Dynamic Simulation (DYSIM)

User Reference Guide

(JVN – UG – 001)

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1. Introduction

1.1. What is DYSIM?

DYSIM refers to a group of executables, included in the JVN Tool Suite, which provide capabilities for dynamic simulation. These capabilities include real-time generation of flight data messages and target positions, automatic modification of the simulation in response to system feedback and air traffic controller and "pilot" commands, processing of live surveillance and non-surveillance data with an option of dynamic takeover of targets, and interaction with other programs such as Target Generator Facility (TGF) and Time Based Flow Management (TBFM) Simulation Interface Support (SMIF). The DYSIM executables are simDriver, simPilot, asdiHandshake, tgfHandshake, cmsDysim, liveCmsDysim, dysim, dysimLogExtract, and srvDysim.

2. Global Configuration

The DYSIM executables use environment variables for the locations of weather scenarios, log files, and adaptation data, including En Route Automation Modernization (ERAM), Standard Terminal Automation Replacement System (STARS), and TBFM adaptation files.

Table 1. Environment Variables

Variable	Description
`ADAPTATION_PATH`	Path to where adaptations are located.
`WX_PATH`	Path to where weather scenarios are located.
`DYSIM_LOG_PATH`	Path to where the DYSIM system logs are located.

Additional configuration needed for individual executables is described below.

3. Executables

3.1. 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) and also has an interface to SMIF.

3.1.1. simDriver Specific Configuration

In order for simDriver to run with SMIF, the SMIF software must be installed on the same processor. The location of the SMIF executable is /opt/CTAS_rel/<TBFM_version>/smif/bin/smif. When SMIF is launched, a configuration file must be specified. A sample configuration file is included with the SMIF software in /opt/CTAS_rel/<TBFM_version>/smif/etc/SMIF.config.

Example 1. Contents of a SMIF.config file.

```
artcc.connections=ZAB

artcc.ZAB.cap.host=<TBFM_address>
artcc.ZAB.cap.port=8080
artcc.ZAB.wdpd.host=<TBFM_address>

dysim.connection.host=localhost
dysim.connection.port=8081

filterDistanceNM=4

CAP_QUERY=UPD&NEV=adp,con,oth,cid,dnt,rtm,evt,aat,atm,dap,apt,acs,wcl,eng,in
a,trw,drw,tds,etd,etm,est,tcr,sid,rwy,tra,mfx,gat,dfx,sfx,oma,ooa,o3a,o4a,cf
g,cat,scn,trk,eta,t2t*&ICAO_APT&TSIM

prsw_cl_gims_proposed_advisory_delay=0
prsw_cl_gims_accepted_advisory_delay=0
prsw_TSAS_advisory_maneuver_delay = 0
prsw_TSAS_advisory_ignore_period = 30000
prsw_TSAS_advisory_match_tolerance = 1
```

3.1.2. Starting simDriver

The simDriver must be started from the command line while inside the directory with the Graphic Simulation Generation Tool (GSGT) scenario to be executed. To launch simDriver with only the required parameters, enter:

```
> simDriver <sdrr_config.xml> --sdrrCmdDev=tcp:<sdrr_address>/<port #>
--tgtOutDev=multi:<multicast_address>/<port #>
```

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

```
> /usr/local/jvn.x.x.x/bin/simDriver <sdrr_config.xml>
--sdrrCmdDev=tcp:<sdrr_address>/<port #>
--tgtOutDev=multi:<multicast_address>/<port #>
```

☞ **Note**

> The simDriver must be started from a command line while inside the scenario directory.

3.1.2.1. Parameters

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

Table 2. Parameters for simDriver

Parameter	Description
<sdrr_config.xml>	The SDRR configuration xml file argument is required to start the simDriver software.
--sdrrCmdDev=tcp:<sdrr_address>/<port#>	Directs simDriver to send flight data messages to SDRR at the named address & port. SDRR must be started with the corresponding parameter.
--tgtOutDev=multi:<multicast_address>/<port#>	Directs simDriver to send target positions to SDRR at the named address & port. SDRR must be started with the corresponding parameter.

--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.
--smifPort=<port#>	Defines the port for the connection to SMIF. This must match the port number in the SMIF.config file.
--hoMargin=<nautical_miles>	Sets the distance from a facility boundary where simDriver will start sending target position messages to SDRR. Value is in nautical miles. The default value is zero.
--hoDuration=< seconds>	Sets the duration for a target to remain in handoff. Value is in seconds. The default value is zero, which also disables hoMargin.
--simPilotPort=<port#>	Defines the port for the connection to simPilot. The simPilot executable must be started with the corresponding parameter.
--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.
--liveSectors=name:<sector position(s)>	Defines which ERAM sector positions will be manned by controllers. Applies to indirect mode only.
--liveHadds= tcp:<sdrr_address>/<port#>	Used with the haddsClient utility. Directs simDriver to connect to a device (address & port) where the haddsClient utility will output CMS messages from a live (or virtualized) En Route Data Distribution System (EDDS). The haddsClient must be started with the corresponding parameter.

--forceCmsToDysim	Forces simDriver to process the CMS messages from a live (or virtualized) EDDS.
--nofullscreen	Not full screen mode; simDriver will be stared in a window roughly half the size of the screen.
--version	Displays simDriver version.
--help	Display application parameters.

Example 2. Start simDriver with optional parameters

```
> simDriver  ./sdrrCfg.xml  --sdrrCmdDev=tcp:tbfmsdrr-tbfm/9601
--tgtOutDev=multi:224.1.1.1/9600  --smifPort=8081  --hoMargin=20  --hoDuration=60
--rsi=10  --rsi=20
```

3.1.3. simDriver GUI

The simDriver Graphical User Interface (GUI) is made up of a main menu bar, date and time clock, and display tabs. The menu bar includes the following options:

Start

> Starts the scenario execution, immediately.

Start At

> Starts the scenario execution, at the specified time.

Help

> The Help menu provides an option to select **About**. The **About** option displays the "About simDriver" dialog which shows the name of the scenario that was launched, the version of simDriver, and the date and time that the simDriver executable was built.

Close

> Stops the scenario execution and closes the simDriver GUI.

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

The display tabs are Status, Dysim, Flight Tracker, SDRR Injections, SMIF (if simDriver was started with the optional smifPort parameter), and Macros. Right clicking in the message log areas of each 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.

3.1.3.1. 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 right side contains a System Log where all system messages, such as status, warnings and errors are displayed.

3.1.3.2. Dysim Tab

The Dysim Tab is separated into two parts. The left side displays the Targets View which can be detached into its own window. The Targets View displays Active, Inactive, and Dropped target tabs and a command input text box. The target tabs list the following details for active, inactive, and dropped targets:

Activation time

>   Time that the target was or will be activated.

ACID

>   Aircraft identification.

BCN

>   Beacon code.

AChar

>   Aircraft type.

RSI

>   Record select indicator.

Pilot

>   Number of the simPilot position assigned to have initial control of the target.

Route

>   Flight plan route.

The target lists can be sorted by clicking on the any of the column headers. Right clicking on an entry in the Active list displays the following options:

Drop

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

Clone

> Opens a dialog for generating a new target; the dialog is populated with the details of the selected target.

Create popup

> Opens a blank dialog for generating a new target.

Disable/Enable handoff tracking

> Toggles the processing of handoff messages received from a haddsClient feed.

Disable/Enable cms dysim tracking

> Toggles the processing of non-handoff and non-HX messages received from a haddsClient feed.

Disable/Enable HX dysim tracking

> Toggles the processing of HX messages received from a haddsClient feed.

Dump Attributes

> Sends all the 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.

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

Release now

Activates the target immediately.

Release with delay

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

Release at

Activates the target at the specified external system time.

Delete

Removes the target from the current simulation execution.

Edit

Opens a dialog for editing the selected target.

Clone

Opens a dialog for generating a new target; the dialog is populated with the details of the selected target.

Create popup

Opens a blank dialog for generating a new target.

Suspend

Prevents the target from activating at the scripted injection time. The target may be manually releases at another time.

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.

Disable/Enable handoff tracking

Toggles the processing of handoff messages received from a haddsClient feed.

Disable/Enable cms dysim tracking

Toggles the processing of non-handoff and non-HX messages received from a haddsClient feed.

Disable/Enable HX dysim tracking

Toggles the processing of HX messages received from a haddsClient feed.

Dump Attributes

Sends all the 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.

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

Clone

Opens a dialog for generating a new target; the dialog is populated with the details of the selected target.

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 3 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).
->cancelVNAV	Clear the current speed and altitude commands.
->override:<VNAV command>	Set a speed and altitude command as a VNAV override. While a VNAV override is in effect, the target will not obey restrictions.
->cancelOverride	Clear the VNAV override command.
LNAV Commands	
FIXNAME	Proceed to the fix.
FIXNAME{attributes}	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.
Attributes:	
{arpt}	On the first fix, auto-apply departure logic; on the last fix, auto-apply top of descent (TOD) restriction. Not valid on other fixes.
{rw:dd} or {rw:ddA}	In conjunction with {arpt} on departures, use a defined departure procedure for the specified runway.
{ils:dd} or {ils:ddA}	In conjunction with {arpt} on arrivals, perform an ILS approach to the specified runway. This disables TOD

	processing.
{dddddft}	Cross the fix at the specified restriction altitude.
{<dddddft}	Cross the fix at or below the specified restriction altitude.
{>dddddft}	Cross the fix at or above the specified restriction altitude.
{dddddftBdddddft}	Cross the fix between the specified restriction altitudes. Order is of the restriction altitudes is irrelevant.
{dddcas}, {dddtas}, or {.ddm}	Cross the fix at the specified restriction speed.
{<dddcas}, {<dddtas}, or {<.ddm}	Cross the fix at or below the specified restriction speed.
{>dddcas}, {>dddtas}, or {>.ddm}	Cross the fix at or above the specified restriction speed.
{rf}{ddd}{turnDir:A}	Perform a radius to fix turn (in the specified turn direction), exiting the fix at the specified (magnetic) heading.
->dddmag	Change the heading of the target to the value specified in degrees from magnetic North.
->dddmag~ddddeg/sec	Change the heading of the target to the value specified in degrees from magnetic North at a given rate of change.
->dddtrue	Change the heading of the target to the value specified in degrees from true North.
->dddtrue~ddddeg/sec	Change the heading of the target to the value specified in degrees from true North at a given rate of change.
->hold	Hold indefinitely with right hand turns and 1 minute leg lengths.
->hold{legTime:dmin}	Hold indefinitely with right hand turns and leg lengths as specified in minutes.
->hold{turnDir:A}	Hold indefinitely with 1 minute leg lengths and left or right hand turns as specified.
->hold{duration:dmin}	Hold with right hand turns and 1 minute leg lengths for the specified amount of time. Once the duration time has expired, complete the current turn and proceed with the remaining route.
->hold{count:d}	Hold with right hand turns and 1 minute leg lengths for the specified number of laps.
->drop	Drop the target.

Mode3A and Mode C Commands	
->Boooo	Set or change the beacon code.
->BE ->BD	Enable the Mode 3A beacon. Disable the Mode 3A beacon.
->MCE ->MCD	Enable Mode C. Disable Mode C.
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:cmsDysimTracking=d	Set the cmsDysimTracking attribute to 0, disabled, or 1, enabled.
->set:hxDysimTracking=d	Set the hxDysimTracking attribute to 0, disabled, or 1, enabled.
->set:cmsHandoffTracking=d	Set the cmsHandoffTracking attribute to 0, disabled, or 1, enabled.
->set:freeText=text	Set the freeText attribute to the specified text.
->clear:<attribute>	Clear the target attribute specified.

NOTE: A indicates an alphabetic character, d indicates decimal digits, o indicates octal digits, and ~ indicates a rate.

The right side of the Dysim 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 geographic map lines, adapted facility boundaries, fixes, airports, and routes.

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..

Tools

Clicking on **Tools** displays submenus for:

Enable rsis

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

Add live sector

Identifies sector position as having live controller interaction.

Remove live sector

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

Display live sectors

Displays all sector positions identified as having live controllers.

Drop active targets

Drops all currently active targets from the simulation without affecting any future targets.

Help

Clicking on **Help** displays submenus for:

Macro definitions

Displays a list of available macro commands.

Quick action keys

Displays a list of available keyboard short cuts.

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.

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.

Zoom

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

Range

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

3.1.3.3. Flight Tracker Tab

The Flight Tracker tab displays a log of all activation status, track ownership, and handoff status changes.

3.1.3.4. SDRR Injections Tab

The SDRR Injections tab displays a log of all flight data messages sent from simDriver to SDRR.

3.1.3.5. SMIF Tab

The SMIF tab displays a log of all messages exchanged between simDriver and the SMIF API.

3.1.3.6. Macros Tab

The Macros tab displays a log of all manually entered macro commands.

3.2. 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. Each simPilot can then be used to manipulate different targets and flight data messages.

3.2.1. Starting simPilot

To launch simPilot with only the required parameters, enter:

```
> simPilot <adaptation> --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 <adaptation>
--dysimDev=tcp:<dysim_address>/<port #> --position=<pilot#>
```

3.2.1.1. Parameters

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

Table 4. Program Parameters

Parameter	Description
<adaptation>	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, an adaptation.xml file or a scenario.xml file may be specified. These XML files may contain ERAM adaptation, TBFM adaptation, STARS site files, and macro files where additional routes may be defined.
--dysimDev=tcp:<dysim_address>/<port#>	Directs simPilot to connect to the address and port where a DYSIM executable like simDriver will output simulation messages and target details. The DYSIM executable must be started with the corresponding parameter identifying the same port number.

Parameter	Description
--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.
--nofullscreen	Not full screen mode; simPilot will be stared in a window roughly half the size of the screen.
--disableEffects	Start simPilot without all graphical effects.

3.2.2. simPilot GUI

The simPilot GUI is made up of a main menu bar, date and time clock, and display tabs. The menu bar includes the following options:

Start

Start is automatically activated when simPilot is launched.

Help

The Help menu provides an option to select **About**. The **About** option displays the "About simPilot" dialog which shows the version of simPilot, and the date and time that the simPilot executable was built.

Close

Closes the simPilot GUI.

When simPilot is launched, the scenario time is displayed in parentheses and the current date and system time are displayed in the upper right corner. When a DYSIM executable, configured to connect to simPilot, is started or re-started, the scenario time is re-started.

The display tabs are Status, SimPilot, and Log. Right clicking in the text areas of each 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 text area.

Find

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

3.2.2.1. 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.

3.2.2.2. SimPilot Tab

The SimPilot Tab is separated into two parts. The left side displays the Targets View which can be detached into its own window. The Targets View displays Active, Inactive, and Dropped target tabs and a command input text box. The target tabs list the following details for active, inactive, and dropped targets:

Activation time

    Time that the target was or will be activated.

ACID

    Aircraft identification.

BCN

    Beacon code.

AChar

    Aircraft type.

RSI

    Record select indicator.

Position

Number of the simPilot position assigned to have initial control of the target.

Route

Flight plan route.

Comments

Scenario comments.

The target lists can be sorted by clicking on the any of the column headers. Right clicking on an entry in the Active list displays the following options:

Drop

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

Clone

Opens a dialog for generating a new target; the dialog is populated with the details of the selected target.

Create popup

Opens a blank dialog for generating a new target.

Disable/Enable handoff tracking

Toggles the processing of handoff messages received from a haddsClient feed.

Disable/Enable cms dysim tracking

Toggles the processing of non-handoff and non-HX messages received from a haddsClient feed.

Disable/Enable HX dysim tracking

Toggles the processing of HX messages received from a haddsClient feed.

Dump Attributes

Sends all the 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.

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

Release now

Activates the target immediately.

Release with delay

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

Release at

Activates the target at the specified external system time.

Delete

Removes the target from the current simulation execution.

Edit

Opens a dialog for editing the selected target.

Clone

Opens a dialog for generating a new target; the dialog is populated with the details of the selected target.

Create popup

Opens a blank dialog for generating a new target.

Suspend

Prevents the target from activating at the scripted injection time. The target may be manually releases at another time.

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.

Disable/Enable handoff tracking

Toggles the processing of handoff messages received from a haddsClient feed.

Disable/Enable cms dysim tracking

Toggles the processing of non-handoff and non-HX messages received from a haddsClient feed.

Disable/Enable HX dysim tracking

Toggles the processing of HX messages received from a haddsClient feed.

Dump Attributes

Sends all the 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.

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

Clone

Opens a dialog for generating a new target; the dialog is populated with the details of the selected target.

Delete

Removes the target from the current simulation execution.

Dump Attributes

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

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 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).
->cancelVNAV	Clear the current speed and altitude commands.
->override:<VNAV command>	Set a speed and altitude command as a VNAV override. While a VNAV override is in effect, the target will not obey restrictions.
->cancelOverride	Clear the VNAV override command.

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

->hold	Hold indefinitely with right hand turns and 1 minute leg lengths.
->hold{legTime:dmin}	Hold indefinitely with right hand turns and leg lengths as specified in minutes.
->hold{turnDir:A}	Hold indefinitely with 1 minute leg lengths and left or right hand turns as specified.
->hold{duration:dmin}	Hold with right hand turns and 1 minute leg lengths for the specified amount of time. Once the duration time has expired, complete the current turn and proceed with the remaining route.
->hold{count:d}	Hold with right hand turns and 1 minute leg lengths for the specified number of laps.

->drop	Drop the target.

Mode3A and Mode C Commands

->Boooo	Set or change the beacon code.

->BE	Enable the Mode 3A beacon.
->BD	Disable the Mode 3A beacon.

->MCE	Enable Mode C.
->MCD	Disable Mode C.

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:cmsDysimTracking=d	Set the cmsDysimTracking attribute to 0, disabled, or 1, enabled.
->set:hxDysimTracking=d	Set the hxDysimTracking attribute to 0, disabled, or 1, enabled.

->set:cmsHandoffTracking=d	Set the cmsHandoffTracking attribute to 0, disabled, or 1, enabled.
->set:freeText=text	Set the freeText attribute to the specified text.
->clear:<attribute>	Clear the target attribute specified.

NOTE: A indicates an alphabetic character, d indicates decimal digits, o indicates octal digits, and ~ indicates a rate.

The right side of the SimPilot 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 geographic map lines, adapted facility boundaries, fixes, airports, and routes.

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.

Help

Clicking on **Help** displays submenus for:

Macro definitions

Displays a list of available macro commands.

Quick action keys

Displays a list of available keyboard short cuts.

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.

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 type 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.

Zoom

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

Range

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

3.2.2.3. Log Tab

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

5. Acronyms

API	Application Program Interface
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
AViD	Airspace Visualization Display
CAS	Commercially Available Software
DataComm	Data Communications
DYSIM	Dynamic Simulation
EDDS	En Route Data DistributionSystem
ERAM	En Route Automation Modernization
FAA	Federal Aviation Administration
GSGT	Graphic Simulation Generation Tool
GUI	Graphical User Interface
JRE	Java Runtime Environment
MIS	Metering Information Service
NAS	National Air Space
NEMS	NAS Enterprise Messaging System
RF	Radius-to-fix
RSI	Record Select Indicator
RTCS	Release Time Coordination Service
RTM	Requirements Traceability Matrix
SDRR	Simulation Driver Radar Recorder
SMIF	Simulation Interface Support

STARS   Standard Terminal Automation Replacement System

TBFM   Time Based Flow Management

TFDM   Terminal Flight Data Manager

TGF   Target Generator Facility

TRACON   Terminal Radar Approach Control

TSIM   TBFM Simulation

WJHTC   William J. Hughes Technical Center