



Dynamic Simulation (DYSIM)

User Reference Guide

April 3, 2025

JVN Tool Suite v13.7.6 Volume 3

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1. DYSIM Overview

Dynamic Simulation (DYSIM) refers to a group of executables included in the JVN Tool Suite that provide capabilities for simulation of aircraft operations in the National Airspace System (NAS). With DYSIM, users can generate real-time flight data messages and target positions, process live surveillance and non-surveillance data, and together with JVN's Simulation Driver Radar Recorder (SDRR) can interface with other systems including but not limited to TBFM, STARS, and ERAM. Interfacing with these systems allows automatic simulation modification in response to system feedback, dynamic Simulation Pilots (simPilot) that may manually manipulate live targets, generate live target events, and send messaging data.

2. Getting Started

The processor with DYSIM installed is configured to boot up to a user login screen. Users can enter a username and password, then click the login button or press **Enter** on the keyboard.

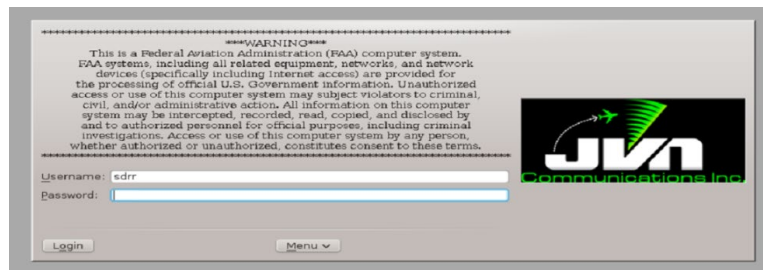


Figure 1. DYSIM Processor Login

NOTE: The 'root' user does not have access to the DYSIM commands and utilities. If root access is needed while logged in, the user should either log out and log in again as 'root' or open a terminal window, type **su** and enter the 'root' user password.

After a short loading period the KDE desktop will appear.



Figure 2. DYSIM Processor Desktop

3. System Configuration

3.1. Environment Variables

DYSIM uses environment variables for the locations of weather scenarios, and adaptation data, including En Route Automation Modernization (ERAM), Standard Terminal Automation Replacement System (STARS), and Time Based Flow Management (TBFM) adaptation files.

Table 1. Environment Variables

Variable Name	Description	Default Location
DYSIM_LOG_PATH	Location of DYSIM system log files.	/usr/local/log
WX_PATH	Location of weather scenarios.	/opt/wx
ADAPTATION_PATH	Location of adaptation data.	/opt/adaptation

Additional configuration needed for individual executables is described below.

4. simDriver

The simDriver executable generates flight data and target positions dynamically during scenario execution and provides the capability to manipulate and interactively “pilot” targets. This executable sends commands to Simulation Driver and Radar Recorder (SDRR).

4.1. Starting simDriver

Start the simDriver executable from the command line while inside the desired scenario directory created with the Graphic Simulation Generation Tool (GSGT). To launch simDriver with basic parameters, enter:

```
> simDriver --cmuListenPort=<port#> --tgtOutDev=tcp://<sdr_address>:<port#>  
--sdrCmdDev=tcp://<sdr_address>:<port#> --precipDev=tcp://<sdr_address>:<port#>  
--cmsListenPort=<port#> --scenarioFile=scenario.xml
```

Other optional parameters may be specified. For example:

```
> simDriver --nofullscreen --setIndependentRelease --cpdlcResponseDelay=5  
--cmuListenPort=10332 --tgtOutDev=tcp://sim4:10320 --sdrCmdDev=tcp://sim4:10330  
--precipDev=tcp://sim4:10334 --cmsListenPort=9800 --scenarioFile=scenario.zob_zbw.xml
```

To launch a version of simDriver that is not the default version, enter:

```
> /usr/local/jvn.x.x.x/bin/simDriver --sdrCmdDev=tcp://<sdr_address>:<port#>  
--tgtDev=tcp://<sdr_address>:<port#>
```

NOTE: The simDriver executable must be started from a command line while inside the scenario directory.

4.2. Command Line Options

The simDriver executable can be started with various options which control its operation. Typing the simDriver -h will show the following arguments:

Table 2. Program Parameters

Parameter	Description
--cmdDev=tcp://<sdr_address>:<port#> or --cmdListenPort=<port#>	Directs simDriver to send flight data messages to SDRR at the named address & port. SDRR must be started with the corresponding parameter.
--tgtDev=tcp://<sdr_address>:<port#>	Directs simDriver to send target positions to SDRR at the named address & port. SDRR must be started with the corresponding parameter.
--precipDev=tcp://<sdr_address>:<port#>	Directs simDriver to send precipitation data to SDRR at the named address & port. SDRR must be started with the corresponding parameter.
--cmuDev=tcp://<sdr_address>:<port#> or cmuListenPort=<port#>	Directs simDriver to send AFN/CPDLC data to SDRR at the named address & port. SDRR must be started with the corresponding parameter.
--simPilotPort=<port#>	Defines the port for the connection to simPilot. The simPilot executable must be started with the corresponding parameter.
--cmsListenPort=<port#>	Used with haddsClient utility. Directs simDriver to listen on the port where the haddsClient utility will output Common Message Set (CMS) messages from a live ERAM System via an En Route Data Distribution System (EDDS). The haddsClient must be started with the corresponding parameter.
--aigListenPort=<port#>	Used with the aigClient utility. Directs simDriver to listen on the port where the aigClient utility will output AIG messages from a live STARS System. The aigClient must be started with the corresponding parameter.

Parameter	Description
--misServer=<hostname or ip>	Connects to TBFM MIS (Metering Information Service) to dynamically start targets at the TBFM suggested departure time (EDCT).
--tcwDev=<device>	Connects to TCW Server.
--tcwFacName="facility name"	3-letter id of facility-in-use. If using multiple facs, use format CENTER:FAC (ex: ZNY:PPP)
--surfaceListenPort="portdevice" (for surfaceDriver)	Port used to connect surfaceDriver.
--slickMode="ip"	Connect to SLICK server.
--hoMargin=<nautical_miles>	Globally sets the distance from all facility boundaries where simDriver will start sending target position messages to SDRR. Applies to sector boundaries, enroute and terminal facility boundaries. Value is in nautical miles. The default value is 5 nmi.
--hoDuration=<seconds>	Sets the duration for a target to remain in handoff. Value is in seconds. The default value is zero.
--facHoMargin=<facility/nautical_miles>	Sets the distance from the specified facility boundary where simDriver will start sending target position messages to SDRR. Applies to enroute or terminal facility boundaries. Value is in nautical miles.
--interval=<seconds>	TargetStateInterval; default is 5.0 secs.
--liveFacility=<eramName:starsName or caatsName>	Defines which ERAM star names will be applied. This states that the TRACON is live.
--liveSectors=<facility name:sector position(s)>	Defines which ERAM sector positions will be manned by controllers. Applies to indirect mode only.

Parameter	Description
--eramSimMode	ERAM simulation mode. Sets simDriver to send ERAM CMS messages to a live or virtual EDDS.
--rsi=<RSI>	Controls which portions of a scenario, as indicated by the record select indicator (RSI), to run. This parameter can be repeated for each RSI. Omitting this parameter results in execution of all RSIs.
--disableRsi=<RSI>	Controls which portions of a scenario, as indicated by the record select indicator (RSI), to exclude from execution. This parameter can be repeated for each RSI to be disabled.
--supervisorPosition=<facName:position>	Changes what ERAM ATS simDriver uses for injecting messages such as an RS after a flight is dropped. Default position used is S1.
--pilotAssignment=<position:RSI>	Defines which simPilot positions will have control of targets tagged with an RSI. This parameter can be repeated for each simPilot position.
--scriptDefinitions=<file>	Selects the scriptDefinitions file manually.
--cpdlcManualMode	Sets all flights in Manual Mode.
--cpdlcResponseDelay=(secs)	Sets the default cpdlc response delay to x many seconds. This is similar to adding it directly to the prefs.xml.
--setIndependentRelease	Sets all flights to Independent Release.
--setManualRelease	Sets all flights to Manual Release.
--createNewTargetFromFH	Creates a live target based on the FH message. This is a type of CMS message.

Parameter	Description
--holdTailoredRoutes	This option is used with --createNewTargetFromFH on flights created dynamically from FH and puts the newly created target on hold if it's not a departure so the route can be adjusted if needed.
--disableToggleFreq	Excludes the ability to send QN messages.
--inhibitHandoff=<facName>	Disable auto handoff to facility.
--disableInterimAltitudes	Disable processing interim altitudes from CMS messages to change target altitude.
--disableCmsToDysim	Disable processing of all CMS messages to manipulate targets.
--ignoreRestrictions	Ignores speed and altitude restrictions for all flights.
--processSpeedAdvisory	Enables speed advisory processing.
--processTMA	Enables HC resequence and HB manual swap processing.
--pushBackLeadTime="time"	(default is 00:05:00)
--arrivalInGateDelay="time"	(default is 00:05:00)
--enableEffects	Enables additional graphical effects used.
--nofullscreen	Not full screen mode; simDriver will be started in a window roughly half the size of the screen.
--start	This starts the scenario immediately on launch.
--preview	Previews the scenario.
--logFile=<filename>	Specify log file name.

Parameter	Description
--nologfile	No log file is used.
--aid=AID	Filters the AID flight list.
--scenarioFile=<file>. (defaults to scenario.xml)	Selects a scenario file manually.
--proxy=http://<server>:<port#>	Sets up a proxy server for mapTiles.
--help	Display application parameters.

For example, simDriver can be started in ERAM Simulation Mode with additional optional parameters:

```
> simDriver --cmdDev=tcp://tbfmsdrr01:9601 --tgtDev=tcp://tbfmsdrr01:9600 --eramSimMode
--hoMargin=20 --hoDuration=60 --rsi=10 --rsi=20
```

Note that there may be a need to multiplex the cmdDev and tgtDev definitions to a second device or file. For example, one simDriver instance may be connected to two instances of SDRR:

```
> simDriver --cmdDev="(tcp://tsim-sdrr1:10560+tcp://tsim-sdrr2:10561)"
--tgtDev="(tcp://tsim-sdrr1:10570+tcp://tsim-sdrr2:10571)" --eramSimMode
```

To multiplex a device to a file:

```
> simDriver --cmdDev="(tcp://tsim-sdrr1:10560+/tmp/commands.jvn)"
--tgtDev="(tcp://tsim-sdrr1:10570+/tmp/targets.jvn)" --eramSimMode
```

4.3. simDriver GUI

The simDriver Graphical User Interface (GUI) is composed of a main menu bar, date and time clock, and display tabs. The times are displayed in UTC.

4.3.1. Menu Bar

The menu bar includes the following options:

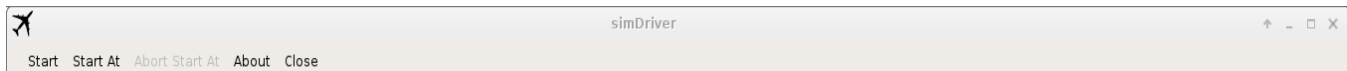


Figure 3. simDriver Menu Bar

Start

Starts the scenario execution, immediately.

Start At

Starts the scenario execution, at a specified time. When 'Start At' is selected, a dialog is displayed for entering a start time. The time is pre-populated with the current system time.

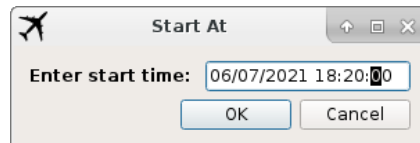


Figure 4. Start At Dialog

Entering a future time and selecting 'OK' causes the 'Abort Start At' option to become available in the menu bar. Also, the 'Start At' time is displayed in the upper right corner of the menu bar. Once the specified time is reached, the time begins to increment, and the scenario starts executing.

Abort Start At

Interrupts the 'Start At' countdown.

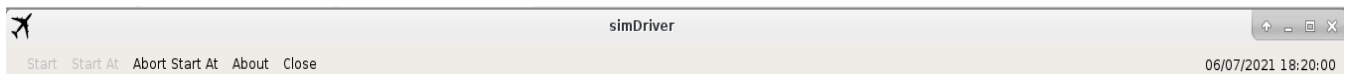


Figure 5. Option to Abort Start At

About

Displays the About simDriver dialog which shows the version of simDriver, and the date and time that the simDriver executable was built.

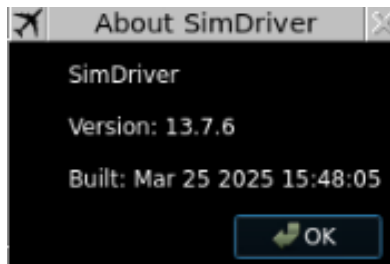


Figure 6. About SimDriver Dialog

Close

Stops the scenario execution and closes the simDriver GUI. When 'Close' is selected, the warning below is displayed. Selecting 'Yes' exits the GUI; selecting 'No' closes the warning and returns to the GUI.

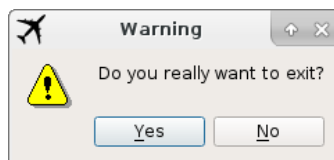


Figure 7. simDriver Exit Warning

4.3.2. Date and Time Clock

When a scenario is running, the scenario date and time are displayed in the upper right corner.

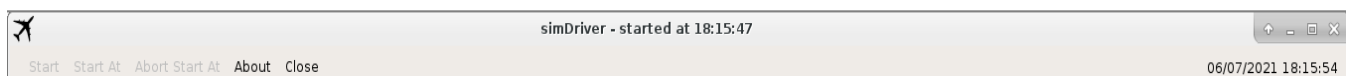


Figure 8. simDriver Run Clock

4.3.3. Display Tabs

The display tabs are Status, Dysim, and Log. Right clicking in the text area of a display tab launches a pop-up with the following options:

Copy

Places any selected text into the copy buffer.

Select All

Selects all the text in the current display tab message log area.

Find

Opens a search bar at the bottom of the current display tab message log area.

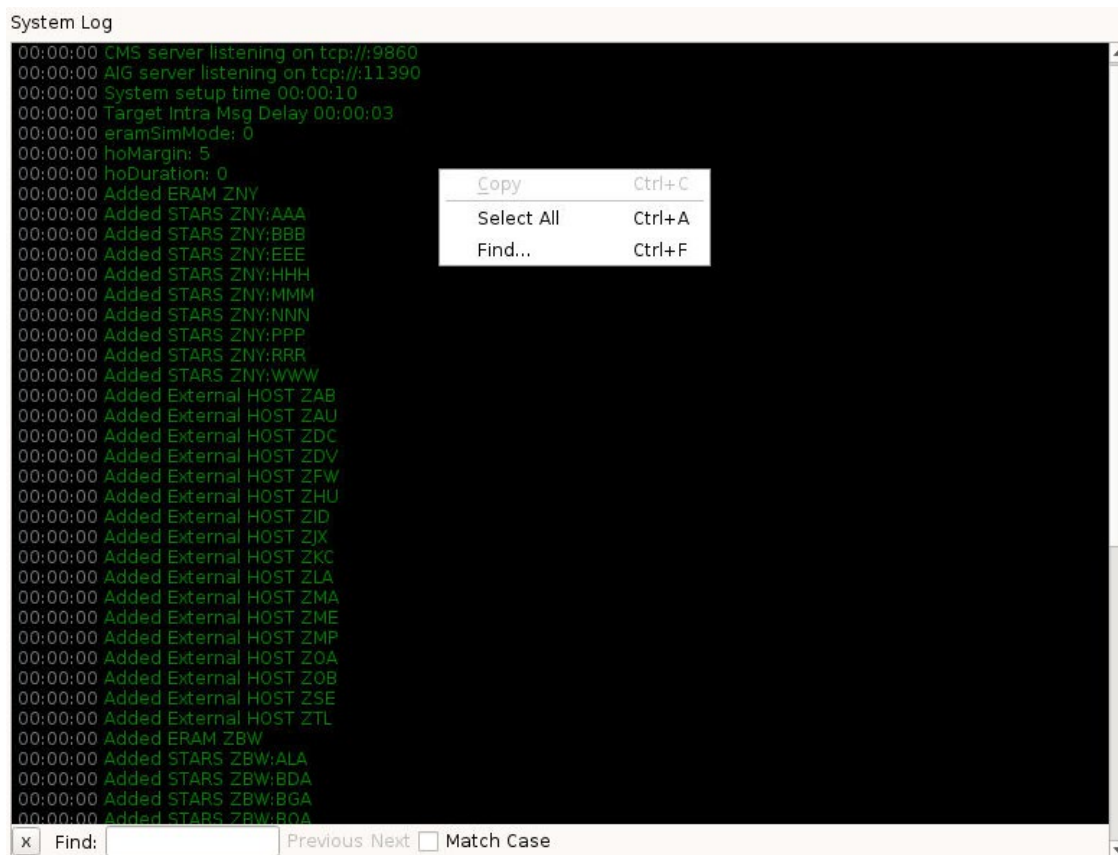


Figure 9. Message Area Text Options

4.3.3.1. Status Tab

The status display tab is separated into two parts. The left side shows the Device Status. All devices connected to simDriver are listed and color coded to indicate connection status. The red indicates that the connection has yet to be established. The yellow indicates that there is at least one connection made. The green indicates that the connection has been fully established. The right side contains a System Log where all system messages, such as status, warnings and errors are displayed.

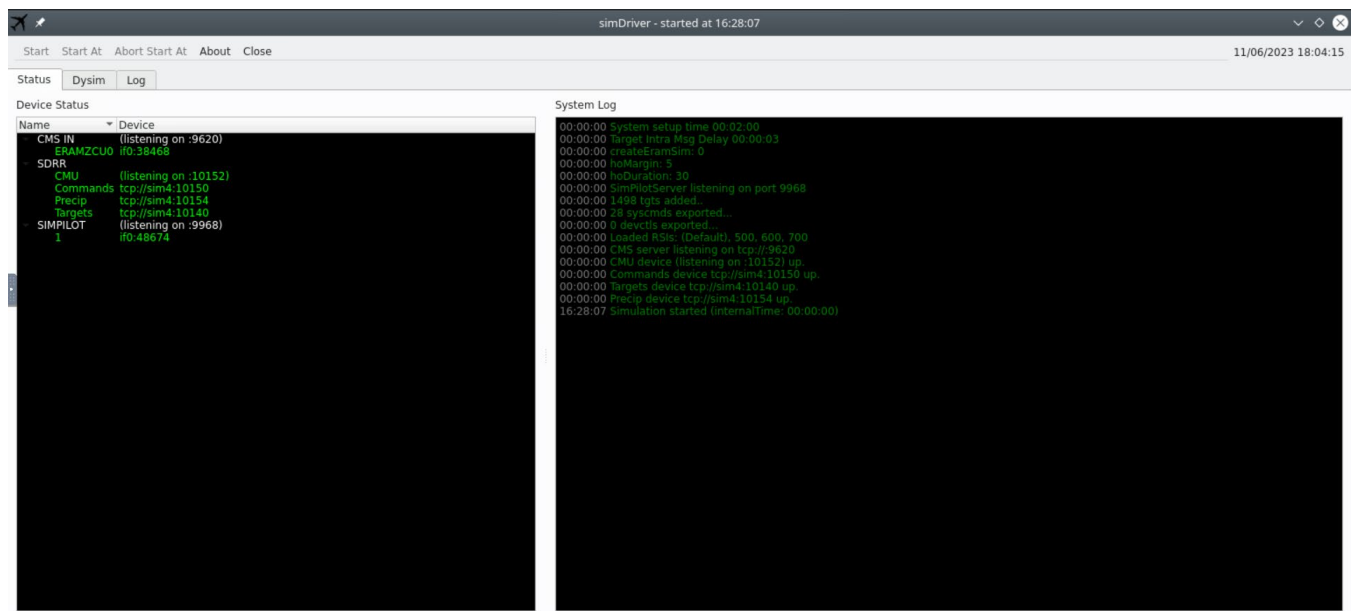


Figure 10. simDriver Status Tab

4.3.3.2. Dysim Tab

The Dysim Tab is separated into two parts. The left side displays the Targets View and the right side displays the Map View.

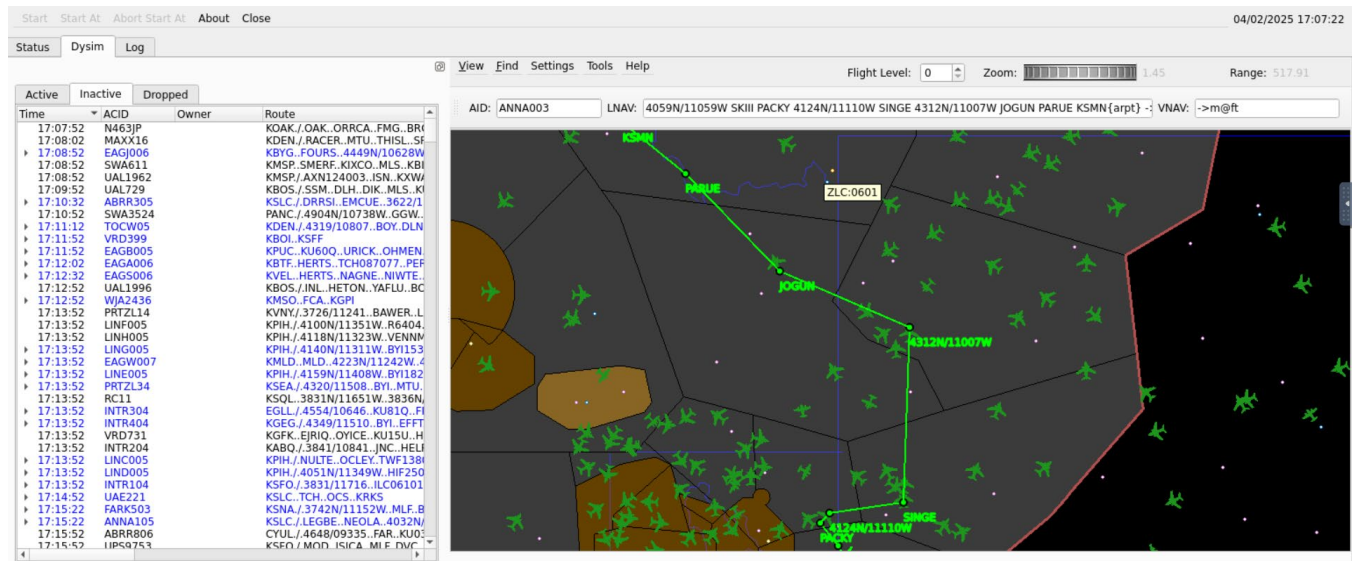


Figure 11. simDriver Dysim Tab

The left side Targets View can be re-sized or popped out into its own window. This view displays Active, Inactive, and Dropped target tabs.

Active	Inactive	Dropped										
Time	ACID	Owner	Route	BCN	ALT	Achar	RSI	Pilot	Address	TailNo	Comments	
16:43:52	INTR102	ZLC/47	KSFOJ/3831/11716.ILC061018.HIBON.GEERY.EDLES.FLOOD.KK51A.EMP.JHJ0545	239	8350	500	50	200124	N100MM			
16:43:52	INTR202	ZLC/32	KABQJ/3841/10841.JNC.HELPR.GOSHU.SPANE.LEEHY.KSLC	0346	239	8350	500	50	20011C	N200MM		
16:43:52	INTR302	ZLC/15	EGLL/4554/10646.KU81Q.FFU.DTA.MLF.KLAS	0547	239	8350	500	50	200113	N300MM		
16:43:52	INTR402	ZLC/14	KEGG/4349/11510.BYL.EFFTA.BLIDA.BEARR.SKEES.KSLC	6067	239	8350	500	50	20011E	N400MM		
16:43:52	LINC003	ZLC/40	KPHJ/NULTE.OCLEY.TWF138019.BYI200067.7RKY.BQU051058.ROTMN.TIP4350	310	8737	500	50	20011B	NLINC03	BOV/LCU Flight		
16:43:52	LINC003	ZLC/40	KPHJ/4051N/11349W.HIF250040.WIDOE.BLIDA.NORDD.DRYAD.BYI182043.4347	350	8737	500	50	20011A	NLINC03	BOV/LCU Flight		
16:43:52	LINC003	ZLC/40	KPHJ/4159N/11408W.BYI182043.MLD225094.KU66M.R6404.EEGL.SCOVL.E4346	380	8737	500	50	20011D	NLINC03	BOV/LCU Flight		
16:43:52	LINC003		KPHJ/4100N/11351W.R6404.EEGL.SCOVL.BYI153032.KU72M.LCMAO.LCU.FFFF	8737	500	50	50	200120	NLINC03	BOV/LCU Flight		
16:43:52	LINC003	ZLC/CC	KPHJ/4140N/11311W.BYI153032.KU72M.LCMAO.LCU.VENNM.TCH292064.E4345	450	8737	500	50	200121	NLINC03	BOV/LCU Flight		
16:43:52	PRTZL12	ZDV/01	KVNYY/3726/11241.BAWER.LARVE.EKR.FROGS.SNY.ELJAY.OBH.TODDO.JOR0337	239	MD11	500	50	200111	N100PN			
16:43:52	PRTZL32	ZLC/14	KSEA/4320/11508.BYL.MTU.CIM.TXO.LBB.DILLO.SZAGI.LAHS.BOYZZ.KAU0546	239	MD11	500	50	200125	N300PN			
16:43:52	RC08	ZOA	KSOL/3831N/11651W.3836N/11537W.3824N/11503W.3821N/11419W.3820N/0352	109	8738	500	50	200129	RCFM04		changed callsign from RCFM01	
16:43:52	SKW3044	ZMP	KRNH/CINCL.KGPI	0336	CRJ7	500	50	200110	N93945			
16:43:52	TOCN42	ZDV	KORD/VIDD.KD84W.RICCO.UROCO.PARZZ.KU631.ANAHO.WEBGO.SLMMR.0340	220	8738	500	50	200112	N012OK			
16:43:52	TOCN44	ZDV	KMDW/4150/09436.3905N/11100W.3820N/11140W.3816N/11327W.3839N/10350	220	8738	500	50	200127	N014OK			
16:43:52	TOCS41	ZLC/30	KPAE/4428/11936.NEERO.SLOWN.BERYL.CORKR.TENTS.PANTD.DUTEY.MA0341	230	8738	500	50	200115	N011TK			
16:43:52	TOCS43	ZDV	KJFK/4503/09226.GEP.ABR.DPR.CZI.BYI.MLD.4213N/11338W.4207N/11410351	230	8738	500	50	200128	N013TK			

Figure 12. Dysim Tab Target View

The Targets View tabs list details for active, inactive, and dropped targets. The target lists can be sorted by clicking on the any of the column headers.

Time

This is the time that the target was or will be activated. This value could also show the status HOLD. A HOLD time means that the flight was suspended or set for manual release and will require further action to activate. Right clicking on an inactive flight displays the options: release now, release with delay(s), and release at.

ACID

Aircraft identification callsign. The callsign is made up of a minimum of two and a maximum of seven letters/numbers. The first character must be a letter.

Owner

Controlling facility and sector position.

Route

Flight plan route.

BCN

Beacon code. The beacon code must be four octal digits. A beacon code of FFFF signifies that a beacon code has not been assigned to the aircraft.

ALT

Filed altitude.

AChar

Aircraft type.

RSI

Record select indicator.

Pilot

Number of the simPilot position that has been assigned to have control of the target.

Address

ICAO address. The ICAO address is six alphanumeric characters.

TailNo

Aircraft registration. The tail number can be a maximum of seven alphanumeric characters.

Comments

Additional user entered text for a target.

Further details about a target can be displayed in a mouse-over text box by allowing the cursor to dwell over a target in any of the Targets View tabs.

In the Active targets tab, the mouse-over text box displays information such as: owners, arrival airport (arrArpt), autologon, disableTracker, and beacon and additional attributes, if available.



Figure 13. Mouse-over Text for an Active Target

When the cursor dwells over the route column, the mouse-over text box displays the route macro.



Figure 14. Mouse-over Text for an Active Target Route

In the Inactive targets tab, the mouse-over text box displays information such as: arrival airport (arrArpt), autologon, disableTracker, and beacon and additional attributes, if available.



Figure 15. Mouse-over Text for an Inactive Target

When the cursor dwells over the route column, the mouse-over text box displays the route macro.

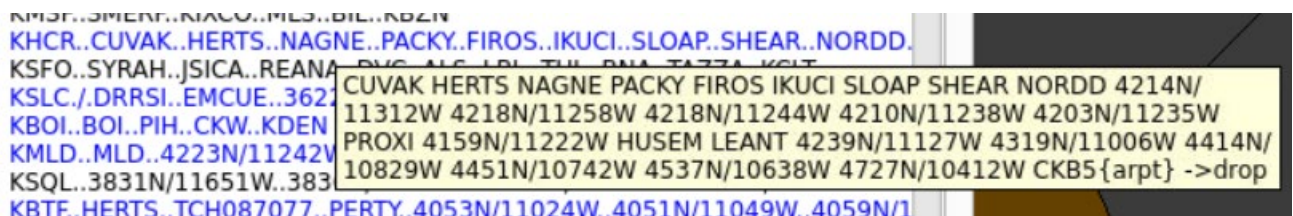


Figure 16. Mouse-over Text for an Inactive Target Route

In the Dropped targets tab, the mouse-over text box displays information such as: owners, arrival airport (arrArpt), autologon, disableTracker, and beacon and additional attributes, if available.

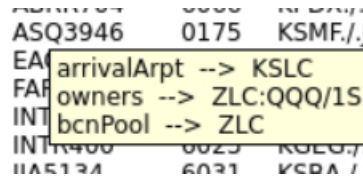


Figure 17. Mouse-over Text for a Dropped Target

4.3.3.2.1.Active Tab

Right clicking on an entry in the Active tab displays the following options:

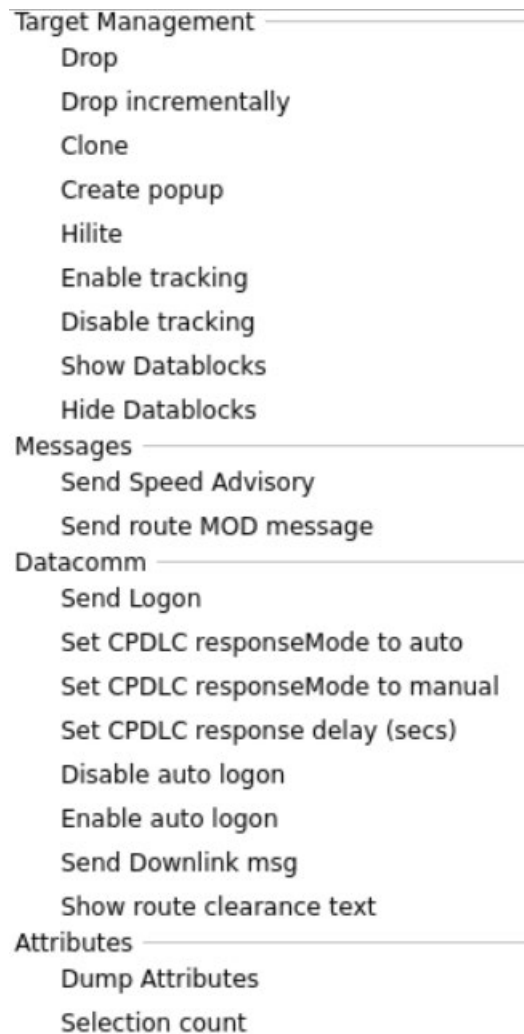


Figure 18. Active Target List Menu Options

Target Management

Drop

simDriver stops generating target position data for the selected aircraft and sends cancel and remove strip messages.

Drop incrementally

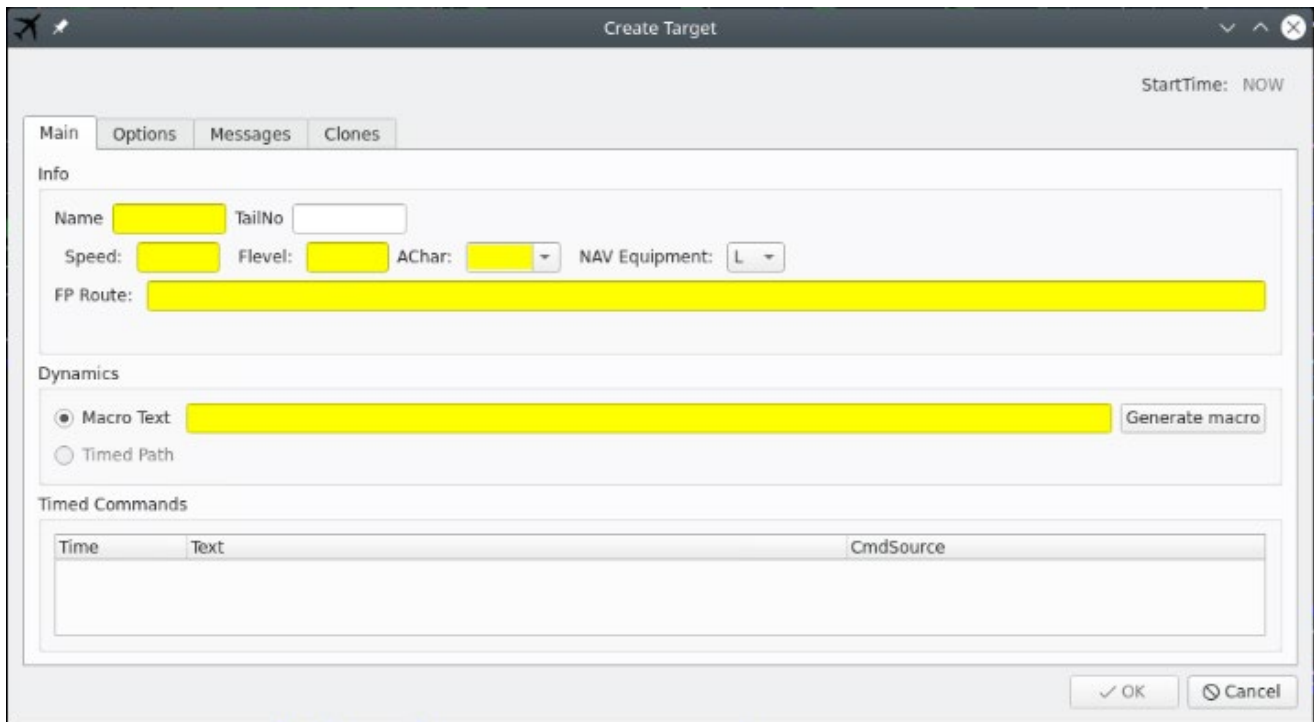
simDriver stops generating target position data for the selected aircrafts and sends cancel and remove strip messages incrementally for each flight.

Clone

Creates a new target with the exact same characteristics as the selected target.

Create popup

Opens a blank dialog for creating a new target. Each yellow field is mandatory. The Name is the desired aircraft ID (ACID) or callsign, TailNo is the aircraft registration number, the assigned speed can be specified in calibrated air speed (CAS) or true air speed (TAS), the Flevel is the flight level, AChar is the aircraft type, NAV Equipment is the type of equipment on board the aircraft, FP Route is the Flight Plan Route, and Macro is populated after selecting the Generate macro button. The text of the Generate macro button will be red if a macro has not been created. Press the Generate macro button to automatically populate the Macro Text input box with macro commands generated from the contents of the FP Route. Or, manually enter macro commands to fly a route that is different from the filed flight plan route.



The screenshot shows the 'Create Target' dialog box with the following fields and options:

- Start Time:** NOW
- Tabs:** Main (selected), Options, Messages, Clones
- Info Section:**
 - Name: [Yellow text box]
 - TailNo: [White text box]
 - Speed: [Yellow text box]
 - Flevel: [Yellow text box]
 - AChar: [Yellow dropdown menu]
 - NAV Equipment: [L dropdown menu]
 - FP Route: [Yellow text box]
- Dynamics Section:**
 - ☒ Macro Text: [Yellow text box] Generate macro
 - ☐ Timed Path
- Timed Commands Section:**

Time	Text	CmdSource
[Empty table body]		
- Buttons:** OK, Cancel

Figure 19. Create Target Dialog

Hilite

Highlights the target, displays its flight path, and displays its message window.

Enable tracking

Processes CMS data that simDriver receives to change target dynamics or generate hand off messages.

Disable tracking

Does not process CMS messages to change target dynamics or generate hand off messages.

Show Datablocks

Enables datablocks.

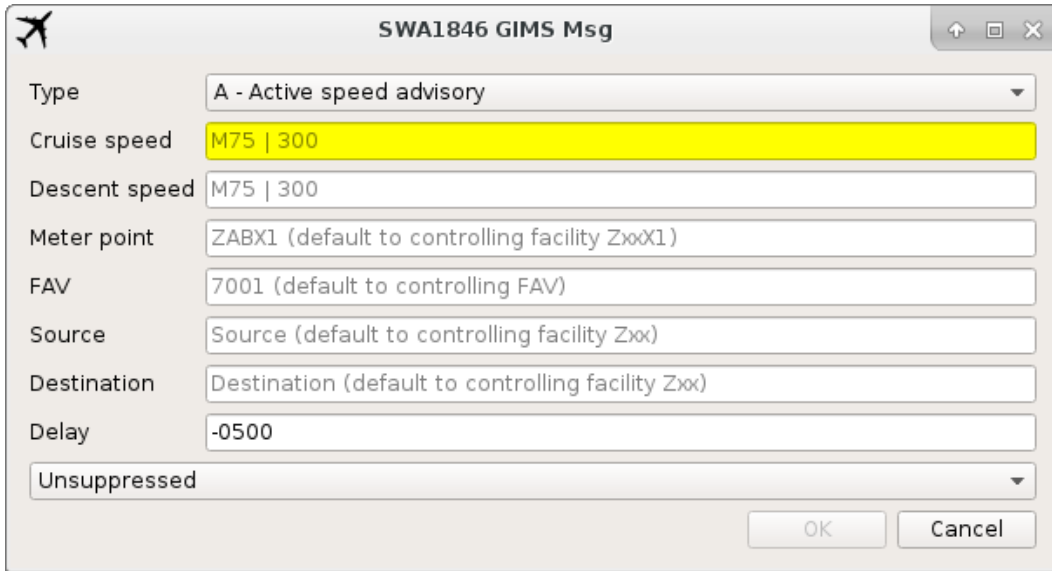
Hide Datablocks

Disables datablocks.

Messages

Send Speed Advisory

Displays a GIM-S Message dialog box for the speed advisory message.



SWA1846 GIMS Msg

Type: A - Active speed advisory

Cruise speed: M75 | 300

Descent speed: M75 | 300

Meter point: ZABX1 (default to controlling facility ZxxX1)

FAV: 7001 (default to controlling FAV)

Source: Source (default to controlling facility Zxx)

Destination: Destination (default to controlling facility Zxx)

Delay: -0500

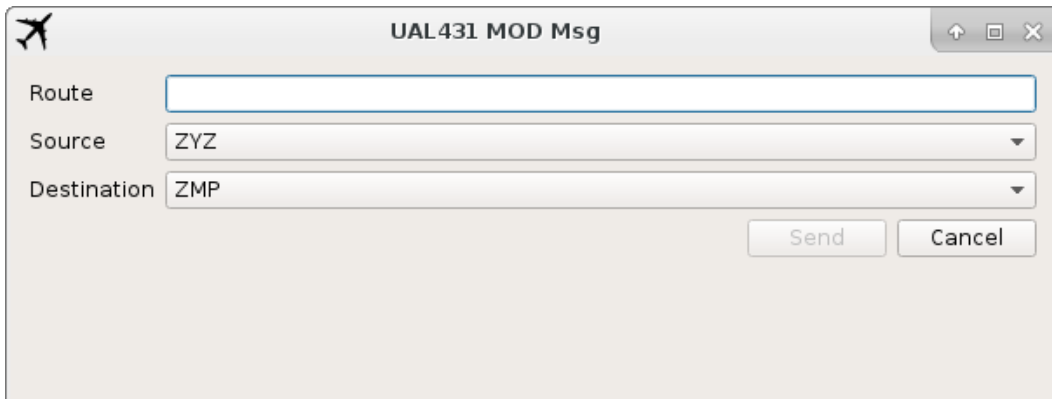
Unsuppressed

OK Cancel

Figure 20. Speed Advisory Message Dialog for an Active Target

Send route MOD message

Displays a MOD message dialog box.



UAL431 MOD Msg

Route:

Source: ZYZ

Destination: ZMP

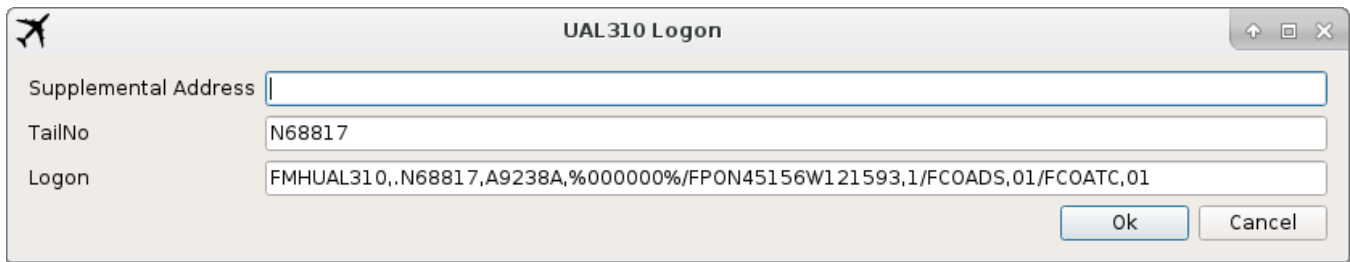
Send Cancel

Figure 21. Send a Route Modification Message

Datacomm

Send Logon

Sends a logon for the flight. This logon message is an aircraft logon for CPDLC services.



UAL310 Logon

Supplemental Address

TailNo

Logon

Ok Cancel

Figure 22. Send Logon Message for Active Target

Set CPDLC responseMode to auto

Changes flight to auto mode. Auto mode is where all CPDLC messages are automatically processed.

Set CPDLC responseMode to manual

Changes flight to manual mode. Manual mode is where the pilot will have to manually send messages and respond to messages received. Flights set to manual mode are marked with a headset icon.

Active	Inact
Time	
▶ 16:45:07	
▶ 16:45:07	
▶ 16:45:07	
▶ 16:45:07	
▶ 16:45:07	
▶  16:45:22	
▶ 16:45:22	
▶ 16:45:37	
▶ 16:45:52	
▶  16:46:22	

Figure 23. Flight SKW4751 Set for Manual Response Mode

Set CPDLC response delay (secs)

Changes the CPDLC response time to have a delay. This is additional time it will take the aircraft to receive the CPDLC message.

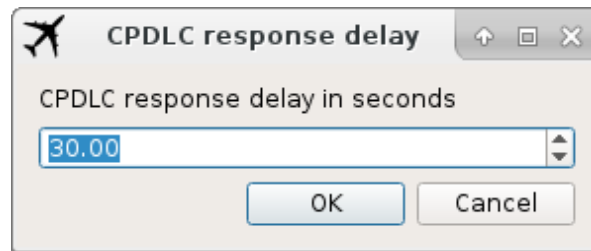


Figure 24. CPDLC Response Delay

Disable auto logon

Disables auto logons.

Enable auto logon

Enables auto logons.

Send Downlink Message

Sends a downlink message with one of the selected options listed below.


ABRR2 Downlink Msg

↑
□
×

IMI

☒ AT1
☐ DR1

%ID% %TS% EI (D68 TEXT)

D0: WILCO
 D1: UNABLE
 D2: STANDBY
 D3: ROGER
 D4: AFFIRM
 D5: NEGATIVE
 D6: REQUEST [altitude FL >= 180]
 D6: REQUEST [altitude QNH < 180]
 D7: REQUEST BLOCK [altitude] TO [altitude FL >= 180]
 D7: REQUEST BLOCK [altitude] TO [altitude QNH < 180]
 D8: REQUEST CRUISE CLIMB TO [altitude]
 D9: REQUEST CLIMB TO [altitude FL >= 180]
 D9: REQUEST CLIMB TO [altitude QNH < 180]
 D10: REQUEST DESCENT TO [altitude FL >= 180]
 D10: REQUEST DESCENT TO [altitude QNH < 180]
 D11: AT [position] REQUEST CLIMB TO [altitude]
 D12: AT [position] REQUEST DESCENT TO [altitude]
 D13: AT [time] REQUEST CLIMB TO [altitude]
 D14: AT [time] REQUEST DESCENT TO [altitude]
 D15: REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
 D16: AT [position] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
 D17: AT [time] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
 D18: REQUEST [speed]
 D19: REQUEST [speed] TO [speed]
 D20: REQUEST VOICE CONTACT
 D21: REQUEST VOICE CONTACT [frequency]
 D22: REQUEST DIRECT TO [fix]
 D22: REQUEST DIRECT TO [LatLon]
 D22: REQUEST DIRECT TO [FRD]
 D23: REQUEST [procedurename]
 D24: REQUEST [routeclearance]
 D25: REQUEST CLEARANCE
 D26: REQUEST WEATHER DEVIATION TO [position] VIA [routeclearance]
 D27: REQUEST WEATHER DEVIATION UP TO [distanceoffset] [direction] OF ROUTE
 D28: LEAVING [altitude]
 D29: CLIMBING TO [altitude]
 D30: DESCENDING TO [altitude]
 D31: PASSING [position]
 D32: PRESENT ALTITUDE [altitude]
 D33: PRESENT POSITION [position]
 D34: PRESENT SPEED [speed]
 D35: PRESENT HEADING [degrees]
 D36: PRESENT GROUND TRACK [degrees]
 D37: LEVEL [altitude]
 D38: ASSIGNED ALTITUDE [altitude]

OK

Cancel

Figure 25. Send Downlink Message for Active Target – Part 1


ABRR2 Downlink Msg
⬆️ □ ✕

IMI

☒ AT1
☐ DR1

%ID% %TS% EI (D68 TEXT)

D38: ASSIGNED ALTITUDE [altitude]
 D39: ASSIGNED SPEED [speed]
 D40: ASSIGNED ROUTE [routeclearance]
 D41: BACK ON ROUTE
 D42: NEXT WAYPOINT [position]
 D43: NEXT WAYPOINT ETA [time]
 D44: ENSUING WAYPOINT [position]
 D45: REPORTED WAYPOINT [position]
 D46: REPORTED WAYPOINT [time]
 D47: SQUAWKING [beaconcode]
 D48: POSITION REPORT [positionreport]
 D49: WHEN CAN WE EXPECT [speed]
 D50: WHEN CAN WE EXPECT [speed] TO [speed]
 D51: WHEN CAN WE EXPECT BACK ON ROUTE
 D52: WHEN CAN WE EXPECT LOWER ALTITUDE
 D53: WHEN CAN WE EXPECT HIGHER ALTITUDE
 D54: WHEN CAN WE EXPECT CRUISE CLIMB TO [altitude]
 D55: PAN PAN PAN
 D56: MAYDAY MAYDAY MAYDAY
 D57: [remainingfuel] OF FUEL REMAINING AND [remainingsouls] SOULS ON BOARD
 D58: CANCEL EMERGENCY
 D59: DIVERTING TO [position] VIA [routeclearance]
 D60: OFFSETTING [distanceoffset] [direction] OF ROUTE
 D61: DESCENDING TO [altitude FL >= 180]
 D61: DESCENDING TO [altitude QNH < 180]
 D62: ERROR [errorinformation]
 D63: NOT CURRENT DATA AUTHORITY
 D64: [icaofacilitydesignation]
 D65: DUE TO WEATHER
 D66: DUE TO AIRCRAFT PERFORMANCE
 D67: [freetext] Note: The ATS Provider System peer will assign an urgency of Low for message element [67].
 D68: [freetext] Note: The ATS Provider System peer will assign an urgency of Distress for message element [68].
 D69: REQUEST VMC DESCENT
 D70: REQUEST HEADING [degrees]
 D71: REQUEST GROUND TRACK [degrees]
 D72: REACHING [altitude]
 D73: [versionnumber]
 D74: MAINTAIN OWN SEPARATION AND VMC
 D75: AT PILOTS DISCRETION
 D76: REACHING BLOCK [altitude] TO [altitude]
 D77: ASSIGNED BLOCK [altitude] TO [altitude]
 D78: AT [time] [distance] [tofrom] [position]
 D79: ATIS [atiscodes]
 D80: DEVIATING [distanceoffset] [direction] OF ROUTE
 EMERSYSPID: EMERGENCY PID TEST MESSAGE (D56 MAYDAY MAYDAY MAYDAY) EI (D68 THIS IS A TEST)

OK
Cancel

Figure 26. Send Downlink Message for Active Target – Part 2

Show route clearance text

Displays the route clearance in a popup window.

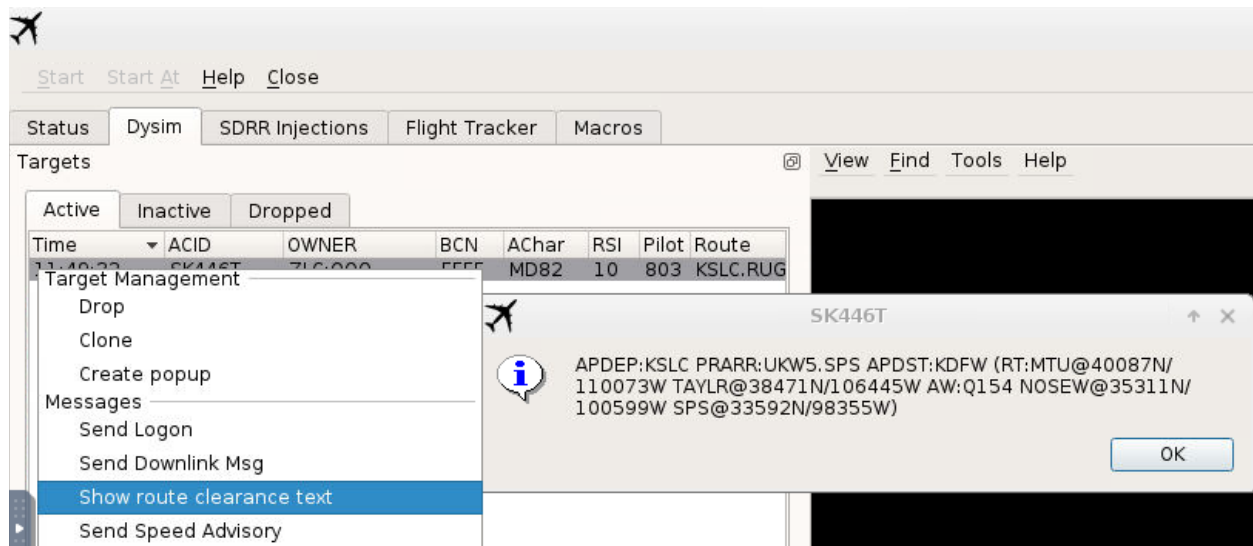


Figure 27. Route Clearance Text for Active Target

Attributes

Dump Attributes

Sends all currently applied attributes for the selected target to standard output.

Selection Count

Returns the number of targets currently selected.

Double clicking on an entry in the Active list opens a control dialog for the selected target. The control dialog consists of a Messages tab and Timed Macros tab, and an information line which displays the transponder, current altitude, heading, true air speed, calibrated air speed, Mach, winds aloft (if scenario includes weather wx) and beacon code for the target. The Messages tab includes a drop-down box for message type, message source text box(es), a message contents text box and a list of injected and pending messages for the target. Once a message type is selected from the drop down, additional drop downs appear with devices and facilities appropriate for the selected type of message. The Timed Macros tab lists any scheduled dynamic events that were scripted in the scenario for the selected target.

Note: For Time based targets, right click and select Take Control and then double click to open the control dialog. For more information on time-based targets, see section 4.3.3.2.6.

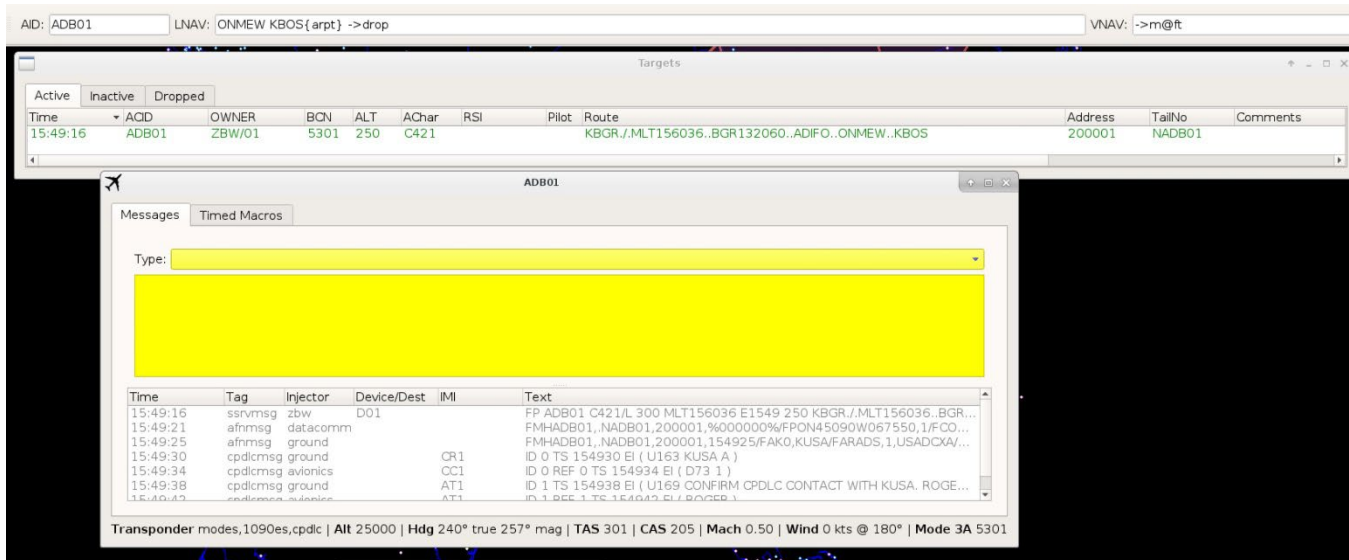


Figure 28. Active Target Control Dialog Messages Tab

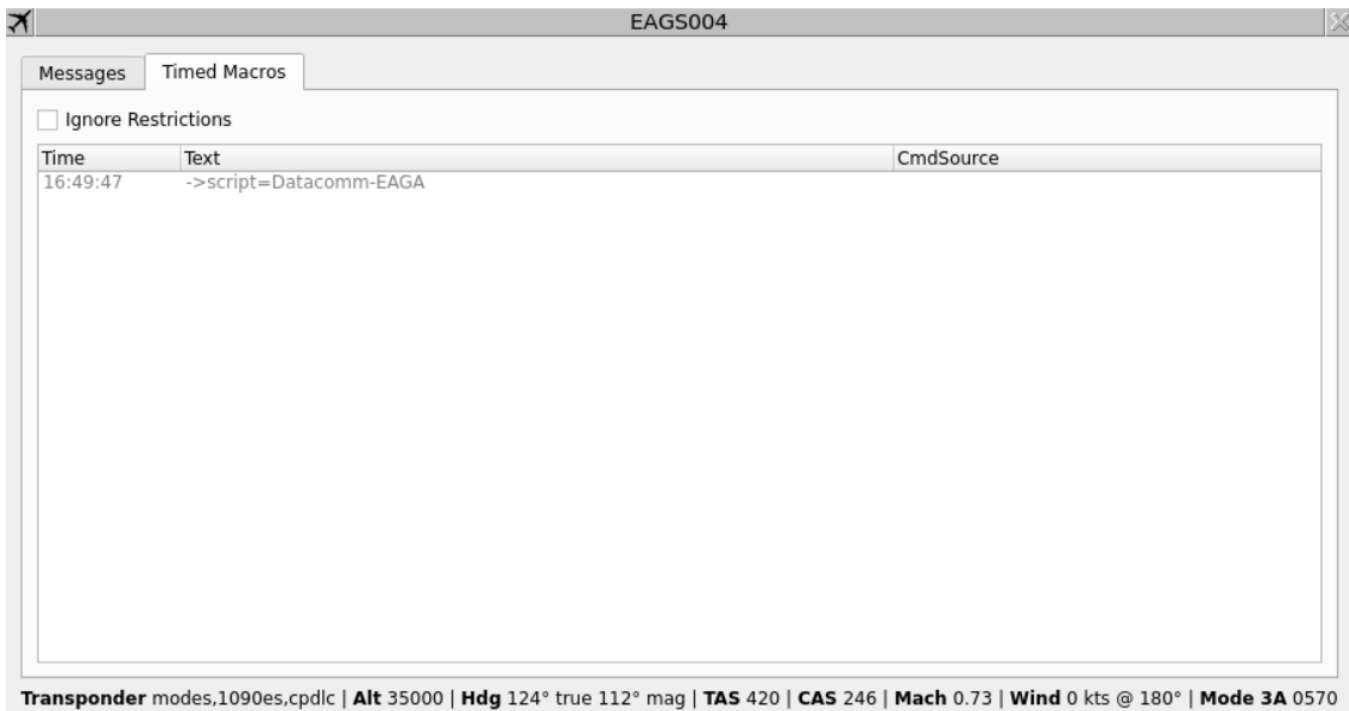


Figure 29. Active Target Control Dialog Timed Macros Tab

4.3.3.2.2. Inactive Tab

Right clicking on an entry in the Inactive list displays the following options:

Target Management

Release now

Activates the target immediately.

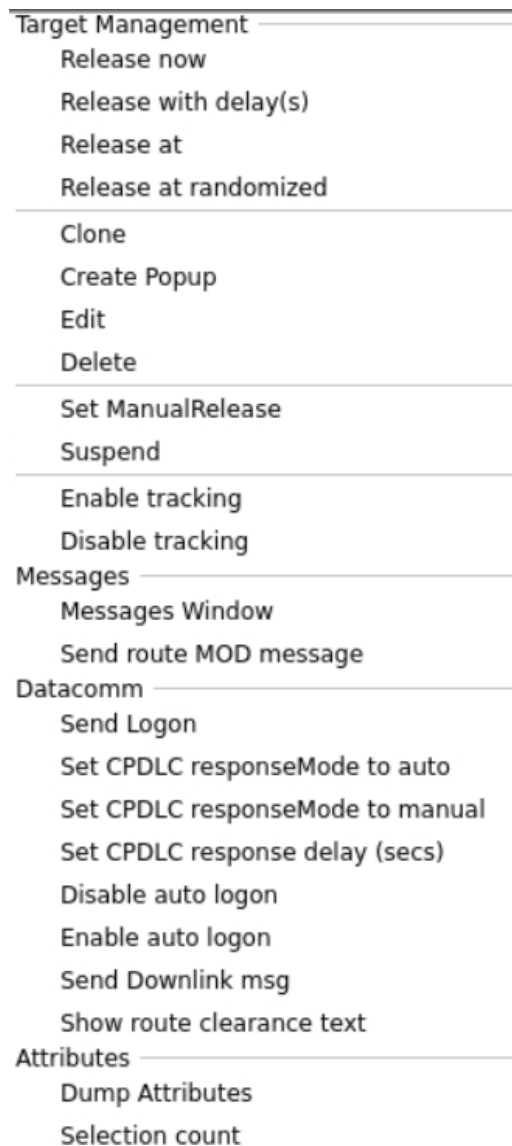


Figure 30. Release Now Option for an Inactive Target

Release with delay(s)

Activates the target after the specified amount of time has elapsed.

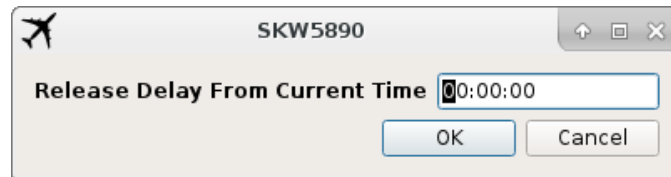


Figure 31. Release with Delay Option for an Inactive Target

Release at

Activates the target at the specified external system time.

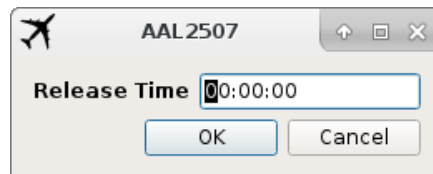


Figure 32. Release at a Specified Time for an Inactive Target

Release at randomized

Activates targets at a randomized time after the specified release time.

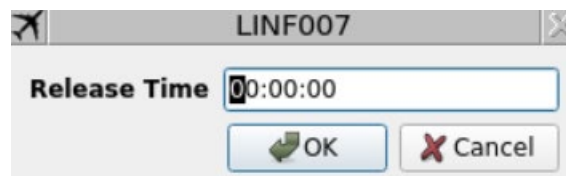
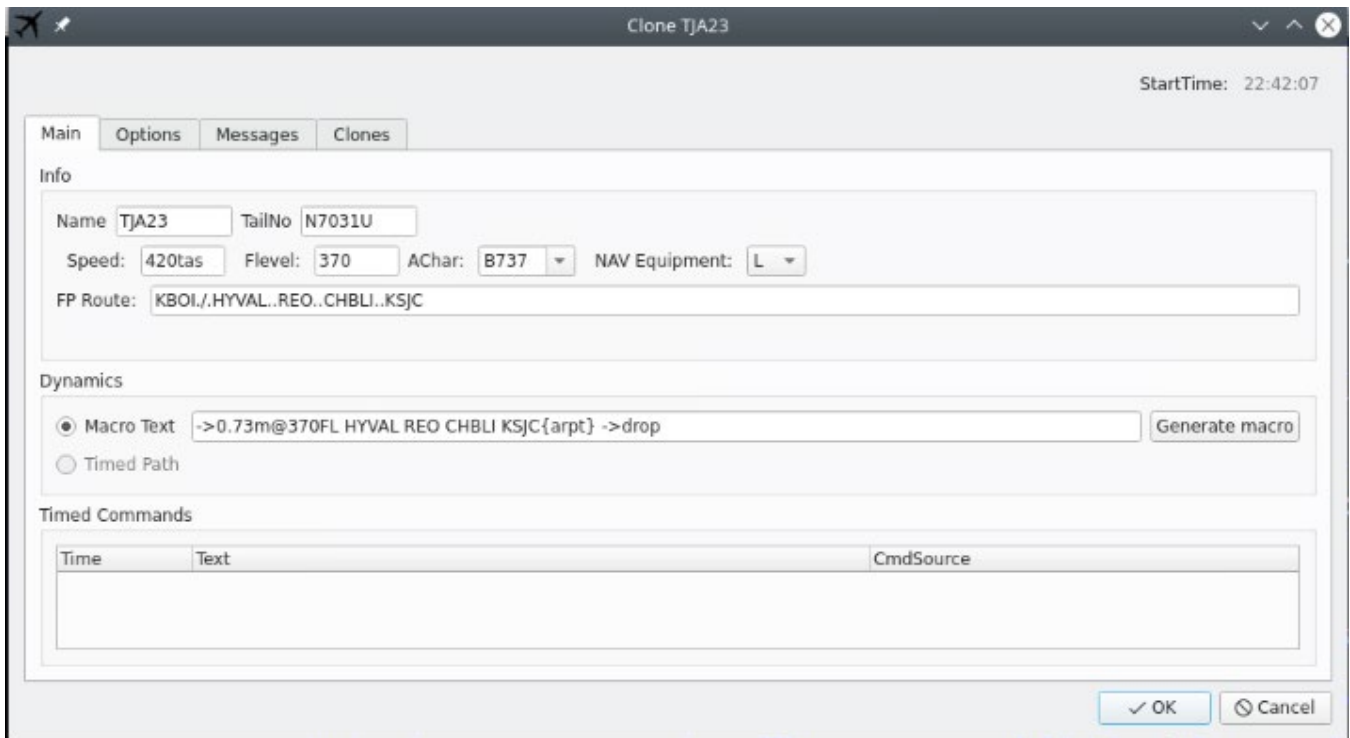


Figure 33. Release at a Randomized

Clone

Opens a Clone dialog and populates the new target with the exact same characteristics as the selected one.

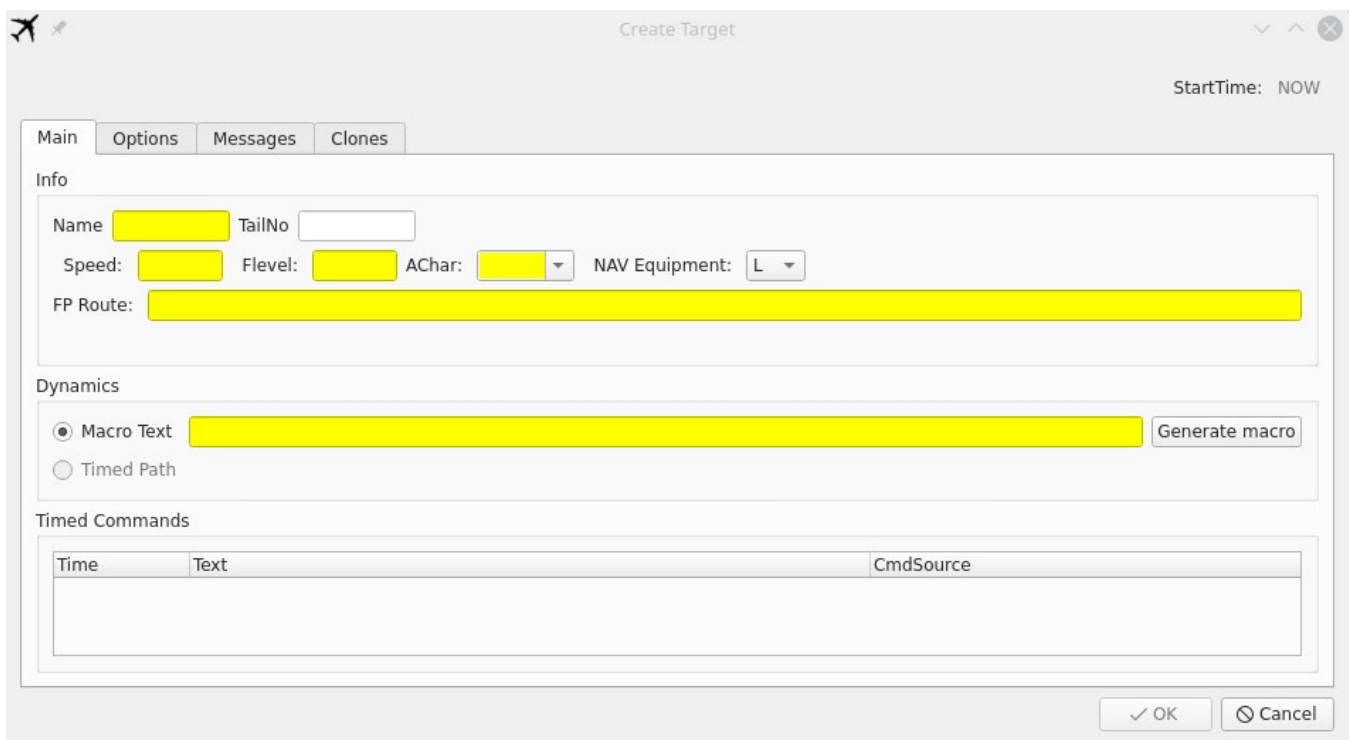


The image shows a software window titled "Clone TJA23". In the top right corner, it displays "StartTime: 22:42:07". Below the title bar is a tabbed interface with four tabs: "Main", "Options", "Messages", and "Clones". The "Main" tab is currently selected. Under the "Info" section, there are input fields for "Name" (containing "TJA23"), "TailNo" (containing "N7031U"), "Speed" (containing "420tas"), "Flevel" (containing "370"), "AChar" (a dropdown menu showing "B737"), and "NAV Equipment" (a dropdown menu showing "L"). Below these is a text field for "FP Route" containing "KBOI../HYVAL..REO..CHBLI..KSJC". The "Dynamics" section has two radio buttons: "Macro Text" (which is selected) and "Timed Path". Next to the "Macro Text" radio button is a text field containing "->0.73m@370FL HYVAL REO CHBLI KSJC{arpt} ->drop", followed by a "Generate macro" button. The "Timed Commands" section contains a table with three columns: "Time", "Text", and "CmdSource". The table is currently empty. At the bottom right of the dialog are "OK" and "Cancel" buttons.

Figure 34. Clone Dialog for an Inactive Target

Create popup

Opens a blank dialog for generating a new target. Each yellow field is mandatory. Name is the ACID; TailNo is the optional registration number of the flight; Speed is the filed speed in CAS, TAS, or mach; Flevel is the filed flight level; AChar is the aircraft type; NAV Equipment is the type of equipment on board the aircraft; FP Route is the filed route of flight; and the Macro field contains commands to maneuver the target. The Macro contents can be generated with by selecting Generate macro. The text of the Generate macro button will be red if a macro has not been created. Press the Generate macro button to automatically populate the Macro Text input box with macro commands generated from the contents of the FP Route. Or, manually enter macro commands to fly a route that is different from the filed flight plan route.



The screenshot shows the 'Create Target' dialog box with the following fields and controls:

- Info Section:**
 - Name: [Yellow field]
 - TailNo: [White field]
 - Speed: [Yellow field]
 - Flevel: [Yellow field]
 - AChar: [Yellow dropdown]
 - NAV Equipment: [L dropdown]
 - FP Route: [Yellow text area]
- Dynamics Section:**
 - ☒ Macro Text: [Yellow text area] Generate macro
 - ☐ Timed Path
- Timed Commands Section:**

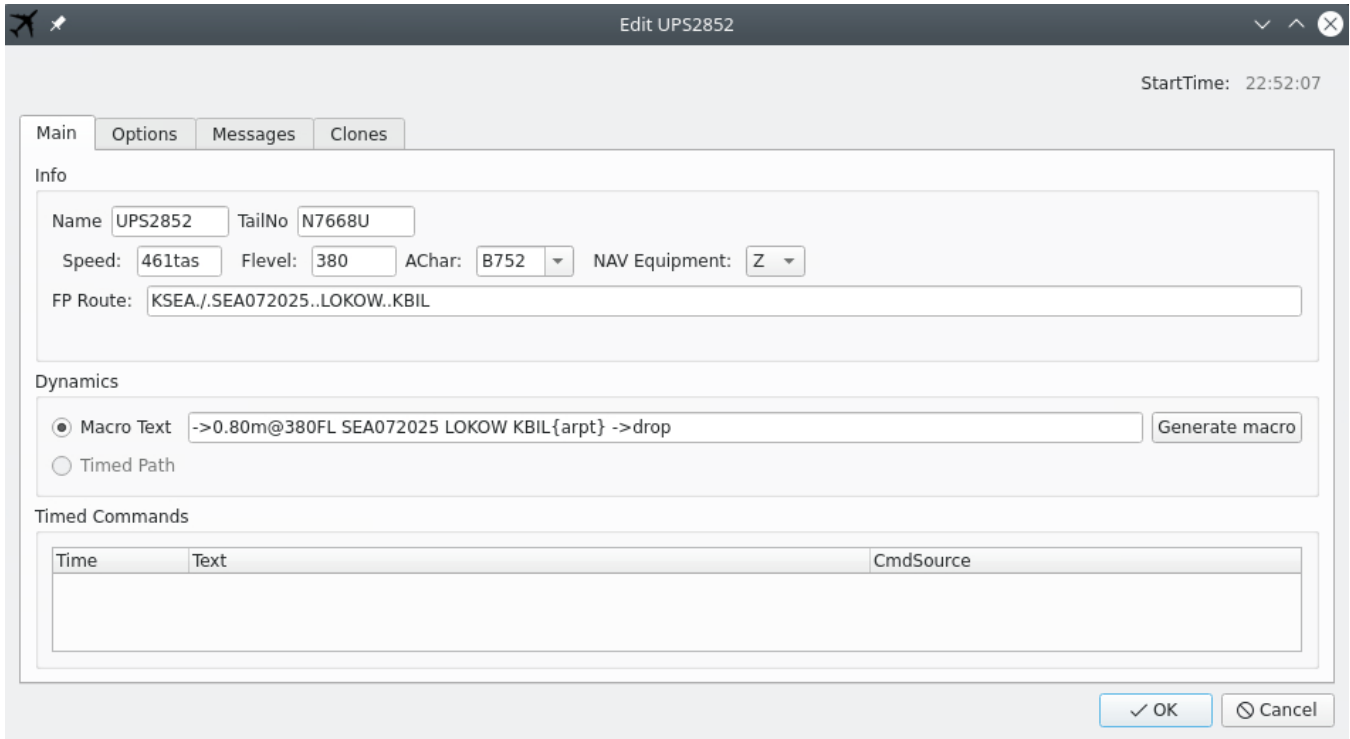
Time	Text	CmdSource

At the bottom right are 'OK' and 'Cancel' buttons. The top right shows 'StartTime: NOW'.

Figure 35. Create Popup Dialog for an Inactive Target

Edit

Opens a dialog for editing the selected target. Double clicking the target performs the same action as clicking edit.



StartTime: 22:52:07

Main Options Messages Clones

Info

Name: UPS2852 TailNo: N7668U

Speed: 461tas Flevel: 380 AChar: B752 NAV Equipment: Z

FP Route: KSEA../SEA072025..LOKOW..KBIL

Dynamics

☒ Macro Text ☐ Timed Path

Macro Text: ->0.80m@380FL SEA072025 LOKOW KBIL{arpt} ->drop

Generate macro

Timed Commands

Time	Text	CmdSource

OK Cancel

Figure 36. Edit Dialog for an Inactive Target

Delete

Removes the selected target(s) from the current simulation execution and sends the target(s) to the Dropped list.

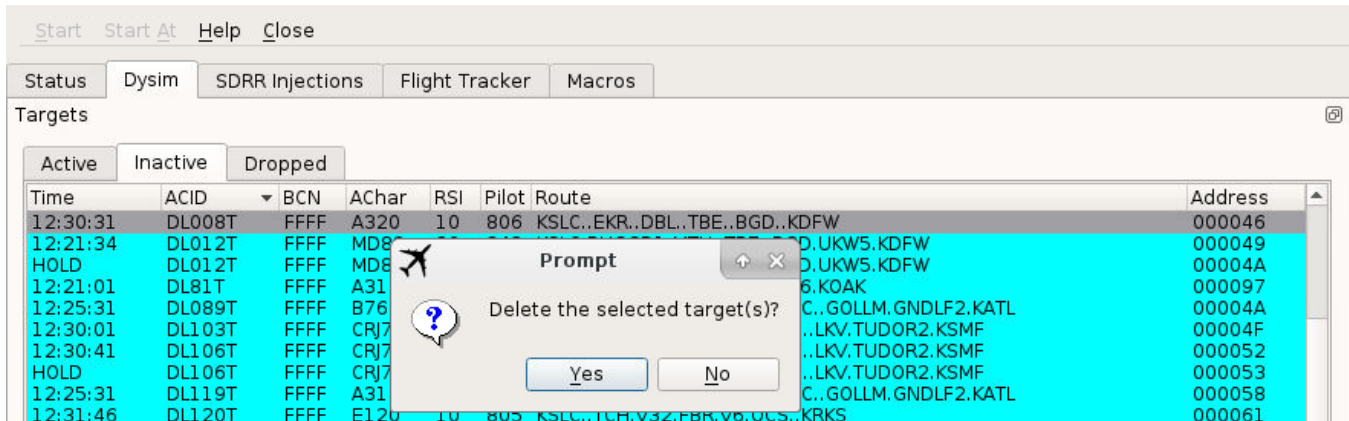


Figure 37. Delete an Inactive Target

Set ManualRelease

Places the selected target into manual release. The target is highlighted in blue.

Suspend

Prevents the target from activating at the scripted injection time. The target may be manually released at another time. Flights in manual mode are highlighted in blue in the Inactive tab.

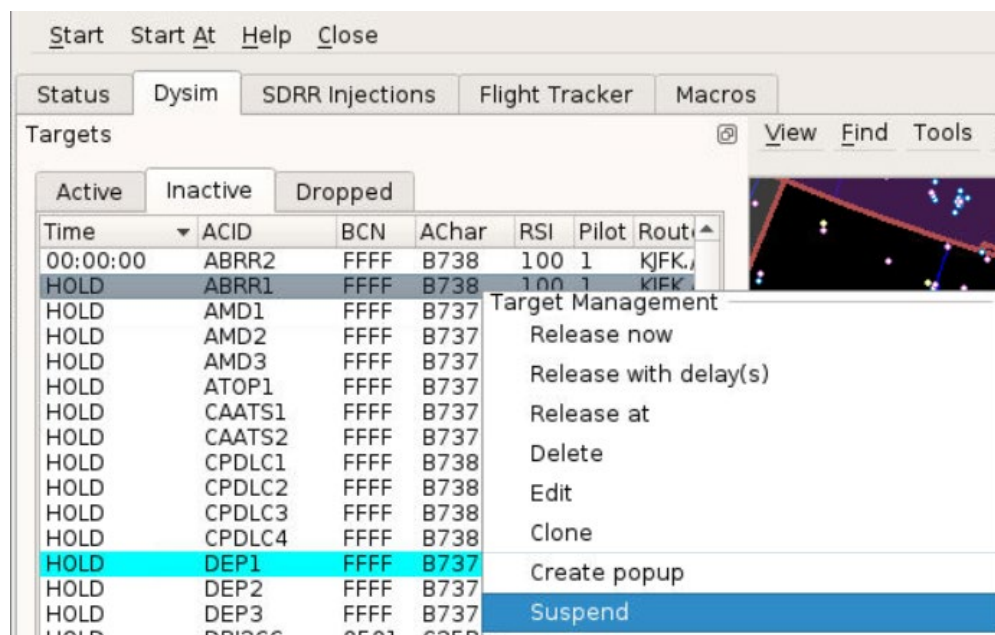


Figure 38. Suspend an Inactive Target

Enable tracking

Processes CMS data that simDriver receives to change target dynamics or generate hand off messages.

Disable tracking

Does not process CMS messages to change target dynamics or generate hand off messages.

If simDriver is configured for TBFM, the following options will be available:



Figure 39. TBFM Options

TBFM -> Release at and send ETD update

Activates the target at the specified external system time and sends a TTP update message.

TBFM -> Release at and send EDCT update

Activates the target at the specified external system time and sends an ET message.

TBFM -> Release at and cancel EDCT

Activates the target at the specified external system time and sends an ET Cancel message.

Messages

Messages Window

Opens a dialog showing the flight data messages associated with the selected aircraft. Messages that have been injected are displayed in gray. Messages awaiting injection are displayed in blue. Existing messages can be selected and edited, or new messages can be written and injected.

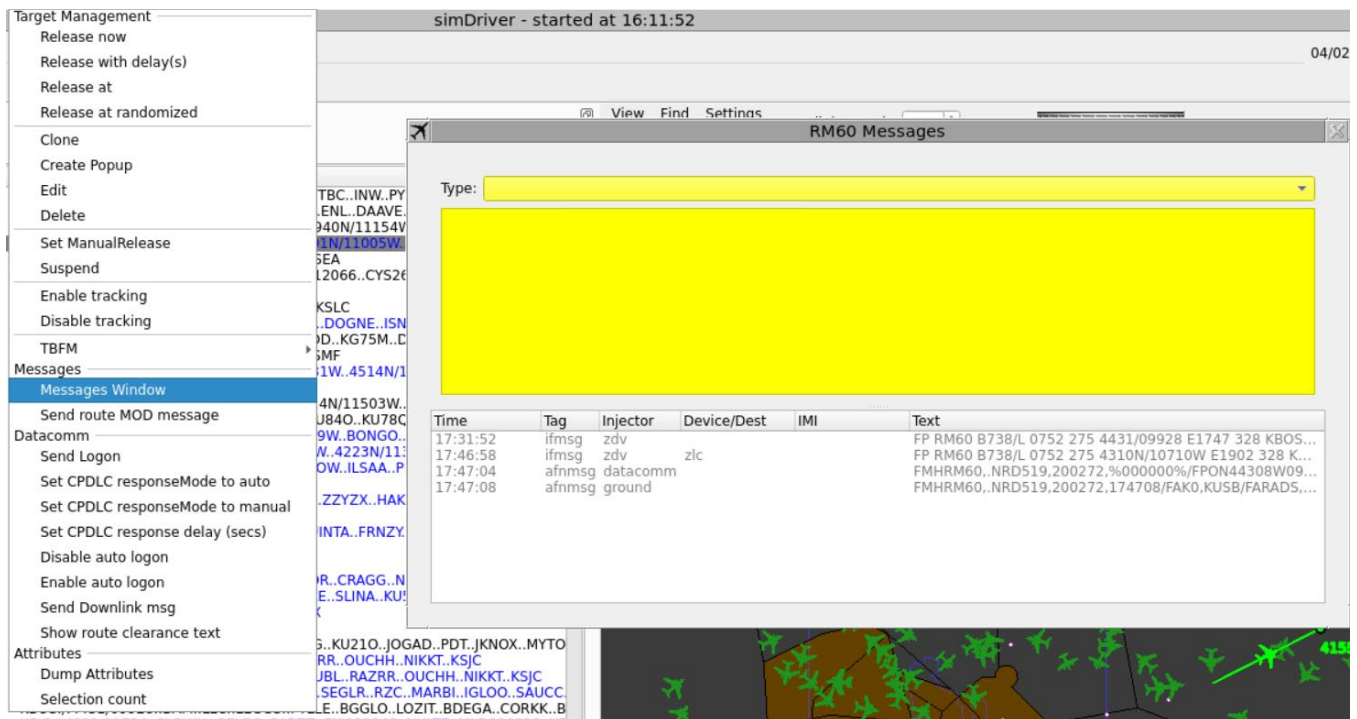


Figure 40. Message Window for an Inactive Target

Send route MOD message

Displays a MOD message dialog box.

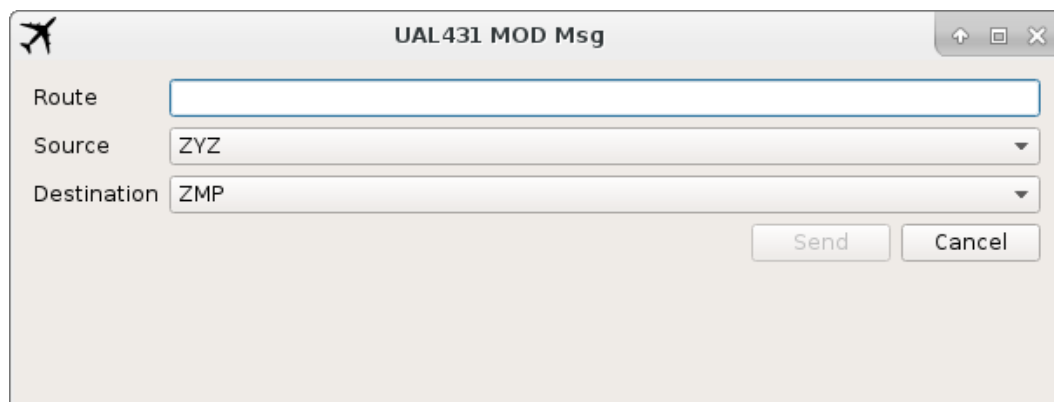


Figure 41. Send a Route Modification Message

Datacomm

Send Logon

Sends a logon to the flight. This logon message is an aircraft logon for CPDLC services. Further, Messages and Attributes are all related to Datacomm.

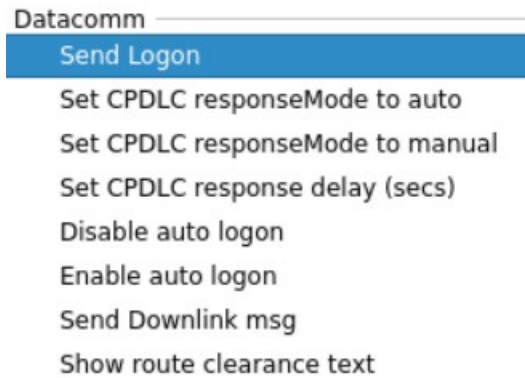


Figure 42. Send Logon for an Inactive Target

Set CPDLC responseMode to auto

Changes flight to auto mode. Auto mode is where all CPDLC messages are automatically processed.

Set CPDLC responseMode to manual

Changes flight to manual mode. Manual mode is where the pilot will have to manually send messages and respond to messages received. Flights set to manual mode are marked with a headset icon.

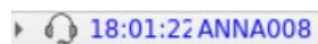


Figure 43. Flight ANNA008 Set for Manual Response Mode

Set CPDLC response delay (secs)

Changes the CPDLC response time to have a delay. This is additional time it will take the aircraft to receive the CPDLC message.

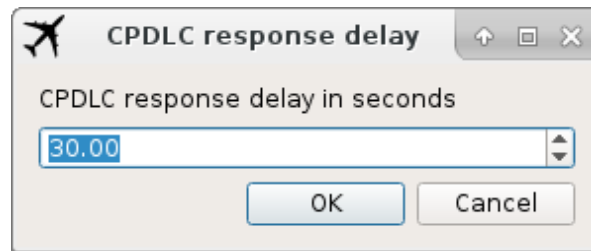


Figure 44. CPDLC Response Delay

Disable auto logon

Disables auto logons.

Enable auto logon

Enables auto logons.

Send Downlink Msg

Sends a downlink message with one of the selected options listed below.

RK124 Downlink Msg

IMI

☒ AT1
☐ DR1

LiteralMode ☐ Ei (D68 TEXT)

D0: WILCO
D1: UNABLE
D2: STANDBY
D3: ROGER
D4: AFFIRM
D5: NEGATIVE
D6: REQUEST [altitude FL >= 180]
D6: REQUEST [altitude QNH < 180]
D7: REQUEST BLOCK [altitude] TO [altitude FL >= 180]
D7: REQUEST BLOCK [altitude] TO [altitude QNH < 180]
D8: REQUEST CRUISE CLIMB TO [altitude]
D9: REQUEST CLIMB TO [altitude FL >= 180]
D9: REQUEST CLIMB TO [altitude QNH < 180]
D10: REQUEST DESCENT TO [altitude FL >= 180]
D10: REQUEST DESCENT TO [altitude QNH < 180]
D11: AT [position] REQUEST CLIMB TO [altitude]
D12: AT [position] REQUEST DESCENT TO [altitude]
D13: AT [time] REQUEST CLIMB TO [altitude]
D14: AT [time] REQUEST DESCENT TO [altitude]
D15: REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
D16: AT [position] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
D17: AT [time] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
D18: REQUEST [speed]
D19: REQUEST [speed] TO [speed]
D20: REQUEST VOICE CONTACT
D21: REQUEST VOICE CONTACT [frequency]
D22: REQUEST DIRECT TO [fix]
D22: REQUEST DIRECT TO [LatLon]
D22: REQUEST DIRECT TO [FRD]
D23: REQUEST [procedurename]
D24: REQUEST [routeclearance]
D25: REQUEST CLEARANCE
D26: REQUEST WEATHER DEVIATION TO [position] VIA [routeclearance]
D27: REQUEST WEATHER DEVIATION UP TO [distanceoffset] [direction] OF ROUTE
D28: LEAVING [altitude]
D29: CLIMBING TO [altitude]
D30: DESCENDING TO [altitude]
D31: PASSING [position]
D32: PRESENT ALTITUDE [altitude]
D33: PRESENT POSITION [position]
D34: PRESENT SPEED [speed]
D35: PRESENT HEADING [degrees]
D36: PRESENT GROUND TRACK [degrees]
D37: LEVEL [altitude]
D38: ASSIGNED ALTITUDE [altitude]
D39: ASSIGNED SPEED [speed]
D40: ASSIGNED ROUTE [routeclearance]
D41: BACK ON ROUTE
D42: NEXT WAYPOINT [position]
D43: NEXT WAYPOINT ETA [time]
D44: ENSUING WAYPOINT [position]
D45: REPORTED WAYPOINT [position]
D46: REPORTED WAYPOINT [time]
D47: SQUAWKING [beaconcode]
D48: POSITION REPORT [positionreport]
D49: WHEN CAN WE EXPECT [speed]
D50: WHEN CAN WE EXPECT [speed] TO [speed]
D51: WHEN CAN WE EXPECT BACK ON ROUTE
D52: WHEN CAN WE EXPECT LOWER ALTITUDE
D53: WHEN CAN WE EXPECT HIGHER ALTITUDE
D54: WHEN CAN WE EXPECT CRUISE CLIMB TO [altitude]
D55: PAN PAN PAN
D56: MAYDAY MAYDAY MAYDAY

OK Cancel

Figure 45. Send Downlink Message for an Inactive Target – Part 1

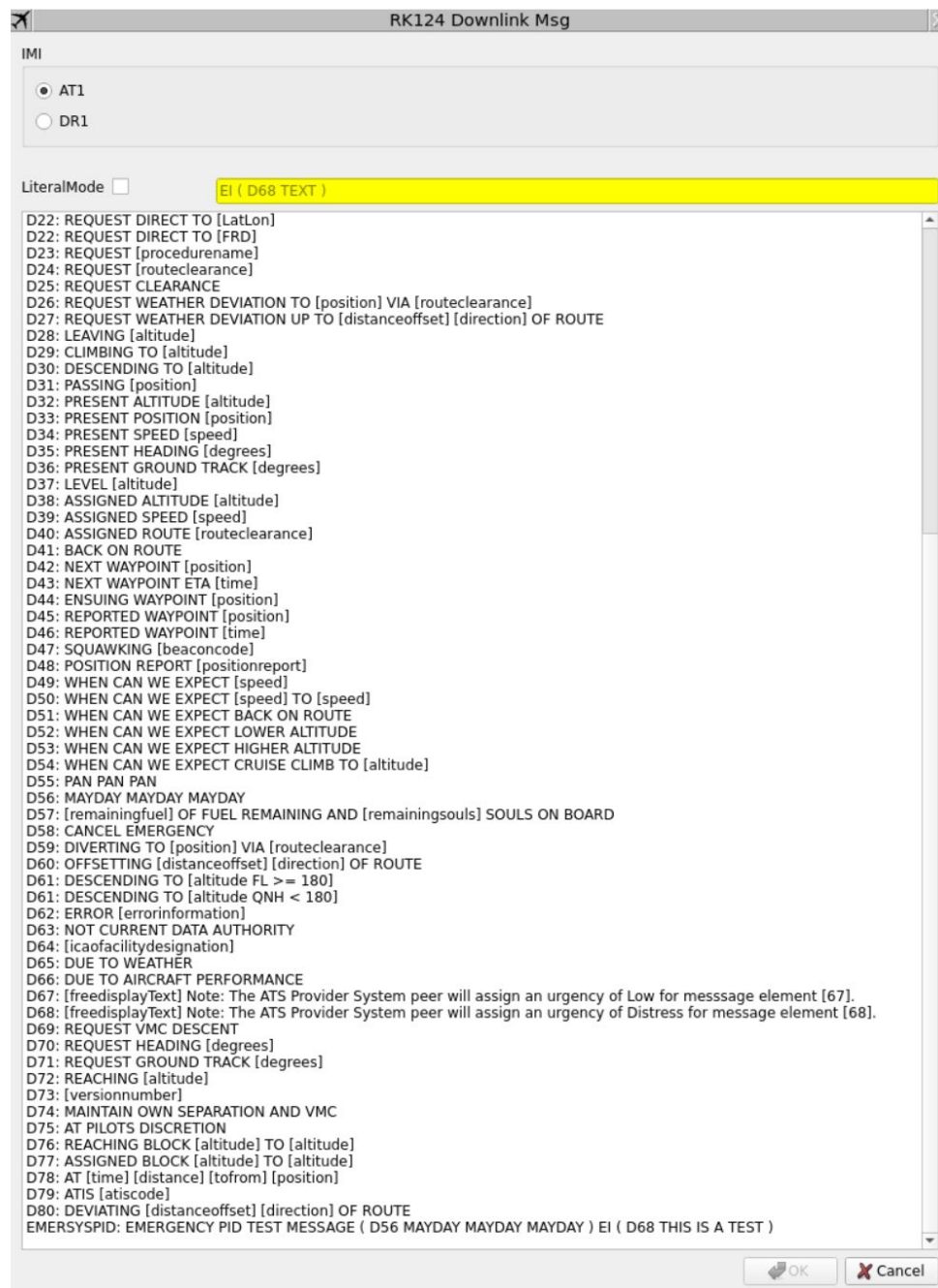


Figure 46. Send Downlink Message for an Inactive Target – Part 2

Show route clearance text

Displays the route clearance in a popup window.

Attributes

Dump Attributes

Sends all currently applied attributes for the selected target to standard output.

Selection Count

Returns the number of targets currently selected.

4.3.3.2.3.Dropped Tab

Right clicking on an entry in the Dropped tab displays the following option:

Clone

A Clone target dialog is displayed and is populated with the same characteristics as the selected one.

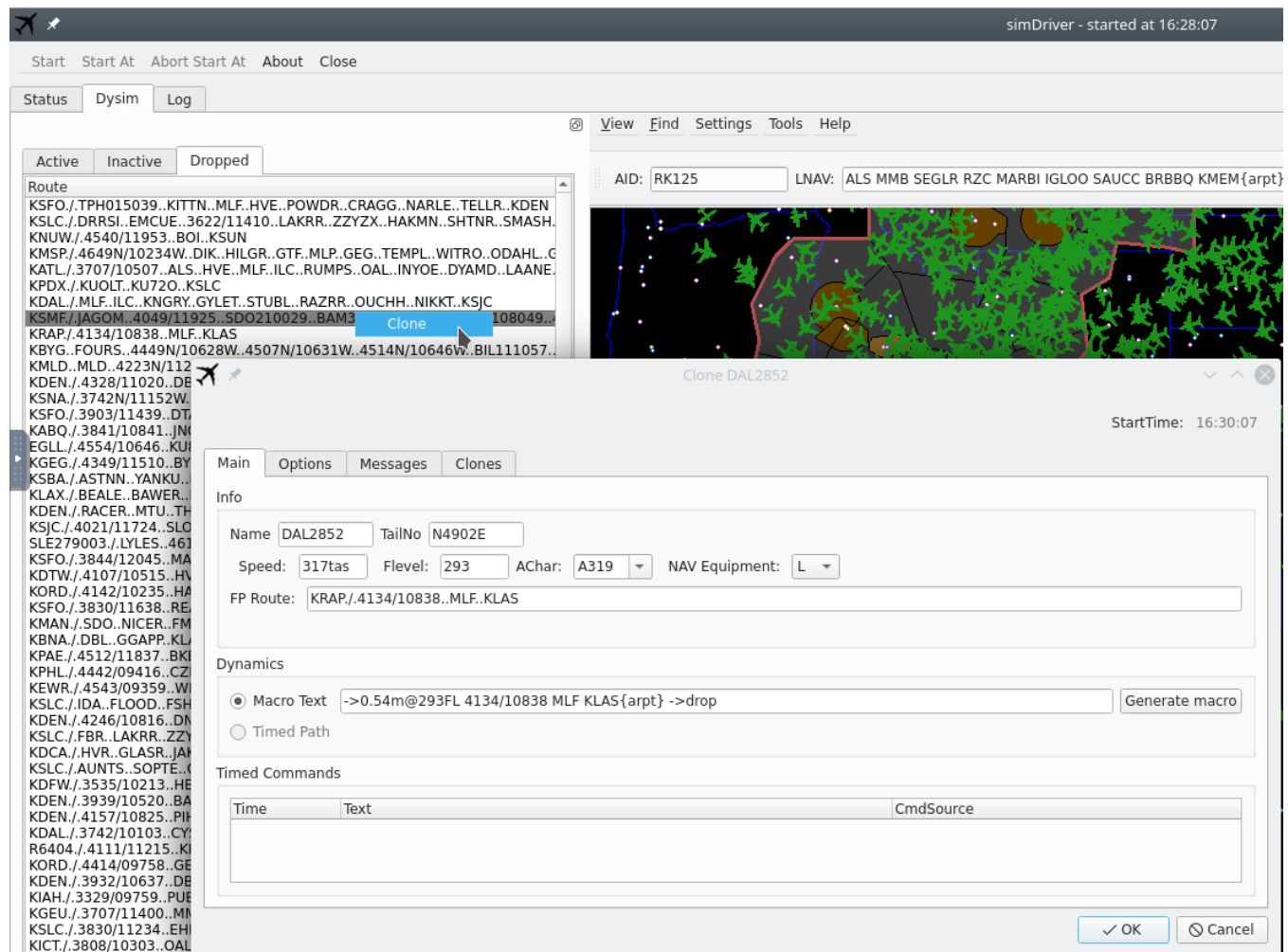


Figure 47. Clone Dialog for a Dropped Target

4.3.3.2.4. Map View

The right side of the Dysim Tab displays a large map area that includes a menu bar, tool bar, and a macro command bar along the top and a status or measurement bar (when invoked) along the bottom. The menu bar options are:

View

Clicking on **View** displays submenus that allow selection of airspace elements to be added to the map. These elements include Maps, Airspace, Terminal Airspace Data, ARTCC Name(s) (e.g., ZIX and ZTL in the figure below), Radars, and External Facilities.

NOTE: Each menu and submenu has a dashed line at the top. Selecting the dashed line will “tear off” the menu into a new dialog. The menu will remain displayed after a selection is made.

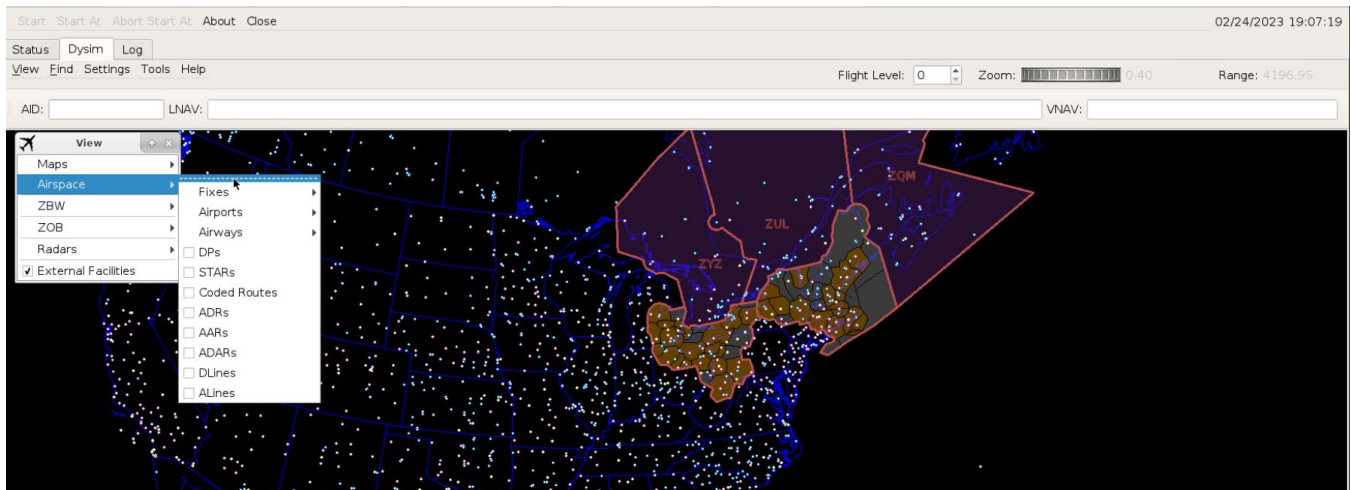


Figure 48. Menu Tear Off

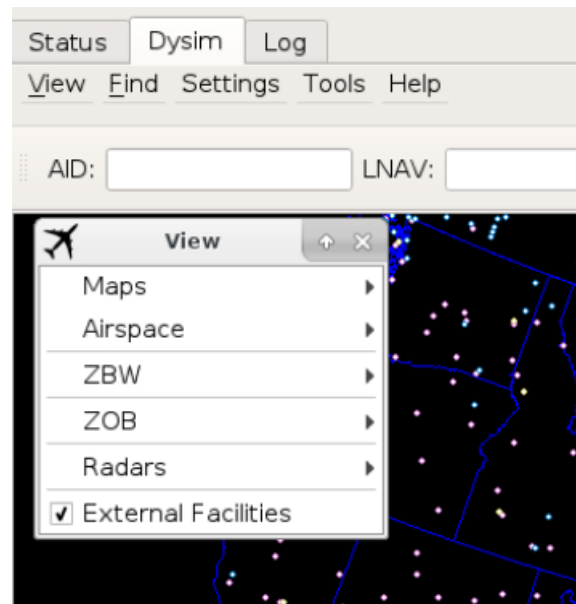


Figure 49. New Dialog

Maps

Political maps displaying boundaries in blue are available, and include US Map showing state boundaries, Canada showing provinces and territories, and Mexico.

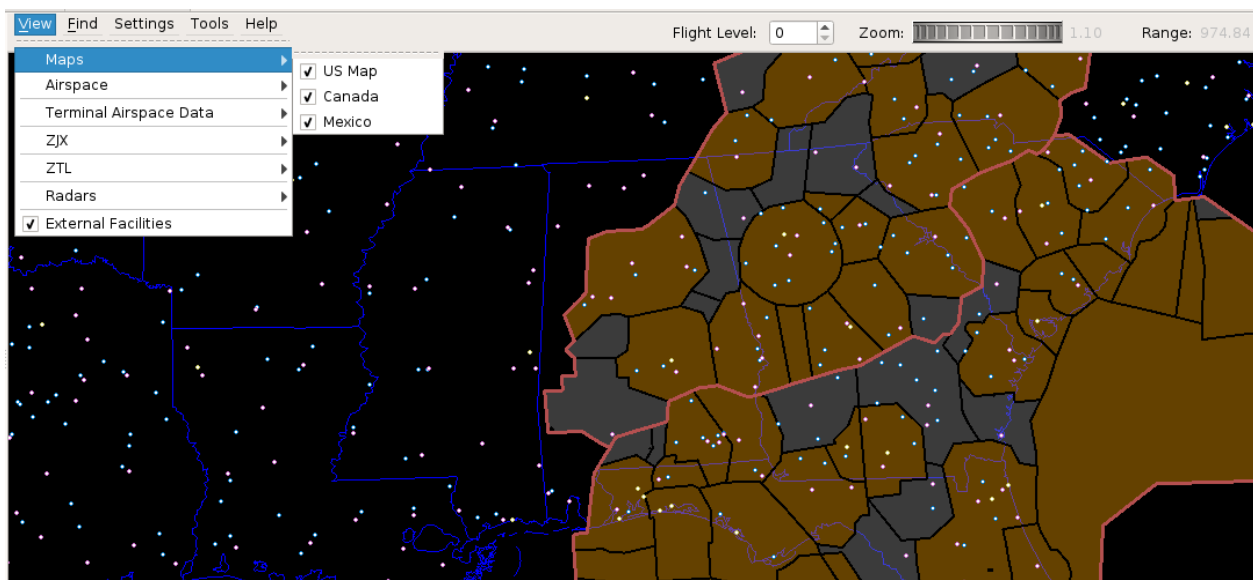


Figure 50. Map View Options

Airspace

The Airspace has a dropdown that includes Fixes, Airports, Airways, DPs, STARs, Coded, Routes, ADRs, AARs, ADARs, DLines, and ALines. The fixes tab has a dropdown that includes VORs, VOR Labels, DMEs, DME Labels, TACANs, TACAN Labels, NDBs, NDB Labels, Waypoints, Waypoint Labels, Fix Aliases, and Fix Alias Labels. The Airports tab includes Airports, Airport Labels, Airport Aliases, and Airport Alias Labels. The Airways tab includes High Airways, Low Airways, and Other Airways.

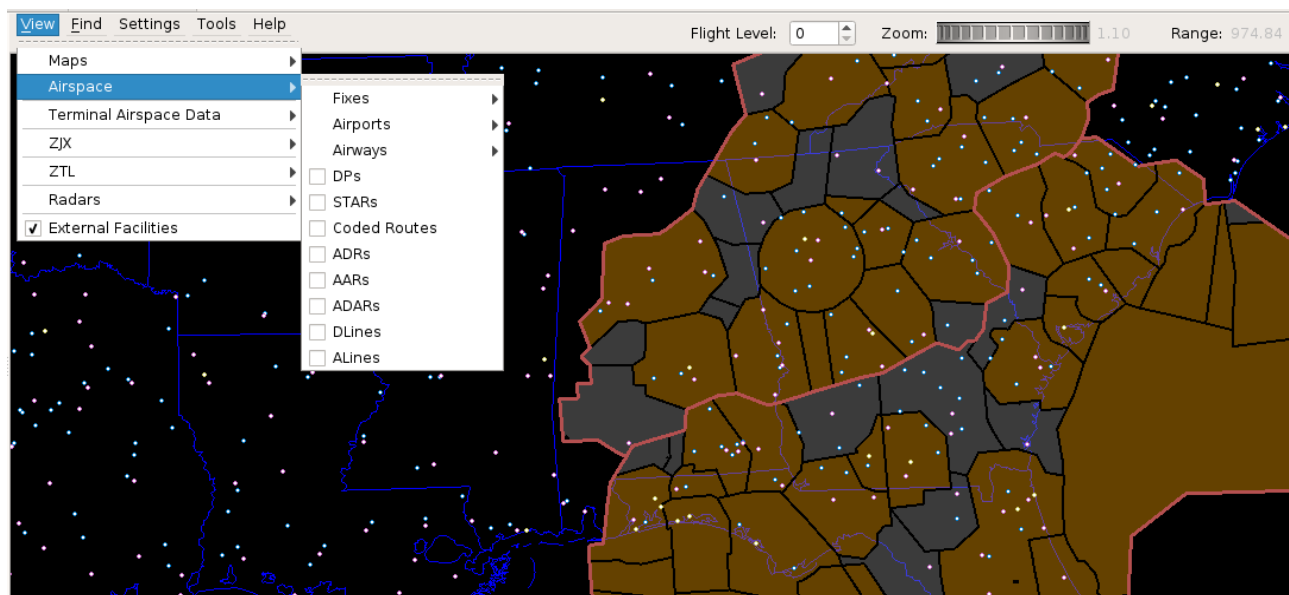


Figure 51. Airspace View Option

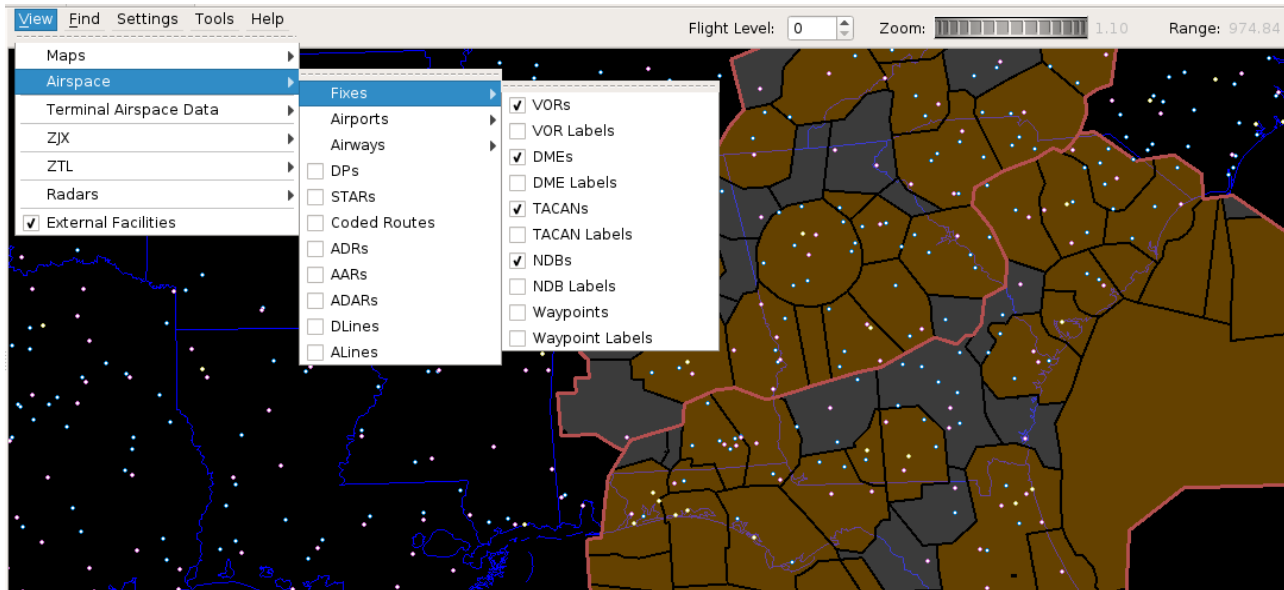


Figure 52. Airspace Fixes View Options

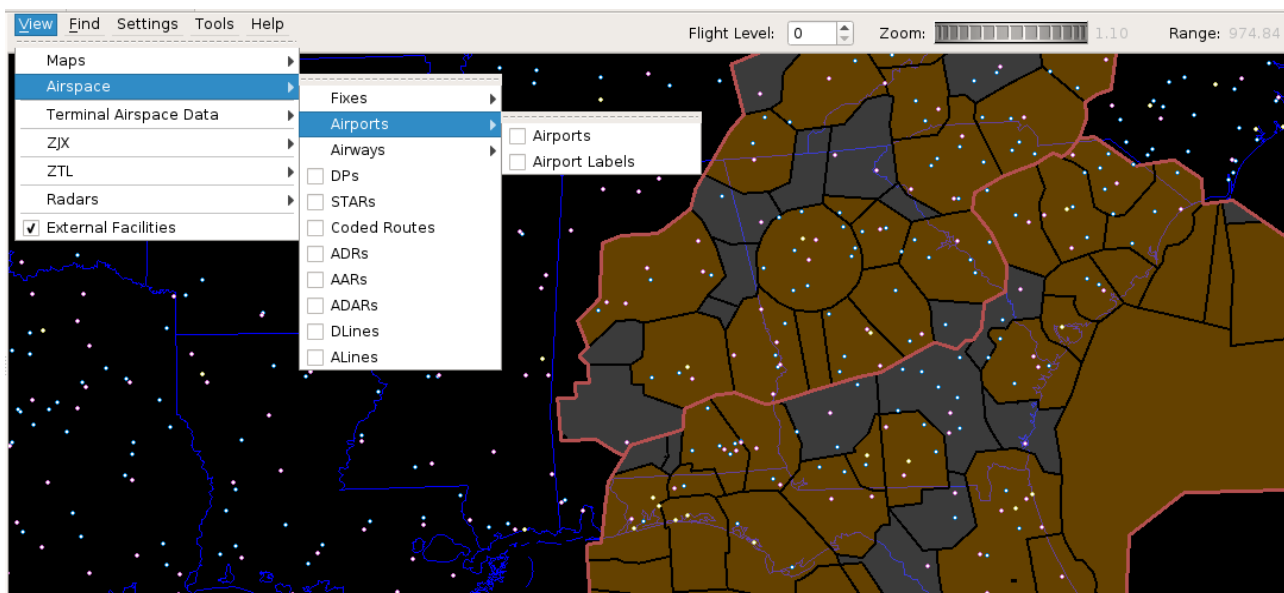


Figure 53. Airspace Airports View Options

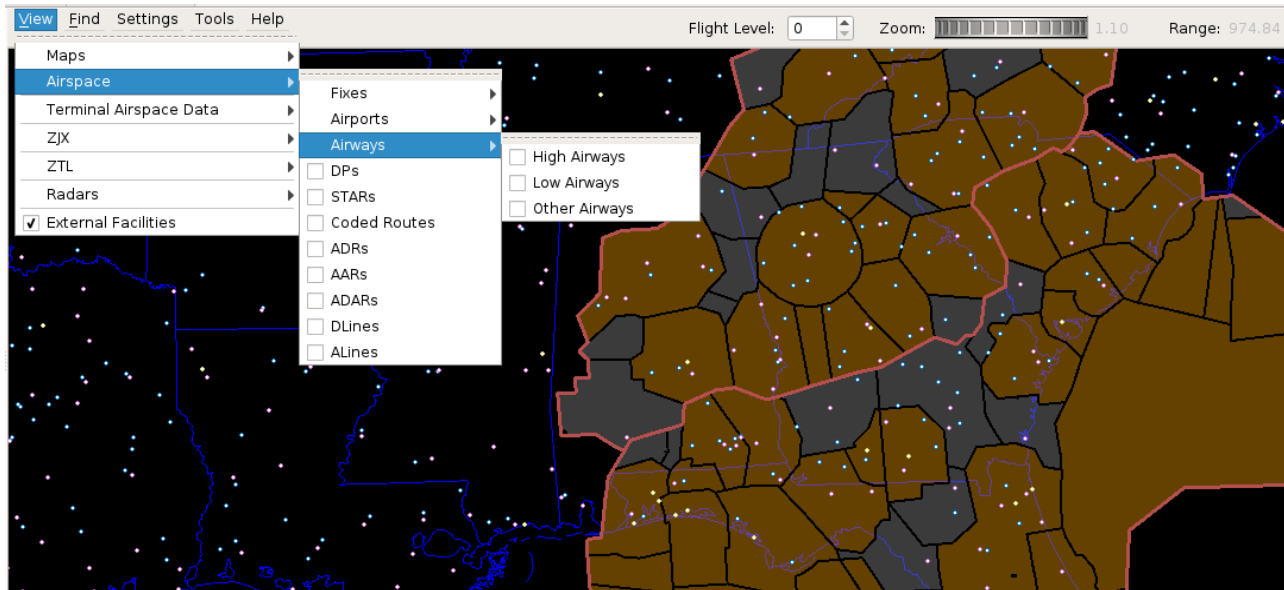


Figure 54. Airspace Airways View Options

DPs

Departure Procedure (turquoise lines and points)

STARs

Standard Terminal Arrival Route (turquoise lines and points)

Coded Routes

adapted routes (heavy tan lines and turquoise points)

ADRs

Adapted Departure Routes (teal lines, gray points, and turquoise points and airports)

AARs

Adapted Arrival Routes (teal lines, gray points, and turquoise points and airports)

ADARs

Adapted Departure/Arrival Routes (teal lines, gray points, and turquoise points and airports)

DLines

lines in the airspace if crossed, the flight is forced onto a ADR (green lines and gray points)

ALines

lines in the airspace if crossed, the flight is forced onto a AAR (green lines and gray points)

Terminal Airspace Data

The Terminal Airspace Data has a dropdown that includes Macros, Points, and Airports. The Macros dropdown will show user defined macros defined in a macro.xml file specified in the scenario.xml or adaptation.xml with the option to select a specific macro to be displayed on the map, or the option to display all macros using On or Off.

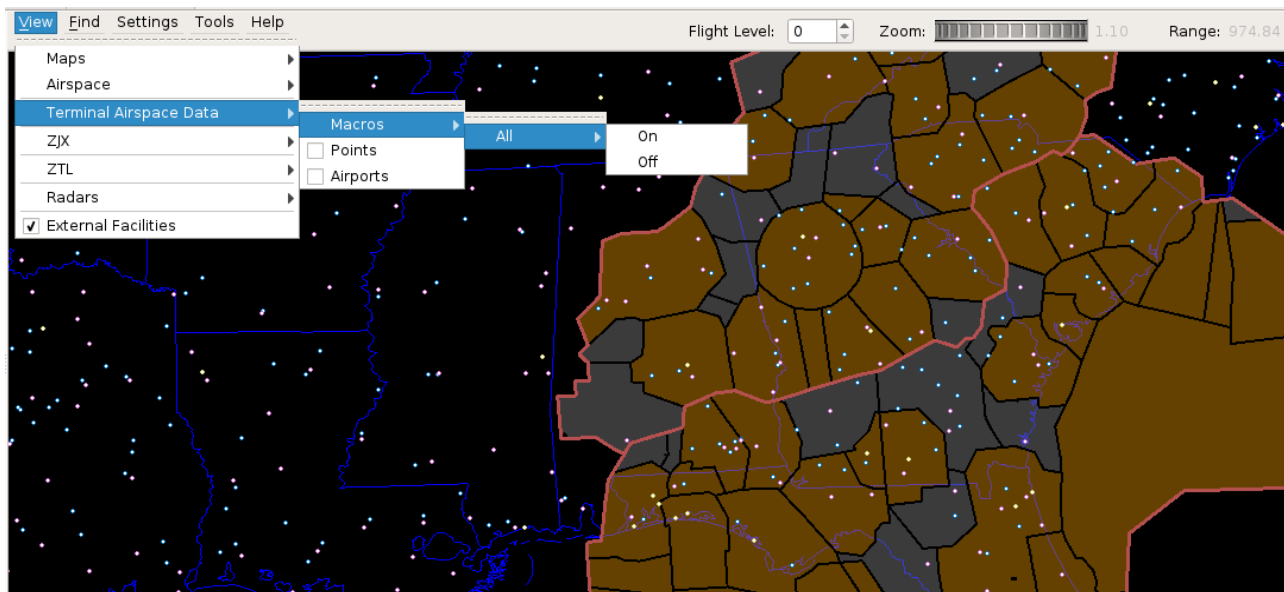


Figure 55. Terminal Airspace Data View Option

En Route Facilities

This option includes FAVs, Boundary, ARTCC Boundaries, FP AOI, Service Volume AOI, Surv AOI, APD Boundary, Surv Sort Cells, TAVs, SAAs, AAVs, Clutter Zone Filters, Geomaps, and Sectors. Geomaps include all on, all off, or the individual adapted geomaps (for the selected ARTCC).

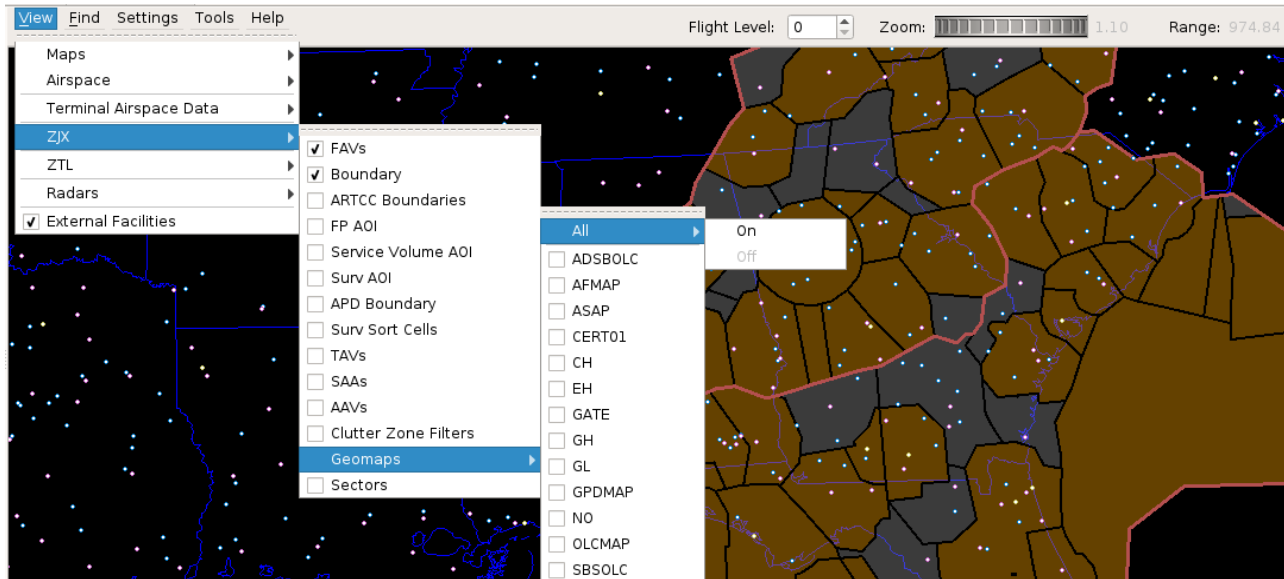


Figure 56. Adapted En Route Facility View Options

FAVs

Fixed Airspace Volumes (gray for ARTCC and orange for Terminal airspace)

Boundary

Area of responsibility (AOR) boundary (red line)

ARTCC Boundaries

Boundaries of all ARTCCs (dark red)

FP AOI

Flight Plan (FP) Area of Interest (AOI) boundary (green)

Service Volume AOI

ADS-B Service Volume Area of Interest boundary (blue)

Service Volume Grid

ADS-B Service Volume Grid (teal)

Service Volume Cert Grid

ADS-B Service Volume Grid for Certification (teal)

Surv AOI

Surveillance Area of Interest boundary (teal)

APD Boundary

(yellow)

Surv Sort Cells

Radar Surveillance Sort Cell Grid (green)

TAVs

Terrain Alert Volumes (yellow cross-hatching with red outline)

SAAs

Special Activities Airspace (solid orange lines, with dotted-line buffer area)

AAVs

Aircraft Alert Volumes (purple)

Clutter Zone Filters

(gray)

Geomaps

Contains a submenu with the names of the adapted Geomaps (white)

Sectors

Contains a submenu with the adapted sector plans (blue)

Radars

The Radar submenu lists all adapted radar sites and an option for toggling all radar sites on or off. When a radar site is on, the range is displayed as a circle with a shaded area indicating the coverage area at the selected altitude.

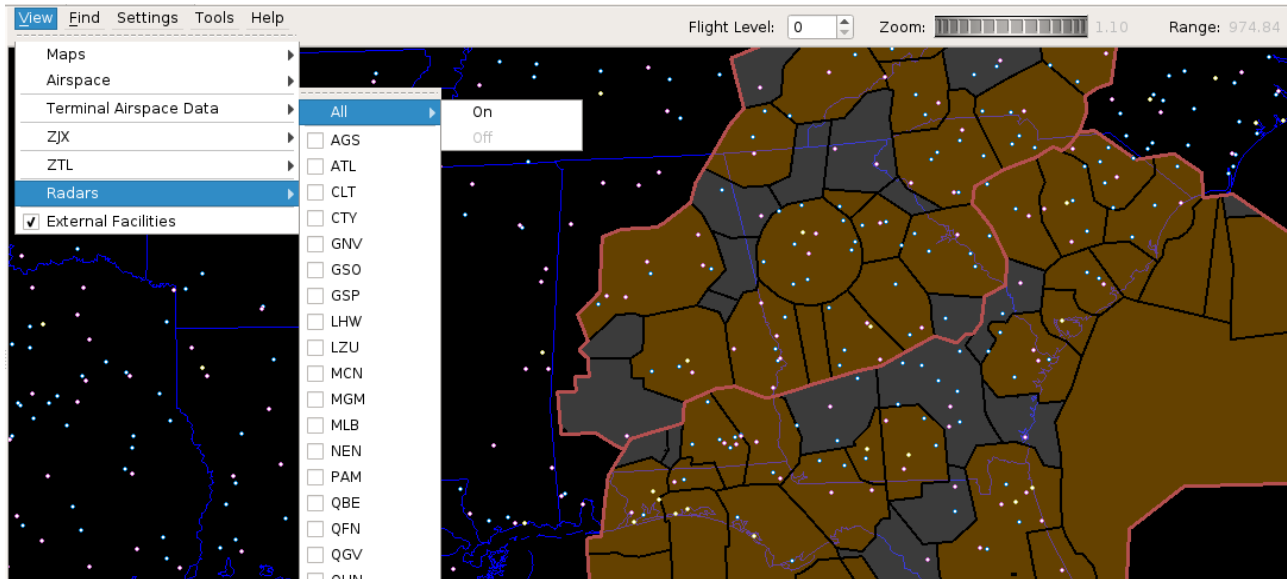


Figure 57. Radar View Options

External Facilities

Turns External Facilities (such as Oceanic and non-US) on or off.

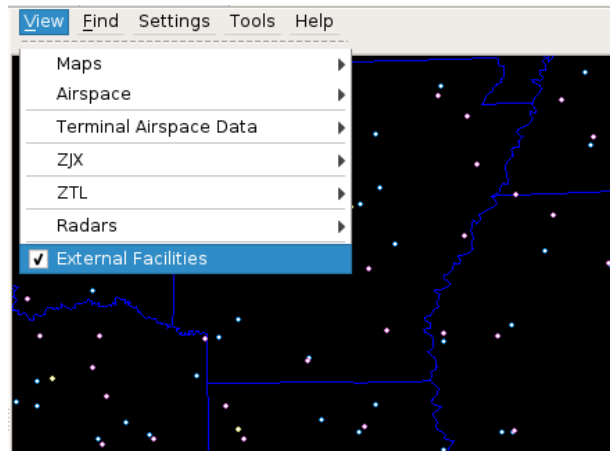


Figure 58. External Facilities View Option

Find

Clicking on **Find** displays the Find dialog. The Find dialog can be used to search the adaptation for airspace elements by name. When found, the element(s) are added to the map display and a context box is displayed with details about the element.

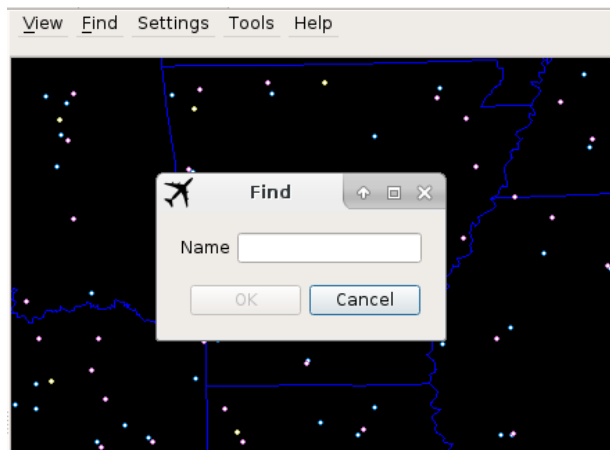


Figure 59. Find Dialog

Settings

Clicking on **Settings** displays the following submenus:

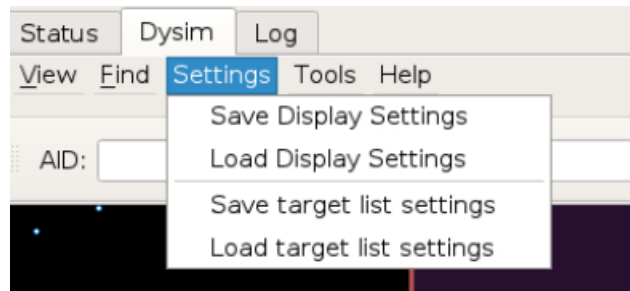


Figure 60. Settings Options

Save Display Settings

Allows saving of preferred display settings.

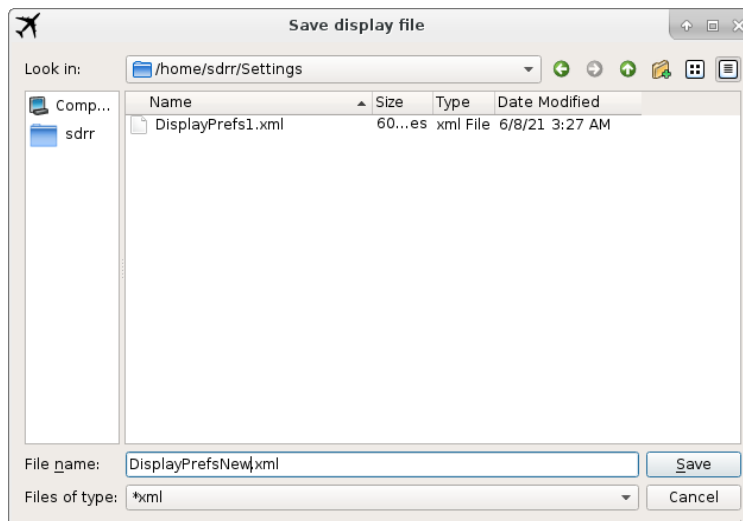


Figure 61. Save Display Settings Dialog

Load Display Settings

Allows loading of previously saved display settings.

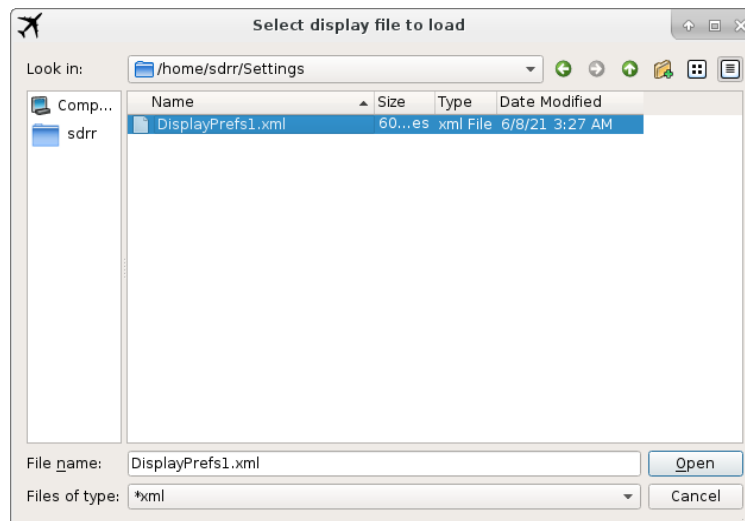


Figure 62. Load Display Settings Dialog

Save Target List Settings

Allows you to save the target list settings as a .dat file.

Load Target List Settings

Allows you to load the target list settings as a .dat file.

Tools

Clicking on **Tools** displays the following submenus:

Enable RSIs

Allows selection of RSIs to be executed not initially included in the simDriver command line parameter option.

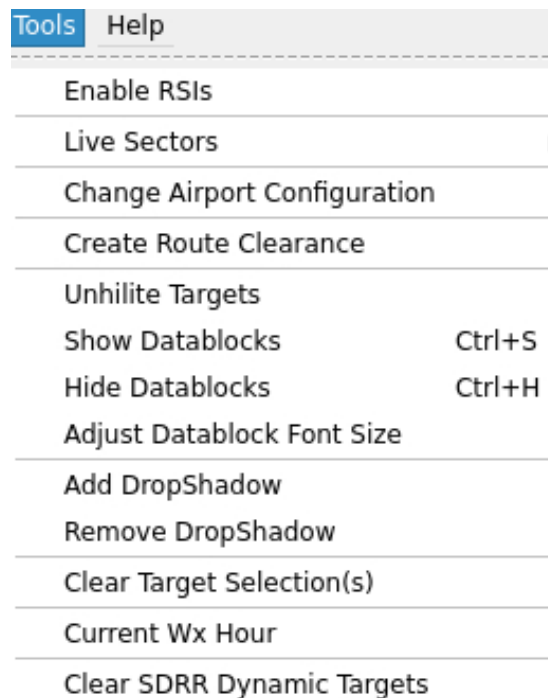


Figure 63. Enable RSIs Tools Menu Option

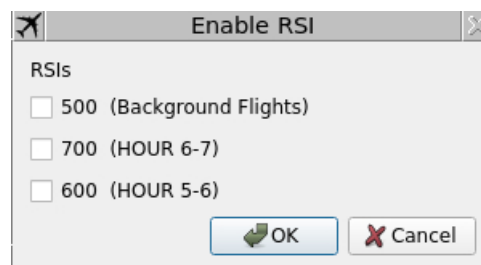


Figure 64. Enable RSIs Dialog

Add Live Sector

Identifies sector position as having live controller interaction.

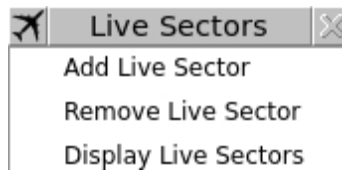


Figure 65. Add Live Sector Tools Menu Option

NOTE: Multiple sectors can be added at one time.

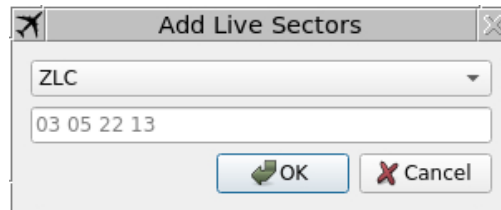


Figure 66. Add Live Sector Dialog

Remove Live Sectors

Removes sector position from list of positions with live controller interaction.

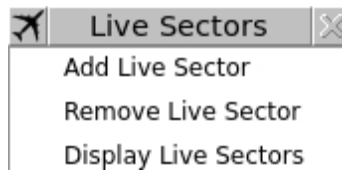


Figure 67. Remove Live Sector Tools Menu Option

NOTE: Multiple sectors can be removed at one time.

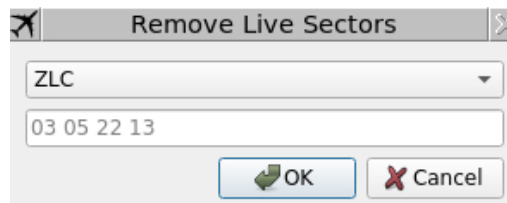


Figure 68. Remove Live Sector Dialog

Display Live Sectors

Displays all sector positions identified as having live controllers.

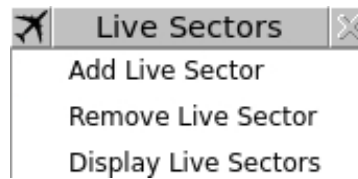


Figure 69. Display Live Sectors Tools Menu Option

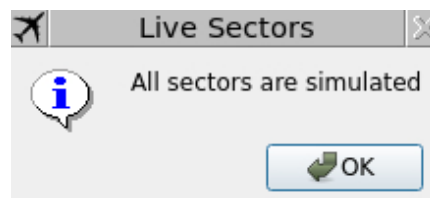


Figure 70. Display Live Sectors Dialog

Airport Configurations

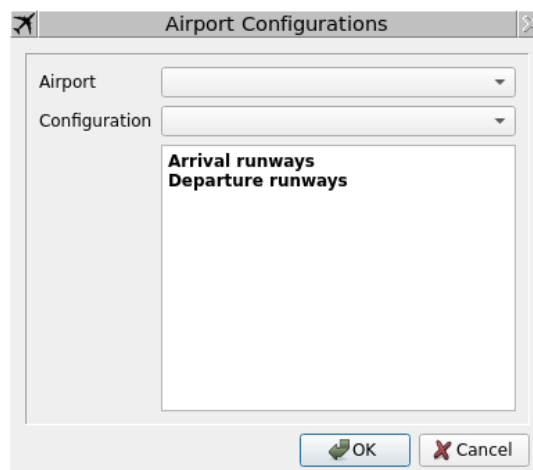


Figure 71. Create Route Clearance Tools Menu Option

Create Route Clearance

Opens a dialog to enter a route clearance.

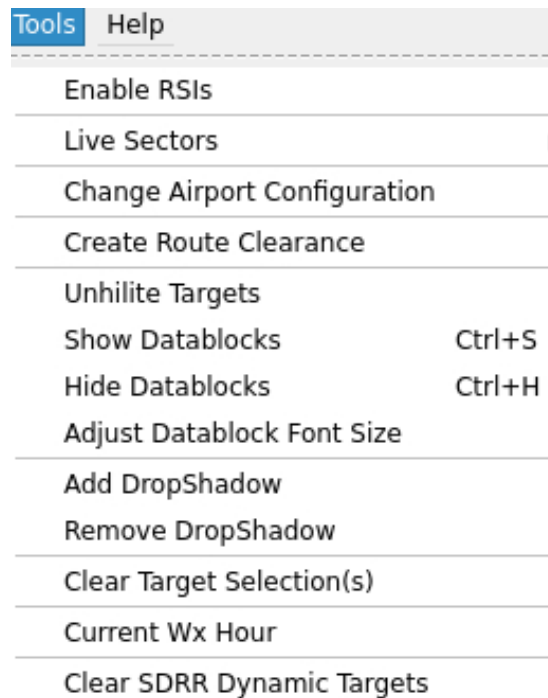


Figure 72. Create Route Clearance Tools Menu Option

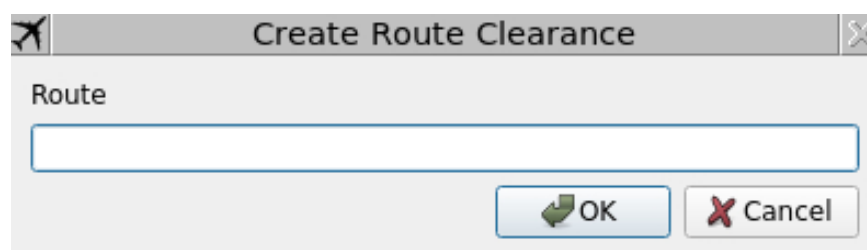


Figure 73. Create Route Clearance Dialog

Unhilit Targets

Removes all highlighted flight paths.

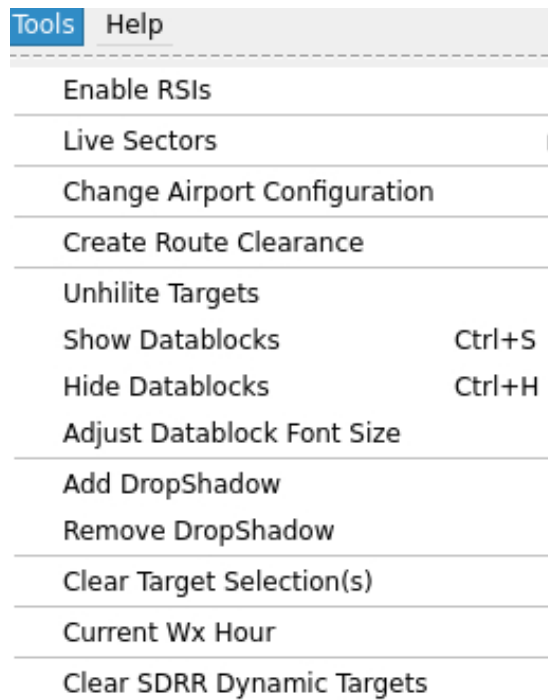


Figure 74. Unhilit Targets

Show/Hide Datablocks

Shows/Hides Datablocks on map.

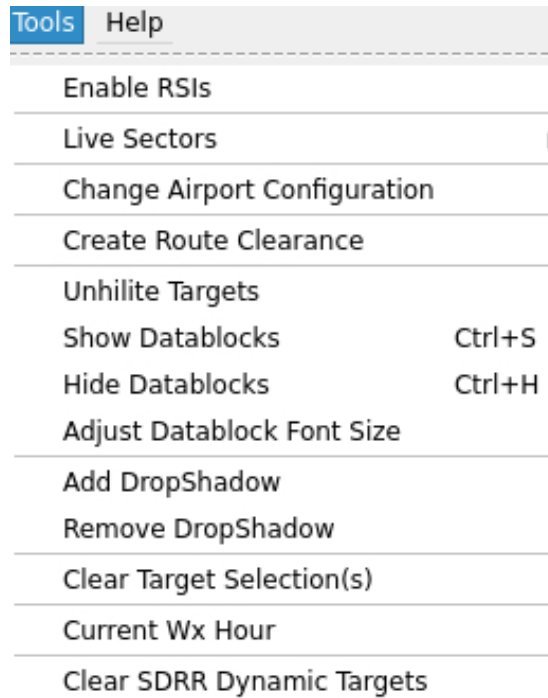


Figure 75. Show/Hide Datablocks

Adjust Datablock Font Size

Changes the font of the datablock text displayed on the map.

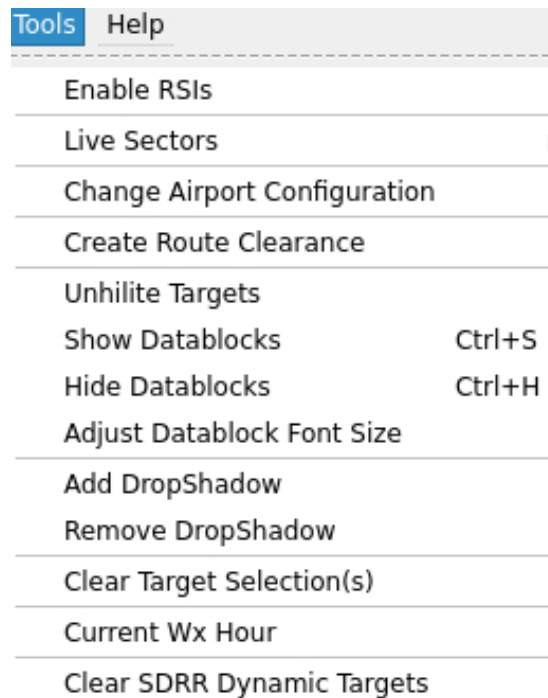


Figure 76. Adjust Datablock Font Size Tools Menu Option

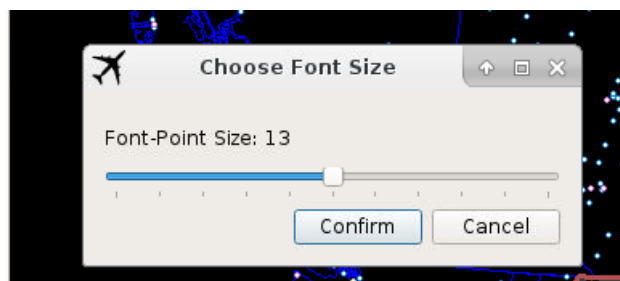


Figure 77. Adjust Datablock Font Size Dialog

Add/Remove Dropshadow

Adds/removes dropshadow from targets and datablocks.

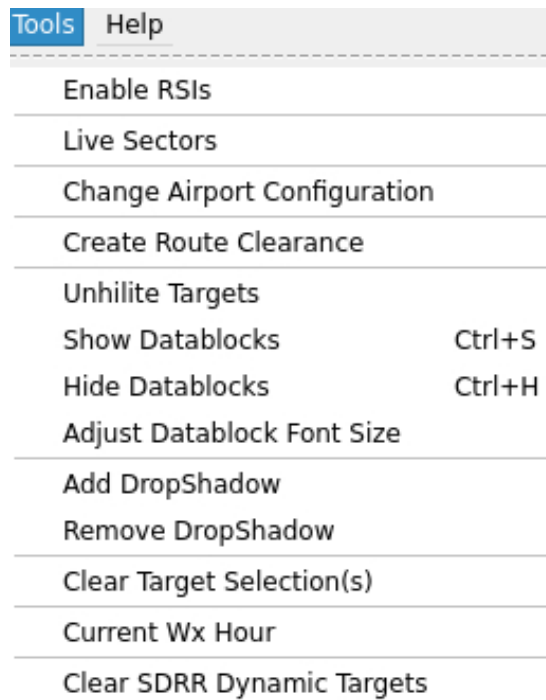


Figure 78. Add/Remove Dropshadow

Clear Target Selections

Unhighlights any selected flights.

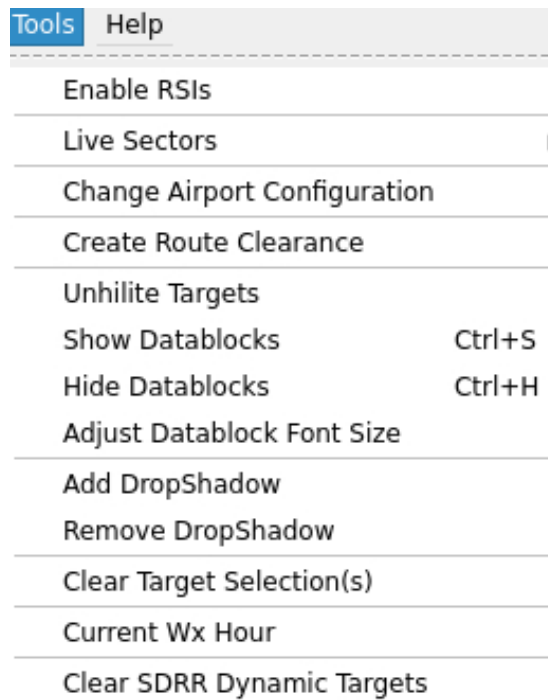


Figure 79. Clear Target Selections

Current Wx Hour

Displays the current weather hour.

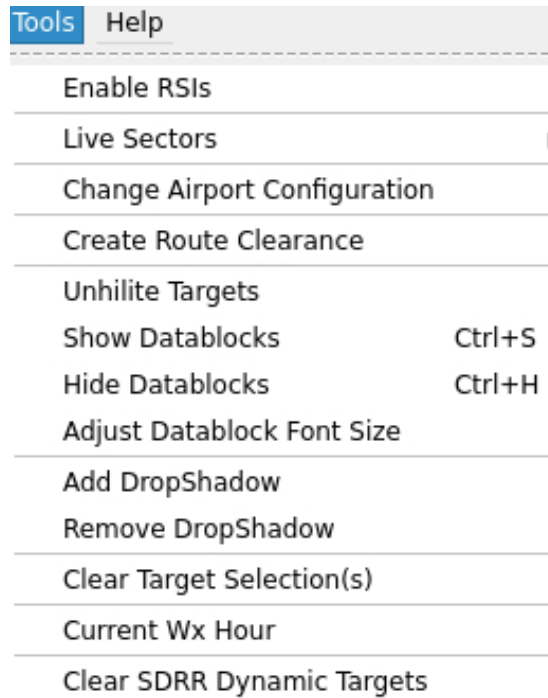


Figure 80. Current Wx Hour

Clear SDRR Dynamic Targets

If you restart simDriver, the button gives you the option to tell SDRR to stop "dead reckoning".

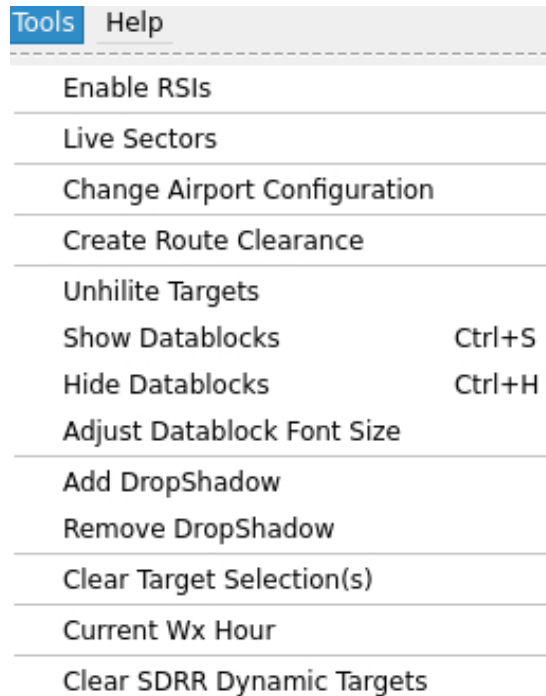


Figure 81. Clear SDRR Dynamic Targets

Help

Clicking on **Help** displays submenus for:

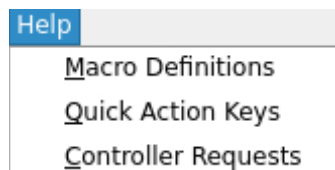


Figure 82. Help Menu

Macro Definitions

Displays a list of available macro commands.

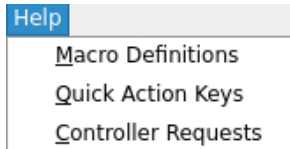


Figure 83. Macro Definitions Help Menu Option



Figure 84. Macro Definitions Help Page

Quick Action Keys

Displays a list of available keyboard short cuts.

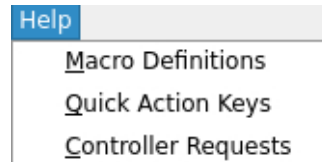


Figure 85. Quick Action Keys Help Menu Option

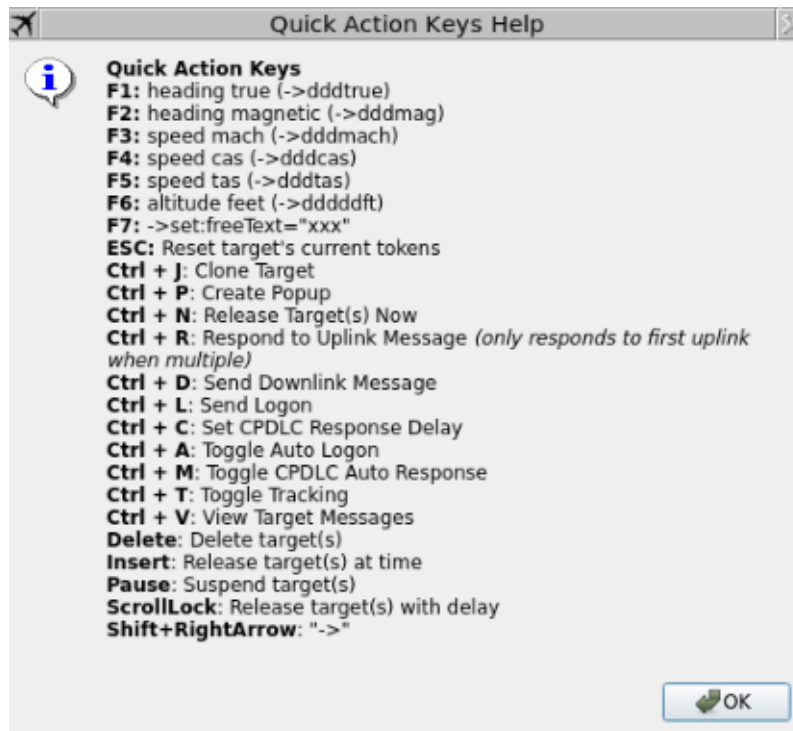


Figure 86. Quick Action Keys Help Page

Controller Requests

Displays a list of commands available for an ERAM controller to enter via the QS command for entry of free text into the 4th line of a target full datablock.

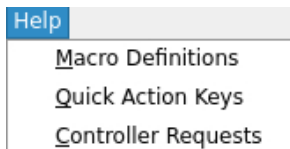


Figure 87. Controller Requests Help Menu Option



Figure 88. Controller Requests Help Page

The tool bar items on the upper right of the map display are:

Flight Level

The **Flight Level** tool allows an altitude to be set either by typing the value into the box or by clicking the up and down arrows. Changing the altitude also changes the sector and facility boundaries that are displayed.

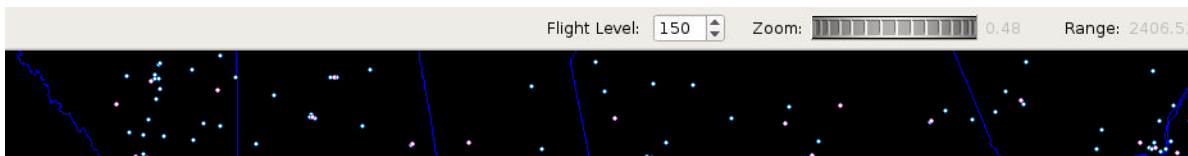


Figure 89. Flight Level

Zoom

The **Zoom** tool allows the range of the display to be adjusted using a wheel selector.



Figure 90. Zoom

Range

The **Range** tool displays the horizontal size (in nmi) of the airspace showing in the map display.

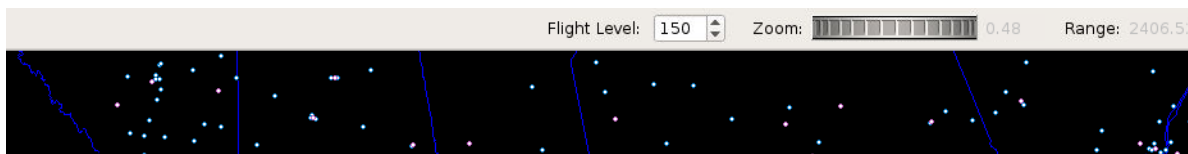


Figure 91. Range

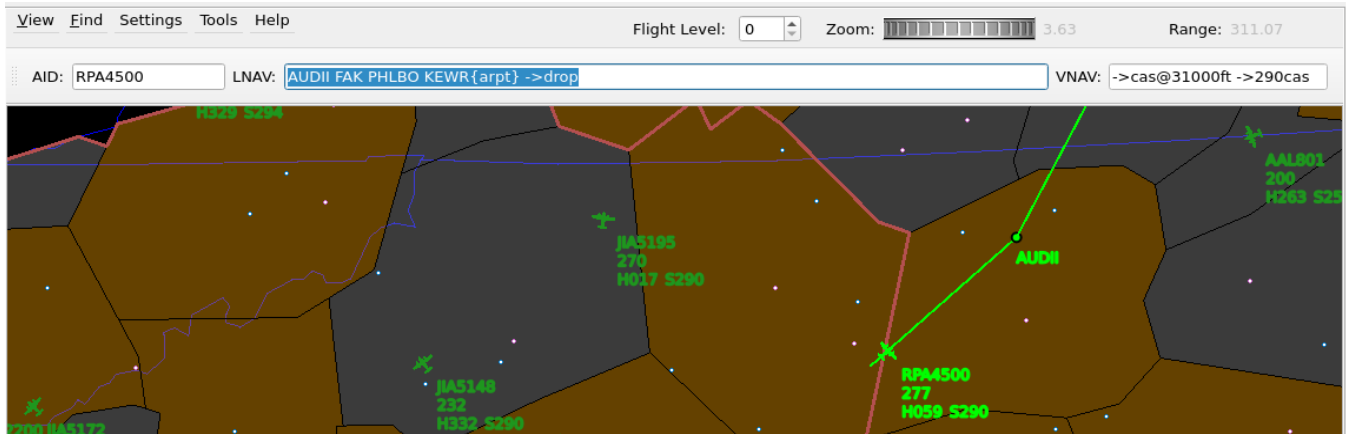


Figure 92. Macro Command Bar

The macro command bar items just above the map are:

AID

Callsign of the selected target.

LNAV

Route macro commands.

VNAV

Altitude and velocity commands.

When an active target is selected by double clicking, the input text boxes are automatically populated with the current values. The LNAV macro commands are automatically highlighted for overtyping. Allowing the cursor to dwell over the LNAV and VNAV command input text boxes, displays a description of valid command syntax.

Valid Commands
values in brackets are optional
d := decimal digit, o := octal digit, ~ := rate

- VNAV commands:
 - altitude: ->d.dft(~d.dft/min)
 - delta altitude: ->(+/-)d.dft
 - speed: ->d.d(tas|cas|m)(~d.dkt/min)@d.dft(~d.dft/min)
 - delta speed: ->(+/-)d.d(tas|cas|m)
 - both: ->d.d(tas|cas|m)@dddddft
- Heading: ->ddd[RL]mag or ->ddd[RL]true(~ddeg/sec)
- Delta Heading: ->(+/-)dddDEG
- Hold: ->hold[{duration:sec}{turnDir:[LR]}{legs:sec}] or ->hold[{count:laps}{turnDir:[LR]}{legs:sec}]
- Cancel a hold: ->cancelHold
- Drop Target: ->drop
- Script assignment: ->script="scriptName"
- Set attribute: ->set:key[=value]
 - ->set:autoLogon=(0|1)
 - ->set:disableTracker=(0|1)
 - ->set:freeText=freeText
 - ->set:prompt=prompt message
- Clear attribute: ->clear:key
- CPDLC options:
 - ->cpdlc.responseMode=(manual|auto)
 - ->cpdlc.responseDelay=seconds
- Transponder cmds:
 - BCN code (Bcn Squawk): ->Booooo
 - BCN enable/disable: ->B(E|D)
 - ModeC enable/disable (Alt Squawk): ->MC(E|D)
 - Radar detection enable/disable: ->RADAR(E|D)
 - ADSB detection enable/disable: ->ADSB(E|D)
- VNAV conditional terminations:
 - Alt terminate: ->maintain{vnavTerm:>dddddft}
 - Speed terminate: ->maintain{vnavTerm:>200(cas|tas)}

Fix Attributes:

- Arpt: {arpt}
- Dep Runway: {rw:26R}
- AltRestriction: {[<>]dddddft}
- SpdRestriction: {[<>]dddd(cas|tas)}
- Radial turn: {rf}{turnDir:[LR]}

Figure 93. Macro Command Syntax Mouse-over Text

4.3.3.2.5. LNAV/VNAV Command Input

The macro command bar consists of input text boxes that allow LNAV and VNAV macro commands to be applied to selected active targets. A list of macro commands is provided in the table below:

Table 3. Custom Macro Commands

Command	Description
VNAV Commands	
->dddcas	Change the calibrated air speed of the target to the value specified.
->dddcas~dddk/min	Change the calibrated air speed of the target to the value specified at a given rate of change.
->dddtas	Change the true air speed of the target to the value specified.
->dddtas~dddk/min	Change the true air speed of the target to the value specified at a given rate of change.
->.ddm	Change the mach speed of the target to the value specified.
->.ddm~dddk/min	Change the mach speed of the target to the value specified at a given rate of change.
->dddcas@dddddft or ->dddtas@dddddft or ->.ddm@dddddft	Change the speed and altitude of the target to the values specified.
->(+)~dddcas	Change the speed of the target by the specified amount.
->dddddft	Change the altitude of the target to the value specified in feet.
->dddddft~dddd	Change the altitude of the target to the value specified in feet at a given rate of change (in feet per minute).
->(+)~dddf	Change the altitude of the target by the specified amount.

LNAV Commands

FIXNAME

FIXNAME{attributes}

Attributes:

{arpt}

{rw:dd} or {rw:ddA}

{ils:dd} or {ils:ddA}

{dddddft}

{<dddddft}

{>dddddft}

{dddddftBdddddft}

{dddcas}, {dddtas}, or {.ddm}

{<dddcas}, {<dddtas}, or {<.ddm}

{>dddcas}, {>dddtas}, or {>.ddm}

{rf}{dddmag}{turnDir:A}

Proceed to the fix.

Proceed to the fix and obey additional instructions or restrictions specified as attributes of the fix. Some attributes (such as speed and altitude restrictions) may be combined for the same fix.

On the first fix, auto-apply departure logic; on the last fix, auto-apply top of descent (TOD) restriction. Not valid on other fixes.

In conjunction with {arpt} on departures, use a defined departure procedure for the specified runway.

In conjunction with {arpt} on arrivals, perform an ILS approach to the specified runway. This disables TOD processing.

Cross the fix at the specified restriction altitude.

Cross the fix at or below the specified restriction altitude.

Cross the fix at or above the specified restriction altitude.

Cross the fix between the specified restriction altitudes. Order of the restriction altitudes is irrelevant.

Cross the fix at the specified restriction speed.

Cross the fix at or below the specified restriction speed.

Cross the fix at or above the specified restriction speed.

Perform a radius to fix turn (in the specified turn direction), exiting the fix at the specified heading.

->ddd[RL]mag

Change the heading of the target to the value specified in degrees from magnetic North or by the right or left offset.

->ddd[RL]mag~ddddeg/sec	Change the heading of the target to the value specified in degrees from magnetic North or by the right or left offset, at a given rate of change.
->ddd[RL>true	Change the heading of the target to the value specified in degrees from true North or by the right or left offset.
->ddd[RL>true~ddddeg/sec	Change the heading of the target to the value specified in degrees from true North or by the right or left offset, at a given rate of change.
->(+\-)ddddeg	Change the heading of the target by the specified amount.
->hold	Hold indefinitely with right hand turns and 1 minute leg lengths.
->hold{legTime:dmin}	Hold indefinitely with right hand turns and leg lengths as specified in minutes.
->hold{turnDir:A}	Hold indefinitely with 1 minute leg lengths and left or right hand turns as specified.
->hold{duration:dmin}	Hold with right hand turns and 1 minute leg lengths for the specified amount of time. Once the duration time has expired, complete the current turn and proceed with the remaining route.
->hold{count:d}	Hold with right hand turns and 1 minute leg lengths for the specified number of laps.
->drop	Drop the target.
Mode3A and Mode C Commands	
->Boooo	Set or change the beacon code.
->BE	Enable the Mode 3A beacon.
->BD	Disable the Mode 3A beacon.
->MCE	Enable Mode C.
->MCD	Disable Mode C.

->RADARE	Enable radar detection.
->RADARD	Disable radar detection.
->ADSBE	Enable ADSB detection.
->ADSBD	Disable ADSB detection.
Target Attributes	
->set:autoLogon=d	Set the autoLogon attribute to 0, off, or 1, on.
->set:cpdlcResponseMode=<mode>	Set the cpdlcResponseMode attribute to manual or auto.
->set:cpdlcResponseDelay=ddd	Set the cpdlcResponseDelay attribute to the specified number of seconds.
->set:script=name	Set the script attribute to the specified script name.
->set:tdls=name	Set the tdls attribute to the specified TDLS name.
->set:disableTracker=d	Set the disableTracker attribute to 1, disabled, or 0, enabled.
->set:freeText=text	Set the freeText attribute to the specified text. This appears in the datablock of the target.
->set:taAcceptDelta=-1	Set the flight to not automatically accept handoffs.
->set:rtaResponse="NO REPLY,-1"	Flight will ignore handoff request.
->set:rtaResponse="NO REPLY,-1"	Flight will ignore handoff accept.
->set:rtaResponse="LRM,10,57/00/INVALID MESSAGE"	Flight will respond to handoff request with Logical Reject Message.
->set:tuDisable=1	Flight will not send TRAC update messages when in handoff state.
->set:tuOffset=10,10	TRAC update messages will add this offset to their position messages.
->clear:<attribute>	Clear the target attribute specified.
->IDENT	Sets the IDENT on the ERAM R position display to highlight the aircraft.

NOTE: An ‘a’ indicates an alphabetic character, ‘d’ indicates decimal digits, ‘o’ indicates octal digits, and ~ indicates a rate of change.

4.3.3.2.6. Time Based Targets

Time Based Targets are targets that have been imported into a GSGT scenario from STARS CDR data. The route of a Time Based Target is a series of latitude and longitude points. Time Based Targets appear in the Target View in red text and the route field is blank. To dynamically pilot these targets, the user must take control. Once control of the target is taken, the original target is dropped and a dynamic target is created, allowing LNAV/VNAV macro commands to be entered.

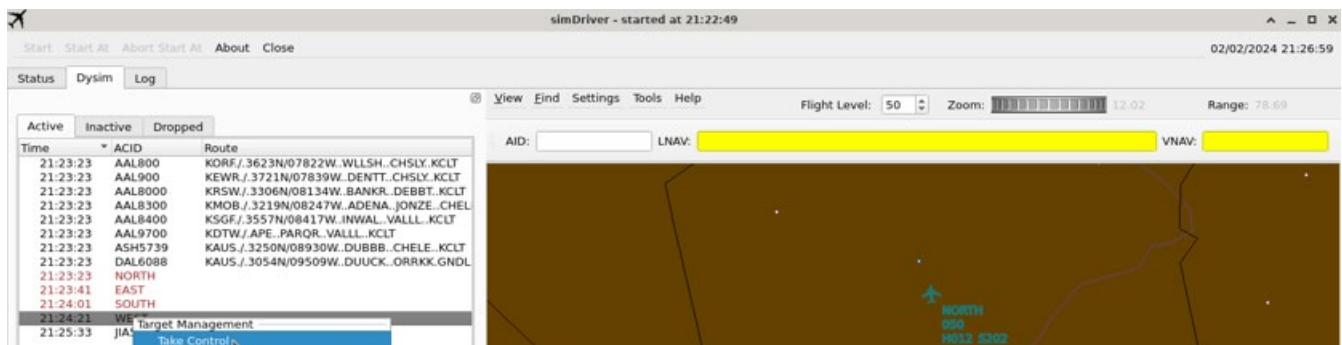


Figure 94. Time Based Targets

4.3.3.2.7. Context Boxes

Holding down the **SHIFT** key and right clicking on any airspace item (such as a Fix, Airport, or FAV) will cause a context box to be displayed. A context box displays information about the airspace item. The contents of each context box depend on the type of item selected and may contain a menu that includes additional data for the selected item.

A context box can be closed by right clicking again on the item, or by selecting the X button of the context box window.

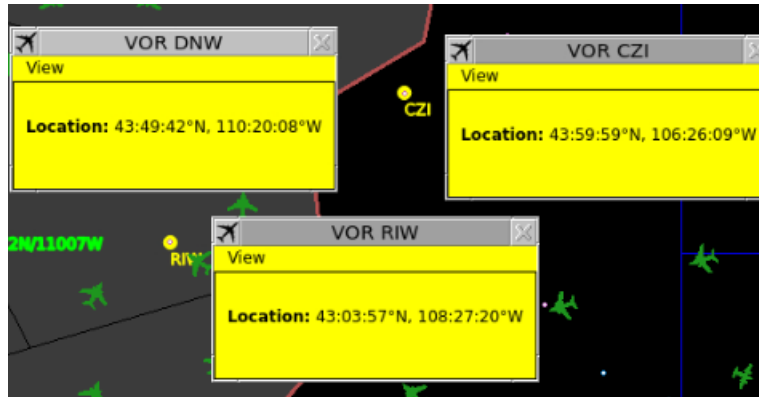


Figure 95. Context Boxes

4.3.3.2.8. Status Bar

The Status Bar, also referred to as the Measurement Bar, located on the bottom of the main window is used to display measurement information from the map. The bar is automatically displayed and updated upon user action that triggers the measurement information.

To display lat/lon and X/Y system coordinates at any specific point, hold down the **SHIFT** key while mouse clicking in any particular location on the map. Holding down the **SHIFT** key and left click dragging the mouse will display spherical distance in nmi, heading, both true and magnetic, and delta X/Y system coordinates.

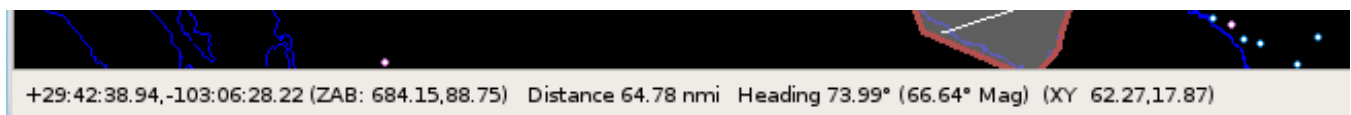


Figure 96. Status Bar

4.3.3.3. Log Tab

The Log tab displays a log of activation status, track ownership, handoff status changes, flight data messages sent from simDriver to SDRR, and macro commands.

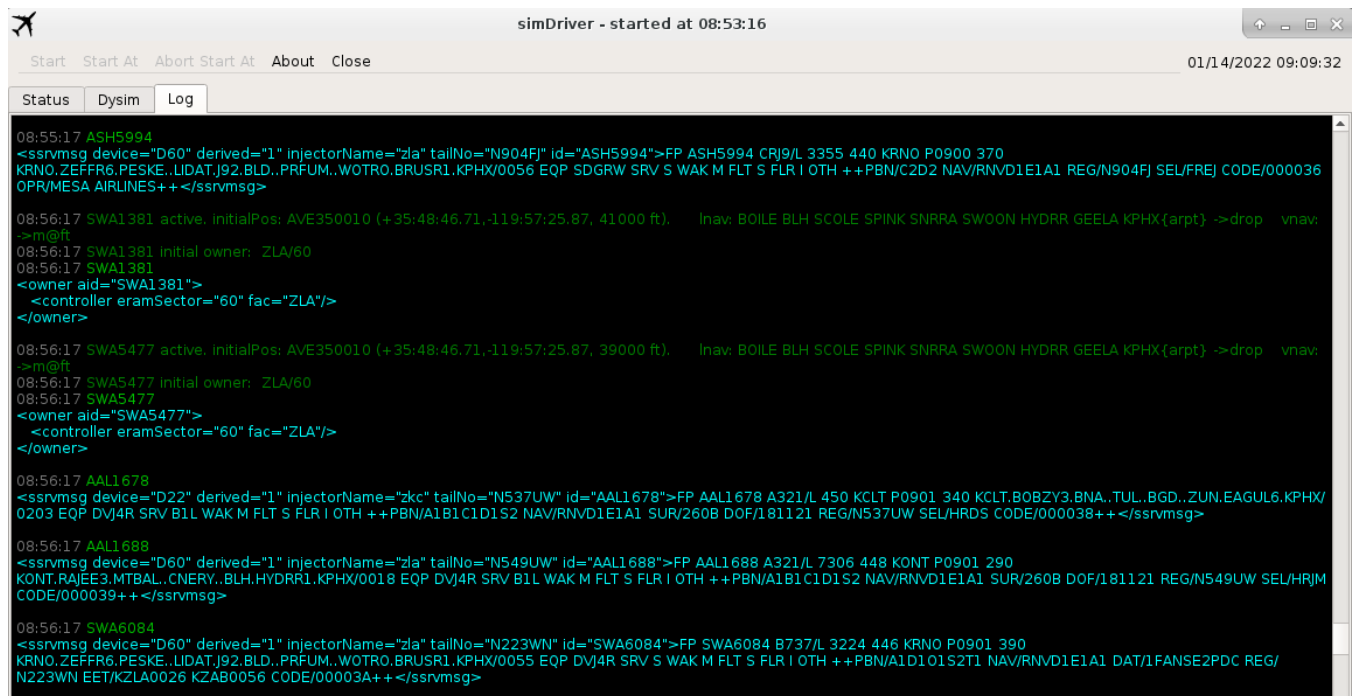


Figure 97. Log Tab

5. simPilot

The simPilot executable provides a graphical interface for dynamic interaction with simulation targets and flight data messages. This executable exchanges information with DYSIM executables like simDriver and allows multiple instances to be connected to the same scenario execution via simDriver. Each simPilot client can then be used to manipulate targets and flight data messages omitting the control of stopping and starting the scenario.

5.1. Starting simPilot

To launch simPilot with only the required parameters, enter:

```
> simPilot <scenario.xml> --dysimDev=tcp://<dysim_address>:<port#> --position=<pilot#>
```

To execute a version of simPilot that is not the default version, enter:

```
> /usr/local/jvn.x.x.x/bin/simPilot <scenario.xml>
--dysimDev=tcp://<dysim_address>:<port#> --position=<pilot#>
```

5.2. Command Line Options

The simPilot executable can be started with various options which control its operation.

Table 4. Program Parameters

Parameter	Description
<adaptation> or <scenario.xml>	At a minimum, one ERAM adaptation must be specified. The location of the adaptation can be specified as a directory relative to the ADAPTATION_PATH environment variable. Multiple adaptations may be listed. Alternately, a scenario.xml file may be specified. These XML files may contain ERAM adaptation, TBFM adaptation, STARS DMS reports, and ATCoach site/macro files where additional routes and procedures may be defined.

Parameter	Description
--dysimDev=tcp://<dysim_address>:<port#>	Directs simPilot to connect to the address and port where the DYSIM executable simDriver will output simulation messages and target details. The DYSIM executable must be started with the corresponding parameter identifying the same port number.
--position=<#>	Assigns a position number to the simPilot instance. A corresponding parameter can be specified for SimDriver to assign certain targets, tagged with an RSI, to particular simPilot position. Multiple instances of the same simPilot position number is prohibited.
--macroKeyAssignments=<filename>	Indicates a file which assigns pilot customizable commands to keyboard function keys.
--nofullscreen	Not full screen mode; simPilot will be started in a window roughly half the size of the screen.
--disableEffects	Start simPilot without all graphical effects.

5.3. simPilot GUI

The simPilot GUI is composed of a main menu bar, date and time clock, and display tabs. The times are displayed in UTC.

5.3.1. Menu Bar

The menu bar includes the following options:

About

Displays the About simPilot dialog which shows the version of simPilot, and the date and time that the simPilot executable was built.

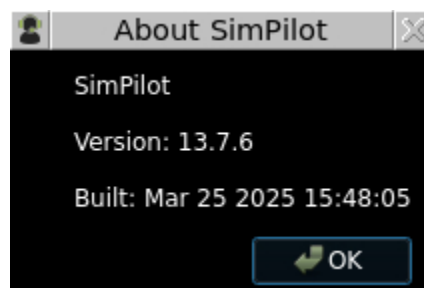


Figure 98. About SimPilot Dialog

Close

Closes the simPilot GUI. When 'Close' is selected, the warning below is displayed. Selecting 'Yes' exits the GUI; selecting 'No' closes the warning and returns to the GUI.

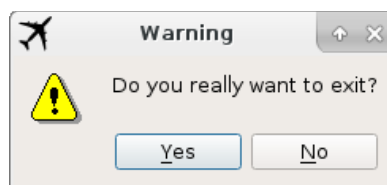


Figure 99. simPilot Exit Warning

5.3.2. Date and Time Clock

When simPilot is launched, if the connected instance of simDriver has not been started, the simPilot window title displays the pilot position number and “INACTIVE”. Once the simDriver scenario is started, the scenario time and the current date are displayed in the upper right corner. The time is displayed in UTC.



Figure 100. Inactive Status Prior to Scenario Start

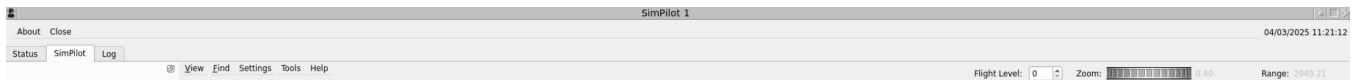


Figure 101. Date and Time Clock After Scenario Start

5.3.3. Display Tabs

The display tabs are Status, SimPilot, and Log. Right clicking in the text areas of either the Status tab or the Log tab launches a pop-up with the following options:

Copy

Places any selected text into the copy buffer.

Select All

Selects all the text in the current display tab text area.

Find

Opens a search bar at the bottom of the current display tab text area.

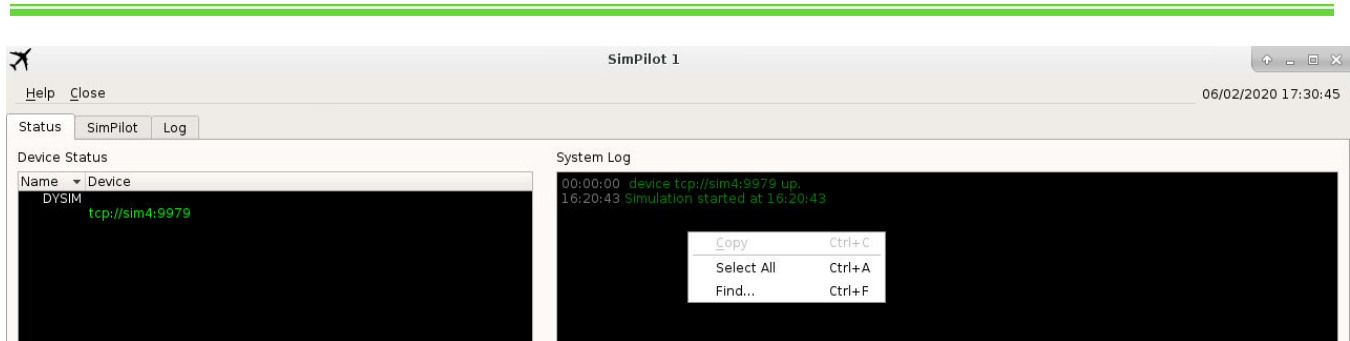


Figure 102. Status Tab Text Options

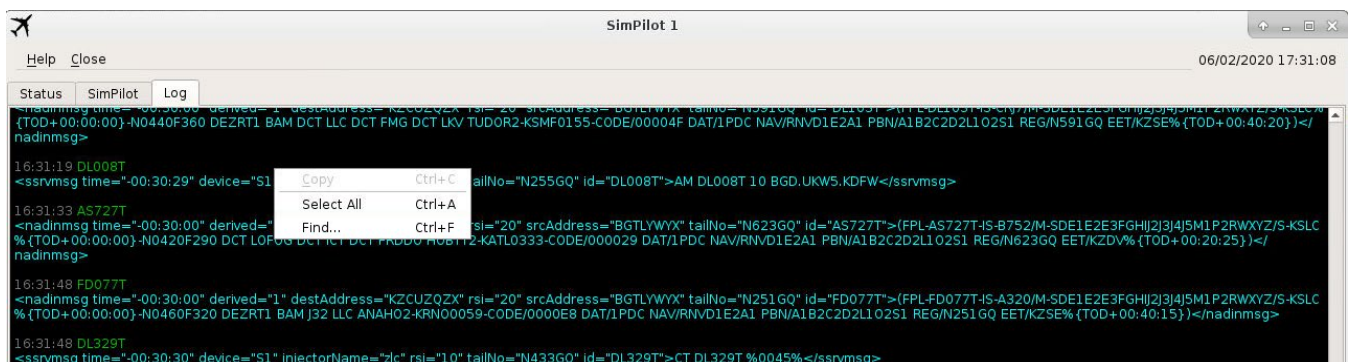


Figure 103. Log Tab Test Options

5.3.3.1. Status Tab

The status display tab is separated into two parts. The left side shows the Device Status. All devices connected to simPilot are listed and color coded to indicate connection status. The right side contains a System Log where all system messages, such as status, warnings and errors are displayed.

5.3.3.2. simPilot Tab

The SimPilot Tab is separated into two parts. The left side displays the Targets List View, and the right side displays the Map View.

The left side Targets List View can be re-sized or popped out into its own window. The Targets List View displays Active, Inactive, and Dropped target tabs. The target tabs list the following details for active, inactive, and dropped targets:

SimPilot 1													
About Close													
Status SimPilot Log													
04/03/2025 11:26:44													
Active Inactive Dropped													
Time	ACID	Owner	Route	BCN	ALT	AChar	RSI	Positi	Address	TailNo	Comments		
11:17:37	HTST01	ZLC/11	KSFO./3903/11439.DTA.BFF.SSWAN.ERICK.TORGY.OFSON.HMBRG.CONIA.F	6001	300	MD11	500	50	000004	N004GQ			
11:17:37	N49LD	ZLC/10	PANC./4746/11011.HILGR.MLS.DPR.ZZIPR.WELCM.TEEQO.MITEE.BHAWK.S	6003	330	C560	500	50	200053	N2087N			
11:17:37	SWA532	ZDV	KDAL./3742/10103.CYS.MBW.BOY.KBZN	0106	300	B737	500	50	200007	N5630S			
11:17:37	UAL654	ZLC/41	KSLC./4208/11357.DRYAD.TWF.DNJ.GEG.KGEG	6006	330	B739	500	50	20002C	N7441U			
11:17:37	N999CA	ZLC/47	KSFO./3830/11638.REANA.ROCCY.HASSL.TAHIB.DIXAN.MIRME.PNH.HEATR	6010	300	C680	500	50	200055	N1760N			
11:17:37	INTR400	ZLC/31	KGEG./4349/11510.BYI.EFFTA.BLIDA.BEARR.SKEES.KSLC	6012	239	B350	500	50	200073	N400MK			
11:17:37	SWA3177	ZLC/39	PANC./4853/10728.GGW.DIK.KP03A.FSD.IOW.FRIZN.HONOS.KSDF	6015	390	B737	500	50	200065	N9253S			

Figure 104. simPilot Tab Targets View

Time

Time that the target was or will be activated.

ACID

Aircraft identification callsign. The callsign is made up of a minimum of two and a maximum of seven letters/numbers. The first character must be a letter.

Owner

Controlling facility and sector position.

Route

Flight plan route.

BCN

Beacon code. The beacon code must be four octal digits. A beacon code of FFFF signifies that a beacon code has not been assigned to the aircraft.

ALT

Filed aircraft altitude.

AChar

Aircraft type.

RSI

Record select indicator.

Position

Number of the simPilot position that has been assigned to have control of the target.

Address

Assigned ICAO address.

TailNo

Assigned tail number or registration of the target.

Comments

Additional user entered text for a target.

The target lists can be sorted by clicking on the any of the column headers.

5.3.3.2.1.Active Tab

Right clicking on an entry in the Active list displays the following options:

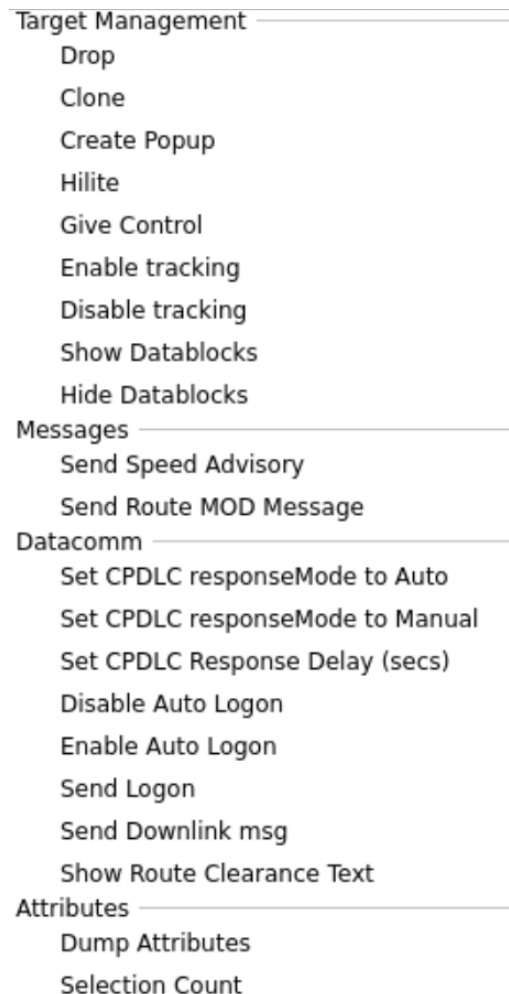


Figure 105. Active Target List Menu Options

Target Management

Drop

simDriver stops generating target position data for the selected aircraft and sends cancel and remove strip messages.

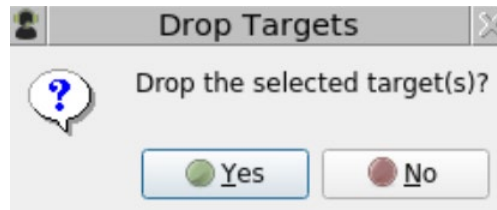


Figure 106. Drop Target Confirmation Dialog

Clone

Creates a new target with the exact same characteristics as the selected target.

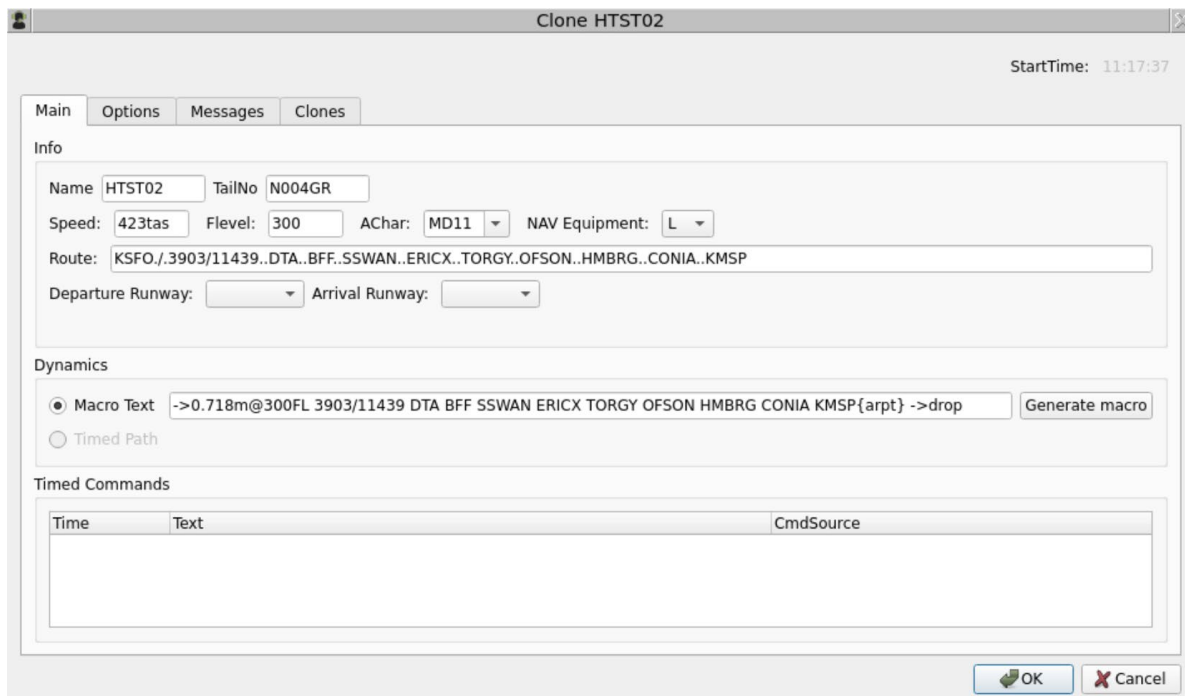
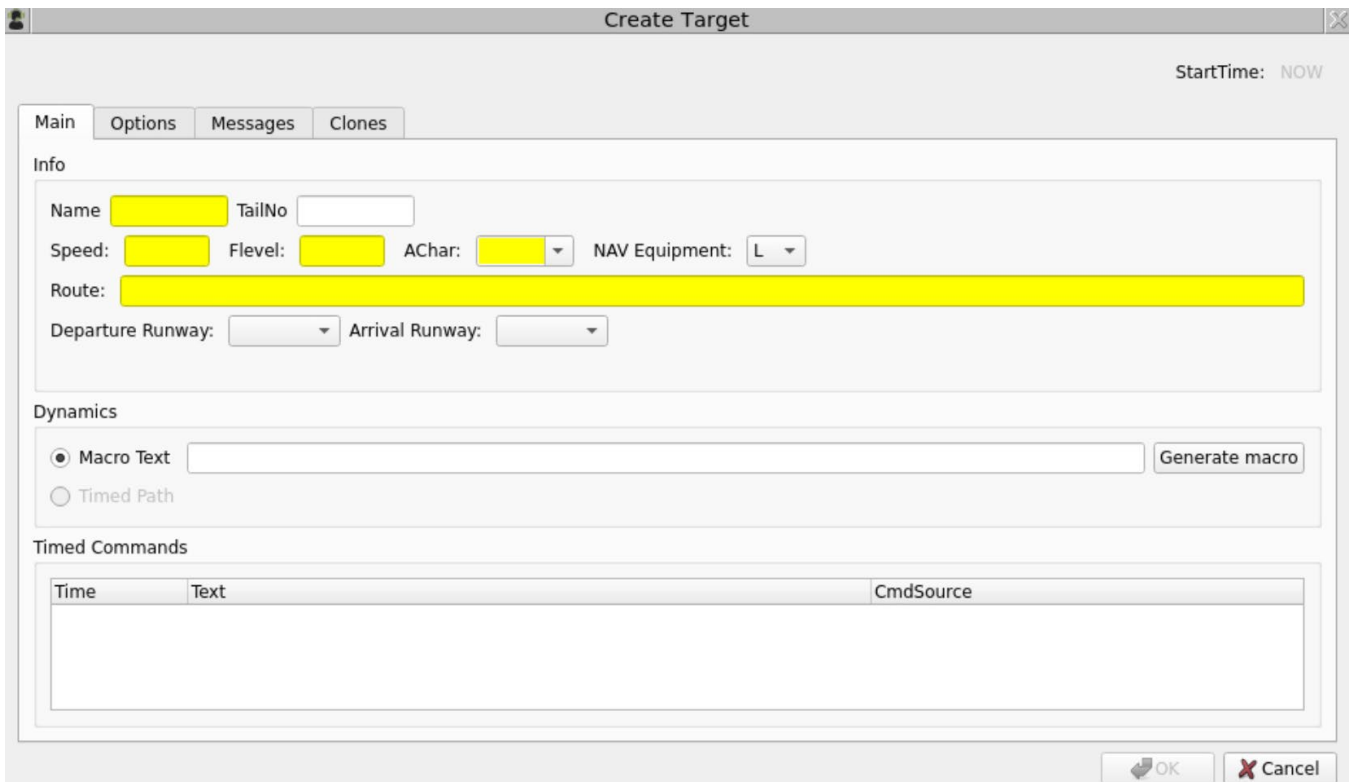


Figure 107. Clone Target Dialog for Active Targets

Create popup

Opens a blank dialog for creating a new target. Each yellow field is mandatory. The Name is the desired aircraft ID (ACID) or callsign, TailNo is the aircraft registration number, the assigned speed can be specified in calibrated air speed (CAS) or true air speed (TAS), the Flevel is the flight level, AChar is the aircraft type, NAV Equipment is the type of equipment on board the aircraft, FP Route is the Flight Plan Route, and Macro is populated after selecting the Generate macro button. The text of the Generate macro button will be red if a macro has not been created. Press the Generate macro button to automatically populate the Macro Text input box with macro commands generated from the contents of the FP Route. Or manually enter macro commands to fly a route that is different from the filed flight plan route.



Create Target

StartTime: NOW

Main Options Messages Clones

Info

Name TailNo

Speed: Flevel: AChar: NAV Equipment:

Route:

Departure Runway: Arrival Runway:

Dynamics

☒ Macro Text

☐ Timed Path

Timed Commands

Time	Text	CmdSource

Figure 108. Create Popup Dialog for Active Targets

Hilite

Highlights the target, displays its flight path, and displays its message window.

Give Control

Assigns the selected flight to a new pilot.

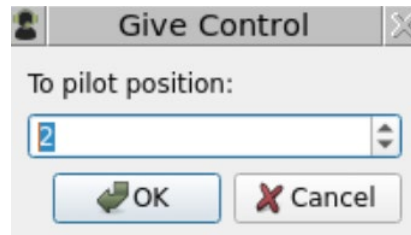


Figure 109. Give Control Dialog

Disable/Enable tracking

Processes CMS data that simDriver receives if enabled. If disabled, simDriver does not process CMS messages to change target dynamics or generate hand off messages.

Show Datablocks

Enables datablocks.

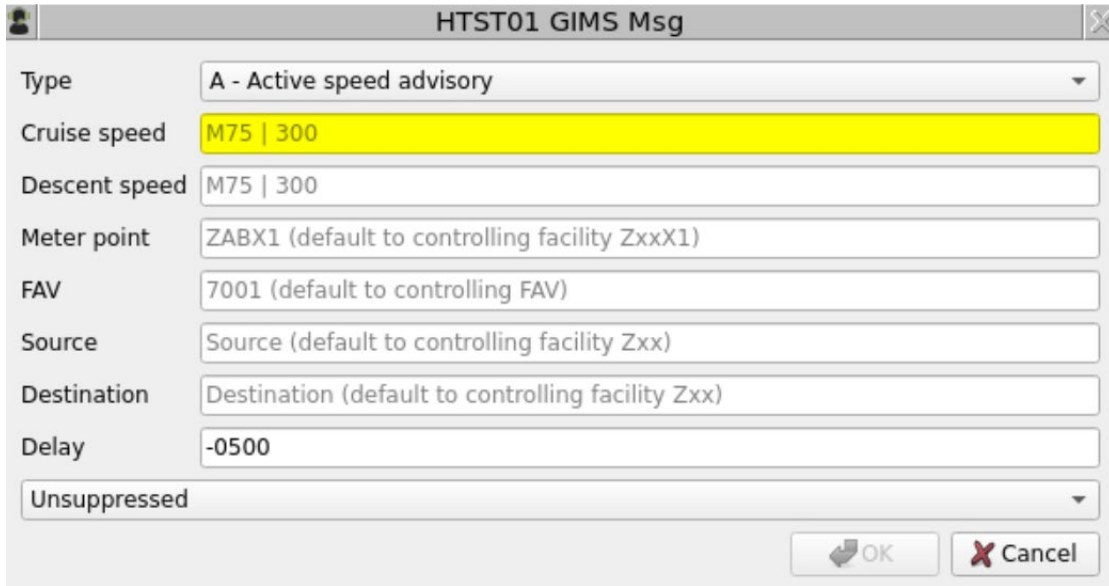
Hide Datablocks

Disables datablocks.

Messages

Send Speed Advisory

Displays a GIM-S Message dialog box for the speed advisory message.



HTST01 GIMS Msg

Type: A - Active speed advisory

Cruise speed: M75 | 300

Descent speed: M75 | 300

Meter point: ZABX1 (default to controlling facility ZxxX1)

FAV: 7001 (default to controlling FAV)

Source: Source (default to controlling facility Zxx)

Destination: Destination (default to controlling facility Zxx)

Delay: -0500

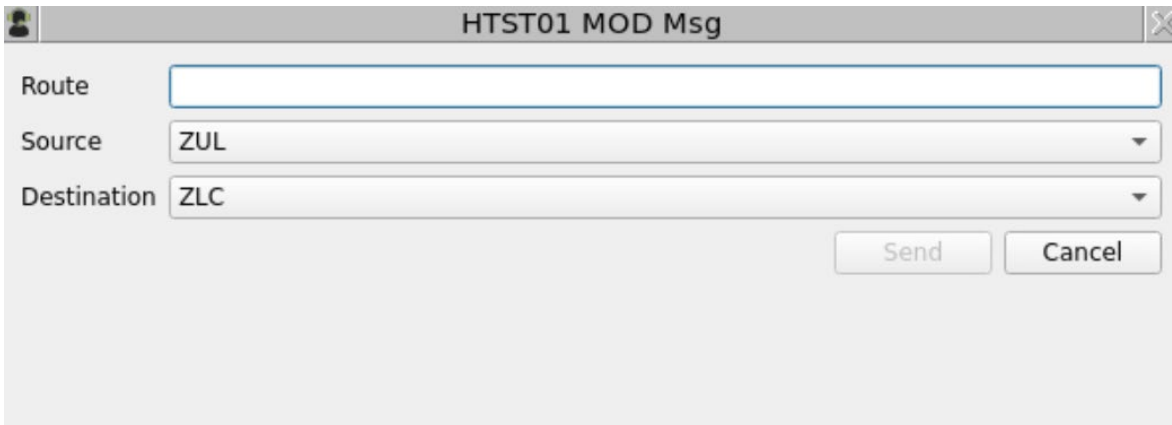
Unsuppressed

OK Cancel

Figure 110. Send Speed Advisory Dialog

Send route MOD message

Displays a MOD message dialog box.



HTST01 MOD Msg

Route:

Source: ZUL

Destination: ZLC

Send Cancel

Figure 111. Send a Route Modification Message

Datacomm

Set CPDLC responseMode to Auto/Manual

Changes flight to auto/manual mode. Auto mode is where everything is automatically processed. Manual mode is where the pilot will have to manually send messages and respond to messages received.

Set CPDLC Response Delay (secs)

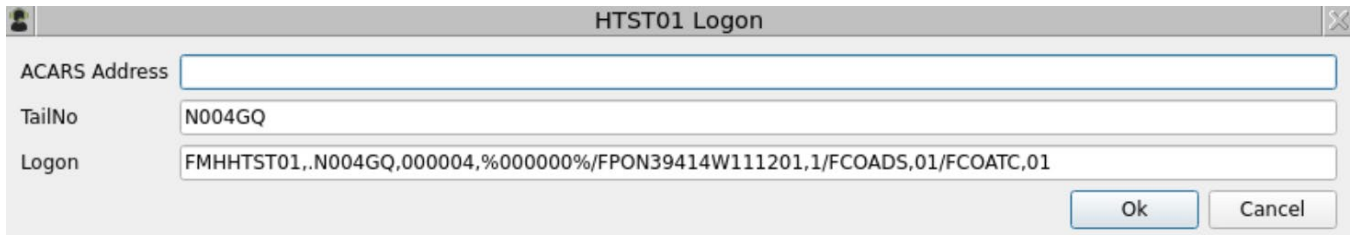
Changes the CPDLC response time to have a delay. This is additional time it will take the aircraft to receive the CPDLC message.

Disable/Enable Auto Logon

Disables and enables auto logons.

Send Logon

Sends a logon to the flight. This logon message is an aircraft logon for CPDLC services. Further, Messages and Attributes are all related to Datacomm.

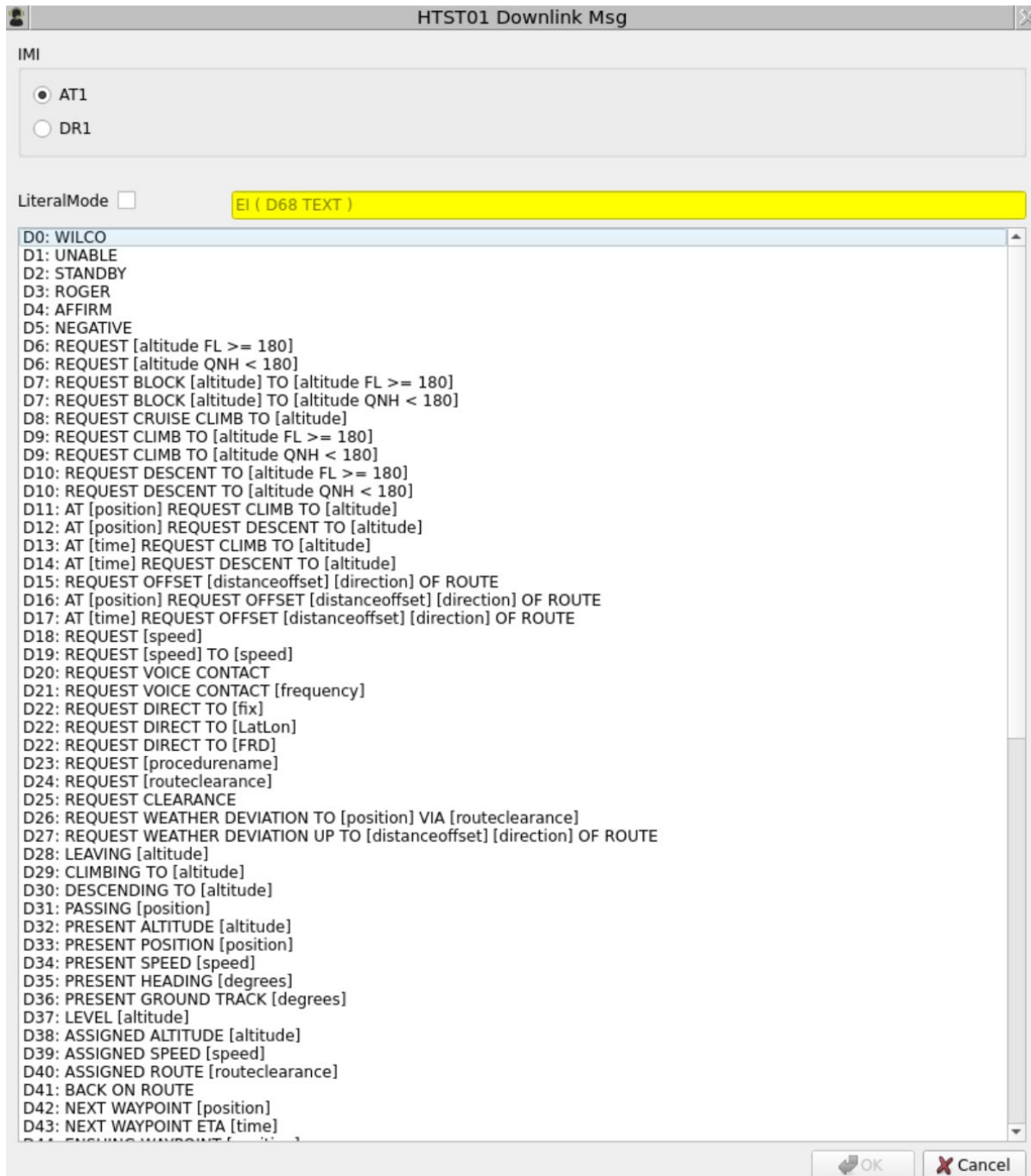


The image shows a dialog box titled "HTST01 Logon". It contains three input fields: "ACARS Address" (empty), "TailNo" (containing "N004GQ"), and "Logon" (containing "FMHHTST01,,N004GQ,000004,%000000%/FPON39414W111201,1/FCOADS,01/FCOATC,01"). At the bottom right are "Ok" and "Cancel" buttons.

Figure 112. Send Logon Dialog

Send Downlink Msg

Sends a downlink message with one of the selected options listed below.



The screenshot shows a dialog box titled "HTST01 Downlink Msg". It has a tab labeled "IMI". Inside the dialog, there are two radio buttons: "AT1" (selected) and "DR1". Below these is a checkbox labeled "LiteralMode" which is unchecked. To the right of the checkbox is a yellow highlighted area containing the text "EI (D68 TEXT)". Below this is a list of downlink message options, each preceded by a label from D0 to D43. The list is as follows:

- D0: WILCO
- D1: UNABLE
- D2: STANDBY
- D3: ROGER
- D4: AFFIRM
- D5: NEGATIVE
- D6: REQUEST [altitude FL >= 180]
- D6: REQUEST [altitude QNH < 180]
- D7: REQUEST BLOCK [altitude] TO [altitude FL >= 180]
- D7: REQUEST BLOCK [altitude] TO [altitude QNH < 180]
- D8: REQUEST CRUISE CLIMB TO [altitude]
- D9: REQUEST CLIMB TO [altitude FL >= 180]
- D9: REQUEST CLIMB TO [altitude QNH < 180]
- D10: REQUEST DESCENT TO [altitude FL >= 180]
- D10: REQUEST DESCENT TO [altitude QNH < 180]
- D11: AT [position] REQUEST CLIMB TO [altitude]
- D12: AT [position] REQUEST DESCENT TO [altitude]
- D13: AT [time] REQUEST CLIMB TO [altitude]
- D14: AT [time] REQUEST DESCENT TO [altitude]
- D15: REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
- D16: AT [position] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
- D17: AT [time] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
- D18: REQUEST [speed]
- D19: REQUEST [speed] TO [speed]
- D20: REQUEST VOICE CONTACT
- D21: REQUEST VOICE CONTACT [frequency]
- D22: REQUEST DIRECT TO [fix]
- D22: REQUEST DIRECT TO [LatLon]
- D22: REQUEST DIRECT TO [FRD]
- D23: REQUEST [procedurename]
- D24: REQUEST [routeclearance]
- D25: REQUEST CLEARANCE
- D26: REQUEST WEATHER DEVIATION TO [position] VIA [routeclearance]
- D27: REQUEST WEATHER DEVIATION UP TO [distanceoffset] [direction] OF ROUTE
- D28: LEAVING [altitude]
- D29: CLIMBING TO [altitude]
- D30: DESCENDING TO [altitude]
- D31: PASSING [position]
- D32: PRESENT ALTITUDE [altitude]
- D33: PRESENT POSITION [position]
- D34: PRESENT SPEED [speed]
- D35: PRESENT HEADING [degrees]
- D36: PRESENT GROUND TRACK [degrees]
- D37: LEVEL [altitude]
- D38: ASSIGNED ALTITUDE [altitude]
- D39: ASSIGNED SPEED [speed]
- D40: ASSIGNED ROUTE [routeclearance]
- D41: BACK ON ROUTE
- D42: NEXT WAYPOINT [position]
- D43: NEXT WAYPOINT ETA [time]

At the bottom right of the dialog box are two buttons: "OK" and "Cancel".

Figure 113. Send Downlink Message – Part 1

HTST01 Downlink Msg

IMI

☒ AT1
☐ DR1

LiteralMode ☐
EI (D68 TEXT)

D33: PRESENT POSITION [position]
D34: PRESENT SPEED [speed]
D35: PRESENT HEADING [degrees]
D36: PRESENT GROUND TRACK [degrees]
D37: LEVEL [altitude]
D38: ASSIGNED ALTITUDE [altitude]
D39: ASSIGNED SPEED [speed]
D40: ASSIGNED ROUTE [routeclearance]
D41: BACK ON ROUTE
D42: NEXT WAYPOINT [position]
D43: NEXT WAYPOINT ETA [time]
D44: ENSUING WAYPOINT [position]
D45: REPORTED WAYPOINT [position]
D46: REPORTED WAYPOINT [time]
D47: SQUAWKING [beaconcode]
D48: POSITION REPORT [positionreport]
D49: WHEN CAN WE EXPECT [speed]
D50: WHEN CAN WE EXPECT [speed] TO [speed]
D51: WHEN CAN WE EXPECT BACK ON ROUTE
D52: WHEN CAN WE EXPECT LOWER ALTITUDE
D53: WHEN CAN WE EXPECT HIGHER ALTITUDE
D54: WHEN CAN WE EXPECT CRUISE CLIMB TO [altitude]
D55: PAN PAN PAN
D56: MAYDAY MAYDAY MAYDAY
D57: [remainingfuel] OF FUEL REMAINING AND [remainingsouls] SOULS ON BOARD
D58: CANCEL EMERGENCY
D59: DIVERTING TO [position] VIA [routeclearance]
D60: OFFSETTING [distanceoffset] [direction] OF ROUTE
D61: DESCENDING TO [altitude FL >= 180]
D61: DESCENDING TO [altitude QNH < 180]
D62: ERROR [errorinformation]
D63: NOT CURRENT DATA AUTHORITY
D64: [icaofacilitydesignation]
D65: DUE TO WEATHER
D66: DUE TO AIRCRAFT PERFORMANCE
D67: [freedisplayText] Note: The ATS Provider System peer will assign an urgency of Low for messsage element [67].
D68: [freedisplayText] Note: The ATS Provider System peer will assign an urgency of Distress for message element [68].
D69: REQUEST VMC DESCENT
D70: REQUEST HEADING [degrees]
D71: REQUEST GROUND TRACK [degrees]
D72: REACHING [altitude]
D73: [versionnumber]
D74: MAINTAIN OWN SEPARATION AND VMC
D75: AT PILOTS DISCRETION
D76: REACHING BLOCK [altitude] TO [altitude]
D77: ASSIGNED BLOCK [altitude] TO [altitude]
D78: AT [time] [distance] [tofrom] [position]
D79: ATIS [atiscodes]
D80: DEVIATING [distanceoffset] [direction] OF ROUTE
EMERSYSPID: EMERGENCY PID TEST MESSAGE (D56 MAYDAY MAYDAY MAYDAY) EI (D68 THIS IS A TEST)

Figure 114. Send Downlink Message – Part 2

Show Route Clearance Text

Displays the route clearance in a popup window.

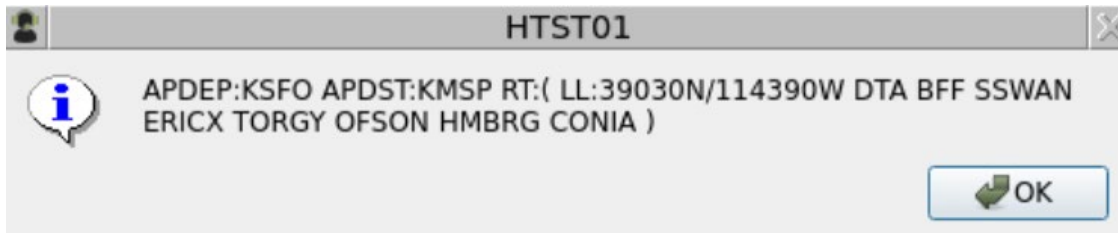


Figure 115. Show Route Clearance Text

Attributes

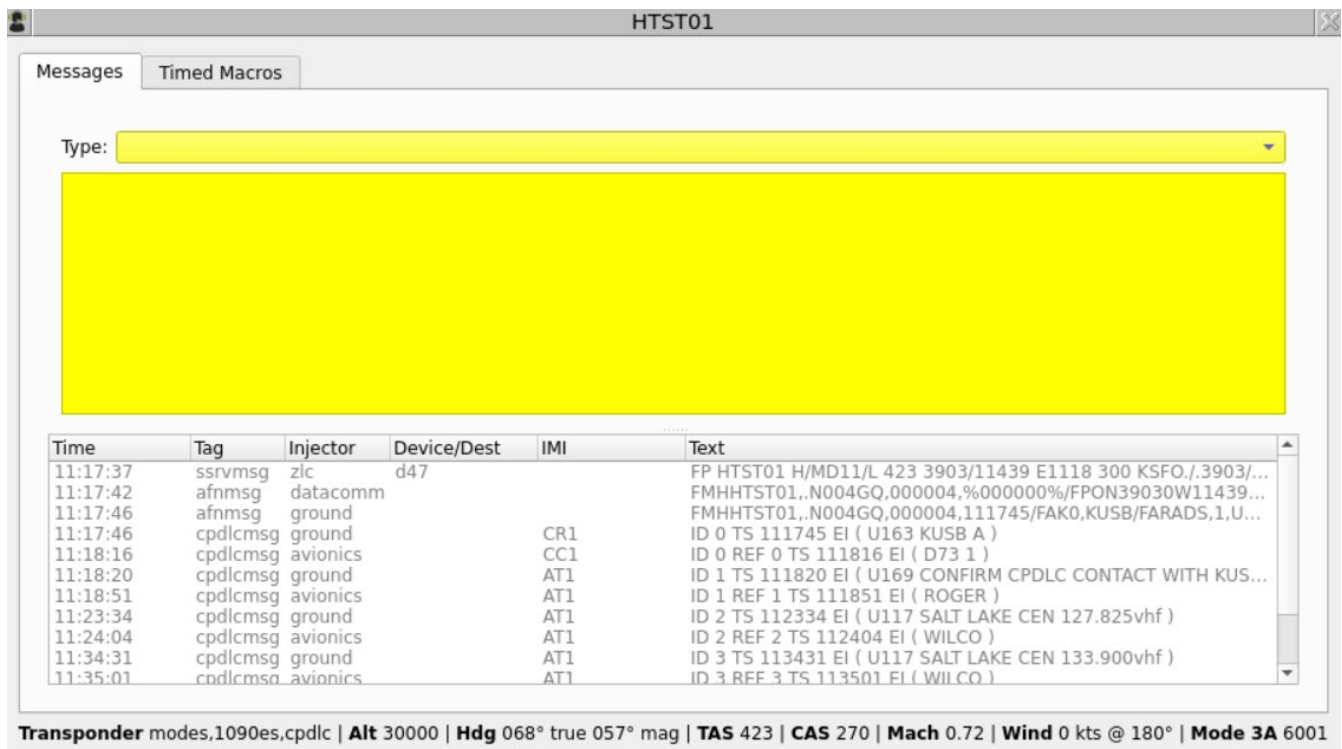
Dump Attributes

Sends all currently applied attributes for the selected target to standard output.

Selection Count

Returns the number of targets currently selected.

Double clicking on an entry in the Active list opens a control dialog for the selected target. The control dialog consists of a Commands tab, a Messages tab, and an information line which displays the current altitude, heading, true air speed, calibrated air speed, Mach, and beacon code for the target. The Commands tab includes a “Save macro” button, a command text box and displays the currently executing and any queued timed commands. The Messages tab includes drop down boxes for selecting RSI, a message type, message source text box(es), a message contents text box and a list of injected and pending messages for the target.



The screenshot shows the 'HTST01' window with the 'Messages' tab selected. The 'Type' dropdown is set to 'Text'. The main area is a large yellow rectangle. Below it is a table of messages:

Time	Tag	Injector	Device/Dest	IMI	Text
11:17:37	ssrvmsg	zlc	d47		FP HTST01 H/MD11/L 423 3903/11439 E1118 300 KSFO./3903/...
11:17:42	afnmsg	datacomm			FMHHTST01..N004GQ,000004,%000000%/FPON39030W11439...
11:17:46	afnmsg	ground			FMHHTST01..N004GQ,000004,111745/FAK0,KUSB/FARADS,1,U...
11:17:46	cpdlcmsg	ground		CR1	ID 0 TS 111745 EI (U163 KUSB A)
11:18:16	cpdlcmsg	avionics		CC1	ID 0 REF 0 TS 111816 EI (D73 1)
11:18:20	cpdlcmsg	ground		AT1	ID 1 TS 111820 EI (U169 CONFIRM CPDLC CONTACT WITH KUS...
11:18:51	cpdlcmsg	avionics		AT1	ID 1 REF 1 TS 111851 EI (ROGER)
11:23:34	cpdlcmsg	ground		AT1	ID 2 TS 112334 EI (U117 SALT LAKE CEN 127.825vhf)
11:24:04	cpdlcmsg	avionics		AT1	ID 2 REF 2 TS 112404 EI (WILCO)
11:34:31	cpdlcmsg	ground		AT1	ID 3 TS 113431 EI (U117 SALT LAKE CEN 133.900vhf)
11:35:01	cpdlcmsg	avionics		AT1	ID 3 REF 3 TS 113501 EI (WILCO)

Transponder modes,1090es,cpdlc | Alt 30000 | Hdg 068° true 057° mag | TAS 423 | CAS 270 | Mach 0.72 | Wind 0 kts @ 180° | Mode 3A 6001

Figure 116. Target Control Dialog Messages Tab



Figure 117. Target Control Timed Macros Tab

5.3.3.2.2. Inactive Tab

Right clicking on an entry in the Inactive list displays the following options:

Target Management

Release now

Activates the target immediately.

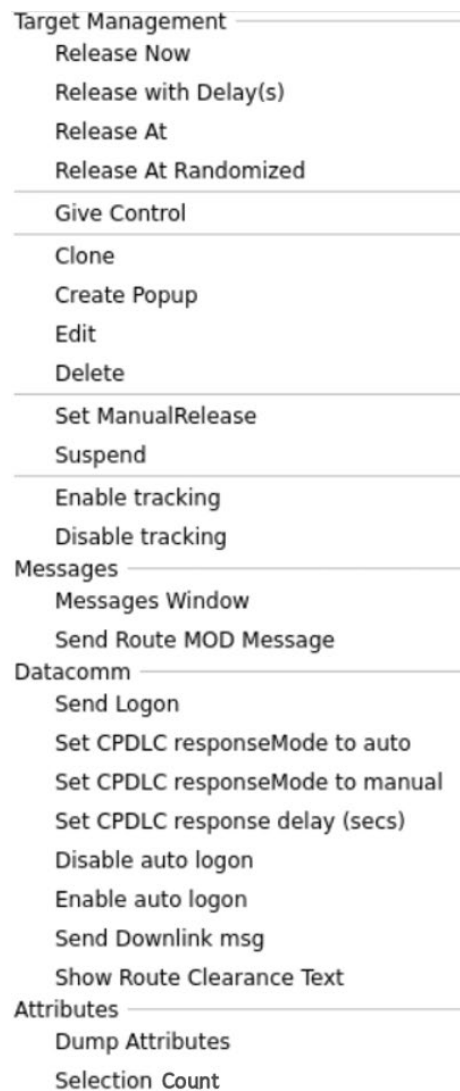


Figure 118. Release Now Menu Option

Release with Delay(s)

Activates the target after the specified amount of time has elapsed.

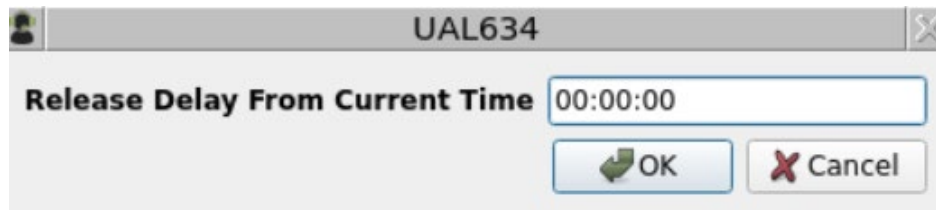


Figure 119. Release with Delay Dialog

Release At

Activates the target at the specified external system time.

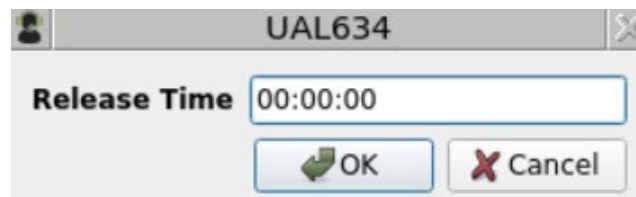


Figure 120. Release at Specified Time Dialog

Release At Randomized

Activates targets at a randomized time after the specified release time.

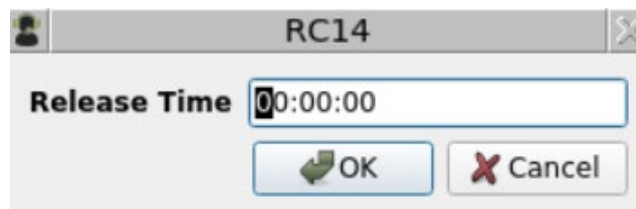


Figure 121. Release at a Randomized

Give Control

Assigns the selected flight to a new pilot position number.

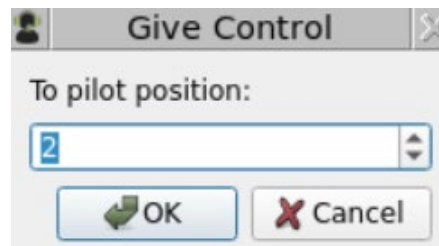


Figure 122. Give Control Dialog

Clone

Opens a Clone dialog and populates the new target with the exact same characteristics as the selected one.

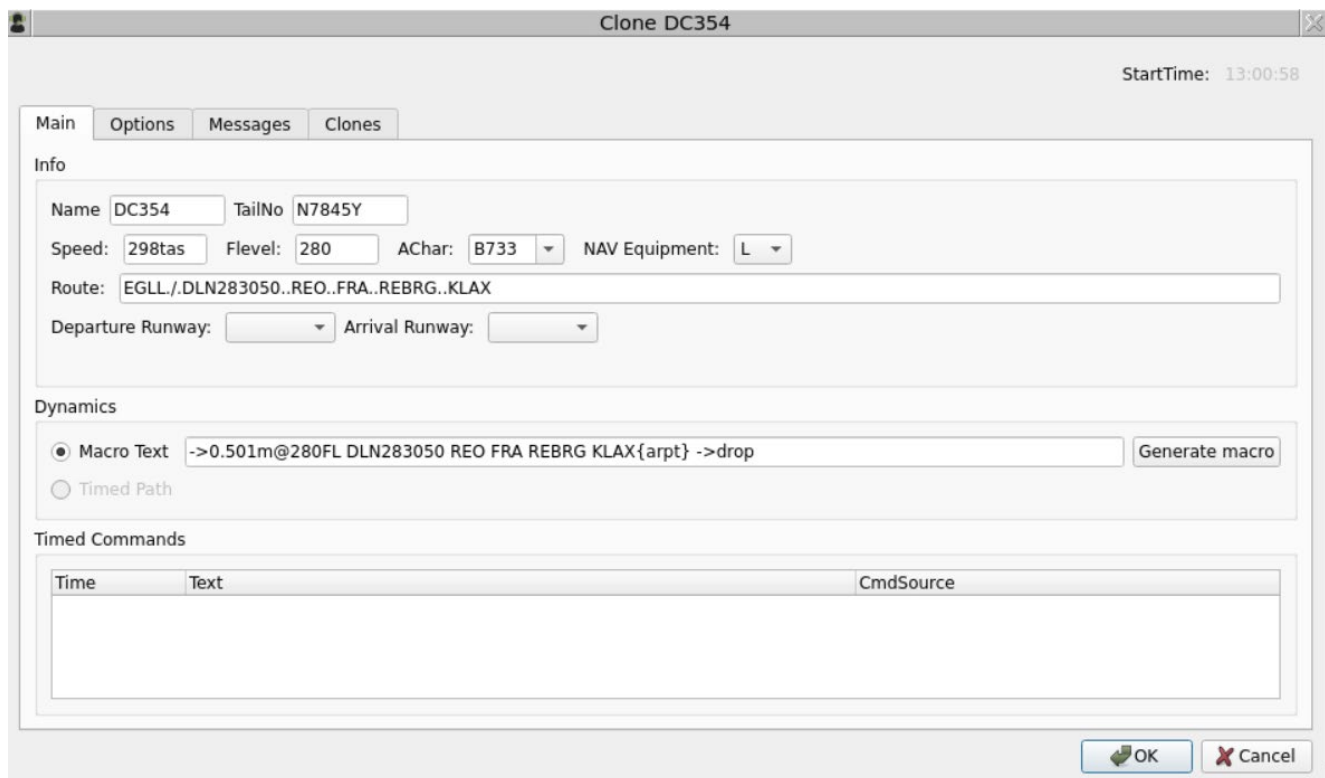


Figure 123. Clone Dialog

Create Popup

Opens a blank dialog for generating a new target. Each yellow field is mandatory to fill out. The Name is the ACID, the TailNo is just the tail number of the flight, the speed is how fast the flight is going in CAS/TAS, the Flevel is the flight level, AChar is the aircraft type, NAV Equipment is the type of equipment on board the aircraft, FP Route is the Flight Plan Route, and Macro appears after selecting Generate macro. The text of the Generate macro button will be red if a macro has not been created. Press the Generate macro button to automatically populate the Macro Text input box with macro commands generated from the contents of the FP Route. Or manually enter macro commands to fly a route that is different from the filed flight plan route.

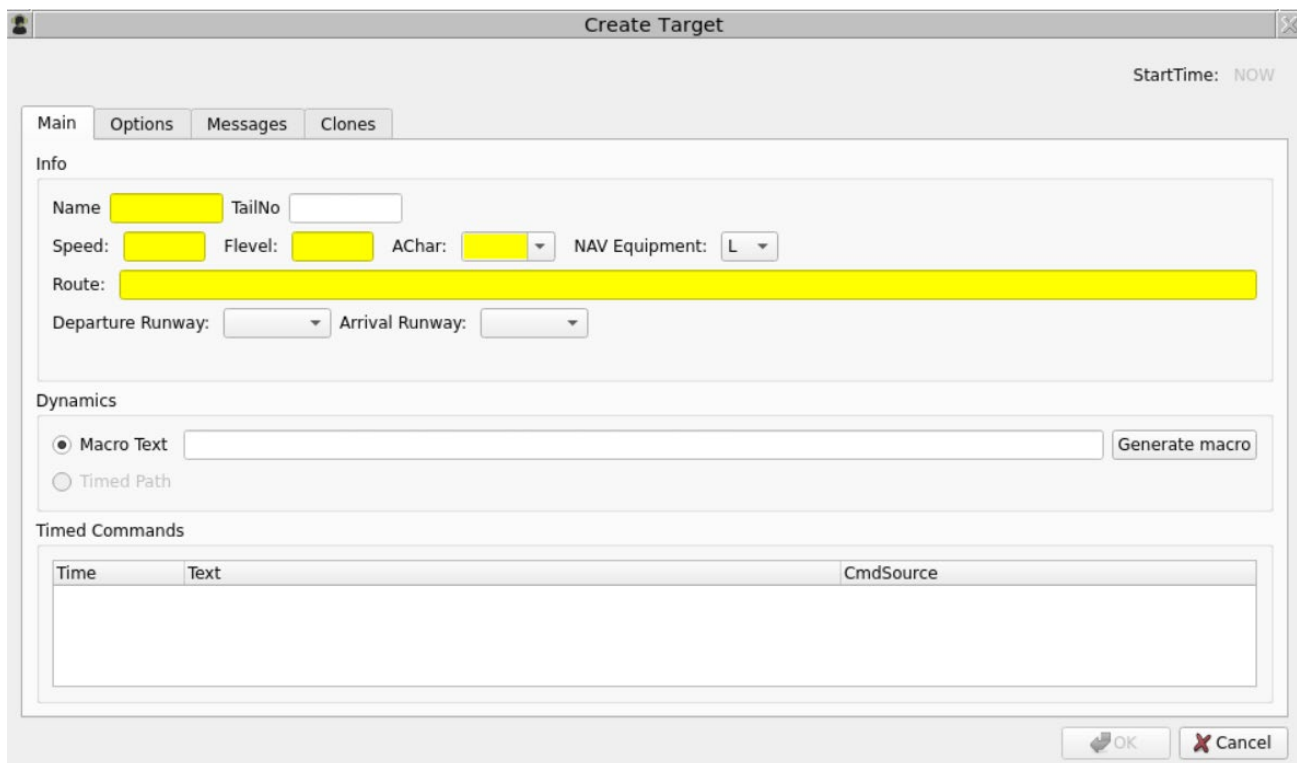
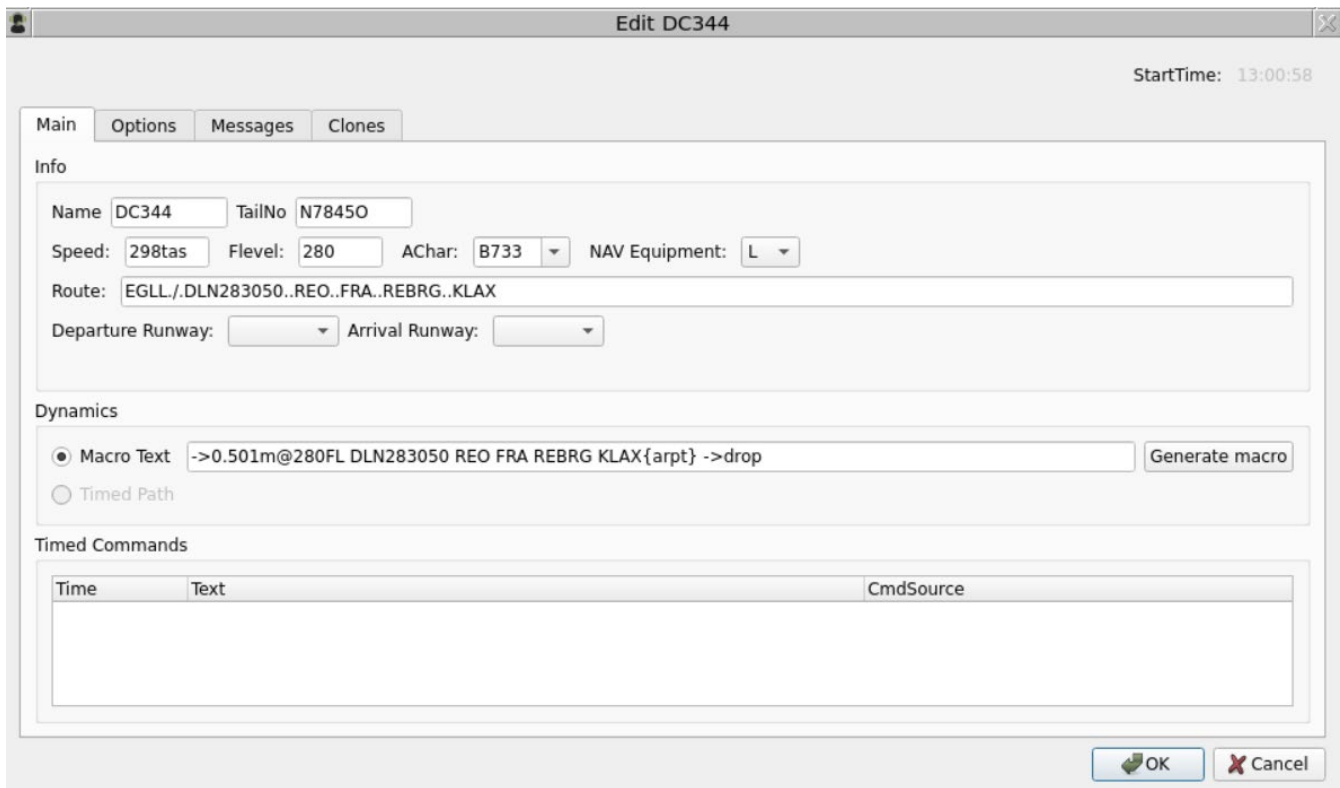


Figure 124. Create Popup Dialog

Edit

Opens a dialog for editing the selected target. Double clicking the target performs the same action as clicking edit.



Edit DC344

StartTime: 13:00:58

Main Options Messages Clones

Info

Name: DC344 TailNo: N78450

Speed: 298tas Flevel: 280 AChar: B733 NAV Equipment: L

Route: EGLL./DLN283050..REO..FRA..REBRG..KLAX

Departure Runway: Arrival Runway:

Dynamics

☒ Macro Text: ->0.501m@280FL DLN283050 REO FRA REBRG KLAX{arpt} ->drop Generate macro

☐ Timed Path

Timed Commands

Time	Text	CmdSource

OK Cancel

Figure 125. Edit Dialog

Delete

Removes the selected target(s) from the current simulation execution and sends the target(s) to the Dropped list.

Set ManualRelease

This will prevent the target from departing at its set release time. Will not depart unless manually released or a departure message is sent.

Suspend

Prevents the target from activating at the scripted injection time. The target may be manually released at another time. Flights in manual mode are highlighted in blue in the Inactive tab.

Disable/Enable tracking

Processes CMS data that simDriver receives if enabled. If disabled, simDriver does not process CMS messages to change target dynamics or generate hand off messages.

If simDriver is configured for TBFM, the following options will be available:



Figure 126. TBFM Options

TBFM -> Release at and send ETD update

Activates the target at the specified external system time and sends a TTP update message.

TBFM -> Release at and send EDCT update

Activates the target at the specified external system time and sends an ET message.

TBFM -> Release at and cancel EDCT

Activates the target at the specified external system time and sends an ET Cancel message.

Messages

Messages Window

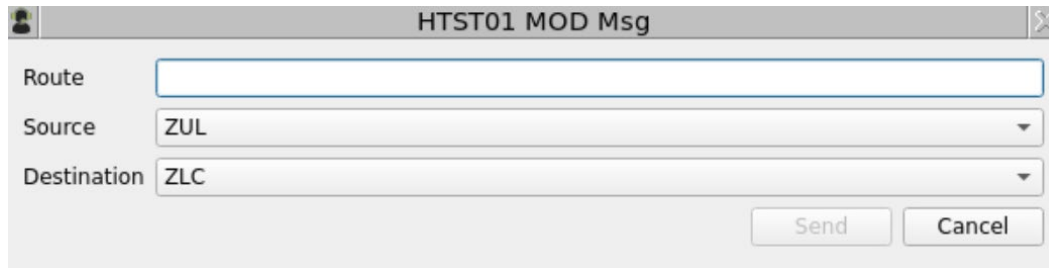
Opens a dialog showing the flight data messages associated with the selected aircraft. Messages that have been injected are displayed in gray. Messages awaiting injection are displayed in blue. Existing messages can be selected and edited, or new messages can be written and injected.



Figure 127. Messages Window

Send Route MOD Message

Displays a MOD message dialog box.



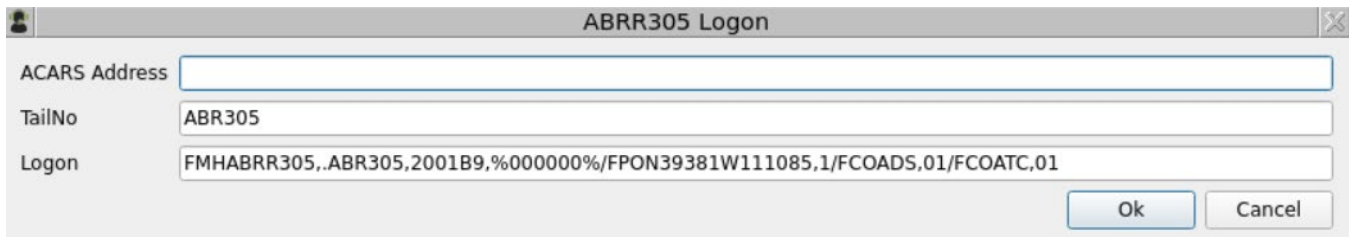
The screenshot shows a dialog box titled "HTST01 MOD Msg". It contains three input fields: "Route" (empty), "Source" (set to "ZUL"), and "Destination" (set to "ZLC"). At the bottom right, there are two buttons: "Send" and "Cancel".

Figure 128. Send a Route Modification Message

Datacomm

Send Logon

Sends a logon to the flight. This logon message is an aircraft logon for CPDLC services. Further, Messages and Attributes are all related to Datacomm.



The screenshot shows a dialog box titled "ABRR305 Logon". It contains three input fields: "ACARS Address" (empty), "TailNo" (set to "ABR305"), and "Logon" (set to "FMHABRR305,,ABR305,2001B9,%000000%/FPON39381W111085,1/FCOADS,01/FCOATC,01"). At the bottom right, there are two buttons: "Ok" and "Cancel".

Figure 129. Send Logon Dialog

Set CPDLC responseMode to auto/manual

Changes flight to auto/manual mode. Auto mode is where everything is automatically processed. Manual mode is where the pilot will have to manually send messages and respond to messages received.

Set CPDLC response delay (sec)

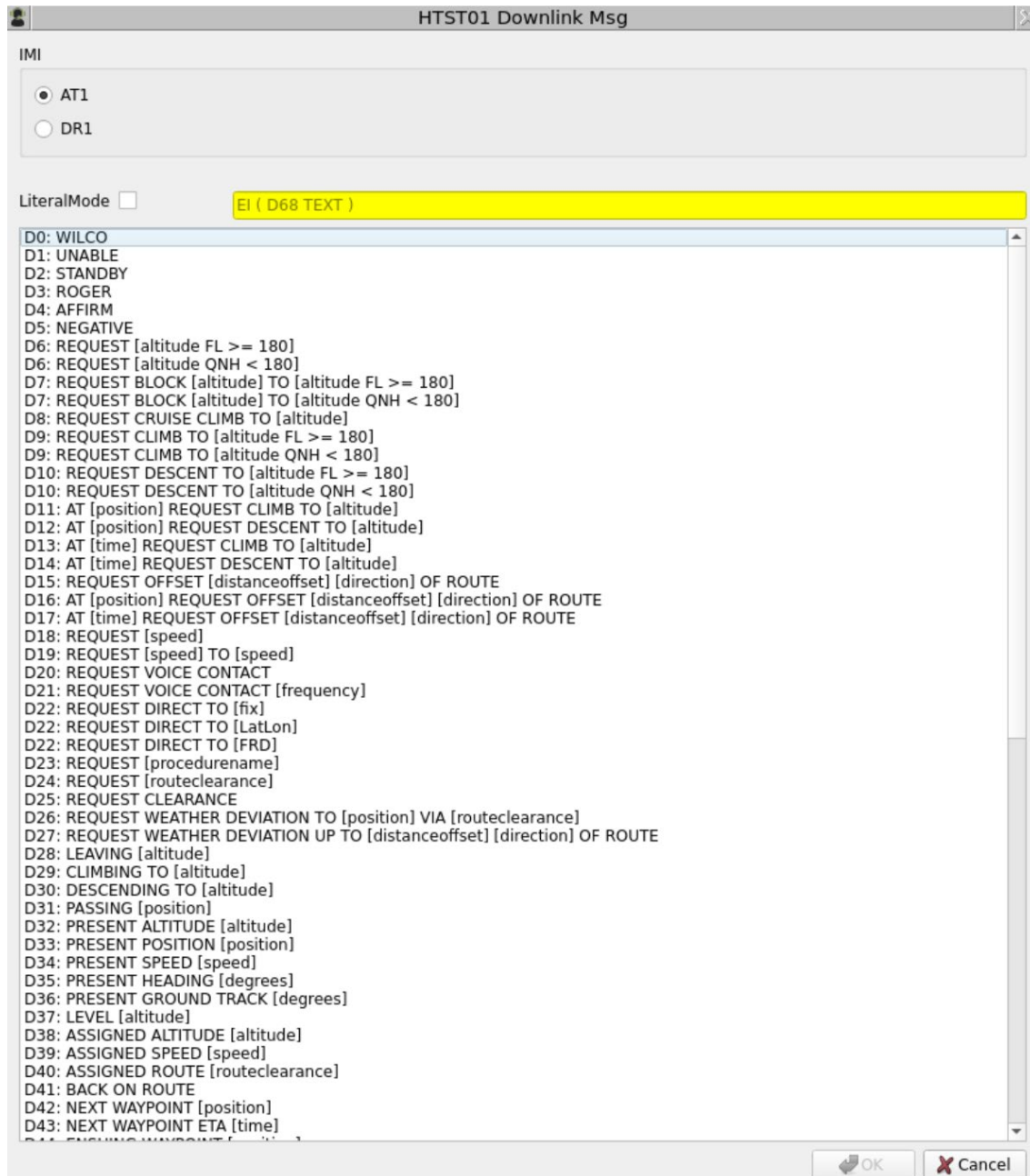
Changes the CPDLC response time to have a delay. This is additional time it will take the aircraft to receive the CPDLC message.

Disable/Enable Auto Logon

Disables and enables auto logons.

Send Downlink msg

Sends a downlink message with one of the selected options listed below.



The screenshot shows a dialog box titled "HTST01 Downlink Msg". It has a tab labeled "IMI". Below the tab, there are two radio buttons: "AT1" (selected) and "DR1". Below these, there is a checkbox labeled "LiteralMode" which is unchecked. To the right of the checkbox is a yellow button labeled "EI (D68 TEXT)". Below these controls is a large list box containing a long list of downlink message options, each starting with a code (D0 through D43) followed by a description. The list is scrollable. At the bottom right of the dialog box, there are two buttons: "OK" and "Cancel".

HTST01 Downlink Msg

IMI

☒ AT1
☐ DR1

LiteralMode ☐ EI (D68 TEXT)

D0: WILCO
D1: UNABLE
D2: STANDBY
D3: ROGER
D4: AFFIRM
D5: NEGATIVE
D6: REQUEST [altitude FL >= 180]
D6: REQUEST [altitude QNH < 180]
D7: REQUEST BLOCK [altitude] TO [altitude FL >= 180]
D7: REQUEST BLOCK [altitude] TO [altitude QNH < 180]
D8: REQUEST CRUISE CLIMB TO [altitude]
D9: REQUEST CLIMB TO [altitude FL >= 180]
D9: REQUEST CLIMB TO [altitude QNH < 180]
D10: REQUEST DESCENT TO [altitude FL >= 180]
D10: REQUEST DESCENT TO [altitude QNH < 180]
D11: AT [position] REQUEST CLIMB TO [altitude]
D12: AT [position] REQUEST DESCENT TO [altitude]
D13: AT [time] REQUEST CLIMB TO [altitude]
D14: AT [time] REQUEST DESCENT TO [altitude]
D15: REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
D16: AT [position] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
D17: AT [time] REQUEST OFFSET [distanceoffset] [direction] OF ROUTE
D18: REQUEST [speed]
D19: REQUEST [speed] TO [speed]
D20: REQUEST VOICE CONTACT
D21: REQUEST VOICE CONTACT [frequency]
D22: REQUEST DIRECT TO [fix]
D22: REQUEST DIRECT TO [LatLon]
D22: REQUEST DIRECT TO [FRD]
D23: REQUEST [procedurename]
D24: REQUEST [route clearance]
D25: REQUEST CLEARANCE
D26: REQUEST WEATHER DEVIATION TO [position] VIA [route clearance]
D27: REQUEST WEATHER DEVIATION UP TO [distanceoffset] [direction] OF ROUTE
D28: LEAVING [altitude]
D29: CLIMBING TO [altitude]
D30: DESCENDING TO [altitude]
D31: PASSING [position]
D32: PRESENT ALTITUDE [altitude]
D33: PRESENT POSITION [position]
D34: PRESENT SPEED [speed]
D35: PRESENT HEADING [degrees]
D36: PRESENT GROUND TRACK [degrees]
D37: LEVEL [altitude]
D38: ASSIGNED ALTITUDE [altitude]
D39: ASSIGNED SPEED [speed]
D40: ASSIGNED ROUTE [route clearance]
D41: BACK ON ROUTE
D42: NEXT WAYPOINT [position]
D43: NEXT WAYPOINT ETA [time]
D44: REQUEST [altitude]

OK Cancel

Figure 130. Send Downlink Message – Part 1

HTST01 Downlink Msg

IMI

☒ AT1
☐ DR1

LiteralMode ☐ EI (D68 TEXT)

D33: PRESENT POSITION [position]
D34: PRESENT SPEED [speed]
D35: PRESENT HEADING [degrees]
D36: PRESENT GROUND TRACK [degrees]
D37: LEVEL [altitude]
D38: ASSIGNED ALTITUDE [altitude]
D39: ASSIGNED SPEED [speed]
D40: ASSIGNED ROUTE [routeclearance]
D41: BACK ON ROUTE
D42: NEXT WAYPOINT [position]
D43: NEXT WAYPOINT ETA [time]
D44: ENSUING WAYPOINT [position]
D45: REPORTED WAYPOINT [position]
D46: REPORTED WAYPOINT [time]
D47: SQUAWKING [beaconcode]
D48: POSITION REPORT [positionreport]
D49: WHEN CAN WE EXPECT [speed]
D50: WHEN CAN WE EXPECT [speed] TO [speed]
D51: WHEN CAN WE EXPECT BACK ON ROUTE
D52: WHEN CAN WE EXPECT LOWER ALTITUDE
D53: WHEN CAN WE EXPECT HIGHER ALTITUDE
D54: WHEN CAN WE EXPECT CRUISE CLIMB TO [altitude]
D55: PAN PAN PAN
D56: MAYDAY MAYDAY MAYDAY
D57: [remainingfuel] OF FUEL REMAINING AND [remainingsouls] SOULS ON BOARD
D58: CANCEL EMERGENCY
D59: DIVERTING TO [position] VIA [routeclearance]
D60: OFFSETTING [distanceoffset] [direction] OF ROUTE
D61: DESCENDING TO [altitude FL >= 180]
D61: DESCENDING TO [altitude QNH < 180]
D62: ERROR [errorinformation]
D63: NOT CURRENT DATA AUTHORITY
D64: [icaoofacilitydesignation]
D65: DUE TO WEATHER
D66: DUE TO AIRCRAFT PERFORMANCE
D67: [freedisplayText] Note: The ATS Provider System peer will assign an urgency of Low for message element [67].
D68: [freedisplayText] Note: The ATS Provider System peer will assign an urgency of Distress for message element [68].
D69: REQUEST VMC DESCENT
D70: REQUEST HEADING [degrees]
D71: REQUEST GROUND TRACK [degrees]
D72: REACHING [altitude]
D73: [versionnumber]
D74: MAINTAIN OWN SEPARATION AND VMC
D75: AT PILOTS DISCRETION
D76: REACHING BLOCK [altitude] TO [altitude]
D77: ASSIGNED BLOCK [altitude] TO [altitude]
D78: AT [time] [distance] [tofrom] [position]
D79: ATIS [atiscode]
D80: DEVIATING [distanceoffset] [direction] OF ROUTE
EMERSYSPID: EMERGENCY PID TEST MESSAGE (D56 MAYDAY MAYDAY MAYDAY) EI (D68 THIS IS A TEST)

OK Cancel

Figure 131. Send Downlink Message – Part 2

Show Route Clearance Text

Displays the route clearance in a popup window.

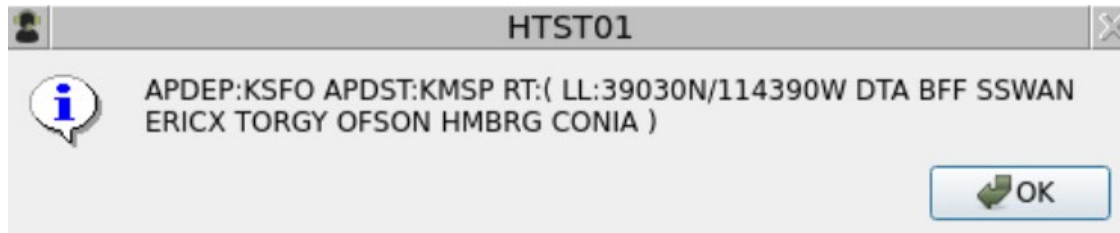


Figure 132. Show Route Clearance Text

Attributes

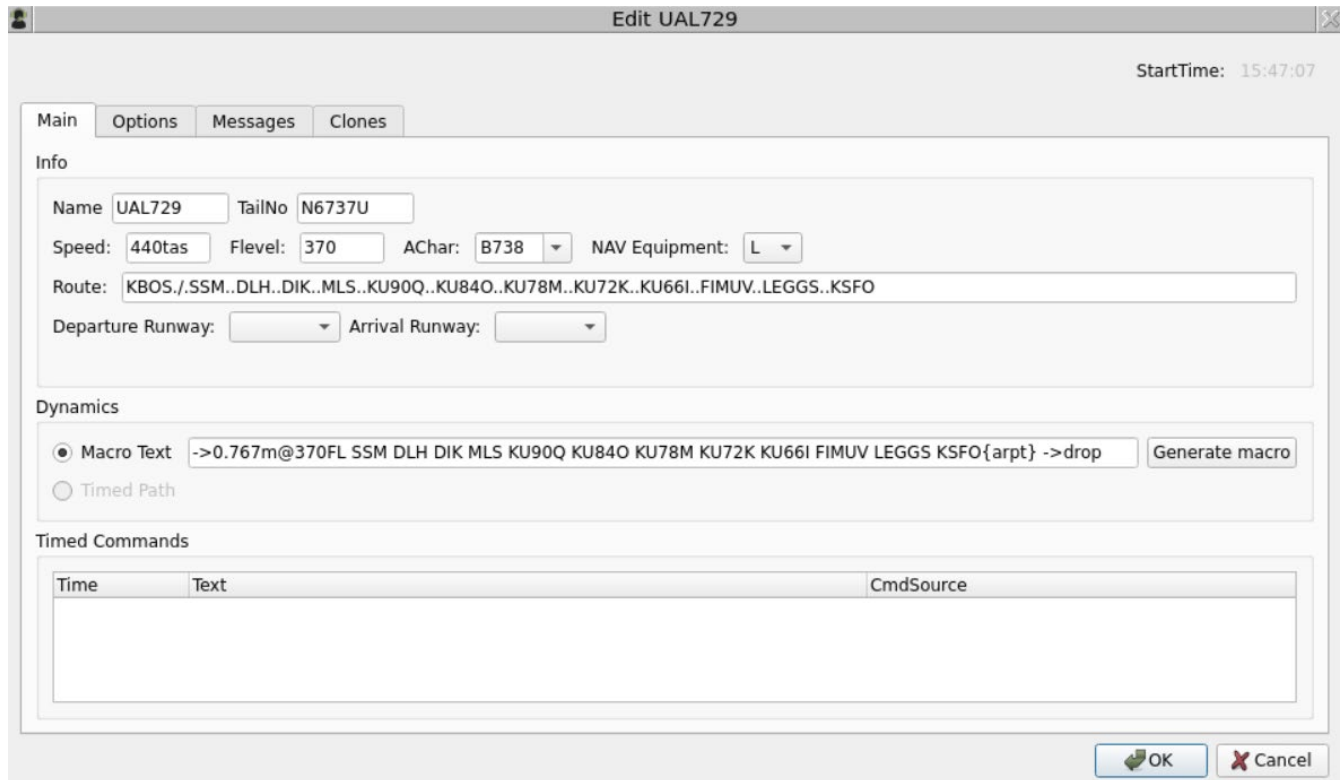
Dump Attributes

Sends all currently applied attributes for the selected target to standard output.

Selection Count

Returns the number of targets currently selected.

Double clicking on an entry in the Inactive tab opens a dialog for editing the selected target.



Edit UAL729 StartTime: 15:47:07

Main Options Messages Clones

Info

Name: TailNo:

Speed: Flevel: AChar: NAV Equipment:

Route:

Departure Runway: Arrival Runway:

Dynamics

☒ Macro Text

☐ Timed Path

Timed Commands

Time	Text	CmdSource

Figure 133. Edit Dialog

5.3.3.2.3.Dropped Tab

Right clicking on an entry in the Dropped tab displays the following option:

Clone

A Clone target dialog is displayed and is populated with the exact same characteristics as the selected one.

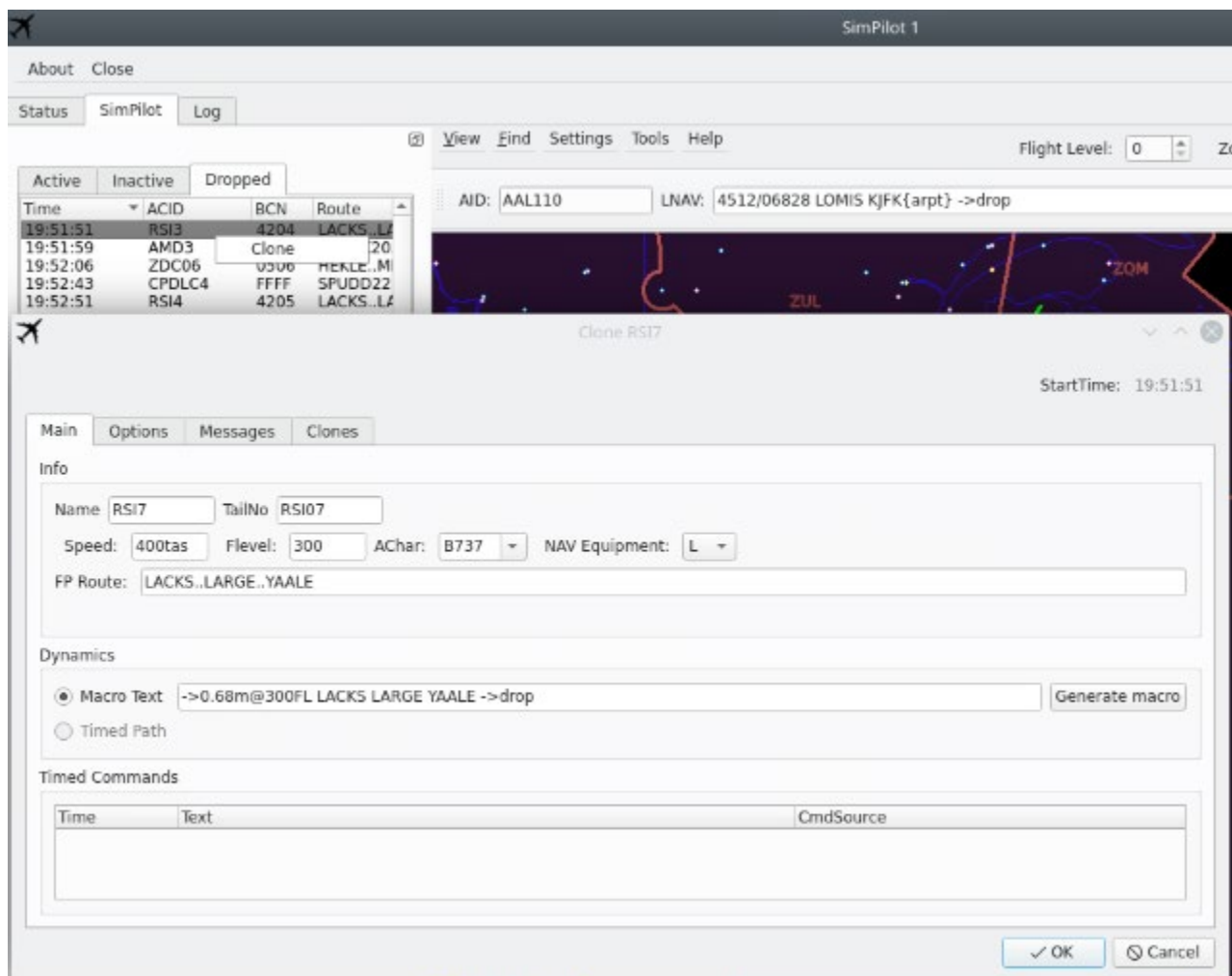


Figure 134. Clone Dialog

5.3.3.2.4. Map View

The right side of the Pilot Tab displays a large map area that includes a menu bar and tool bar along the top and a status or measurement bar (when invoked) along the bottom. The menu bar options are:

View

Clicking on **View** displays submenus that allow selection of airspace elements to be added to the map. These elements include Maps, Airspace, Terminal Airspace Data, ARTCC Name(s) (e.g., ZDV in the figure below), Radars, and External Facilities.

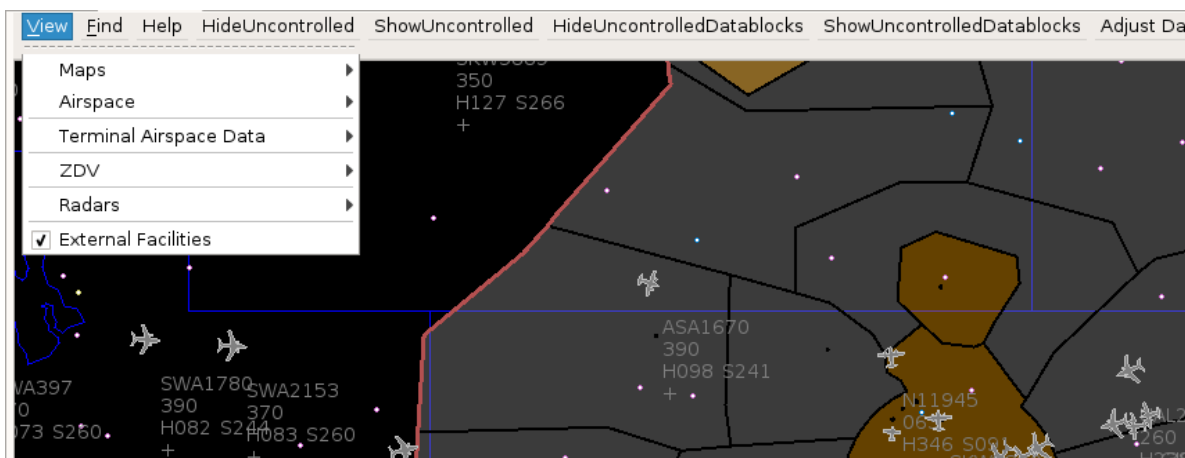


Figure 135. View Menu Option

Maps

The map dropdown includes US Map, Canada, and Mexico.

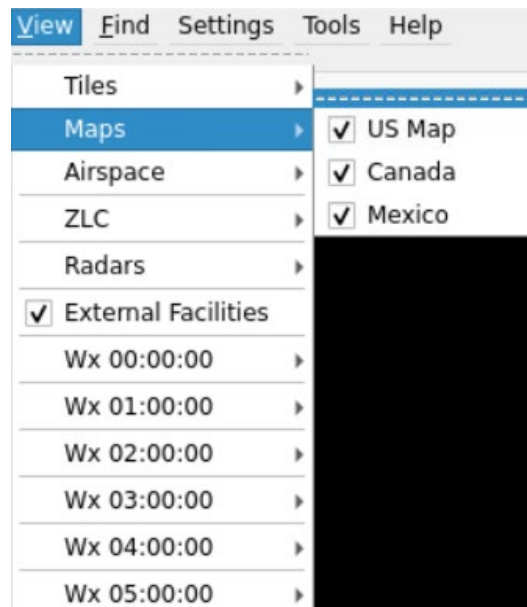


Figure 136. Map View Menu Options

Airspace

The Airspace dropdown includes Fixes, Airports, Airways, DPs, STARs, Coded Routes, ADRs, AARs, ADARs, DLines, Alines, and CONUS. Fixes, Airports, and Airways have dropdowns shown below.

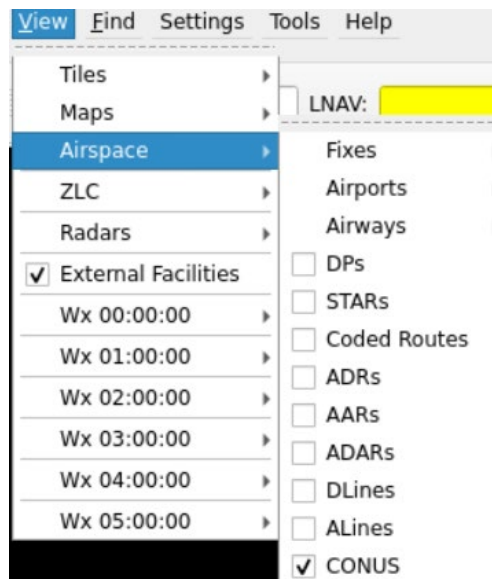


Figure 137. Airspace Menu Options

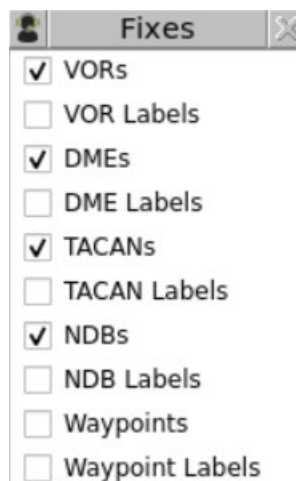


Figure 138. Fixes Menu Options



Figure 139. Airspace Airports View Menu Options



Figure 140. Airspace Airways View Menu Options

DPs

Departure Procedure (turquoise lines and points)

STARs

Standard Terminal Arrival Route (turquoise lines and points)

Coded Routes

adapted routes (heavy tan lines and turquoise points)

ADRs

Adapted Departure Routes (teal lines, gray points, and turquoise points and airports)

AARs

Adapted Arrival Routes (teal lines, gray points, and turquoise points and airports)

ADARs

Adapted Departure/Arrival Routes (teal lines, gray points, and turquoise points and airports)

DLines

lines in the airspace if crossed, the flight is forced onto a ADR (green lines and gray points)

ALines

lines in the airspace if crossed, the flight is forced onto a AAR (green lines and gray points)

CONUS

Adds a red square along the entire border of all the airspace

Terminal Airspace Data

Terminal Airspace Data displays on the map Terminal defined points, airports, and macros including user generated macros.

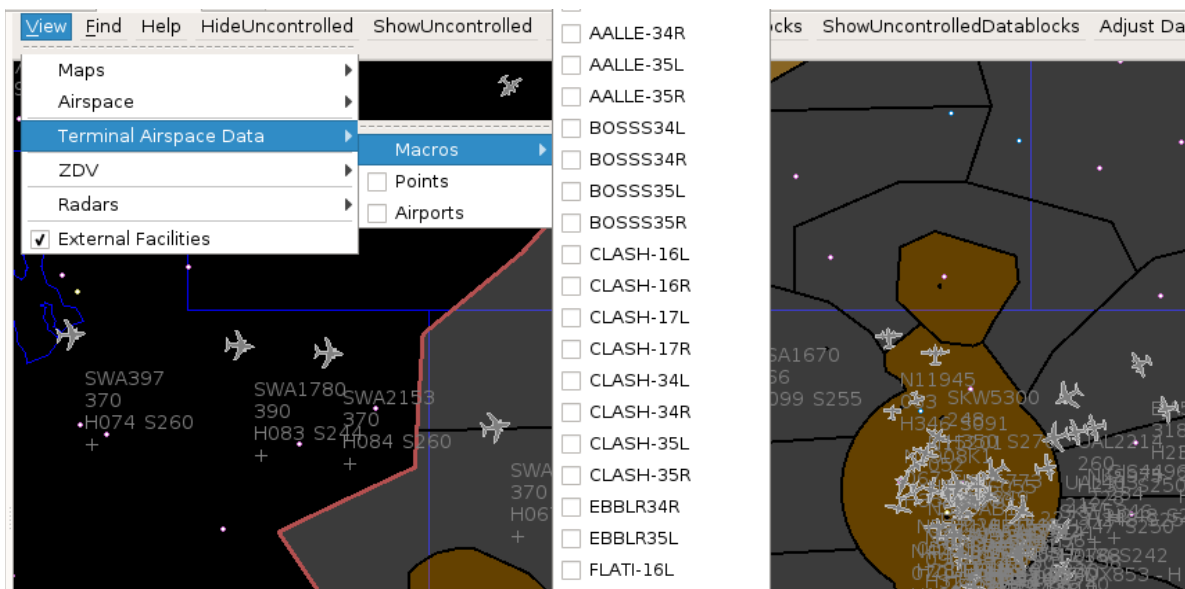


Figure 141. Terminal Airspace Data View Menu Options

En Route Facilities

This option includes FAVs, Boundary, ARTCC Boundaries, FP AOI, Service Volume AOI, Surv AOI, APD Boundary, Surv Sort Cells, TAVs, SAAs, AAVs, Clutter Zone Filters, Geomaps, and Sectors. Geomaps include All on or off, or the individual adapted geomaps (for the selected ARTCC).

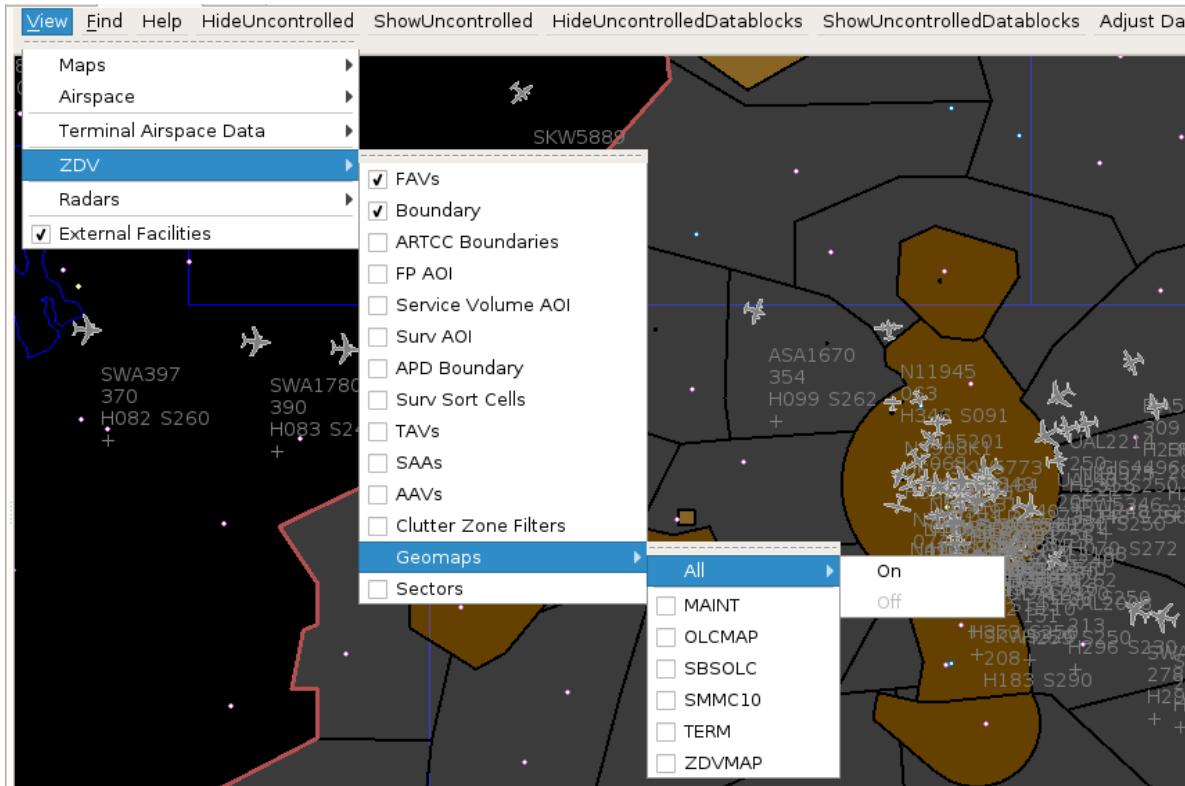


Figure 142. En Route Facility View Menu Options

FAVs

Fixed Airspace Volumes (gray for ARTCC and orange for Terminal airspace)

Boundary

Area of responsibility (AOR) boundary (red line)

ARTCC Boundaries

Boundaries of all ARTCCs (dark red)

FP AOI

Flight Plan (FP) Area of Interest (AOI) boundary (green)

Service Volume AOI

ADS-B Service Volume Area of Interest boundary (blue)

Service Volume Grid

ADS-B Service Volume Grid (teal)

Service Volume Cert Grid

ADS-B Service Volume Grid for Certification (teal)

Surv AOI

Surveillance Area of Interest boundary (teal)

APD Boundary

(yellow)

Surv Sort Cells

Radar Surveillance Sort Cell Grid (green)

TAVs

Terrain Alert Volumes (yellow cross-hatching with red outline)

SAAs

Special Activities Airspace (solid orange lines, with dotted-line buffer area)

AAVs

Aircraft Alert Volumes (purple)

Clutter Zone Filters

(gray)

Geomaps

Contains a submenu with the names of the adapted Geomaps (white)

Sectors

Contains a submenu with the adapted sector plans (blue)

Radars

The Radar submenu lists all adapted radar sites and an option for toggling all radar sites on or off. When a radar site is on, the range is displayed as a circle with a shaded area indicating the coverage area at the selected altitude.

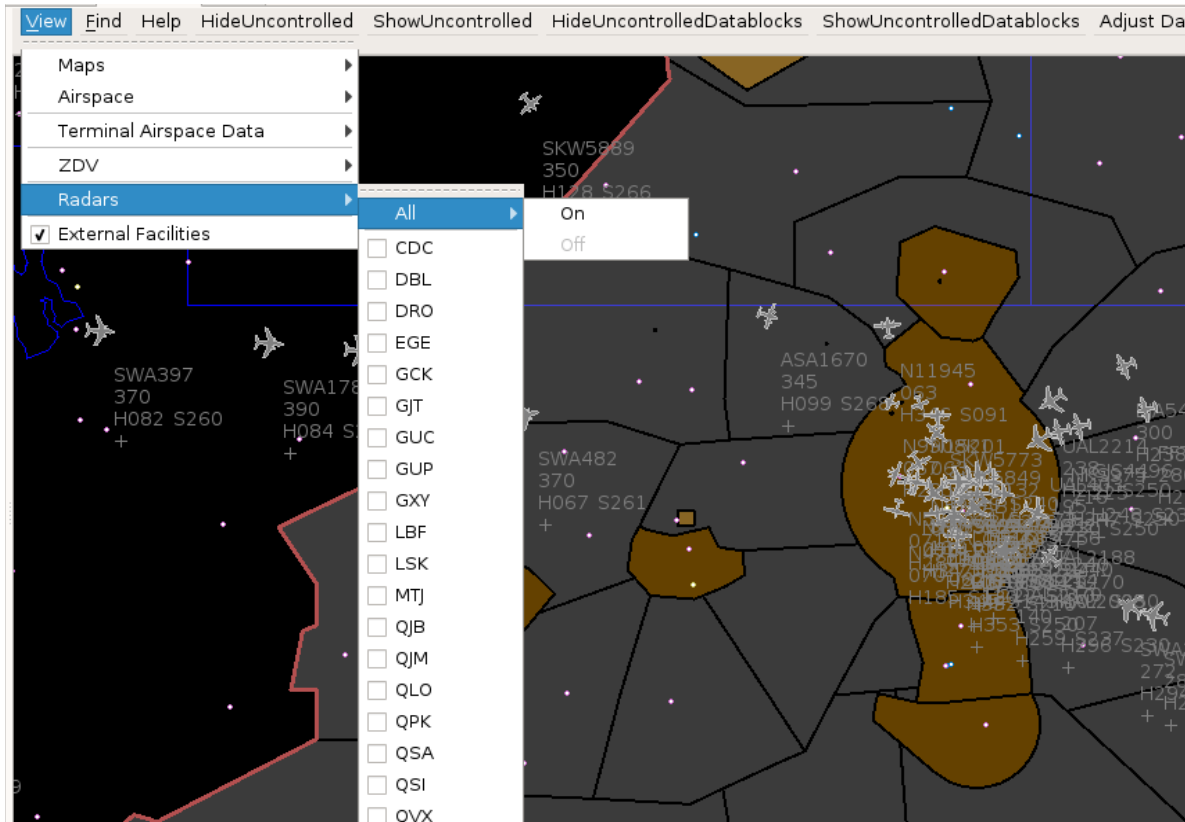


Figure 143. Radars View Menu Options

Find

Clicking on **Find** displays the Find dialog. The Find dialog can be used to search the adaptation for airspace elements by name. When found, the element(s) are added to the map display and a context box is displayed with details about the element.

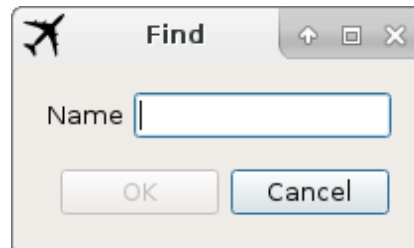


Figure 146. Find Dialog

Help

Clicking on **Help** displays submenus for:

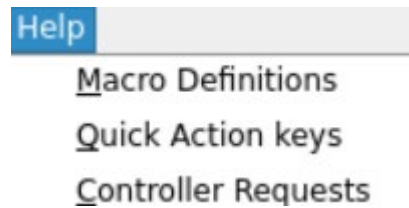


Figure 147. Help Menu

Macro Definitions

Displays a list of available macro commands.



Figure 148. Macro Definitions

Quick Action keys

Displays a list of available keyboard short cuts.

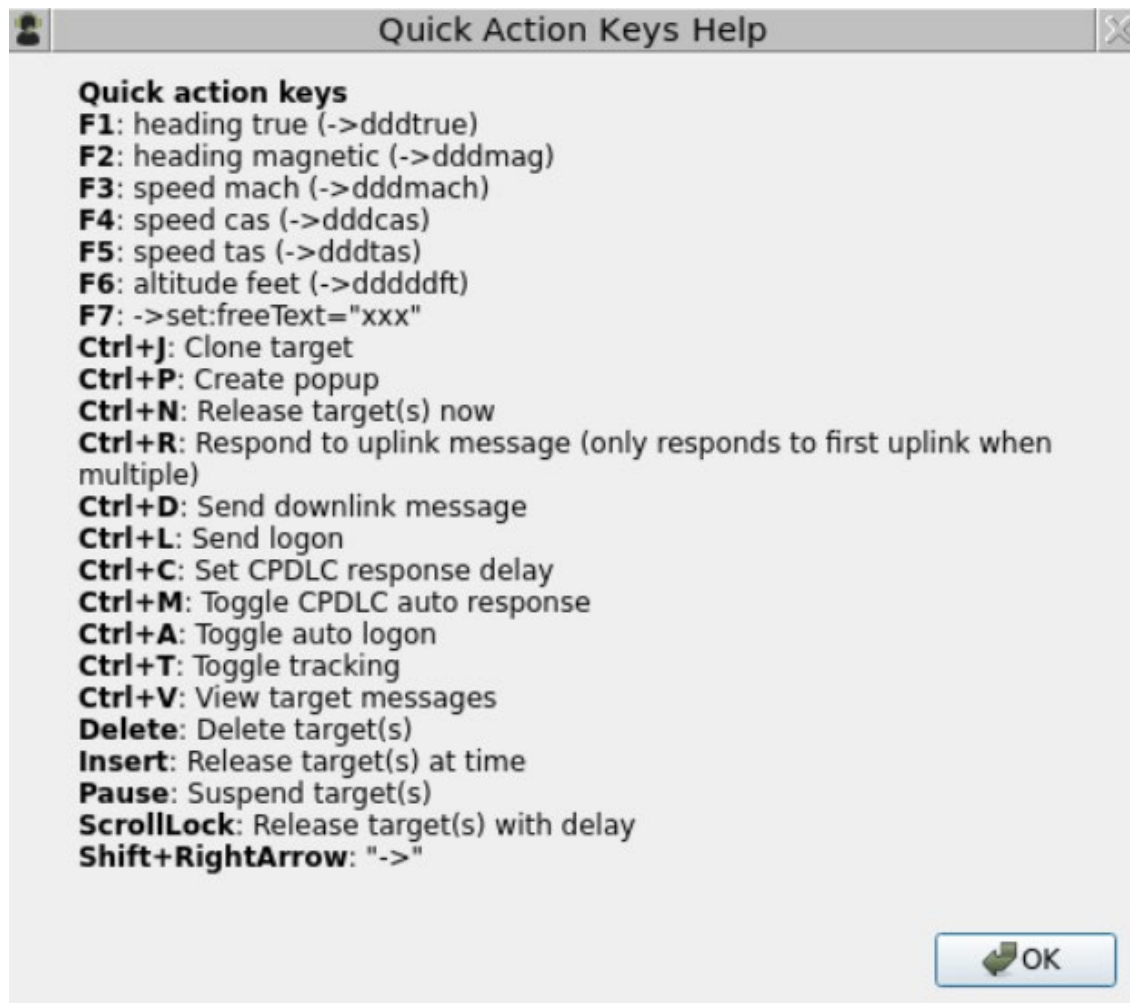


Figure 149. Available Keyboard Shortcuts

Controller Requests

Displays a list of commands available for an ERAM controller to enter via the QS command for entry of free text into the 4th line of a target full datablock.



Figure 150. Controller Request Dialog

Settings

The user may create Preference Sets of SimPilot display maps once all points, routes or macros, map center location, zoom level, and font size for a particular scenario and based on lab configurations. Within the **Settings** menu, the user can Save the Display Setting which generates a user display file. This display file may then be imported into the SimPilot using the Load Display Settings option. The Change Fix Menu Visibility will Show/Hide the pop-up waypoint menu boxes to remove clutter on the screen that may be caused by a large amount of fixes displayed on the map.

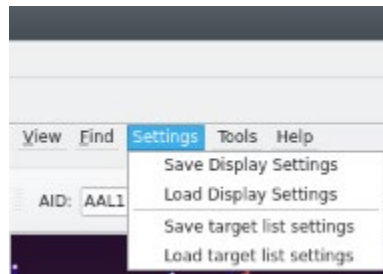


Figure 151: SimPilot – User Display Settings

Tools

Clicking on **Tools** displays the following submenus:



Figure 152. Tools Menu Option

Add live sector

Identifies sector position as having live controller interaction.



Figure 153. Add Live Sector Tools Menu Option

NOTE: Multiple sectors can be added at one time.

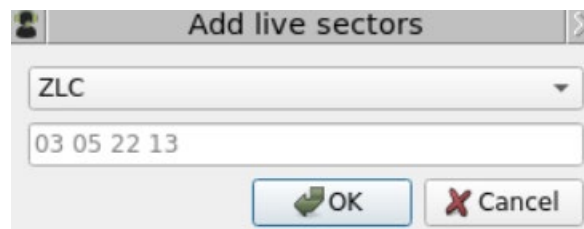


Figure 154. Add Live Sector Dialog

Remove live sector

Removes sector position from list of positions with live controller interaction.



Figure 155. Remove Live Sector Tools Menu Option

NOTE: *Multiple sectors can be removed at one time.*

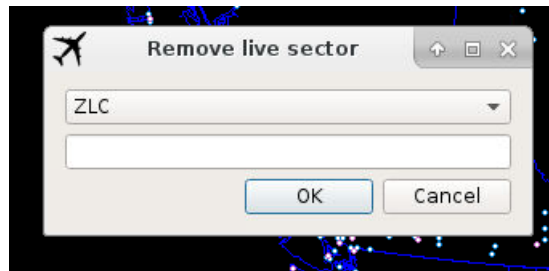


Figure 156. Remove Live Sector Dialog

Display live sectors

Displays all sector positions identified as having live controllers.



Figure 157. Display Live Sectors Tools Menu Option



Figure 158. Display Live Sectors Dialog

Create route clearance

Opens a dialog to enter a route clearance.



Figure 159. Create Route Clearance Tools Menu Option

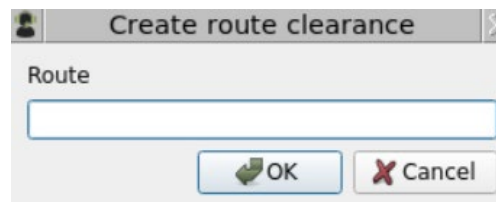


Figure 160. Create Route Clearance Dialog

Unhilit Targets

Removes all highlighted flight paths.

Show / Hide Uncontrolled Targets

The targets on the simPilot display can be hidden or displayed based on pilot position control to reduce clutter. The simPilot program defaults to **ShowUncontrolled** for all targets.

Show / Hide Uncontrolled Datablocks

HideUncontrolledDatablocks leaves all targets on the display but removes the datablocks of targets not under the pilot position's control. **ShowUncontrolledDatablocks** will display target datablocks regardless of pilot position's control status.

Show/Hide Datablocks

Shows/Hides Datablocks on map.

Adjust Datablock Font Size

The size of the target datablocks can be adjusted to the SimPilot user's preference by clicking the **AdjustDatablock Font Size**. Font size can be set between 8pt.-18pt. font size.



Figure 161. Adjust Datablock Font Size Tools Menu Option

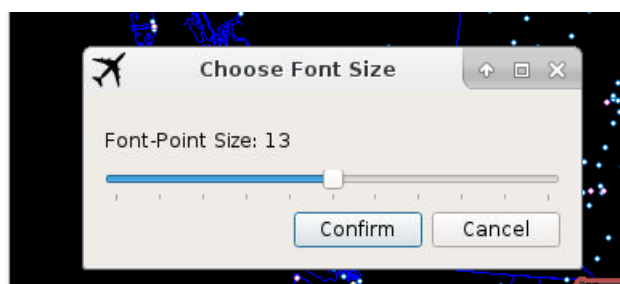


Figure 162. Adjust Datablock Font Size Dialog

Add/Remove Dropshadow

Adds/removes dropshadow from targets and datablocks.

Clear Target Selections

Unhighlights any selected flights.

Flight Level

The **Flight Level** tool allows an altitude to be set either by typing the value into the box or by clicking the up and down arrows. Changing the altitude also changes the sector and facility boundaries that are displayed.



Figure 163. Flight Level

Zoom

The **Zoom** tool allows the range of the display to be adjusted using a wheel selector.



Figure 164. Zoom

Range

The **Range** tool displays the horizontal size (in nmi) of the airspace showing in the map display.



Figure 165. Range

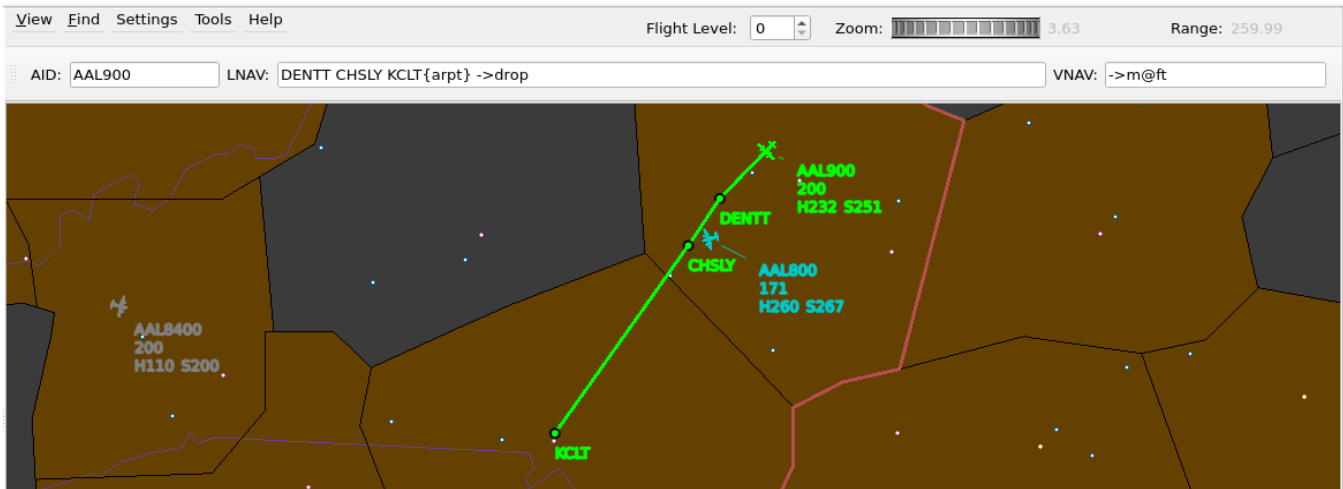


Figure 166. Macro Command Bar

The macro command bar items just above the map are:

AID

Callsign of the selected target.

LNAV

Route macro commands.

VNAV

Altitude and velocity commands.

When an active target is selected, the input text boxes are automatically populated with the current values. The LNAV macro commands are automatically highlighted for overtyping. Allowing the cursor to dwell over the LNAV and VNAV command input text boxes, displays a description of valid command syntax.

5.3.3.2.5. LNAV/VNAV Command Input

The command input text box allows macro commands to be applied to selected active targets. A “Save macro” button is displayed above the command input box to allow often used commands to be saved and made available for recall. A list of macro commands is provided in the table below:

Table 5. Custom Macro Commands

Command	Description
VNAV Commands	
->dddcas	Change the calibrated air speed of the target to the value specified.
->dddcas~dddkt/min	Change the calibrated air speed of the target to the value specified at a given rate of change.
->dddtas	Change the true air speed of the target to the value specified.
->dddtas~dddkt/min	Change the true air speed of the target to the value specified at a given rate of change.
->.ddm	Change the mach speed of the target to the value specified.
->.ddm~dddkt/min	Change the mach speed of the target to the value specified at a given rate of change.
->dddcas@ddddddft or ->dddtas@ddddddft or ->.ddm@ddddddft	Change the speed and altitude of the target to the values specified.
->ddddddft	Change the altitude of the target to the value specified in feet.
->ddddddft~dddd	Change the altitude of the target to the value specified in feet at a given rate of change (in feet per minute).

LNAV Commands

FIXNAME

FIXNAME{attributes}

Attributes:

{arpt}

{rw:dd} or {rw:ddA}

{ils:dd} or {ils:ddA}

{dddddft}

{<dddddft}

{>dddddft}

{dddddftBdddddft}

{dddcas}, {dddtas}, or {.ddm}

{<dddcas}, {<dddtas}, or {<.ddm}

{>dddcas}, {>dddtas}, or {>.ddm}

{rf}{dddmag}{turnDir:A}

Proceed to the fix.

Proceed to the fix and obey additional instructions or restrictions specified as attributes of the fix. Some attributes (such as speed and altitude restrictions) may be combined for the same fix.

On the first fix, auto-apply departure logic; on the last fix, auto-apply top of descent (TOD) restriction. Not valid on other fixes.

In conjunction with {arpt} on departures, use a defined departure procedure for the specified runway.

In conjunction with {arpt} on arrivals, perform an ILS approach to the specified runway. This disables TOD processing.

Cross the fix at the specified restriction altitude.

Cross the fix at or below the specified restriction altitude.

Cross the fix at or above the specified restriction altitude.

Cross the fix between the specified restriction altitudes. Order is of the restriction altitudes is irrelevant.

Cross the fix at the specified restriction speed.

Cross the fix at or below the specified restriction speed.

Cross the fix at or above the specified restriction speed.

Perform a radius to fix turn (in the specified turn direction), exiting the fix at the specified heading.

->ddd[RL]mag

Change the heading of the target to the value specified in degrees from magnetic North or by the right or left offset.

->ddd[RL]mag~ddddeg/sec	Change the heading of the target to the value specified in degrees from magnetic North or by the right or left offset, at a given rate of change.
->ddd[RL>true	Change the heading of the target to the value specified in degrees from true North or by the right or left offset.
->ddd[RL>true~ddddeg/sec	Change the heading of the target to the value specified in degrees from true North or by the right or left offset, at a given rate of change.
->hold	Hold indefinitely with right hand turns and 1 minute leg lengths.
->hold{legTime:dmin}	Hold indefinitely with right hand turns and leg lengths as specified in minutes.
->hold{turnDir:A}	Hold indefinitely with 1 minute leg lengths and left or right hand turns as specified.
->hold{duration:dmin}	Hold with right hand turns and 1 minute leg lengths for the specified amount of time. Once the duration time has expired, complete the current turn and proceed with the remaining route.
->hold{count:d}	Hold with right hand turns and 1 minute leg lengths for the specified number of laps.
->drop	Drop the target.
Mode3A and Mode C Commands	
->Boooo	Set or change the beacon code.
->BE	Enable the Mode 3A beacon.
->BD	Disable the Mode 3A beacon.
->MCE	Enable Mode C.
->MCD	Disable Mode C.
->RADARE	Enable radar detection.

->RADARD	Disable radar detection.
->ADSBE	Enable ADSB detection.
->ADSBD	Disable ADSB detection.
Target Attributes	
->set:autoLogon=d	Set the autoLogon attribute to 0, off, or 1, on.
->set:cpdlcResponseMode=<mode>	Set the cpdlcResponseMode attribute to manual or auto.
->set:cpdlcResponseDelay=ddd	Set the cpdlcResponseDelay attribute to the specified number of seconds.
->set:script=name	Set the script attribute to the specified script name.
->set:tdls=name	Set the tdls attribute to the specified TDLS name.
->set:disableTracker=d	Set the disableTracker attribute to 1, disabled, or 0, enabled.
->set:freeText=text	Set the freeText attribute to the specified text. This appears in the datablock of the target.
->set:taAcceptDelta=-1	Set the flight to not automatically accept handoffs.
->set:rtaResponse="NO REPLY,-1"	Flight will ignore handoff request.
->set:rtaResponse="NO REPLY,-1"	Flight will ignore handoff accept.
->set:rtaResponse="LRM,10,57/00/INVALID MESSAGE"	Flight will respond to handoff request with Logical Reject Message.
->set:tuDisable=1	Flight will not send TRAC update messages when in handoff state.
->set:tuOffset=10,10	TRAC update messages will add this offset to their position messages.
->clear:<attribute>	Clear the target attribute specified.
->IDENT	Sets IDENT to highlight the aircraft on the ERAM R position display.

NOTE: An ‘a’ indicates an alphabetic character, ‘d’ indicates decimal digits, ‘o’ indicates octal digits, and ~ indicates a rate of change.

5.3.3.2.6.Context Boxes

Holding down the **SHIFT** key and right clicking on any airspace item (such as a Fix, Airport, or FAV) will cause a context box to be displayed. A context box displays information about the airspace item. The contents of each context box depend on the type of item selected and may contain a menu that includes additional data for the selected item.

A context box can be closed by right clicking again on the item, or by selecting the X button of the context box window.

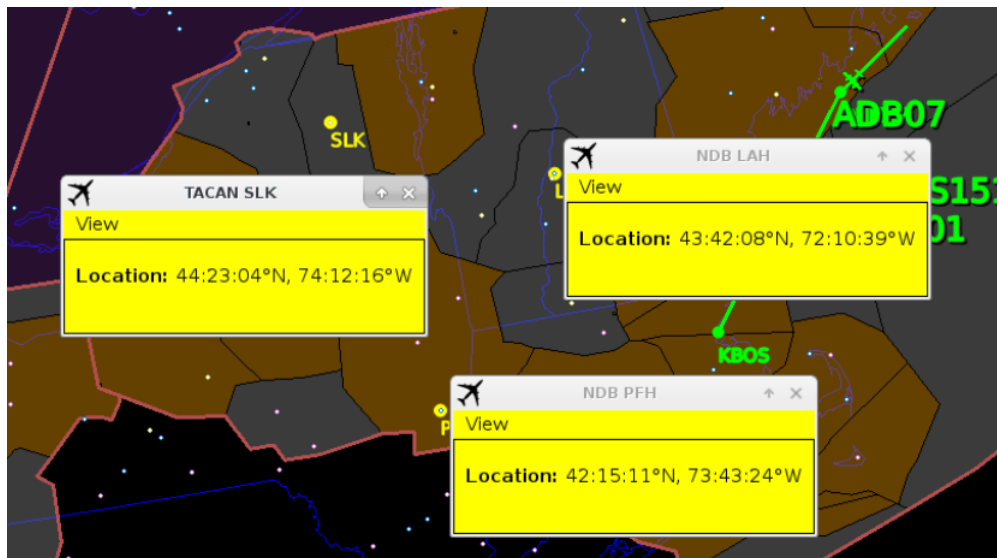


Figure 167. Context Boxes

5.3.3.2.7.Status Bar

The Status Bar, also referred to as the Measurement Bar, located on the bottom of the main window is used to display measurement information from the map. The bar is automatically displayed and updated upon user action that triggers the measurement information.

To display lat/lon and X/Y system coordinates at any specific point, hold down the **SHIFT** key while mouse clicking in any particular location on the map. Holding down the **SHIFT** key and left click dragging the mouse will display spherical distance in nmi, heading, both true and magnetic, and delta X/Y system coordinates.

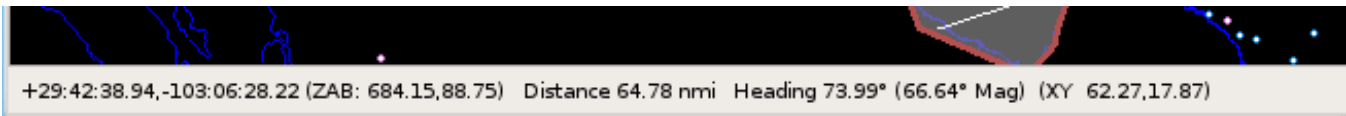


Figure 168. Status Bar

5.3.3.3. Log Tab

The Log tab displays a list of flight data messages associated with the targets under the control of the simPilot position.

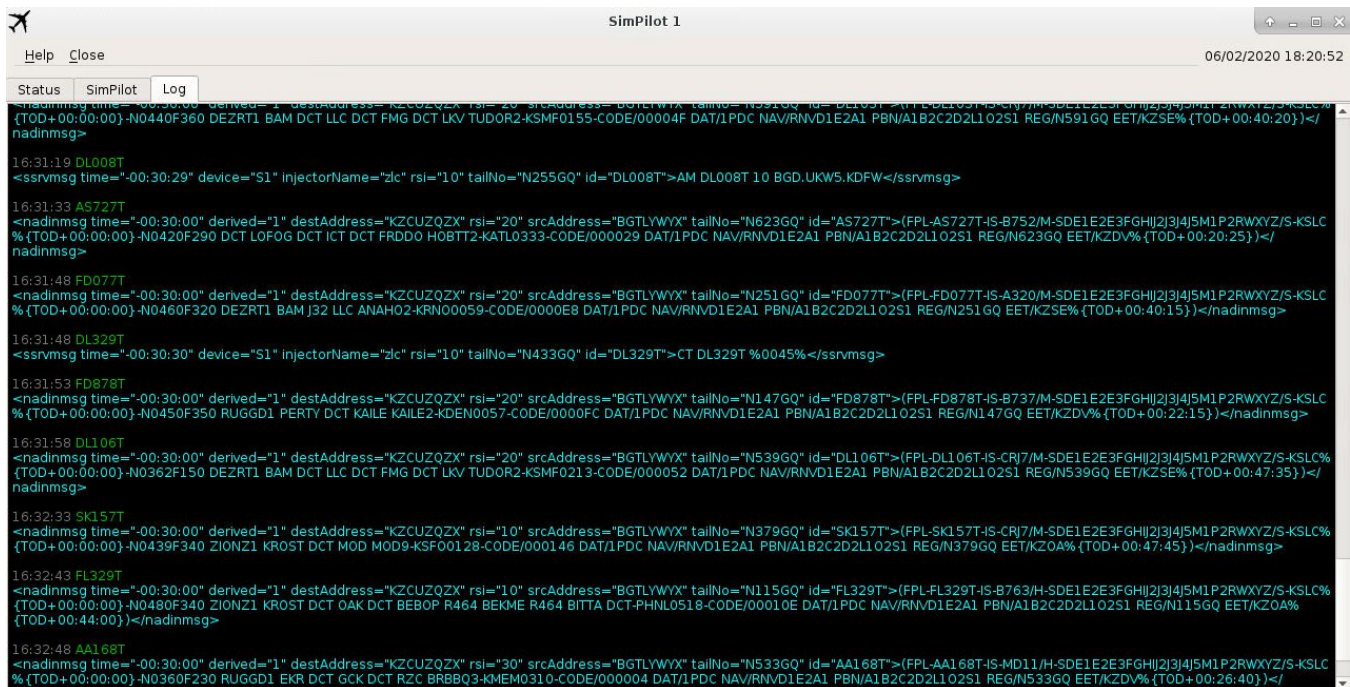


Figure 169. Log Tab

6. surfaceDriver

The surfaceDriver executable generates target positions dynamically during scenario execution for flights on the surface of the airport. Departing flights are simulated to back away from a gate and proceed to the selected runway. Arriving flights are simulated to move from the selected runway to a gate. Gates and runways can be assigned in GSGT or in simDriver. Flights that have gate and runway assignments are automatically transferred between simDriver and surfaceDriver at the point of takeoff or touchdown.

6.1. Starting surfaceDriver

Start the surfaceDriver executable from the command line while inside the desired scenario directory created with the GSGT. To launch surfaceDriver with basic parameters, enter:

```
> surfaceDriver --arpt=<icao airport name> --tgtDev=tcp://<sdr_address>:<port#>  
--dysimDevice=tcp://<simDriver_address>:<port#>
```

Other optional parameters may be specified. For example:

```
> surfaceDriver --arpt=<icao airport name> --tgtDev=tcp://<sdr_address>:<port#>  
--dysimDevice=tcp://<simDriver_address>:<port#> --nofullscreen --nologfile
```

To launch a version of simDriver that is not the default version, enter:

```
> /usr/local/jvn.x.x.x/bin/surfaceDriver --arpt=<icao airport name>  
--tgtDev=tcp://<sdr_address>:<port#> --dysimDevice=tcp://<simDriver_address>:<port#>
```

NOTE: The surfaceDriver executable must be started from a command line while inside the scenario directory.

6.2. Command Line Options

The surfaceDriver executable can be started with various options which control its operation. Typing the surfaceDriver -h will show the following arguments:

Table 6. Program Parameters

Parameter	Description
--tgtDev=tcp://<sdr_address>:<port#>	Directs surfaceDriver to send target positions to SDRR at the named address & port. SDRR must be started with the corresponding parameter.
--dysimDevice=tcp://<dysim_address>:<port#>	Directs surfaceDriver to connect to the address and port where the DYSIM executable simDriver will output simulation messages and target details. The DYSIM executable must be started with the corresponding parameter identifying the same port number.
--nofullscreen	Not full screen mode; surfaceDriver will be started in a window roughly half the size of the screen.
--start	This starts the scenario immediately on launch.
--preview	Previews the scenario.
--logfile=<filename>	Specify log file name.
--nologfile	No log file will be written.
--proxy=http://<server>:<port#>	Sets up a proxy server for mapTiles.
--help	Display application parameters.

6.3. surfaceDriver GUI

The surfaceDriver Graphical User Interface (GUI) is composed of a main menu bar, date and time clock, and display tabs. The times are displayed in UTC.

6.3.1. Menu Bar

The menu bar includes the following options:

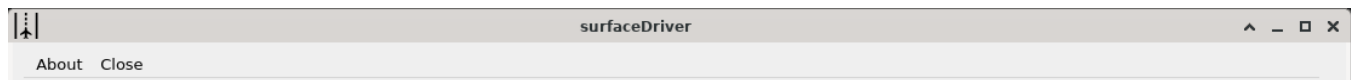


Figure 170. surfaceDriver Menu Bar

About

Displays the About simDriver dialog which shows the version of simDriver, and the date and time that the simDriver executable was built.

Close

Stops the scenario execution and closes the simDriver GUI. When 'Close' is selected, the warning below is displayed. Selecting 'Yes' exits the GUI; selecting 'No' closes the warning and returns to the GUI.

6.3.2. Date and Time Clock

When a scenario is running, the scenario date and time are displayed in the upper right corner.

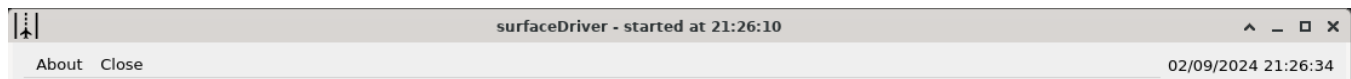


Figure 171. surfaceDriver Run Clock

6.3.3. Display Tabs

The display tabs are Status, Dysim, and Log. Right clicking in the text area of a display tab launches a pop-up with the following options:

Copy

Places any selected text into the copy buffer.

Select All

Selects all the text in the current display tab message log area.

Find

Opens a search bar at the bottom of the current display tab message log area.

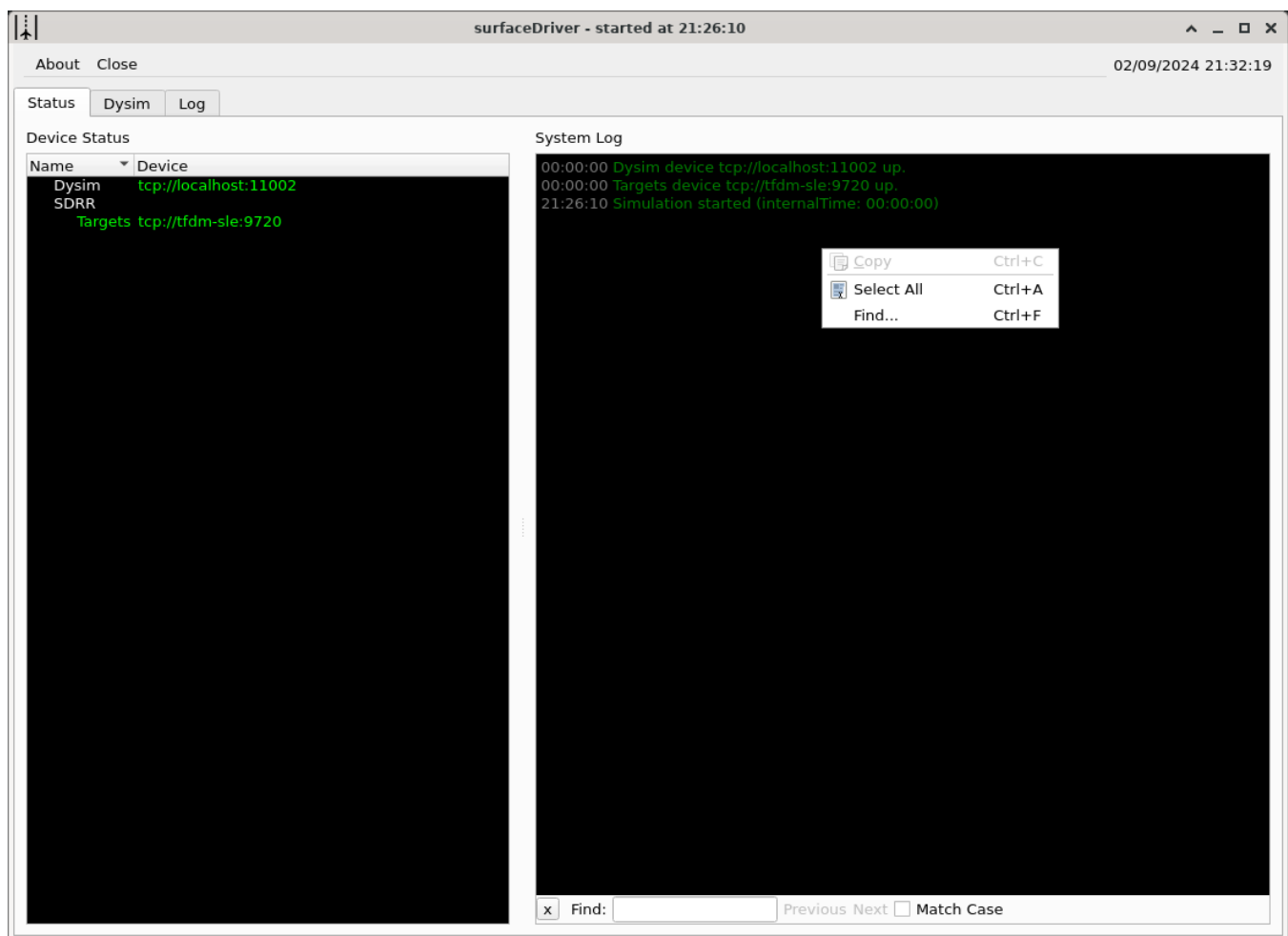


Figure 172. Message Area Text Options

6.3.3.1. Status Tab

The status display tab is separated into two parts. The left side shows the Device Status. All devices connected to surfaceDriver are listed and color coded to indicate connection status. The red indicates that the connection has yet to be established. The yellow indicates that there is at least one connection made. The green indicates that the connection has been fully established. The right side contains a System Log where all system messages, such as status, warnings and errors are displayed.

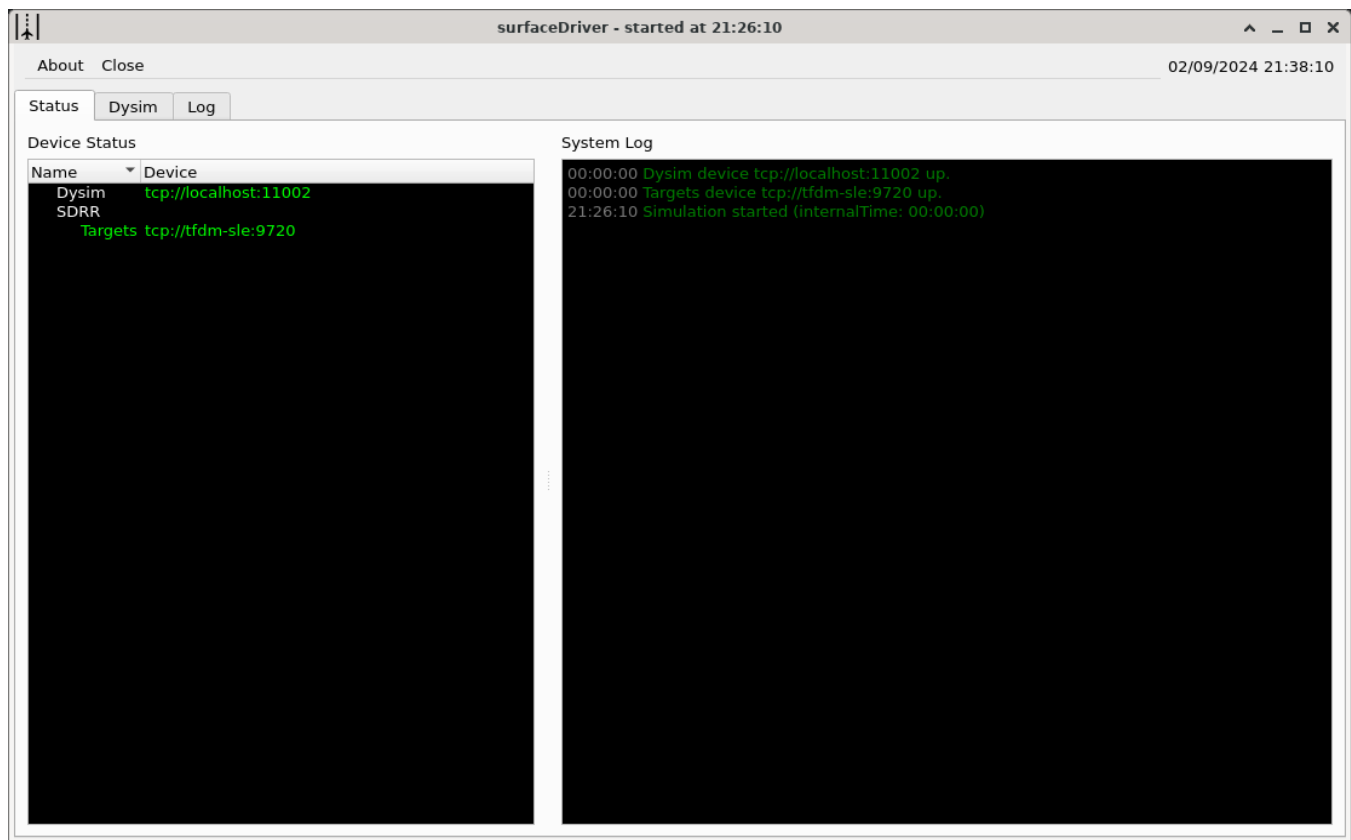
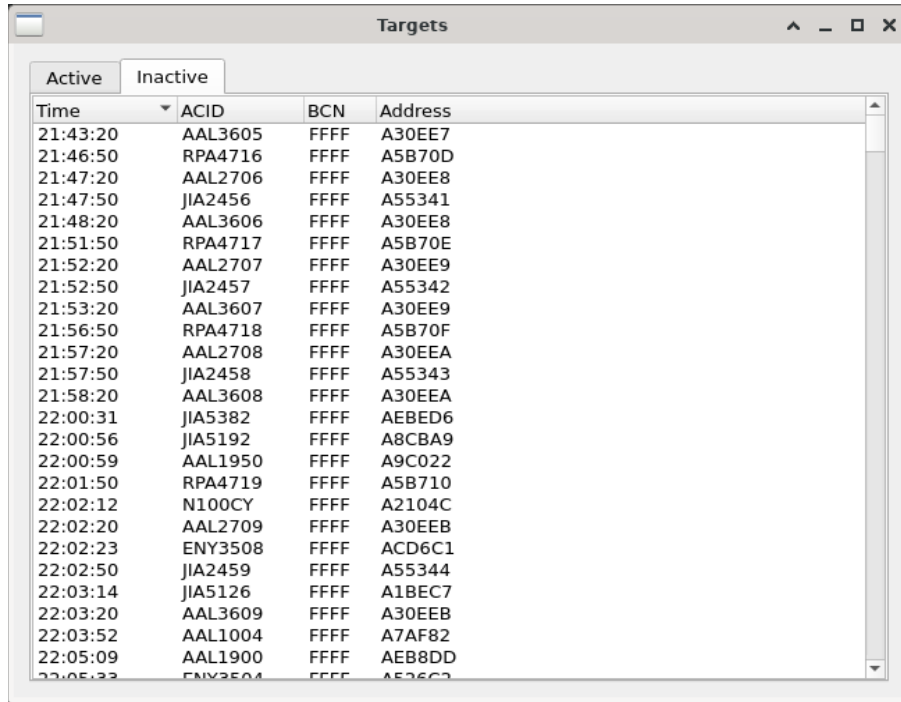


Figure 173. surfaceDriver Status Tab



Time	ACID	BCN	Address
21:43:20	AAL3605	FFFF	A30EE7
21:46:50	RPA4716	FFFF	A5B70D
21:47:20	AAL2706	FFFF	A30EE8
21:47:50	JIA2456	FFFF	A55341
21:48:20	AAL3606	FFFF	A30EE8
21:51:50	RPA4717	FFFF	A5B70E
21:52:20	AAL2707	FFFF	A30EE9
21:52:50	JIA2457	FFFF	A55342
21:53:20	AAL3607	FFFF	A30EE9
21:56:50	RPA4718	FFFF	A5B70F
21:57:20	AAL2708	FFFF	A30EEA
21:57:50	JIA2458	FFFF	A55343
21:58:20	AAL3608	FFFF	A30EEA
22:00:31	JIA5382	FFFF	AEBED6
22:00:56	JIA5192	FFFF	A8CBA9
22:00:59	AAL1950	FFFF	A9C022
22:01:50	RPA4719	FFFF	A5B710
22:02:12	N100CY	FFFF	A2104C
22:02:20	AAL2709	FFFF	A30EEB
22:02:23	ENY3508	FFFF	ACD6C1
22:02:50	JIA2459	FFFF	A55344
22:03:14	JIA5126	FFFF	A1BEC7
22:03:20	AAL3609	FFFF	A30EEB
22:03:52	AAL1004	FFFF	A7AF82
22:05:09	AAL1900	FFFF	AEB8DD
22:05:23	ENY3504	FFFF	A55343

Figure 175. Dysim Tab Targets View

The Targets View tabs list details for active and inactive targets. The target lists can be sorted by clicking on the any of the column headers.

Time

This is the time that the target was or will be activated. This value could also show the status HOLD. A HOLD time means that the flight was suspended or set for manual release and will require further action to activate. Right clicking on an inactive flight displays the options: release now, release with delay(s), and release at.

ACID

Aircraft identification callsign. The callsign is made up of a minimum of two and a maximum of seven letters/numbers. The first character must be a letter.

BCN

Beacon code. The beacon code must be four octal digits. A beacon code of FFFF signifies that a beacon code has not been assigned to the aircraft.

Address

ICAO address. The ICAO address is six alphanumeric characters.

6.3.3.2.1.Active Tab

Right clicking on an entry in the Active tab displays the following options:

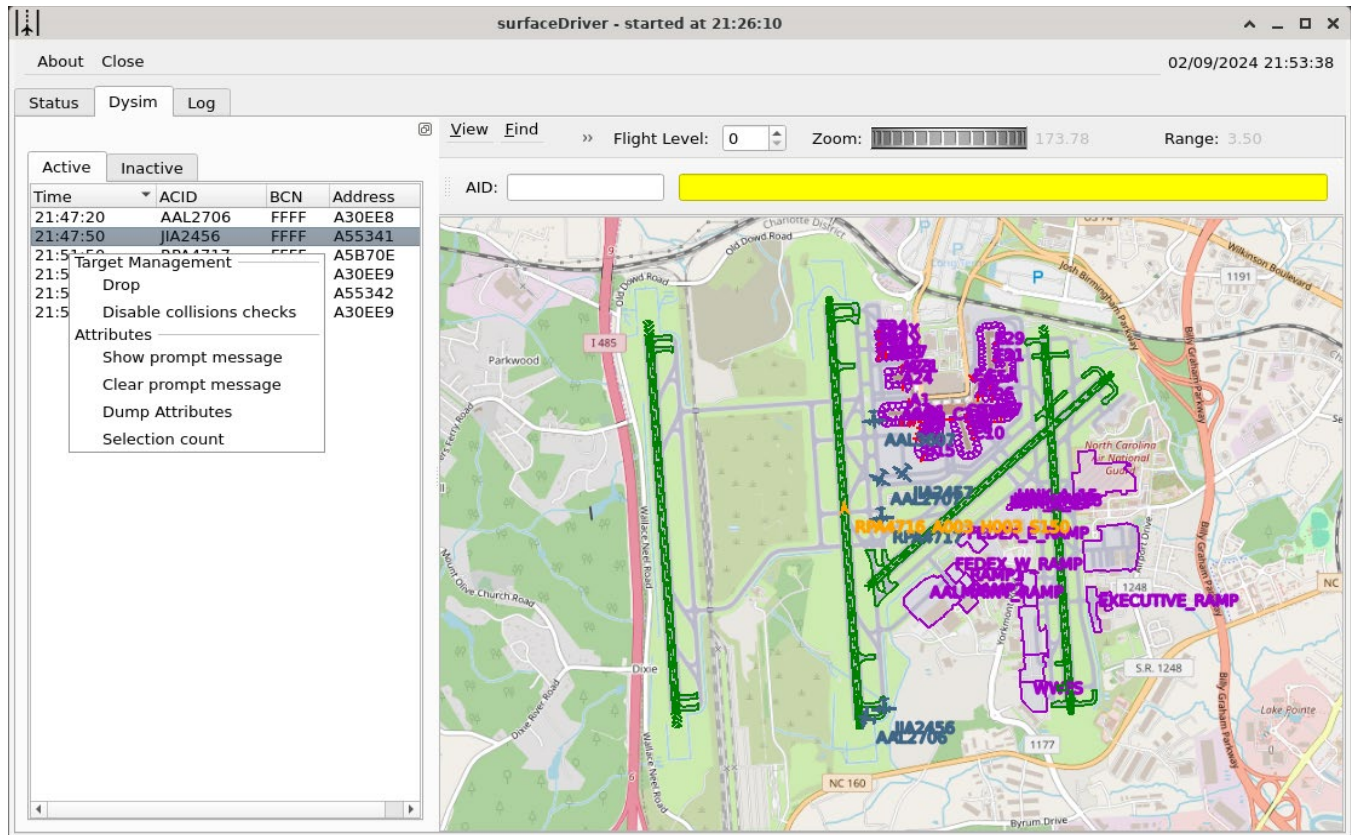


Figure 177. Active Target List Menu Options

Target Management

Drop

surfaceDriver stops generating target position data for the selected aircraft.

Disable Collision Checks

surfaceDriver automatically deconflicts targets on the airport surface unless collision checks are disabled.

Attributes

Show Prompt Message

Displays prompt message.

Clear Prompt Message

Clears prompt message.

Dump Attributes

Sends all currently applied attributes for the selected target to standard output.

Selection Count

Returns the number of targets currently selected.

6.3.3.2.2. Inactive Tab

Right clicking on an entry in the Inactive tab displays the following options:

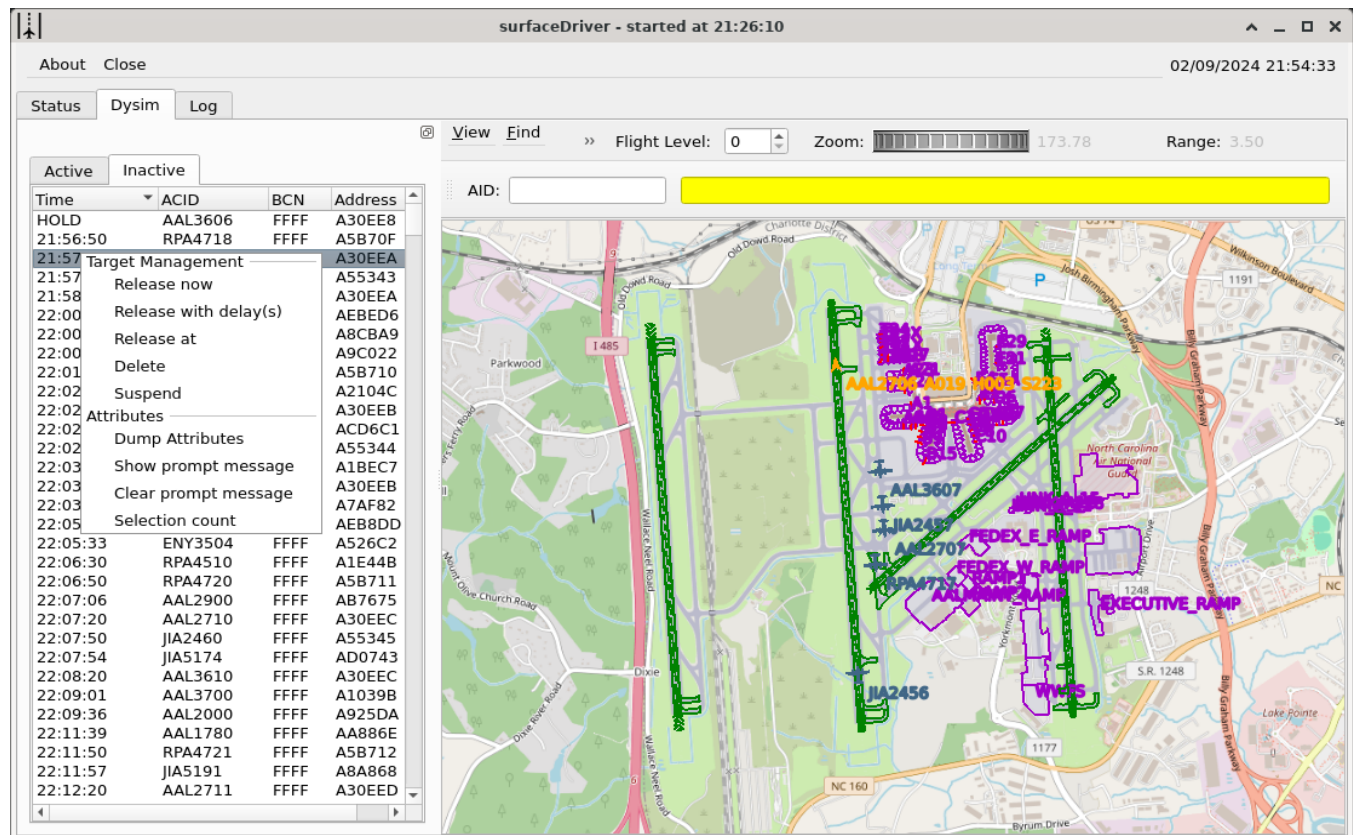


Figure 178. Inactive Target List Menu Options

Target Management

Release now

Activates the target immediately.

Release with delay(s)

Activates the target after the specified amount of time has elapsed.

Release at

Activates the target at the specified external system time.

Delete

Removes the selected target(s) from processing in surfaceDriver but does not remove them from simDriver.

Suspend

Prevents the target from activating at the scripted injection time. The target may be manually released at another time. Flights in manual mode are highlighted in blue in the Inactive tab.

Attributes

Dump Attributes

Sends all currently applied attributes for the selected target to standard output.

Show Prompt Message

Displays prompt message.

Clear Prompt Message

Clears prompt message.

Selection Count

Returns the number of targets currently selected.

6.3.3.2.3. Map View

The right side of the Dysim Tab displays a large map area that includes a menu bar, tool bar, and a macro command bar along the top and a status or measurement bar (when invoked) along the bottom. The menu bar options are:

View

Clicking on **View** displays submenus that allow selection of airspace elements to be added to the map. These elements include Maps, Airspace, Terminal Airspace Data, ARTCC Name(s) (e.g., ZJX and ZTL in the figure below), Radars, and External Facilities.

NOTE: *Each menu and submenu has a dashed line at the top. Selecting the dashed line will “tear off” the menu into a new dialog. The menu will remain displayed after a selection is made.*

7. Target Manipulation

Dynamic simulation allows for the aircraft dynamics to be modified during the scenario playback such as speed, altitude, heading, and route. There are three different ways in which these dynamics may be modified during a scenario, via the target's datablock, macro entry box, or the control dialog box. These methods may be used in both simDriver and simPilot within the Dysim tab and SimPilot tab, respectively.

7.1. Target Datablock

The dynamics of a target may also be manipulated via right clicking the areas of a target's datablock. Figure 169 shows the target's datablock, where 'SWA1288' is the FLID, '180' is the altitude, 'H304' is the magnetic heading, 'S362' is the speed in knots, and ZDV/27 is the controlling sector. A fifth line may be incorporated that displays the free text entered by the pilot using the freeText command.



Figure 179: simPilot Target Datablock

7.1.1. Modifying Altitude

The target's altitude may be modified by right clicking the altitude of the target's datablock. Within this window, the altitude is entered in hundreds of feet. The "Ignore Altitude Restrictions?" checkbox is available to force the aircraft to maintain the altitude and ignore any altitude restrictions that may be included in the aircraft's route or macro restrictions. Altitude restrictions are ignored until the checkbox is unchecked. Target's altitude in the datablock will display an underline while the "Ignore Altitude Restrictions?" checkbox remains checked.



Figure 180: Right Click Altitude Change

7.1.2. Modifying Heading

The target's heading may be modified by right clicking the altitude of the target's datablock. Within this window, the heading is entered in magnetic degrees. By default, turn direction is calculated by the software to minimize the angle between present heading and desired heading. Turn direction can be force by specifying the heading and appending "L" or "R" to the heading value to turn left or right to the desired heading.



Figure 181: Right Click Heading Change

7.1.3. Modifying Speed

The target's speed may be modified by right clicking the speed in the target's datablock. Within this window, the speed is entered in knots calibrated airspeed (CAS) by default. True airspeed (TAS) and Mach Number speeds are also available by appending "tas" or "m", respectively. The "Ignore Speed Restrictions" checkbox is available to force the aircraft to maintain the speed entered and ignore any speed restrictions that may be included in the aircraft's route or macro restrictions. Speed restrictions are ignored until the checkbox is unchecked. Target's speed in the datablock will display an underline while the "Ignore Speed Restrictions?" checkbox remains checked.

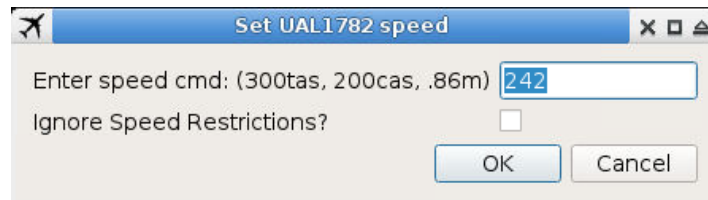


Figure 182: Right Click Speed Change

7.1.4. Give Control

SimPilot ownership may be invoked by right clicking a target's FLID in the Active list and selecting "Take Control". Once ownership is taken, it may be given by also right clicking the target's FLID in the Active list and selecting "Give Control". Once "Give Control" is selected, the user will be prompted with a dialog box of which position to give control to.

Taking and giving ownership may also be invoked by double middle clicking the target on the map, where the user will automatically take control of a selected target or will be prompted to give control to a pilot position. The Give Control dialogue box value will default to the last Given Control position number sent.



Figure 183: Give Control

7.2. Macro Entry

Aircraft dynamics may be modified, and new macro commands may be entered, using the entry boxes for LNAV and VNAV. If a valid command is typed, the input box remains white. If an invalid command is typed, the input box is highlighted yellow to indicate an error.

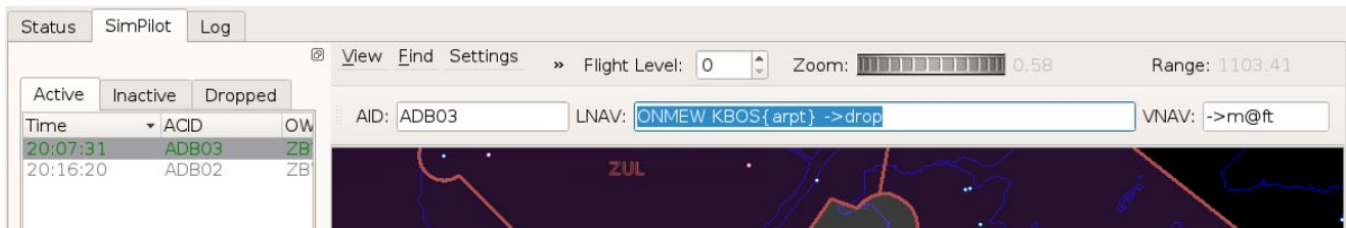


Figure 184. Macro Entry

When the Enter key is pressed, the input box is highlighted green to indicate the successful entry of a valid command.

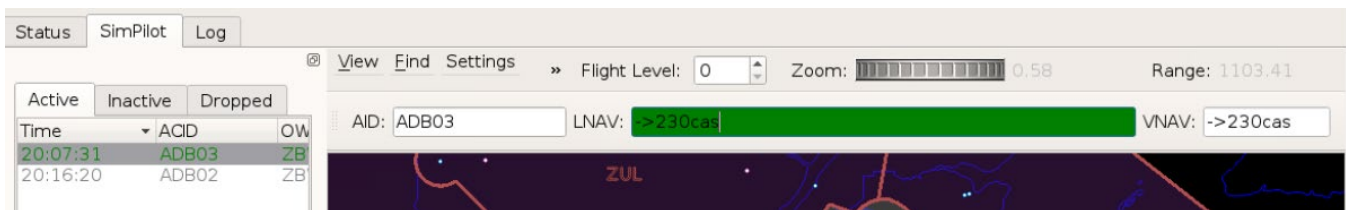


Figure 185. Accepted Macro Entry

A list of macro commands is provided in Table 5 of Section 5.3.3.2.5.

7.3. Timed Macros Box

A timed macros box can be invoked by either double clicking a target in the active tab or by holding the SHIFT key while right clicking a target on the map. The timed macros box contains a list of commands scripted in the scenario to be executed at a specific time.



Figure 186. Timed Macros Box

8. Sample Configuration Files

8.1. Adaptation File

The simPilot executable must be launched with at least one ERAM facility adaptation specified as a parameter. To maximize the capability of the simPilot, all the adaptation that was selected to create the scenario should also be specified in the simPilot command. Including all ERAM, STARS, and TBFM adaptation will allow simPilot to have definitions for all waypoints, routes, airports, and runways that are available to simDriver. Within the scenario directory, references to all the adaptation are included in the scenario.xml file. As an alternative, a separate file called adaptation.xml can be created that includes just the airspace stanza portion of the scenario.xml file. An example of a scenario.xml file is shown below:

```
<scenario version="13.3.2">
  <airspace>
    <eadp dir="/opt/adaptation/eadp/e310gdk0">
      <override product="STAR.xml.74">./STAR.xml</override>
      <dms file="STARS/d01/DenAdapt-MG-02-17-2021" name="RDC"/>
      <atcoach file="STARS/d01/d01_SYS1_ENV001_ad.st" name="RDC"/>
      <atcoach file="/opt/adaptation/macro/ZDV_D01/macro.st" name="RDC"/>
      <tbfm dir="/opt/adaptation/tbfm/ZDV_T4.14.0_0.0MG"/>
    </eadp>
  </airspace>
  <facility>
    <eadp dir="/opt/adaptation/eadp/e310gdk0">
  </facility>
  <targets>tgts.xml</targets>
  <syscmds>syscmds.xml</syscmds>
  <prefs>prefs.xml</prefs>
  <rsi>rsi.xml</rsi>
  <devctl>devctl.xml</devctl>
</scenario>
```

8.2. Macro File

In addition to adaptation information, the scenario.xml file can also specify one or more macro files. In the example scenario.xml file above, the file defined as 'macro.st' contains custom user macros that may be invoked by simPilots while running a scenario with simDriver. Rather than typing each fix and restriction manually during simulation, a pilot can apply a macro to a target to fly a desired route. These

macros can be defined for SIDs, STARs, ILS approaches, or any other routes that a user desires to abbreviate.

For example, a macro for an ILS approach to runway 16L at Denver International Airport (D01) is named ILS16L within the macro.st file and is defined with a route that is based on the approach plate:

```
RT ILS16L JEEPR{200cas@<10000ft} JOBOB{<190cas@<10000ft} 16L{130cas@5343ft} ->drop
```

where RT indicates a route macro, ILS16L is the name by which a pilot can invoke the macro during a simulation, and

```
JEEPR{200cas@<10000ft} JOBOB{<190cas@<10000ft} 16L{130cas@5343ft} ->drop
```

is the route defined by the approach plate for an ILS approach to runway 16L.

There is no limit to the quantity of macros defined in the macro.st file.

8.3. Key Assignment File

For macros or pilot commands that are frequently used, the keyboard function keys are fully customizable to adapt to the needs of the dynamic simulation. When the simPilot clicks in the command input text box, the keyboard function keys can be used to populate the text area with a defined macro. This is accomplished by specifying the --macroKeyAssignments program parameter on simPilot startup to read in the file in which these function key assignments are defined. The full path is required to apply the macroKeyAssignment file in the program parameter. An example of the contents macroKeyAssignments file is as follows:

```
<root>
  <standardMacro key="F1" position="1" shortcut="TRUE HEADING"/>
  <standardMacro key="F2" position="1" shortcut="MAG HEADING"/>
  <standardMacro key="F3" position="1" shortcut="SPD MACH"/>
  <standardMacro key="F4" position="1" shortcut="SPD CAS"/>
  <standardMacro key="F5" position="1" shortcut="SPD TAS"/>
  <standardMacro key="F6" position="1" shortcut="ALT FEET"/>
  <standardMacro key="F7" position="1" shortcut="FREE TEXT"/>
  <customMacro key="F9" needsConfirm="0" position="1" shortcut="-&gt;"/>
  <ControlKey key="A" position="1" shortcut="TOGGLE AUTO LOGON"/>
  <ControlKey key="B" position="1" shortcut="SET CPDLC RESPONSE DELAY"/>
  <ControlKey key="C" position="1" shortcut="SEND DOWNLINK MESSAGE"/>
  <ControlKey key="D" position="1" shortcut="CLONE TARGET"/>
  <ControlKey key="E" position="1" shortcut="SEND LOGON"/>
  <ControlKey key="F" position="1" shortcut="TOGGLE CPDLC AUTO RESPONSE"/>
  <ControlKey key="G" position="1" shortcut="RELEASE TGT NOW"/>
  <ControlKey key="H" position="1" shortcut="CREATE POPUP"/>
  <ControlKey key="I" position="1" shortcut="RESPONSE TO UPLINK"/>
  <ControlKey key="J" position="1" shortcut="TOGGLE TRACKING"/>
</root>
```

where **position** defines the pilot position number 1, **shortcut** defines what is invoked within the macro input box, **needsConfirm** determines if the simPilot needs to confirm the entry by pressing Enter (1) or is entered automatically (0).

To customize the assignments, a user can enter the desired key in the 'key' attribute, however, the 'shortcut' value must NOT BE MODIFIED. The 'standardMacro' entries are used when the quick command box is in focus and will insert a built-in macro. The 'customMacro' entries are also used when the quick command box is in focus but can be any macro command. The 'ControlKey' entries are used when the quick command box is NOT in focus and are activated by holding the CTRL plus the assigned 'key'.

Appendix A. Acronyms

AAR	Adapted Arrival Routes
AAV	Aircraft Alert Volumes
ACID	Aircraft Identification
ADAR	Adapted Departure/Arrival Routes
ADR	Adapted Departure Routes
ADS-B	Automatic Dependent Surveillance – Broadcast
AIG	Application Interface Gateway
AOI	Area of Interest
API	Application Program Interface
ARSR	Air Route Surveillance Radar
ARTCC	Air Route Traffic Control Center
ARTS	Automated Radar Terminal System
ASDI	Aircraft Situation Display to Industry
ASR	Airport Surveillance Radar
ASR-9	Airport Surveillance Radar Model-9
ASTERIX	All Purpose Structured Eurocontrol Radar Information Exchange
ATC	Air Traffic Control
AViD	Airspace Visualization Display
BRTQC	Beacon Real Time Quality Control
CAS	Commercially Available Software
CD	Common Digitizer
CDR	Continuous Data Recording
CMS	Common Message Set
DASI	Digital Altimeter Setting Indication System
DASR	Digital Airport Surveillance Radar
DataComm	Data Communications

DME	Distance Measuring Equipment
DP	Departure Procedure
DYSIM	Dynamic Simulation
ECG	External Communications Gateway
ECGP	External Communications Gateway Protocol
EDDS	En Route Data Distribution System
ERAM	En Route Automation Modernization
ETMS	Enhanced Traffic Management System
FAA	Federal Aviation Administration
FAV	Fixed Airspace Volumes
FDIO	Flight Data Input/Output
GIM-S	Groundbased Interval Management-Spacing
GSGT	Graphic Simulation Generation Tool
GUI	Graphical User Interface
IFDT	Interfacility Flight Data Transfer
JMS	JAVA Messaging Service
JRE	Java Runtime Environment
MIS	Metering Information Service
Mode 3/A	Identification Reporting Mode of Secondary Radar
Mode C	Altitude Reporting Mode of Secondary Radar
Mode S	Mode Select Beacon System
MLAT	Multilateration
NAS	National Air Space
NDB	Non-directional (radio) Beacon
NEMS	NAS Enterprise Messaging System
RAPPI	Random Access Plan Position Indicator
RF	Radius-to-fix
RSI	Record Select Indicator
RTCS	Release Time Coordination Service

RTQC	Real Time Quality Control
SAA	Special Activities Airspace
SAC	System Area Code
SDRR	Simulation Driver Radar Recorder
SIC	System Identity Code
SIRS	STARS Interfacility and Radar Simulator
SLICK	Simulated Live Interactive Capability Kit
SMIF	Simulation Interface Support
SSRV	Simulation Services
STAR	Standard Terminal Arrival Route
STARS	Standard Terminal Automation Replacement System
SWIM	System-Wide Information Management
TACAN	Tactical Air Navigation System
TARP	Time-based Archive Recording Player
TAV	Terrain Alert Volume
TBFM	Time Based Flow Management
TFDM	Terminal Flight Data Manager
TFMS	Traffic Flow Management System
TRACON	Terminal Radar Approach Control
TSIM	TBFM Simulation
TTP	TFDM Terminal Publication
VOR	Very High Frequency (VHF) Omni-Directional Range
WAM	Wide Area Multilateration
WJHTC	William J. Hughes Technical Center