\_E Displays received CPDLC emergency messages
- CPDLC\_W Displays message and connection status messages
- List CMT Displays DCL/PDC request status
- List DCL Displays DCL/PDC request status
- List RFL Displays level downlink status
- NPT Displays direct-to downlink status
- NSSR Displays squawk code uplink status
- PFREQ Displays pilot monitored frequency after “monitor” uplink has been used
- PRFL Displays level downlink status (non-“COOPANS” version only)
- RFL Displays level downlink status (“COOPANS” version only)
- SI Displays frequency change uplink status

#### 1.7.3.2 Tag functions

- Acknowledge PFREQ Acknowledges the information (use with PFREQ tag item)
- CPDLC Warning functions Acknowledges warning or opens a menu (use with CPDLC\_W tag item)
- Open AHDG menu Used to send/answer heading uplinks/downlinks and send direct-to uplinks
- Open ASP menu Used to send/answer speed uplinks/downlinks
- Open Callsign menu Contains many CPDLC related items
- Open CFL menu / Open CFL/PEL menu Used to send/answer level uplinks/downlinks
- Open CMT Pop-up Opens the pop-up
- Open CPDLC Current Message Window (\*) Opens the window (use with the corresponding items, except RFL in the non-“COOPANS” version: use with “List RFL” and “PRFL” items)
- Open CPDLC Emergency Acknowledgement menu Opens the menu (use with CPDLC\_E tag item)
- Open DCL menu Used to send DCL/PDC
- Open Waypoint menu Used to send/answer direct-to uplinks/downlinks
- Send CPDLC squawk SSR Sends squawk code uplink



### 1.7.4 Oceanic

The following tag items (all variants – List, ET, etc. unless otherwise specified) and functions have Oceanic related features, and should be incorporated in the relevant tag definitions and flight lists to provide the intended functionality when the plugin’s oceanic features are enabled (setting “System\_Oceanic=1”).

#### 1.7.4.1 Tag items

- + Displays indicator for a time restriction present in the OCM
- List CTO Displays cleared oceanic entry time
- List MNR Displays cleared Mach number
- List NAT Displays cleared track designator
- List NBT Displays time restriction
- List NLT Displays time restriction
- O Displays indicator for non-acknowledged OCM
- List OAN Displays cleared oceanic entry point
- OFL Displays cleared oceanic cruising level

#### 1.7.4.2 Tag functions

- Acknowledge OCM Acknowledges the received OCM
- Acknowledge OCM/Toggle OFL Highlight If OCM not acknowledged: acknowledges it  
Otherwise: toggles the highlight
- Acknowledge/clear OCM NBT If NBT not acknowledged: acknowledges it  
Otherwise: clears it
- Acknowledge/clear OCM NLT If NLT not acknowledged: acknowledges it  
Otherwise: clears it
- Open Oceanic Time Restriction Window Opens the window
- Toggle Oceanic Level Highlight Toggles the highlight

## 2 Plugin data files

This chapter gives guidance on developing the data files used by the plugin for various features. The data files must be located in the same folder as the plugin dll. Even though the plugin does its best to check the data for errors, some errors may get through and cause all kinds of issues, possibly leading to ES crashing, so it's important to be careful to provide correctly formed data when creating the files. Errors found in the data files by the plugin can be seen in the "Plugin Status" submenu. It is found in the "Status" or "STS" menu depending on the plugin version.

To reload a data file, left-click on the "Reload" button. Some of the data can also be visually checked for correctness by left-clicking the "View" button. The areas will then be shown on the radar screen.

## 2.1 TopSkyAirspace.txt

The file contains the QNH value to transition level tables for the QNH/TL Window, any custom runway approach lines (i.e. starting point not on the runway threshold and/or approach course not aligned with the runway centerline), lists of fixes for the “no fix” warning, lists of custom level menu values, definitions for transition altitude areas and pre-defined initial cleared levels.

For the QNH/TL tables, the file is read one line at a time and the first matching line will be used. The following example shows a possible setup:

// Made up lines...	Comment
QNHTL:XBZZ:80	QNHTL
QNHTL:XB,XC:80,978,75,996,70	QNHTL

For the runway approach lines, any lines defined here will override the corresponding lines automatically created from the sector file data. The following line shows an example:

APPLINE:EFHK:15:153.4:HEL	AppLine
---------------------------	---------

For the custom level lists, the file is read one line at a time and the first matching line will be used. The following example shows a possible setup:

LEVELS:EETN:22,25,32,35,50	LEVELS
LEVELS:*:15,20,30	LEVELS

For the transition altitude areas, the file is read one line at a time and the first matching line will be used. The following example shows a possible setup:

TA_CIRCLE:8000:54.2:11.5:50.0	TA_Circle
TA_POLYGON:7000:54.0:10.0:54.0:20.0:52.0:20.0:52.0:10.0	TA_Polygon

### QNHTL

**QNHTL:ICAolist:TL**

**QNHTL:ICAolist:TL<sub>1</sub>,QNH<sub>1</sub>,TL<sub>2</sub>,QNH<sub>2</sub>, ... ,TL<sub>n</sub>,QNH<sub>n</sub>,TL<sub>n+1</sub>**

Defines a variable transition level based on the QNH value for the specified airports.

- ICAolist                      Comma-separated list of airport ICAO designators. Either complete designators or one to three first letters of the designator.
- TL<sub>n</sub>                            Transition level value (text string, will be displayed exactly as written)
- QNH<sub>n</sub>                         QNH value (integer value, see also below)

The first definition sets a fixed transition level, while the second one creates a table of transition levels based on QNH values.

The QNH value must be in the same format as in the METAR. If the METAR reports the QNH in hPa (Qxxxx), the values in the list must be in hPa as well. If the METAR reports the QNH in inHg (Axxxx), the values in the list must be in inHg\*100.

The TL/QNH list must contain one or more pairs of TL and QNH values followed by a TL value in the end.

The transition level is found in the following way: the actual QNH value found in the METAR is compared against the values in the list, from left to right. If the actual QNH is less than the list value, the corresponding TL value (the one before the QNH value) is used. If not, the next QNH value in the list is checked and so on. If the actual QNH value is equal to or greater than all the values in the list, the TL value after the last QNH value in the list ( $TL_{n+1}$ ) is used.

## AppLine

**APPLINE:AirportCode:Runway:AppCourseT:PointName**

**APPLINE:AirportCode:Runway:AppCourseT:Lat:Lon**

Defines a runway approach line with a specified approach course and end point (either as a point name or coordinates). By default, approach lines are created for all runways in the active sector file with the approach courses set on the extended runway center lines and ending at the runway thresholds. If a runway needs some other approach line instead, it can be defined here. Any runway approach line defined here will override the plugin created default one for the same runway.

- AirportCode            Airport ICAO code
- Runway                Runway identifier
- AppCourseT           Approach track (degrees true, decimal value)
- PointName            Fix, VOR, NDB, airport code or runway (must be found in the active sector file)
- Lat                    Endpoint latitude (decimal degrees or sector file format)
- Lon                    Endpoint longitude (decimal degrees or sector file format)

*Note: the syntax to define a runway threshold as a PointName is the 4-letter ICAO airport designator followed by a forward slash and the runway identifier.*

## Levels

**LEVELS:AirportCode:LevelList**

Defines a custom level list to be used in all plugin level menus (AFL, CFL and RFL). The list here overrides the default list values up to the highest value in the custom list, which after the default list takes over. The airport code is compared against the login callsign, and if a matching list is found, it will be used. In case a matching list is not found, the code then compares the lists against the aircraft's departure airport until more than 1/3 of the way to the destination, and then against the destination airport.

- AirportCode            Airport ICAO code. "\*" matches any airport, other wildcards are not supported
- LevelList              Comma-separated list of levels (in 100's of feet, range 1-999)

## *TA\_Circle*

### **TA\_CIRCLE:TransAlt:Lat:Lon:Radius**

Defines a transition altitude area as a circle with a defined center point and radius. When within this area, the default EuroScope transition altitude will be overridden with the value defined here. The EuroScope transition altitude should still be set to a value representing the airspace as it is used everywhere outside the defined areas, and in parts of the code where the current aircraft position is not available or relevant.

- TransAlt                      Transition altitude (feet, range 0-99999)
- Lat                              Center point latitude (decimal degrees or sector file format)
- Lon                              Center point longitude (decimal degrees or sector file format)
- Radius                         Radius (nautical miles, range 0.1-9999.9)

## *TA\_Polygon*

### **TA\_POLYGON:TransAlt:Lat<sub>1</sub>:Lon<sub>1</sub>:Lat<sub>2</sub>:Lon<sub>2</sub>:Lat<sub>3</sub>:Lon<sub>3</sub>:...**

Defines a transition altitude area as a polygon. When within this area, the default EuroScope transition altitude will be overridden with the value defined here. The EuroScope transition altitude should still be set to a value representing the airspace as it is used everywhere outside the defined areas, and in parts of the code where the current aircraft position is not available or relevant.

- TransAlt                      Transition altitude (feet, range 0-99999)
- Lat<sub>n</sub>                            Polygon vertex latitude (decimal degrees or sector file format)
- Lon<sub>n</sub>                            Polygon vertex longitude (decimal degrees or sector file format)

## *No\_Fix*

### **NO\_FIX:IcaoList:FixList**

Lists mandatory fixes in the flight plan for specific destinations. More than one *No\_Fix* line can be used to set up multiple airports, but information for one airport may not be present in more than one line.

- IcaoList                        Comma-separated list of aerodrome location identifiers
- FixList                         Comma-separated list of waypoint/navaid identifiers

## *Initial\_CFL*

### **INITIAL\_CFL:Value**

Starts a new initial cleared altitude rule definition. If no CFL has been set, this value will be used as the default value in the CFL menu when opened using the “Open CFL menu (DEP List)” function, and from the PDC Window. Additionally, the PDC Window may be set up to automatically assign the value when opened. To set restrictions to where this value is used, *CFL\_\** lines (see below) may be used after this line. The rule definitions are checked in the order they are in the file, and the first one matching will be used.

- Value                      CFL value (altitude in feet, 100-99900)

## *CFL\_FRUL*

### **CFL\_FRUL:FlightRules**

Restricts the preceding rule definition to flights with the specified flight rules.

- FlightRules              “I” or “V”

## *CFL\_ADEP*

### **CFL\_ADEP:Adep<sub>1</sub>:Adep<sub>2</sub>:Adep<sub>3</sub>:...**

Restricts the preceding rule definition to flights departing from the specified airports. “AB\*” will match any airport whose code begins with “AB”. No other type of wildcard use is supported.

- Adep<sub>x</sub>                      Departure airport ICAO code

## *CFL\_DRWY*

### **CFL\_DRWY:Rwyld<sub>1</sub>:Rwyld<sub>2</sub>:Rwyld<sub>3</sub>:...**

Restricts the preceding rule definition to flights departing from the specified runways.

- Rwyld<sub>x</sub>                      Departure runway identifier

## *CFL\_DRWY\_ISACTIVE*

### **CFL\_DRWY\_ISACTIVE:State**

Restricts the preceding rule definition based on the activity state of the aircraft’s departure runway.

- State                      The activity state of the runway
  - “1”                      runway must be active for departures
  - “0”                      runway must not be active for departures

## *CFL\_SID*

### **CFL\_SID:Sid<sub>1</sub>:Sid<sub>2</sub>:Sid<sub>3</sub>:...**

Restricts the preceding rule definition to flights with the specified SIDs.

- Sid<sub>x</sub>                      SID identifier
  - "ABC1A"      matches with SID ABC1A
  - "ABC\*"      matches any SID beginning with "ABC"
  - "none"      must not have a SID assigned
  - "\*"      must have a SID assigned (any SID will match)

## *CFL\_AHDG*

### **CFL\_AHDG:Ahdg<sub>1</sub>:Ahdg<sub>2</sub>:Ahdg<sub>3</sub>:...**

Restricts the preceding rule definition to flights with the specified assigned headings.

- Ahdg<sub>x</sub>                      Assigned heading value
  - "DDD"      assigned heading value in degrees (001-360)
  - "LLL-RRR"      assigned heading range, clockwise from LLL to RRR degrees
  - "none"      must not have an assigned heading
  - "\*"      must have an assigned heading (any heading will match)

## *CFL\_VIA*

### **CFL\_VIA:Point<sub>1</sub>:Point<sub>2</sub>:Point<sub>3</sub>:...**

Restricts the preceding rule definition to flights routing via one of the specified points.

- Point<sub>x</sub>                      Point name

## *CFL\_ENGTYPE*

### **CFL\_ENGTYPE:EngineTypes**

Restricts the preceding rule definition to aircraft with the specified engine types.

- EngineTypes              List of allowed engine types (one or more of the following characters):
  - E (Electric), J (Jet), P (Piston), R (Rocket) or T (Turboprop/turboshaft)

## *CFL\_ENGCOUNT*

### **CFL\_ENGCOUNT:EngineCounts**

Restricts the preceding rule definition to aircraft with the specified number of engines.

- EngineCounts              List of allowed numbers of engines (one or more of the following characters):
  - 1-8 or C (Two engines coupled to drive a single propeller system)

## 2.2 TopSkyAreas.txt

This file contains the areas for the APW and SAP functionality as well as the MTCD, STCA and CLAM/RAM inhibit areas, STCA areas and FPCAs for the MTCD function. The following example area is used to show the syntax (optional lines in grey color).

CATEGORYDEF:D:7:0:5:0:0:0	CategoryDef
// EF D101 Isosaari	Comment
AREA:T:EFD101	Name
CATEGORY:D	Category
ACTIVE:NOTAM:EFIN:EF D101	Active
ACTIVE:NOTAM:EFIN:EFD101	Active
LABEL:N059.55.08.817:E025.07.08.496:D101	Label
LIMITS:0:390	Limits
N059.54.15.000 E025.15.06.000	Coordinate
N059.53.27.000 E024.59.49.000	Coordinate
N059.56.36.000 E025.10.10.000	Coordinate

### CategoryDef

**CATEGORYDEF:Name:ActBorderColor:ActFillColor:ActFillPattern:PreBorderColor:PreFillColor:PreFillPattern**  
**CATEGORYDEF:Name:ActBorderColor:ActFillColor:ActFillPattern:PreBorderColor:PreFillColor:PreFillPattern:LabelName:LabelMapText:LabelUserText:LabelLevels:LabelTimes**

This line defines the display colors for an area category. The default border color is *Active Map* for unfilled and *Active RD Map* for filled areas. The default fill color is *Active RD Infill Map*, and the fill percentage that was used in previous plugin versions is 50. If the label settings are left out, the default settings are used.

- Name Name for the category (text string)
- ActBorderColor Active area border color
  - 0 use default color
  - 1-20 custom color (*Active Map Type X*)
- ActFillColor Active area fill color (values as in ActBorderColor)
  - 0 use default color
  - 1-20 custom color (*Active Map Type X*)
- ActFillPattern Active area fill pattern
  - 0 no fill
  - 5, 10, 20, 25, 30, 40, 50, 60, 70, 75, 80, 90, 100 percentage to fill
  - E0 – E52 hatch fill
- PreBorderColor Pre-active area border color (values as in ActBorderColor)
- PreFillColor Pre-active area fill color (values as in ActFillColor)
- PreFillPattern Pre-active area fill pattern (values as in ActFillPattern)
- LabelName Show area name in area label (1=yes, 0=no)
- LabelMapText Show map text in area label (1=yes, 0=no)
- LabelUserText Show user text in area label (0=no,1=manually entered/pre-defined,2=also activity period specific,3=also NOTAM id)



- LabelLevels      Show area level limits in area label (1=yes, 0=no)
- LabelTimes      Show area activation times in area label (1=yes, 0=no)
  - E0 – E52      hatch fill

The hatch fill values correspond to the GDI+ HatchStyle enumeration values. For example “E0” sets “HatchStyleHorizontal” and “E6” sets “HatchStyle05Percent” which can also be achieved by “5” (the numeric values for the FillPattern are just shortcuts to the percentage hatch styles)

## Name

**AREA:AreaType:AreaName**

The first line for each area definition must be a *name* line.

- AreaType                      Area type (one of the following):
  - T                                      (TSA area)
  - 1, 2, 3, 4 or 5                      (TSA area)
  - 1F, 2F, 3F, 4F or 5F              (TSA area)
  - M                                      (MTCD inhibit area)
  - S                                      (STCA inhibit area)
  - DD                                    (CLAM/RAM inhibit area)
  - FPCA                                (Flight Plan Conflict Area for MTCD)
  - STCA\_AREA                        (STCA area)
- AreaName                    Area name to identify it in the relevant window (text string)

TSA area types 1F-5F are filled, 1-5 are not (the number defines the area border color). For area type T the colors and filling are defined in a *category* line. If a *category* line is not defined for a type T area, the area is not filled and a default border color is used.

Area type T and the category definitions are meant to be used with plugin type **A** and area types 1-5 and 1F-5F with plugin type **B**, but their use is not restricted by the code.

Of the line types described below, area types M, S and DD only support *active* (partly, only “ACTIVE:1”), *bound*, *limits* and *coordinate*. TSA areas support all line types. CLAM/RAM inhibit areas are always active regardless of whether ACTIVE:1 is defined or not. FPCAs only support *FPCA\_seps*, *limits*, *bound*, *circle* and *coordinate*. STCA areas only support *STCA\_\**, *limits*, *bound*, *circle* and *coordinate*.

If no FPCAs are defined, MTCD is available everywhere using either the default alert values or any values specified in the settings file, but if even one FPCA is defined, MTCD is only available within the specified FPCA(s). If FPCAs overlap, the one specified earlier in the file will have priority. As FPCAs add more calculations to the MTCD code, they should be as few and as simple as possible.

If no STCA areas are defined, the global STCA parameters are used everywhere. If one or more STCA areas are defined, the parameters for each flight are based on the areas (global parameters outside all defined areas) and the more restrictive parameters are used for each conflict pair. In case of overlapping areas, the one specified first in the data file will have priority. The areas use the global STCA parameters for any parameters not specified using *STCA* \* lines.

## Category

### **CATEGORY:Name**

The *category* line is optional. It defines the display colors for type T areas.

- Name                      Category name (must have been defined earlier in the file)

## Label

### **LABEL:Lat:Lon:LabelText**

The *label* line is optional. It displays the area name and/or altitude limits on the radar display.

- Lat                      Latitude for the label (decimal degrees or sector file format)
- Lon                      Longitude for the label (decimal degrees or sector file format)
- LabelText              Label text (text string)

## Group

### **GROUP:Name**

The *group* line is optional. It defines the area's group name if desired (only used in plugin type **A** )

- Name                      Group name

## Usertext

### **USERTEXT:Text**

The *usertext* line is optional. It defines the default user text for the area.

- Text                      User text string

## Active

The *active* line is optional. If there are no *active* lines defined, the area will not be automatically activated. An area can contain more than one *active* line; if even one of them matches, the area is activated. See also the *and\_active* line type below for grouping conditions.

### **ACTIVE:1**

Activates the area automatically without any time limits when the plugin is loaded. Note that this option cannot be used together with other *active* lines as it would override any other schedule.

**ACTIVE:SchedStartDate:SchedEndDate:SchedWeekdays:StartTime:EndTime**

**ACTIVE:SchedStartDate:SchedEndDate:SchedWeekdays:StartTime:EndTime:Lower:Upper:UserText**

Used to set activation schedules.

- SchedStartDate      First day to activate the area
  - month and day in the format MMDD (for recurring periods every year)
  - year, month and day in the format YYMMDD (for a single period)
- SchedEndDate      Last day to activate the area, formats as above
- SchedWeekdays      Days of the week to activate the area
  - list of numbers representing the days to activate the area, for example “145” means the area will activate on Mondays, Thursdays and Fridays
  - “0” (zero) to activate the area continuously from StartTime on SchedStartDate to EndTime on SchedEndDate
- StartTime      Time to activate the area (UTC time in the format HHMM)
- EndTime      Time to deactivate the area (UTC time in the format HHMM)
- Lower      Lower limit for the area (feet, 0-999999)
- Upper      Upper limit for the area (feet, 0-999999)
- UserText      Displayed user text string

*Note: SchedEndDate and SchedWeekdays only limit the activation of the area. If the activation time extends past midnight, the area stays active until EndTime on the following day. Lower, Upper and UserText are optional fields. If any of them are specified, all the preceding fields must be included as well (i.e. if UserText is specified, both Lower and Upper must also be).*

**ACTIVE:NOTAM:Icao:Text**

**ACTIVE:NOTAM\_GROUP:Icao:Text**

Activates the area based on NOTAM information. The NOTAM\_GROUP version can be used for cases where for example the NOTAM text specifies “ABC123” but means all sub-areas such as “ABC123A” and “ABC123B”. If the NOTAM\_GROUP version is used for these areas, the code checks the default lower and upper limits of the area and prevents the NOTAM activating it outside those values. The NOTAM version on the other hand overrides any area default limits with the NOTAM data.

- Icao      ICAO location indicator that publishes activation NOTAMs for the area
- Text      Text to search for in the NOTAM

**ACTIVE:AUP:rsa\_ids**

**ACTIVE:AUP\_GROUP:rsa\_ids**

Activates the area based on AUP information. AUP\_GROUP has the same difference from AUP as NOTAM\_GROUP has from NOTAM, see above.

- rsa\_ids      Comma-separated list of area IDs to look for in the downloaded data

### **ACTIVE:RWY:ARR:ArrRwyList:DEP:DepRwyList**

### **ACTIVE:RWY:ARR:ArrRwyList:NotArrRwyList:DEP:DepRwyList:NotDepRwyList**

Activates the area based on active runways. If all the specified runway states match, the area is activated. The runway identifiers must be in the format "<4-letter ICAO code><runwayID>", for example "EFHK15".

- ArrRwyList                      Comma-separated list of runways. Enter "\*" to disregard.
- NotArrRwyList                Comma-separated list of runways. Enter "\*" to disregard.
- DepRwyList                    Comma-separated list of runways. Enter "\*" to disregard.
- NotDepRwyList               Comma-separated list of runways. Enter "\*" to disregard.

### **ACTIVE:ID:YourIdList:NotYourIdList:OnlineIdList:NotOnlineIdList**

Activates the area based on the current controller position ID, and the IDs of other online controllers. The area is activated if the current controller position ID is found in YourIdList, not found in NotYourIdList, all controllers specified in OnlineIdList and none of the controllers specified in NotOnlineIdList are online.

- YourIdList                      Comma-separated list of controller IDs (enter "\*" to disregard)
- NotYourIdList                Comma-separated list of controller IDs (enter "\*" to disregard)
- OnlineIdList                  Comma-separated list of controller IDs (enter "\*" to disregard)
- NotOnlineIdList              Comma-separated list of controller IDs (enter "\*" to disregard)

### *And\_Active*

To combine two or more conditions, the first condition must be defined using an *active* line (see above), and the other conditions using *and\_active* lines. The syntax for *and\_active* is the same as for *active*, the only difference is that instead of starting with "ACTIVE", the *and\_active* line definitions start with "**AND\_ACTIVE**". More than one set of conditions can be defined just by starting the next set with an *active* line. The following setup would create two activation rule sets, and the area would activate when either both of the first two conditions are met, or the third one.

ACTIVE:something

AND\_ACTIVE:something

ACTIVE:something

Combining multiple lines with time-based schedules (including NOTAM- and AUP-schedules) within a rule set will not work, the plugin will not attempt to combine the schedules.

### *Bound*

### **BOUND:C:Lat:Lon:Radius**

The *Bound* line is optional but highly recommended for areas that are circle-shaped and have not been defined using the *Circle* line as it sets the necessary parameters automatically. It increases the accuracy of the calculation while at the same time reducing the number of calculations required, giving both an accuracy and a performance gain to the plugin.

The bound line should only be used for areas that are circles. The "Lat" and "Lon" coordinates (decimal degrees or sector file format) 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 (the coordinates will not be used for any calculations so make sure you only use this line for circular areas!).

### *Limits*

#### **LIMITS:Alt<sub>min</sub>:Alt<sub>max</sub>**

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 lower limit will be set to 0ft and upper limit to 999999ft.

### *Elevation*

#### **ELEVATION:Min:Max**

The *elevation* line is optional. It defines the minimum and maximum ground elevation in the area (in hundreds of feet). The default values are 0, available values are from -10 to 999 (-1000ft to 99900ft). The values are used to correct the vertical limits when the area is activated by NOTAM and AGL values are specified. The Min value is used to correct the lower limit and the Max value the upper limit. The Max value may not be lower than the Min value.

### *NoCLAMRAM*

#### **NOCLAMRAM**

The optional *NoCLAMRAM* line inhibits CLAM and RAM alerts inside the area when it's active.

### *NoMSAW*

#### **NOMSAW**

The optional *NoMSAW* line inhibits MSAW alerts inside the area when it's active.

### *NoAIW*

#### **NOAIW**

The optional *NoAIW* line inhibits AIW alerts for the area.

### *NoAPW*

#### **NOAPW**

The optional *NoAPW* line inhibits APW alerts for the area.

## *APW\_Buffer\_Lat*

### **APW\_BUFFER\_LAT:BufferU:BufferLI:BufferLV**

The optional *APW\_Buffer\_Lat* line can be used to override the default lateral buffers applied to the area for APW processing. The first value is used above the setting value “APW\_Buffer\_Lat\_SepLevel”, the others at or below it.

- BufferU High level buffer (nautical miles, decimal value, range 0.0-999.0)
- BufferLI Low level buffer for IFR flights (nautical miles, decimal value, range 0.0-999.0)
- BufferLV Low level buffer for VFR flights (nautical miles, decimal value, range 0.0-999.0)

## *APW\_Buffer\_Vert*

### **APW\_BUFFER\_VERT:BufferU:BufferLI:BufferLV**

The optional *APW\_Buffer\_Vert* line can be used to override the default vertical buffers applied to the area for APW processing. The first value is used above the minimum RVSM level, the others at or below it.

- BufferU High level buffer (feet, integer value, range 0-9999)
- BufferLI Low level buffer for IFR flights (feet, integer value, range 0-9999)
- BufferLV Low level buffer for VFR flights (feet, integer value, range 0-9999)

## *NoSAP*

### **NOSAP**

The optional *NoSAP* line inhibits SAP alerts for the area.

## *SAP\_Buffer\_Lat*

### **SAP\_BUFFER\_LAT:BufferU:BufferLI:BufferLV**

The optional *SAP\_Buffer\_Lat* line can be used to override the default lateral buffers applied to the area for SAP processing. The first value is used above the setting value “SAP\_Buffer\_Lat\_SepLevel”, the others at or below it.

- BufferU High level buffer (nautical miles, decimal value, range 0.0-999.0)
- BufferLI Low level buffer for IFR flights (nautical miles, decimal value, range 0.0-999.0)
- BufferLV Low level buffer for VFR flights (nautical miles, decimal value, range 0.0-999.0)

## *SAP\_Buffer\_Vert*

### **SAP\_BUFFER\_VERT:BufferU:BufferLI:BufferLV**

The optional *SAP\_Buffer\_Vert* line can be used to override the default vertical buffers applied to the area for SAP processing. The first value is used above the minimum RVSM level, the others at or below it.

- BufferU                      High level buffer (feet, integer value, range 0-9999)
- BufferLI                    Low level buffer for IFR flights (feet, integer value, range 0-9999)
- BufferLV                   Low level buffer for VFR flights (feet, integer value, range 0-9999)

## *Coordinate*

### **Lat Lon**

#### **COORD:Lat:Lon**

Each area definition must have at least three *Coordinate* lines (or alternatively, one *Circle* line). 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 first format option has a pair of latitude and longitude values with 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. The second option uses the same format as the ESE file. The coordinates may be either in decimal degrees or in the sector file format.

## *Circle*

### **CIRCLE:Lat:Lon:Radius:Spacing**

Defines a set of vertex points making up a circle (the same as defining the points one by one using *Coordinate* lines, just simpler). An area definition cannot contain both *Circle* and *Coordinate* lines.

- Lat                          Center point latitude (decimal degrees or sector file format)
- Lon                         Center point longitude (decimal degrees or sector file format)
- Radius                     Radius (in nautical miles, 0.1-9999.9)
- Spacing                    Vertex radial spacing (in degrees, 0.1-120.0)

## *FPCA\_Seps*

### **FPCA\_SEPS:VertSepU:VertSepL:LatSep**

Defines the vertical and lateral separation alert values for the FPCA. This is a mandatory line for a FPCA type area and not used by any other area type. These values are used for the MTCD calculations within this area.

- VertSepU                      Non-RVSM and above RVSM vertical separation alert value (in feet, 0-99999)
- VertSepL                      RVSM and below RVSM vertical separation alert value (in feet, 0-99999)
- LatSep                          Lateral separation alert value (in nautical miles, 0.0-30.0)

## *STCA\_Seps\_Lat\_U*

### **STCA\_SEPS\_LAT\_U:LatSepU**

Defines the lateral separation upper level (above “STCA\_Sep\_Lat\_SepLevel”, 9500ft by default) alert values for the STCA area. It is not used by any other area type.

- LatSepU                      Lateral separation parameter (nm, 0.0-99.0), corresponding to the setting “STCA\_Coarse\_Sep\_Lat\_U”. Typically the separation value above the upper/lower separation level. The rest of the upper lateral separation values for the area will be set automatically based on it.

## *STCA\_Seps\_Lat\_L*

### **STCA\_SEPS\_LAT\_L:LatSepL**

Defines the lateral separation lower level (below “STCA\_Sep\_Lat\_SepLevel”, 9500ft by default) alert values for the STCA area. It is not used by any other area type.

- LatSepU                      Lateral separation parameter (nm, 0.0-99.0), corresponding to the setting “STCA\_Coarse\_Sep\_Lat\_L”. Typically the separation value below the upper/lower separation level. The rest of the lower lateral separation values for the area will be set automatically based on it.

## *STCA\_Seps\_Lat\_S*

### **STCA\_SEPS\_LAT\_S:LatSepS**

Defines the lateral separation special alert values for the STCA area. It is not used by any other area type. These values are used for the STCA calculations within this area.

- LatSepU                      Lateral separation parameter (nm, 0.0-99.0), corresponding to the setting “STCA\_CurrProx\_Sep\_Lat\_S”. Typically a bit less than the separation value for the final approach area. The rest of the special lateral separation values for the area will be set automatically based on it.



## *STCA\_Seps\_Vert\_U*

### **STCA\_SEPS\_VERT\_U:VertSepU**

Defines the vertical separation upper level (Non-RVSM flights in RVSM airspace and all flights above RVSM airspace) alert values for the STCA area. It is not used by any other area type.

- VertSepU                      Vertical separation parameter (feet, 0-9999), corresponding to the setting “STCA\_Coarse\_Sep\_Vert\_U”. The rest of the upper vertical separation values for the area will be set automatically based on it.

## *STCA\_Seps\_Vert\_L*

### **STCA\_SEPS\_VERT\_L:VertSepL**

Defines the vertical separation lower level (RVSM flights in RVSM airspace and all flights below RVSM airspace) alert values for the STCA area. It is not used by any other area type.

- VertSepL                      Vertical separation parameter (feet, 0-9999), corresponding to the setting “STCA\_Coarse\_Sep\_Vert\_L”. The rest of the lower vertical separation values for the area will be set automatically based on it.

## *STCA\_Alert\_Times*

### **STCA\_ALERT\_TIMES:WarnU:WarnL:ImmU:ImmL**

Defines the alert times for the STCA area. It is not used by any other area type.

- WarnU                      Warning time (sec, 0-300), corresponding to the setting “STCA\_WarningTime\_U”.
- WarnL                      Warning time (sec, 0-300), corresponding to the setting “STCA\_WarningTime\_L”.
- ImmU                      Immediate warning time (sec, 0-300), corresponding to the setting “STCA\_WarningTime\_U\_Imm”.
- ImmL                      Immediate warning time (sec, 0-300), corresponding to the setting “STCA\_WarningTime\_L\_Imm”.

### 2.2.1 AUP activation

The “AUP” activation option in the Airspace Management Window is used to set activity periods based on AUP data, much like the “NOTAM” option sets activity periods based on NOTAM data. The format for the file can be chosen from two options. The text format is assumed when the data file location specified in the plugin settings ends with “.txt”, the JSON format otherwise. See below for the syntax.

#### 2.2.1.1 Text format

In the text format, each activation period is defined on its own line. To add an activation period, use one of the following line types:

**rsa\_id:StartDate:EndDate:0:StartTime:EndTime:Lower:Upper**

**rsa\_id:StartDate:EndDate:0:StartTime:EndTime:Lower:Upper:UserText**

- **rsa\_id**                      Area ID as specified in the “ACTIVE:AUP:rsa\_id” line in TopSkyAreas.txt
- **StartDate**                Activation start date (year, month and day in the format YYMMDD)
- **EndDate**                 Activation end date (year, month and day in the format YYMMDD)
- **StartTime**                Time to activate the area (UTC time in the format HHMM)
- **EndTime**                 Time to deactivate the area (UTC time in the format HHMM)
- **Lower**                    Lower limit for the area (feet, 0-999999)
- **Upper**                    Upper limit for the area (feet, 0-999999)
- **UserText**                Displayed user text string

#### 2.2.1.2 JSON format

The JSON format must contain at least the following objects and information:

- **notice\_info**
  - **valid\_wef**    string            Schedule validity start time (ISO 8601 datetime string, UTC)
- **areas** (array of activity period objects as specified below)
  - **name**            string            Area ID as specified in the “ACTIVE:AUP:rsa\_id” line in TopSkyAreas.txt
  - **minimum\_fl**    number           Area lower limit (hundreds of feet)
  - **maximum\_fl**    number           Area upper limit (hundreds of feet)
  - **start\_datetime** string            Start time (ISO 8601 datetime string, UTC)
  - **end\_datetime** string            End time (ISO 8601 datetime string, UTC)

The datetime formats must contain the time up to at least minutes accuracy (e.g. “2023-01-01T12:34”). The string is not parsed any further so any following information about seconds and time offsets is not taken into account.

Alternatively, “start\_datetime” and “end\_datetime” can be replaced with “start\_time” and “end\_time”. They are also string type but the format is “HH:MM” (or “HH:MM:SS” but the seconds value is disregarded). The schedule validity start time is then used to determine the start and end dates.

### 2.2.2 Remote activation

The “Remote” activation option in the Airspace Management Window is used to control area activation based on a data file whose location is defined using the “HTTP\_Areas\_Remote\_URL” setting. The file can be used to override existing as well as add new activation rules to the areas defined in the TopSkyAreas.txt file.

The following lines affect all areas:

<b>MANUAL_ALL</b>	Sets all areas to manual mode
<b>OVERRIDE_ALL_ALL</b>	Overrides all activation types for all areas
<b>OVERRIDE_ALL_SCHED</b>	Overrides all scheduled activations for all areas
<b>OVERRIDE_ALL_NOTAM</b>	Overrides all NOTAM activations for all areas
<b>OVERRIDE_ALL_AUP</b>	Overrides all AUP activations for all areas
<b>OVERRIDE_ALL_RWY</b>	Overrides all runway activations for all areas
<b>OVERRIDE_ALL_ID</b>	Overrides all controller id activations for all areas

The following lines affect only the specified area (AreaName is the area name):

<b>AreaName:MANUAL</b>	Sets the area to manual mode
<b>AreaName:OVERRIDE_ALL</b>	Overrides all activation types
<b>AreaName:OVERRIDE_SCHED</b>	Overrides all scheduled activations
<b>AreaName:OVERRIDE_NOTAM</b>	Overrides all NOTAM activations
<b>AreaName:OVERRIDE_AUP</b>	Overrides all AUP activations
<b>AreaName:OVERRIDE_RWY</b>	Overrides all runway activations
<b>AreaName:OVERRIDE_ID</b>	Overrides all controller id activations

To add new rules, the following line types can be used:

**AreaName:1**  
**AreaName:SchedStartDate:SchedEndDate:SchedWeekdays:StartTime:EndTime**  
**AreaName:SchedStartDate:SchedEndDate:SchedWeekdays:StartTime:EndTime:Lower:Upper:UserText**  
**AreaName:AUP:rsa\_id**  
**AreaName:AUP\_GROUP:rsa\_id**  
**AreaName:NOTAM:lcao:Text**  
**AreaName:NOTAM\_GROUP:lcao:Text**  
**AreaName:RWY:ARR:ArrRwyList:DEP:DepRwyList**  
**AreaName:RWY:ARR:ArrRwyList:NotArrRwyList:DEP:DepRwyList:NotDepRwyList**  
**AreaName:ID:YourIdList:NotYourIdList:OnlineIdList:NotOnlineIdList**

- AreaName                      Area name as specified in TopSkyAreas.txt
- Other fields                      See TopSkyAreas.txt “ACTIVE” line types

## 2.3 TopSkyCPDLC.txt

This file contains data for the CPDLC system. It defines the departure clearance format(s) and pre-defined CPDLC free text items that are available and connects controller position IDs to CPDLC logins.

### Departure clearance format definition

DCL:EFHK:SID:CLRD TO <ades> OFF <drwy> VIA <sid> SQUAWK <assr> NEXT FREQ <freq\_next>  
<stop\_highlight> <qnh> @@ <rmk> @@ CLIMB TO <cfl>

**Type:Adep:Subtype:Text**

- Type
  - One of the following:
    - DCL DCL type message (other than US)
    - DCL\_US CPDLC DCL type message (used in USA)
    - PDC PDC type message
- Adep
  - Comma-separated list of departure airport ICAO codes (or “\*” to match any airport)
- Subtype
  - One of the following:
    - AHDG match when aircraft has an assigned heading
    - SID match when aircraft has a SID
    - AHDG+SID match when the aircraft has both
    - \* always match
- Text
  - The clearance message that is sent

Note that if both “AHDG” and “AHDG+SID” formats are defined for an airport with automatically assigned SIDs, the “AHDG” format will only be used when a SID isn’t automatically assigned (an automatically assigned SID cannot be removed without changing the flight plan to prevent the automatic assignment).

As an airport typically provides either DCL or PDC (or PDC and DCL\_US) type clearances, both DCL and PDC types should not be defined here for any airport. They are requested using the same message format, and if both clearance types are defined, the plugin won't know which one to send. Having both PDC and DCL\_US for one airport is OK as they are requested with different messages.

The first definition line that matches both the *Adep* and *Subtype* will be used. The *Text* can contain some data fields that are automatically filled by the plugin. Some are highlighted if the pilot's CPDLC software supports it. The "<" character may not be used in the message definition for anything other than entering the defined data fields.

Data fields that are not highlighted:

- `<day>` current UTC day (two digits)
- `<hour>` hours of the current UTC time (two digits)
- `<min>` minutes of the current UTC time (two digits)
- `<month2>` current UTC month (two digits)
- `<month3>` current UTC month (three characters: “JAN”, “FEB”, etc.)
- `<number>` running number of sent PDCs (three digits)
- `<sec>` seconds of the current UTC time (two digits)

- <wday3> current UTC weekday (three characters: "MON", "TUE", etc.)
- <year2> last two digits of the current UTC year
- <year4> current UTC year

Data fields that are highlighted in DCL and DCL\_US clearances unless found after "<stop\_highlight>":

- <adep> departure airport ICAO code
- <ades> destination airport ICAO code
- <ahdg> assigned heading (three digits)
- <ahdg/trk> assigned heading ("HDG xxx") or track ("TRACK xxx")
- <aobt> actual off-blocks time (four digits)
- <aobtMDI> same as <aobt>, except displays "MDI" if equal to estimated off-blocks time
- <assr> assigned transponder code (four digits)
- <atis> "ATIS " + ATIS identifier (either the aircraft reported or manually entered)
- <atis\_chg> "ATIS " + ATIS identifier (only if manually entered)
- <callsign> callsign of the aircraft
- <cfl> cleared altitude/FL
- <copx> exit coordination point
- <drwy> departure runway identifier
- <eobt> estimated off-blocks time (four digits)
- <freq\_dep> departure frequency
- <freq\_next> next frequency
- <freq\_own> own primary frequency
- <npt> next route point
- <qnh> "QNH " (or "ALTIM " if reported in inHg) + the QNH value (3-4 digits)
- <qnh4> same as <qnh> but always with four digits
- <qnhQ> "Q" or "A" + the QNH value (four digits)
- <rfl> requested altitude/FL
- <rmk> remarks text
- <sid> SID identifier
- <sid+npt> SID identifier, a blank space and the next route point
- <startup\_next> either "START-UP APPROVED" or "REPORT READY ON " + next frequency
- <startup\_own> either "START-UP APPROVED" or "REPORT READY ON " + own primary freq

The initial value for the frequencies in "<freq\_next>" and "<startup\_next>" is the controller's primary frequency if the track is assumed, otherwise the primary frequency of the controller whose airspace the aircraft is in currently. It can be adjusted in the DCL Window prior to sending the clearance. The frequency for "<freq\_own>" and "<startup\_own>" is always the controller's primary frequency.

Highlighted items should have some text between them to work correctly unless the second item contains static text before the actual highlighted value. In cases where no text is desired between items, for example the underscore character "\_" can be used. Creating the clearance formats usually requires some testing to get them right.

A header part will be automatically added in front of "DCL" type, by default it is

```
<adep> PDC <number> . . . . CLD <hour><min> <year2><month2><day> <adep> PDC <number> <callsign>
```

The whole clearance including the header part is sent to the aircraft, but the header is not displayed in the plugin's message windows. Fields in the header part will not be highlighted.

### *CPDLC free text definition*

#### **FREETEXT:ReplyType:Text**

- ReplyType                      Reply type expected from the aircraft. One of the following:
  - WU                      "WILCO" or "UNABLE"
  - AN                      "AFFIRM" or "NEGATIVE"
  - R                      "ROGER"
  - NE                      no reply expected
  - UNICOM              see below
- Text                              Message text that is sent

The "UNICOM" reply type is a special message. It is meant to be used to instruct the aircraft to switch to UNICOM. The actual expected replies are either WILCO or UNABLE. When a WILCO reply is received to this message, the following happens:

- 1) all currently open CPDLC dialogues are closed and discarded
- 2) the CPDLC connection is terminated
- 3) the aircraft is set to the "Free" state (i.e. drop track command sent)

### *CPDLC login definition*

#### **LOGIN:Login:RadioCall:ControllerID**

- Login                              CPDLC login to match with the controller ID (four characters, alphanumeric)
- RadioCall                      RTF callsign used by the controller
- ControllerID                      Controller ID to match with the CPDLC login

As there is no way to match a controller to a CPDLC login automatically, this list is used. It follows that it's very important to use only agreed CPDLC logins for the CPDLC connection handovers to work properly.

The "RadioCall" text is sent in the communication transfer and current ATC unit messages.

## 2.4 TopSkyMaps.txt & TopSkyMapsLocal.txt

These files contain the definitions for the maps in the Maps Window. The difference is that the maps in the “Local” file are automatically assigned to a folder named “LMAPS” and any map folder names in that file are disregarded. The following example area is used to show the syntax (optional lines in grey color):

COLORDEF:Approach:255:255:255	Color definition
SYMBOLDEF:Fix1	Symbol definition
MOVETO:-4:3	Moveto
LINETO:0:-4	Lineto
LINETO:4:3	Lineto
LINETO:-4:3	Lineto
// EFKU VOR app rwy 15	Comment
MAP:EFKU VOR 15	Name
FOLDER:IAP	Folder
COLOR:Approach	Color
LINE:N063.01.03.067:E027.47.04.942:N063.11.03.016:E027.39.18.377	Line
LINE:N063.01.22.882:E027.49.09.775:N063.00.43.220:E027.45.00.157	Line
LINE:N063.06.39.890:E027.45.04.332:N063.06.00.228:E027.40.53.958	Line
STYLE:Dot:1	Line style
LINE:N063.01.03.067:E027.47.04.942:N062.58.47.170:E027.48.49.840	Line
LINE:N062.58.47.170:E027.48.49.840:N062.54.47.000:E027.53.04.000	Line
SYMBOL:Fix1:N063.06.19.000:E027.43.04.000:ROVSU:20:-10	Symbol + label
SYMBOL:Fix1:N062.54.47.000:E027.53.04.000:VEKEM:20:-10	Symbol + label

The mandatory items for each map are a name, a folder it belongs to in the Maps Window, and a color with which to draw the items.

### *Override\_Sct\_Map*

**OVERRIDE\_SCT\_MAP:FolderName**

**OVERRIDE\_SCT\_MAP:FolderName\MapName**

Indicates that the automatically generated map or sector file item in question should not be displayed in the Maps Window. Can be used to hide sector file items that have custom maps to replace them, or to hide unwanted sector file items from being displayed in the Maps Window. The first option hides the whole folder, the second only a single map.

- FolderName      Folder name to hide
- MapName        Map name to hide

## Name

### MAP:MapName

The first line for each map definition must be a name line. This will identify the map in the Maps Window.

- MapName                      Map name to identify it in the Maps window (text string)

## Folder

### FOLDER:FolderName

Every map must belong to a folder. There is practically no limit to how many maps a single folder can contain. The following folder names get special treatment: "ARTCC HIGH", "ARTCC", "ARTCC LOW", "GEO", "SID", "STAR" and "FREE TEXT". Maps assigned to those folders will not be shown in the Maps Window. Instead, if sector file items with the same names are found in the active sector file (i.e. a SID named ABC1A exists in the sector file and a map named "ABC1A" in folder "SID"), the map is assigned as additional data for that sector file item and activated/deactivated together with it.

- FolderName                      Folder name to identify it in the Maps window (text string)

*Note: the folder name may not start with an empty space character, and may not contain the backslash ("\\") character. Folder names "AUTO" and "LMAPS" are reserved for plugin use.*

## Layer

### LAYER:LayerNumber

To adjust the drawing order of the maps, a layer number can be specified. Layers are drawn in increasing order, maps within the same layer in the order they are defined in the data file. Areas specified in TopSkyAreas.txt are drawn in layer 0. If a layer is not specified, the map will be placed in layer 1.

- LayerNumber                      Drawing layer number (valid layers are -999...-1 and 1...999)

## Zoom

### ZOOM:ZoomLevel

A whole map or parts of it can be hidden based on the current zoom level. With a positive value set, when the radar screen is zoomed out so that there are less than the specified number of pixels per nautical mile, the lines of the map definition after this line are not read. There can be more than one *zoom* line in one map to hide parts of the map at different zoom levels. When the set value is negative, the following lines are not read when the radar screen is zoomed in more than the set value.

- ZoomLevel                      Radar screen zoom level (pixels per nautical mile, decimal value)

*Note: when there is more than one zoom line in a map, their order is important (for example "ZOOM:5" has to be before "ZOOM:10" to have any effect as with zoom below 10 pix/nm the "ZOOM:5" line will never be read if it's after the "ZOOM:10" line...)*



### *Default\_Screen-specific*

#### **DEFAULT\_SCREEN-SPECIFIC**

Sets the default visibility state of all following maps to screen-specific unless an *active* line is present. This is the default value when starting to read a map data file.

### *Default\_Global*

#### **DEFAULT\_GLOBAL**

Sets the default visibility state of all following maps to global (synchronized across all radar screens)

### *Screen-specific*

#### **SCREEN-SPECIFIC**

Sets this map's visibility state to be screen-specific. Only available for maps with no *active* lines.

### *Global*

#### **GLOBAL**

Sets this map's visibility state to be global (synchronized across all radar screens).

### *ASRdata*

#### **ASRDATA:ItemList**

Display of certain parts of the map can be decided based on information entered in the currently active ASR file. This line defines the “type” of the following lines in the map until the next *ASRdata* line. It is then checked against any definitions in the ASR file. “ASRDATA:\*” reads the following lines regardless of ASR definitions.

- ItemList                      Comma-separated list of items

The formats to define map data in the ASR file are as follows:

**PLUGIN:TopSky plugin:ShowMapData:<ItemList>**

**PLUGIN:TopSky plugin:HideMapData:<ItemList>**

<ItemList> is a comma-separated list of items. ShowMapData draws only those parts of plugin maps affected by *ASRdata* lines that contain at least one of the defined items, HideMapData hides such parts.

## *SctData*

**SCTDATA:Type**

**SCTDATA:Type\Name**

**SCTDATA:FREETEXT\Group**

**SCTDATA:FREETEXT\Group\Name**

The *SctData* line is used to draw items from the active sector file data. Specifying only the Type or Group will draw all items. Due to limitations in the data available from EuroScope, the drawing will only look correct when an item contains a single polygon or polyline with the points in consecutive order. The items are drawn using the current map line style and color regardless of what is specified in the sector file.

- Type                      Type of item(s) to draw
  - “LOW AIRWAY”, “HIGH AIRWAY”, “ARTCC LOW”, “ARTCC”, “ARTCC HIGH”, “SID”, “STAR” or “GEO”
- Group                    Group name of free text item(s) to draw
- Name                    Name of item to draw

## *SctFileData*

**SCTFILEDATA:Type**

**SCTFILEDATA:Type\Name**

**SCTFILEDATA:FREETEXT\Group**

**SCTFILEDATA:FREETEXT\Group\Name**

The *SctFileData* line is used to draw items from a sector file specified with the *SctFilePath* line. Specifying only the Type or Group will draw all items. The items are drawn using the current map line style and color unless a specific color is set in the sector file. To force all items to be drawn using the current map color regardless of possible specific colors set in the sector file, start the line with “**SCTFILEDATA/MONO**” instead of “SCTFILEDATA”.

- Type                      Type of item(s) to draw
  - “LOW AIRWAY”, “HIGH AIRWAY”, “ARTCC LOW”, “ARTCC”, “ARTCC HIGH”, “SID”, “STAR”, “GEO”, “REGIONS”, “SECTOR” or “SECTORLINE”
- Group                    Group name of free text item(s) to draw
- Name                    Name of item to draw

## *SctFilePath*

**SCTFILEPATH:FileLocation**

The *SctFilePath* line sets the location for the sector file to use as the data source for the *SctFileData* lines.

- FileLocation            Location of the sector file including the file name

The path can be either absolute or relative to the folder where the plugin dll is located. If the path ends with the “\*” character, all files matching up to that and having the “.sct” extension will be considered and the one that’s alphabetically last will be chosen. (e.g. “..\ABCD-\*” will search the parent folder of the plugin dll folder for any files starting with “ABCD-” and with “.sct” extension. If “ABCD-1234.sct” and “ABCD-1235.sct” are found, “ABCD-1235.sct” will be used).

## Active

The *active* line is optional. If there are no *active* lines, the map will not be automatically activated. A map can contain more than one *active* line; if even one of them is a match, the map will be activated.

Automatically activating maps cannot be placed in the following folders: “ARTCC HIGH”, “ARTCC”, “ARTCC LOW”, “AIRWAYS H”, “AIRWAYS L”, “SID”, “STAR”, “GEO”, “REGIONS” and “FREE TEXT”. If no folder name is specified, an automatically activating map will be placed in the “AUTO” folder. See also the *and\_active* line type below for grouping conditions.

### ACTIVE:1

Activates the map automatically when the plugin is loaded. Note that this option cannot be used together with other *active* lines.

### ACTIVE:SchedStartDate:SchedEndDate:SchedWeekdays:StartTime:EndTime

Activates the map based on fixed activation schedules.

- SchedStartDate      First day to activate the map
  - month and day in the format MMDD (for recurring periods every year)
  - year, month and day in the format YYMMDD (for a single period)
- SchedEndDate      Last day to activate the map, formats as above
- SchedWeekdays      Days of the week to activate the map
  - list of numbers representing the days to activate the map, for example “145” means the map will activate on Mondays, Thursdays and Fridays
  - “0” (zero) to activate the map continuously from StartTime on SchedStartDate to EndTime on SchedEndDate
- StartTime      Time to activate the map (UTC time in the format HHMM)
- EndTime      Time to deactivate the map (UTC time in the format HHMM)

*Note: SchedEndDate and SchedWeekdays only limit the activation of the map. If the activation time extends past midnight, the map stays active until EndTime on the following day.*

### ACTIVE:NOTAM:Icao:Text

### ACTIVE:NOTAM\_GROUP:Icao:Text

Activates the map based on NOTAM information. For the difference between NOTAM and NOTAM\_GROUP see the same definitions in the Areas file.

- Icao      ICAO location indicator that publishes activation NOTAMs for the map
- Text      Text to search for in the NOTAM

### ACTIVE:AUP:rsa\_ids

### ACTIVE:AUP\_GROUP:rsa\_ids

Activates the map based on AUP information. For the difference between AUP and AUP\_GROUP see the same definitions in the Areas file.

- rsa\_ids      Comma-separated list of area IDs to look for in the downloaded data

### **ACTIVE:AREA:ActiveAreaList**

### **ACTIVE:AREA:ActiveAreaList:NotActiveAreaList**

Activates the map based on area activity. The map will be activated if all areas listed in *ActiveAreaList* and none of the areas listed in *NotActiveAreaList* are active.

- ActiveAreaList      Comma-separated list of area names
- NotActiveAreaList      Comma-separated list of area names

### **ACTIVE:RWY:ARR:ArrRwyList:DEP:DepRwyList**

### **ACTIVE:RWY:ARR:ArrRwyList:NotArrRwyList:DEP:DepRwyList:NotDepRwyList**

Activates the map based on active runways. If all the specified runway states match, the map is activated. The runway identifiers must be in the format "<4-letter ICAO code><runwayID>", for example "EFHK15".

- ArrRwyList      Comma-separated list of runways. Enter "\*" to disregard.
- NotArrRwyList      Comma-separated list of runways. Enter "\*" to disregard.
- DepRwyList      Comma-separated list of runways. Enter "\*" to disregard.
- NotDepRwyList      Comma-separated list of runways. Enter "\*" to disregard.

### **ACTIVE:ID:YourIdList:NotYourIdList:OnlineIdList:NotOnlineIdList**

Activates the map based on the current controller position ID, and the IDs of other online controllers. The map is activated if the current controller position ID is found in YourIdList, not found in NotYourIdList, all controllers specified in OnlineIdList and none of the controllers specified in NotOnlineIdList are online.

- YourIdList      Comma-separated list of controller IDs (enter "\*" to disregard)
- NotYourIdList      Comma-separated list of controller IDs (enter "\*" to disregard)
- OnlineIdList      Comma-separated list of controller IDs (enter "\*" to disregard)
- NotOnlineIdList      Comma-separated list of controller IDs (enter "\*" to disregard)

## *And\_Active*

To combine two or more conditions, the first condition must be defined using an *active* line (see above), and the other conditions using *and\_active* lines. The syntax for *and\_active* is the same as for *active*, the only difference is that instead of starting with "ACTIVE", the *and\_active* line definitions start with "**AND\_ACTIVE**". More than one set of conditions can be defined just by starting the next set with an *active* line. The following setup would create two activation rule sets, and the map would activate when either both of the first two conditions are met, or the third one.

ACTIVE:something

AND\_ACTIVE:something

ACTIVE:something

Combining multiple lines with time-based schedules (including NOTAM- and AUP-schedules) within a rule set will not work, the plugin will not attempt to combine the schedules.

## Color

**COLOR:ColorName**

**COLOR:ColorName:FillColorName**

**COLOR:ColorName:FillColorName:FillBgColorName**

Every map must have at least one *color* line. It sets the color to be used to draw the subsequent drawings.

Each item within a map can be drawn with a different color simply by including a new *color* line when a color change is required. If the FillColorName is not specified, it is set to the same color as ColorName. All used color names (with some exceptions listed below) must be defined in the file using a *colordef* line.

- ColorName                      Color to be used for drawing lines and texts
- FillColorName                Color to be used for filling the FILLARC, POLYGON and COORDPOLY items
- FillBgColorName            If specified, used to color the background of the filled area of COORDPOLY items with a hatch fill. If not specified, a transparent background is set.

The following plugin colors can be used as map colors without having to define them in a *colordef* line (however if the color is defined in a *colordef* line, that definition will override the plugin color definition):

- Active\_Map
- Active\_Map\_Type\_1 ... Active\_Map\_Type\_20
- Active\_RD\_Infill\_Map
- Active\_RD\_Map
- Active\_Sector
- Active\_Text\_Map
- East\_NAT\_Map
- Inactive\_Sector
- Map\_1 ... Map\_4
- Map\_Border
- Map\_Hotspot
- Map\_Info
- Map\_Land
- Map\_Symbol
- Preactive\_Map
- Preactive\_Text\_Map
- Predisplay\_Map
- Rwy\_App\_Line\_Inuse
- Rwy\_App\_Line\_Not\_Inuse
- West\_NAT\_Map

## Color definition

**COLORDEF:ColorName:R:G:B**

Every color used in the maps (with some exceptions listed in the COLOR line specification) must be defined using one of these lines.

- ColorName                      Color name to be used in the Color lines (text string)
- R, G and B                    Color's red, green and blue component values (0-255)

## Style

### STYLE:StyleName

### STYLE:StyleName:Width

The *style* line sets the line type for any subsequent *line* items within this map. It is not mandatory, a Solid type line with width 1 pixel will be drawn by default. As with the *color* line, a single map may contain any required number of *style* lines to draw different line styles within the same map. If a width is not defined, a 1-pixel width is drawn by default.

- StyleName                      Style to be used
  - Default: Solid, Alternate, Dash, Dot, DashDot, DashDotDot or Null
  - Custom: a style name defined earlier in the file using a *LineStyleDef* line
- Width                          Width of line (pixels)

## Line style definition

### LINESTYLEDEF:StyleName:BrushStyle:HatchStyle

### LINESTYLEDEF:StyleName:BrushStyle:HatchStyle:StyleArray

Custom line styles can be defined using the *LineStyleDef* line.

- StyleName                      Style name to be used in the *Style* lines (text string)
- BrushStyle                    Brush style (Solid, Hatched or Null)
- HatchStyle                    Hatch style (set any value when brush style is not “Hatched”)
  - /                      45-degree upward hatch
  - +                      Horizontal and vertical crosshatch
  - X                      45-degree crosshatch
  - \                      45-degree downward hatch
  - -                      Horizontal hatch
  - |                      Vertical hatch
- StyleArray                    Comma-separated array of values to define the line style if not a solid line. First value defines the length of the first dash, second the first space, etc. The pattern repeats as necessary when drawing the line – reversing if the number of values is odd (dashes become spaces and vice versa). A maximum of 16 values may be entered to define the style.

## Line

**LINE:Lat<sub>1</sub>:Lon<sub>1</sub>:Lat<sub>2</sub>:Lon<sub>2</sub>**

**LINE:StartPointName:EndPointName**

Draws a line from one point to another. Uses the previously defined line style (or solid line with 1-pixel width if no style defined).

- Lat<sub>1</sub>                      Latitude of starting point (decimal degrees or sector file format)
- Lon<sub>1</sub>                      Longitude of starting point (decimal degrees or sector file format)
- Lat<sub>2</sub>                      Latitude of end point (decimal degrees or sector file format)
- Lon<sub>2</sub>                      Longitude of end point (decimal degrees or sector file format)
- StartPointName          Fix, VOR, NDB, airport code or runway (must be found in the active sector file)
- EndPointName            Fix, VOR, NDB, airport code or runway (must be found in the active sector file)

*Note: the syntax to define a runway threshold as a StartPointName or an EndPointName is the 4-letter ICAO airport designator followed by a forward slash and the runway identifier.*

## FontSize

**FONTSIZE:Type:Size**

**FONTSIZE:0**

Each new map starts out with the default font size. It can be modified using the *FontSize* line. All texts after the line in that map use the new size. "FONTSIZE:0" sets the size back to the default value.

- Type                      Type of change
  - "=" sets a new size
  - "-" reduces the size from the default by the given amount
  - "+" increases the size from the default by the given amount
  - "\*" multiplies the size of the default by the given amount
- Size                      New font size (1-99)

The resulting font size is limited to values between 1 and 99.

## FontStyle

**FONTSTYLE:Weight:Italic:Underline:Strikethrough**

**FONTSTYLE:0**

Each new map starts out with the default font style. It can be modified using the *FontStyle* line. All texts after the line in that map use the new style. "FONTSTYLE:0" sets the style back to the default settings.

- Weight                      Font weight (0-1000)
  - some example values are 0=default weight, 400=normal, 700=bold
- Italic                      Italic (1=yes, 0=no)
- Underline                  Underline (1=yes, 0=no)
- Strikethrough              Strikethrough (1=yes, 0=no)

## TextAlign

### TEXTALIGN:Flags

Sets the default text alignment used in the *Text* and *Symbol* lines. If defined before the first map, becomes the default alignment for all maps. If defined within a map, becomes the default alignment for all following lines of that map.

- Flags                      Combination of the following:
  - "L", "C" or "R"              for left, center or right-aligned horizontally
  - "T", "C" or "B"              for top, center or bottom-aligned vertically

By default, the alignment is centered both horizontally and vertically, i.e. the text label is centered on the defined position. Entering for example "LT" puts the text label's top left corner in the defined position instead.

## Text

### TEXT:Lat:Lon:Label

### TEXT:Lat:Lon:Label:OffsetX:OffsetY

### TEXT:PointName:Label

### TEXT:PointName:Label:OffsetX:OffsetY

Draws a text label.

- Lat                      Latitude of label anchor point (decimal degrees or sector file format)
- Lon                      Longitude of label anchor point (decimal degrees or sector file format)
- PointName              Fix, VOR, NDB, airport code or runway (must be found in the active sector file)
- Label                      Text label (text string)
- OffsetX                      Number of pixels to offset the label in the left(-) - right(+) direction
- OffsetY                      Number of pixels to offset the label in the up(-) - down(+) direction

*Note 1: the syntax to define a runway threshold as a PointName is the 4-letter ICAO airport designator followed by a forward slash and the runway identifier.*

*Note 2: to set the text alignment for just this label, it is possible to suffix TEXT with a forward slash followed by the required alignment flags, i.e. TEXT/LT to align the label top left corner on the anchor point.*



## Symbol

**SYMBOL:SymbolName:Lat:Lon**

**SYMBOL:SymbolName:Lat:Lon:Label:OffsetX:OffsetY**

**SYMBOL:SymbolName:PointName**

**SYMBOL:SymbolName:PointName:Label:OffsetX:OffsetY**

Draws a predefined symbol on the screen, optionally with a text label.

- SymbolName            Name of symbol (1)
- Lat                    Latitude of symbol centerpoint (decimal degrees or sector file format)
- Lon                    Longitude of symbol centerpoint (decimal degrees or sector file format)
- PointName            Fix, VOR, NDB, airport code or runway (must be found in the active sector file) (2)
- Label                Text label (text string)
- OffsetX               Number of pixels to offset the label in the left(-) - right(+) direction
- OffsetY               Number of pixels to offset the label in the up(-) - down(+) direction

*Note 1: the SymbolName can be a symbol type name (see TopSkySymbols.txt) or a symbol defined in this file with a SymbolDef line.*

*Note 2: the syntax to define a runway threshold as a PointName is the 4-letter ICAO airport designator followed by a forward slash and the runway identifier.*

*Note 3: to set the text alignment for just this label, it is possible to suffix SYMBOL with a forward slash followed by the required alignment flags, i.e. SYMBOL/LT to align the label top left corner on the symbol centerpoint.*

## Symbol definition

**SYMBOLDEF:SymbolName**

The first line for each symbol definition must be a *symbol definition* line.

- SymbolName            Symbol name to use for this symbol in the Symbol lines (text string)

The symbol itself can consist of various elements, drawn by the following lines. The X and Y coordinates are relative to the symbol centerpoint, with the X axis having increasing values to the right and the Y axis having increasing values to the down direction. The commands are the same as in the EuroScope Symbology dialog with the exception of the possibility to draw elliptical arcs and the “:” separating the values here so the ES dialog can be used in most cases to test the results.

## **MOVETO:X:Y**

Sets the starting point for the next LINETO command

- X                      Number of pixels from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Number of pixels from the symbol centerpoint in the up(-)-down(+) direction

## **LINETO:X:Y**

Draws a straight line from the previous position

- X                      Number of pixels from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Number of pixels from the symbol centerpoint in the up(-)-down(+) direction

## **SETPIXEL:X:Y**

Paints the selected pixel

- X                      Number of pixels from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Number of pixels from the symbol centerpoint in the up(-)-down(+) direction

## **ARC:X:Y:Radius:StartAngle:EndAngle**

### **ARC:X:Y:Radius<sub>X</sub>:Radius<sub>Y</sub>:StartAngle:EndAngle**

Draws a part of a circle

- X                      Centerpoint offset from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Centerpoint offset from the symbol centerpoint in the up(-)-down(+) direction
- Radius                Arc radius in pixels (to make a circular arc)
- Radius<sub>X</sub>            Arc radius in relation to the X axis in pixels (to make an elliptical arc)
- Radius<sub>Y</sub>            Arc radius in relation to the Y axis in pixels (to make an elliptical arc)
- StartAngle            Arc starting angle (integer degrees, 0 degrees is at positive X-axis, increasing counterclockwise)
- EndAngle             Arc ending angle (integer degrees, 0 degrees is at positive X-axis, increasing counterclockwise)

## **FILLARC:X:Y:Radius:StartAngle:EndAngle**

### **FILLARC:X:Y:Radius<sub>X</sub>:Radius<sub>Y</sub>:StartAngle:EndAngle**

Otherwise the same as ARC above but the result is filled

## **POLYGON:X<sub>1</sub>:Y<sub>1</sub>: X<sub>2</sub>:Y<sub>2</sub>:...: X<sub>n</sub>:Y<sub>n</sub>**

Draws a filled polygon with n vertices

## Coordinate

**COORD:Lat:Lon**

**COORD:PointName**

Defines line or polygon vertex coordinates to be used later with *CoordLine* or *CoordPoly* lines.

- Lat Latitude (decimal degrees or sector file format)
- Lon Longitude (decimal degrees or sector file format)
- PointName Fix, VOR, NDB, airport code or runway (must be found in the active sector file)

*Note: the syntax to define a runway threshold as a PointName is the 4-letter ICAO airport designator followed by a forward slash and the runway identifier.*

Circle

**CIRCLE:Lat:Lon:Radius:Spacing**

Defines a set of vertex points making up a circle to be used later with *CoordLine* or *CoordPoly* lines (the same as defining the points one by one using *Coordinate* lines, just simpler).

- Lat Center point latitude (decimal degrees or sector file format)
- Lon Center point longitude (decimal degrees or sector file format)
- Radius Radius (in nautical miles, 0.1-9999.9)
- Spacing Vertex radial spacing (in degrees, 0.1-120.0)

*CoordLine*

**COORDLINE**

Draws a sequence of lines from a set of coordinates having been defined by preceding *coordinate* lines. The lines use the previously defined line style (or solid line with 1-pixel width if no style defined).

*CoordPoly*

## COORDPOLY:FillPattern

Draws a polygon from a set of coordinates having been defined by preceding *coordinate* lines. The edge line is drawn with the previously defined line style (or solid line with 1-pixel width if no style defined).

- FillPattern      Polygon fill pattern
  - 0      no fill
  - 5, 10, 20, 25, 30, 40, 50, 60, 70, 75, 80, 90, 100      percentage to fill
  - E0 – E52      hatch fill

The hatch fill values correspond to the GDI+ HatchStyle enumeration values. For example, “E0” sets “HatchStyleHorizontal” and “E6” sets “HatchStyle05Percent” which can also be achieved by “5” (the numeric values for the FillPattern are just shortcuts to the percentage hatch styles)

## 2.5 TopSkyMSAW.txt

This file contains the data for the MSAW and APM functions.

### 2.5.1 MSAW areas

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. Setting a MSA value of "0" to an area makes it an inhibit area (no alerts even if aircraft are below 0 feet). Only define one area per line. There are five types of area definitions that are accepted:

#### *Lat/Lon box area*

**A:Lat<sub>min</sub>:Lat<sub>max</sub>:Lon<sub>min</sub>:Lon<sub>max</sub>:MSA**

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

- Lat<sub>min</sub> Minimum Latitude (decimal degrees or sector file format)
- Lat<sub>max</sub> Maximum Latitude (decimal degrees or sector file format)
- Lon<sub>min</sub> Minimum Longitude (decimal degrees or sector file format)
- Lon<sub>max</sub> Maximum Longitude (decimal degrees or sector file format)
- 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)

- Lat Circle center point latitude (decimal degrees or sector file format)
- Lon Circle center point longitude (decimal degrees or 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<sub>min</sub>:Lon<sub>min</sub>:ΔLat:ΔLon:N:MSA<sub>1</sub>:MSA<sub>2</sub>:...:MSA<sub>n</sub>**

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

- Lat<sub>min</sub> Latitude of the south edge of the boxes (decimal degrees or sector file format)
- Lon<sub>min</sub> Longitude of the west edge of first box (decimal degrees or sector file format)
- ΔLat Latitude size of one box (decimal degrees)
- ΔLon Longitude size of one box (decimal degrees)
- N Number of boxes
- MSA<sub>1</sub>-MSA<sub>n</sub> Minimum Safe Altitudes of the boxes (feet, integer values)

## Polygon

**P:N:Lat<sub>1</sub>:Lon<sub>1</sub>:Lat<sub>2</sub>:Lon<sub>2</sub>:...:Lat<sub>n</sub>:Lon<sub>n</sub>:MSA**

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

- N                      Number of vertices
- Lat<sub>1</sub>                Latitude of vertex 1 (decimal degrees or sector file format)
- Lon<sub>1</sub>                Longitude of vertex 1 (decimal degrees or sector file format)
- Lat<sub>2</sub>                Latitude of vertex 2 (decimal degrees or sector file format)
- Lon<sub>2</sub>                Longitude of vertex 2 (decimal degrees or sector file format)
- Lat<sub>n</sub>                Latitude of vertex  $n$  (decimal degrees or sector file format)
- Lon<sub>n</sub>                Longitude of vertex  $n$  (decimal degrees or sector file format)
- MSA                  Minimum Safe Altitude within the polygon (feet, integer value)

## Sector

**S:Lat:Lon:TRdl<sub>1</sub>:TRdl<sub>2</sub>:R<sub>min</sub>:R<sub>max</sub>:MSA**

An area defined as being between two true bearings from a point (Lat,Lon) - clockwise direction from Rdl<sub>1</sub> to Rdl<sub>2</sub> - and between distances R<sub>min</sub> and R<sub>max</sub> from the point

- Lat                    Point latitude (decimal degrees or sector file format)
- Lon                    Point longitude (decimal degrees or sector file format)
- TRdl<sub>1</sub>                Bearing 1 (degrees true, decimal value)
- TRdl<sub>2</sub>                Bearing 2 (degrees true, decimal value)
- R<sub>min</sub>                  Minimum distance from point (nautical miles, decimal value)
- R<sub>max</sub>                  Maximum distance from point (nautical miles, decimal value)
- MSA                  Minimum Safe Altitude within the sector (feet, integer value)

### 2.5.2 APM areas

APM areas, unlike the other MSAW areas, are defined by more than one data line. The definition for an APM area starts with an *APM* line:

#### *APM*

**APM:Icao:Rwy:Alerts:TdpLat:TdpLon:TdpAlt:AppCrst:Rmin**

- Icao                      Airport ICAO code
- Rwy                      Runway identifier
- Alerts                    One or more of the following characters to define which alerts to display:
  - L                      Lateral alerts
  - A                      Above path alerts
  - B                      Below path alerts
- TdpLat                   Touchdown point latitude (decimal degrees or sector file format)
- TdpLon                   Touchdown point longitude (decimal degrees or sector file format)
- TdpAlt                   Touchdown point altitude (feet, integer value)
- AppCrst                  Approach course (degrees true, decimal value)
- Rmin                      Alert inhibit distance from touchdown point (nautical miles, decimal value)

The approach lateral path area is then defined using either three or more *Coord* lines, or an *APM\_Area* line.

#### *Coord*

**COORD:Lat:Lon**

- Lat                      Point latitude (decimal degrees or sector file format)
- Lon                      Point longitude (decimal degrees or sector file format)

#### *APM\_Area*

**APM\_AREA:XTE\_init:XTE\_slope:Rmax**

**APM\_AREA:XTE\_init:XTE\_slope:XTE\_limit:Rmax**

- XTE\_init                  Half-width of area at touchdown point (nautical miles, decimal value, 0.1-99.9)
- XTE\_slope                Angle by which the area opens outwards (degrees, decimal value, 0.0-45.0)
- XTE\_limit                Maximum half-width of area (nautical miles, decimal value, 0.1-999.9)
- Rmax                      Length of area from touchdown point (nautical miles, decimal value, 0.1-999.9)

The rest of the definitions below are optional, and if not specified, default values will be used.

### *APM\_Vert*

The *APM\_Vert* line is used to specify the vertical path area of the approach. The low and high angles begin from the touchdown point at its altitude minus/plus the VTE\_init value.

#### **APM\_VERT:VTE\_init:AngleLow:AngleHigh**

- VTE\_init                      Half-height of area at touchdown point (feet, integer value, default **0**)
- AngleLow                      “Below path” angle (degrees, decimal value, default **2.0**)
- AngleHigh                      “Above path” angle (degrees, decimal value, default **4.0**)

### *APM\_Vert\_Lim*

The *APM\_Vert\_Lim* line is used to specify the lowest altitude to join the final approach path (no “below path” alerts will be displayed above this altitude), and the altitude above which aircraft are not considered as being on approach even when within the approach lateral area.

#### **APM\_VERT\_LIM:JoinAlt:OverflyAlt**

- JoinAlt                      Joining altitude (feet, integer value, default **99999**)
- OverflyAlt                      Overflight altitude (feet, integer value, default **99999**)

### *APM\_TKE*

The *APM\_TKE* line is used to specify the track error limits to start monitoring the approach (less than Tolerance and within lateral path area) and to flag a lateral deviation within the lateral path area (more than Tolerance+Deviation when previously less than Tolerance).

#### **APM\_TKE:Tolerance:Deviation**

- Tolerance                      Track error tolerance (degrees, integer value, default **20**)
- Deviation                      Track error deviation (degrees, integer value, default **10**)

## 2.6 TopSkyRadars.txt

The file contains the primary radar station definitions to be used for displaying raw video radar data. The following example shows the syntax (optional lines in grey color):

// Helsinki PSR	Comment
RADAR:Helsinki	Radar
POSITIONS:EFHF:EFHK:EFES	Positions
LOCATION:N060.18.56.400:E024.57.54.400	Location
ALTITUDE:335	Altitude
BEAMWIDTH:1.4	Beamwidth
PULSEWIDTH:1.0	Pulsewidth
MAXANGLE:50	Maxangle
RANGE:0.0:60.0	Range
NOTERRAIN	NoTerrain

### *Radar*

#### **RADAR:RadarName**

Each radar definition must start with a Radar line that defines the radar station name.

- RadarName                      Radar station name (text string)

### *Positions*

#### **POSITIONS:Pos<sub>1</sub>:Pos<sub>2</sub>:...**

Defines the list of controller positions that use the radar station. Only one radar station can be active so the first station in the file that contains a match will be used. The logic compares the positions against the login callsign from the beginning of the string ("EF" will be a match for either "EFES\_CTR" or "EFHK\_TWR" but not for "SAEF\_APP")

- Pos<sub>x</sub>                              Position login callsign (text string, full callsign or first x letters)

### *Location*

#### **LOCATION:Lat:Lon**

The location of the radar antenna.

- Lat                                  Latitude value (decimal degrees or sector file format)
- Lon                                  Longitude value (decimal degrees or sector file format)



## *Altitude*

### **ALTITUDE:Alt**

The radar antenna altitude above mean sea level. If not specified, a value of 0 is used.

- Alt                      Antenna altitude (feet AMSL, integer value)

## *Beamwidth*

### **BEAMWIDTH:Beamwidth**

Specifies the beamwidth of the radar in degrees. If not specified, a value of 1.5 will be used. The value affects how wide the radar targets will be (twice the beamwidth value).

- Beamwidth              Beamwidth of the radar (degrees, decimal value)

## *Pulsewidth*

### **PULSEWIDTH:Pulsewidth**

Specifies the pulse width of the radar in microseconds. If not specified, a value of 1.0 will be used. The value affects how deep the radar targets will be (approx. 0.08nm/microsecond).

- Pulsewidth              Pulse width of the radar (microseconds, decimal value)

## *Maxangle*

### **MAXANGLE:MaxAngle**

Defines the maximum elevation angle of the radar measured from horizontal level. If not specified, a value of 90 will be used (i.e. coverage all the way up to vertical)

- MaxAngle              Maximum vertical angle of the radar (degrees, integer value)

## *Range*

### **RANGE:MinRange:MaxRange**

Defines the minimum and maximum detection ranges of the radar station. If not specified, a minimum value of 0 and a maximum value of 999999 will be used.

- MinRange              Minimum detection range of the radar (nautical miles, decimal value)
- MaxRange              Maximum detection range of the radar (nautical miles, decimal value)

## *Ceiling*

### **CEILING:Ceiling**

Defines the maximum detection altitude of the radar. If not specified, a value of 999999 will be used.

- Ceiling                      Maximum detection altitude of the radar (feet AMSL, integer value)

## *NoTerrain*

### **NOTERRAIN**

Sets the radar station to disregard ESE file radar data and to have no terrain masking.

When *NoTerrain* or *terrain* lines are not defined, the displayed targets are based on the primary radar coverage defined in the ESE file. For reasonable results, a primary radar should be defined at the same position in the ESE file as the one in this data file.

With the *NoTerrain* definition, all targets within the radar's visibility area will be displayed regardless of the ESE file radar definitions.

## *Terrain*

### **TERRAIN:ARC:StartAngle:EndAngle:Distance:Elevation**

### **TERRAIN:LINE:StartLat:StartLon:EndLat:EndLon:Elevation**

Sets the radar station to disregard ESE file radar data and defines a terrain obstruction for the radar, either as a radial arc or a line segment of constant elevation value. The arc format is more performance-friendly so it's the preferred choice whenever possible.

When one or more *terrain* lines are defined, all targets within the radar's visibility area that are not masked by the defined terrain will be displayed regardless of the ESE file radar definitions.

- StartAngle                      Arc starting angle (degrees true, decimal value)
- EndAngle                        Arc ending angle (degrees true, decimal value)
- Distance                        Arc radius from radar station (nautical miles, decimal value)
- StartLat                        Line starting point latitude (decimal degrees or sector file format)
- StartLon                        Line starting point longitude (decimal degrees or sector file format)
- EndLat                         Line ending point latitude (decimal degrees or sector file format)
- EndLon                         Line ending point longitude (decimal degrees or sector file format)
- Elevation                        Terrain elevation (feet AMSL, decimal value)

## 2.7 TopSkySettings.txt & TopSkySettingsLocal.txt

These two files allow changing the plugin settings. The difference between them is that the settings in the first file are loaded every time, while the settings in the “Local” file are only loaded on user request (by performing a “Sign In”).

The available settings, their default values and acceptable ranges are described in an Excel spreadsheet provided together with this document.

The settings in the files can be either general or login callsign specific. General settings have to be located at the beginning of the file before any login callsign specific ones. Login callsign specific ones are defined by creating sections starting with a line that contains a text string in square brackets above them.

The login callsign specific settings are checked by comparing the text string against the login callsign. If the login callsign contains the text, any settings after that are loaded until a new line with text in square brackets is found which after the check is done again. If not, all the settings in that section are skipped.

Example TopSkySettings.txt file:

Setting1=0	
Setting2=123	
[_CTR]	New section start
Setting2=100	
Setting3=0	
[EFES_]	New section start
Setting2=200	
[ESSA_TWR]	New section start
Setting2=300	
Setting4=0	

The plugin reads the file as follows (login callsign “EFES\_2\_CTR”):

- The first part of the file has no callsign restrictions, so the settings are valid for any callsign
  - “Setting1” is set to “0” and “Setting2” to “123”
- The first section (“\_CTR”) is a match
  - “Setting2” will be changed to “100” and “Setting3” is set to “0”.
- The second section (“EFES\_”) is also a match
  - “Setting2” is changed once again, this time to “200”.
- The last section (“ESSA\_TWR”) is not a match so the settings there won’t be applied.

So, any one setting can appear in the file more than once, and be set more than once depending on how the file is laid out. As the file is always read in the order it is written, the more specific sections should be at the bottom (like in the example, any \_CTR callsign will get a different “Setting2” value than the other callsigns, but if it happens to be EFES\_CTR or EFES\_<anything here>\_CTR, the value is different from the other \_CTR callsigns).

When the plugin detects that the login callsign has changed, the settings files are automatically reloaded (the “Local” file only if a “Sign In” has been done).

## 2.8 TopSkySSRcodes.txt

The file contains the SSR code range and area definitions to be used when assigning transponder codes via the plugin. The following example shows the syntax (optional lines in grey color):

AREA:EF1	Area
RADIUS:15.0	Radius
N060.00.00.000 E025.00.00.000	Coordinate
// domestic secondary	Comment
RANGE:3201:3277	Range
ADES:EF	ADES
PROTECTION:EF1	Protection
PRIORITY:-1	Priority
IFR	IFR

The plugin's SSR code assignment system checks the flightplan, finds out which code ranges are available for that flightplan, checks for codes already in use, and then assigns one of the available codes. Transponder codes ending with "00" are not assigned.

The example area above designates the code range 3201-3277 available for IFR traffic with destinations starting with "EF" and not entering the area "EF1". In addition, the range is defined to have a priority level of -1, to be used only if there are no available codes found in higher priority ranges.

### Mode S global

#### MODE\_S\_GLOBAL

If this line appears anywhere in the file, it indicates that the identity of mode S capable aircraft will be maintained using mode S information everywhere. See also *Mode S* line to limit the availability to specified area(s).

### Group

#### GROUP:GroupName:Item<sub>1</sub>:Item<sub>2</sub>:Item<sub>3</sub>:...

The *group* line can be used as a shortcut to writing a large number of text entries. It can be used in line types where lists of text strings are used. To use a group in a line, enter "GROUP\_<groupname>" like any other text string. It will be automatically expanded to the list of text strings in the group definition.

- GroupName            Name for the group
- Item<sub>x</sub>                Text strings

*Note: the item separator to be used here is the colon (:), regardless of what's used in the target line type.*

## Area

### AREA:AreaName

Each area definition must start with an *area* line that defines the area name. The area must be defined in the file before it is referred to in a code range definition. The area names are case sensitive.

- AreaName                      Area name to use in the code assignment rules (text string)

## Radius

### RADIUS:Radius

If the area is a circle, it can be defined as a center point and a distance from it. In this case the area definition needs the *radius* line and one *coordinate* line (see below). All other area shapes need to be defined as polygons using three or more *coordinate* lines, and then the *radius* line shall not be used.

- Radius                          Area radius (nautical miles, decimal value)

## Mode S

### MODE\_S

This line indicates that inside this area the identity of mode S capable aircraft will be maintained using mode S information. The mode S conspicuity code (1000) can be assigned by the plugin when the entire planned route is within these areas.

## Coordinate

### Lat Lon

Each area definition must have either at least three *coordinate* lines (three points being the minimum required to create a closed area, a triangle), or one *coordinate* line and a *radius* line (see above). 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 either in decimal degrees or 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.

## Callsign\_Code

### CALLSIGN\_CODE:Callsign:Code

A specific code can be forced to a callsign using this line. The defined code will always be assigned to this callsign even if it results in a duplicate code assignment, except when the code is already assigned to this callsign, in which case another suitable code is assigned.

- Callsign                      FPL callsign
- Code                          Assigned code (4 octal digits, 0000-7777)

## *Range*

### **RANGE:StartCode:EndCode**

This line is the only mandatory line for a code range definition and must always be the first line in a definition. It starts the definition by specifying the range of codes in it.

- StartCode                      First code in the range (4 octal digits, 0001-7777)
- EndCode                        Last code in the range (4 octal digits, 0001-7777)

## *Adhoc*

### **ADHOC**

This line causes the codes in this range to be assigned only to flightplans where the departure, destination or both are empty.

## *Priority*

### **PRIORITY:Level**

This line sets the priority level of this range. When more than one range of codes is suitable for a flight, codes are assigned based on the range priority level, with codes from lower priority ranges assigned only when no codes are available in higher priority ranges. The default priority level of a code range is zero.

- Level                            Priority level (-3 to +3, +3 being the highest priority)

## *Mandatory*

### **MANDATORY**

Available for backward compatibility. Sets the priority level to +1.

## *Secondary*

### **SECONDARY**

Available for backward compatibility. Sets the priority level to -1.

## *IFR*

### **IFR**

This line causes the codes in this range to be assigned only to IFR flightplans.

## *VFR*

### **VFR**

This line causes the codes in this range to be assigned only to VFR flightplans.

## *GAT*

### **GAT**

This line causes the codes in this range to be assigned only to GAT (general air traffic) flightplans. By default, a flightplan is categorized as GAT when “RMK/OAT” is not found in the remarks section.

## *OAT*

### **OAT**

This line causes the codes in this range to be assigned only to OAT (operational air traffic) flightplans. By default, a flightplan is categorized as OAT when “RMK/OAT” is found in the remarks section.

## *Direction*

### **DIRECTION:TTrk1:TTrk2**

This line limits the code assignment to flights having a track between the two specified true tracks (clockwise direction from Trk1 to Trk2). If *via* and/or *NotVia* lines are also present in the code range, the track to be checked is the outbound track from the specified point(s). If not, the tracks are checked against the aircraft’s planned track from its present position.

- TTrk1                      Start angle for the track range (degrees true, decimal value)
- TTrk2                      End angle for the track range (degrees true, decimal value)

## *ADEP*

### **ADEP:ICAOcode:ICAOcode:ICAOcode:...**

This line limits the code assignment to flights departing from one of the defined airports. The whole ICAO airport code is not needed; the match can also be done on the first one or more letters, e.g. entering “EF” will match all airports with ICAO designators beginning with “EF”. The *ADEP* line can contain one or more airport codes and one code range definition can also have more than one *ADEP* line if necessary.

- ICAOcode                      Airport ICAO code (complete or partial)

### *NotADEP*

#### **NOTADEP:ICAOcode:ICAOcode:ICAOcode:...**

This line limits the code assignment to flights not departing from any of the defined airports. Otherwise the format and limitations are the same as in the *ADEP* line.

- ICAOcode                      Airport ICAO code (complete or partial)

### *ADES*

#### **ADES:ICAOcode:ICAOcode:ICAOcode:...**

This line limits the code assignment to flights arriving at one of the defined airports. Otherwise the format and limitations are the same as in the *ADEP* line.

- ICAOcode                      Airport ICAO code (complete or partial)

### *NotADES*

#### **NOTADES:ICAOcode:ICAOcode:ICAOcode:...**

This line limits the code assignment to flights not arriving at any of the defined airports. Otherwise the format and limitations are the same as in the *ADEP* line.

- ICAOcode                      Airport ICAO code (complete or partial)

### *Local*

#### **LOCAL:ICAOcode:ICAOcode:ICAOcode:...**

This line limits the code assignment to local flights (ADEP=ADES) from one of the defined airports. The whole ICAO airport code is not needed; the match can also be done on the first one or more letters, e.g. entering “EF” will match all airports with ICAO designators beginning with “EF”. The *local* line can contain one or more airport codes and one code range definition can also have more than one *local* line if necessary. The *local* line cannot be used together with *ADEP* or *ADES* lines.

- ICAOcode                      Airport ICAO code (complete or partial)

### *Via*

#### **VIA:Point:Point:Point:...**

This line limits the code assignment to flights routing via at least one of the defined points. The point can be anywhere along the flightplan. One or more points can be defined in one *via* line and one code range definition can contain more than one *via* line if necessary.

- Point                              Point name (Fix, VOR, NDB or airport)



### *NotVia*

#### **NOTVIA:Point:Point:Point:...**

This line limits the code assignment to flights not routing via any of the defined points. Otherwise the format and limitations are the same as in the *via* line.

- Point                      Point name (Fix, VOR, NDB or airport)

### *AreaVia*

#### **AREAVIA:AreaName:AreaName:AreaName:...**

This line limits the code assignment to flights routing via at least one of the defined areas. The area(s) must have been defined earlier in the data file. One or more areas can be defined in one *AreaVia* line and one code range definition can contain more than one *AreaVia* line if necessary.

- AreaName                      Area name (text string)

### *Protection*

#### **PROTECTION:AreaName:AreaName:AreaName:...**

This line limits the code assignment to flights not routing via any of the defined areas. Otherwise the format and limitations are the same as in the *AreaVia* line.

- AreaName                      Area name (text string)

### *ADEParea*

#### **ADEPAREA:AreaName:AreaName:AreaName:...**

This line limits the code assignment to departing from one of the defined areas. The area(s) must have been defined earlier in the data file. One or more areas can be defined in one *ADEParea* line and one code range definition can contain more than one *ADEParea* line if necessary.

- AreaName                      Area name (text string)

### *NotADEParea*

#### **NOTADEPAREA:AreaName:AreaName:AreaName:...**

This line limits the code assignment to flights not departing from any of the defined areas. Otherwise the format and limitations are the same as in the *ADEParea* line.

- AreaName                      Area name (text string)

## *ADESarea*

### **ADESAREA:AreaName:AreaName:AreaName:...**

This line limits the code assignment to flights arriving in one of the defined areas. The area(s) must have been defined earlier in the data file. One or more areas can be defined in one *ADESarea* line and one code range definition can contain more than one *ADESarea* line if necessary.

- AreaName                      Area name (text string)

## *NotADESarea*

### **NOTADESAREA:AreaName:AreaName:AreaName:...**

This line limits the code assignment to flights not arriving in any of the defined areas. Otherwise the format and limitations are the same as in the *ADESarea* line.

- AreaName                      Area name (text string)

## *Unit*

### **UNIT:LoginCallsign:LoginCallsign:LoginCallsign:...**

This line limits the code assignment based on your network login callsign. The whole callsign is not needed; the match can also be done on the first one or more letters, e.g. entering “EFES” will match callsigns beginning with “EFES”. The *unit* line can contain one or more callsigns and one code range definition can also have more than one *unit* line if necessary.

- LoginCallsign                  Current login callsign (complete or partial)

## *NotUnit*

### **NOTUNIT:LoginCallsign:LoginCallsign:LoginCallsign:...**

This line limits the code assignment to network login callsigns other than the specified ones. Otherwise the format and limitations are the same as in the *unit* line.

- LoginCallsign                  Current login callsign (complete or partial)

## *Callsign*

### **CALLSIGN:Callsign:Callsign:Callsign:...**

This line limits the code assignment based on the aircraft's callsign. The whole callsign is not needed; the match can also be done on the first one or more letters, e.g. entering "FIN" will match callsigns beginning with "FIN". The *callsign* line can contain one or more callsigns and one code range definition can also have more than one *callsign* line if necessary.

- Callsign                      Aircraft callsign (complete or partial)

## *NotCallsign*

### **NOTCALLSIGN:Callsign:Callsign:Callsign:...**

This line limits the code assignment to aircraft callsigns other than the specified ones. Otherwise the format and limitations are the same as in the *callsign* line.

- Callsign                      Aircraft callsign (complete or partial)

## *ATYP*

### **ATYP:Atyp:Atyp:Atyp:...**

This line limits the code assignment based on the aircraft's type. The whole type is not needed; the match can also be done on the first one or more letters, e.g. entering "A3" will match types beginning with "A3". The *ATYP* line can contain one or more types and one code range definition can also have more than one *ATYP* line if necessary.

- Atyp                          Aircraft type designator (complete or partial)

## *NotATYP*

### **NOTATYP:Atyp:Atyp:Atyp:...**

This line limits the code assignment to aircraft types other than the specified ones. Otherwise the format and limitations are the same as in the *ATYP* line.

- Atyp                          Aircraft type designator (complete or partial)

## *Descr*

### **DESCR:List**

This line limits the code assignment based on the aircraft's description.

- List                      Allowed description letters. Any combination of the following can be used:
  - L              landplane
  - S              seaplane
  - A              amphibian
  - H              helicopter
  - G              gyrocopter
  - T              tilt-wing aircraft
  - ?              unknown

## *NotDescr*

### **NOTDESCR:List**

This line limits the code assignment to aircraft with descriptions other than the specified ones. Otherwise the format is the same as in the *descr* line.

- List                      Forbidden description letters

## *Remarks*

### **REMARKS:Text:Text:Text:...**

This line limits the code assignment based on the flightplan remarks. When all the specified text strings are found in the remarks section, the line is a match. The *remarks* line can contain one or more text strings and one code range definition can also have more than one *remarks* line if necessary (in this case it is enough that one of the lines is a match for the code range to be used).

- Text                      Text string to look for in the flightplan remarks

## *NotRemarks*

### **NOTREMARKS:Text:Text:Text:...**

Same as above but limits the code assignment to flightplans whose remarks section contains none of the specified text strings. When more than one *NotRemarks* line is used in a code range, the range is used when even one of the lines is a match.

- Text                      Text string to look for in the flightplan remarks

## 2.9 TopSkySTCA.txt

The file contains the definitions for final approach areas where smaller (usually 2.5nm) separation can be used, as well as STCA exclusion areas needed for parallel approaches and departures. The following example is used to show the syntax (optional lines in grey color):

FINALAPP:EFHK:04L	FinalApp
// EFHK 04's	Comment
SOIR:EFHK:04L/2300:04R/3300	SOIR
NOZ1:N060.18.37.790:E024.54.30.240	NOZ 1
NOZ1:N060.19.21.880:E024.53.08.680	NOZ 1
NOZ1:N060.12.36.560:E024.38.23.030	NOZ 1
NOZ1:N060.11.52.460:E024.39.44.310	NOZ 1
NOZ2:N060.18.49.470:E024.55.54.640	NOZ 2
NOZ2:N060.18.05.350:E024.57.16.110	NOZ 2
NOZ2:N060.11.20.250:E024.42.29.640	NOZ 2
NOZ2:N060.12.04.370:E024.41.08.450	NOZ 2

### *FinalApp*

#### **FINALAPP:AirportICAO:RwyID:Range:XTE:Lat:Lon:CourseT**

This line creates a final approach area where smaller separation values for STCA are used.

- AirportICAO      Airport ICAO code
- RwyID            Runway identifier
- Range            Maximum range from the approach end point (decimal value, range 0.0-99.0)
- XTE              Maximum cross-track error from the approach course (decimal value, range 0.0-99.0)
- Lat               Approach end point latitude (decimal degrees or sector file format)
- Lon               Approach end point longitude (decimal degrees or sector file format)
- CourseT          Approach course (degrees true, decimal value)

Only the ICAO code and RwyID are mandatory to be defined, so for example “FINALAPP:EFHK:04L” creates an approach area for that runway with default values. The default values for the other items are:

- Range            10.0 nm
- XTE               0.5 nm
- Lat, Lon          Runway threshold coordinates from the active sector file
- CourseT          Runway true bearing calculated from the threshold coordinates

Note that if one or more of the optional values needs to be changed, the line must include all the values up to the last changed value.

An STCA alert between two aircraft will be inhibited when all of the following are true:

- Both aircraft are planned to land on the runway in question
- Both aircraft are inside the same approach area
- Both aircraft have ground tracks within 10 degrees of the approach course
- The aircraft closer to the runway is not wake turbulence category HEAVY or SUPER, or a B757
- The aircraft further from the runway is in the same or higher wake turbulence category

## SOIR

### **SOIR:AirportICAO:RwyID1:RwyID2:Range:WidthIn:WidthOut:MinSep**

This line starts the definition.

- AirportICAO            Airport ICAO code
- RwyID1                Identifier of the runway on the left side in the direction of flight
- RwyID2                Identifier of the runway on the right side in the direction of flight
- Range                 Length of the NOZ (nm, decimal value, range 0.0-99.0)
- WidthIn               Width of the NOZ toward the other runway (nm, decimal value, range 0.0-99.0)
- WidthOut              Width of the NOZ away from the other runway (nm, decimal value, range 0.0-99.0)
- MinSep                Minimum separation between tracks

Only the ICAO code and runway identifiers are mandatory to be defined. The default values for the other items are:

- Range                 10.0 nm
- WidthIn / WidthOut   0.3 nm
- MinSep                0.33 nm

Note that if one or more of the optional values needs to be changed, the line must include all the values up to the last changed value. A custom polygon can also be defined as the NOZ, see the NOZ1 and NOZ2 lines.

An optional altitude value (feet AMSL) can be appended to the runway ID field to be used as the cleared level when the actual cleared level is “cleared for approach”. The format is “RwyIDx/altitude”, e.g. “22L/3000”. This may help to prevent nuisance STCA alerts when an aircraft with an approach clearance is not yet established on the final approach.

For arrivals, an STCA warning will be inhibited when all of the following conditions are true:

- One track is within NOZ1 and the other within NOZ2
- The separation between the tracks is not less than MinSep
- The ground tracks of both aircraft are within a specified (default 10 degrees) tolerance from the approach tracks

For departures, the MinSep value does not apply and the track error limit is fixed at 10 degrees and only valid toward the other runway. Both runways also need to be set as active for arrival (for an arrival setup)

or departure (for a departure setup) in the EuroScope runway setup. Both arrival and departure setups can be active simultaneously.

If the airport has more than two runways where simultaneous approaches are performed, each possible pair must be defined separately. For example, if an airport can do simultaneous approaches on any combination of runways 01L, 01C and 01R, three definitions are required (one for 01L/01C, one for 01L/01R and one for 01C/01R).

## *Departure*

### **DEPARTURE**

This optional line defines the setup as a departure setup. If not present, the setup is an arrival setup.

## *Approach course 1 and 2*

### **CRS1:CourseT**

### **CRS2:CourseT**

This optional line is used to define the approach course if it is different from the runway bearing. For it to have any effect, the setup must be an arrival setup and the NOZ for the corresponding runway must also be defined manually (see below).

- CourseT                      Approach course for the runway (degrees true, decimal value)

## *NOZ 1 and 2*

### **NOZ1:Lat:Lon**

### **NOZ2:Lat:Lon**

These optional lines are used to define vertices for custom polygons to override the default NOZ areas for the runways.

- Lat                              Point latitude (decimal degrees or sector file format)
- Lon                              Point longitude (decimal degrees or sector file format)

## *NTZ*

### **NTZ:Lat:Lon**

This optional line is used to define vertices for a custom polygon to override the default NTZ area. It may only be used in an arrival setup. The NTZ is used to extend STCA alerting below its normal lower limit altitude when an aircraft is inside the NTZ.

- Lat                              Point latitude (decimal degrees or sector file format)
- Lon                              Point longitude (decimal degrees or sector file format)

## 2.10 TopSkySymbols.txt

This file makes it possible to change the default symbols drawn by the plugin. The following example symbol shows the syntax:

// distance marker	Comment
SYMBOL:MARKER	Type
ELLIPSE:0:0:2	Definition

### Symbol definition

#### SYMBOL:SymbolType

The first line for each symbol definition must be a type line.

- SymbolType            Symbol type (one of the following):

##### Track symbols

- PRIMARY                      PSR tracks
- PRIMARY\_DIV                Diverging PSR tracks
- NODAPS                      Tracks without valid DAPs
- NODAPS\_DIV                Diverging tracks without valid DAPs
- NODAPS\_SPI                SPI tracks without valid DAPs
- DAPS                        Tracks with valid DAPs
- DAPS\_DIV                  Diverging tracks with valid DAPs
- DAPS\_SPI                  SPI tracks with valid DAPs
- ADSB                        ADS-B only tracks
- ADSB\_DIV                  Diverging ADS-B only tracks
- ADSB\_SPI                  SPI ADS-B only tracks
- UNCONTROLLED              Uncontrolled tracks
- COASTED                    Coasting tracks
- FPASD\_UNCONTROLLED       Uncontrolled FPASD tracks
- FPASD\_CONTROLLED        Controlled FPASD tracks

##### Other symbols

- HISTORY                    History dot symbol
- AIRPORT                    Airport symbol
- HOTSPOT                    Area hotspot symbol
- FIX                        Fix symbol
- NDB                        NDB symbol
- VOR                        VOR symbol
- MARKER                    Runway approach line distance marker symbol
- LEADER                    Leader line used in automatically generated maps

The symbol itself can consist of various elements, drawn by the following lines. The X and Y coordinates are relative to the symbol centerpoint, with the X axis having increasing values to the right and the Y axis having increasing values to the down direction. The commands are the same as in the EuroScope Symbology dialog with the exception of the possibility to draw elliptical arcs and the “:” separating the values here so the ES dialog can be used in most cases to test the results.



## **MOVETO:X:Y**

Sets the starting point for the next LINETO command

- X                      Number of pixels from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Number of pixels from the symbol centerpoint in the up(-)-down(+) direction

## **LINETO:X:Y**

Draws a straight line from the previous position

- X                      Number of pixels from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Number of pixels from the symbol centerpoint in the up(-)-down(+) direction

## **SETPIXEL:X:Y**

Paints the selected pixel

- X                      Number of pixels from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Number of pixels from the symbol centerpoint in the up(-)-down(+) direction

## **ARC:X:Y:Radius:StartAngle:EndAngle**

### **ARC:X:Y:Radius<sub>X</sub>:Radius<sub>Y</sub>:StartAngle:EndAngle**

Draws a part of a circle or ellipse

- X                      Centerpoint offset from the symbol centerpoint in the left(-)-right(+) direction
- Y                      Centerpoint offset from the symbol centerpoint in the up(-)-down(+) direction
- Radius                Arc radius in pixels (to make a circular arc)
- Radius<sub>X</sub>            Arc radius in relation to the X axis in pixels (to make an elliptical arc)
- Radius<sub>Y</sub>            Arc radius in relation to the Y axis in pixels (to make an elliptical arc)
- StartAngle            Arc starting angle (integer degrees, 0 degrees is at positive X-axis, increasing counterclockwise)
- EndAngle             Arc ending angle (integer degrees, 0 degrees is at positive X-axis, increasing counterclockwise)

## **FILLARC:X:Y:Radius:StartAngle:EndAngle**

### **FILLARC:X:Y:Radius<sub>X</sub>:Radius<sub>Y</sub>:StartAngle:EndAngle**

Otherwise the same as ARC, but the result is filled

**ELLIPSE:X:Y:Radius**

**ELLIPSE:X:Y:Radius<sub>x</sub>:Radius<sub>y</sub>**

Otherwise the same as FILLARC, but always draws a complete circle or ellipse

**FILLRECT:Left:Top:Right:Bottom**

Draws a filled rectangle

- Left                      Left edge offset from the symbol centerpoint in the left(-)-right(+) direction
- Top                      Top edge offset from the symbol centerpoint in the up(-)-down(+) direction
- Right                    Right edge offset from the symbol centerpoint in the left(-)-right(+) direction
- Bottom                  Bottom edge offset from the symbol centerpoint in the up(-)-down(+) direction

**POLYGON:X<sub>1</sub>:Y<sub>1</sub>: X<sub>2</sub>:Y<sub>2</sub>:...: X<sub>n</sub>:Y<sub>n</sub>**

Draws a filled polygon with n vertices

## 2.11 TopSkyViews.txt

The file contains the definitions for the items in the View Window. Two types of definitions are allowed, enter only one definition per line:

### *Lat/Lon box*

**VIEW:ViewName:Lat<sub>min</sub>:Lon<sub>min</sub>:Lat<sub>max</sub>:Lon<sub>max</sub>**

An area bounded by the minimum and maximum latitude and longitude values. The resulting screen area covers at least the required coordinates, possibly more depending on the screen shape.

- ViewName                      Name to identify the view in the View Window
- Lat<sub>min</sub>                        Minimum Latitude (decimal degrees or sector file format)
- Lon<sub>min</sub>                        Minimum Longitude (decimal degrees or sector file format)
- Lat<sub>max</sub>                        Maximum Latitude (decimal degrees or sector file format)
- Lon<sub>max</sub>                        Maximum Longitude (decimal degrees or sector file format)

### *Centerpoint and range*

**VIEW:ViewName:Lat:Lon:Range**

**VIEW:ViewName:PointName:Range**

An area defined by a range from a centerpoint. The resulting screen area will be centered on the required centerpoint and will show at least the required distance to every direction from the centerpoint.

- ViewName                      Name to identify the view in the View Window
- Lat                              Centerpoint Latitude (decimal degrees or sector file format)
- Lon                              Centerpoint Longitude (decimal degrees or sector file format)
- PointName                      Fix, VOR, NDB, airport code or runway (must be found in the active sector file)
- Range                          The displayed range (nautical miles, decimal value)

*Note: the syntax to define a runway threshold as a PointName is the 4-letter ICAO airport designator followed by a forward slash and the runway identifier.*

## 2.12 ICAO\_Aircraft.txt

This file contains aircraft type information, and is used by the Flight Plan Window and Create APL Window for checking entries and as a data source for the Document Viewer Window. The format of the file is the same as in the one used by EuroScope.

As an alternative to having the aircraft data, this file can contain the location of another file that has the data. In that case, this file should have only one line, containing the data file location. The location can be defined as absolute or relative. Relative locations starting with “.\” or “..\” are relative to the plugin folder. The pointed file must contain the aircraft data, not a path to another file.

## 2.13 ICAO\_Aircraft.json

This file contains more detailed information on the aircraft types. It is a JSON file containing an array of objects with the following keys:

Key	Data type	Description
○ ICAO	string	Type designator (mandatory item)
○ Description	string	Three-character description <ul style="list-style-type: none"><li>▪ First character – description: A (Amphibian), G (Gyrocopter), H (Helicopter), L (Landplane), S (Seaplane) or T (Tiltrotor)</li><li>▪ Second character – engine count: 1-8 or C (Two engines coupled to drive a single propeller system)</li><li>▪ Third character – engine type: E (Electric), J (Jet), P (Piston), R (Rocket) or T (Turboprop/turboshaft)</li></ul>
○ WTC	string	Wake turbulence category <ul style="list-style-type: none"><li>▪ L, M, H or J</li></ul>
○ WTG	string	ICAO wake turbulence group <ul style="list-style-type: none"><li>▪ A, B, C, D, E, F or G</li></ul>
○ RECAT-EU	string	RECAT-EU wake turbulence group <ul style="list-style-type: none"><li>▪ A, B, C, D, E or F</li></ul>
○ Wingspan	number	Wingspan in meters
○ Length	number	Length in meters
○ Height	number	Height in meters
○ MTOW	number	Maximum take-off weight in kilograms
○ Use	string	Typical use(s) for the aircraft <ul style="list-style-type: none"><li>▪ One or more of the following: A (Airliner/commuter), B (Business/corporate), C (Cargo), H (Helicopter, other than military), I (Military helicopter), M (Military, other than helicopter), P (Private), T (Military tanker/transport)</li></ul>
○ IATA	string	IATA designator
○ IATA_cargo	string	IATA designator when used as cargo aircraft
○ Manufacturer	string	Manufacturer name
○ Model	string	Aircraft model name(s) for this type designator

The “ICAO” key is the only mandatory one. Keys that are irrelevant or whose values are not known can be left out.

## 2.14 ICAO\_Airlines.txt & ICAO\_Airlines\_Virtual.txt

These files contain the radiotelephony callsigns to be displayed in the track labels, and is used as a data source for the Document Viewer Window. By default, if an identifier is found in both files, the information in the “ICAO\_Airlines.txt” file is used. The following example line shows the syntax:

AAB	Abelag Aviation	ABG	Callsign definition
-----	-----------------	-----	---------------------

The format of the files is the same as in the “ICAO\_Airlines.txt” file provided with EuroScope. Only one callsign must be defined per line.

### *Callsign definition*

#### **ThreeLetterID<tab>OperatorName<tab>Callsign**

- ThreeLetterID                                      Three-letter designator in the flightplan
- OperatorName                                      Operator name – Notifying state
- Callsign    Radiotelephony callsign

As an alternative to having the callsign data, this file can contain the location of another file that has the data. In that case, this file should have only one line, containing the data file location. The location can be defined as absolute or relative. Relative locations starting with “.\” or “..\” are relative to the plugin folder. The data in the pointed file must be in the above format, and the pointed file must contain the callsign data, not a path to another file.

## 2.15 ICAO\_Airports.txt

This file contains airport information, and is used as a data source for the Document Viewer Window. The format of the file is the same as in the one used by EuroScope.

As an alternative to having the airport data, this file can contain the location of another file that has the data. In that case, this file should have only one line, containing the data file location. The location can be defined as absolute or relative. Relative locations starting with “.\” or “..\” are relative to the plugin folder. The pointed file must contain the airport data, not a path to another file.

## 2.16 isec.txt

This file contains waypoint information, and is used as a data source for the plugin maps (currently only for the auto-generated NAT maps). The format of the file is the same as in the one used by EuroScope.

As an alternative to having the airport data, this file can contain the location of another file that has the data. In that case, this file should have only one line, containing the data file location. The location can be defined as absolute or relative. Relative locations starting with “.\” or “..\” are relative to the plugin folder. The pointed file must contain the airport data, not a path to another file.

### 3 Sound files

The plugin uses the following sound files if present in the same folder as the plugin dll:

- TopSkySoundAPW.wav                      APW warning sound
- TopSkySoundCoord.wav                  Coordination received sound (ROF, RTI and TIP)
- TopSkySoundCoordACP.wav              Coordination accepted sound (RTI and TIP)
- TopSkySoundCoordRJC.wav              Coordination rejected sound (ROF, RTI and TIP)
- TopSkySoundCPDLC.wav                  CPDLC/DCL message sound
- TopSkySoundSTCA.wav                   STCA warning sound

The limitations for the used files are that the file must fit into available physical memory and be playable by an installed waveform-audio device driver. If a specific file is not found, no sound is played.

### 4 Cursor files

Six custom cursors are used:

- TopSkyCursorArrowLeft.cur            General purpose cursor
- TopSkyCursorArrowRight.cur          Used when over an opened menu
- TopSkyCursorCross.cur                Used when drawing vectors, selecting points, etc.
- TopSkyCursorMove.cur                Used when moving windows
- TopSkyCursorStop.cur                Used when no input is allowed in that area
- TopSkyCursorResize.cur               Used when resizing windows

If even one of the cursor files is not found in the plugin dll folder, none of the custom cursors will be used.

### 5 External access

It is possible to trigger a transponder code assignment from another plugin, using “StartTagFunction” with the following parameters:

- sFunctionPlugInName                  TopSky plugin
- functionID                              667
- sltemString                              Callsign of the aircraft

The “sCallsign” parameter is not used by the plugin, but as StartTagFunction will set that text string (case sensitive!) as the ASEL callsign, it is recommended to set a reasonable value to it – for example the current ASEL callsign, the same as sltemString, or an empty string. NULL will cause an exception.

The function will trigger an automatic assignment if all the following conditions are met (otherwise the function will do nothing):

- SSR menu is not open
- A code assignment is currently not in progress
- At least 2 seconds have elapsed from the previous call to this function
- Both a valid CFlightPlan and a CRadarTarget are found for the requested callsign
- You are a controller
- The aircraft is not tracked by someone else