



Dynamic Simulation (DYSIM)

User Reference Guide

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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.

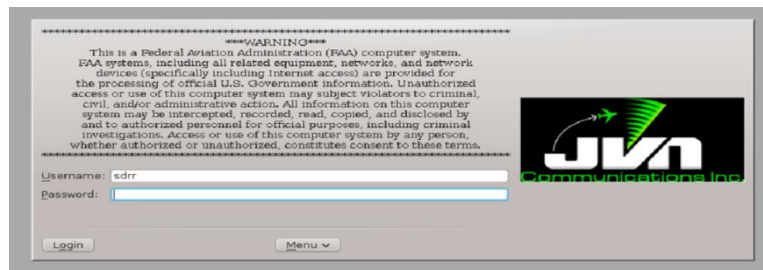


Figure 1. DYSIM Processor Login

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:

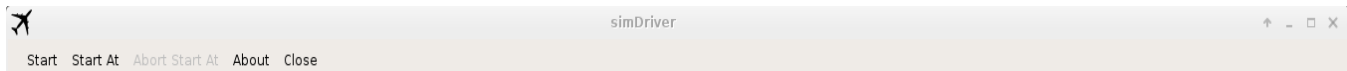


Figure 3. simDriver Menu Bar

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.

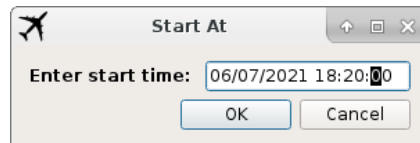


Figure 4. Start At Dialog

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.

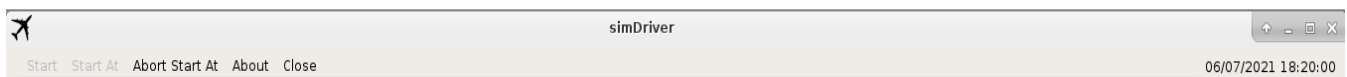


Figure 5. Option to Abort Start At

About

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

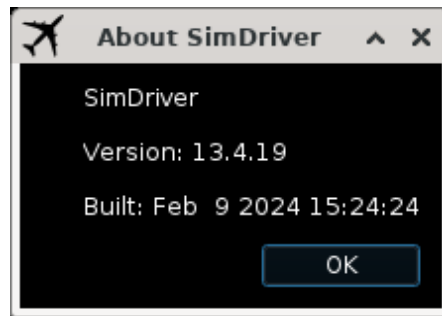


Figure 6. About SimDriver Dialog

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.

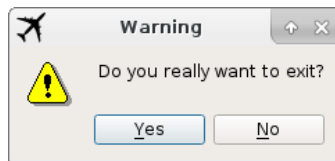


Figure 7. simDriver Exit Warning

4.3.2. Date and Time Clock

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

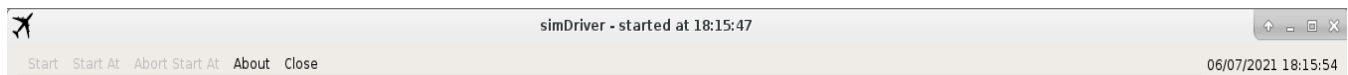


Figure 8. simDriver Run Clock

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.

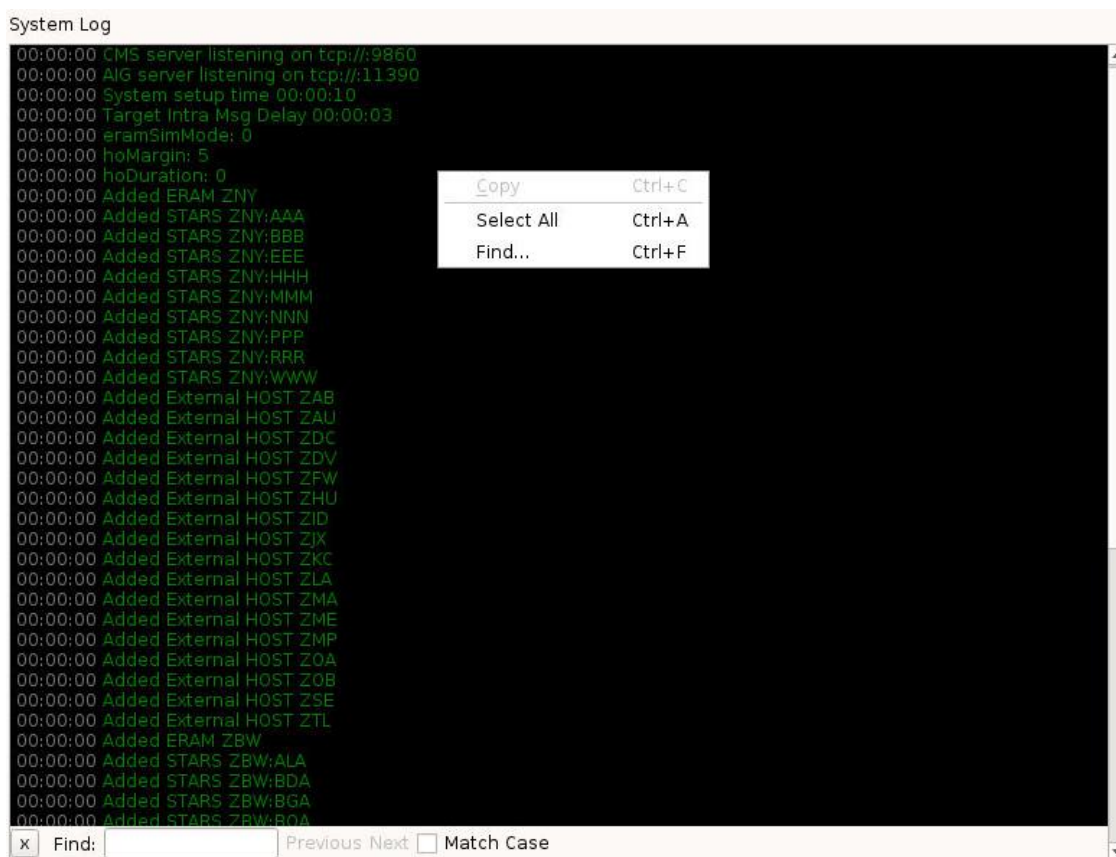


Figure 9. Message Area Text Options

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.

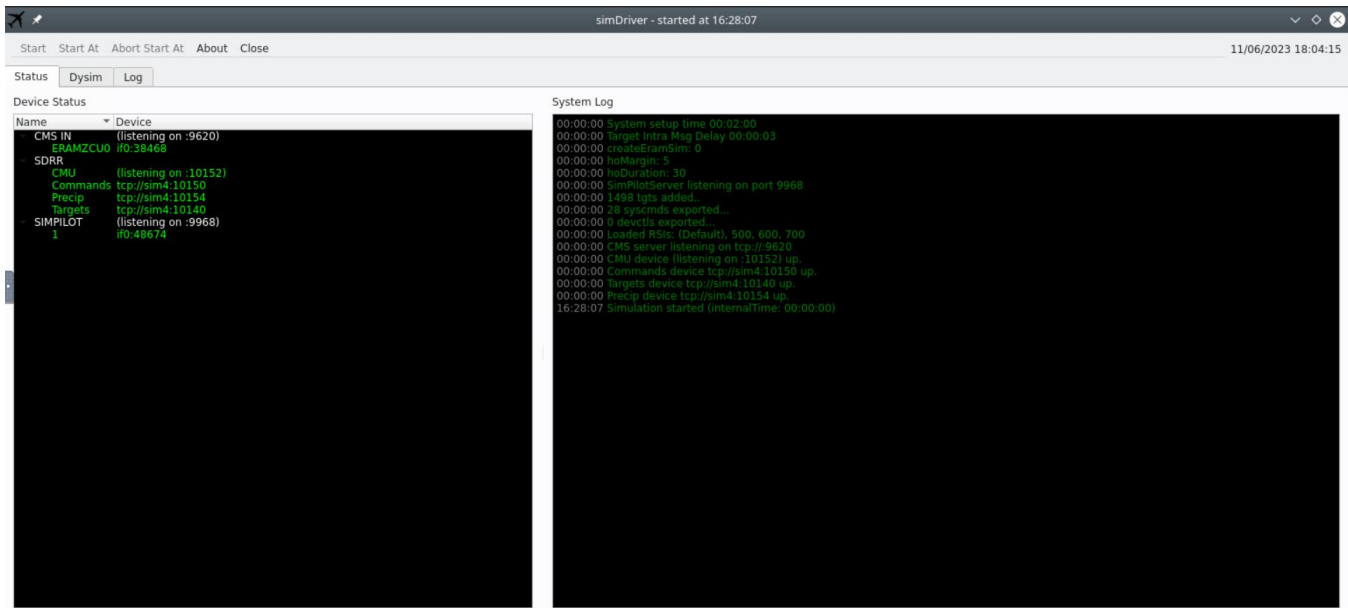


Figure 10. simDriver Status Tab

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.

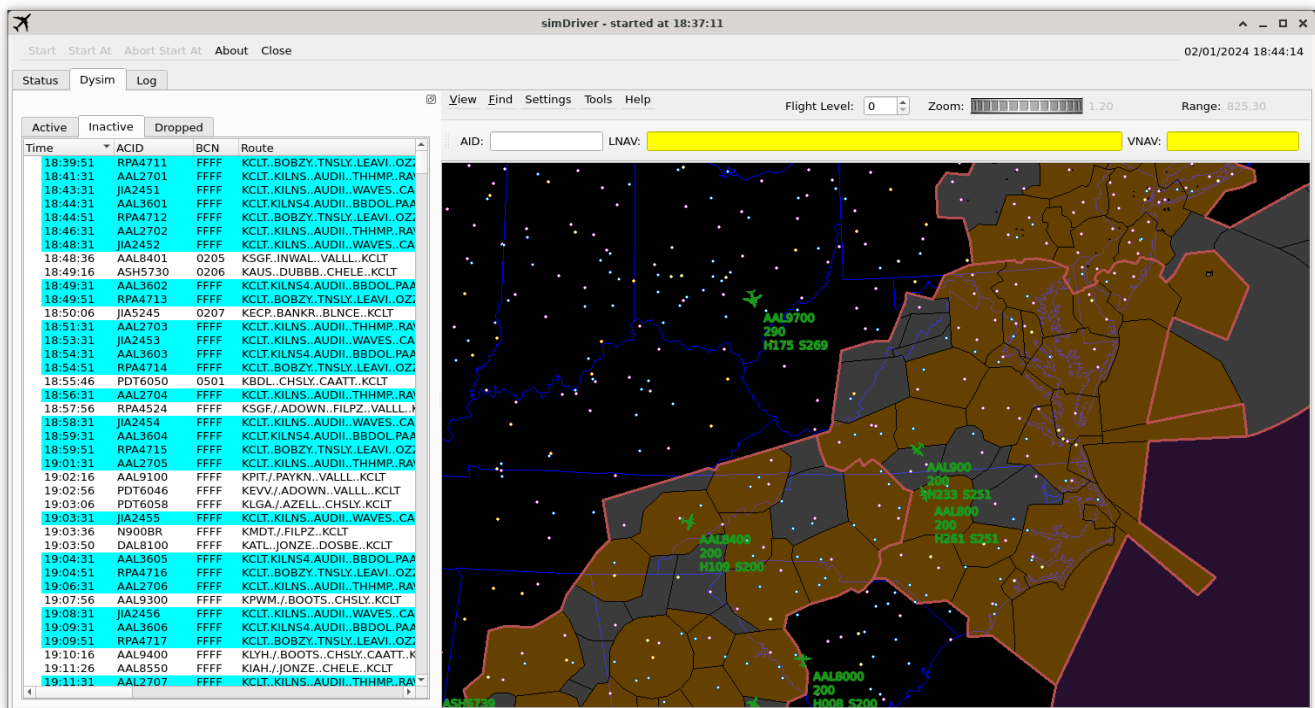


Figure 11. simDriver Dysim Tab

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.

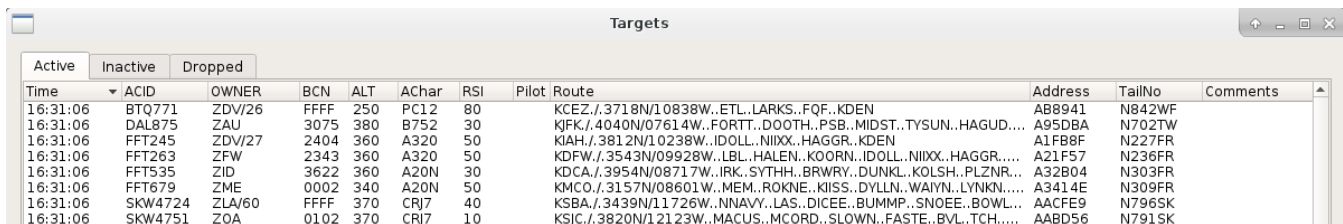


Figure 12. Dysim Tab Target View

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.

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.

Route

Flight plan route.

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.

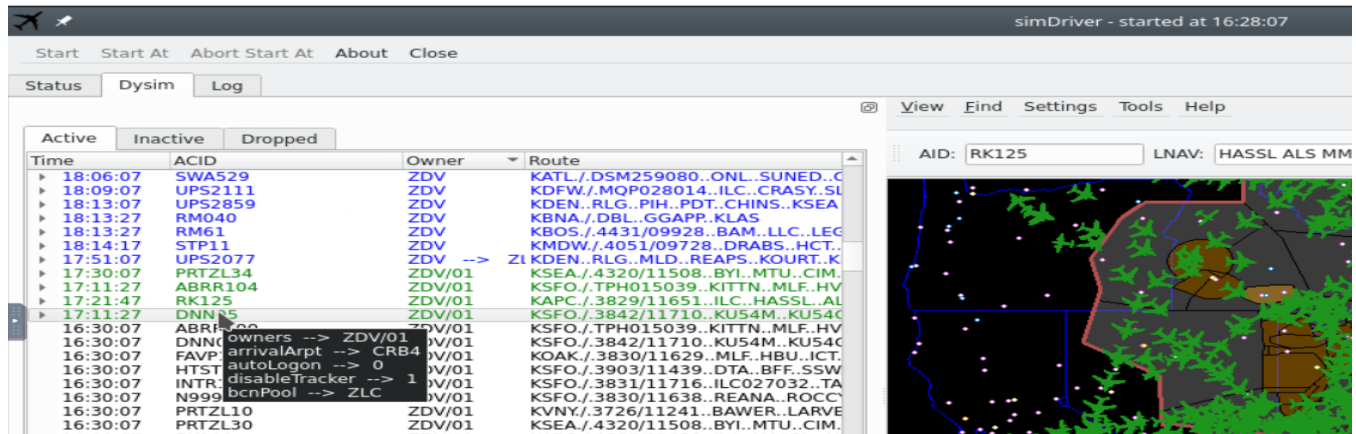


Figure 13. Mouse-over Text for an Active Target

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

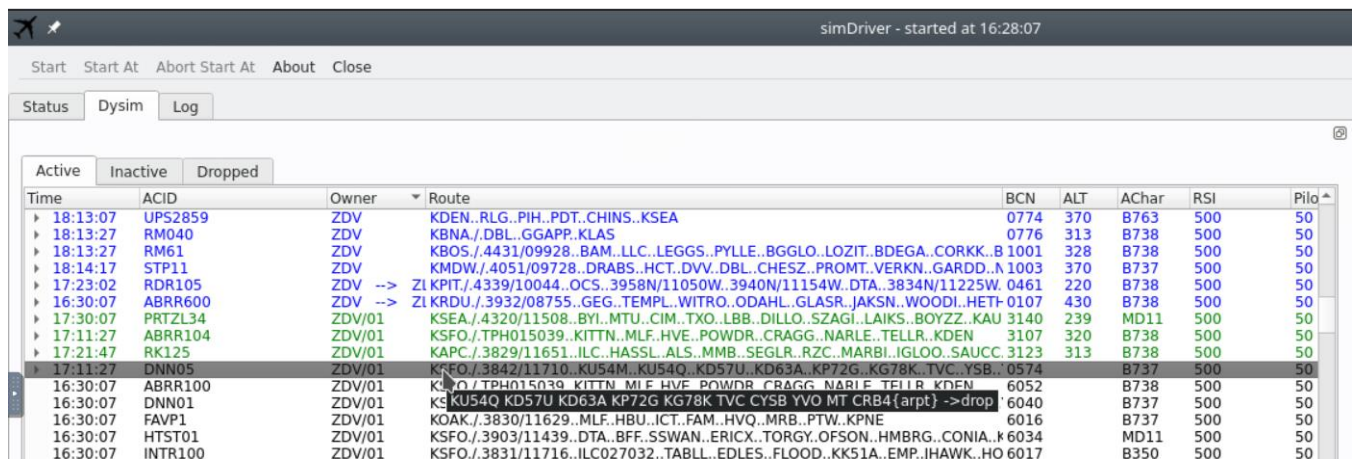
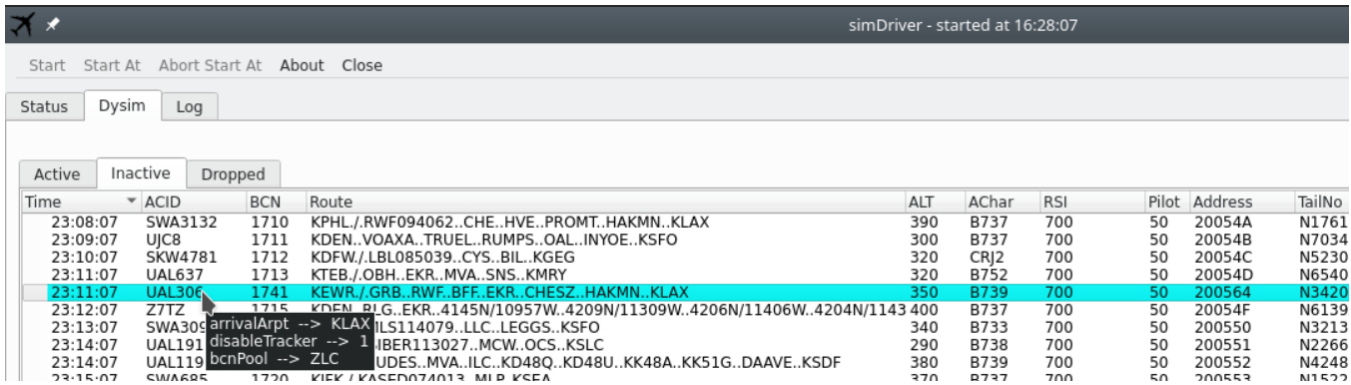


Figure 14. Mouse-over Text for an Active Target Route

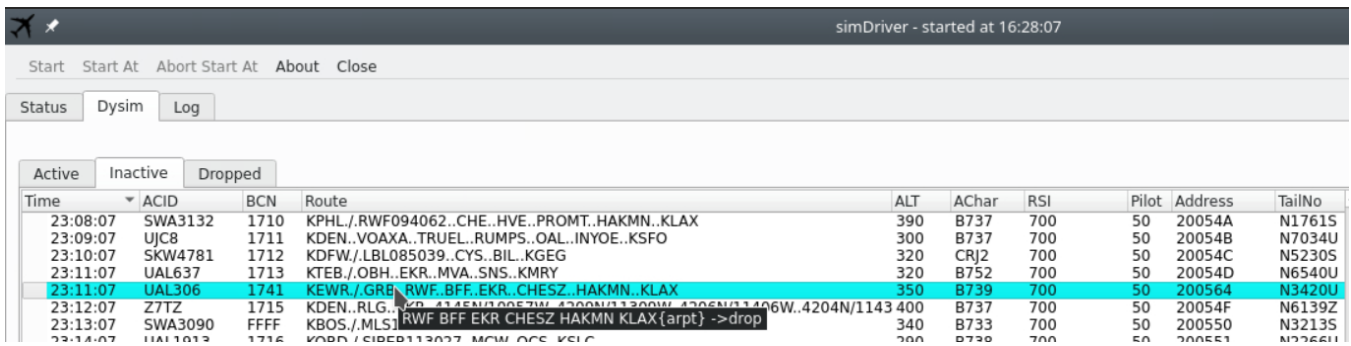
In the Inactive targets tab, the mouse-over text box displays information such as: arrival airport (arrArpt), autologon, disableTracker, and beacon and additional attributes, if available.



Time	ACID	BCN	Route	ALT	AChar	RSI	Pilot	Address	TailNo
23:08:07	SWA3132	1710	KPHL./RWF094062..CHE..HVE..PROMT..HAKMN..KLAX	390	B737	700	50	20054A	N1761
23:09:07	UJC8	1711	KDEN..VOAXA..TRUEL..RUMPS..OAL..INYOE..KSFO	300	B737	700	50	20054B	N7034
23:10:07	SKW4781	1712	KDFW./LBLE085039..CYS..BIL..KGGG	320	CRJ2	700	50	20054C	N5230S
23:11:07	UAL637	1713	KTEB./OBH..EKR..MVA..SNS..KMRY	320	B752	700	50	20054D	N6540U
23:11:07	UAL306	1741	KEWR./GRB..RWF..BFF..EKR..CHESZ..HAKMN..KLAX	350	B739	700	50	200564	N3420U
23:12:07	Z7TZ	1715	KDEN..RLG..EKR..4145N/10957W..4209N/11309W..4206N/11406W..4204N/1143	400	B737	700	50	20054F	N6139Z
23:13:07	SWA3090	FFFF	KBOS./MLS1	340	B733	700	50	200550	N3213S
23:14:07	UAL191	1716	IBER113027..MCW..OCS..KSLC	290	B738	700	50	200551	N2266
23:14:07	UAL119	1716	ZLC	380	B739	700	50	200552	N4248

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.



Time	ACID	BCN	Route	ALT	AChar	RSI	Pilot	Address	TailNo
23:08:07	SWA3132	1710	KPHL./RWF094062..CHE..HVE..PROMT..HAKMN..KLAX	390	B737	700	50	20054A	N1761S
23:09:07	UJC8	1711	KDEN..VOAXA..TRUEL..RUMPS..OAL..INYOE..KSFO	300	B737	700	50	20054B	N7034U
23:10:07	SKW4781	1712	KDFW./LBLE085039..CYS..BIL..KGGG	320	CRJ2	700	50	20054C	N5230S
23:11:07	UAL637	1713	KTEB./OBH..EKR..MVA..SNS..KMRY	320	B752	700	50	20054D	N6540U
23:11:07	UAL306	1741	KEWR./GRB..RWF..BFF..EKR..CHESZ..HAKMN..KLAX	350	B739	700	50	200564	N3420U
23:12:07	Z7TZ	1715	KDEN..RLG..EKR..4145N/10957W..4209N/11309W..4206N/11406W..4204N/1143	400	B737	700	50	20054F	N6139Z
23:13:07	SWA3090	FFFF	KBOS./MLS1	340	B733	700	50	200550	N3213S
23:14:07	UAL191	1716	IBER113027..MCW..OCS..KSLC	290	B738	700	50	200551	N2266U

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.

simDriver - started at 16:28:07

Start Start At Abort Start At About Close

Status Dysim Log

Active	Inactive	Dropped								
Time	ACID	BCN	Route	ALT	AChar	RSI	Pilot	Address	TailNo	
16:30:07	INTR200	0166	KABO./3841/10841..JNC..HELPR..GOSHU..SPANE..LEEHY.KSLC	239	B350	500	50	20005D	N200N	
16:30:07	INTR400	6027	KGEG./4349/11510..BYL.EFFTA..BLIDA..BEARR..SKEES..KSLC	239	B350	500	50	200061	N400N	
16:30:07	JIA5134	6031	KSBA./ASTNN..YANKU..BAM050090..TNKUS..DRYAD..NORDD..KU720..FIROS..SK	240	CRJ9	500	50	200068	N9024	
16:30:07	JIA5729	0177	KLAX./BEALE..BAWER..LOYD..SKIER..DBL.KASE	270	CRJ9	500	50	20006A	N495E	
16:30:07	MAX71	0135	KDFN./RACER..MTU..THISL..SPANE..LEEHY.KSLC	310	BE20	500	50	000604	MXX11	
16:30:07	MEMowners -->	ZDV/01	.4021/11724..SLOWN..GELDS..PARZZ..BYI182043..NULTE..MLD090010..KE	310	B737	500	50	20007B	N500N	
16:30:07	N325arrivalArpt -->	KASE	./3844/12045..MACUS..MCORD..SLOWN..FASTE..BVL..KNOLE..WAATS..KSLC	200	PC12	500	50	20004F	N2767	
16:30:07	N451bcnPool -->	ZLC	./4107/10515..HVE..GGAPP.KLAS	400	B737	500	50	20004E	N5604	
16:30:07	NKS913	6021	KMAN./SDO..NICER..FMG..HUYJO..RICHY.KTVL	360	A320	500	50	200054	N1541	
16:30:07	RM030	0170	KBNA./DBL..GGAPP.KLAS	313	B738	500	50	20005F	NRM01	

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:

▶ 18:15:07	SWA2986	Target Management
▶ 16:30:07	N37TD	Drop
▶ 17:21:47	ABRR105	Drop incrementally
▶ 17:21:47	DNN06	Clone
▶ 17:32:07	RK126	Create popup
▶ 16:30:07	TOCS15	Hilite
▶ 16:50:57	WAIV202	Enable tracking
▶ 16:30:07	RC05	Disable tracking
17:15:07	INTR103	Show Datablocks
17:30:07	PRTZL34	Hide Datablocks
17:11:27	ABRR104	Messages
17:21:47	RK125	Send Speed Advisory
17:11:27	DNN05	Send route MOD message
16:30:07	ABRR100	Datcomm
16:30:07	DNN01	Set CPDLC responseMode to auto
16:30:07	FAVP1	Set CPDLC responseMode to manual
16:30:07	HTST01	Set CPDLC response delay (secs)
16:30:07	INTR100	Disable auto logon
16:30:07	N999CA	Enable auto logon
16:30:07	PRTZL10	Send Logon
16:30:07	PRTZL30	Send Downlink msg
16:30:07	RK120	Show route clearance text
16:30:07	RP01	Attributes
16:30:07	RPA3597	Dump Attributes
16:30:07	SKW5738	Selection count
16:30:07	SWA15	
16:30:07	SWA291	
16:30:07	SWA1713	
16:30:07	UAL1561	
16:30:07	UPS9862	
16:30:07	WAIV200	
16:31:07	OPT910	
16:33:07	UAL1400	
16:40:27	ABRR101	
16:40:27	DNN02	
16:40:27	RK121	
16:40:32	WAIV201	

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.

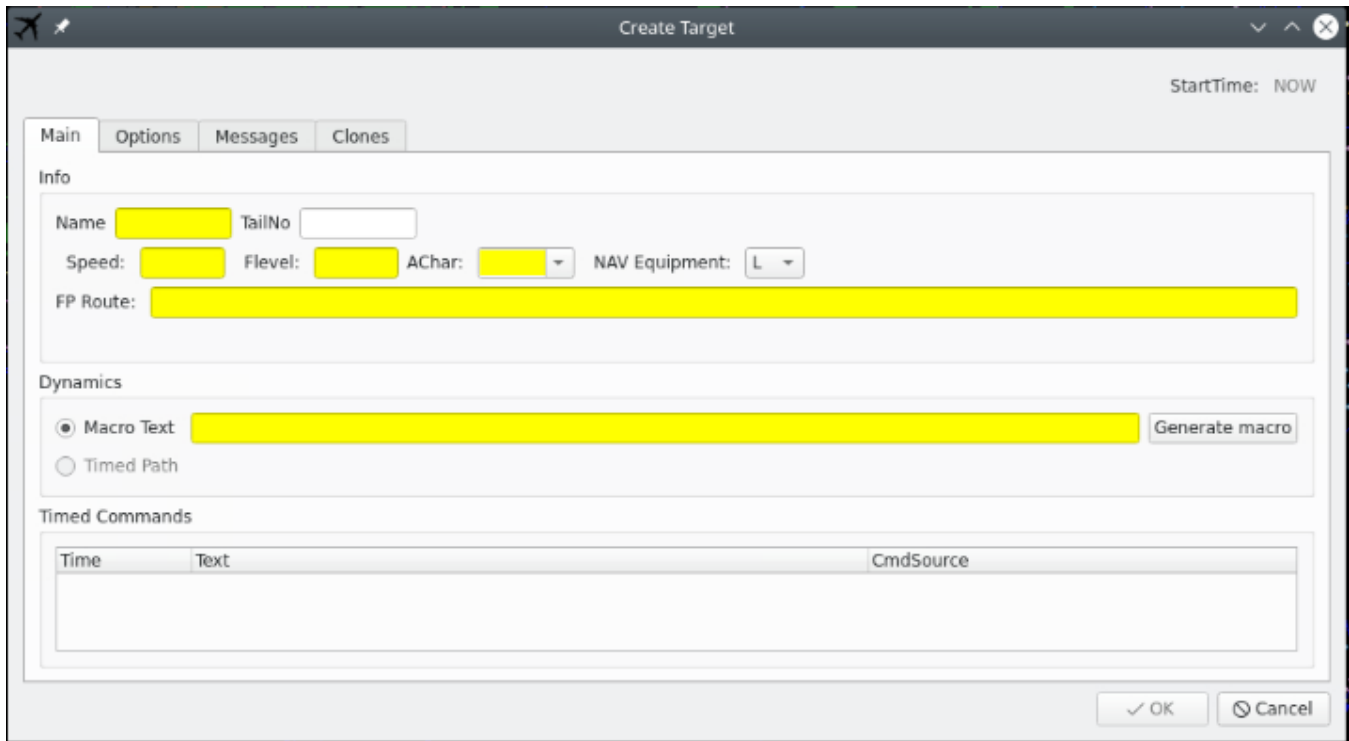


Figure 19. Create Target Dialog

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.

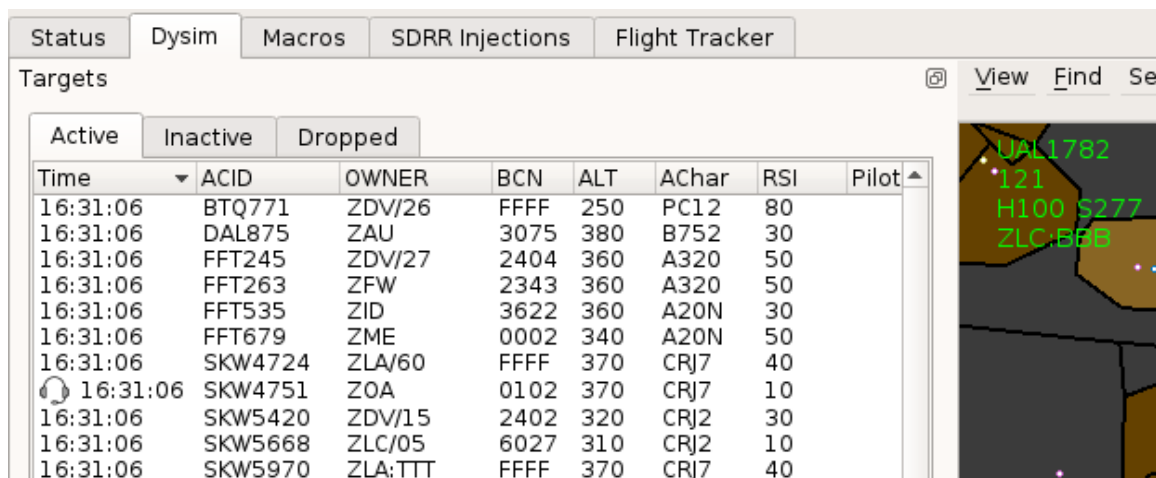
Datacomm

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.




Time	ACID	OWNER	BCN	ALT	AChar	RSI	Pilot
16:31:06	BTQ771	ZDV/26	FFFF	250	PC12	80	
16:31:06	DAL875	ZAU	3075	380	B752	30	
16:31:06	FFT245	ZDV/27	2404	360	A320	50	
16:31:06	FFT263	ZFW	2343	360	A320	50	
16:31:06	FFT535	ZID	3622	360	A20N	30	
16:31:06	FFT679	ZME	0002	340	A20N	50	
16:31:06	SKW4724	ZLA/60	FFFF	370	CRJ7	40	
 16:31:06	SKW4751	ZOA	0102	370	CRJ7	10	
16:31:06	SKW5420	ZDV/15	2402	320	CRJ2	30	
16:31:06	SKW5668	ZLC/05	6027	310	CRJ2	10	
16:31:06	SKW5970	ZLA:TTT	FFFF	370	CRJ7	40	

Figure 20. 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.

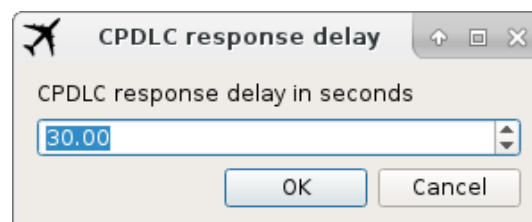


Figure 21. CPDLC Response Delay

Disable auto logon

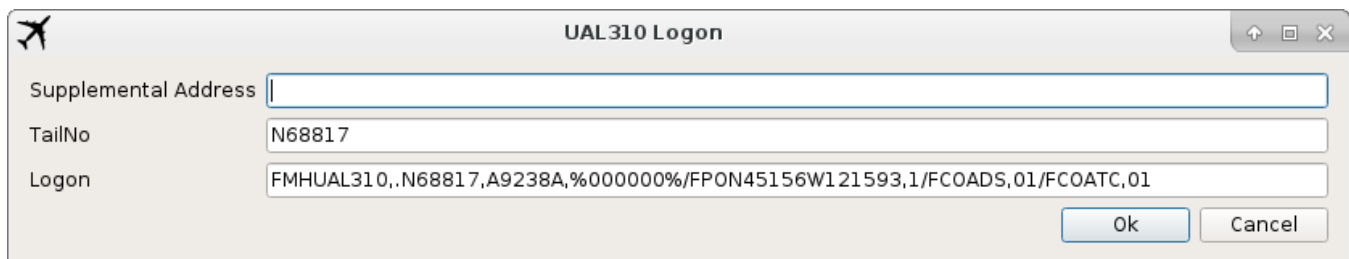
Disables auto logons.

Enable auto logon

Enables auto logons.

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

Send Downlink Message

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

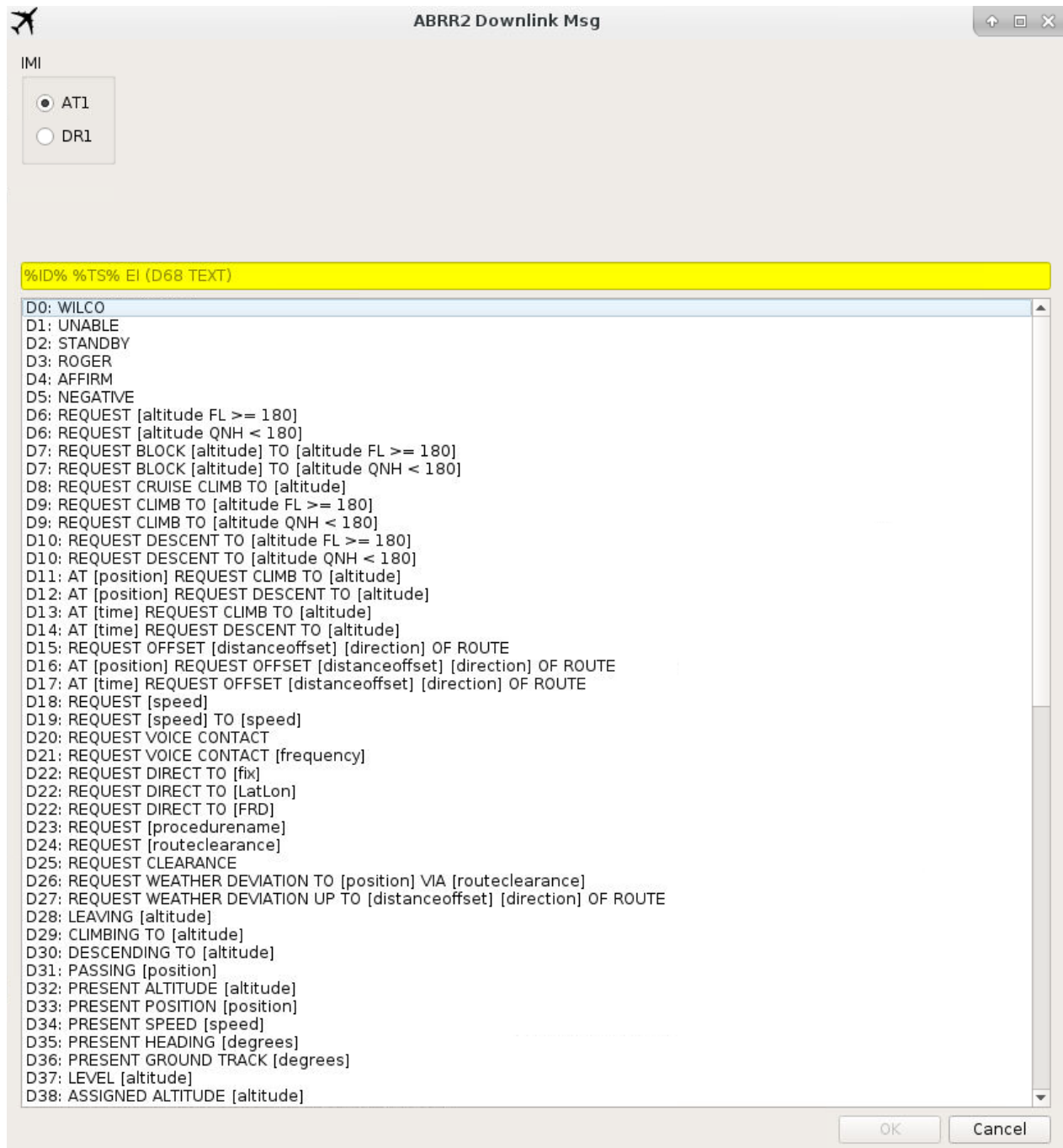


Figure 23. Send Downlink Message for Active Target – part 1

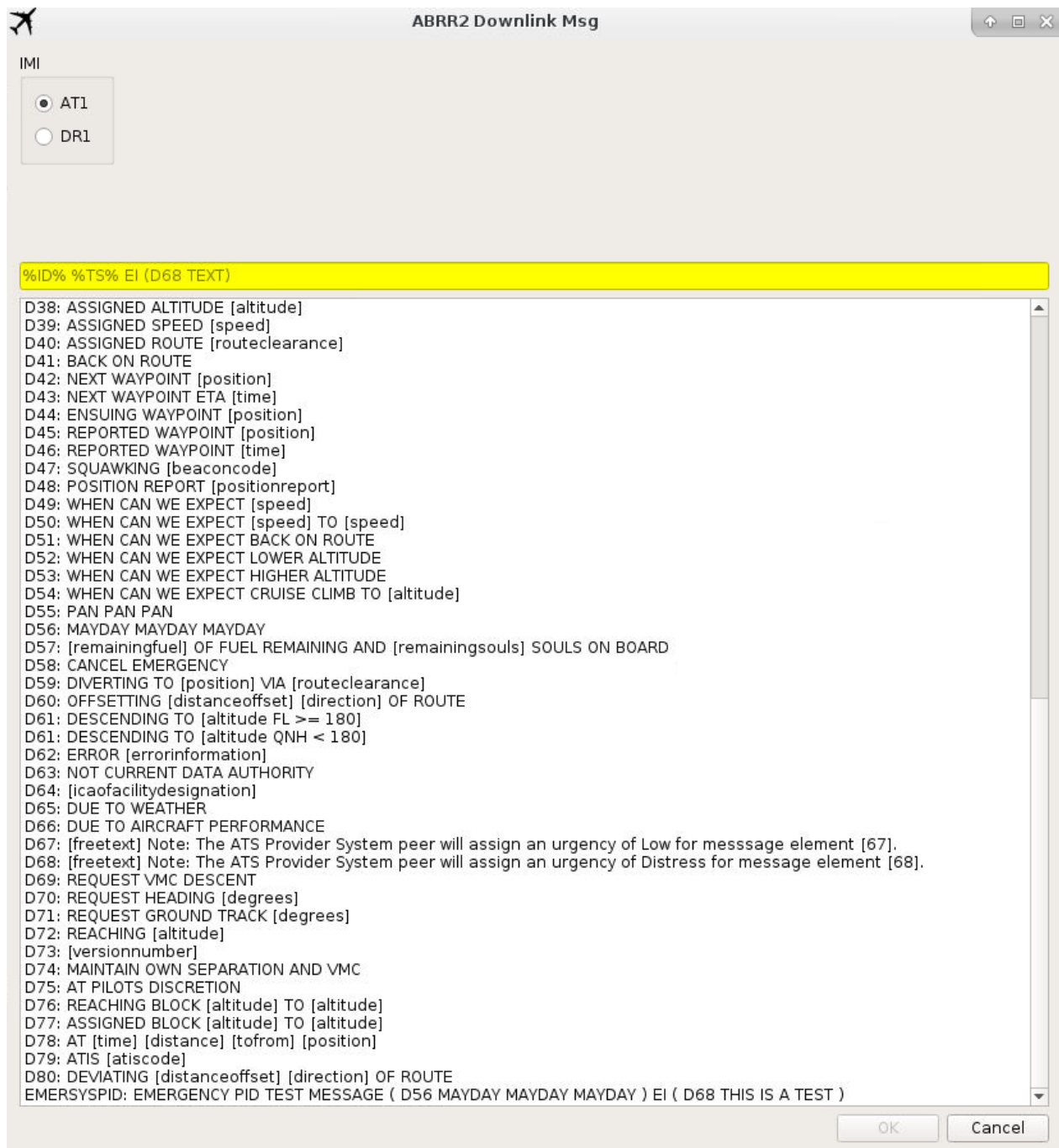


Figure 24. Send Downlink Message for Active Target – part 2

Messages

Show route clearance text

Displays the route clearance in a popup window.

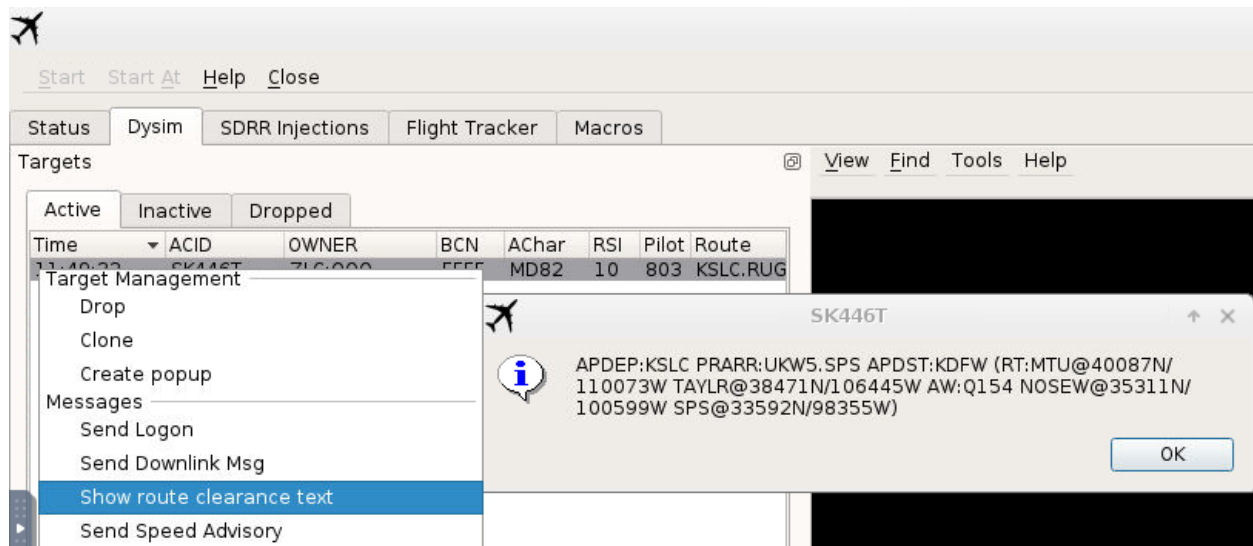


Figure 25. Route Clearance Text for Active Target

Send Speed Advisory

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

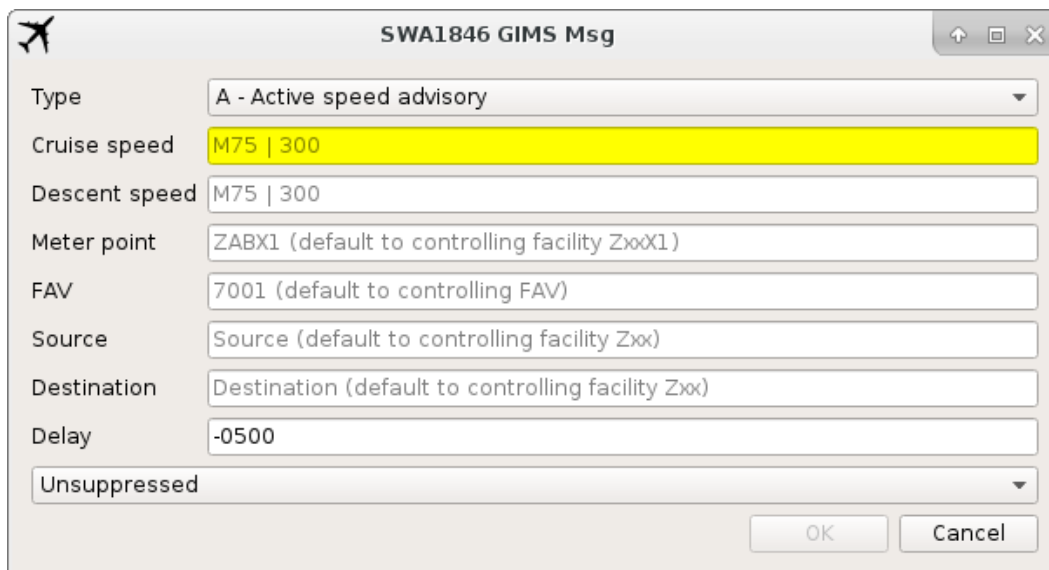


Figure 26. Speed Advisory Message Dialog for an Active Target

Send route MOD message

Displays a MOD message dialog box.

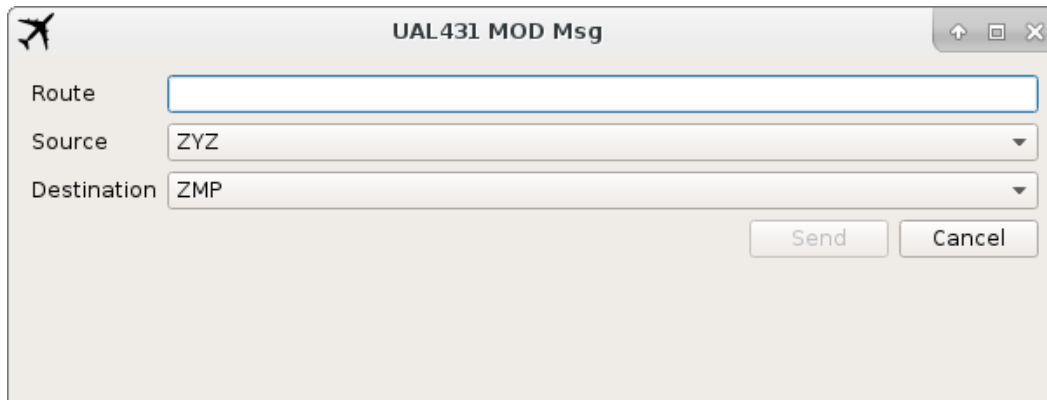


Figure 27. Send a Route Modification Message

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.

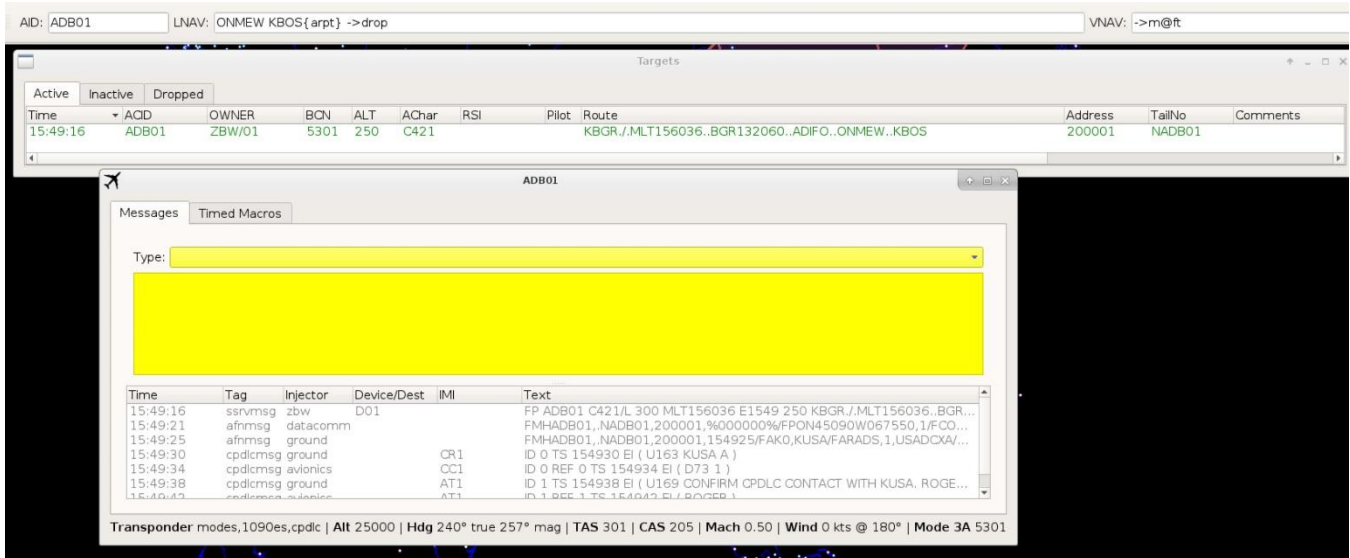


Figure 28. Active Target Control Dialog Messages Tab



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.

Active	Inactive	Dropped	
Time	ACID	BCN	Route
19:11:35	RC19	1103	KSQL..3831N/11651W..3836N/11537W..3824N/1150
19:11:35	VRD089	1104	DDY..KRIW
▶ 19:11:35	EAGW015	4223	KMLB..MLD..4223N/11243W..4226N/11258W..4223N
▶ 19:12:15	EAGB014		06N/10919W..BONC
19:12:35	SWA2682		EA
19:13:35	TMC477		
19:13:35	SWA608		WC..CHESZ..ZZYZX..
▶ 19:14:35	EAGJ014		507N/10631W..4514
19:14:35	TCF3281		JOTBA..KPDX
▶ 19:15:05	FARK507		RR..DTA..UINTA..FRM
19:15:35	UPS2843		RUMPS..OAL..INYOE
▶ 19:16:15	RK134		ALS..MMB..SEGLR..F
▶ 19:16:15	TOCW15		509K..METOW..ILSA
▶ 19:16:15	DNN15		4Q..KD57U..KD63A.
▶ 19:16:15	TOC15		GYLET..STUBL..RAZI
▶ 19:16:15	DC348		BRG..KLAX
19:16:15	RM044		
▶ 19:16:15	ABRR114		IVE..POWDR..CRAGC
▶ 19:16:15	ADSB114		TUBL..RAZRR..OUCH
19:16:15	FMT15		GIR..COSOG..KU210.
▶ 19:16:15	MEM15		DS..PARZZ..BY1820
19:16:15	RM65		EGGS..PYLLE..BGGL
▶ 19:16:35	SHAD178		
19:16:35	RPA4506		.GRI..PWE..KMCI
▶ 19:17:25	NRDR15		1057..KU90S..ZABI
▶ 19:17:25	RK514		ECA..OHLIE..YEDSU.
19:17:25	WAIV214		KU78K..KU72M..PAT
▶ 19:17:25	FMER15		J66Q..FOSOV..SARA
19:17:25	STP15		T..DVV..DBL..CHESZ
▶ 19:17:35	EAGZ013		YYA..IHHIB..DOGNE.
▶ 19:17:35	UAL1235		
▶ 19:18:35	VANDY21		
19:18:35	RP114		.ELY..BCE..TBC..INW
▶ 19:18:55	ABRR313		.O..LAKRR..ZZYZX..I
19:19:35	UAL1705		.DTA..RUMPS..OAL..
19:19:35	UAL527		042Q..FTI..MDANO..I
19:19:45	RDR114		1050W..3940N/111
▶ 19:20:25	EAGA014		4053N/11024W..40
19:20:35	SWA2895		FF..VIVID..DLH..YSP..
▶ 19:20:55	EAGU015		004W..4101N/1100
▶ 19:20:55	EAGS014		INE..SLOAP..BLIDA..
19:21:35	UAL2008		OAL..INYOE..KSFO
19:21:35	RC20		537W..3824N/1150
▶ 19:21:35	EAGW016		6N/11258W..4223N
19:22:35	UAL15		69W..KD66S..KU63

Figure 30. Release Now Option for an Inactive Target

Release with delay(s)

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

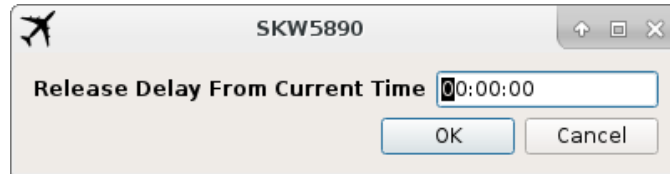


Figure 31. Release with Delay Option for an Inactive Target

Release at

Activates the target at the specified external system time.

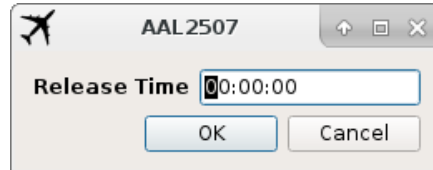


Figure 32. Release at a Specified Time for an Inactive Target

Release at randomized

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

Clone

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

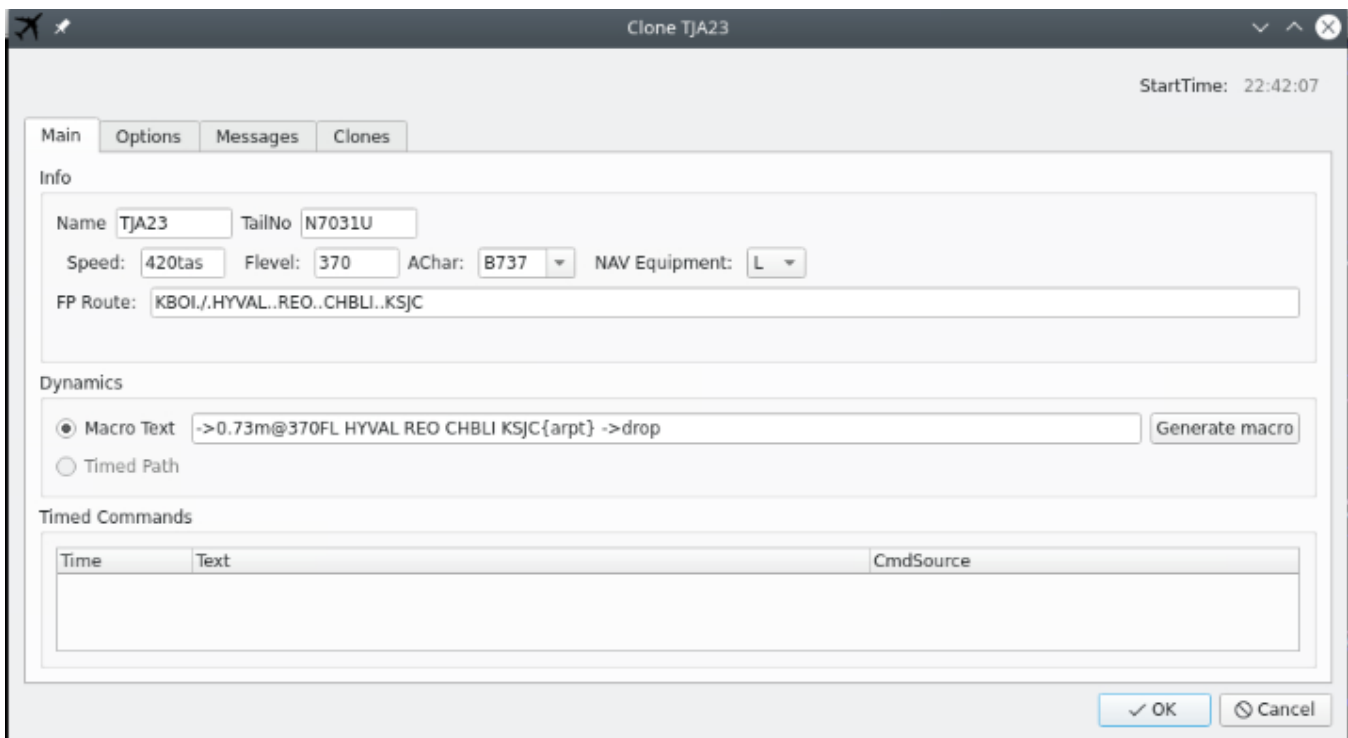
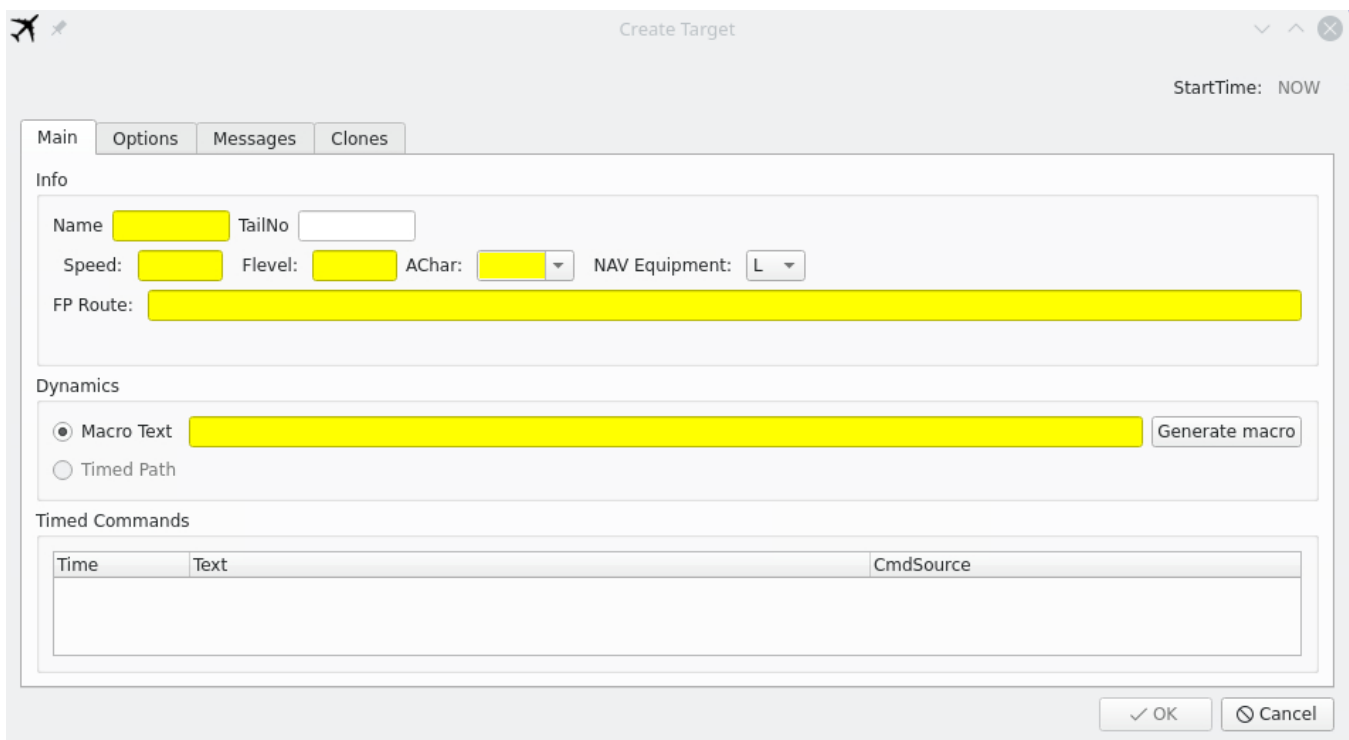


Figure 33. Clone Dialog for an Inactive Target

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:

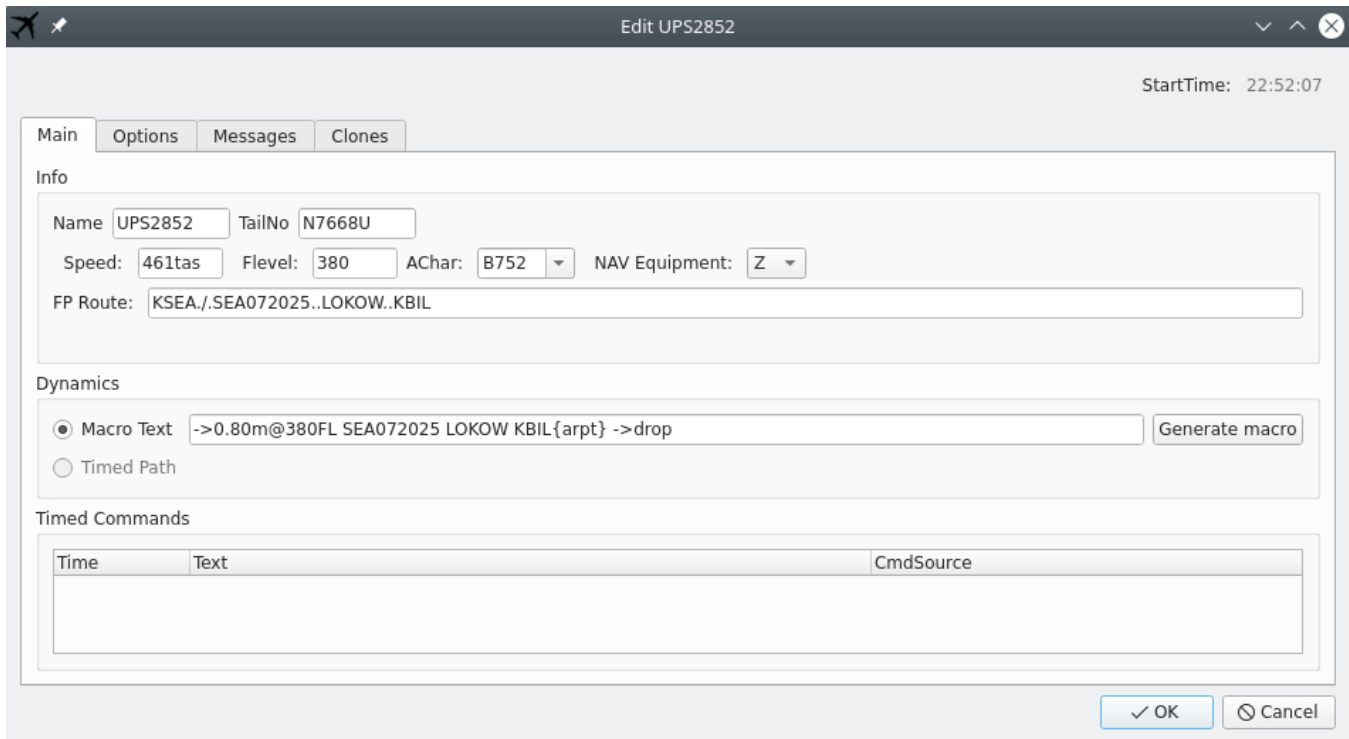
- Start Time:** NOW
- Info Section:**
 - Name: [Yellow field]
 - TailNo: [White field]
 - Speed: [Yellow field]
 - Flevel: [Yellow field]
 - AChar: [Yellow dropdown menu]
 - NAV Equipment: [L dropdown menu]
 - FP Route: [Yellow text area]
- Dynamics Section:**
 - Macro Text [Yellow text area] Generate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

Time	Text	CmdSource
- Buttons:** OK, Cancel

Figure 34. 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

Timed Commands

Time	Text	CmdSource

Figure 35. 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.

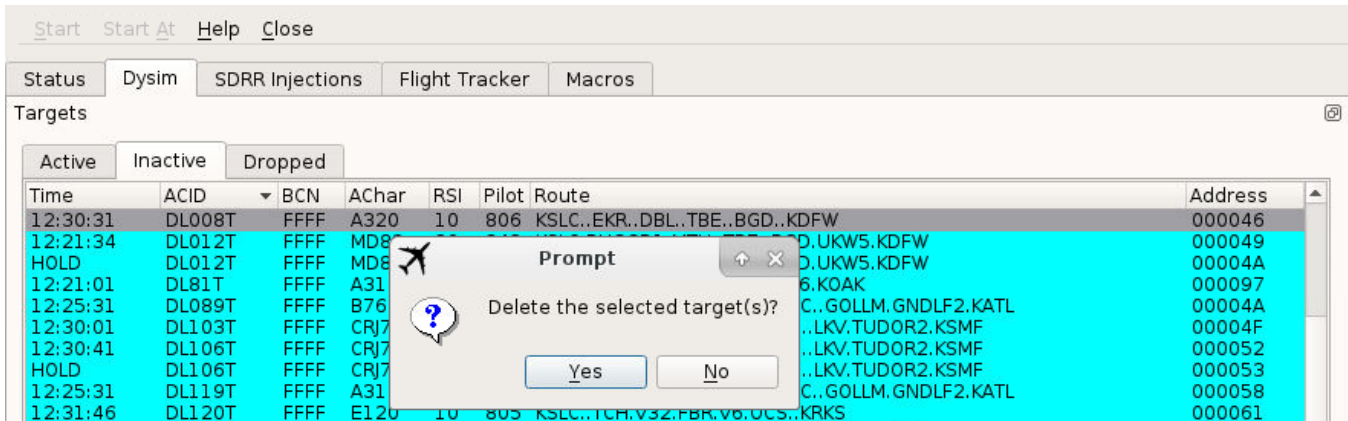


Figure 36. Delete an Inactive Target

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.

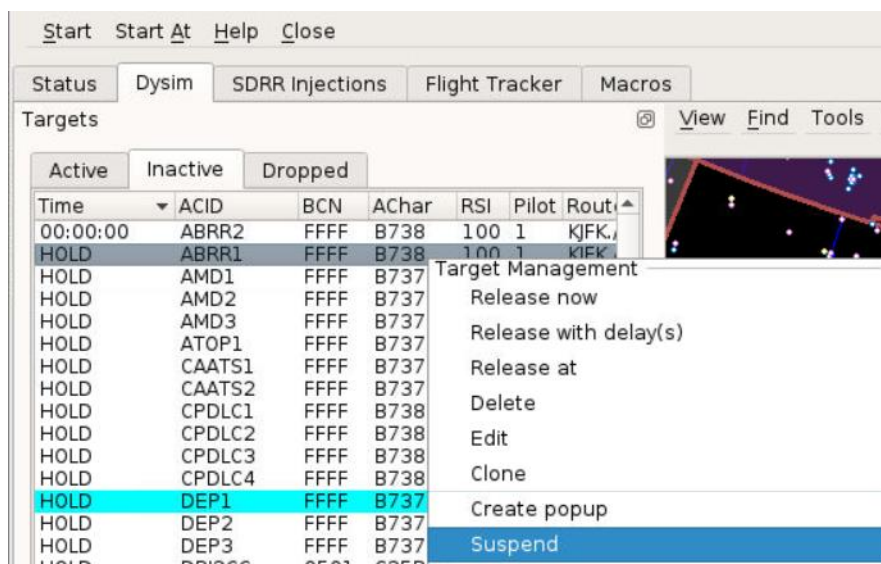


Figure 37. Suspend an Inactive Target

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.

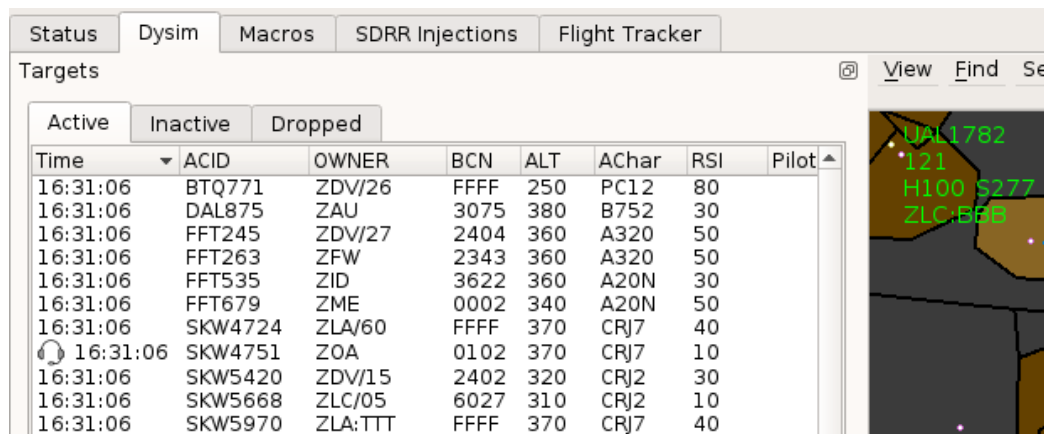


Figure 38. Flight SKW4751 Set for Manual Response Mode

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.

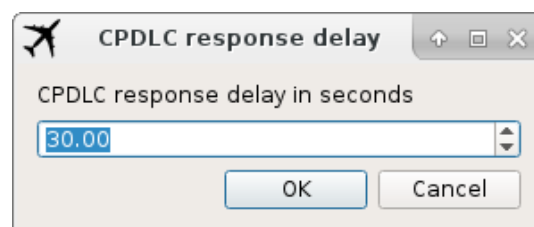


Figure 39. CPDLC Response Delay

Enable auto logon

Enables auto logons.

Disable auto logon

Disables auto logons.

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.

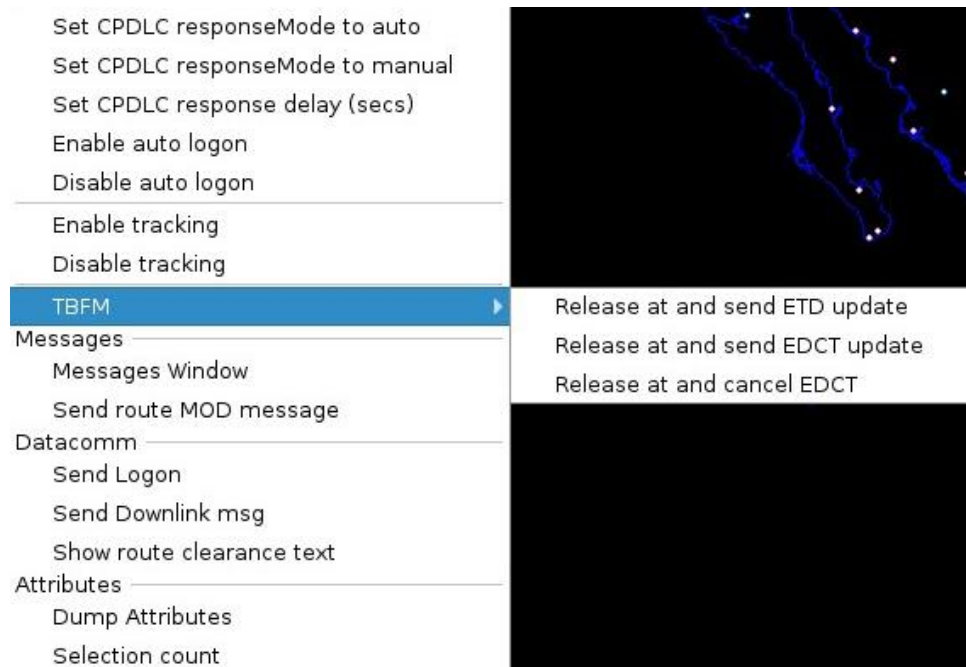


Figure 40. TBFM Options

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

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.

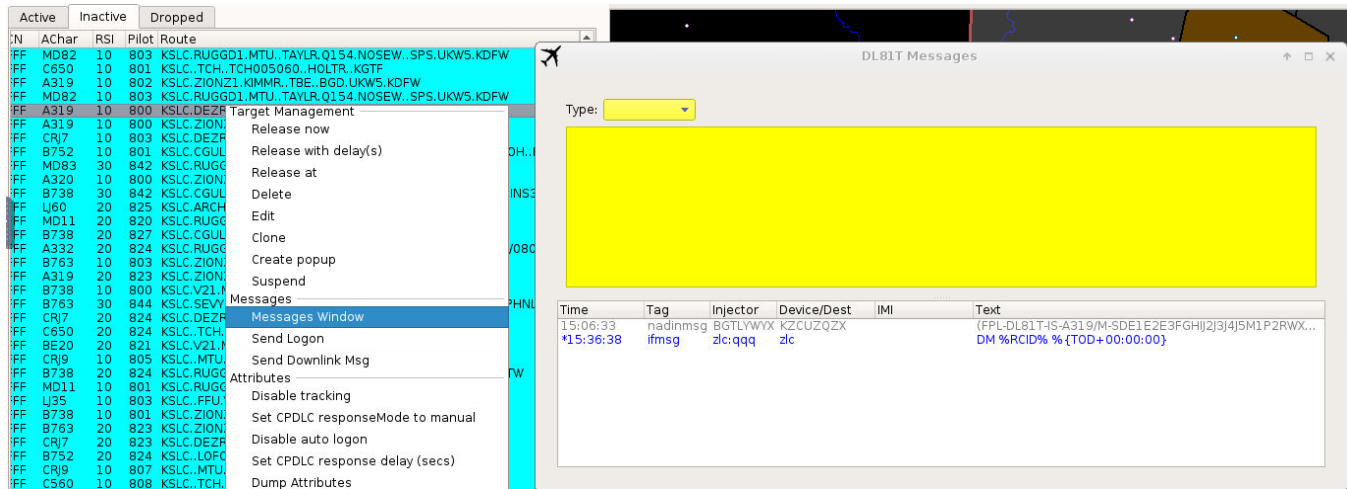


Figure 41. Message Window for an Inactive Target

Send route MOD message

Displays a MOD message dialog box.

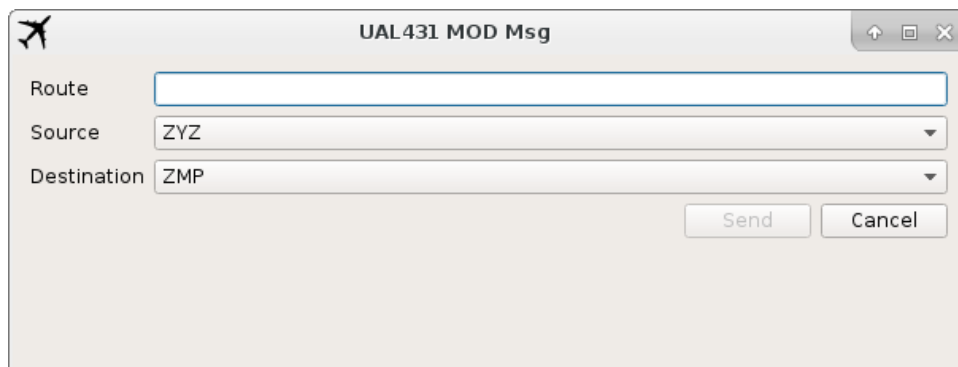
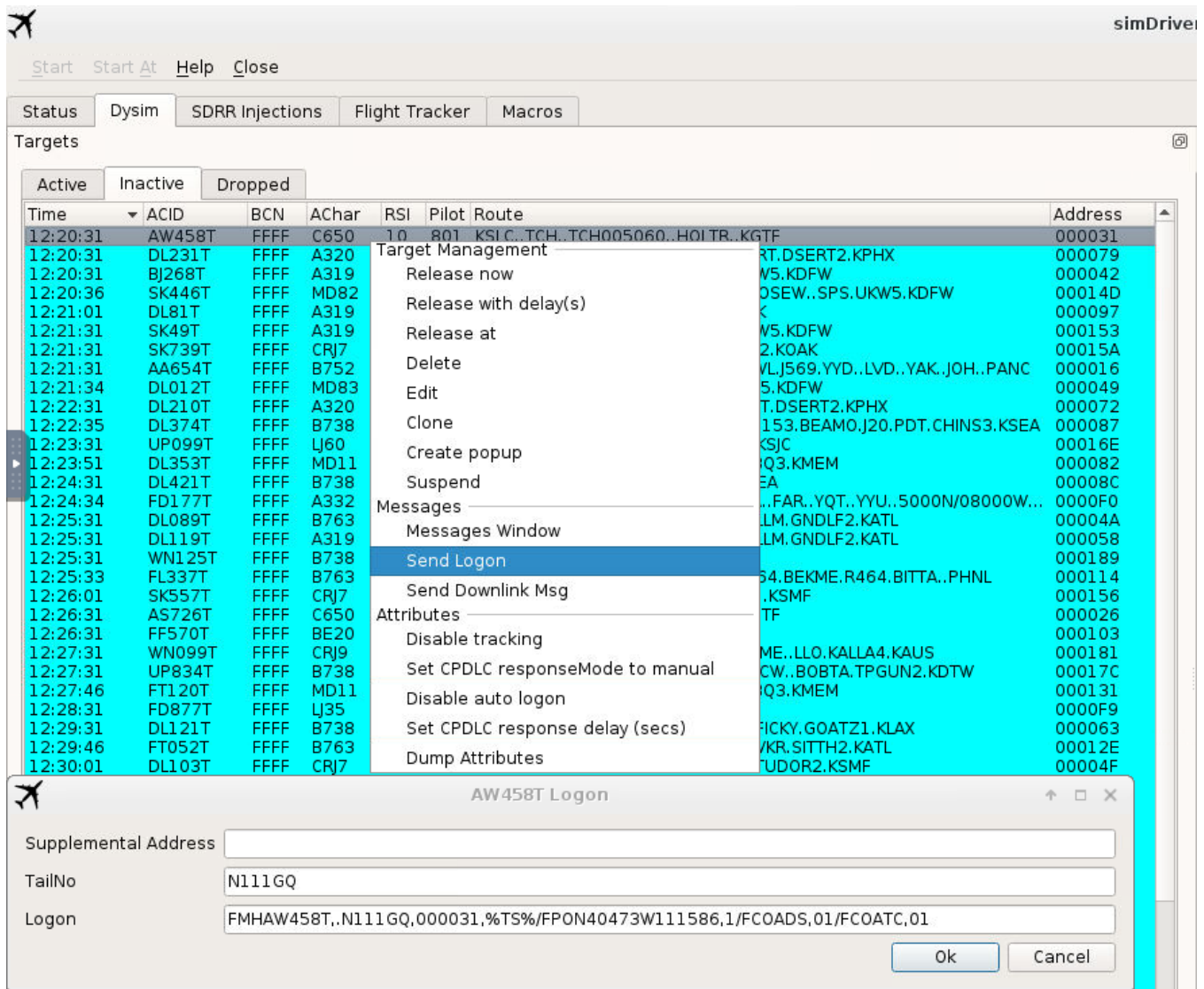


Figure 42. Send a Route Modification Message

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 the 'simDrive' application window with a 'Targets' list. The list has columns for Time, ACID, BCN, AChar, RSI, Pilot Route, and Address. The target 'AW458T' is selected, and a context menu is open over it. The 'Send Logon' option is highlighted. Below the list, a dialog box titled 'AW458T Logon' is open, showing the following fields:

Field	Value
Supplemental Address	
TailNo	N111GQ
Logon	FMHAW458T,.N111GQ,000031,%TS%/FPON40473W111586,1/FCOADS,01/FCOATC,01

Figure 43. Send Logon for an Inactive Target

Send Downlink Msg

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

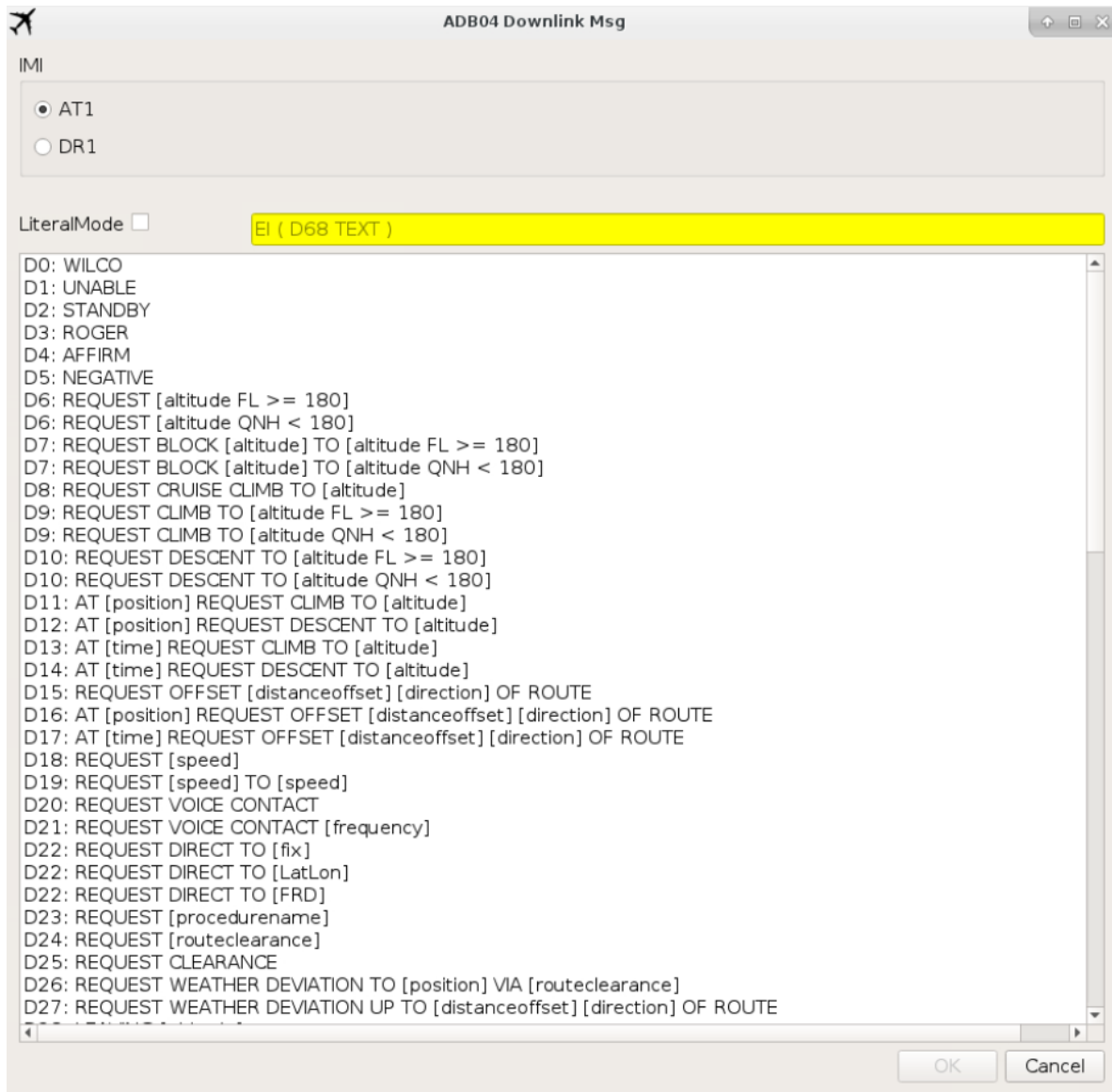


Figure 44. Send Downlink Message for an Inactive Target – part 1

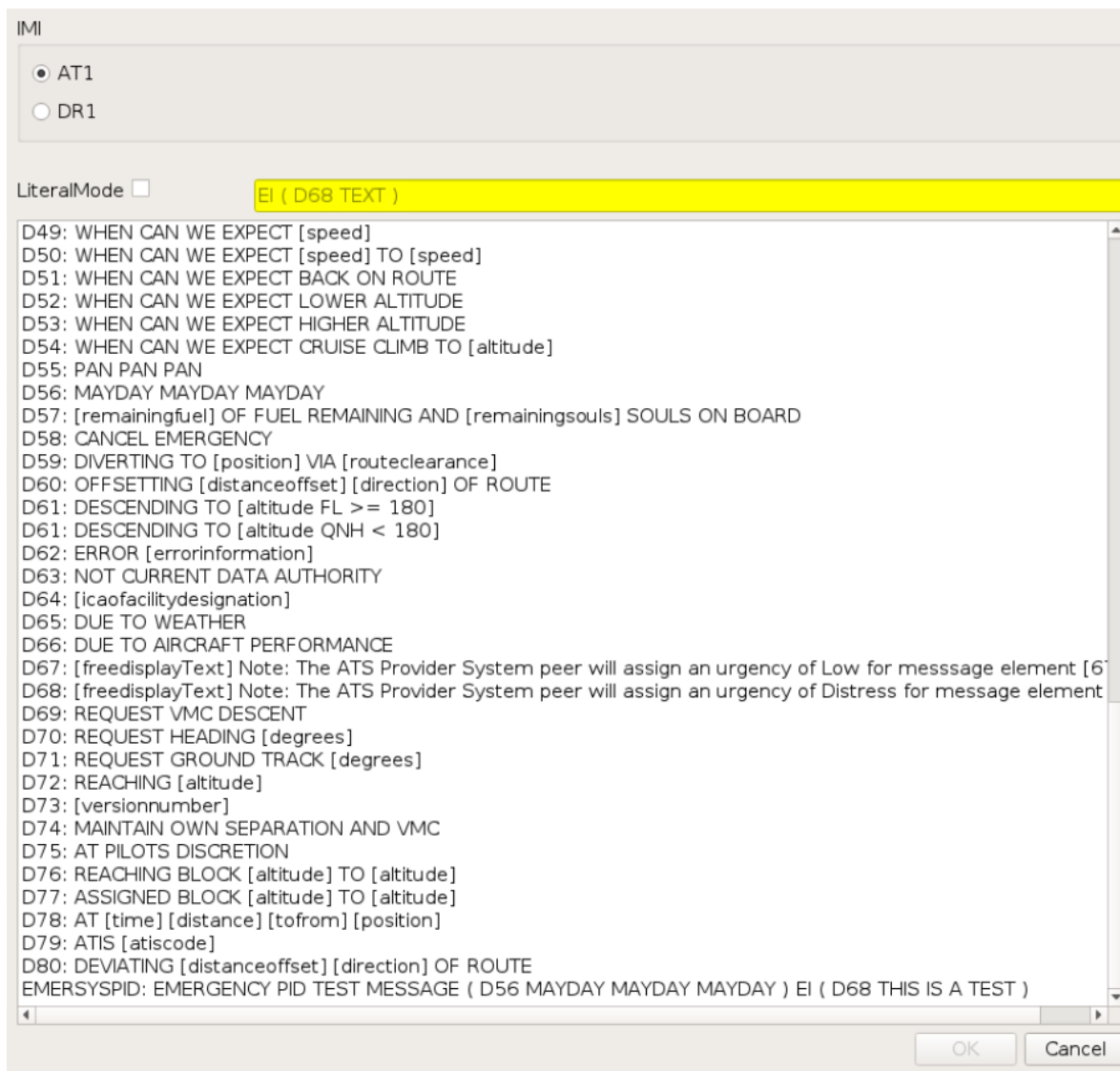


Figure 45. Send Downlink Message for an Inactive Target – part 2

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 exact same characteristics as the selected one.

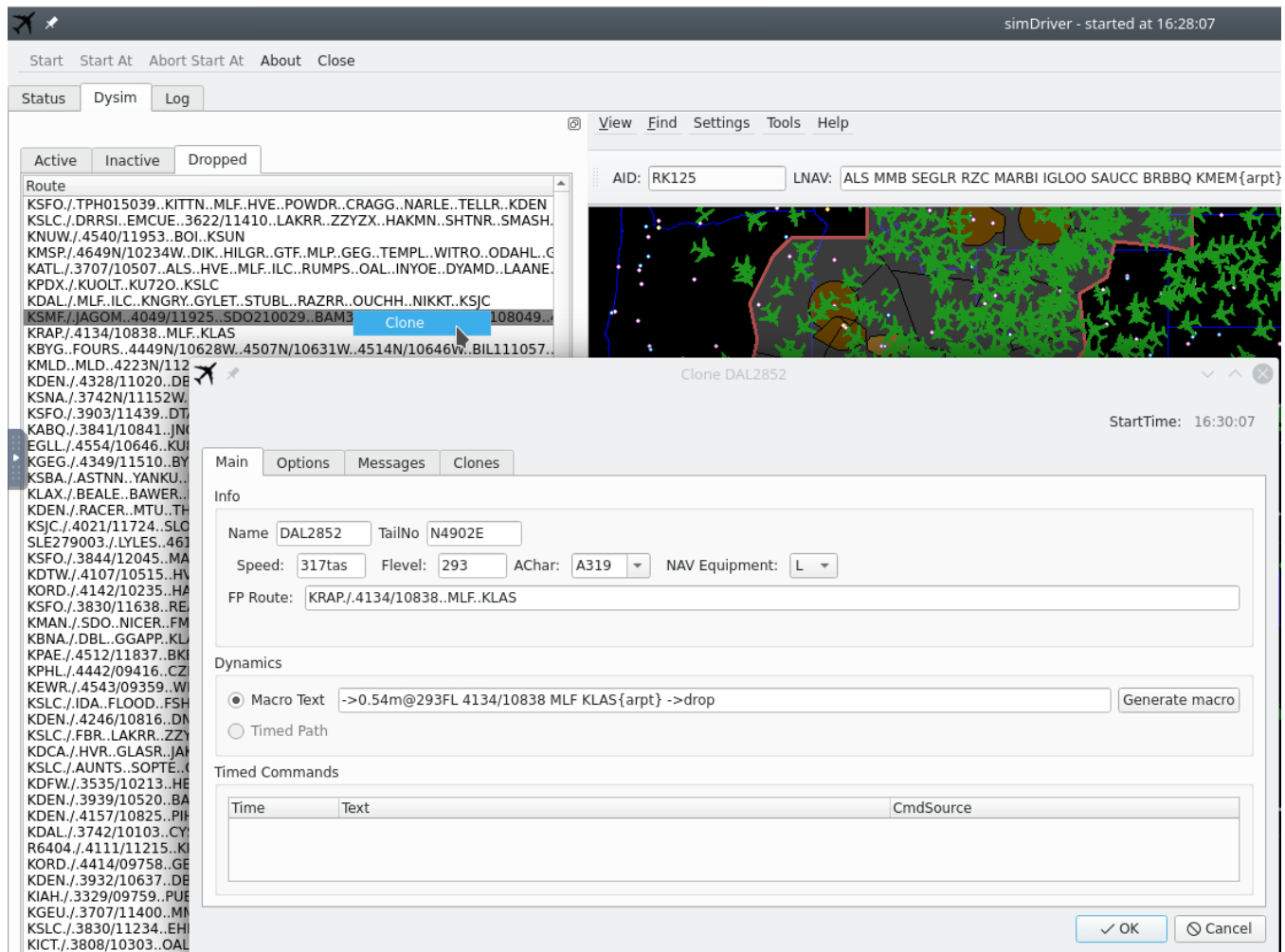


Figure 46. Clone Dialog for a Dropped Target

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., 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.

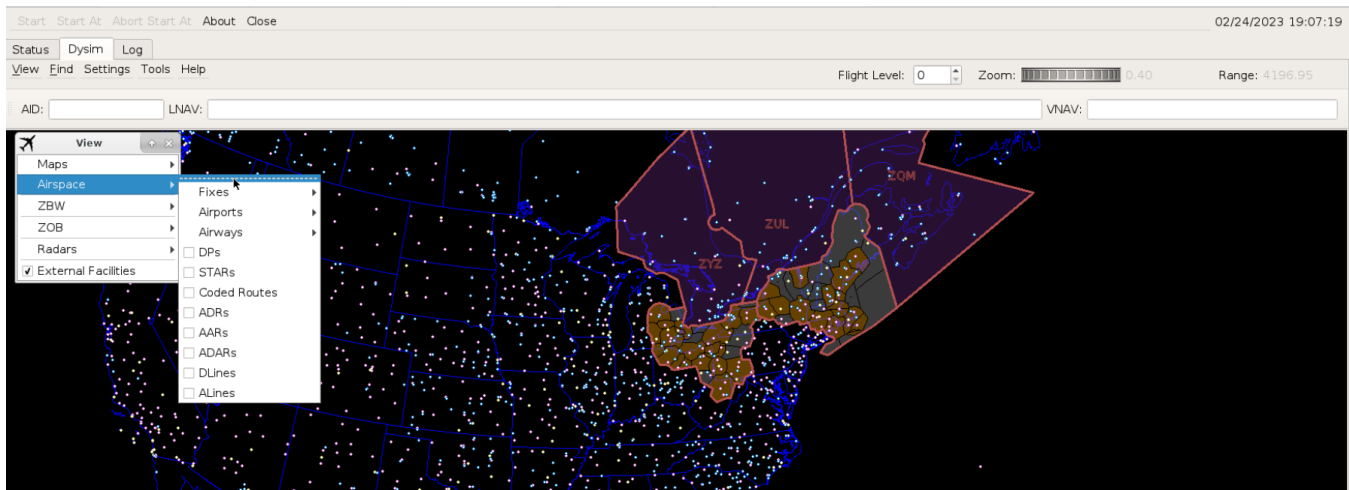


Figure 47. Menu Tear Off

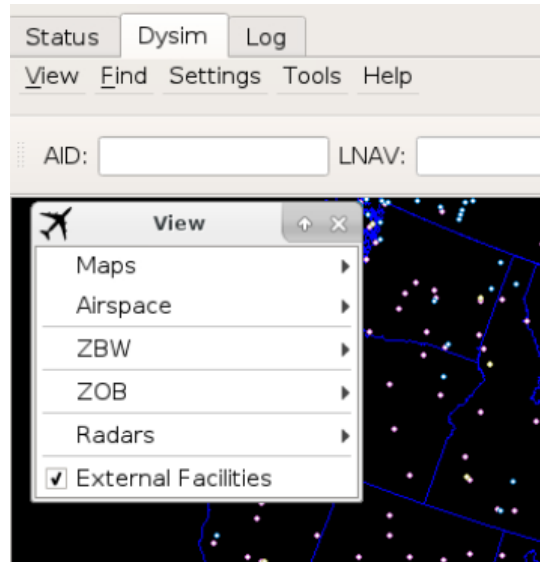


Figure 48. New Dialog

Maps

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

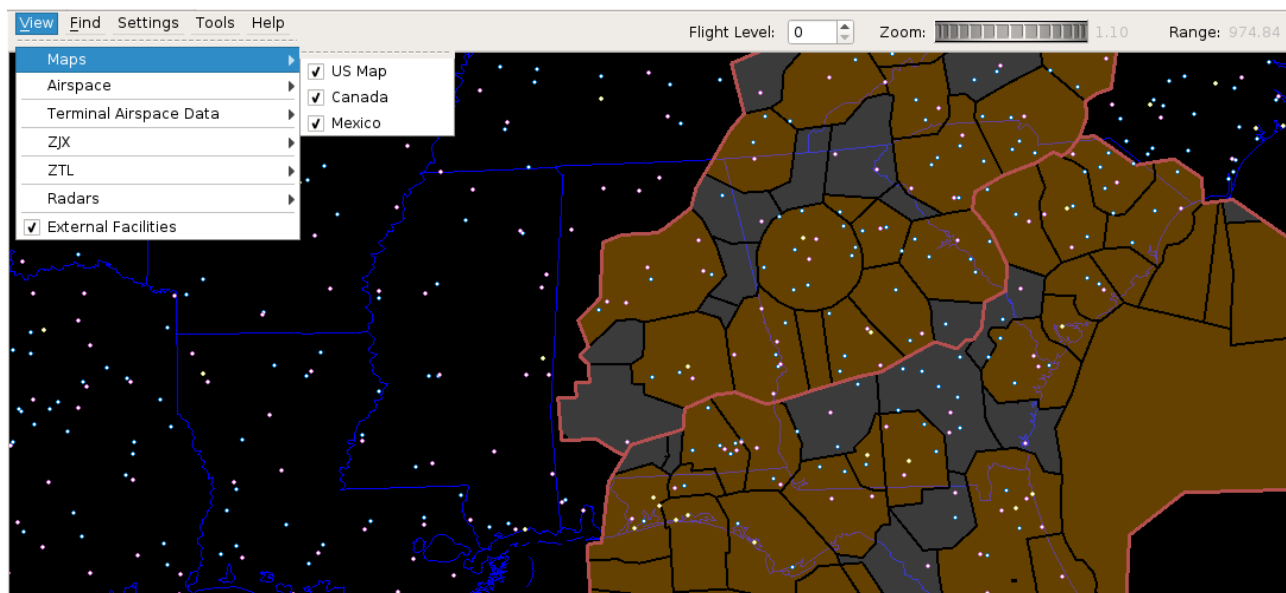


Figure 49. Map View Options

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.

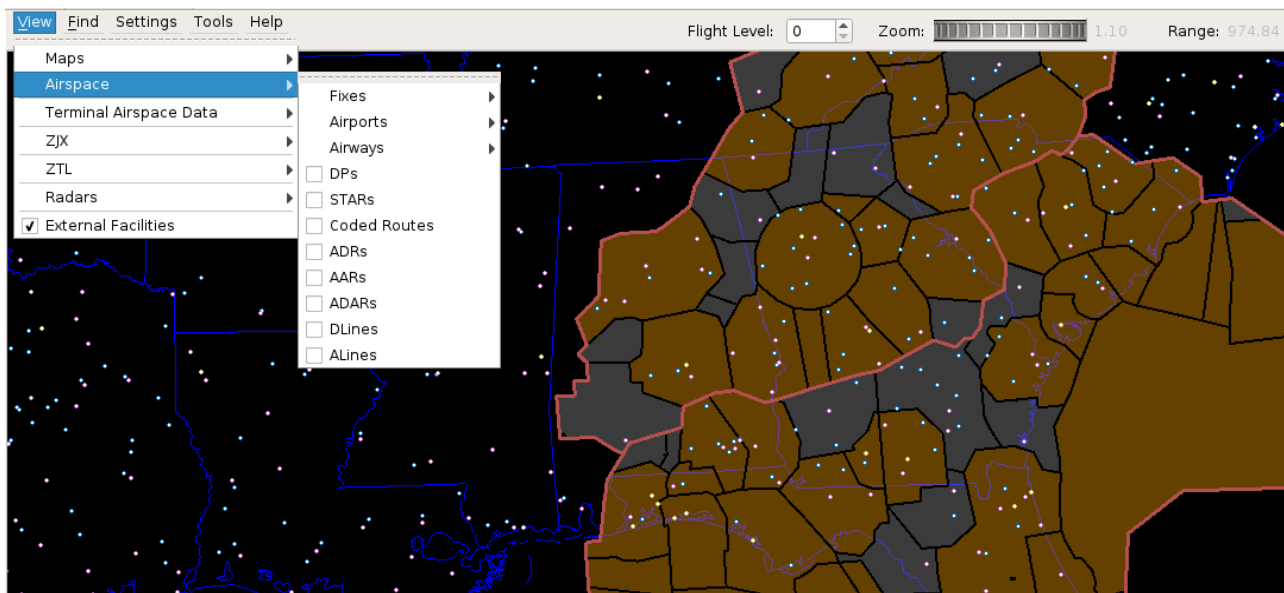


Figure 50. Airspace View Option

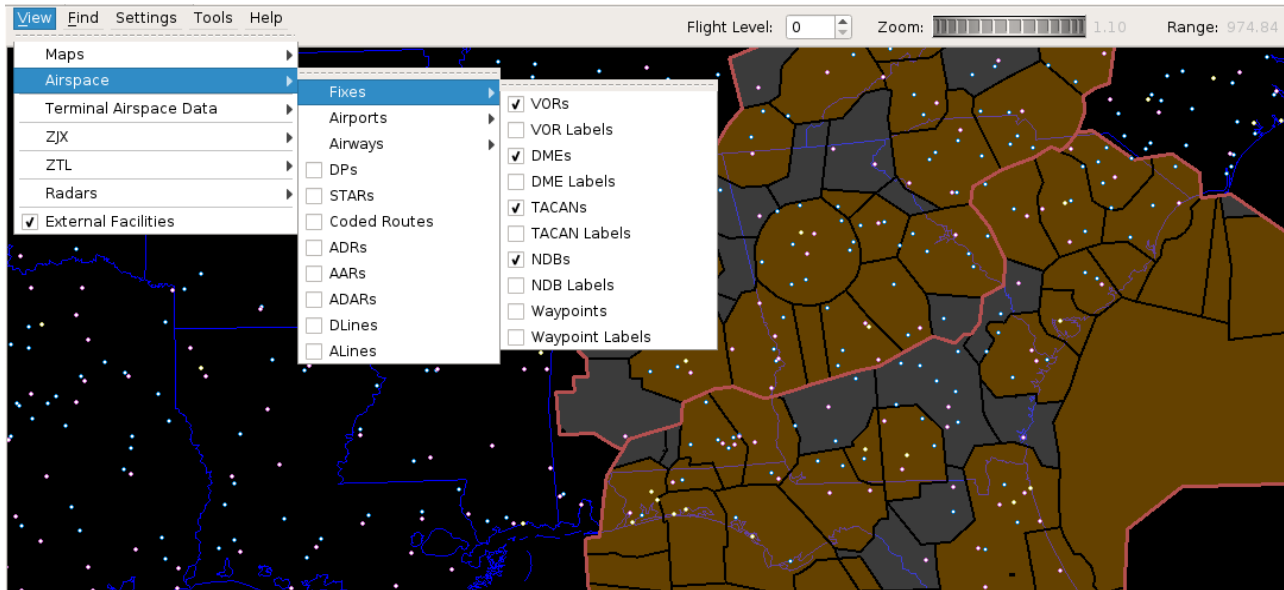


Figure 51. Airspace Fixes View Options

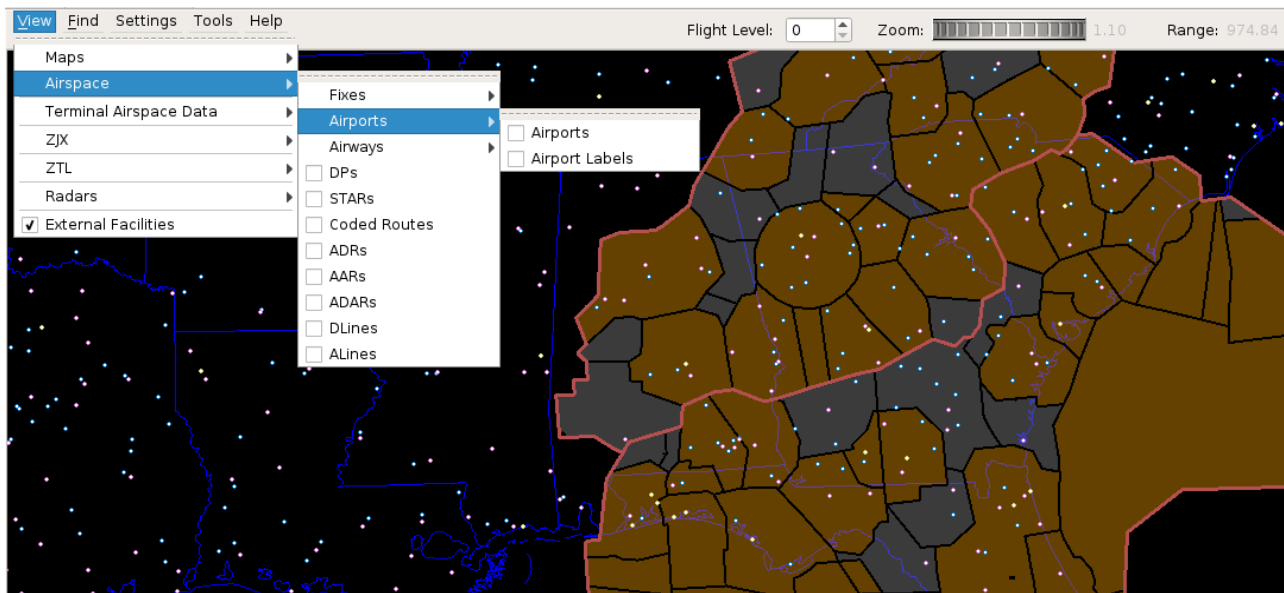


Figure 52. Airspace Airports View Options

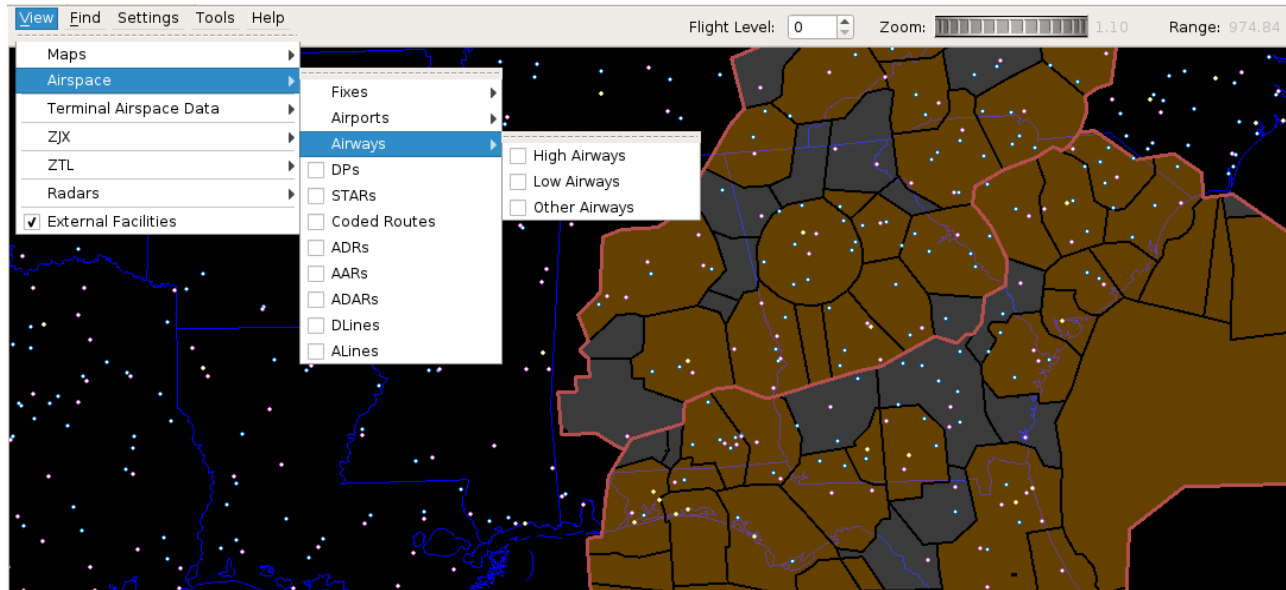


Figure 53. Airspace Airways View Options

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.

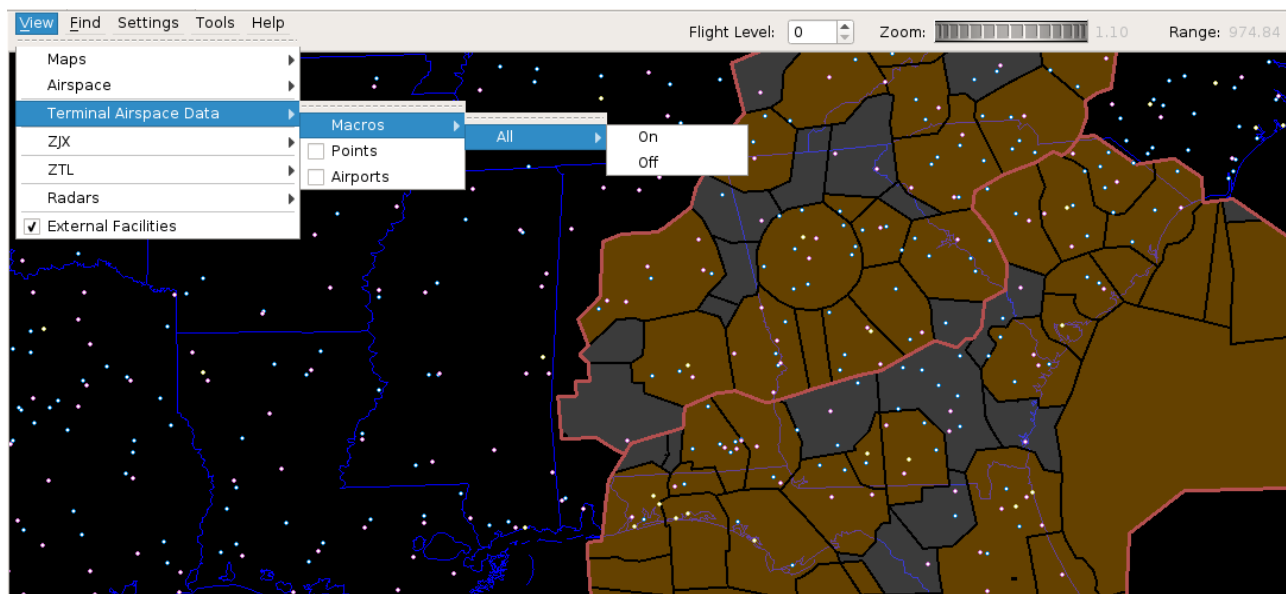


Figure 54. Terminal Airspace Data View Option

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).

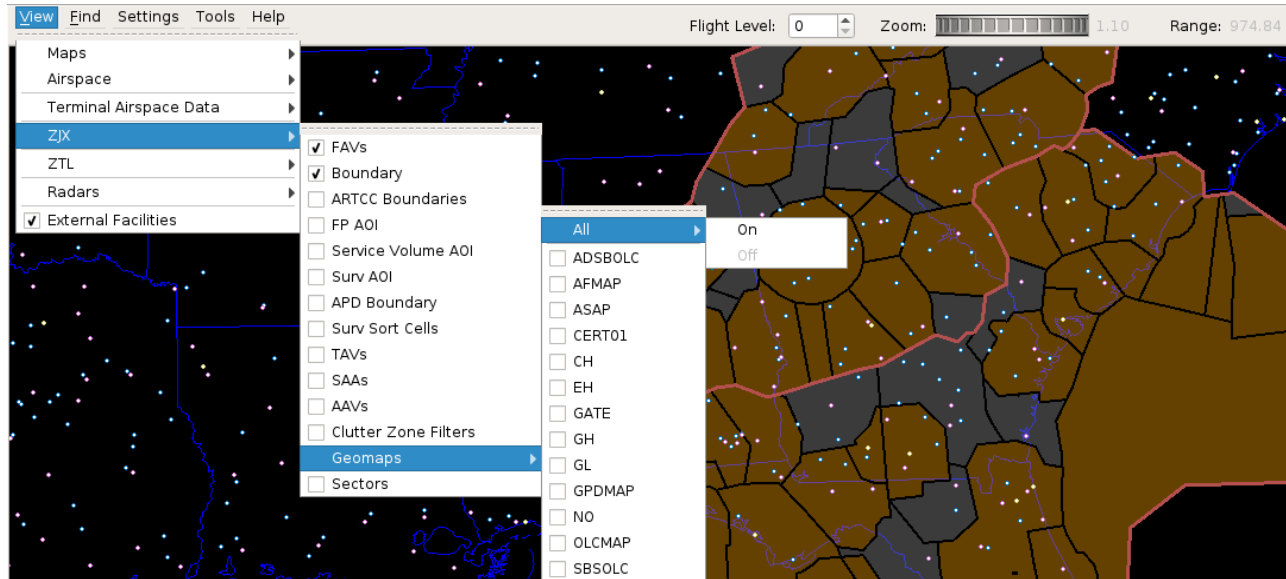


Figure 55. Adapted En Route Facility View Options

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.

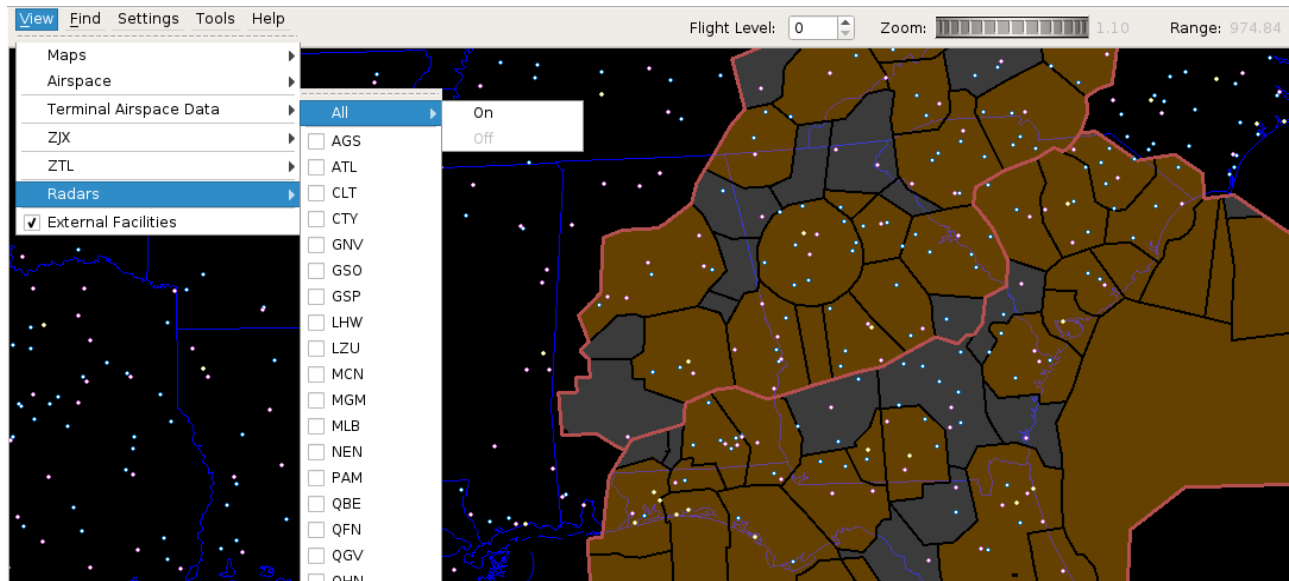


Figure 56. Radar View Options

External Facilities

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

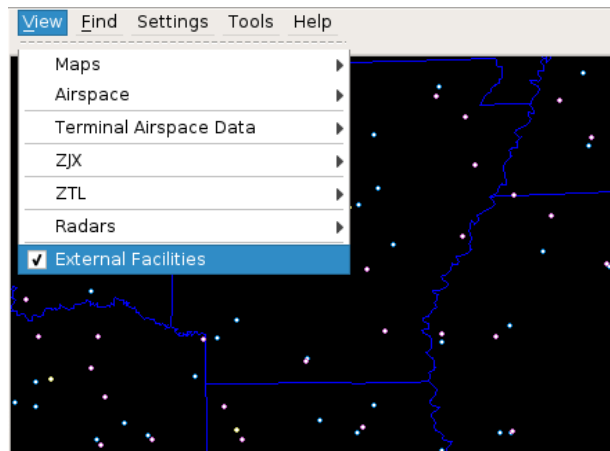


Figure 57. External Facilities View Option

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.

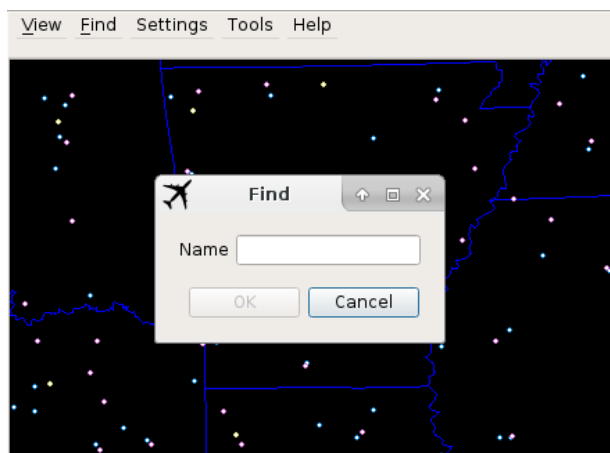


Figure 58. Find Dialog

Settings

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

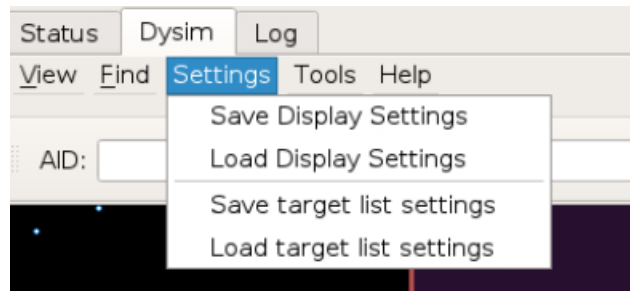


Figure 59. Settings Options

Save Display Settings

Allows saving of preferred display settings.

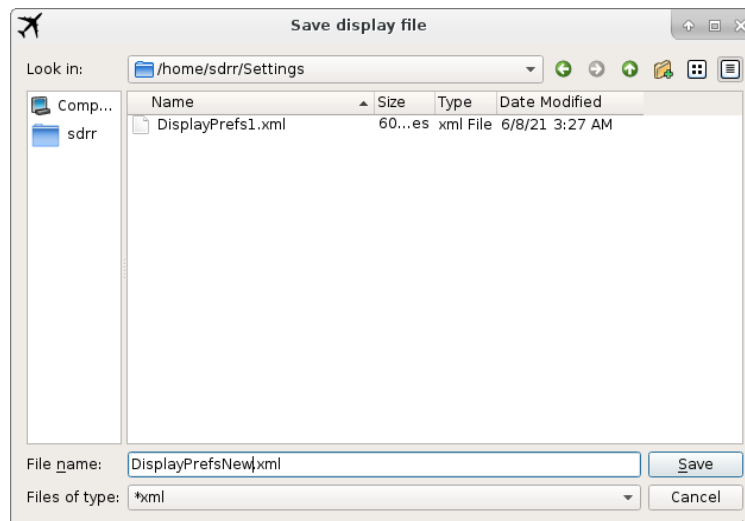


Figure 60. Save Display Settings Dialog

Load Display Settings

Allows loading of previously saved display settings.

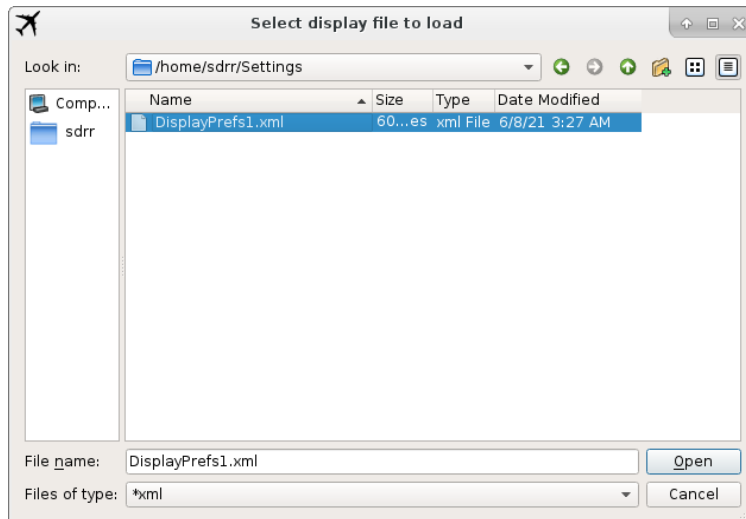


Figure 61. Load Display Settings Dialog

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.

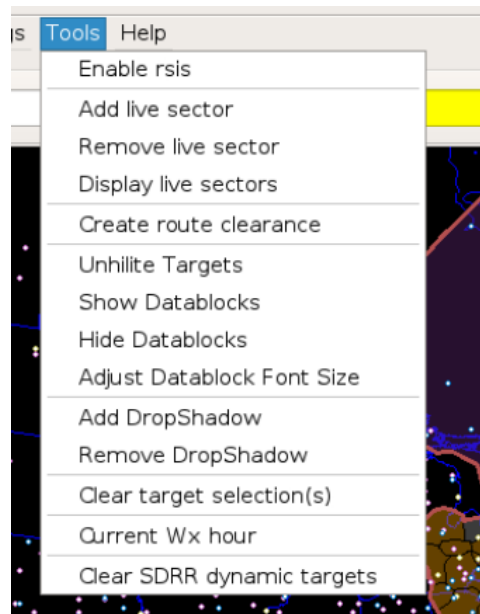


Figure 62. Enable RSIs Tools Menu Option

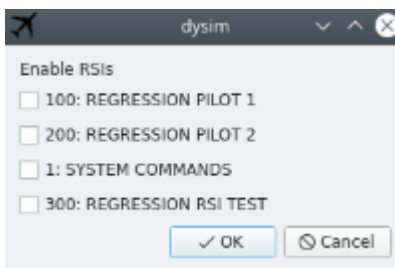


Figure 63. Enable RSIs Dialog

Add live sector

Identifies sector position as having live controller interaction.

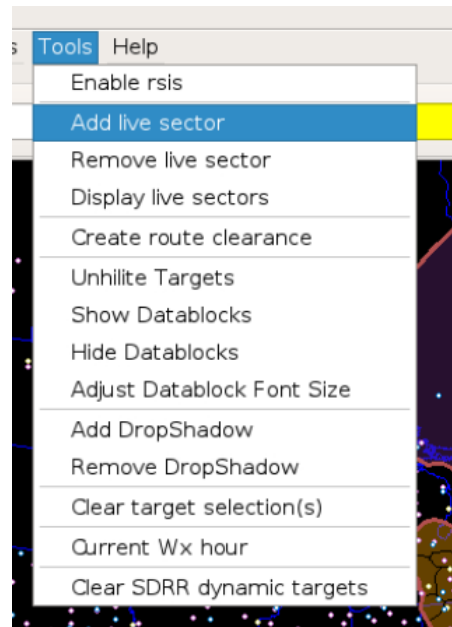


Figure 64. Add Live Sector Tools Menu Option

NOTE: Multiple sectors can be added at one time.

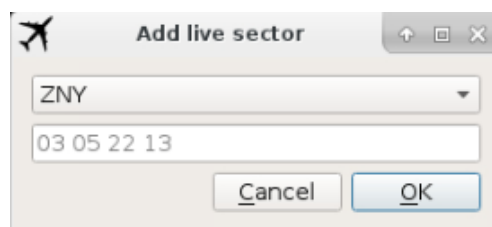


Figure 65. Add Live Sector Dialog

Remove live sector

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

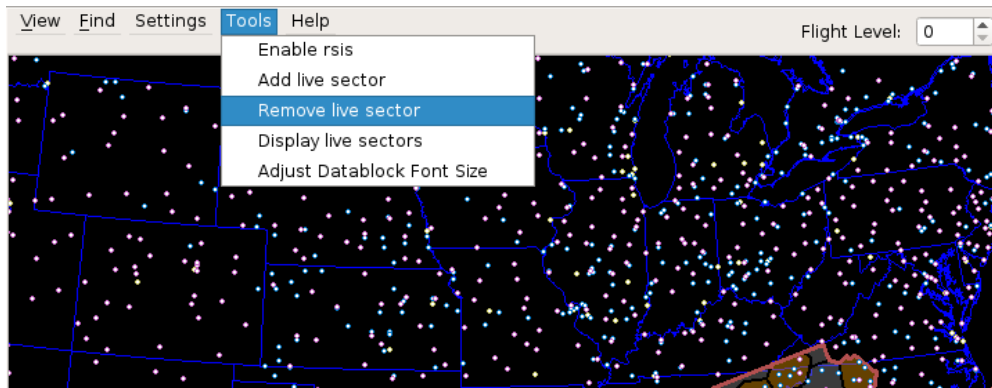


Figure 66. Remove Live Sector Tools Menu Option

NOTE: Multiple sectors can be removed at one time.

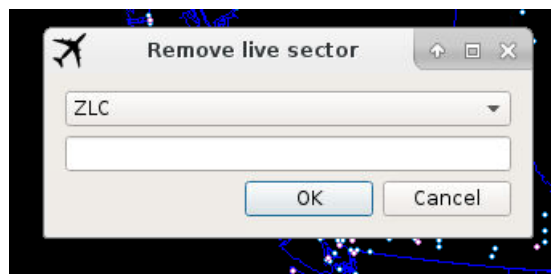


Figure 67. Remove Live Sector Dialog

Display live sectors

Displays all sector positions identified as having live controllers.

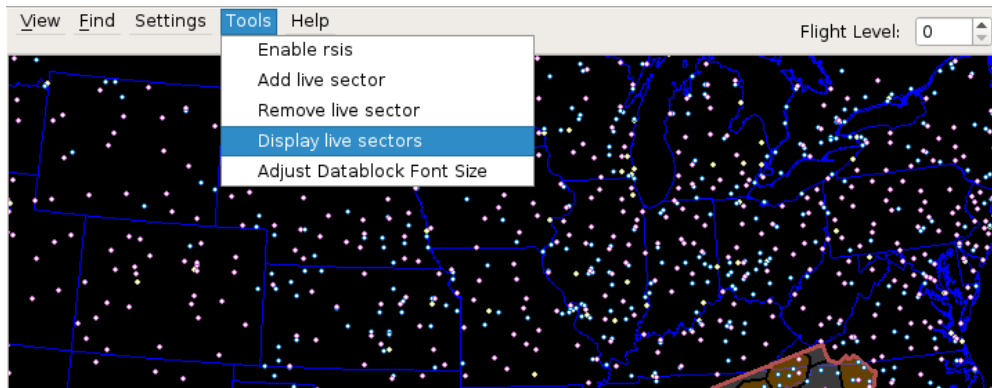


Figure 68. Display Live Sectors Tools Menu Option

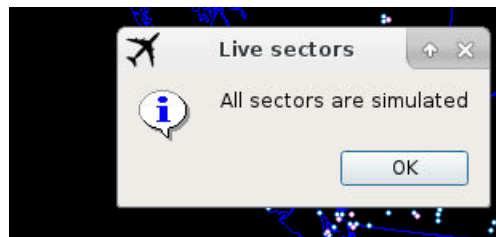


Figure 69. Display Live Sectors Dialog

Adjust Datablock Font Size

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

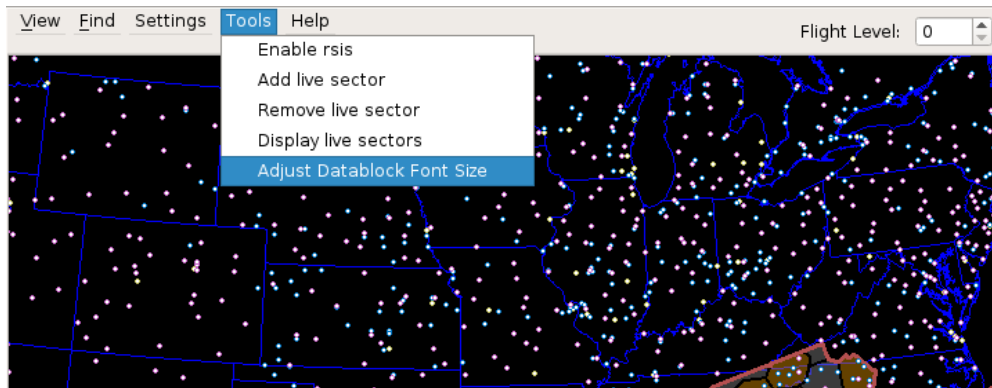


Figure 70. Adjust Datablock Font Size Tools Menu Option

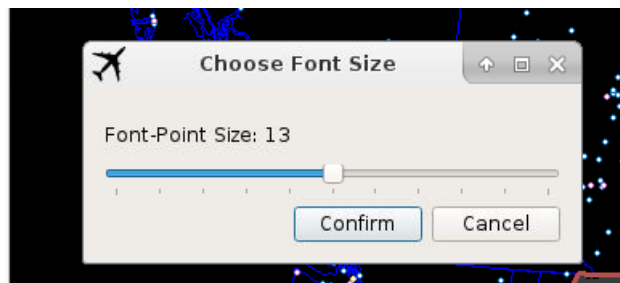


Figure 71. Adjust Datablock Font Size Dialog

Create route clearance

Opens a dialog to enter a route clearance.

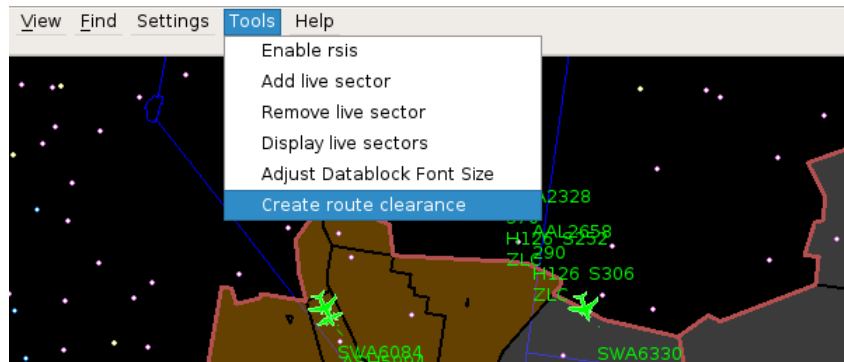


Figure 72. Create Route Clearance Tools Menu Option

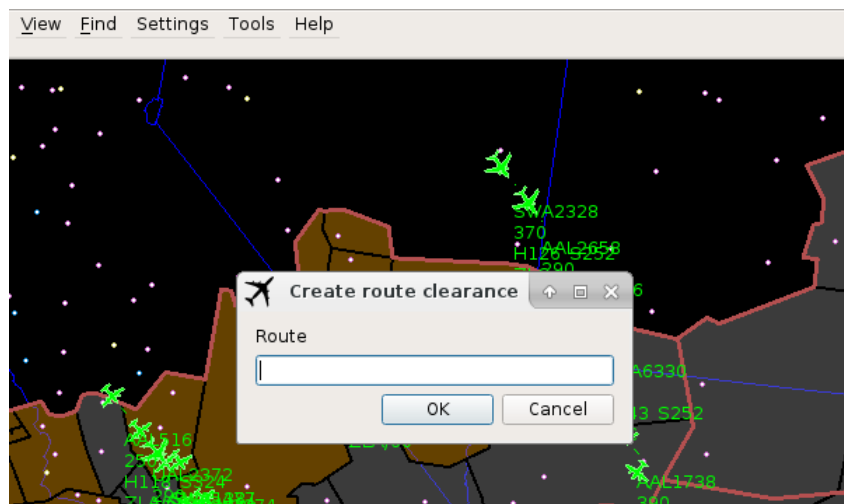


Figure 73. Create Route Clearance Dialog

Unhilit Targets

Removes all highlighted flight paths.

Show/Hide

Shows/Hides Datablocks on map.

Add/Remove Dropshadow

Adds/removes dropshadow from targets and datablocks.

Clear Target Selections

Unhighlights any selected flights.

Current Wx Hour

Displays the current weather hour.

Clear SDRR Dynamic Targets

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

Help

Clicking on **Help** displays submenus for:

Macro definitions

Displays a list of available macro commands.

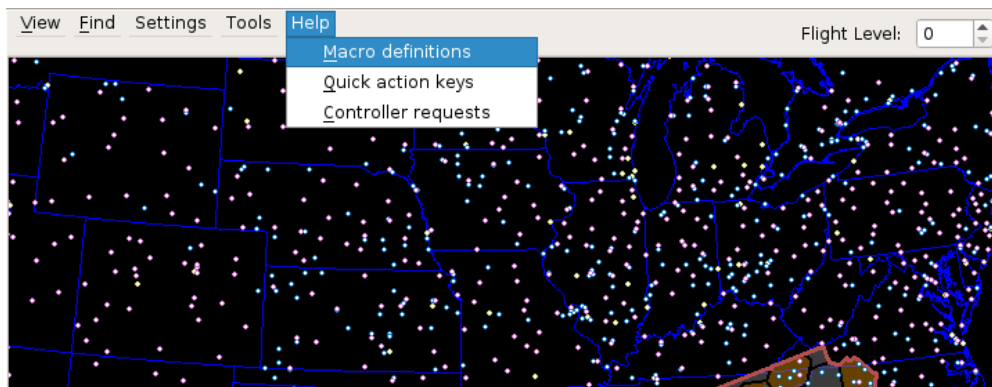


Figure 74. Macro Definitions Help Menu Option

✈
Macro definitions

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)@dddft

- Heading: ->ddd[RL]mag or ->ddd[RL]truef(~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): ->B0000
 - 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:>dddft}
 - Speed terminate: ->maintain{vnavTerm:>200(cas|tas)}

Fix Attributes:

- Arpt: {arpt}
- Dep Runway: {rw:26R}

- AltRestriction: {[<>]dddft}
- SpdRestriction: {[<>]ddd(cas|tas)}
- Radial turn: {rf}{turnDir:[LR]}

Figure 75. Macro Definitions Help Page

Quick action keys

Displays a list of available keyboard short cuts.

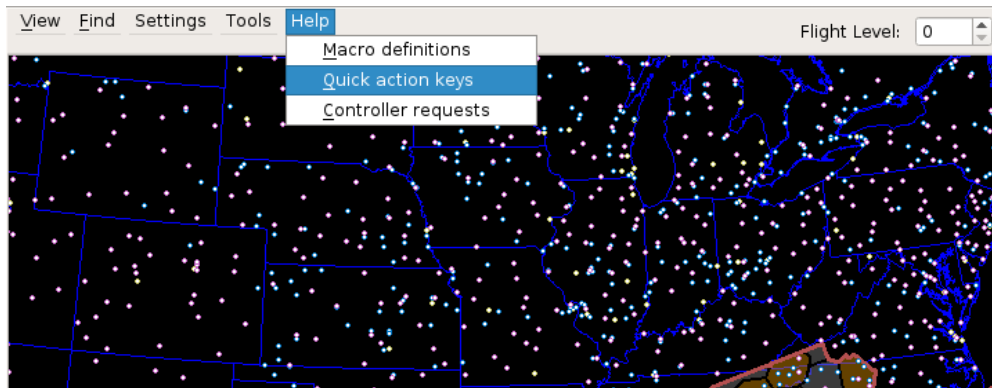


Figure 76. Quick Action Keys Help Menu Option

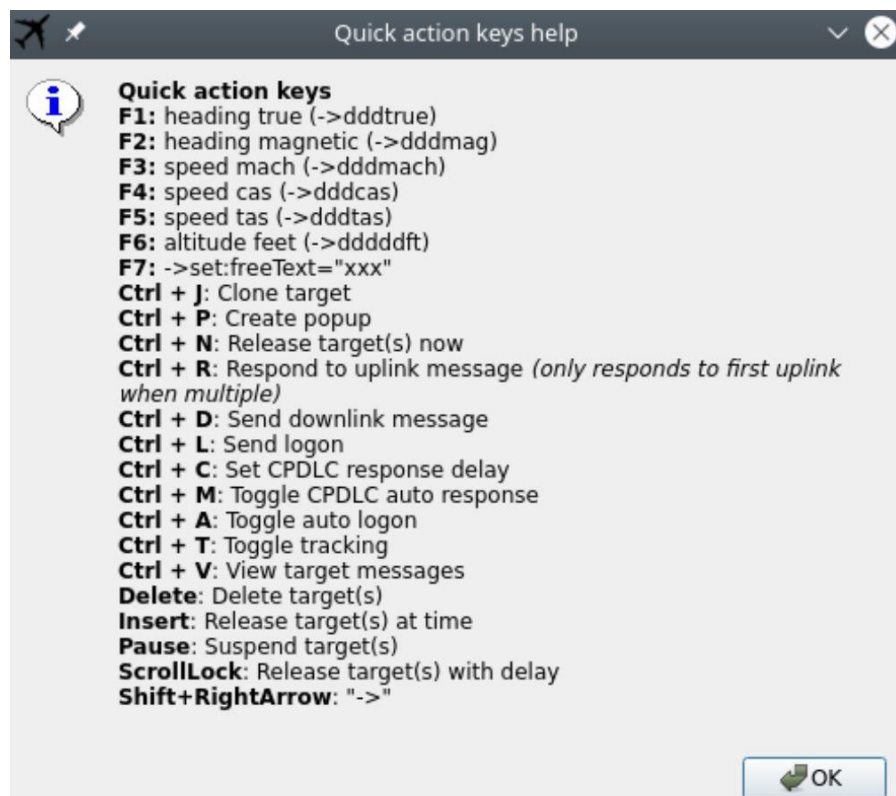


Figure 77. Quick Action Keys Help Page

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.

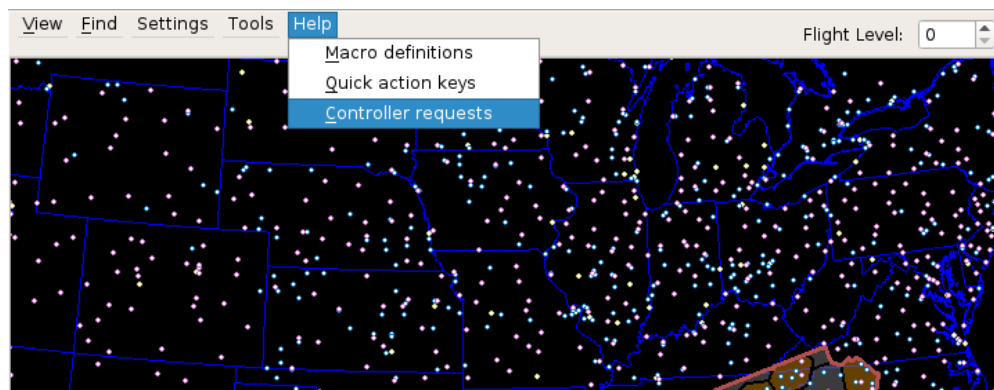


Figure 78. Controller Requests Help Menu Option



Figure 79. 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.

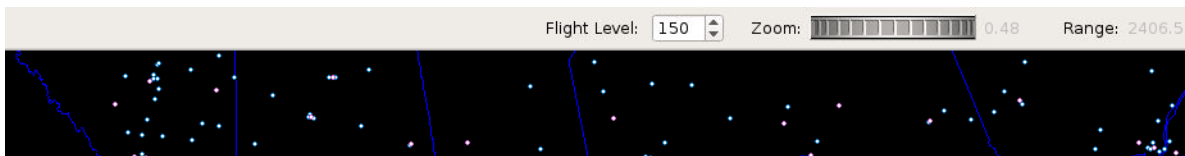


Figure 80. Flight Level

Zoom

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



Figure 81. Zoom

Range

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

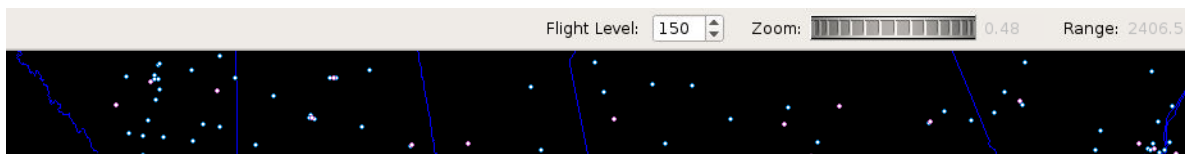


Figure 82. Range

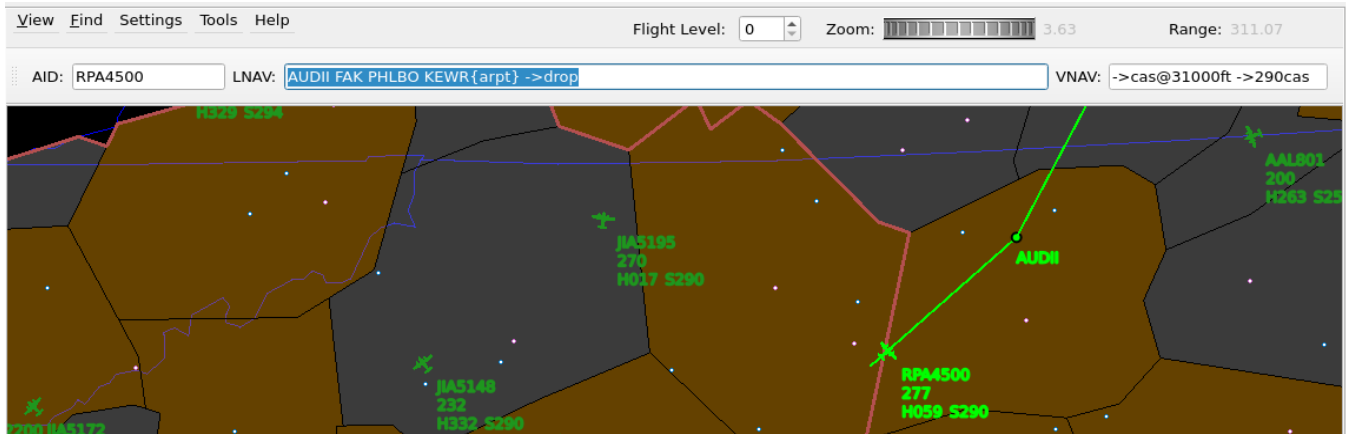


Figure 83. Macro Command Bar

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.

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): ->B0000
 - 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: {[<>]ddd(cas|tas)}
- Radial turn: {rf} {turnDir:[LR]}

Figure 84. 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~dddkt/min	Change the calibrated air speed of the target to the value specified at a given rate of change.
->dddtdas	Change the true air speed of the target to the value specified.
->dddtdas~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@dddddft or ->dddtdas@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).
->(+\-)dddft	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}, {dddtdas}, or {.ddm}

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

{>dddcas}, {>dddtdas}, 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.

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

->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.

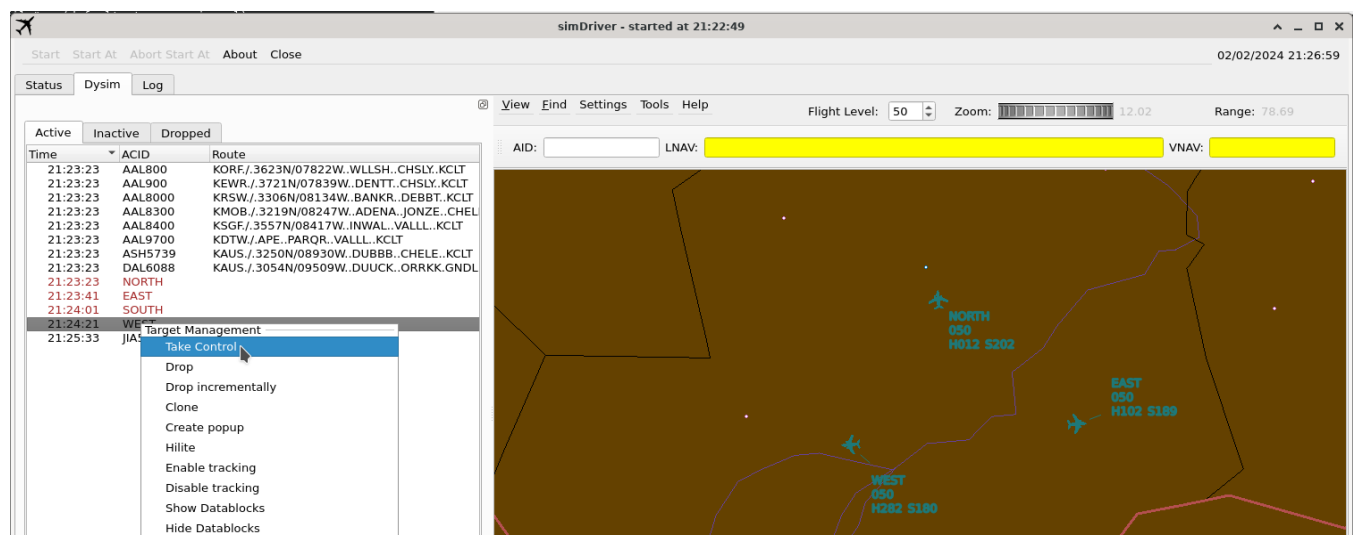


Figure 85. Time Based Targets

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.

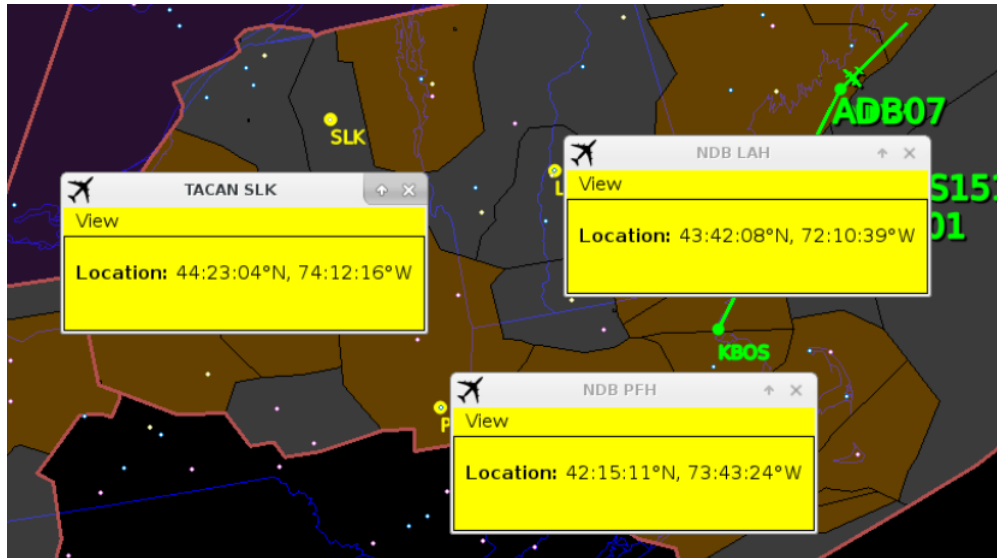


Figure 86. Context Boxes

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.

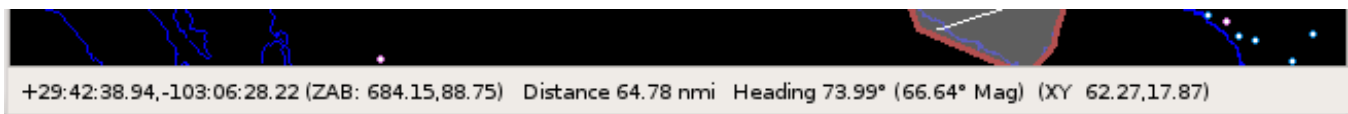


Figure 87. Status Bar

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.

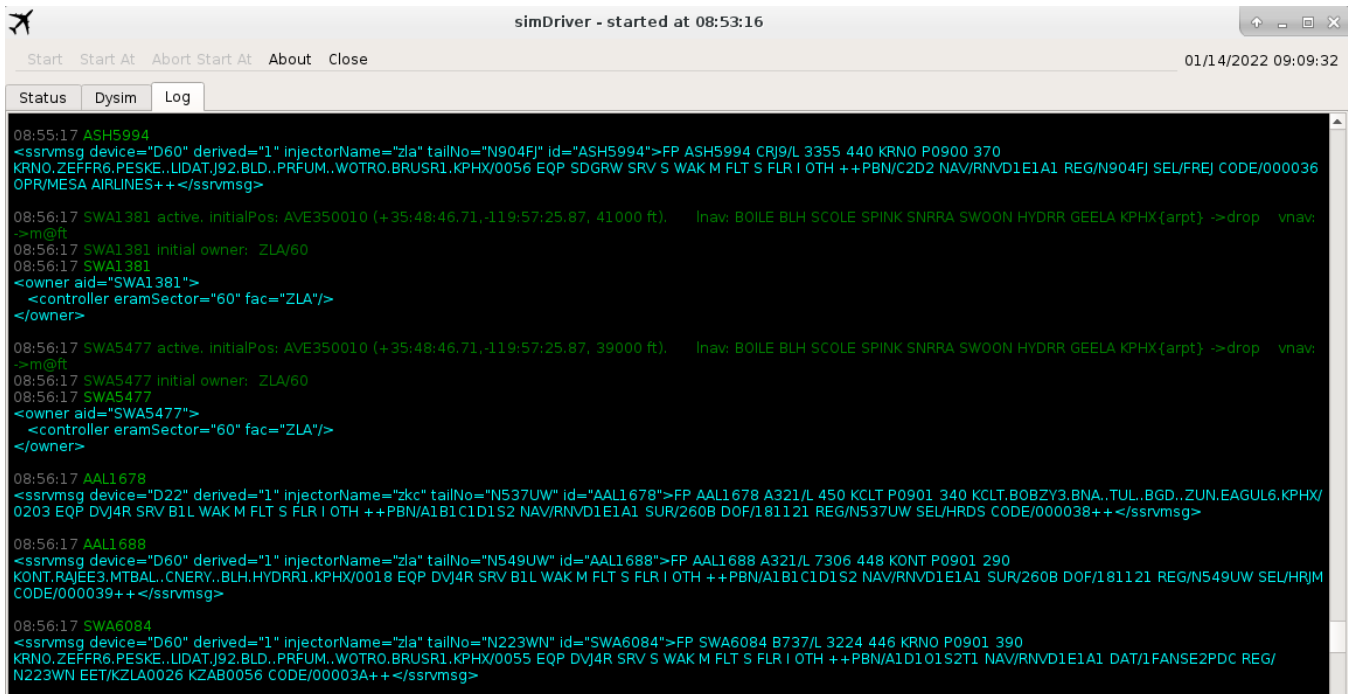


Figure 88. Log Tab

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.

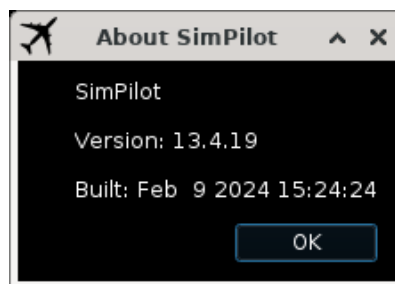


Figure 89. About SimPilot Dialog

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.

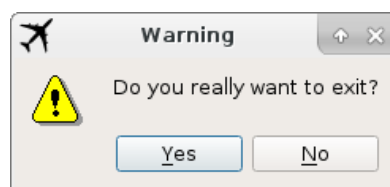


Figure 90. simPilot Exit Warning

5.3.2. Date and Time Clock

When simPilot is launched, if the connected instances 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.

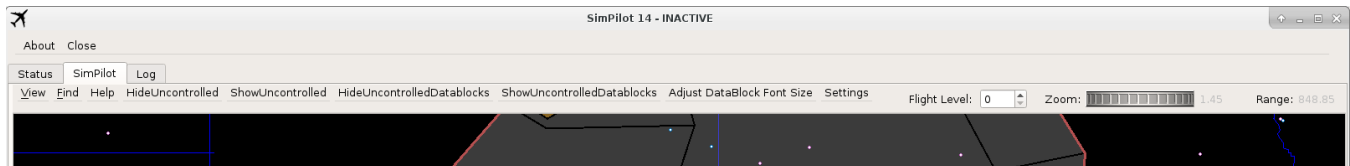


Figure 91. Inactive Status Prior to Scenario Start

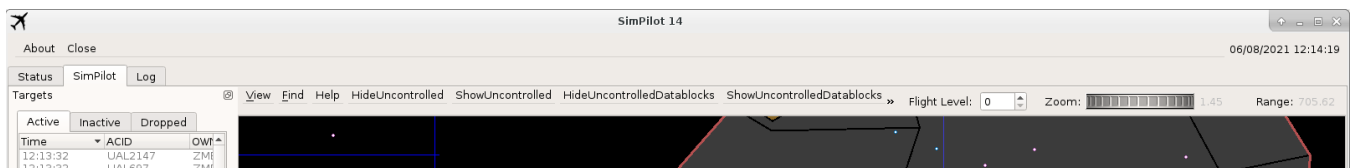


Figure 92. Date and Time Clock After Scenario Start

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.

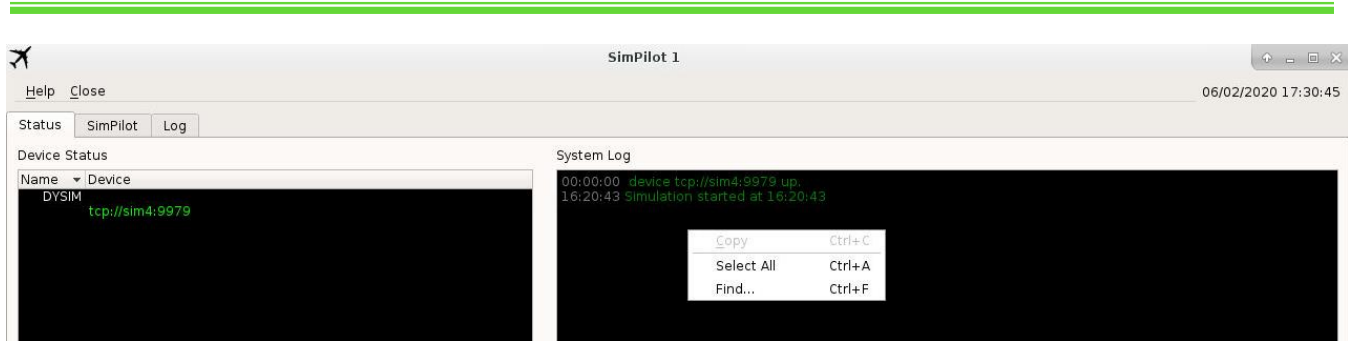


Figure 93. Status Tab Text Options

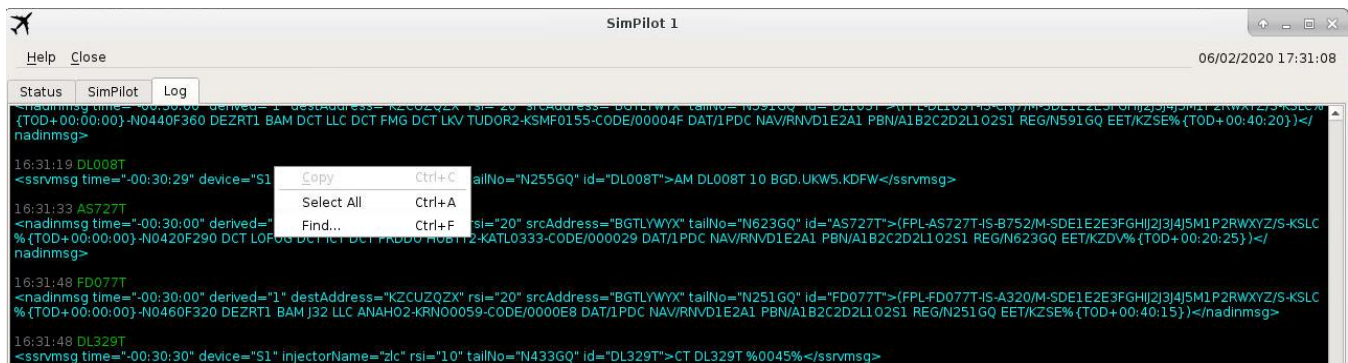


Figure 94. Log Tab Test Options

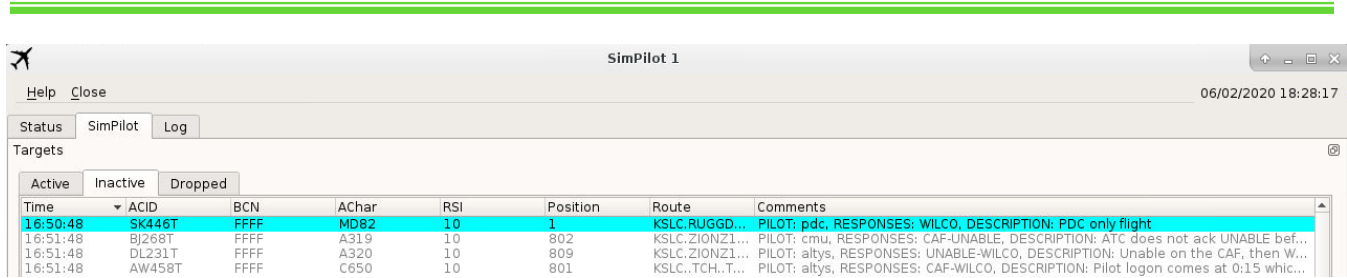
5.3.3.1. Status Tab

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:



Time	ACID	BCN	AChar	RSI	Position	Route	Comments
16:50:48	SK446T	FFFF	MD82	10	1	KSLC.RUGGD...	PILOT: pdc, RESPONSES: WILCO, DESCRIPTION: PDC only flight
16:51:48	BJ268T	FFFF	A319	10	802	KSLC.ZIONZ1...	PILOT: cmu, RESPONSES: CAF-UNABLE, DESCRIPTION: ATC does not ack UNABLE bef...
16:51:48	DL231T	FFFF	A320	10	809	KSLC.ZIONZ1...	PILOT: alty, RESPONSES: UNABLE-WILCO, DESCRIPTION: Unable on the CAF, then W...
16:51:48	AW458T	FFFF	C650	10	801	KSLC..TCH..T...	PILOT: alty, RESPONSES: CAF-WILCO, DESCRIPTION: Pilot logon comes at 0:15 whic...

Figure 95. 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.

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.

Route

Flight plan route.

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:

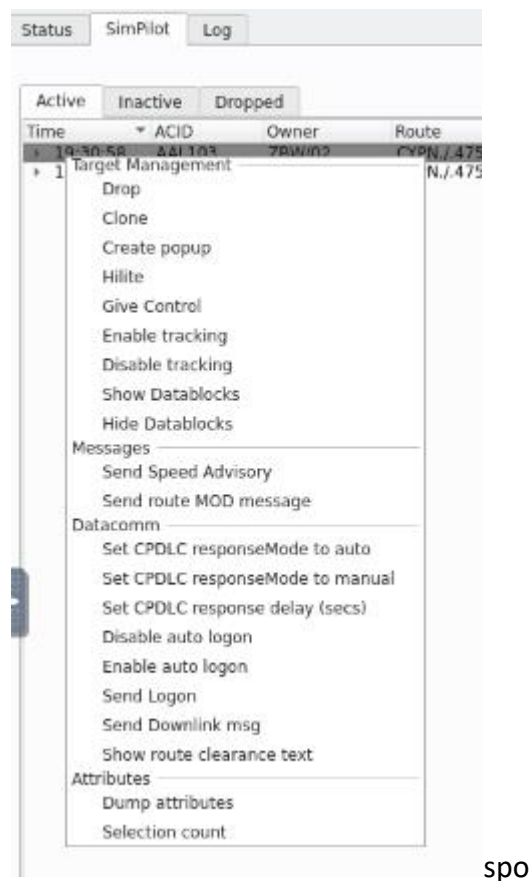


Figure 96. Active Target List Menu Options

Target Management

Drop

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

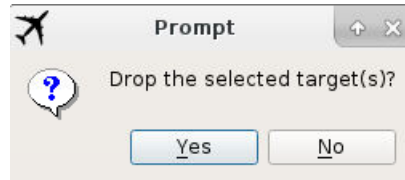


Figure 97. Drop Target Confirmation Dialog

Clone

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

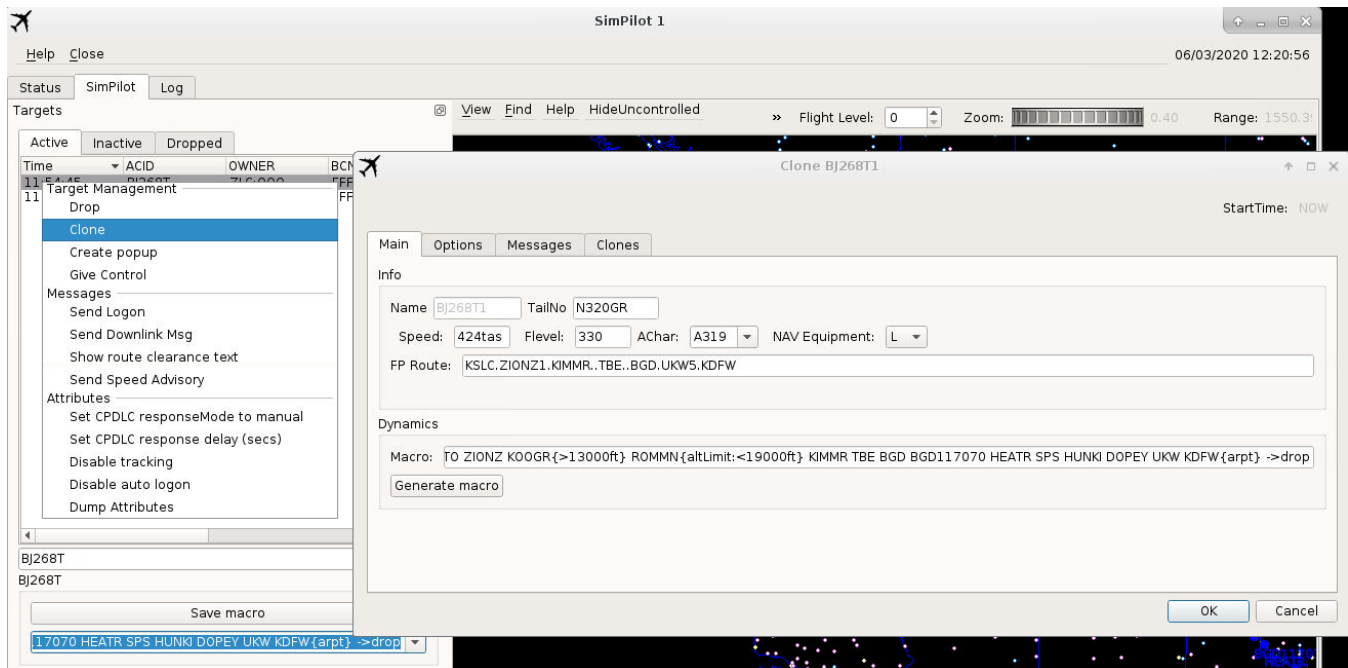


Figure 98. Clone Target Dialog for Active Targets

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.

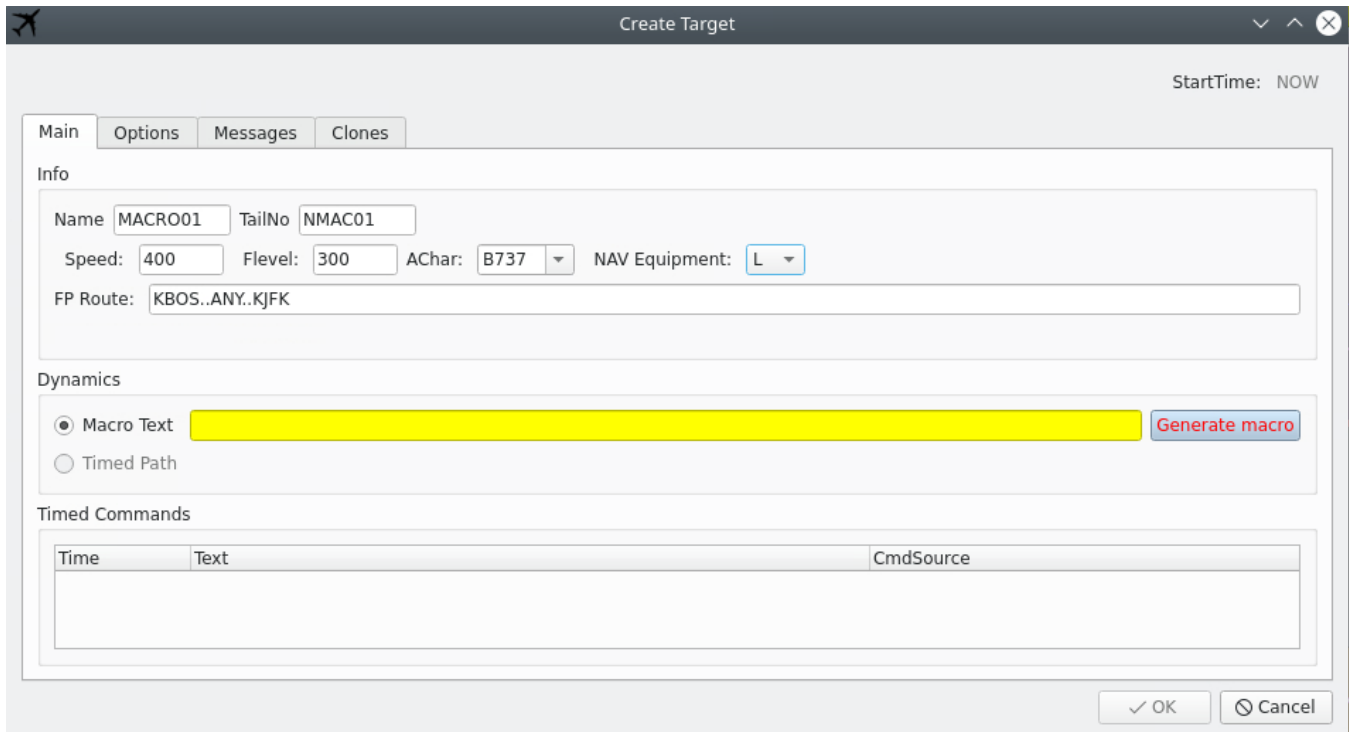


Figure 99. Create Popup Dialog for Active Targets

Give Control

Assigns the selected flight to a new pilot.

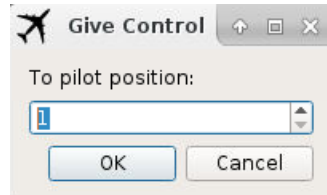


Figure 100. Give Control Dialog

Set CPDLC responseMode to manual/auto

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

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 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.

Disable/enable auto logon

Disables and enables auto logons.

Show Datablocks

Enables datablocks.

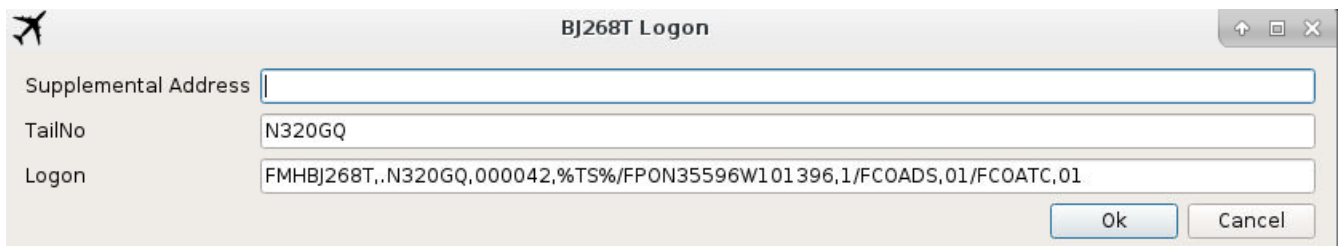
Hide Datablocks

Disables datablocks.

Messages

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.



Supplemental Address	
TailNo	N320GQ
Logon	FMHBJ268T,.N320GQ,000042,%TS%/FPON35596W101396,1/FCOADS,01/FCOATC,01

Figure 101. Send Logon Dialog

Send Downlink Message

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

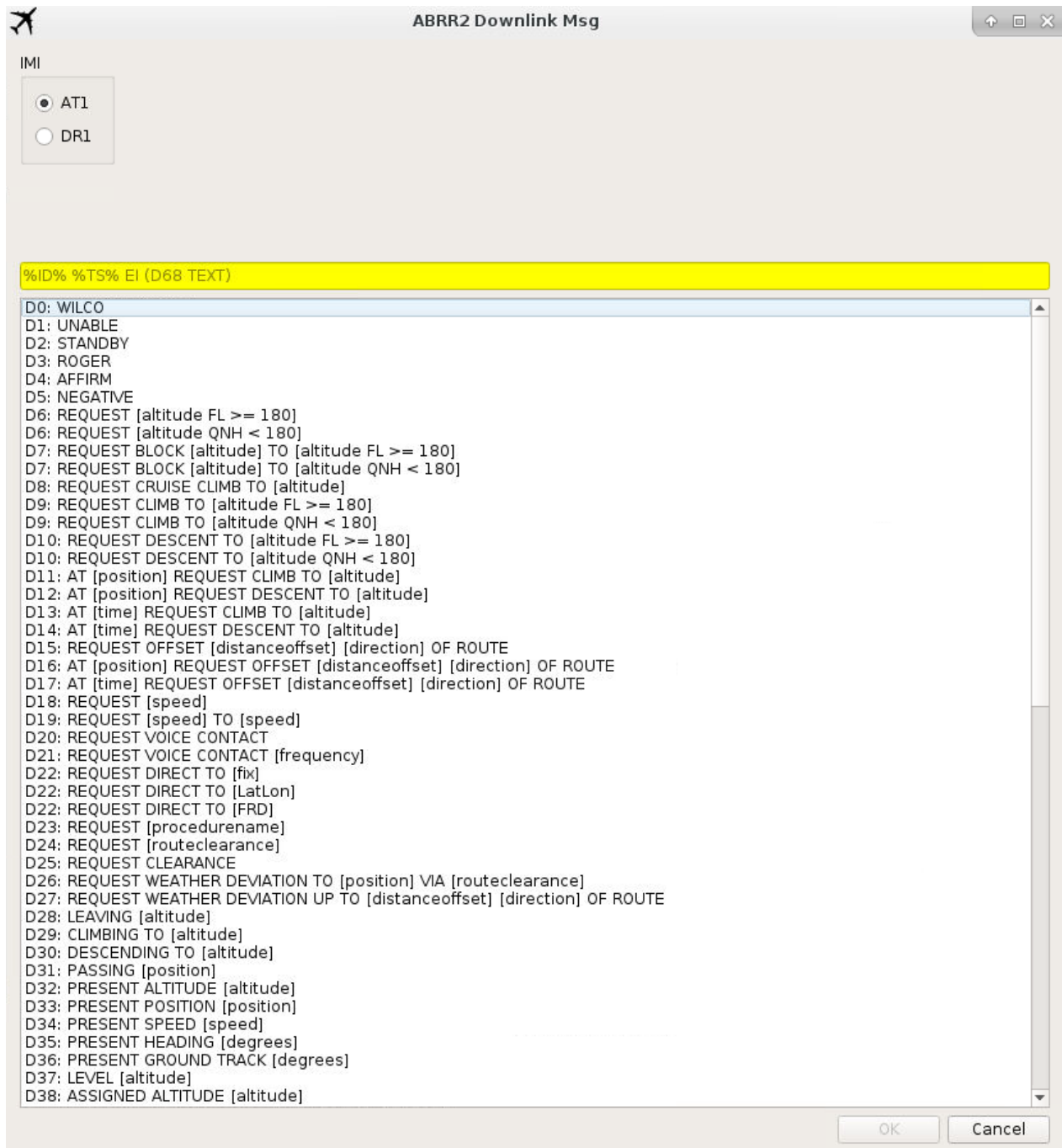


Figure 102. Send Downlink Message - part 1

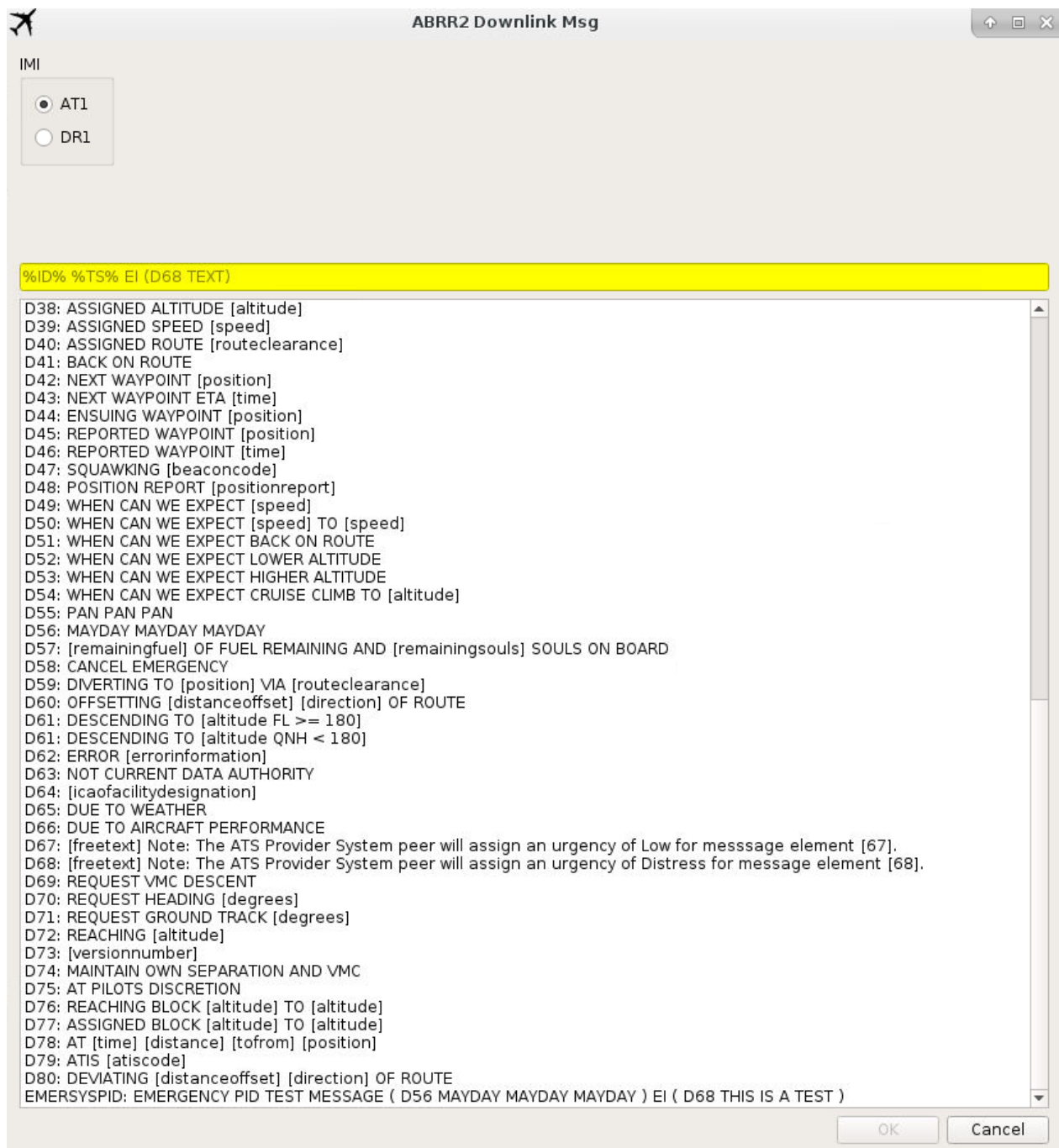


Figure 103. Send Downlink Message - part 2

Show route clearance text

Displays the route clearance in a popup window.

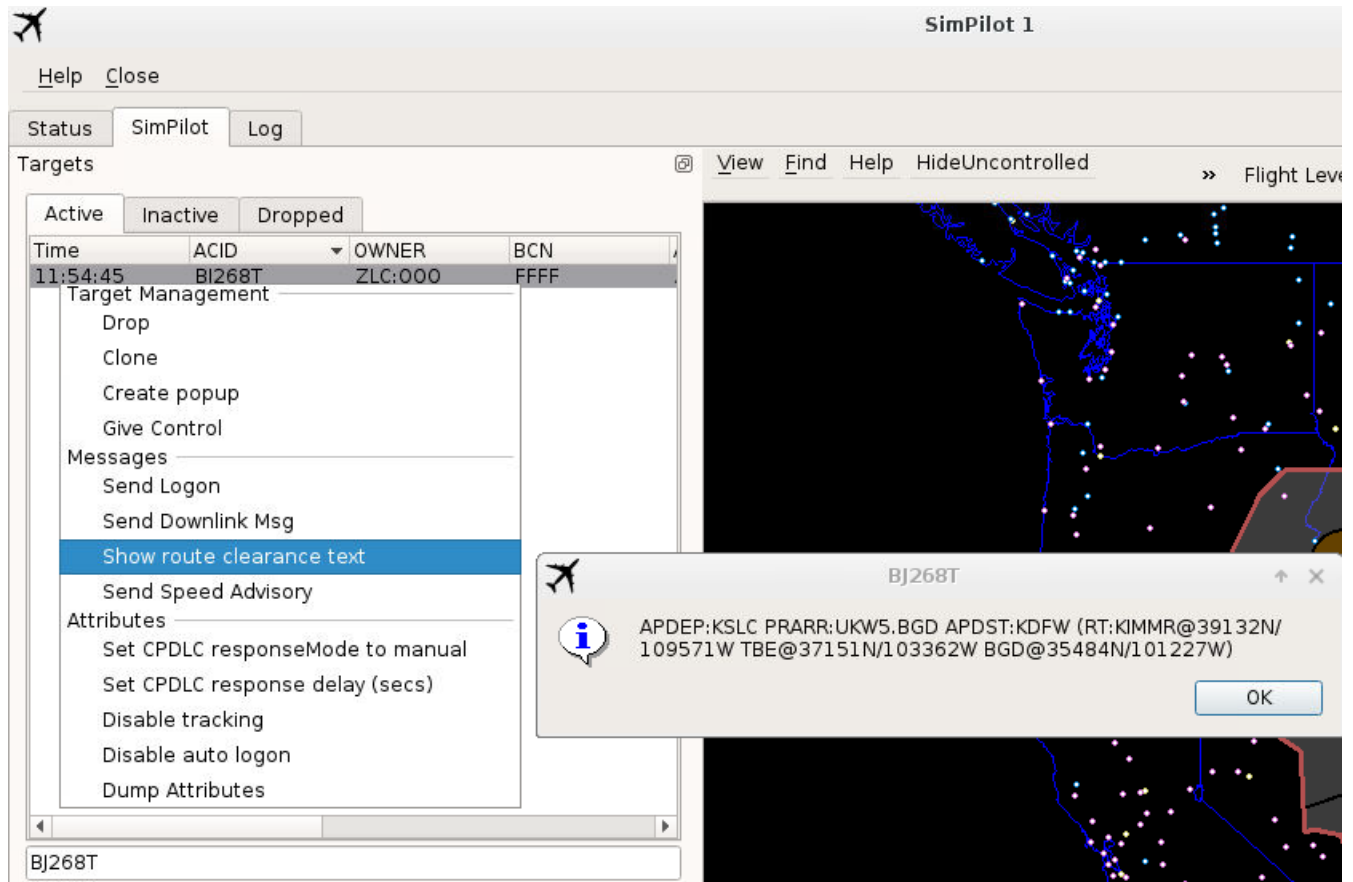


Figure 104. Show Route Clearance Text

Send Speed Advisory

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

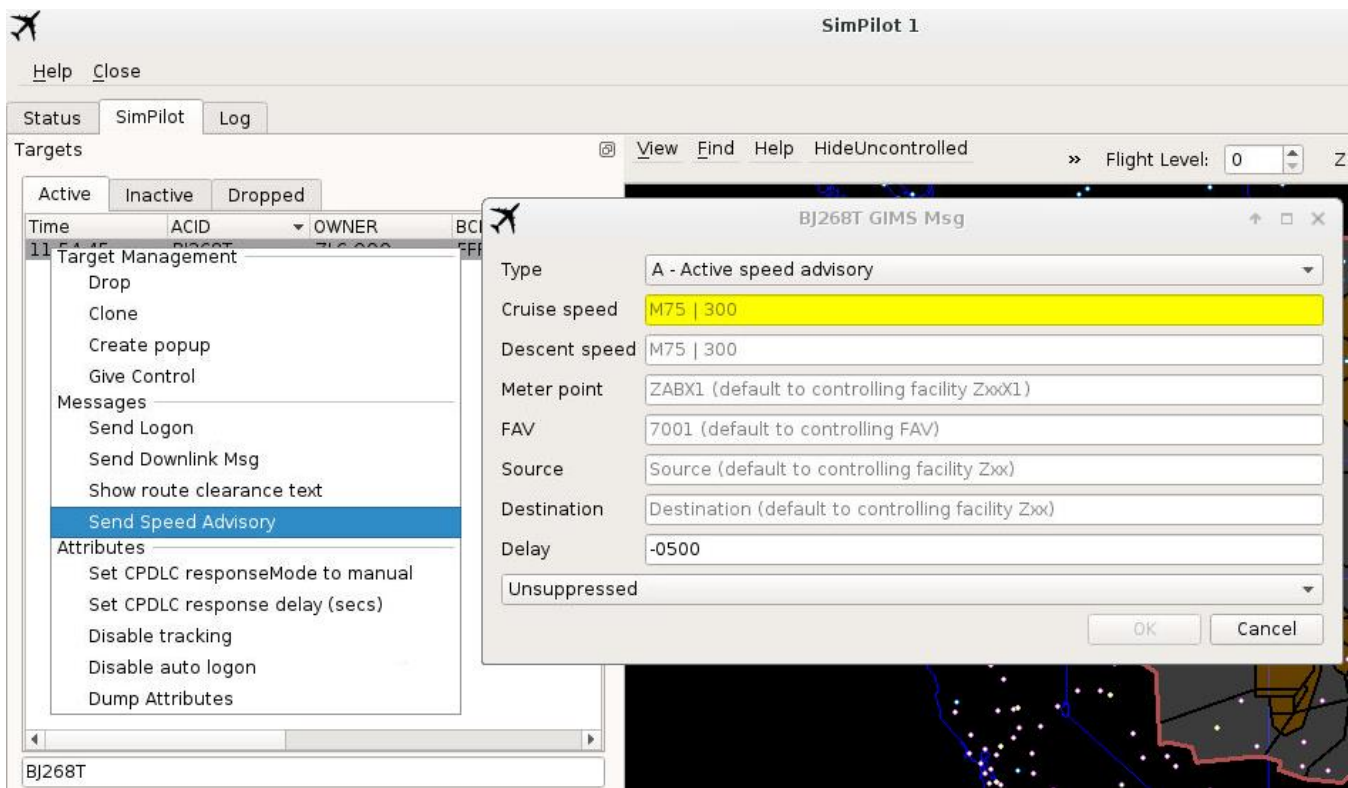


Figure 105. Send Speed Advisory Dialog

Attributes

Dump Attributes

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

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.

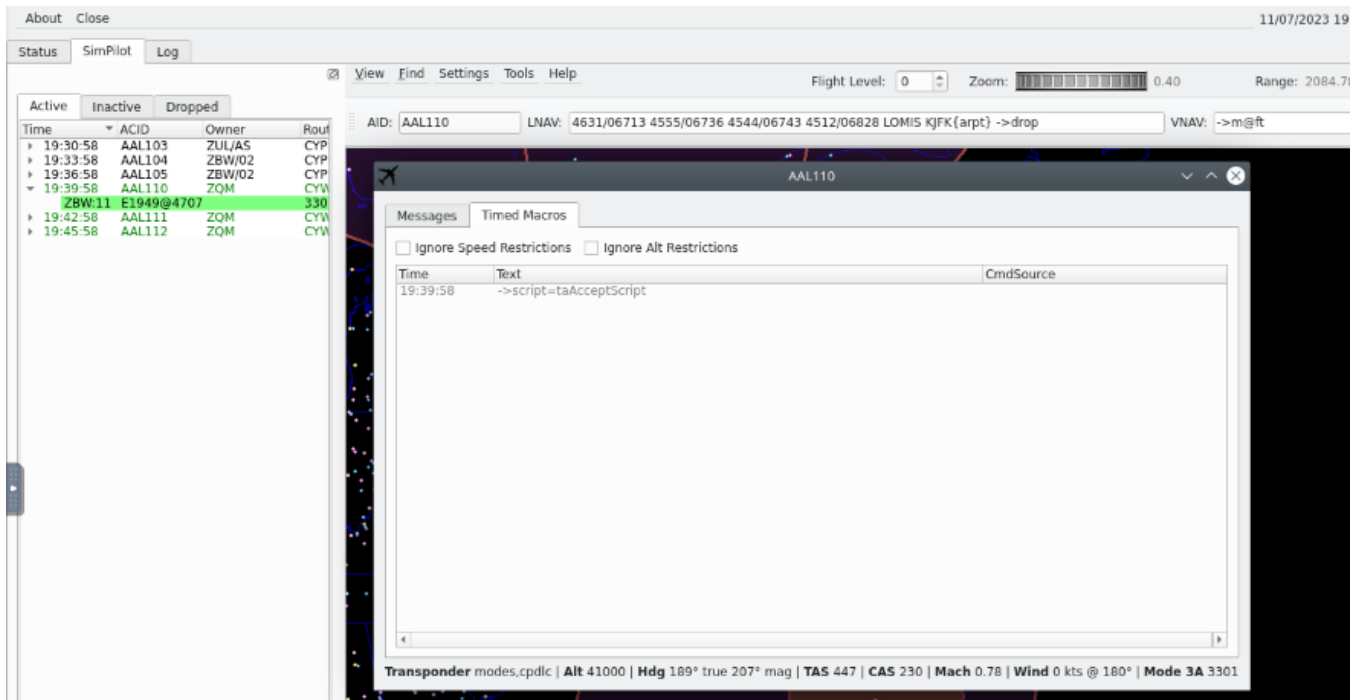


Figure 106. Target Control Timed Macros Tab

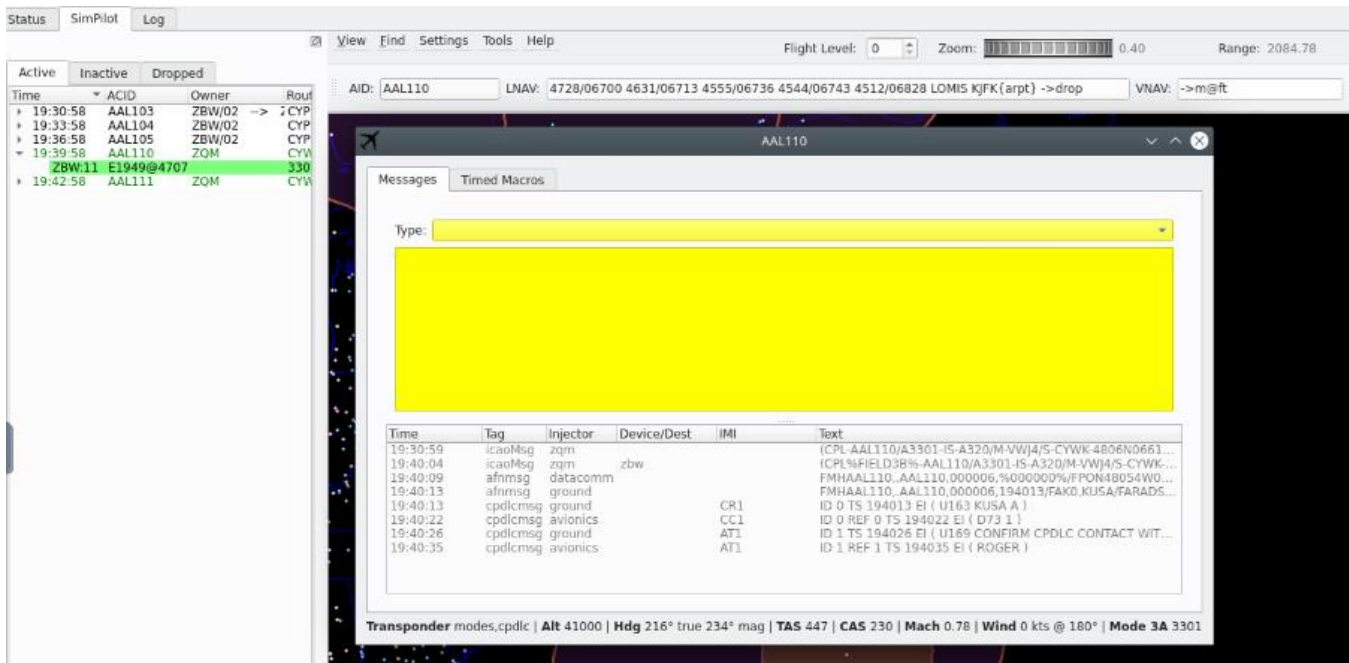


Figure 107. Target Control Dialog Messages Tab

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.

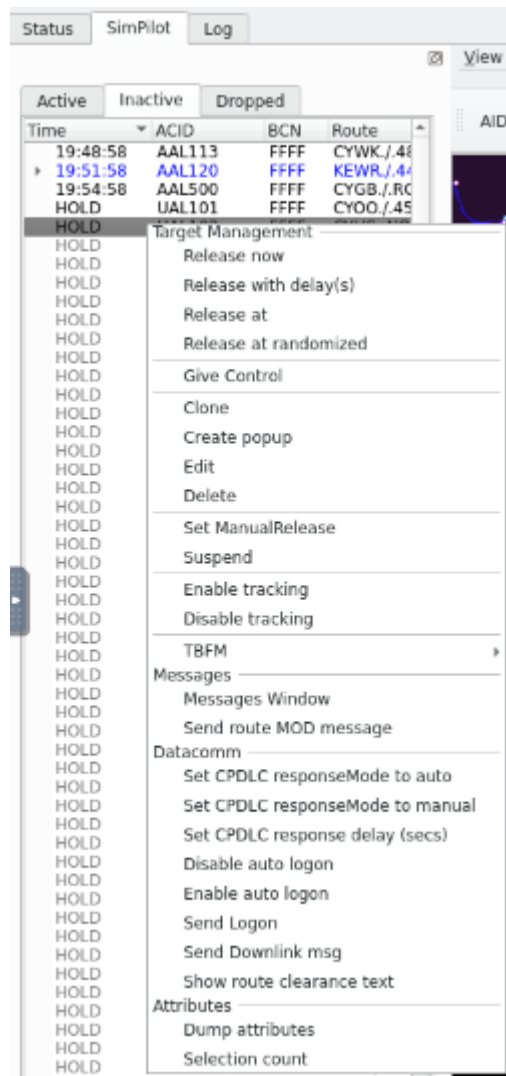


Figure 108. Release Now Menu Option

Release with delay(s)

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

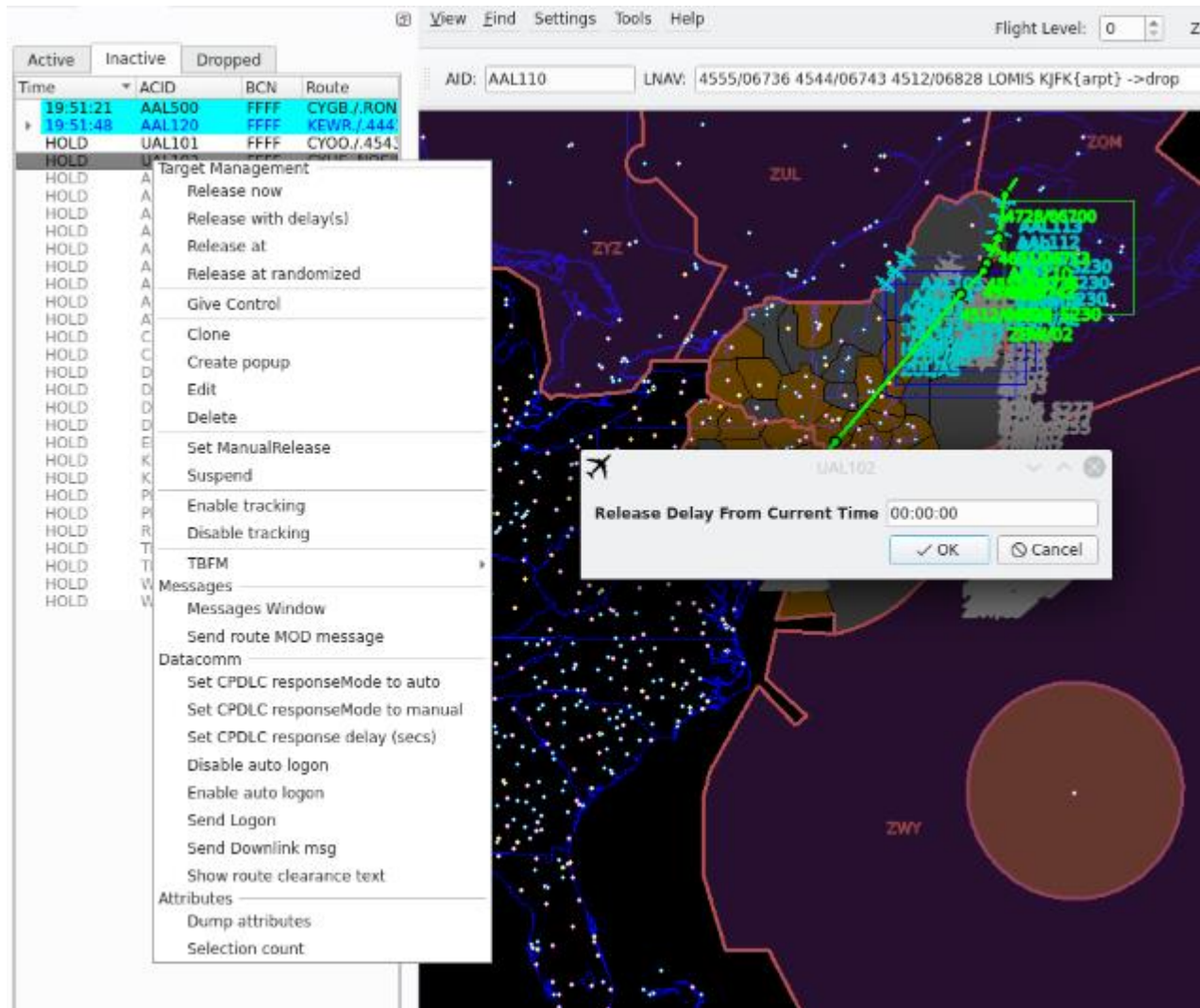


Figure 109. Release with Delay Dialog

Release at

Activates the target at the specified external system time.

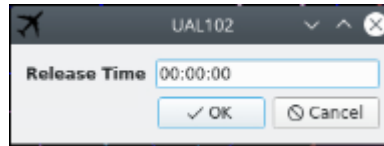


Figure 110. Release at Specified Time Dialog

Delete

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

Edit

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

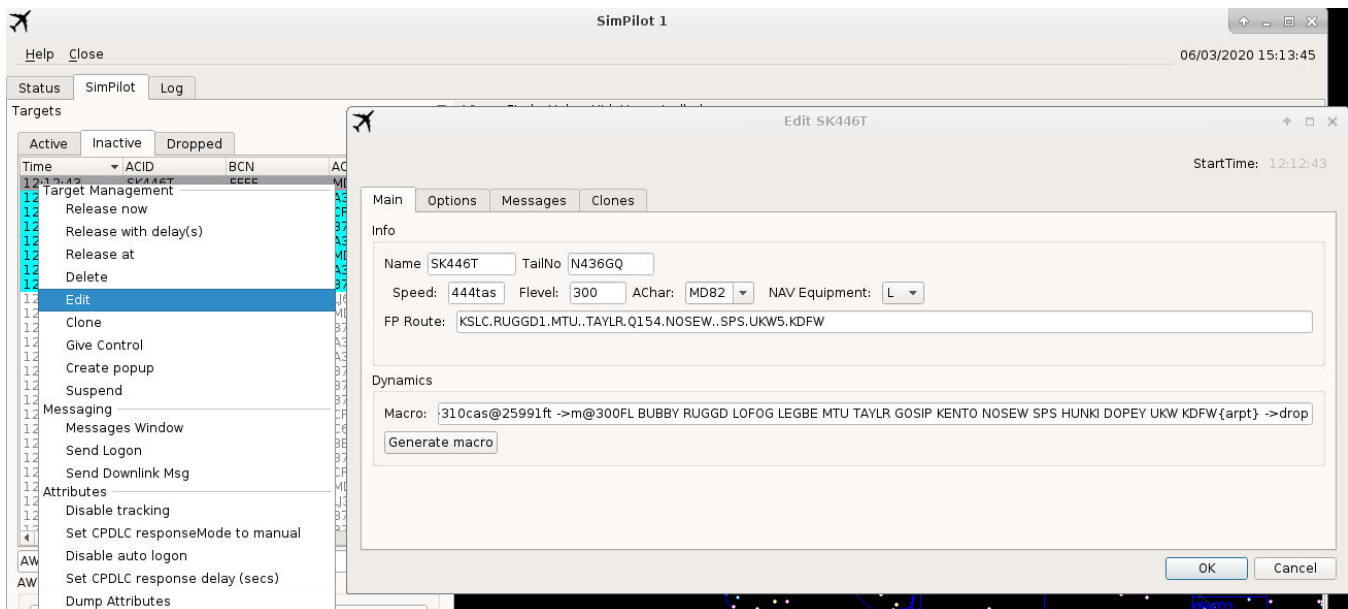


Figure 111. Edit Dialog

Clone

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

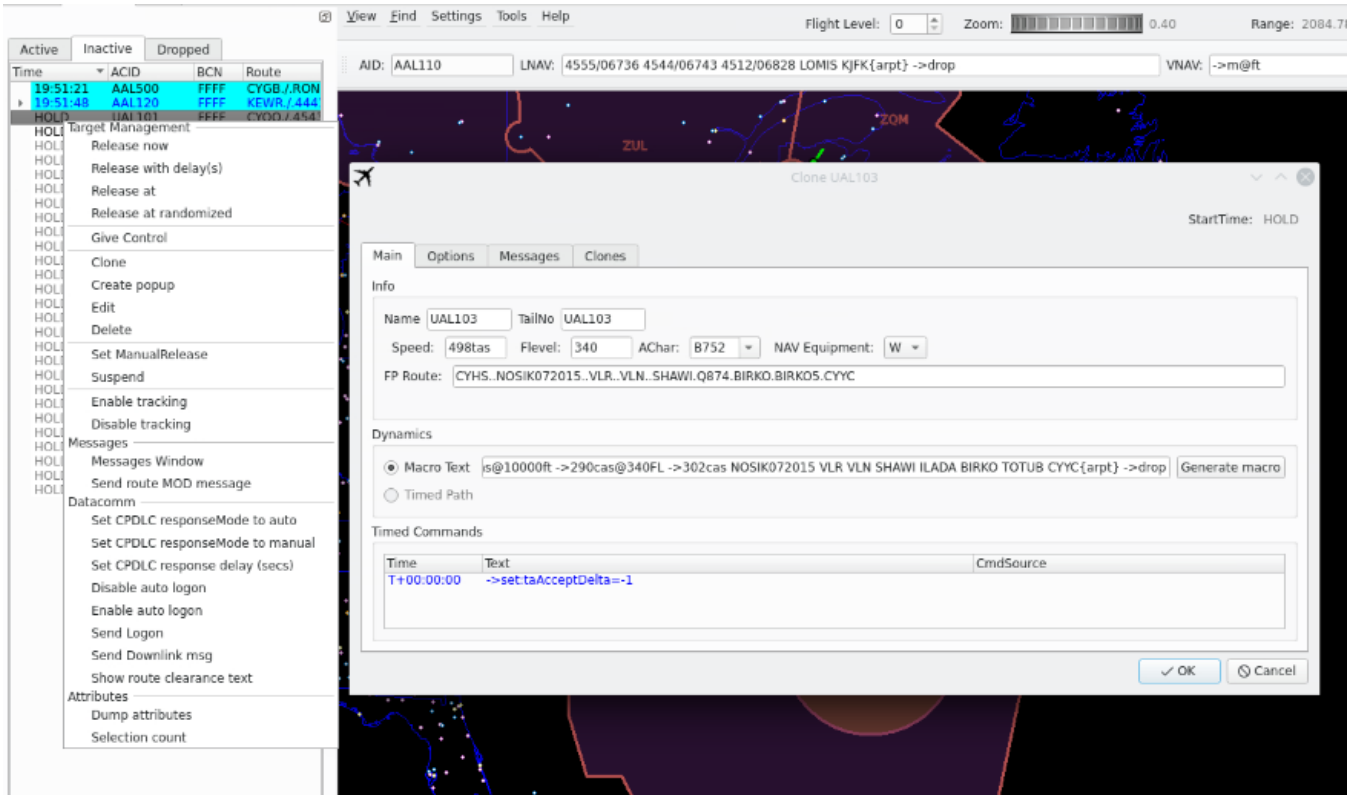


Figure 112. Clone Dialog

Give Control

Assigns the selected flight to a new pilot position number.



Figure 113. Give Control 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.

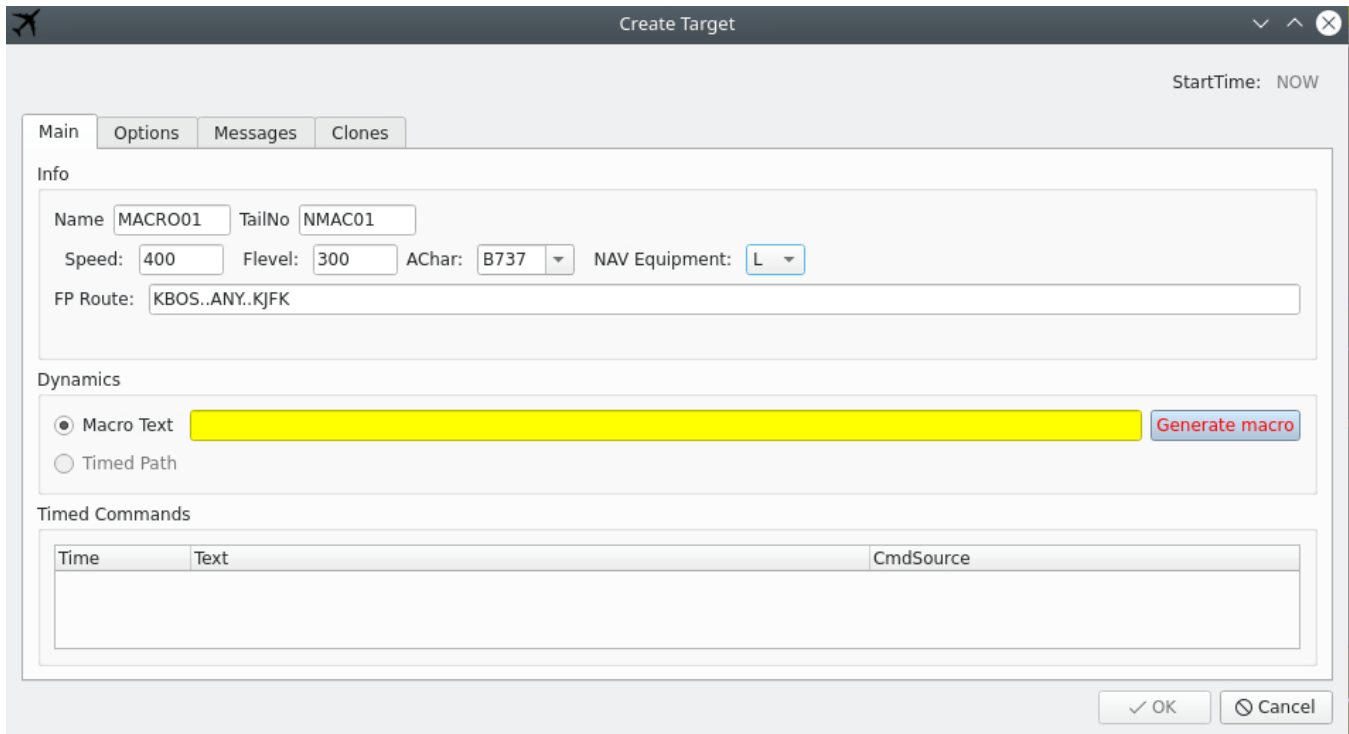


Figure 114. Create Popup Dialog

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.

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.

Set CPDLC responseMode to manual/auto

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

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 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.

Disable auto logon

Disables auto logons.

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.

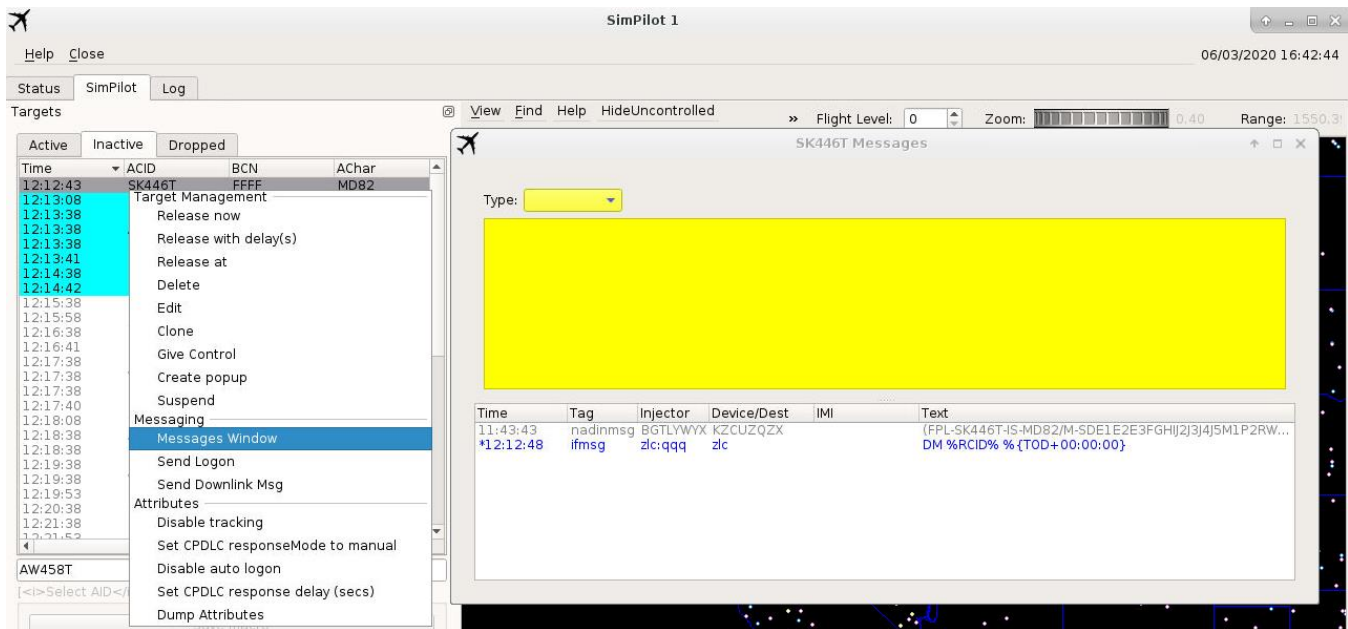


Figure 115. Messages Window

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.

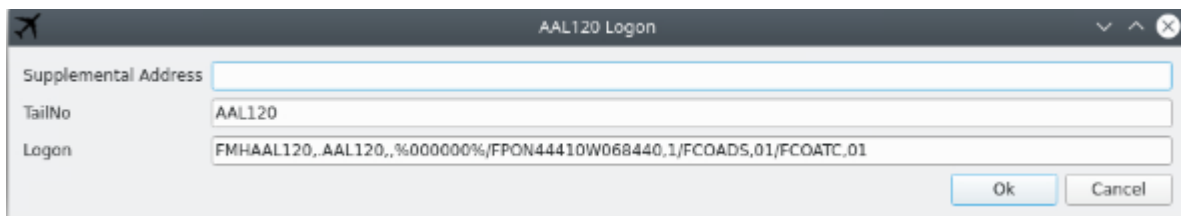


Figure 116. Send Logon Dialog

Send Downlink Msg

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

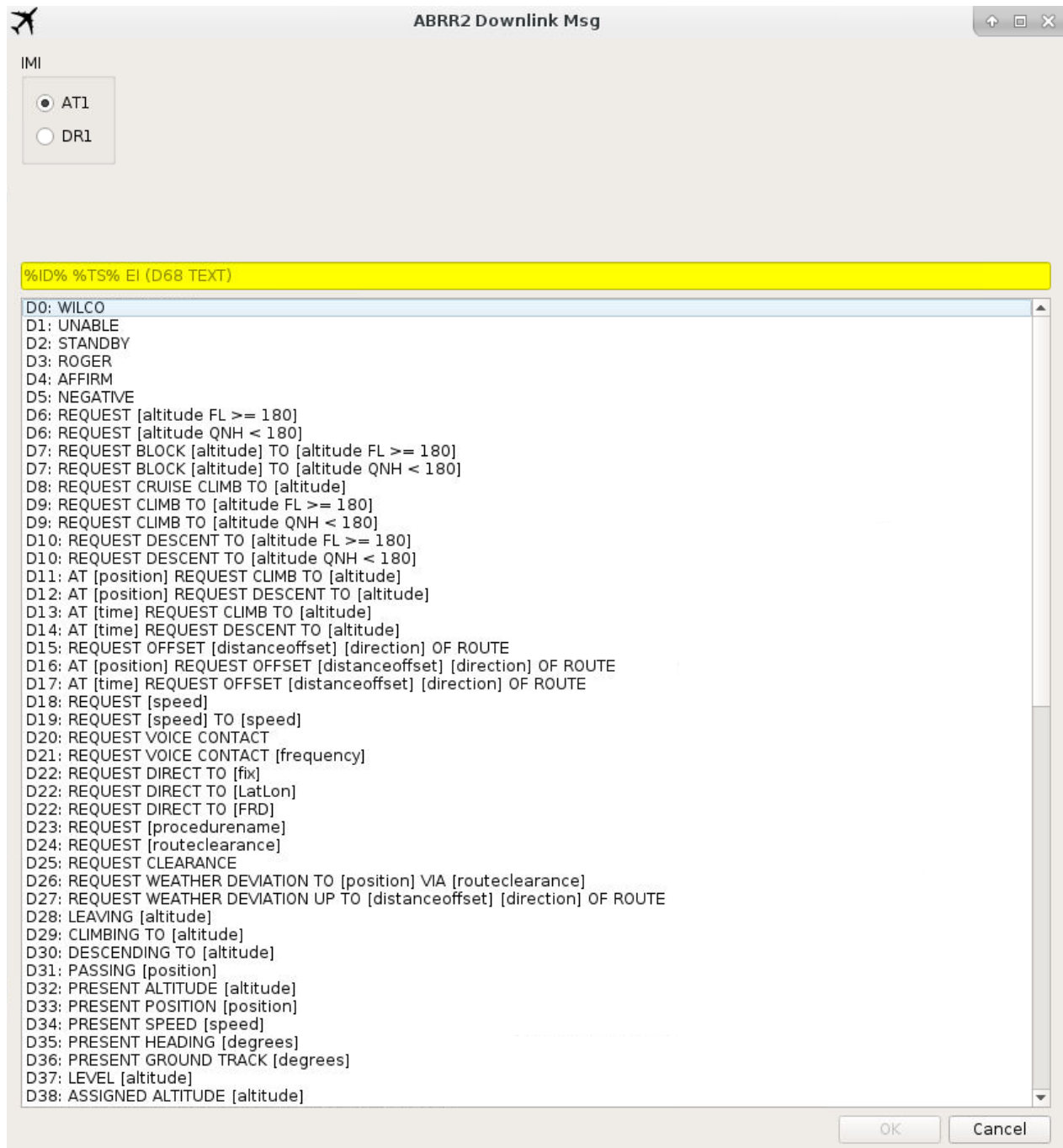


Figure 117. Send Downlink Message – part 1



Figure 118. Send Downlink Message – part 2

Attributes

Dump Attributes

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

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

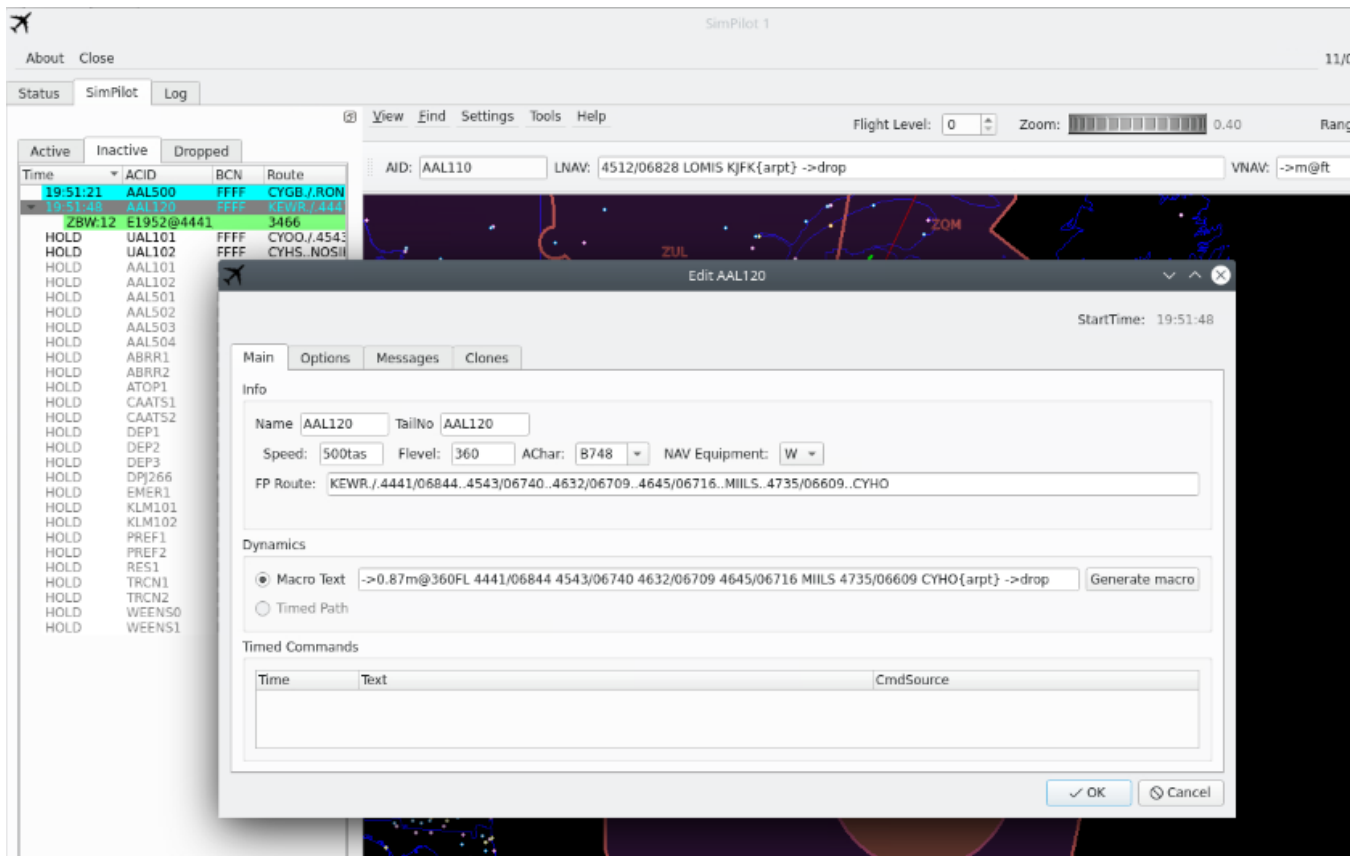


Figure 119. Edit Dialog

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.

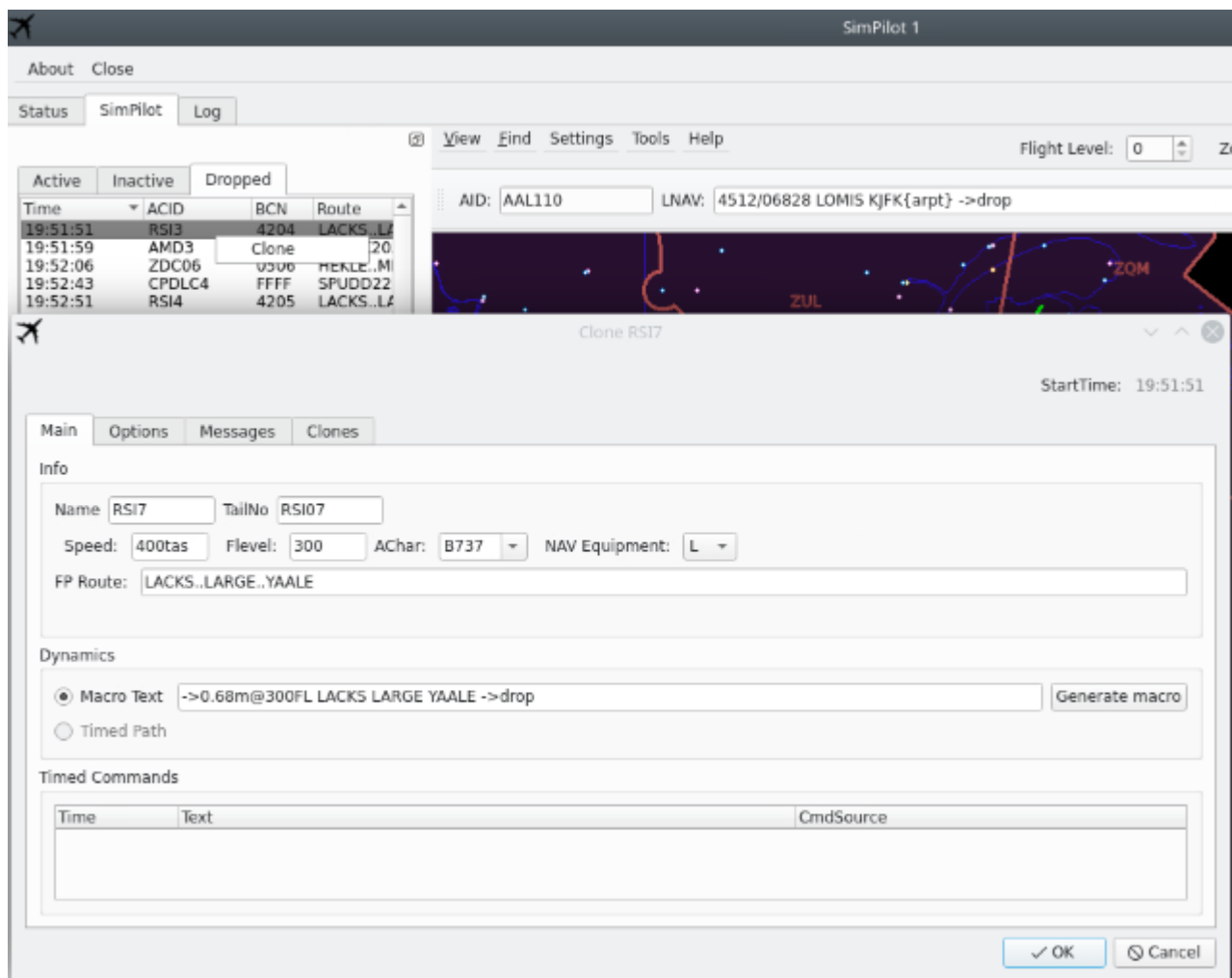


Figure 120. Clone Dialog

Delete

Removes the target from the current simulation execution.

Dump Attributes

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

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.

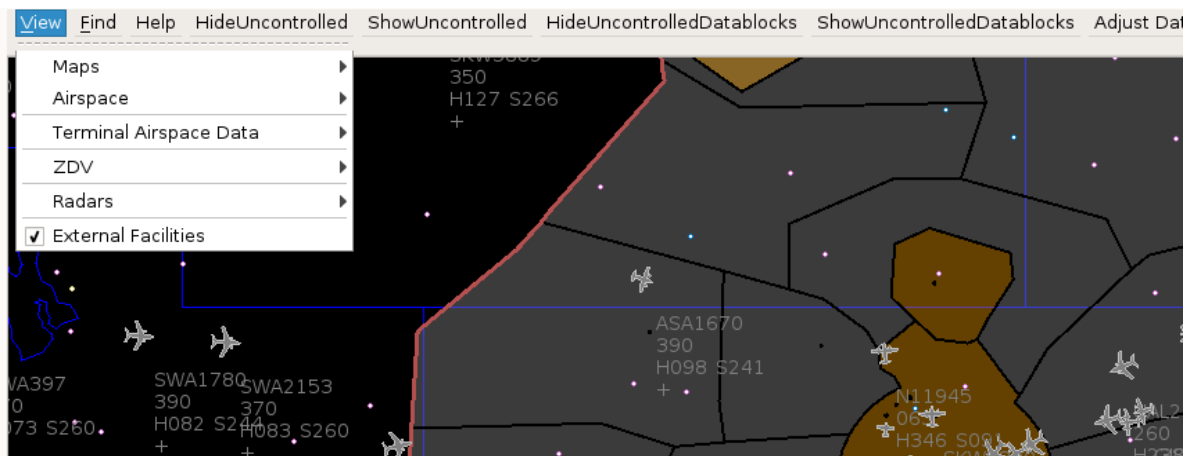


Figure 121. View Menu Option

Maps

The map dropdown includes: US Map, Canada, Mexico, No Background Map, Virtual Earth, Open Street Map, Google Satellite Map, Google Satellite, Google Street, Google Terrain, Stamen, and ThunderForest.

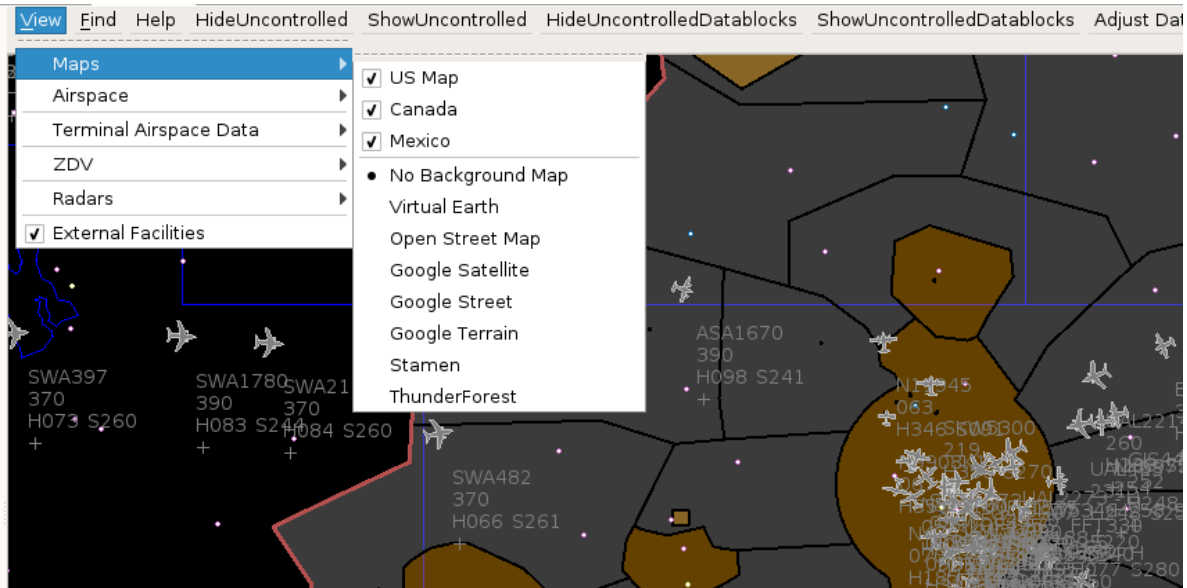


Figure 122. Map View Menu Options

Airspace

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

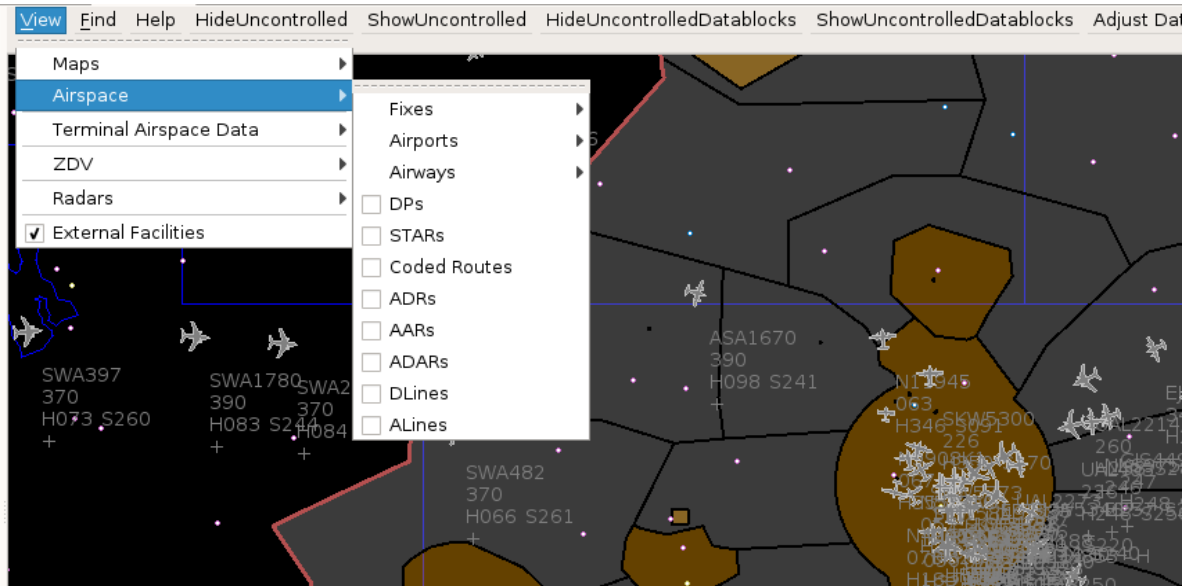


Figure 123. Airspace View Menu Options

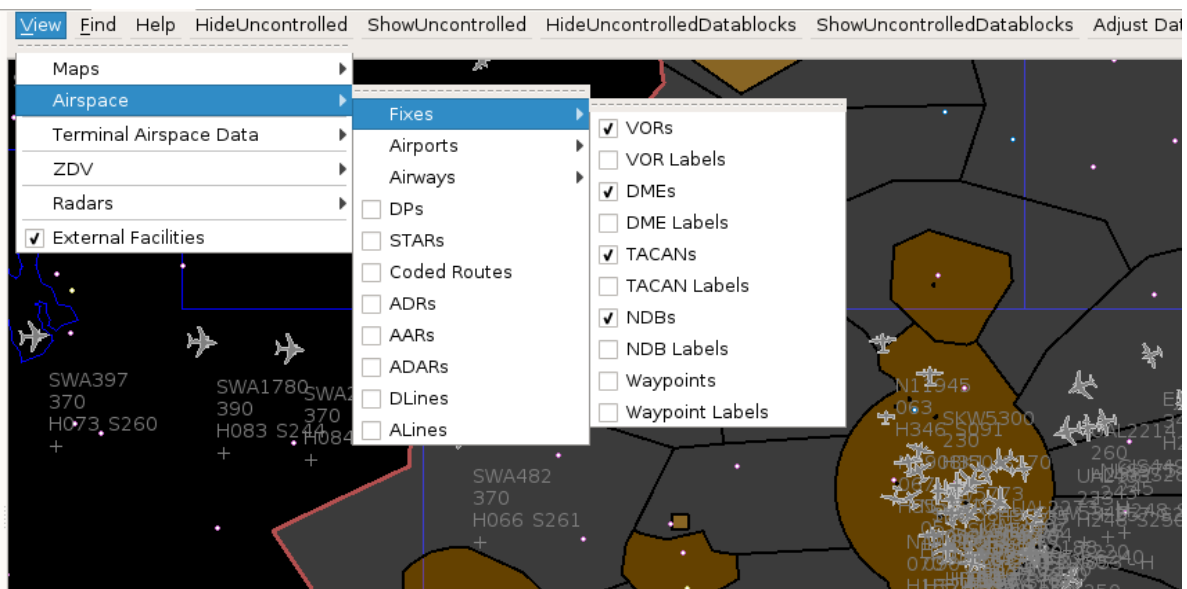


Figure 124. Airspace Fixes View Menu Options

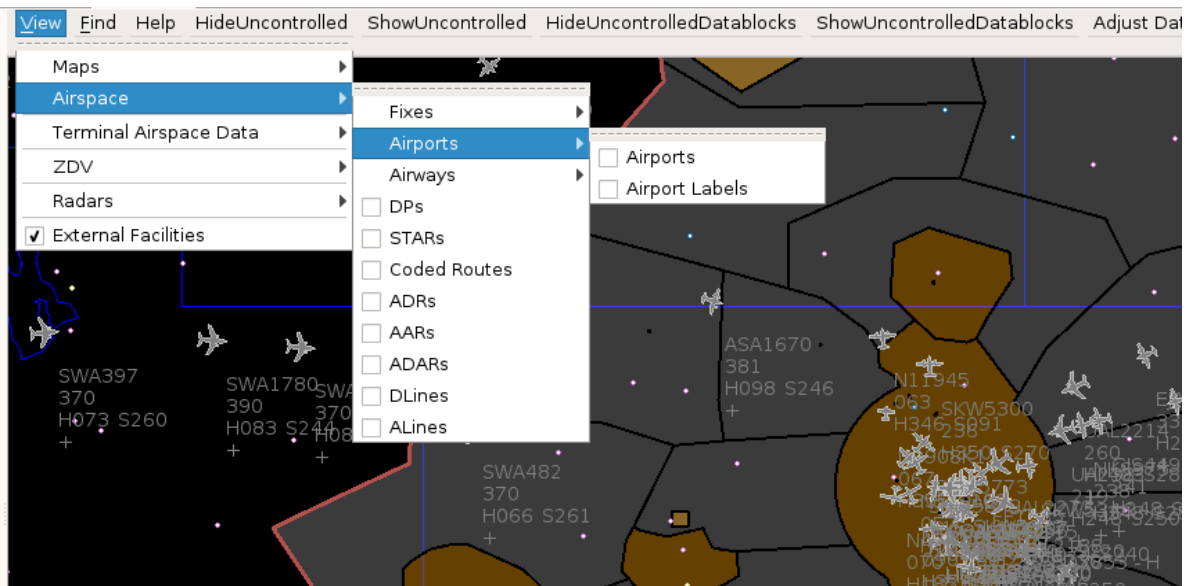


Figure 125. Airspace Airports View Menu Options

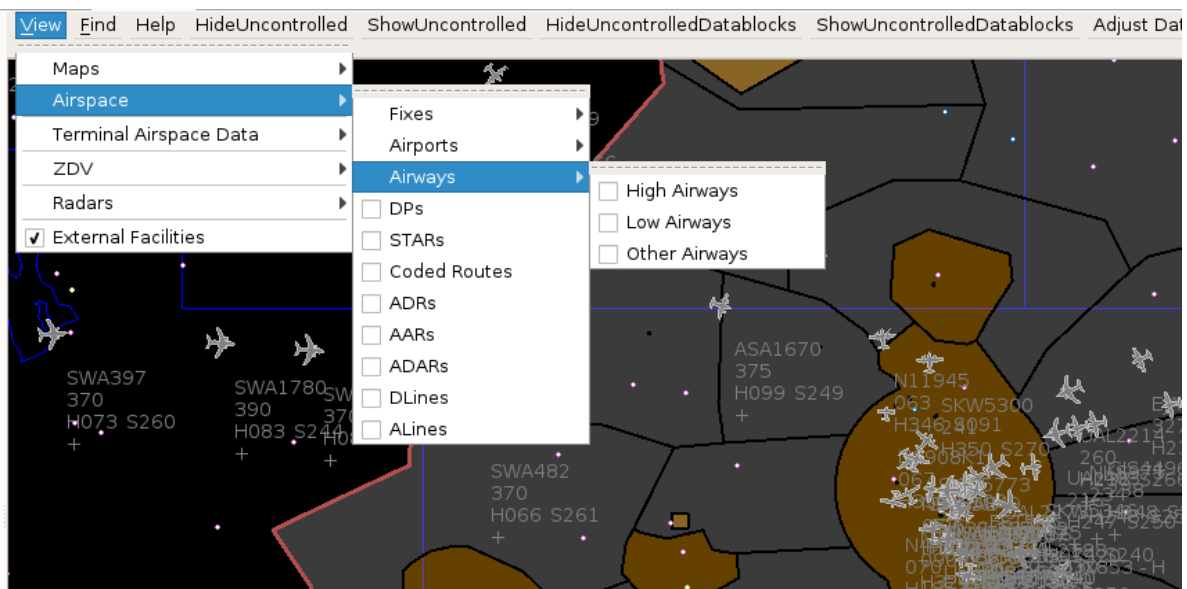


Figure 126. Airspace Airways View Menu Options

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)

Terminal Airspace Data

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

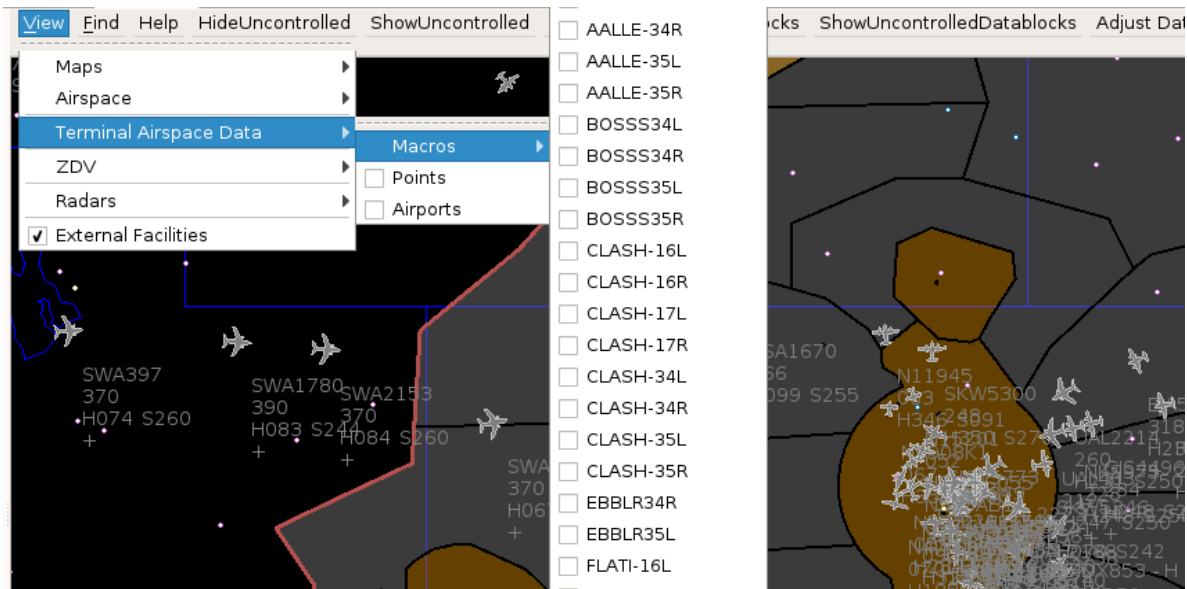


Figure 127. Terminal Airspace Data View Menu Options

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).

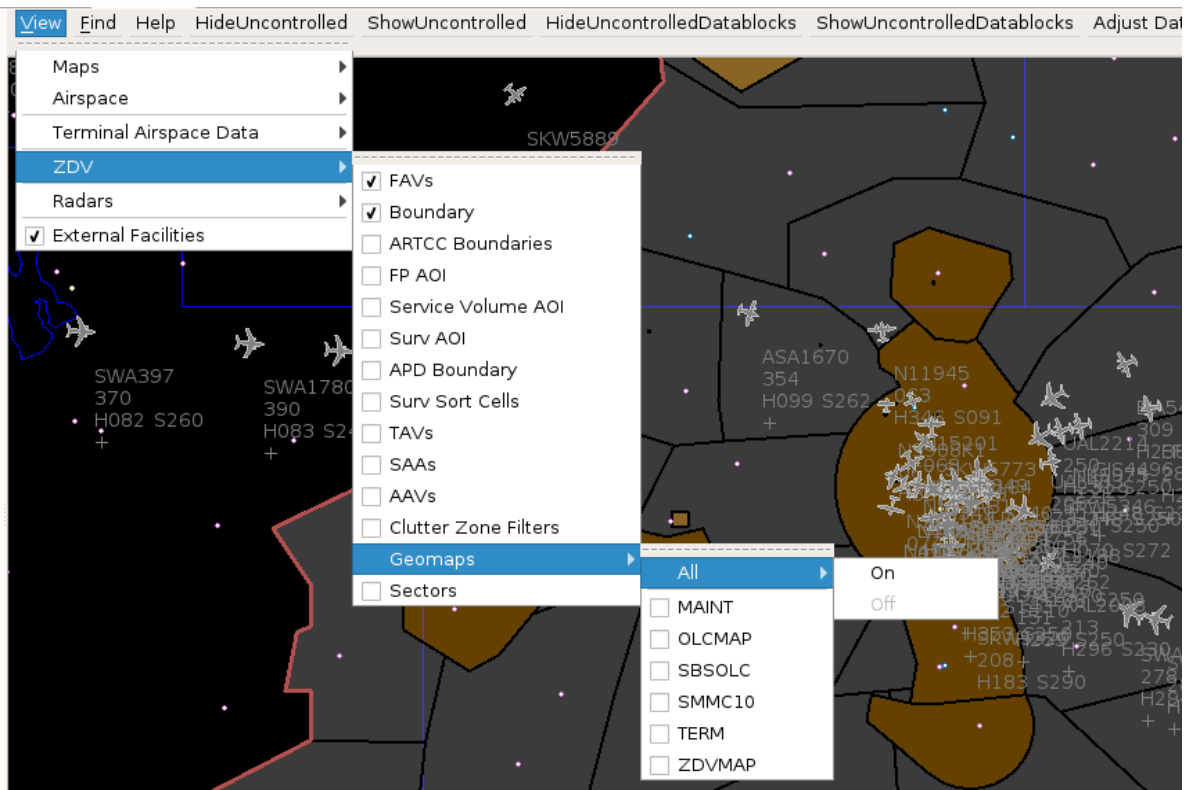


Figure 128. En Route Facility View Menu Options

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)

SAA

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.

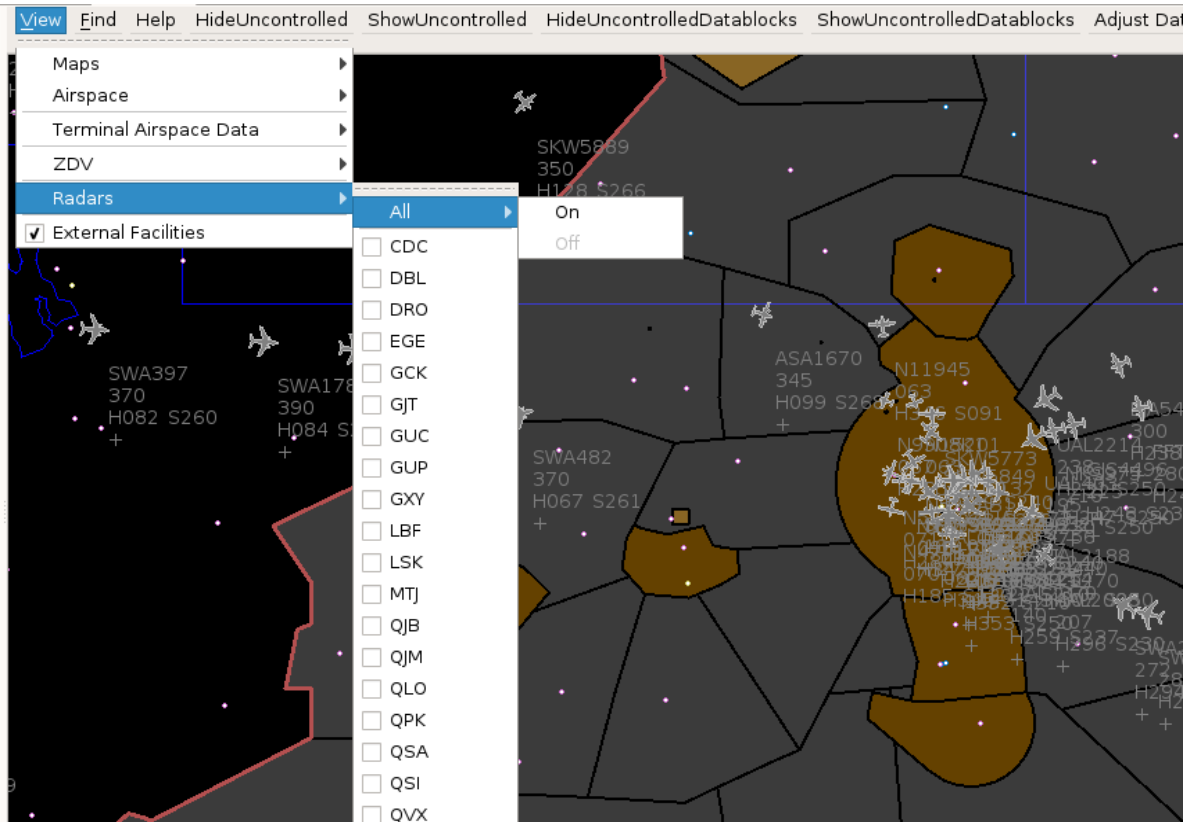


Figure 129. Radars View Menu Options

External Facilities

Turns External Facilities on or off.

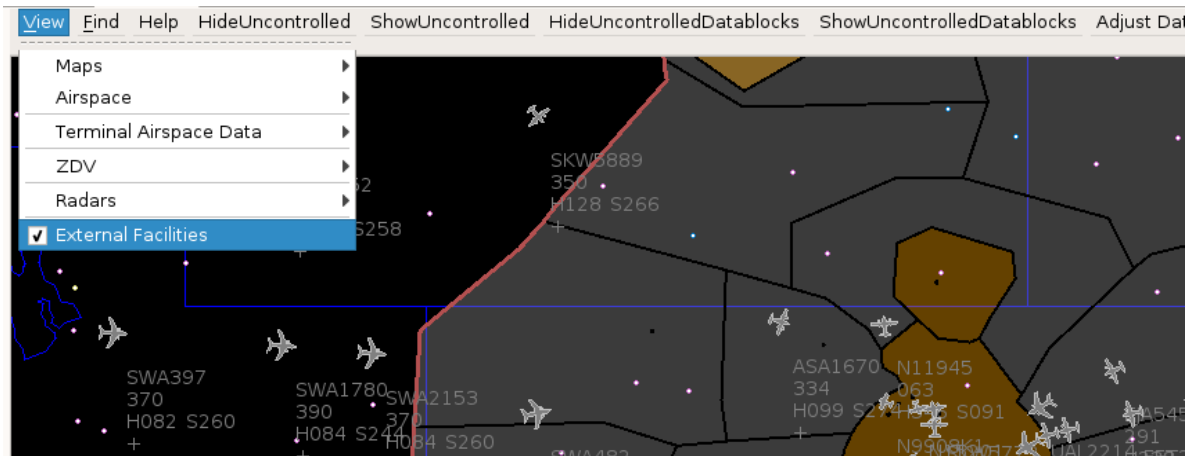


Figure 130. External Facility View Menu Option

WX 00:00:00

WX 00:00:00 view option displays weather: Temperature, Pressure, Wind, and Precipitation.

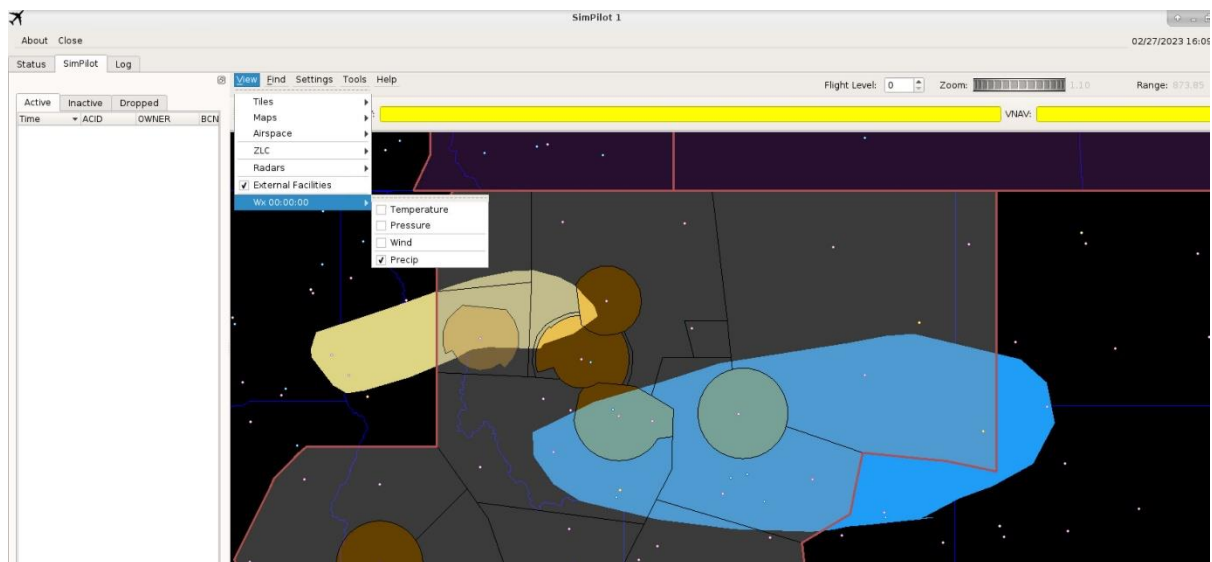


Figure 131. Weather Options

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.

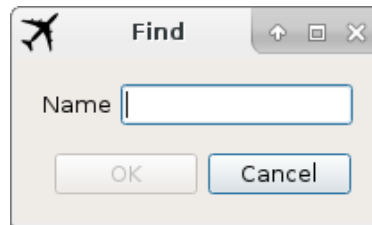


Figure 132. Find Dialog

Help

Clicking on **Help** displays submenus for:

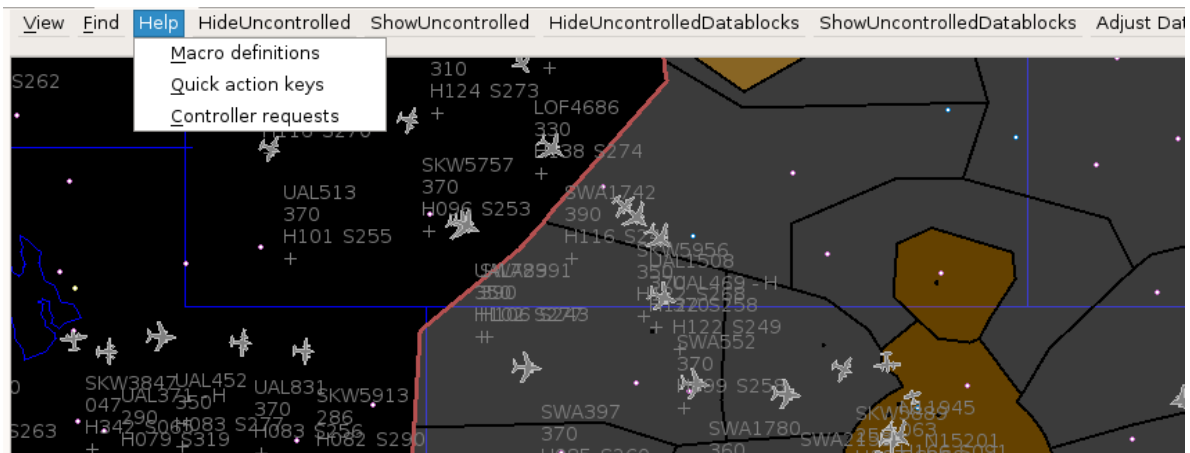


Figure 133. Help Menu

Macro definitions

Displays a list of available macro commands.



Figure 134. Macro Definitions

Quick action keys

Displays a list of available keyboard short cuts.

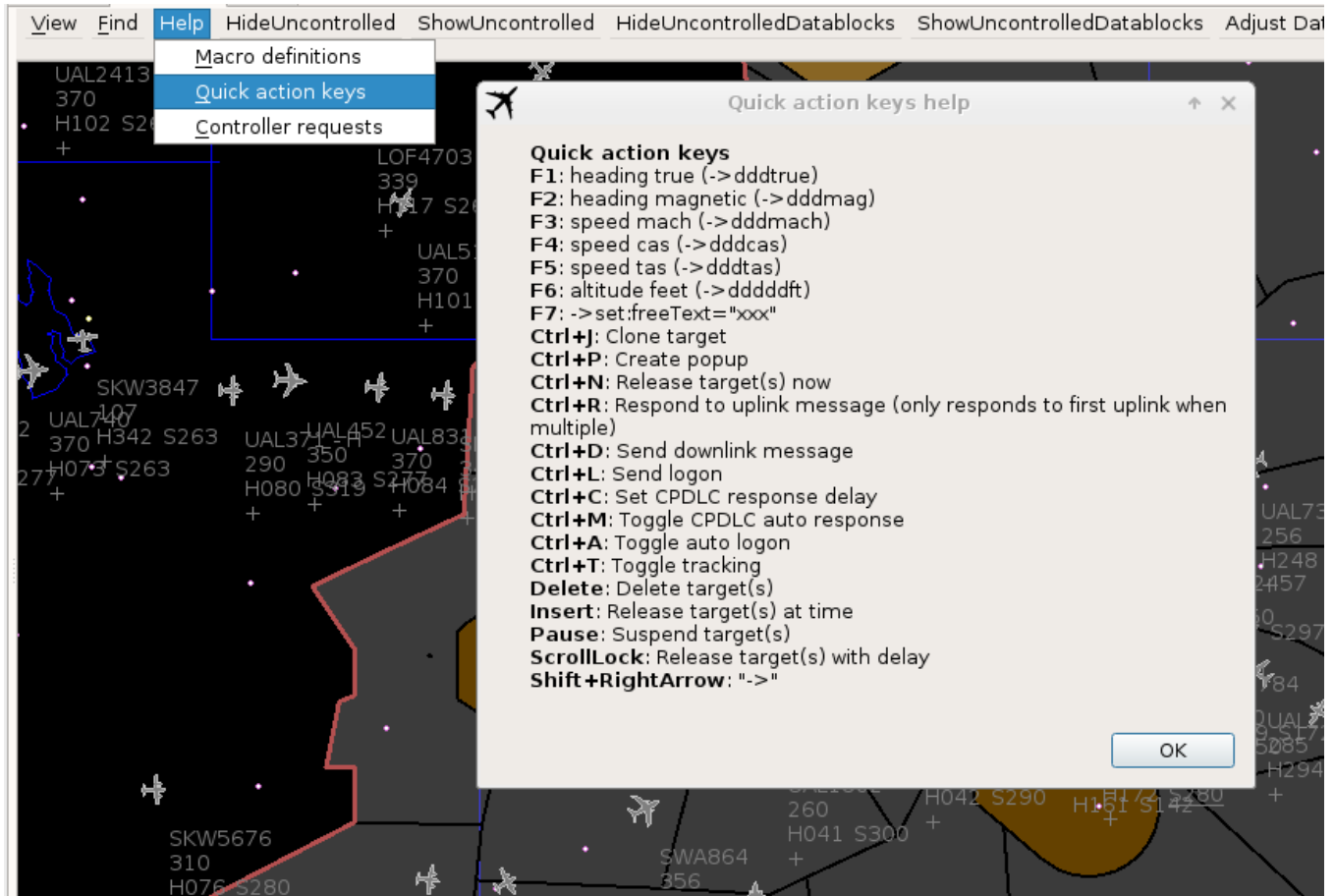


Figure 135. Available Keyboard Shortcuts

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.

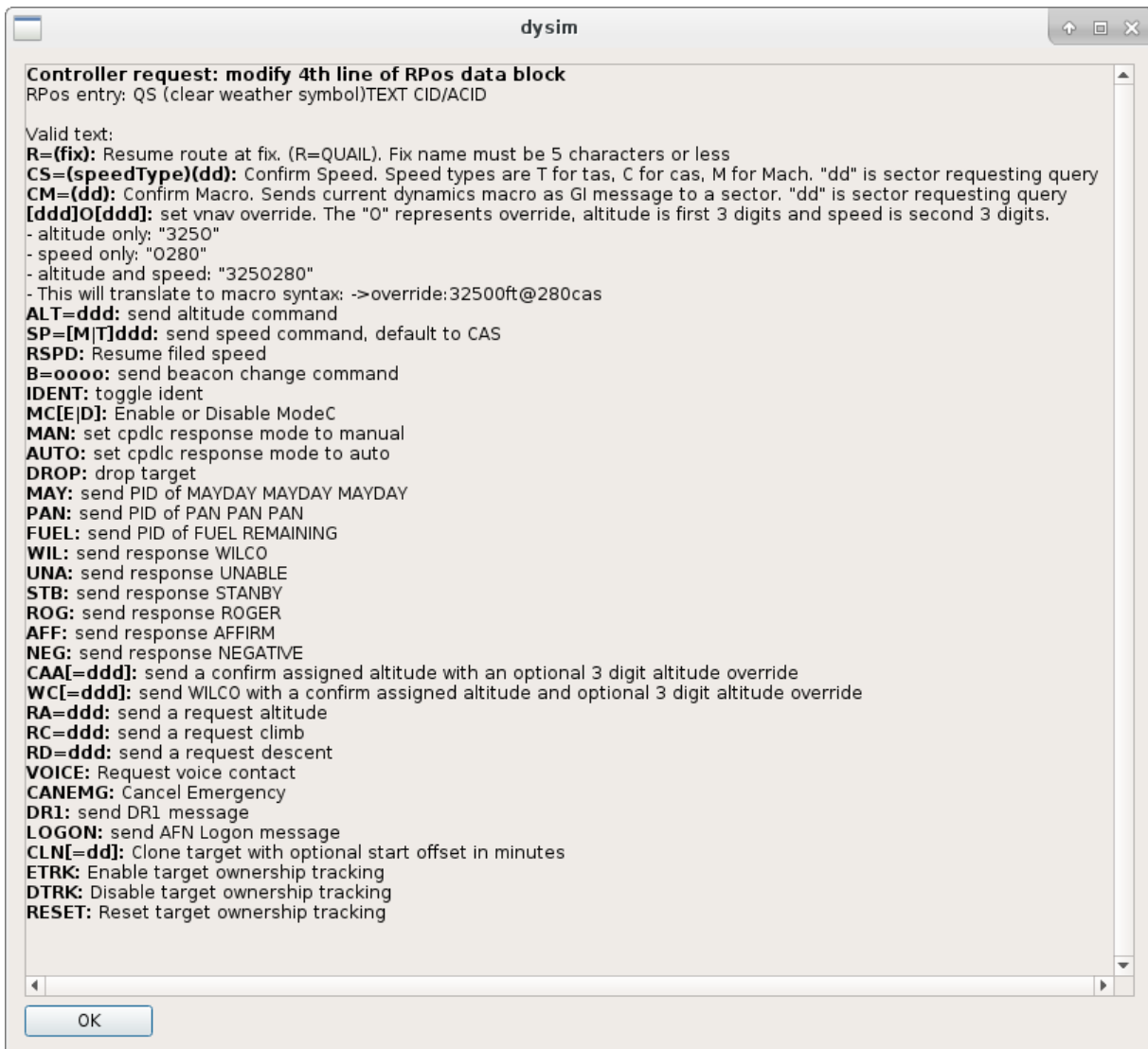


Figure 136. Controller Request Dialog

Target Display Management

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** as all targets and their datablocks are displayed on the simPilot display regardless of the pilot position's control status. **HideUncontrolled** will hide all targets and datablocks that are not under the pilot position's control. **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.

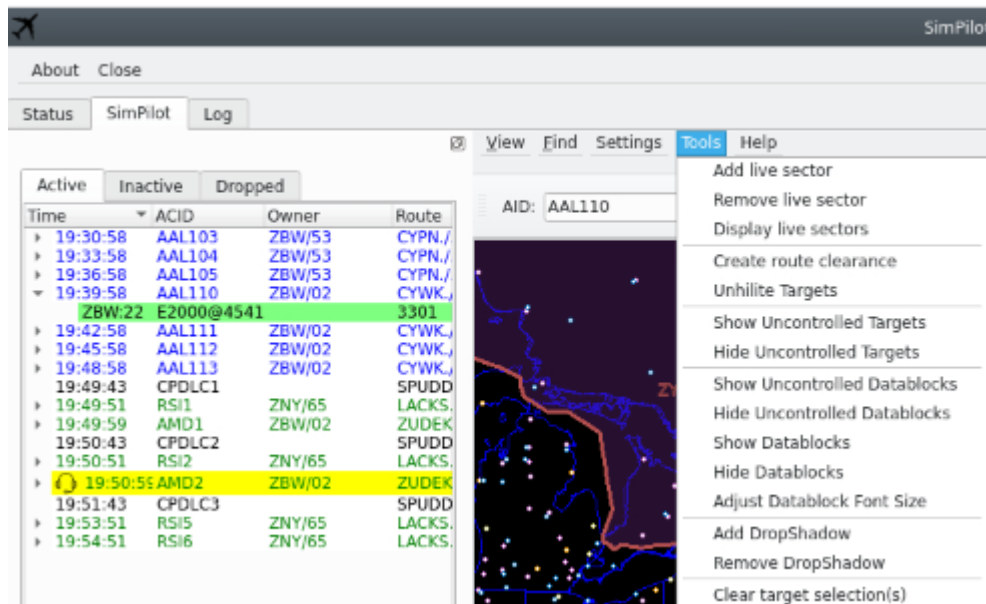


Figure 137: SimPilot – Target Display Management

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.

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.

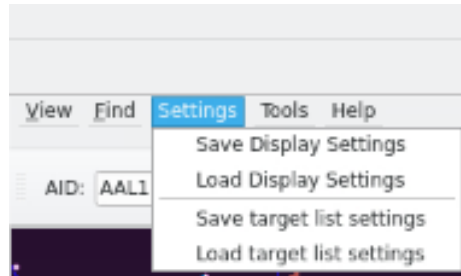


Figure 138: SimPilot – User Display Settings

Tools

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

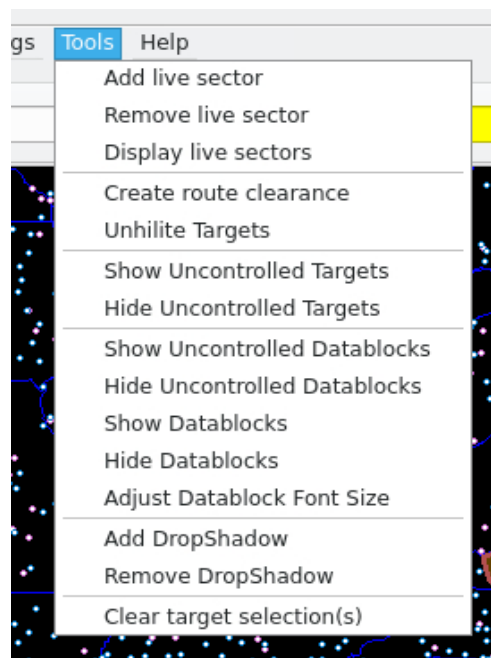


Figure 139. Tools Menu Option

Add live sector

Identifies sector position as having live controller interaction.

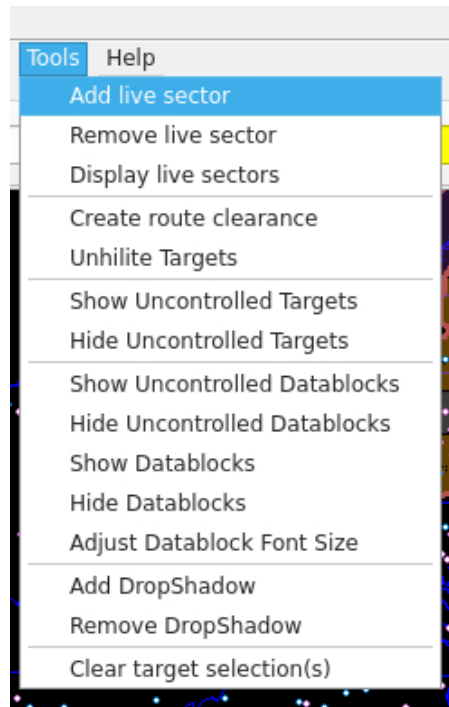


Figure 140. Add Live Sector Tools Menu Option

NOTE: Multiple sectors can be added at one time.

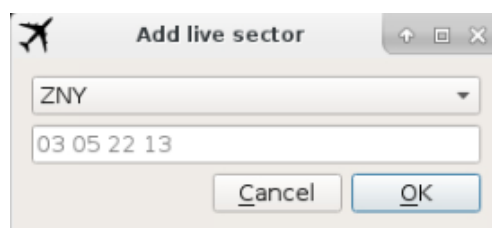


Figure 141. Add Live Sector Dialog

Remove live sector

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

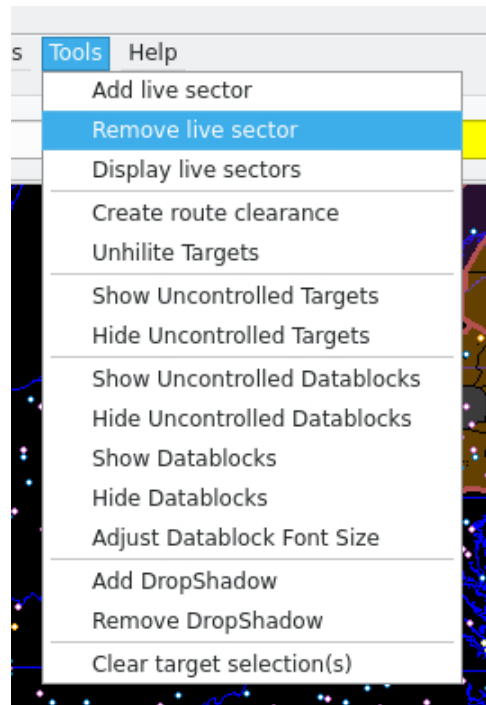


Figure 142. Remove Live Sector Tools Menu Option

NOTE: Multiple sectors can be removed at one time.

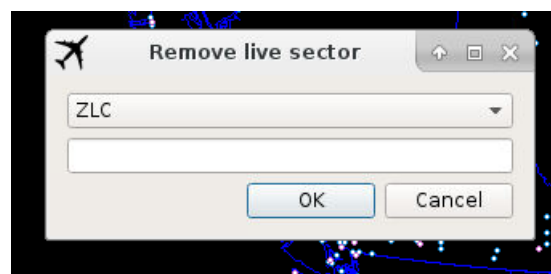


Figure 143. Remove Live Sector Dialog

Display live sectors

Displays all sector positions identified as having live controllers.

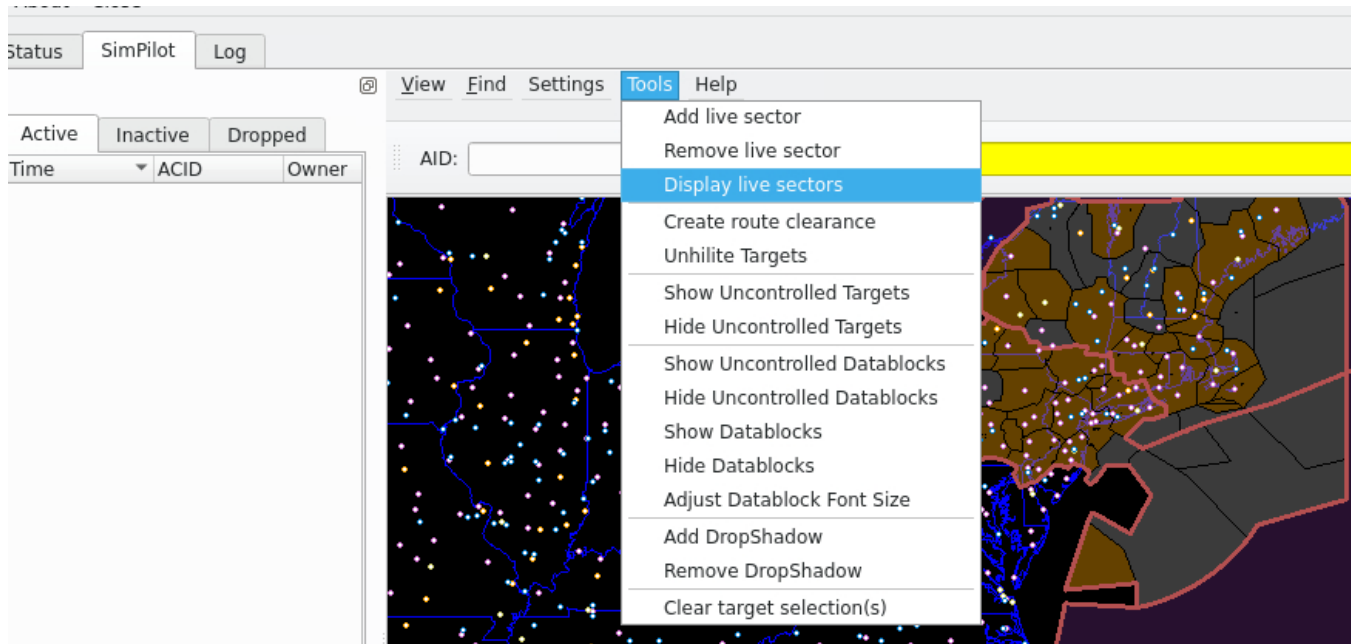


Figure 144. Display Live Sectors Tools Menu Option

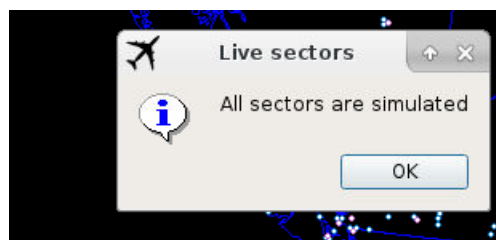


Figure 145. Display Live Sectors Dialog

Adjust Datablock Font Size

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

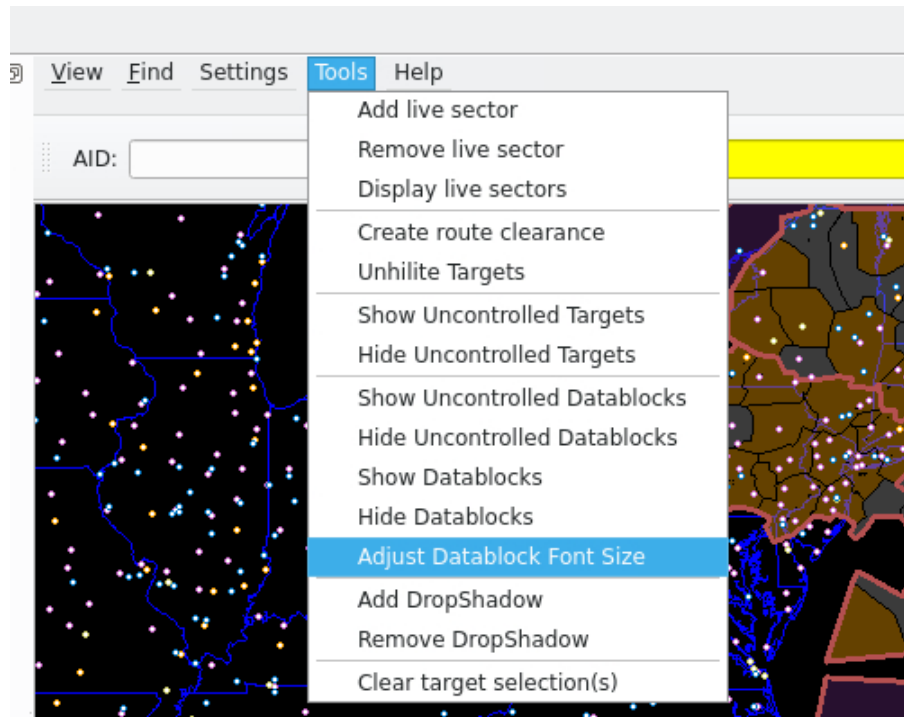


Figure 146. Adjust Datablock Font Size Tools Menu Option

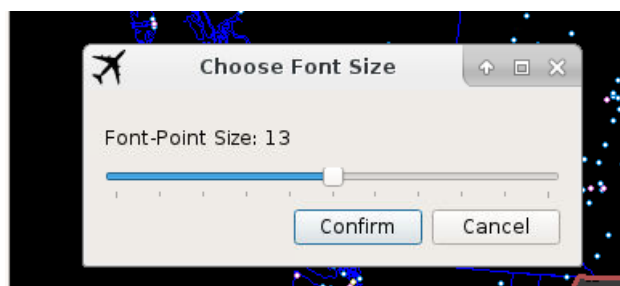


Figure 147. Adjust Datablock Font Size Dialog

Create route clearance

Opens a dialog to enter a route clearance.

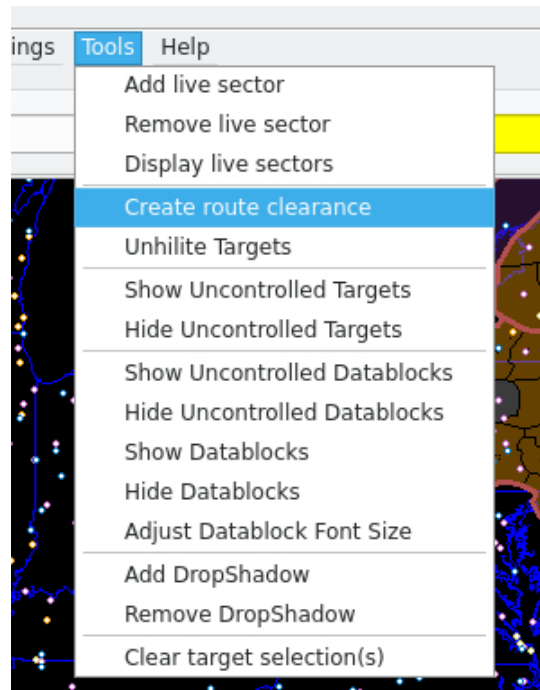


Figure 148. Create Route Clearance Tools Menu Option



Figure 149. Create Route Clearance Dialog

Unhilit Targets

Removes all highlighted flight paths.

Show/Hide Datablocks

Shows/Hides Datablocks on map.

Add/Remove Dropshadow

Adds/removes dropshadow from targets and datablocks.

Clear Target Selections

Unhighlights any selected flights.

Current Wx Hour

Displays the current weather hour.

Clear SDRR Dynamic Targets

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

Help

Clicking on **Help** displays submenus for:

Macro definitions

Displays a list of available macro commands.

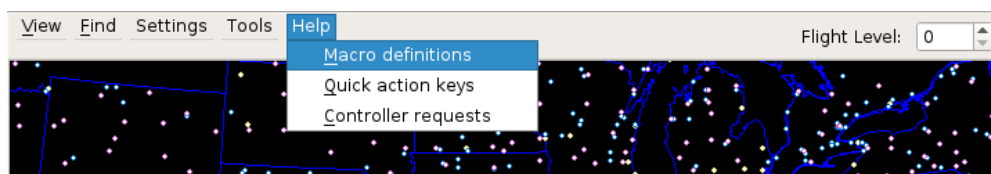


Figure 150. Macro Definitions Help Menu Option

✈
Macro definitions

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)@dddfft

- 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): ->B0000
 - 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:>dddfft}
 - Speed terminate: ->maintain{vnavTerm:>200(cas|tas)}

Fix Attributes:

- Arpt: {arpt}
- Dep Runway: {rw:26R}

- AltRestriction: {[<>]dddfft}
- SpdRestriction: {[<>]kddd(cas|tas)}
- Radial turn: {rf}{turnDir:[LR]}

Figure 151. Macro Definitions Help Page

Quick action keys

Displays a list of available keyboard short cuts.

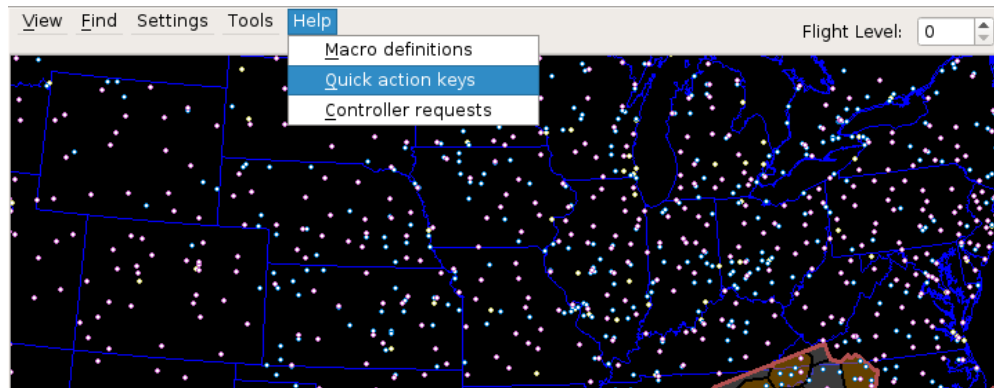


Figure 152. Quick Action Keys Help Menu Option

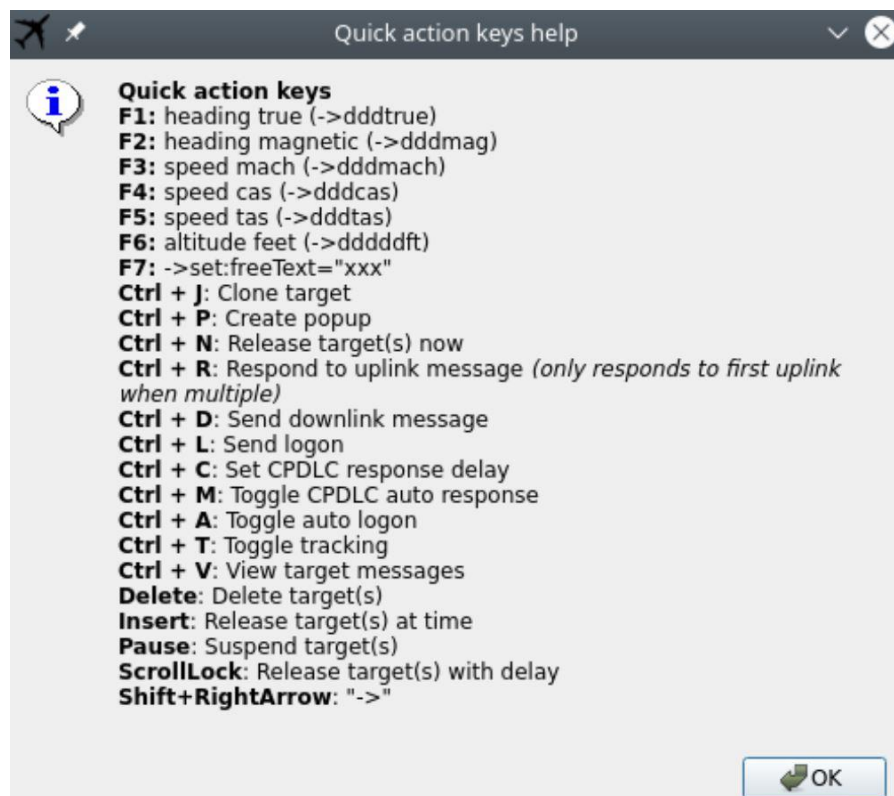


Figure 153. Quick Action Keys Help Page

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.

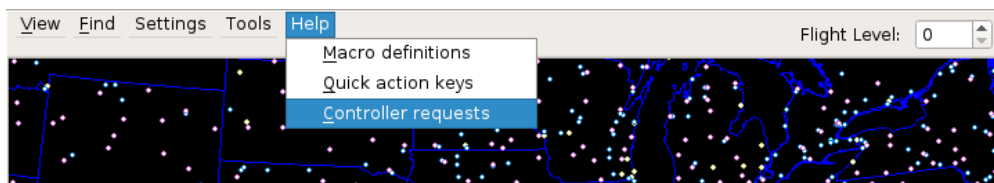


Figure 154. Controller Requests Help Menu Option

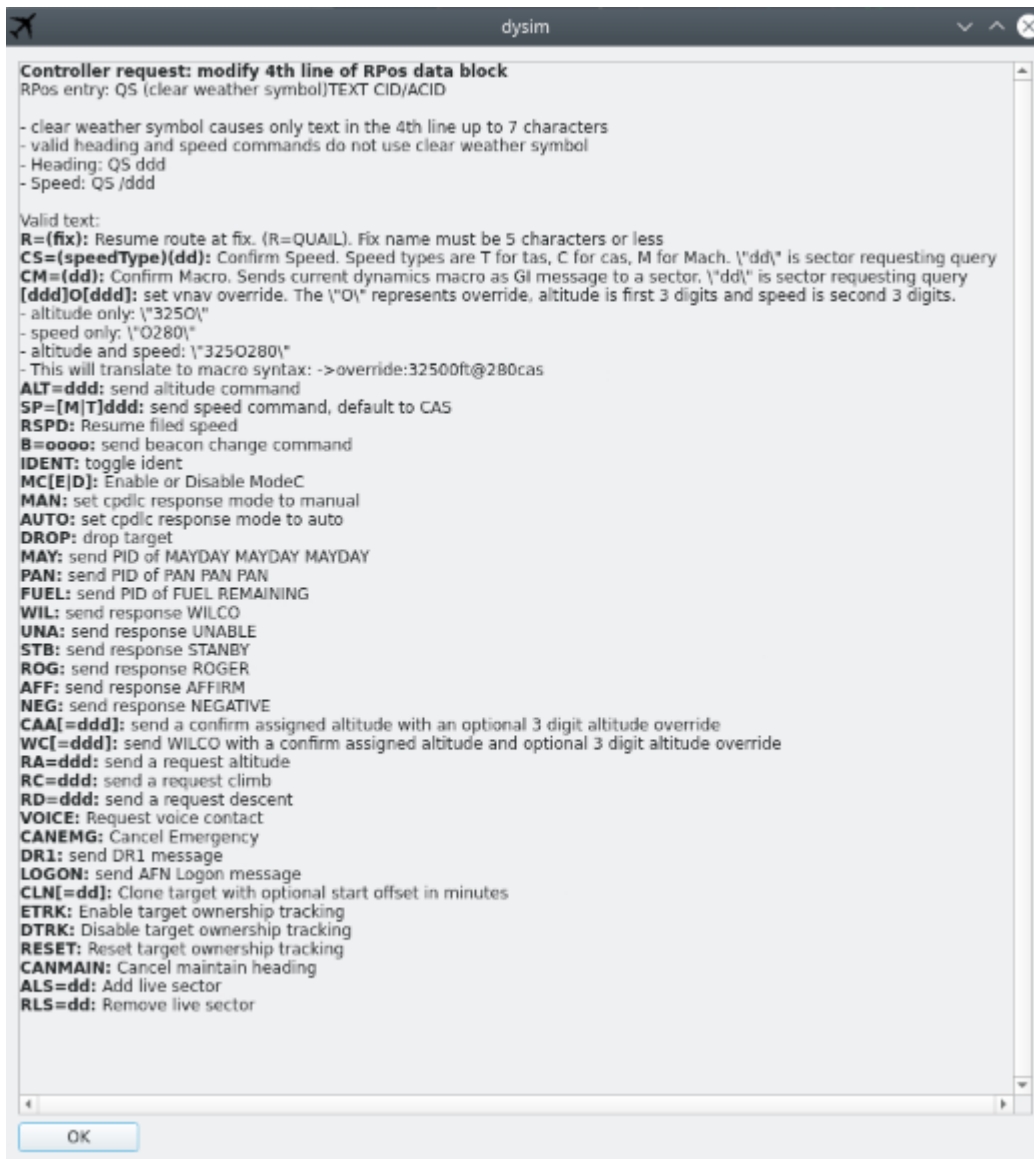


Figure 155. Controller Requests Help Page

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 156. Flight Level

Zoom

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



Figure 157. Zoom

Range

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



Figure 158. Range

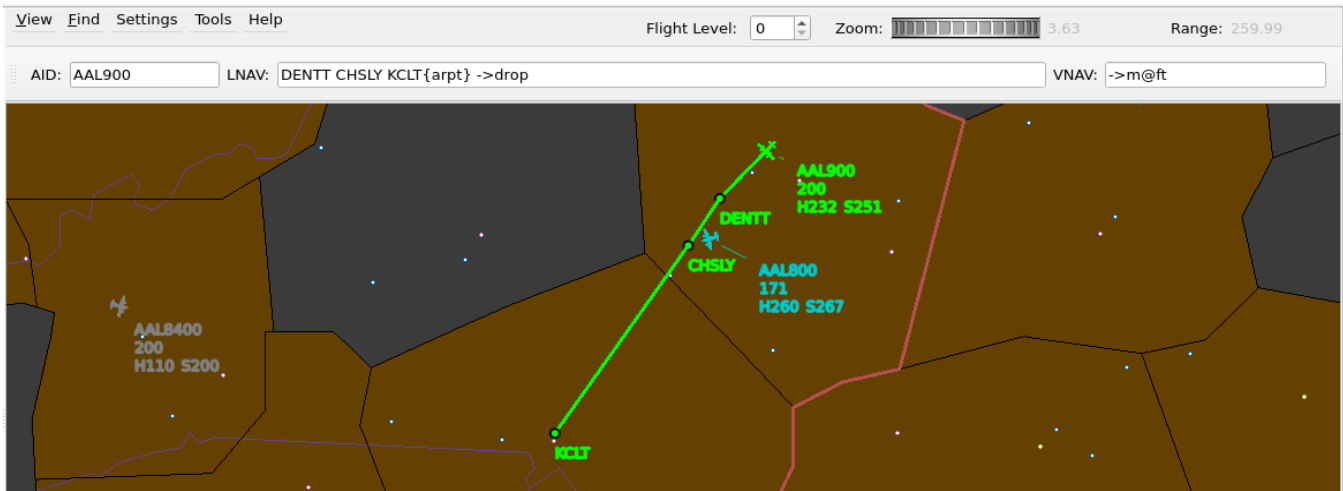


Figure 159. Macro Command Bar

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@dddddft or ->dddtas@dddddft or ->.ddm@dddddft	Change the speed and altitude of the target to the values specified.
->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).

LNAV Commands

<p>FIXNAME</p> <p>FIXNAME{attributes}</p> <p>Attributes:</p> <p>{arpt}</p> <p>{rw:dd} or {rw:ddA}</p> <p>{ils:dd} or {ils:ddA}</p> <p>{ddddft}</p> <p>{<ddddft}</p> <p>{>ddddft}</p> <p>{ddddftBddddft}</p> <p>{dddcas}, {dddtas}, or {.ddm}</p> <p>{<dddcas}, {<dddtas}, or {<.ddm}</p> <p>{>dddcas}, {>dddtas}, or {>.ddm}</p> <p>{rf}{dddmag}{turnDir:A}</p>	<p>Proceed to the fix.</p> <p>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.</p> <p>On the first fix, auto-apply departure logic; on the last fix, auto-apply top of descent (TOD) restriction. Not valid on other fixes.</p> <p>In conjunction with {arpt} on departures, use a defined departure procedure for the specified runway.</p> <p>In conjunction with {arpt} on arrivals, perform an ILS approach to the specified runway. This disables TOD processing.</p> <p>Cross the fix at the specified restriction altitude.</p> <p>Cross the fix at or below the specified restriction altitude.</p> <p>Cross the fix at or above the specified restriction altitude.</p> <p>Cross the fix between the specified restriction altitudes. Order is of the restriction altitudes is irrelevant.</p> <p>Cross the fix at the specified restriction speed.</p> <p>Cross the fix at or below the specified restriction speed.</p> <p>Cross the fix at or above the specified restriction speed.</p> <p>Perform a radius to fix turn (in the specified turn direction), exiting the fix at the specified heading.</p>
<p>->ddd[RL]mag</p>	<p>Change the heading of the target to the value specified in degrees from magnetic North or by the right or left offset.</p>

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

->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: *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.

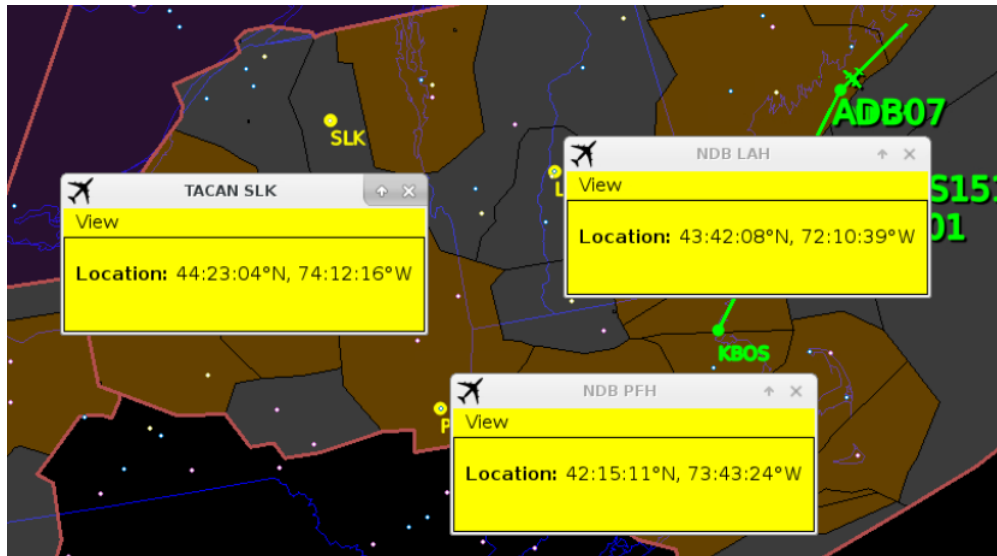


Figure 160. Context Boxes

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.

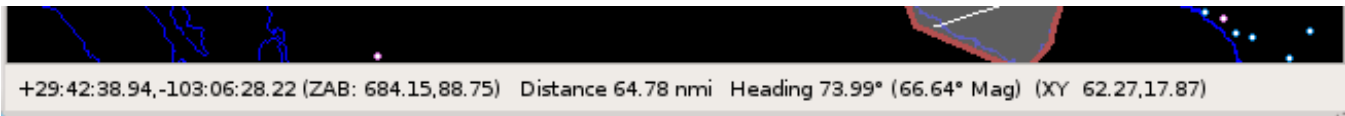


Figure 161. Status Bar

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.

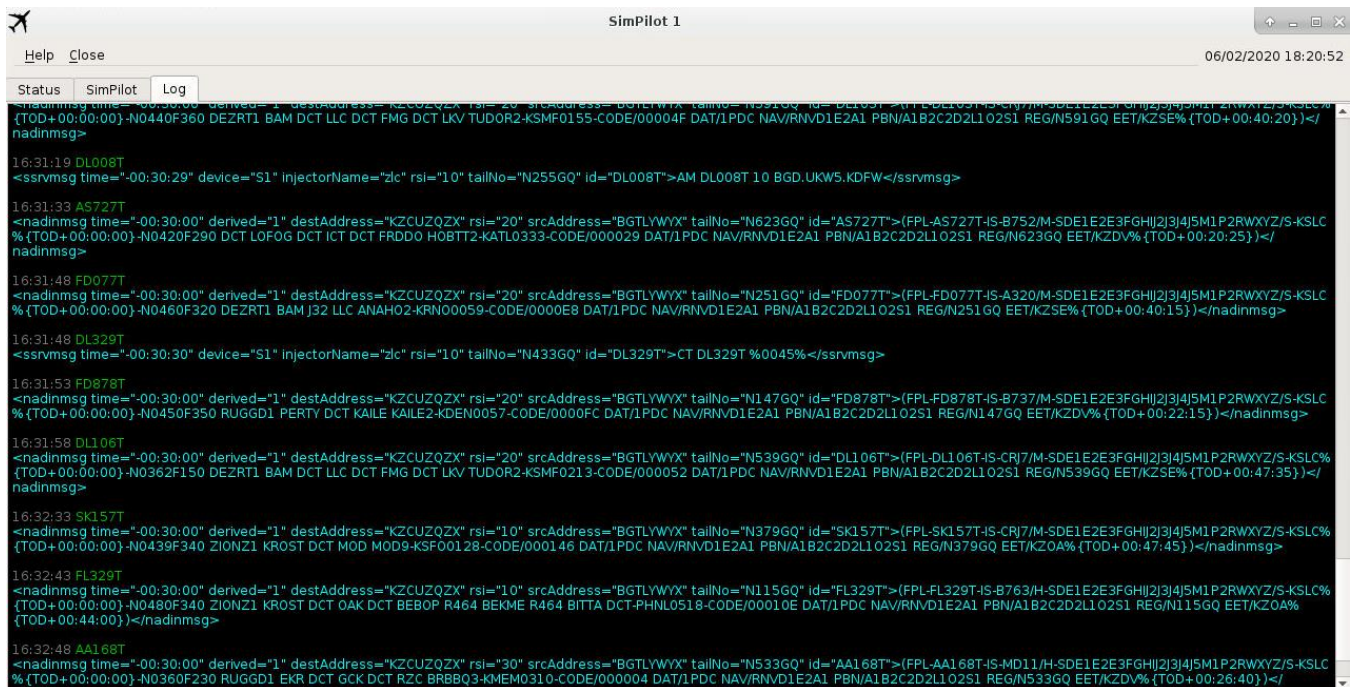


Figure 162. Log Tab

6. 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.

6.1. 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 163: simPilot target datablock

6.1.1. Modifying Altitude via right-click

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 164: Right-click altitude change

6.1.2. Modifying Heading via right-click

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.

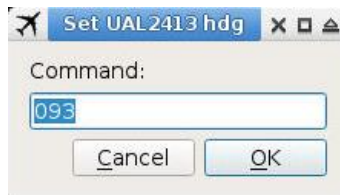


Figure 165: Right-click heading change

6.1.3. Modifying Speed via right-click

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 166: Right-click speed change

6.1.4. 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 167: Give Control

6.2. 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.

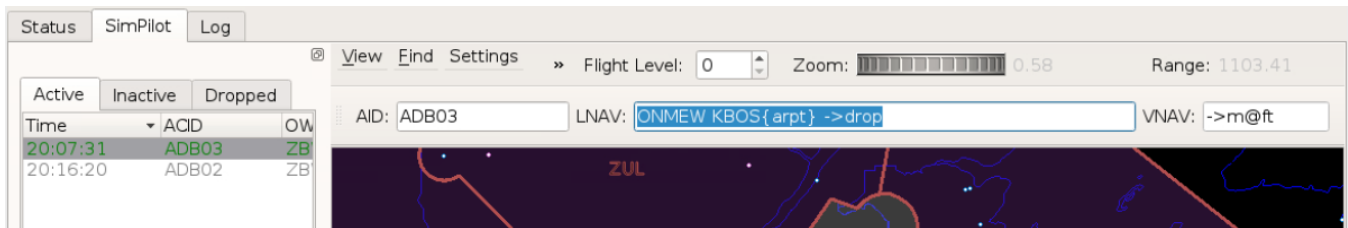


Figure 168. Macro Entry

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



Figure 169. Accepted Macro Entry

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

6.3. Timed Macros Box

A timed macros box can be invoked by either double left-clicking a target in the active tab or by shift-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 170. Timed Macros Box

7. Sample Configuration Files

7.1. 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>
  <scriptDefinitions>scriptDefinitions.xml</scriptDefinitions>
  <activeRunways>activeRunways.xml</activeRunways>
  <restrictions>restrictions.xml</restrictions>
  <pilotControls>pilotControls.xml</pilotControls>
  <devctl>devctl.xml</devctl>
</scenario>
```

7.2. 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.

7.3. 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 command box is in focus and will insert a built-in macro. The 'customMacro' entries are also used when the command box is in focus but can be any macro command. The 'ControlKey' entries are used when the command box is NOT in focus and are activated by holding 'Ctrl' plus the assigned 'key'.

7.4. Pilot Controls File

The scenario.xml file can reference a pilotControls.xml file that is used to modify the behavior of automatic pilot control of targets during scenario execution. Essentially, the pilot controls file maps airspace sector controllers to individual pilot positions. During scenario execution, when flights are handed off to one of the specified sector controllers, target control of the flight is automatically offered to the pilot position mapped to that sector controller. An example of a pilotControls.xml is shown below:

```
<pilotControls>
  <pilotControl controller="ZAB/71" pilot="20"/>
  <pilotControl controller="ZDV/13" pilot="20"/>
  <pilotControl controller="ZDV/15" pilot="20"/>
  <pilotControl controller="ZDV/26" pilot="20"/>
  <pilotControl controller="ZDV/27" pilot="20"/>
  <pilotControl controller="ZDV:RDC/1E" pilot="2"/>
  <pilotControl controller="ZDV:RDC/1G" pilot="7"/>
  <pilotControl controller="ZDV:RDC/1H" pilot="6"/>
  <pilotControl controller="ZDV:RDC/1I" pilot="5"/>
  <pilotControl controller="ZDV:RDC/10" pilot="3"/>
  <pilotControl controller="ZDV:RDC/1S" pilot="1"/>
  <pilotControl controller="ZDV:RDC/1T" pilot="4"/>
  <pilotControl controller="ZDV:RDC/1W" pilot="1"/>
  <pilotControl controller="ZDV:RDC/1X" pilot="8"/>
  <pilotControl controller="ZKC/22" pilot="20"/>
  <pilotControl controller="ZLA/60" pilot="20"/>
  <pilotControl controller="ZLC/05" pilot="20"/>
  <pilotControl controller="ZMP/29" pilot="20"/>
</pilotControls>
```


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