



# **Airspace Visualization Display (AViD)**

## **User Reference Guide**

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## 1. AViD Overview

Airspace Visualization Display (AViD) is one component of the JVN Tool Suite, an integrated set of software programs for simulating and displaying air traffic data with the ability to emulate and interface with a variety of air traffic control and advisory systems.

AViD is used for recording, viewing, and analyzing surveillance data and monitoring interfacility messages from sources defined in the adaptation files of systems such as En Route Automation Modernization (ERAM) and Standard Terminal Automation Replacement System (STARS).

AViD contains imbedded applications that plot, list, and dissect surveillance data in multiple formats including Automatic Dependent Surveillance – Broadcast (ADS-B), Common Digitizer (CD2), Multilateration (MLAT), Digital Surveillance Radar (DASR), Wide Area Multilateration (WAM), and networked surveillance data using External Communications Gateway Protocol (ECGP). Input data can be streamed from configured physical devices, surveillance recordings, or user developed simulations. Surveillance data can be globally filtered and further sorted within the applications. AViD is customizable and can display geopolitical and satellite maps as the background to plotted surveillance data.

## 2. Getting Started

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

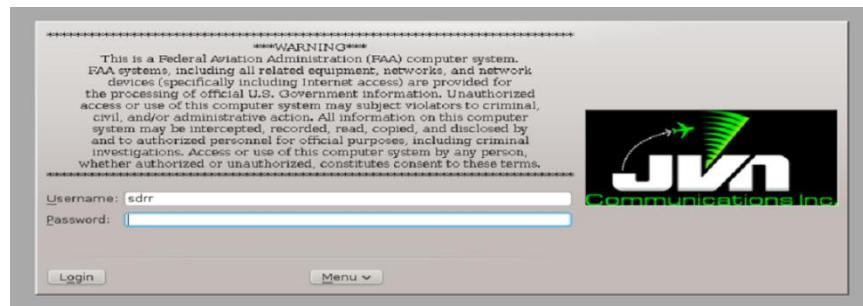


Figure 1. AViD Processor Login

After a short loading period the KDE desktop will appear.



Figure 2. AViD Processor Desktop

## 2.1. Environment Variables

AViD uses several environment variables that set the locations of configuration files, scenarios, and recordings.

**Table 1. Environment Variables**

Variable Name	Description	Default Location
SDRR_CONFIG_PATH	Location of SDRR configuration files.	/usr/local/cfg
SDRR_SCENARIO_PATH	Location of SDRR scenario files.	/usr/local/scenarios
RECORD_PATH	Location of recording files.	/usr/local/recordings

## 2.2. AViD Parameters

AViD can be started with optional parameters which control its operation.

**Table 2. Program Parameters**

Parameter	Description
cfgFile.xml	XML configuration file defining surveillance sources. A relative path from \${SDRR_CONFIG_PATH} is assumed, unless an explicit path is given. Multiple files may be specified.
--scenario=sdrScenFile.xml	Start AViD with an exported SDRR scenario. A relative path from \${SDRR_SCENARIO_PATH} is assumed, unless an explicit path is given.
--recordingDir=directory	Directs SDRR to read in recorded files from the specified directory.
srcFile.srv	Surveillance data file from an exported SDRR scenario or from a recording. Multiple files may be specified.

Parameter	Description
--auto	Used in conjunction with srcFile.srv. Instructs AViD to automatically generate the configuration for surveillance sources based on the contents of the specified surveillance data file(s).
--include=srcName,srcName	Include data from specified sources.
--exclude=srcName,srcName	Exclude data from specified sources.
--nofullscreen	Not full screen mode.
--version	Displays AViD version.
--help	Displays parameters and options.

### 2.3. Starting AViD

AViD can be started either by left clicking on the AViD icon in the system task bar on the lower right side of the display (see figure below) or by typing **avid** at the command line in a terminal window:

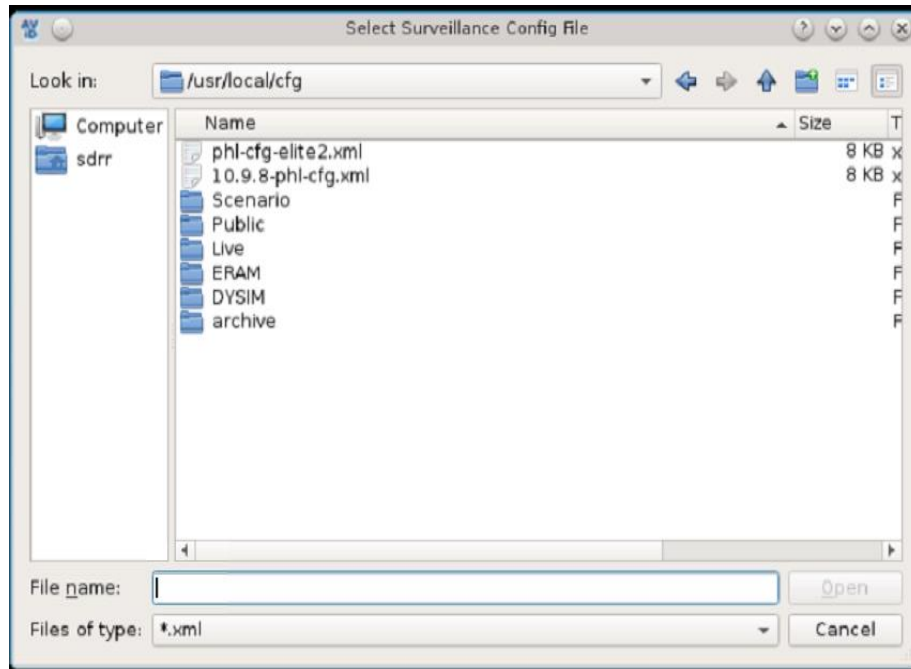
```
> avid
```



**Figure 3. AViD Icon**

Once AViD is launched, the Surveillance Config selection window appears. This window lists the available configuration files located in the directory specified by the environment variable  $\${SDRR\_CONFIG\_PATH}$ . The configuration file should include all the surveillance sources of interest.

Select a configuration file containing the desired surveillance sources and click Open.



**Figure 4. Surveillance Config Selection Window**

Configuration files can be generated using the offline **exportStarsConfig** utility with the following options:

```
> exportStarsConfig <adaptation> -i <siteFile>
```

Both the ERAM adaptation and STARS site file (.st) are needed to properly parse the sensor data. The files should be located in the directory specified by the environment variable `${ADAPTATION_PATH}` unless explicit paths are given.

Below is an example of a surveillance sources configuration file generated by exporting ERAM adaptation and STARS site file.



```

<radar name="ph1" device="sirs15s1-jvn:/dev/srr0" type="asr9-modes" elev="87.00" magdev="-11.00" psrMaxRange="64" scantime="4.62" spos="+39:51:33.00,-0
75:16:00.30" ssrMaxRange="64">
  <brtqc acps="2102" alt="839" bcn="7770" range="59.1"/>
  <srtqc acps="2060" range="50.1" runlength="24"/>
  <parrot acps="906" mode3a="1273" modec="-10" range="50"/>
  <parrot acps="1001" mode3a="1274" modec="-10" range="44.3"/>
  <permanentEcho acps="833" modec="0" range="2.9" runlength="24"/>
  <permanentEcho acps="993" modec="0" range="1.2" runlength="24"/>
</radar>
<radar name="qie" device="sirs15s1-jvn:/dev/lrr1" type="lrr" elev="284.00" psrMaxRange="250" scantime="12.00" spos="+39:49:29.00,-074:57:15.00" ssrMaxR
ange="250">
  <brtqc acps="2048" alt="839" bcn="7777" range="1"/>
  <srtqc acps="0" range="1" runlength="24"/>
  <parrot acps="1615" mode3a="1275" modec="730" range="64.2"/>
  <parrot acps="3691" mode3a="1274" modec="900" range="63.2"/>
</radar>
<radar name="wri" device="sirs15s1-jvn:/dev/asr11-3" type="asr11" elev="217.00" psrMaxRange="64" psrRangeUnits="64.00" scantime="4.84" spos="+40:02:08.
50,-074:35:53.10" ssrMaxRange="128" ssrRangeUnits="32.00">
  <brtqc acps="2104" alt="0" bcn="7777" range="59"/>
  <srtqc acps="174" range="56" runlength="24"/>
  <parrot acps="1197" mode3a="1275" modec="590" range="3"/>
  <permanentEcho acps="1918" modec="0" range="1.2" runlength="24"/>
</radar>
<svol name="ppp-ads" sac="0xab" sic="0x0d" svType="1">
<stream name="uat" device="(sirs15:multi:eth2:239.160.28.30/59950+sirs15:multi:eth3:239.160.28.30/59950)"/>
<stream name="1090" device="(sirs15:multi:eth2:239.160.28.30/59951+sirs15:multi:eth3:239.160.28.30/59951)"/>
<stream name="equip" device="(sirs15:multi:eth2:239.160.28.30/59952+sirs15:multi:eth3:239.160.28.30/59952)"/>
<stream name="svol" device="(sirs15:multi:eth2:239.160.28.30/59953+sirs15:multi:eth3:239.160.28.30/59953)"/>
<stream name="sdp" device="(sirs15:multi:eth2:239.160.28.30/59954+sirs15:multi:eth3:239.160.28.30/59954)"/>
<radio_station name="TTM01" lid="1300" maxRange="60.00" spos="+40:16:40.11,-074:49:10.16">
  <receiver id="0xd0260" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-074:49:10.16" uat="0"/>
  <receiver id="0xd0261" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-074:49:10.16" uat="0"/>
  <receiver id="0xd0262" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-074:49:10.16" uat="0"/>
  <receiver id="0xd0263" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-074:49:10.16" uat="0"/>
  <receiver id="0x90260" icao="0xfaafaa" period="5.0" spos="+40:16:40.11,-074:49:10.16" uat="1"/>
</radio_station>
<radio_station name="WCHES" lid="1301" maxRange="60.00" spos="+39:56:54.14,-075:34:40.18">
  <receiver id="0xd0270" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-075:34:40.18" uat="0"/>
  <receiver id="0xd0271" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-075:34:40.18" uat="0"/>
  <receiver id="0xd0272" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-075:34:40.18" uat="0"/>
  <receiver id="0xd0273" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-075:34:40.18" uat="0"/>
  <receiver id="0x90270" icao="0xfaafaa" period="5.0" spos="+39:56:54.14,-075:34:40.18" uat="1"/>
</radio_station>

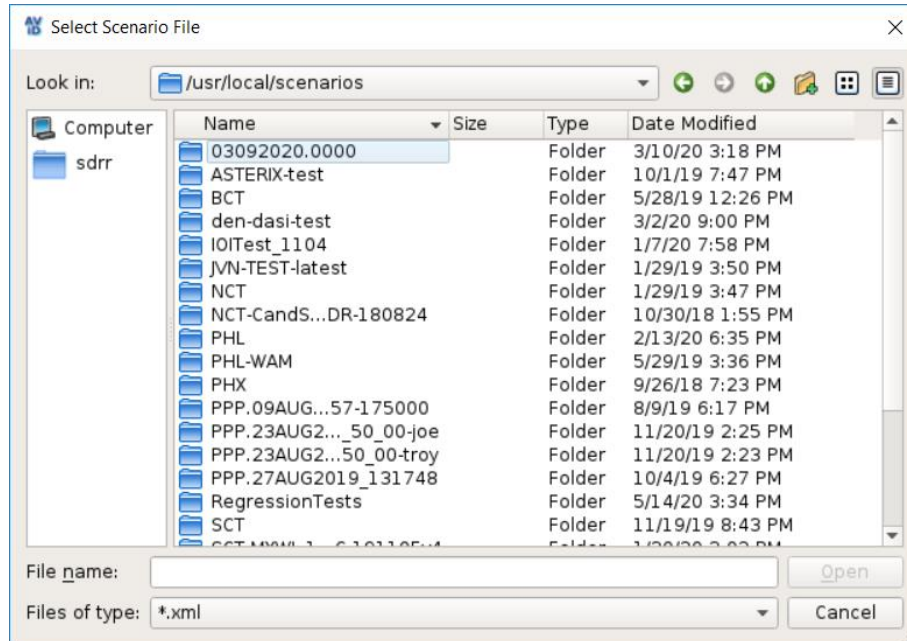
```

Figure 5. Example Configuration File

See Appendix B for more details on the contents of the sources configuration file.

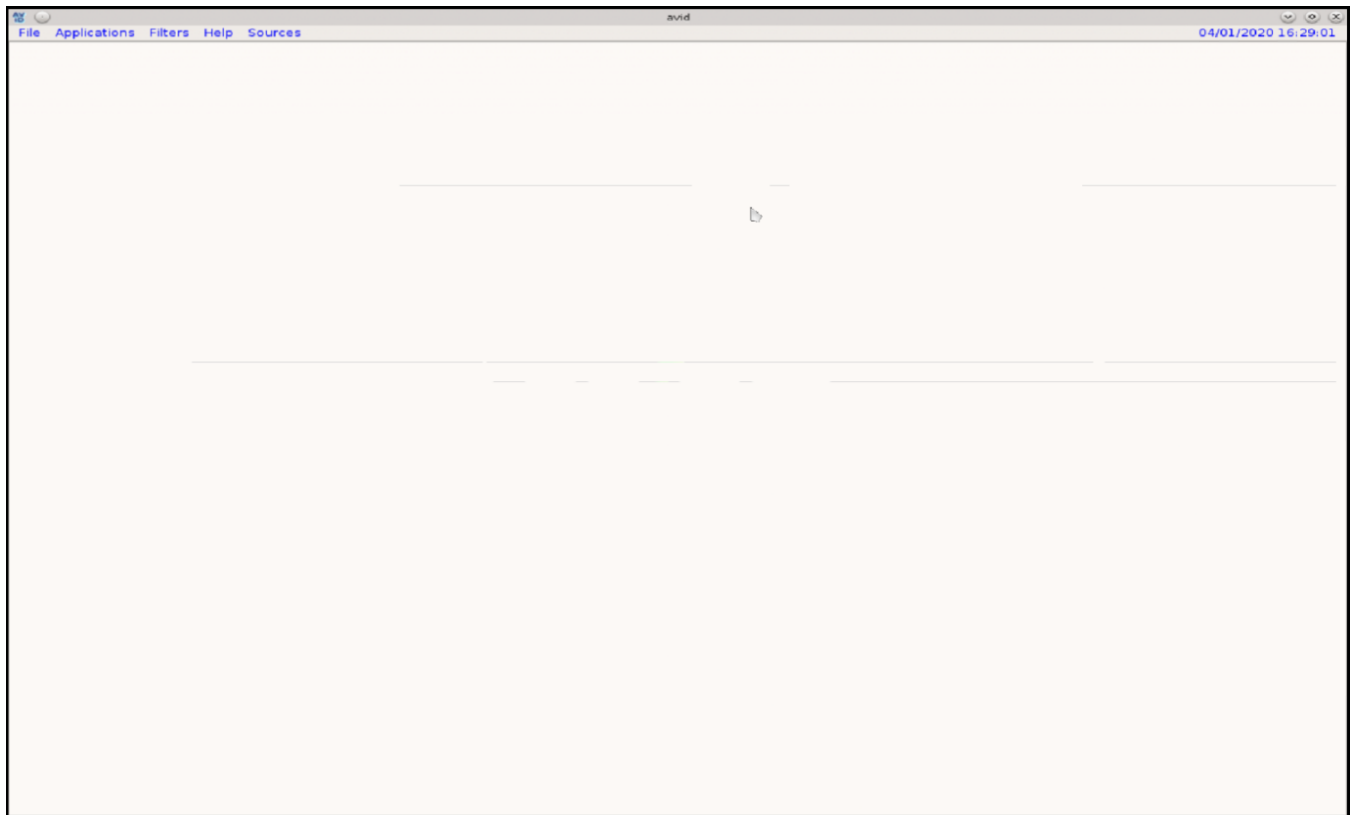
After the configuration file has been selected, the Scenario selection window appears. This window lists the available scenarios located in the directory specified by the environment variable `${SDRR_SCENARIO_PATH}`.

Select the desired scenario and click Open or click Cancel to continue without specifying a scenario.



**Figure 6. Scenario Selection Window**

After the configuration file and, optionally, a scenario have been selected, the AViD main window will appear. If the configuration file did not contain any user specified AViD applications then the main window will be empty.



**Figure 7. AViD Main Window**

In addition to the ability to display surveillance data from a configured physical device, AViD has the capability to display recorded surveillance data and exported SDRR scenarios. To display an entire scenario, AViD can be started from the command line with the scenario option:

```
> avid <cfgFile.xml> --scenario=<sdrScenFile.xml>
```

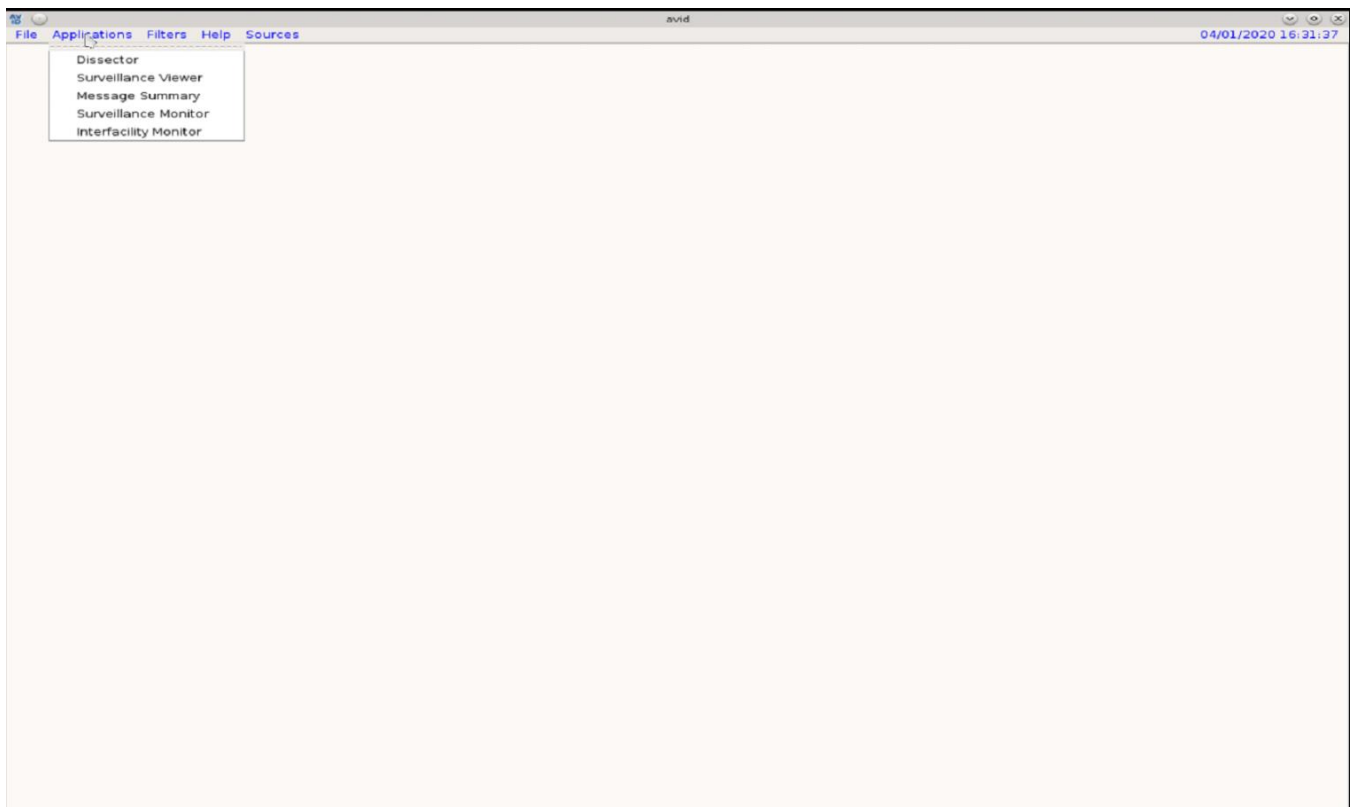
To view select individual surveillance sources from recorded data or an exported SDRR scenario, AViD can automatically create the necessary configuration from specified surveillance source data files:

```
> avid --auto ph1.srv qie.srv
```

See Section 6 for more details on recording and scenario playback controls.

## 3. Applications

AViD applications are launched from the main window menu bar. Left click “Applications” and select the application to run from the drop down menu. A user can have multiple applications running simultaneously in the AViD main window.

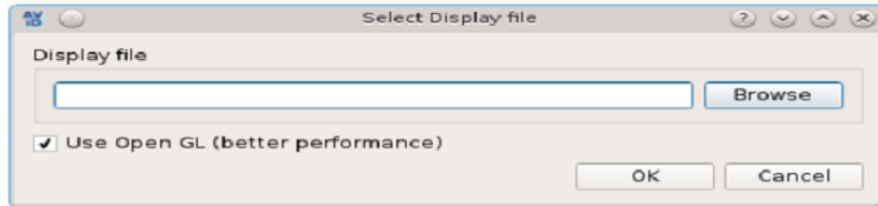


**Figure 8. Launching an AViD Application**

### 3.1. Surveillance Viewer

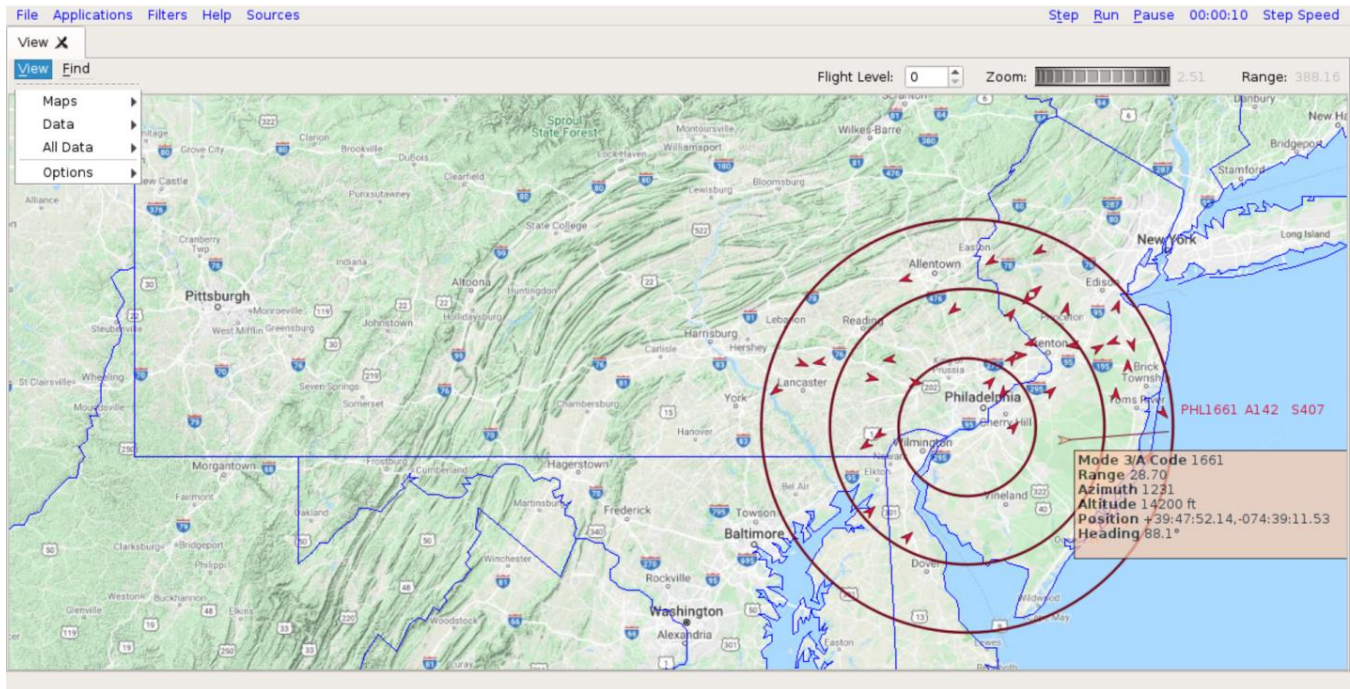
The Surveillance Viewer application supports plotting multiple formats of surveillance data.

Once the Surveillance Viewer has been selected from the applications menu the user will be prompted to select a display file. The display file is used to configure the background map display. Selecting a display file is optional; clicking “OK” without selecting a display file will load a default map configuration. See Appendix C for more details on the contents of the display file.



**Figure 9. Display File Selection Window**

After the display file has been specified and the user selects the “OK” button the Surveillance Viewer application will be launched. The Surveillance Viewer application GUI consists of a map display that includes a menu/tool bar and a status bar (when invoked).



**Figure 10. Surveillance Viewer Application**

### 3.1.1. Menu/Tool Bar

The menu/tool bar items are:

- **View**

The View menu is used to select maps and surveillance sources for display. These elements may be displayed individually or in combinations.

- **Find**

The Find menu is used to search for a specific target by beacon code or ICAO address. Enter the three letter radar name followed by the beacon code or ICAO address and click on “OK”. For example, to find the target with beacon code 1661 in the PHL radar data, enter PHL1661. If the beacon code exists in the PHL radar data, the target will be highlighted.

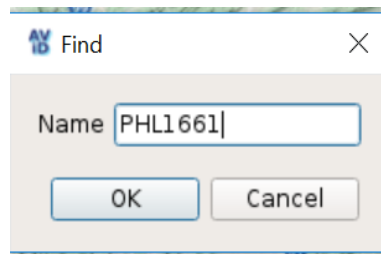


Figure 11. Find Menu

- **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 surveillance coverage area.

- **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.

### 3.1.2. Status Bar

The Status Bar, also referred to as the Measurement Bar, located on the bottom of the map display is used to show 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.

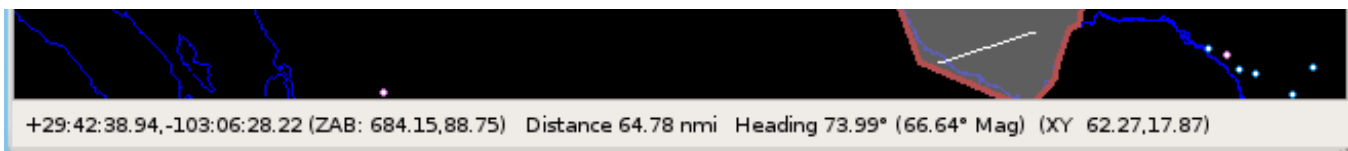


Figure 12. Status Bar

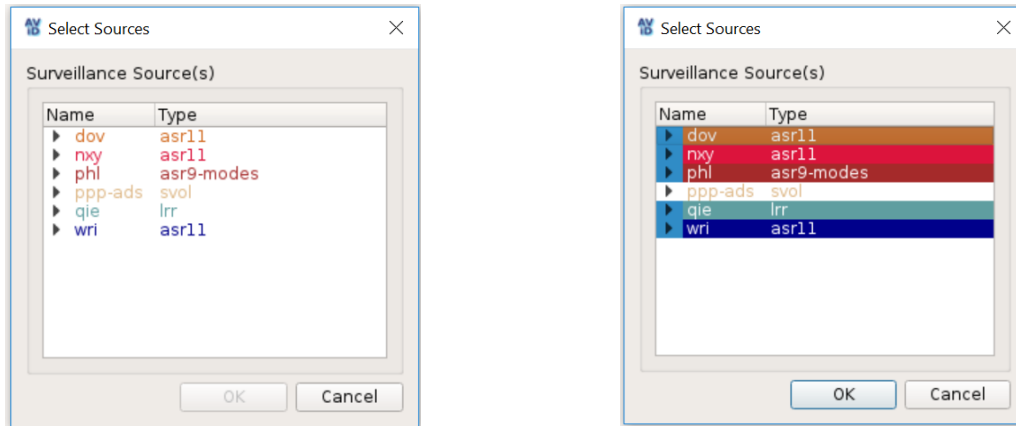
### 3.1.3. Target Information

A left mouse click on a target will display a data block of information associated with the target. Right click on a target to display a context box containing detailed information on that target.

## 3.2. Message Summary

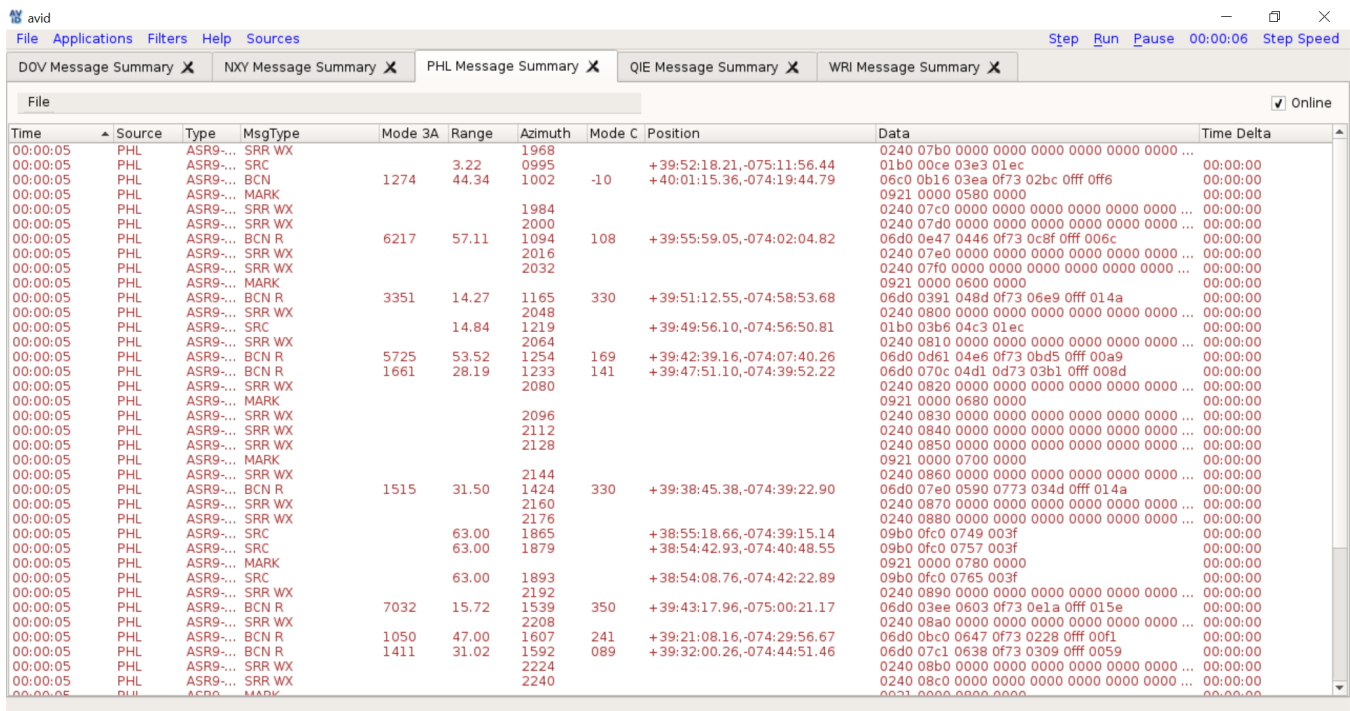
The Message Summary application displays surveillance messages in a readable format.

Once the Message Summary has been selected from the applications menu the user will be prompted to select the surveillance sources to summarize. To select multiple sources press and hold the **CTRL** key while selecting. To select a range of sources press and hold the **SHIFT** key.



**Figure 13. Surveillance Sources Selection Window**

After the surveillance sources have been specified and the user selects the “OK” button the Message Summary application will be launched.



Time	Source	Type	MsgType	Mode 3A	Range	Azimuth	Mode C	Position	Data	Time Delta
00:00:05	PHL	ASR9...	SRR WX			1968			0240 07b0 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRC		3.22	0995		+39:52:18.21,-075:11:56.44	01b0 00ce 03e3 01ec	00:00:00
00:00:05	PHL	ASR9...	BCN R	1274	44.34	1002	-10	+40:01:15.36,-074:19:44.79	06c0 0b16 03ea 0f73 02bc 0fff 00f6	00:00:00
00:00:05	PHL	ASR9...	MARK						0921 0000 0580 0000	00:00:00
00:00:05	PHL	ASR9...	SRR WX			1984			0240 07c0 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2000			0240 07d0 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	BCN R	6217	57.11	1094	108	+39:55:59.05,-074:02:04.82	06d0 0e47 0446 0f73 0c8f 0fff 006c	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2016			0240 07e0 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2032			0240 07f0 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	MARK						0921 0000 0600 0000	00:00:00
00:00:05	PHL	ASR9...	BCN R	3351	14.27	1165	330	+39:51:12.55,-074:58:53.68	06d0 0391 048d 0f73 06e9 0fff 014a	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2048			0240 0800 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRC		14.84	1219		+39:49:56.10,-074:56:50.81	01b0 03b6 04c3 01ec	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2064			0240 0810 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	BCN R	5725	53.52	1254	169	+39:42:39.16,-074:07:40.26	06d0 0d61 04a6 0f73 0bd5 0fff 00a9	00:00:00
00:00:05	PHL	ASR9...	BCN R	1661	28.19	1233	141	+39:47:51.10,-074:39:52.22	06d0 070c 04d1 0d73 03b1 0fff 008d	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2080			0240 0820 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	MARK						0921 0000 0680 0000	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2096			0240 0830 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2112			0240 0840 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2128			0240 0850 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	MARK						0921 0000 0700 0000	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2144			0240 0860 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	BCN R	1515	31.50	1424	330	+39:38:45.38,-074:39:22.90	06d0 07e0 0590 0773 034d 0fff 014a	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2160			0240 0870 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2176			0240 0880 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRC		63.00	1865		+38:55:18.66,-074:39:15.14	09b0 0fc0 0749 003f	00:00:00
00:00:05	PHL	ASR9...	SRC		63.00	1879		+38:54:42.93,-074:40:48.55	09b0 0fc0 0757 003f	00:00:00
00:00:05	PHL	ASR9...	MARK						0921 0000 0780 0000	00:00:00
00:00:05	PHL	ASR9...	SRC		63.00	1893		+38:54:08.76,-074:42:22.89	09b0 0fc0 0765 003f	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2192			0240 0890 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	BCN R	7032	15.72	1539	350	+39:43:17.96,-075:00:21.17	06d0 03ee 0603 0f73 0e1a 0fff 015e	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2208			0240 08a0 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	BCN R	1050	47.00	1607	241	+39:21:08.16,-074:29:56.67	06d0 0bc0 0647 0f73 0228 0fff 00f1	00:00:00
00:00:05	PHL	ASR9...	BCN R	1411	31.02	1592	089	+39:32:00.26,-074:44:51.46	06d0 07c1 0638 0f73 0309 0fff 0059	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2224			0240 08b0 0000 0000 0000 0000 0000 0000 ...	00:00:00
00:00:05	PHL	ASR9...	SRR WX			2240			0240 08c0 0000 0000 0000 0000 0000 0000 ...	00:00:00

**Figure 14. Message Summary Application**

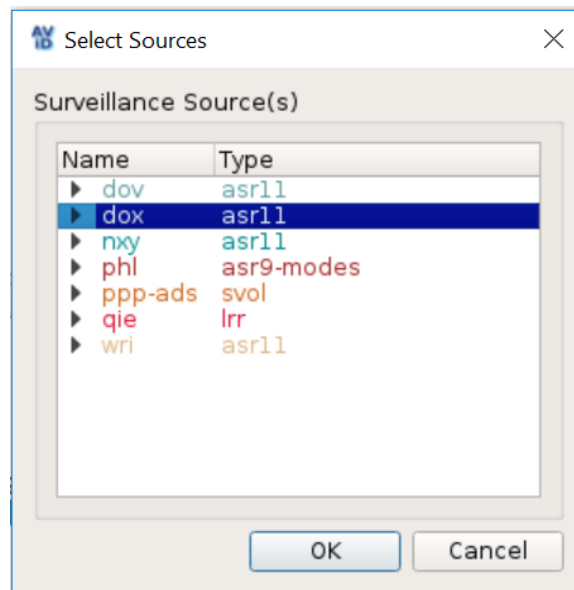


The Message Summary application displays tabs of messages from all selected surveillance sources by the color specified in the surveillance sources XML file. By default the summary is sorted by time. When the “Online” option is checked the application is processing incoming messages and cannot process any user input. If the “Online” option is unchecked the user can sort the summary by selecting a column header. Sorting toggles between ascending and descending when selecting the same column. The application also provides the ability to export the messages to a comma separated value file from the “File” menu option.

### 3.3. Dissector

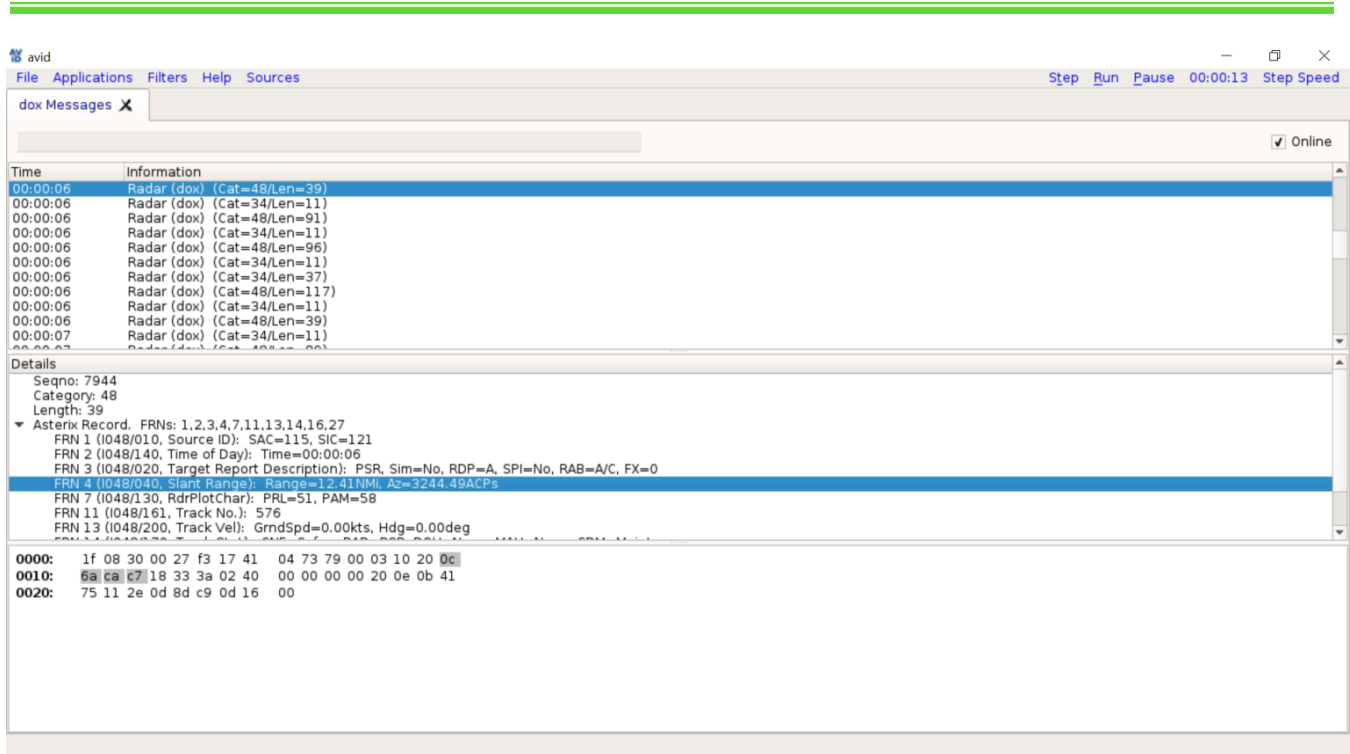
The Dissector application gives a detailed display of surveillance data in ASTERIX format.

Once the Dissector option has been selected from the applications menu the user will be prompted to select the surveillance source to dissect.



**Figure 15. Surveillance Sources Selection Window**

After the surveillance source has been specified and the user selects the “OK” button the Dissector application will be launched.



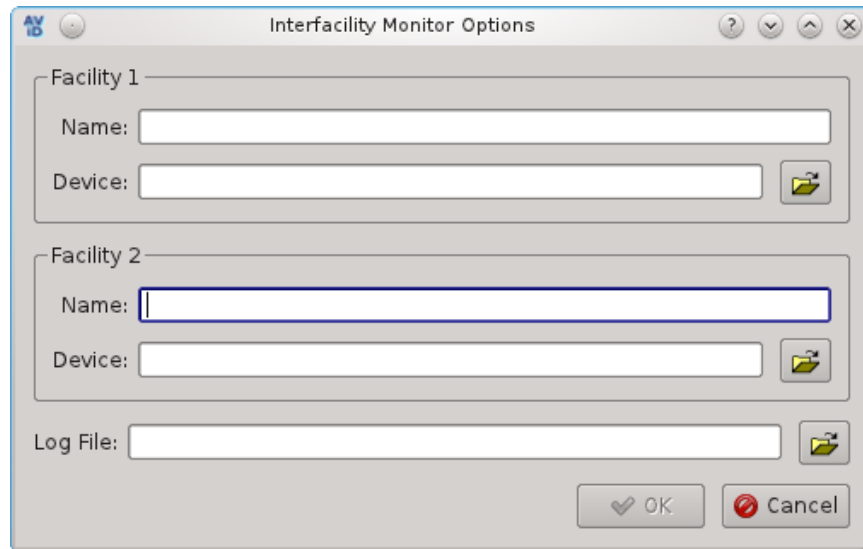
**Figure 16. Dissector Application**

The Dissector application displays an ASTERIX formatted message in 3 separate panes. The top pane displays the time the message was received and general information such as the type, category, and length. The middle pane displays the selected message details. The details of the message are displayed for each FRN value. The selected FRN's hex value will be highlighted in the bottom pane. To stop processing messages deselect the “Online” check box.

### 3.4. Interfacility Monitor

The Interfacility Monitor application displays the message communication between two specified facilities.

Once the Interfacility Monitor option has been selected from the applications menu the user will be prompted to input information on the selected facilities. The facility name and device inputs are required; the log file input is optional.



**Figure 17. Interfacility Monitor Options Window**

After the information on the selected facilities has been entered and the user selects the “OK” button the Interfacility Monitor application will be launched.

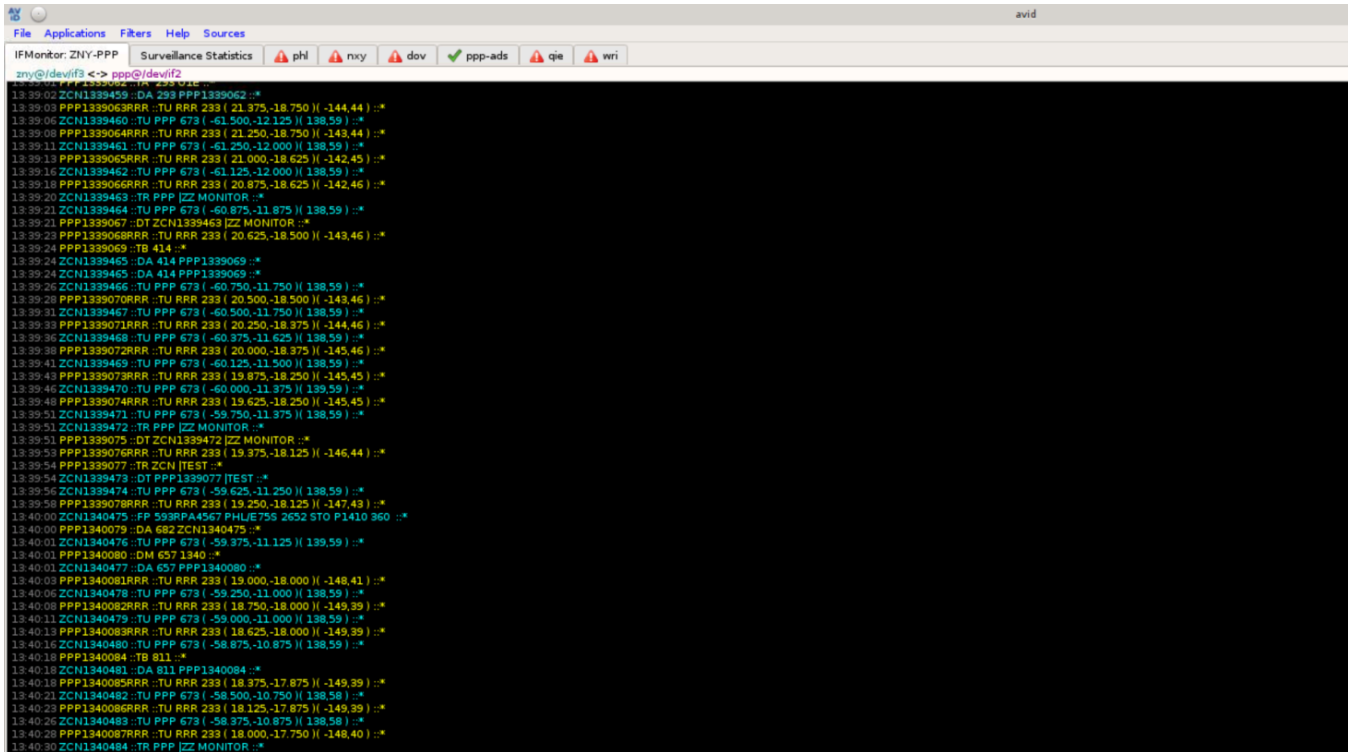


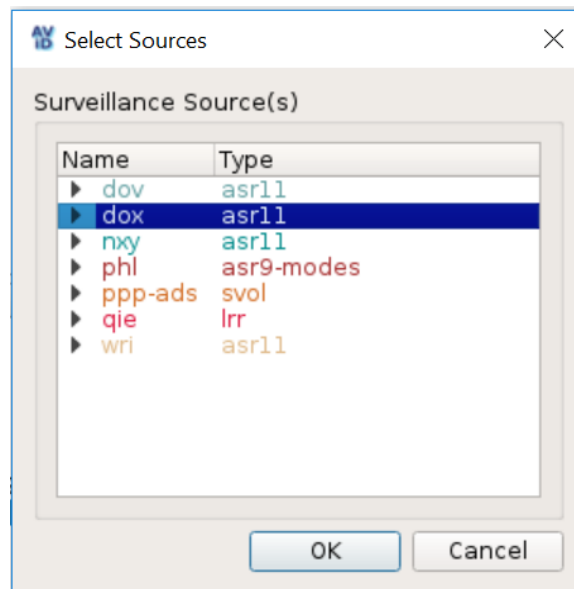
Figure 18. Interfacility Monitor Application

The Interfacility Monitor application displays the interfacility messages between two specified facilities. Facility one's messages are displayed in blue and facility two's messages are displayed in yellow. The title bar above the messages pane displays the facility names and the devices they are configured to use. The tab displays the name of the monitor specified in the configuration file.

### 3.5. Surveillance Monitor

AViD can be used as an active monitor for radar and ADS-B, triggering a colored Red/Green/Yellow radar icon symbol when defined values are in/out of defined tolerance.

Once the Surveillance Monitor option has been selected from the applications menu the user will be prompted to select the surveillance source to monitor.



**Figure 19. Surveillance Sources Selection Window**

After the surveillance source has been specified and the user selects the “OK” button the Surveillance Monitor application will be launched.

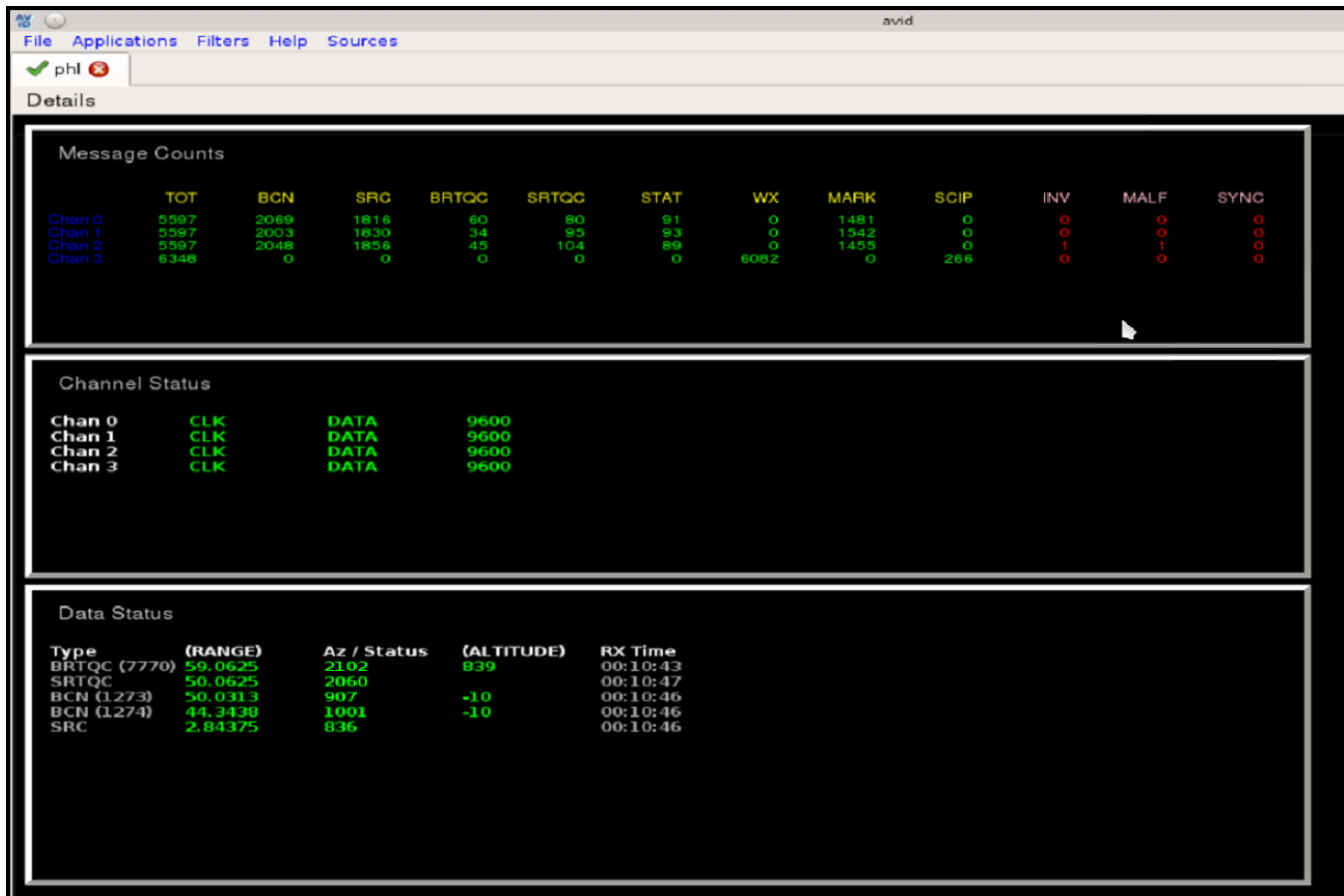


Figure 20. Surveillance Monitor Application

AViD checks the inbound feeds against the values for clock/data and static radar messages that are defined in the surveillance sources configuration XML file. When the values are correct they will turn green; when all values for a sensor are correct the radar tab name will turn green. Red indicates a low level issue exists, typically clock or data; while Yellow indicates a less serious value discrepancy. Red can also indicate tolerance issues with test targets, such as BRTQC.

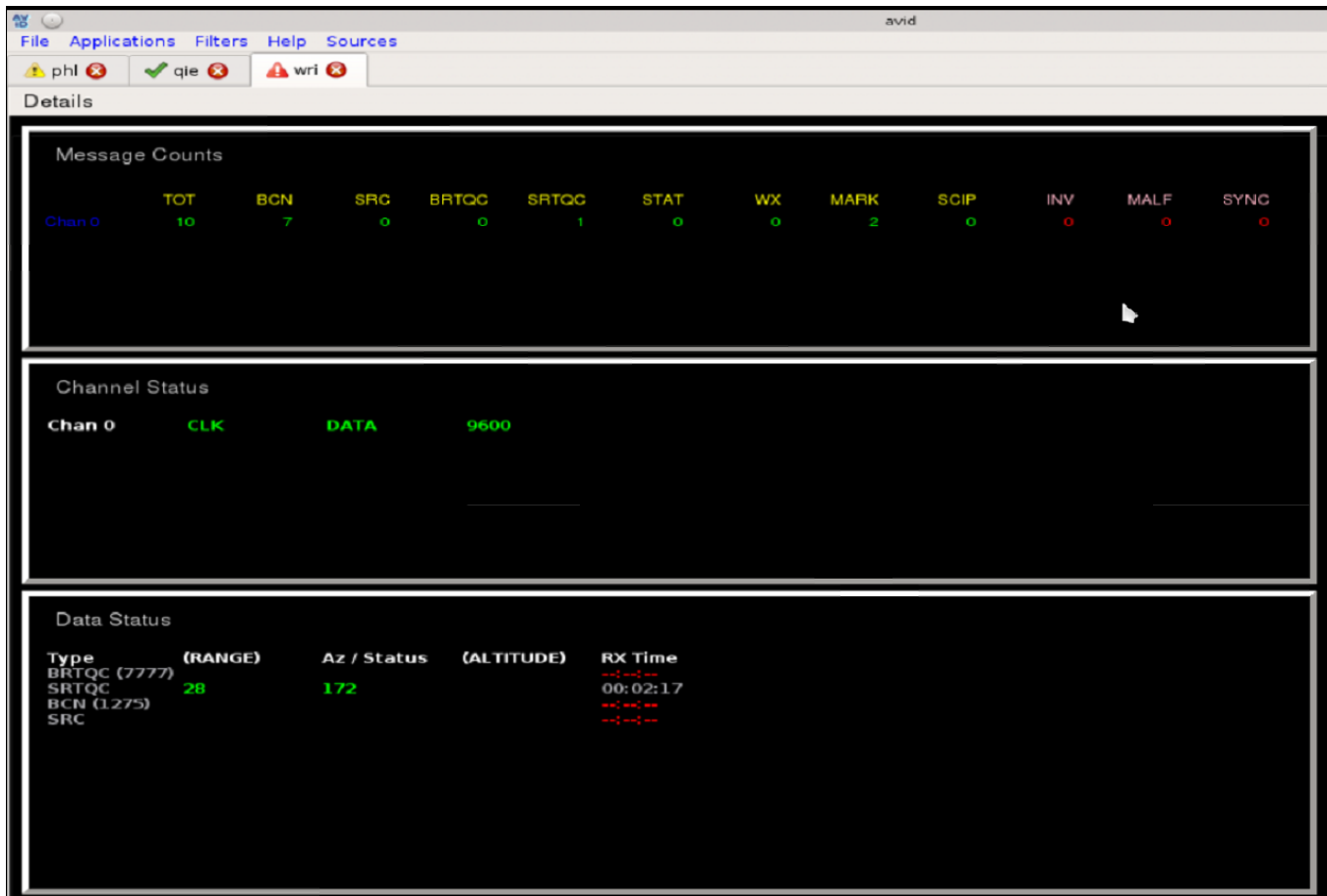
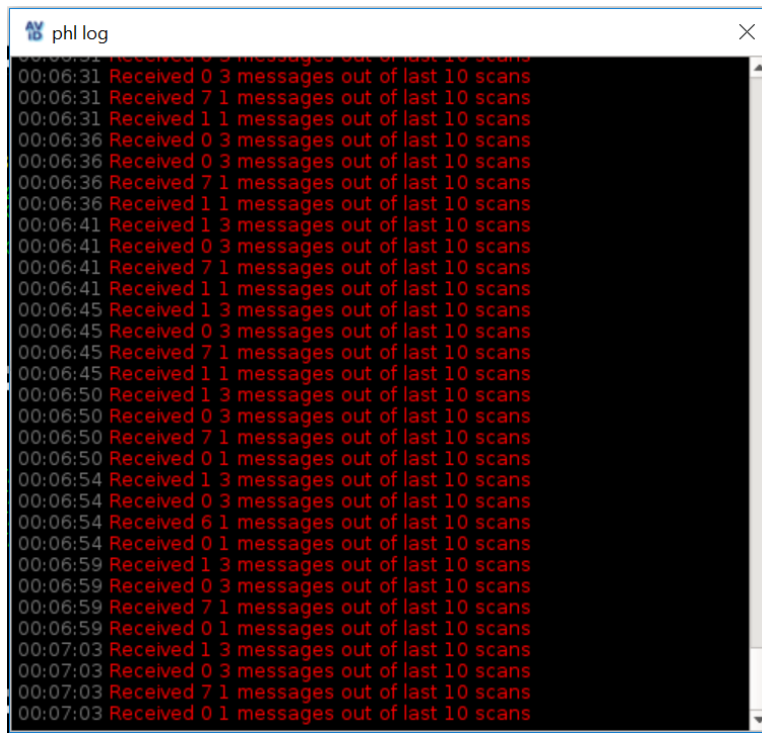


Figure 21. Error Indications

To see the status messages of the surveillance data, click on the Details menu option and a window will be displayed with status messages of the present sensor.



```
phl log
00:06:31 Received 0 3 messages out of last 10 scans
00:06:31 Received 7 1 messages out of last 10 scans
00:06:31 Received 1 1 messages out of last 10 scans
00:06:36 Received 0 3 messages out of last 10 scans
00:06:36 Received 0 3 messages out of last 10 scans
00:06:36 Received 7 1 messages out of last 10 scans
00:06:36 Received 1 1 messages out of last 10 scans
00:06:41 Received 1 3 messages out of last 10 scans
00:06:41 Received 0 3 messages out of last 10 scans
00:06:41 Received 7 1 messages out of last 10 scans
00:06:41 Received 1 1 messages out of last 10 scans
00:06:45 Received 1 3 messages out of last 10 scans
00:06:45 Received 0 3 messages out of last 10 scans
00:06:45 Received 7 1 messages out of last 10 scans
00:06:45 Received 1 1 messages out of last 10 scans
00:06:50 Received 1 3 messages out of last 10 scans
00:06:50 Received 0 3 messages out of last 10 scans
00:06:50 Received 7 1 messages out of last 10 scans
00:06:50 Received 0 1 messages out of last 10 scans
00:06:54 Received 1 3 messages out of last 10 scans
00:06:54 Received 0 3 messages out of last 10 scans
00:06:54 Received 6 1 messages out of last 10 scans
00:06:54 Received 0 1 messages out of last 10 scans
00:06:59 Received 1 3 messages out of last 10 scans
00:06:59 Received 0 3 messages out of last 10 scans
00:06:59 Received 7 1 messages out of last 10 scans
00:06:59 Received 0 1 messages out of last 10 scans
00:07:03 Received 1 3 messages out of last 10 scans
00:07:03 Received 0 3 messages out of last 10 scans
00:07:03 Received 7 1 messages out of last 10 scans
00:07:03 Received 0 1 messages out of last 10 scans
```

Figure 22. Sensor Status Messages



## 4. Sources Information Display

The Sources Information Display can be toggled from the “Sources” menu bar option. This display shows information about the available surveillance sources. Some of the options are configurable by checking and un-checking a selection box; these options are in black text. For example, to change the wx from off to on, check the selection box to turn on visible weather. Other fields such as color, bcn, bcnR, showCorrelated, showDataBlocks, showUncorrelated, historyAge, historyinterval and src are also changeable. The options in the Sources Information Display are populated directly from the sources configuration file. See Appendix B for more details on the configuration file.

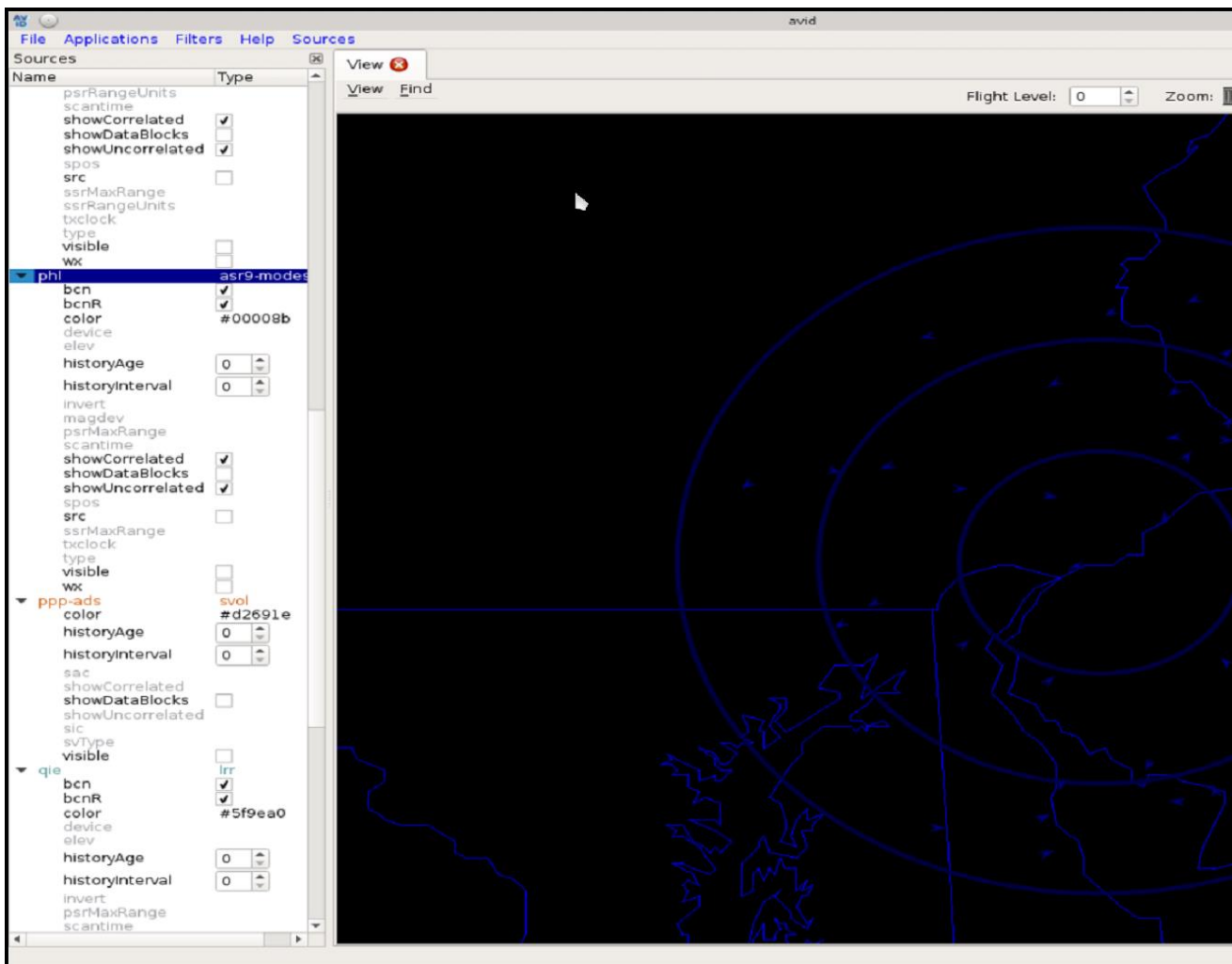


Figure 23. Sources Information Display

The display color can be changed for each listed source. To display the color selection window, double click on the color option of the desired source.

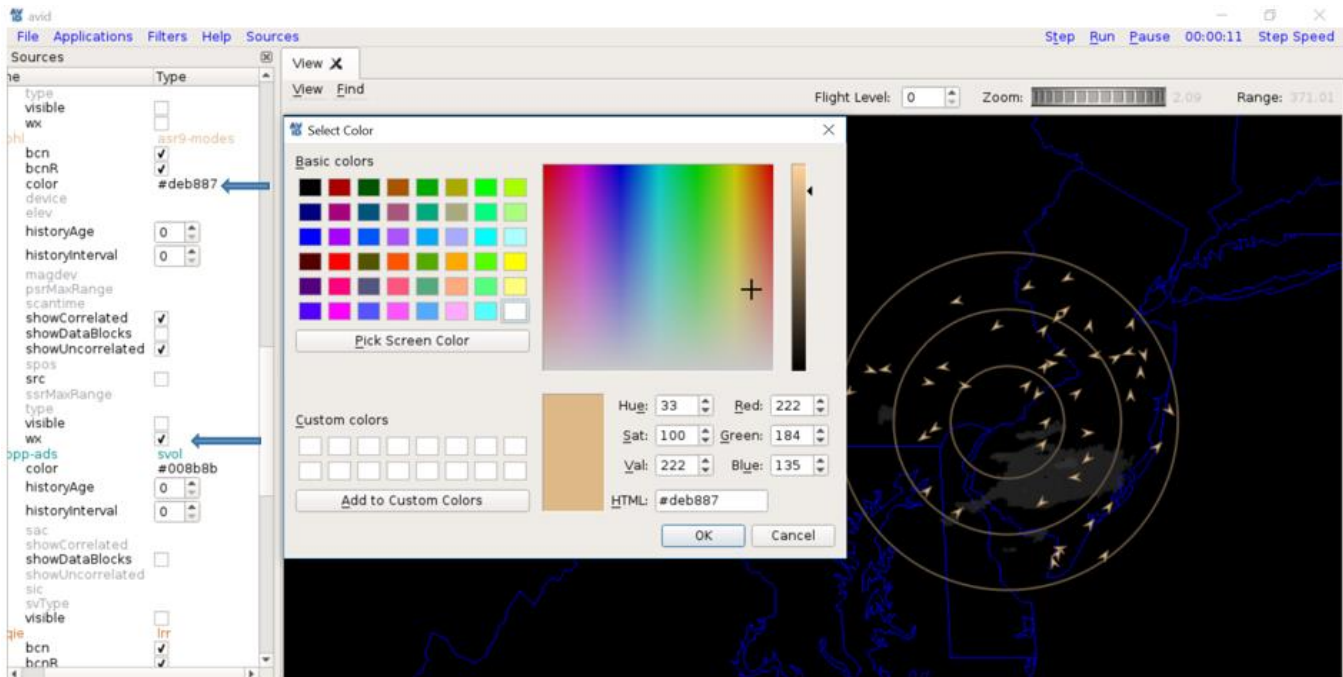


Figure 24. Color Selection Window

## 5. Filters

The display of surveillance data can be filtered using the “Filters” menu option. After clicking on “Filters” from the menu bar, a Filters window is displayed. In the Filters window, users can right click to add filters. The available filter types are beacon code, altitude, aircraft ID, time, ICAO address, search only targets, correlated targets, beacon only targets, and beacon R only targets. Multiple values may be specified for a filter by entering each value on a separate line. Below is the format for each filter type.

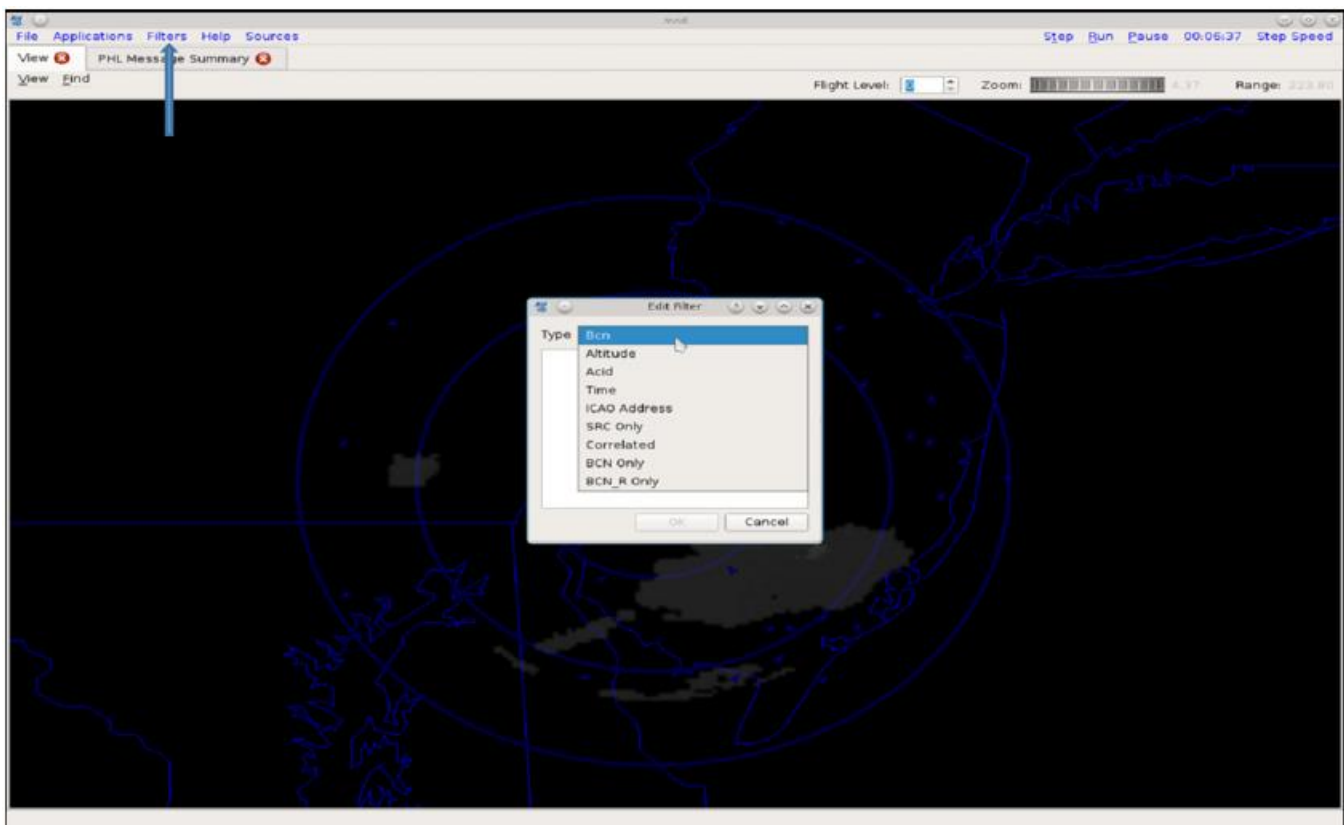


Figure 25. Filters Window

- **Bcn** – Four digit octal beacon code; one code specified per line. A Bcn filter with the value 4733 will only display targets with a beacon code of 4733.
- **Altitude** – Altitude stratum; one flight level range specified per line. An Altitude filter with a value of 240,300 will only display targets with altitudes between 24,000ft and 30,000ft.
- **Acid** – Valid Aircraft ID; one call sign per line. An Acid filter with a value of UAL287 will only display targets with the call sign UAL287.
- **Time** – Time interval; one time range per line. A Time filter with a value of 0/10:00:00.00,0/11:00:00.00 will only display targets between 10:00 and 11:00.
- **ICAO Address** – Six digit hex address; one address per line. An ICAO Address filter with a value of ABC123 will only display targets with an ICAO address of ABC123.
- **SRC Only** – No value required. Filters out all except SRC messages.
- **Correlated** – Zero or one. A Correlated filter with a value of 0 will only display uncorrelated targets. A Correlated filter with a value of 1 will only display correlated targets.
- **BCN Only** – No value required. Filters out all except BCN messages.
- **BCN\_R Only** – No value required. Filters out all except BCN\_R messages.

## 6. Recording

AViD has the capability to playback recordings. The recording utility is not dependent on having the AViD application running. Recording is done using the recordcontroller icon located in the system task bar on the lower right side of the display. There is a circle that is either red (not recording) or green (is recording).

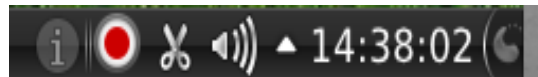


Figure 26. System is NOT Recording.



Figure 27. System IS Recording.

Right clicking on the button will bring up the recording control menu.

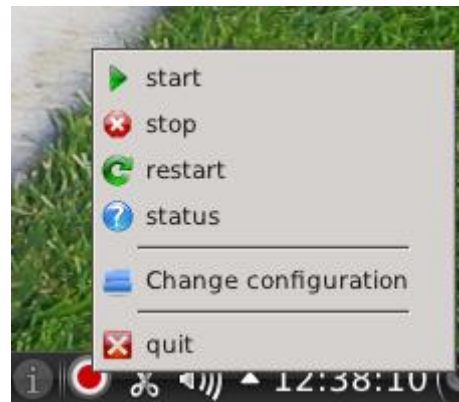


Figure 28. Recording Control Menu.

From this menu you can start, stop, restart or find the status of recording. While recording, the button will turn green. If you would like to display AViD to see the Interfacility Monitor or the Surveillance Monitor applications click the green button to launch AViD. The button must be green to launch AViD.

If you close AViD it will not stop the recording, that must be done by right clicking on the icon and clicking stop.

The default recording configuration file is located at `/usr/local/cfg/record.xml`. The default configuration can be changed by right clicking and selecting change configuration. This will pop up a window that allows you to select a new configuration file. If changes are made to the `record.xml` file, the above process needs to be repeated for the changes to be applied to the record button.

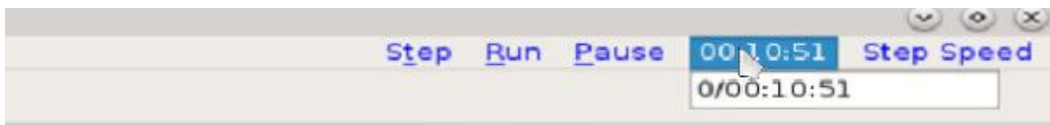
AViD has the capability to playback recordings and scenarios. To view an entire scenario, AViD can be started from the command line using the scenario option:

```
> avid /usr/local/cfg/phl-cfg.xml --scenario=/usr/local/scenarios/PHL/Test1/sdrr.xml
```

To view one or more surveillance sources in a scenario or a recording without specifying a configuration file, AViD can be started with the auto option and the desired surveillance data (srv) files:

```
> avid --auto phl.srv qie.srv
```

To control the scenario while running on AViD, there are buttons on the right top corner of the taskbar.



**Figure 29. Scenario Playback Control**

- **Step** – Steps through the scenario in 1 second intervals.
- **Run** – Starts playing the scenario at regular speed.
- **Pause** – Pauses the scenario.
- **Time** – Set the time on where you want the scenario to take place.
- **Step Speed** – Set the step speed by scrolling the bar left and right. The more you scroll to the right the faster the run speed.

## 7. JVN Tool Suite Integration

AViD functionality is integrated across multiple JVN tools and utilities including SDRR, SDRRplayer, and TARP.

### 7.1. SDRR

Radars found in the SDRR configuration file are used to populate the Random Access Plan Position Indicator (RAPPI) tab within the SDRR GUI. The RAPPI tab gives a visual representation of the targets sent from each radar. The RAPPI tab is functionally equivalent to the AViD Surveillance Viewer application. For more information on RAPPI or SDRR, please see the SDRR v12.0.x Vol 4 User Reference Guide.

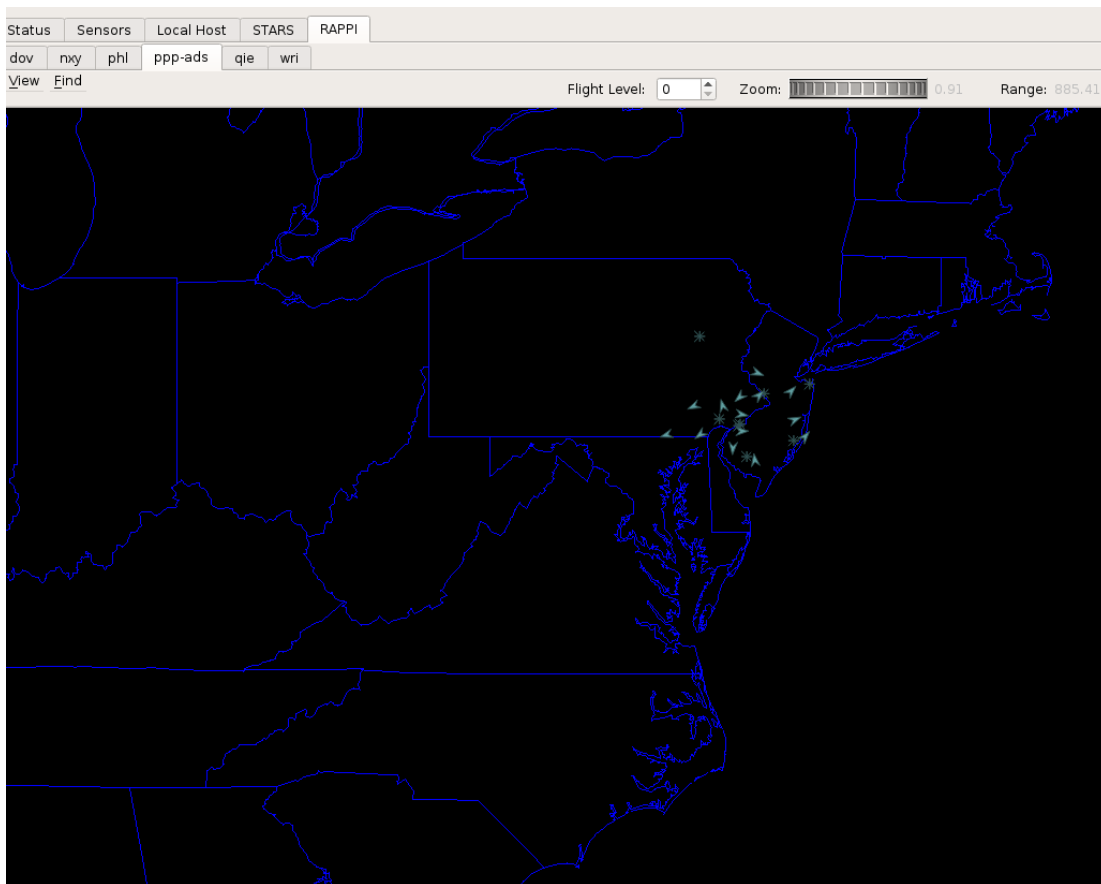
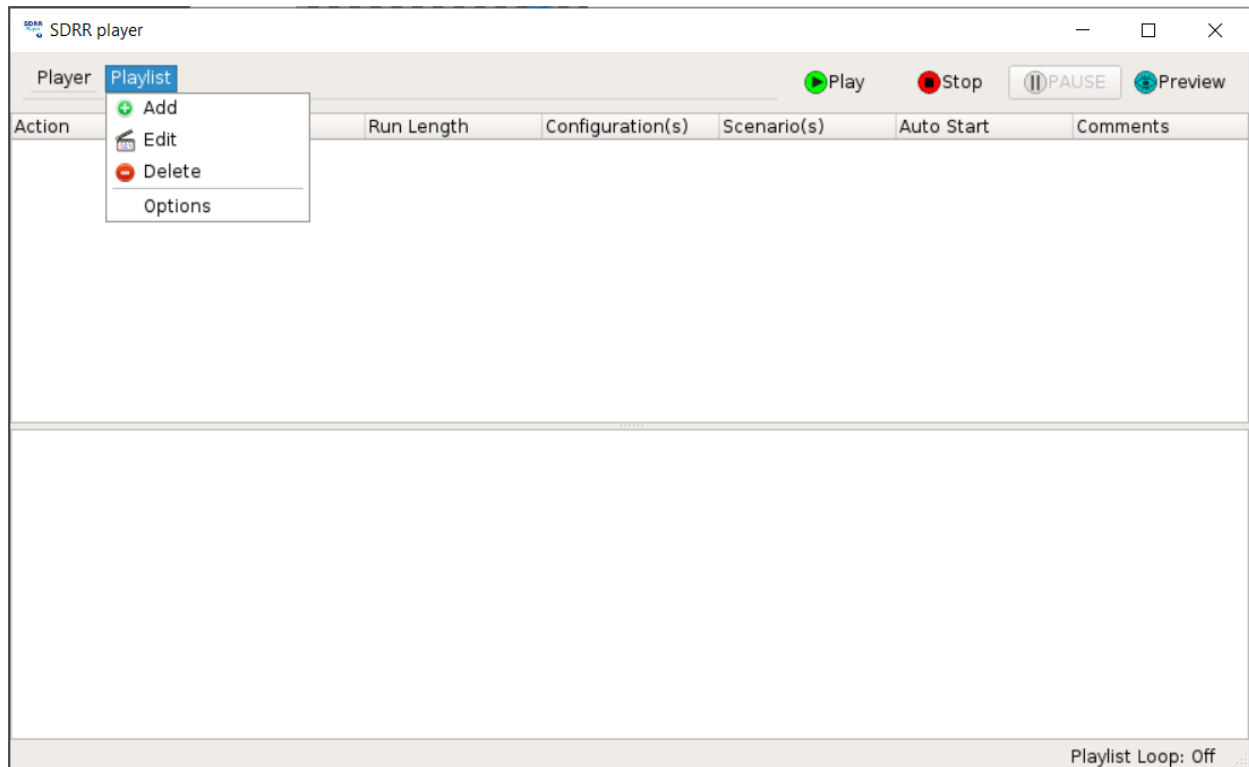


Figure 30. SDRR RAPPI Tab

## 7.2. SDRRplayer

The SDRRplayer utility allows users to create playlists containing SDRR scenarios. This utility can be launched either from an icon on the KDE desktop (if created) or by typing **sdrplayer** (case sensitive) in a terminal window. This will launch the SDRRplayer GUI interface:



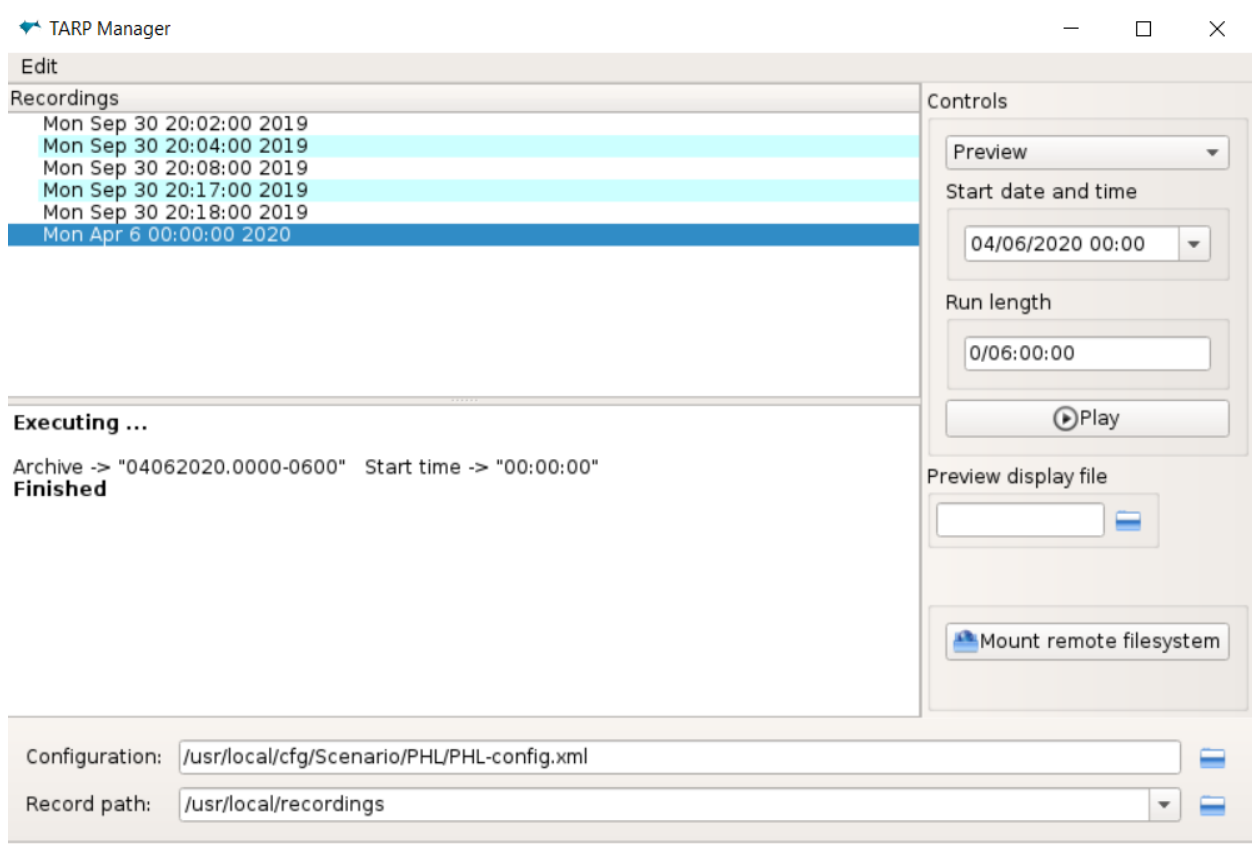
**Figure 31. SDRRpalyer**

Clicking on the “Preview” Tool Bar button launches AViD. For more information on SDRRplayer, please see the SDRR v12.0.x Vol 4 User Reference Guide.

## 7.3. TARP

The Time based Archive Recording Player (TARP) is a graphical interface that allows the user to either preview or playback a SDRR recording. This utility can be launched either from an icon on the Desktop (if created) or by typing **TARP** (case sensitive) in a terminal window. TARP can be used to quickly preview recordings by invoking AViD simply by selecting the “Preview” option from the drop down in the *Controls* panel.





**Figure 32. TARP Manager**

Once Preview is selected, the user will be prompted to select a display file. The display file is used to configure the background map display. Selecting a display file is optional; clicking “OK” without selecting a display file will load a default map configuration. Select Play to launch the preview in AViD. For more information on TARP, please see the SDRR v12.0.x Vol 4 User Reference Guide.

---

## Appendix A. Acronyms

ADS-B	Automatic Dependent Surveillance – Broadcast
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
AViD	Airspace Visualization Display
CAS	Commercially Available Software
CD2	Common Digitizer
DASR	Digital Surveillance Radar
DYSIM	Dynamic Simulation
ECGP	External Communications Gateway Protocol
ERAM	En Route Automation Modernization
FAA	Federal Aviation Administration
GSGT	Graphic Simulation Generation Tool
GUI	Graphical User Interface
IFDT	Interfacility Data Transfer
MLAT	Multilateration
NAS	National Air Space
RAPPI	Random Access Plan Position Indicator
RSI	Record Select Indicator
SDRR	Simulation Driver Radar Recorder
SSRV	Simulation Services
STARS	Standard Terminal Automation Replacement System
SWIM	System-Wide Information Management
TARP	Time based Archive Recording Player
TRACON	Terminal Radar Approach Control
WAM	Wide Area Multilateration
WJHTC	William J. Hughes Technical Center

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## Appendix B. Sources Configuration File

The sources configuration file is an XML file which defines surveillance sources. Surveillance sources can include radar sensors, multilateration devices, and Automatic Dependent Surveillance – Broadcast (ADS-B) service volumes.

### B.1. Format

- **Common attributes**

The following XML attributes are common to all surveillance source types (*radar, mlat, wam, svol, etc.*):

- **name** – Used as the title of the display window for this source, and is matched with the “src” field in the scenario file format for messages (see Scenario File Format).
- **device** – Device or file name.
- **color** – Color of the surveillance source in all applications.

- **radar**

XML element that defines a radar sensor surveillance source. In addition to the common attributes listed above, a radar source may be configured with the following attributes:

- **type** – Radar type (defaults to LRR).
- **chans** – Number of channels (default is 0, which means auto-determine based on type).
- **magdev** – Magnetic deviation of the radar, in degrees.
- **scantime** – Scan time of the radar.
- **spos** – Position of the radar in latitude/longitude.
- **elev** – Elevation of the radar.
- **format** – Used to specify the input stream format (default is CD2).
- **wx** – Enable/disable weather to be displayed in AVID.
- **bcn** – Enable/disable beacon code to be displayed in AVID.
- **src** – Enable/disable search \* to be displayed in AVID.

- ***mlat***

XML element that defines a multilateration device surveillance source. In addition to the common attributes listed above, a mlat device may be configured with the following attributes:

- ***sac*** – System Area Code, 8 bit value. Along with ***sic*** creates a unique identifier.
- ***sic*** – System Identification Code, 8 bit value. Along with ***sac*** creates a unique identifier.
- ***tvl*** – Time to live.
- ***spos*** – Position of the mlat in latitude/longitude.

- ***wam***

XML element that defines a wide area multilateration device surveillance source. In addition to the common attributes listed above, a wam device may be configured with the following attributes:

- ***sac*** – System Area Code, 8 bit value. Along with ***sic*** creates a unique identifier.
- ***sic*** – System Identification Code, 8 bit value. Along with ***sac*** creates a unique identifier.
- ***spos*** – Position of the wam in latitude/longitude.

- ***svol***

XML element that defines an ADS-B service volume surveillance source. In addition to the common attributes listed above, a svol device may be configured with the following attributes:

- ***sac*** – System Area Code, 8 bit value. Along with ***sic*** creates a unique identifier.
- ***sic*** – System Identification Code, 8 bit value. Along with ***sac*** creates a unique identifier.

- ***Optional AViD configuration elements***

The following XML elements can be added to the sources configuration file to have Surveillance Viewer and Surveillance Monitor applications tabs opened immediately on AViD startup:

- ***viewer*** – Specified with attribute enable="1" to open the surveillance viewer at startup.
- ***monitor*** – Specified with attribute enable="1" to open the surveillance monitor at startup.

## B.2. Configuration File Example

```

<root>
  <viewer enable="1"/>
  <monitor enable="1"/>
  <sources>
    <radar name="ph1" device="/dev/srr0" type="asr9-modes" elev="87.00" magdev="-11.00"
      psrMaxRange="64" scantime="4.62" spos="+39:51:33.00,-075:16:00.30" srrMaxRange="64">
      <brtqc acps="2102" alt="839" bcn="7770" range="59.1"/>
      <srtqc acps="2060" range="50.1" runlength="24"/>
      <parrot acps="906" mode3a="1273" modec="-10" range="50"/>
      <parrot acps="1001" mode3a="1274" modec="-10" range="44.3"/>
      <permanentEcho acps="833" modec="0" range="2.9" runlength="24"/>
      <permanentEcho acps="993" modec="0" range="1.2" runlength="24"/>
    </radar>
    <radar name="qie" device="/dev/lrr1" type="lrr" elev="284.00" psrMaxRange="250"
      scantime="12.00" spos="+39:49:29.00,-074:57:15.00" srrMaxRange="250">
      <brtqc acps="2048" alt="839" bcn="7777" range="1"/>
      <srtqc acps="0" range="1" runlength="24"/>
      <parrot acps="1615" mode3a="1275" modec="730" range="64.2"/>
      <parrot acps="3691" mode3a="1274" modec="900" range="63.2"/>
    </radar>
    <radar name="wri" device="/dev/asr11-3" type="asr11" elev="217.00" psrMaxRange="64"
      psrRangeUnits="64.00" scantime="4.84" spos="+40:02:08.50,-074:35:53.10"
      srrMaxRange="128" srrRangeUnits="32.00">
      <brtqc acps="2104" alt="0" bcn="7777" range="59"/>
      <srtqc acps="174" range="56" runlength="24"/>
      <parrot acps="1197" mode3a="1275" modec="590" range="3"/>
      <permanentEcho acps="1918" modec="0" range="1.2" runlength="24"/>
    </radar>
    <svol name="ppp-ads" sac="0xab" sic="0xd" svType="1">
      <stream name="uat" device="multi:244.1.1.1/59950"/>
      <stream name="1090" device="multi:244.1.1.1/59951"/>
      <stream name="equip" device="multi:244.1.1.1/59952"/>
      <stream name="svol" device="multi:244.1.1.1/59953"/>
      <stream name="sdp" device="multi:244.1.1.1/59954"/>
      <radio_station name="TTN01" lid="1300" maxRange="60.00" spos="+40:16:40.11,-
        074:49:10.16">
        <receiver id="0xd0260" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-
          074:49:10.16" uat="0"/>
        <receiver id="0xd0261" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-
          074:49:10.16" uat="0"/>
      </radio_station>
    </svol>
  </sources>

```

```

<receiver id="0xd0262" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-
074:49:10.16" uat="0"/>
<receiver id="0xd0263" icao="0xfaafaa" period="10.0" spos="+40:16:40.11,-
074:49:10.16" uat="0"/>
<receiver id="0x90260" icao="0xfaafaa" period="5.0" spos="+40:16:40.11,-074:49:10.16"
uat="1"/>
</radio_station>
<radio_station name="WCHES" lid="1301" maxRange="60.00" spos="+39:56:54.14,-
075:34:40.18">
<receiver id="0xd0270" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-
075:34:40.18" uat="0"/>
<receiver id="0xd0271" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-
075:34:40.18" uat="0"/>
<receiver id="0xd0272" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-
075:34:40.18" uat="0"/>
<receiver id="0xd0273" icao="0xfaafaa" period="10.0" spos="+39:56:54.14,-
075:34:40.18" uat="0"/>
<receiver id="0x90270" icao="0xfaafaa" period="5.0" spos="+39:56:54.14,-075:34:40.18"
uat="1"/>
</radio_station>
</svol>
<wam name="wamsvg" period="3" radius="60" sac="0xbb" sic="0x02" spos="+39:51:33.00,-
075:16:00.30">
<stream name="modeS" device="multi: 244.1.1.1/59970"/>
<stream name="1090" device="multi: 244.1.1.1/59971"/>
<stream name="uat" device="multi: 244.1.1.1/59972"/>
<stream name="atcrbs" device="multi: 244.1.1.1/59973"/>
<stream name="svol" device="multi: 244.1.1.1/59974"/>
<stream name="sdp" device="multi: 244.1.1.1/59975"/>
<radio_station name="WM1" lid="7"/>
</wam>
<mlat name="mlt" device="/dev/null" sac="0x00" sic="0x01" spos="+39:51:33.00,-
075:16:00.30"/>
</sources>
</root>

```

---

## Appendix C. Display File

The display file is an XML file which configures the Surveillance Viewer.

### C.1. Format

- **display** – Display configuration element. Available attributes:
  - **name** – Name of the display.
  - **height** – Height of the canvas.
  - **width** – Width of the canvas.
  - **scale** – Zoom factor.
  - **tangent** – Point of tangency.
  - **radius** – Conformal radius.
  - **projection** – Type of projection used.
  
- **map** – Map configuration sub-element. Available attributes:
  - **name** – Name of the map.
  - **type** – Type of map.
  - **file** – Map file to load.
  - **visible** – Display at start of application; 0 = false, 1 = true.
  - **color** – Display color of map.

---

## C.2. Display File Example

```
<config>
  <display width="3000." radius="3438.41" scale="1.00" projection="stereographic"
    height="3000." name="ZBW" tangent="+43:48:33.98,-072:26:24.00">
    <map visible="1" type="noaamap" name="US Map" file="maps/us.dat" color="0,0,255"/>
    <map type="vectorMap" name="ARTCC Map" file="maps/ARTCC_Centers.db" color="200,100,0"/>
  </display>
</config>
```