McIDAS-V Tutorial

Importing Data from Text Files

updated June 2015 (software version 1.5)

McIDAS-V is a free, open source, visualization and data analysis software package that is the next generation in SSEC's 40-year history of sophisticated McIDAS software packages. McIDAS-V displays weather satellite (including hyperspectral) and other geophysical data in 2- and 3-dimensions. McIDAS-V can also analyze and manipulate the data with its powerful mathematical functions. McIDAS-V is built on SSEC's VisAD and Unidata's IDV libraries. The functionality of SSEC's HYDRA software package is also being integrated into McIDAS-V for viewing and analyzing hyperspectral satellite data.

More training materials are available on the McIDAS-V webpage and in the Getting Started chapter of the McIDAS-V User's Guide, which is available from the Help menu within McIDAS-V. You will be notified at the startup of McIDAS-V when new versions are available on the McIDAS-V webpage - http://www.ssec.wisc.edu/mcidas/software/v/.

If you encounter an error or would like to request an enhancement, please post it to the McIDAS-V Support Forums - http://www.ssec.wisc.edu/mcidas/forums/. The forums also provide the opportunity to share information with other users.

This tutorial assumes that you have McIDAS-V installed on your machine, and that you know how to start McIDAS-V. If you can not start McIDAS-V on your machine, you should follow the instructions in the document entitled *McIDAS-V Tutorial – Installation and Introduction*.

Terminology

There are two windows displayed when McIDAS-V first starts, the **McIDAS-V Main Display** (hereafter **Main Display**) and the **McIDAS-V Data Explorer** (hereafter **Data Explorer**).

The **Data Explorer** contains three tabs that appear in bold italics throughout this document: ***Data Sources,*** ***Field Selector***, and ***Layer Controls***. Data is selected in the ***Data Sources*** tab, loaded into the ***Field Selector***, displayed in the **Main Display**, and output is formatted in the ***Layer Controls***.

Menu trees will be listed as a series (e.g. ***Edit -> Remove -> All Layers and Data Sources***).

Mouse clicks will be listed as combinations (e.g. *Shift+Left Click+Drag*).

Plotting Point Observations from a text file

1. Remove all layers and data sources from the previous displays.

2. If there is more than one tab, close the extra tabs by clicking the "X" in the right corner of the tabs.

3. Add the data from the <*local path*>/**Data/Generic/Point/text/N18_N_2009_090_12_03.asci** file.

   a. In the ***Data Sources*** tab of the **Data Explorer**, open the ***General -> Files/Directories*** chooser.

   b. In the **Data Type** field, choose **Text Point Data files**.

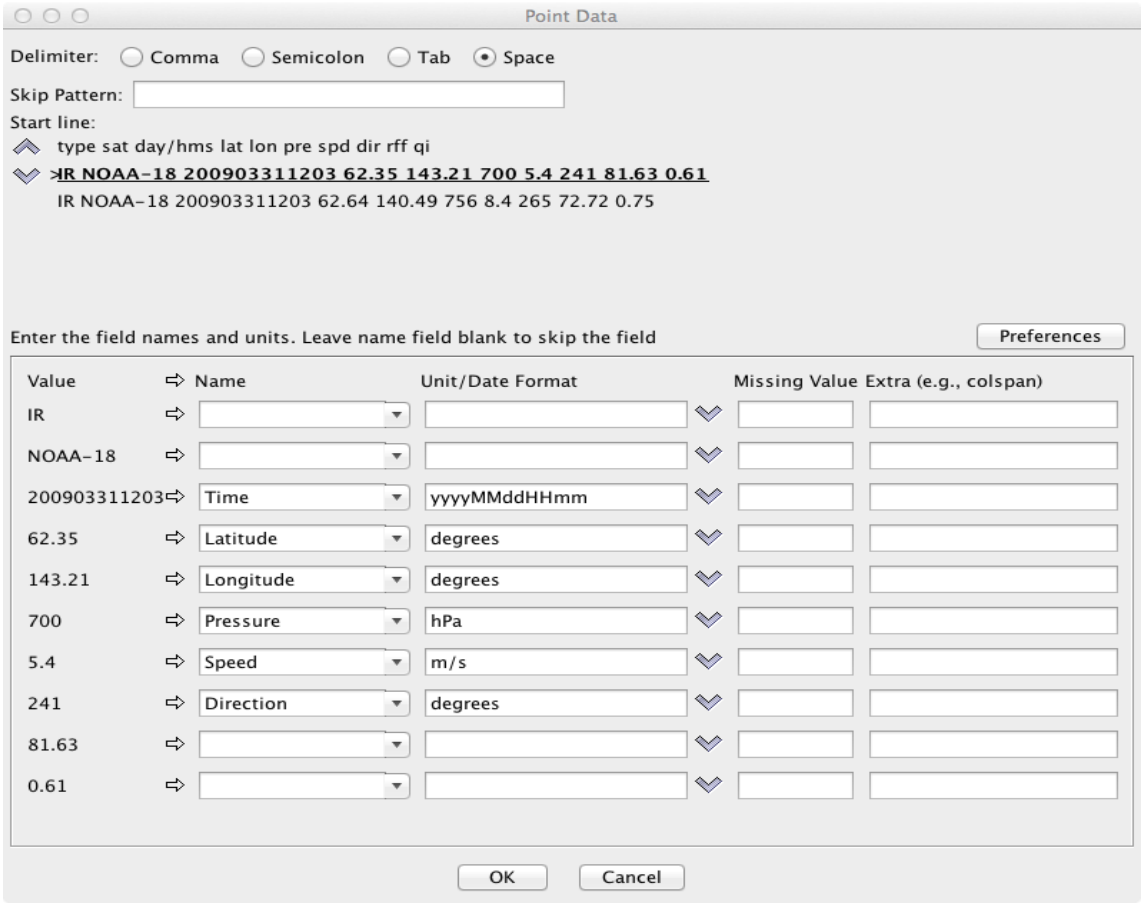
   c. Navigate to the <*local path*>**/Data/Generic/Point/text/N18_N_2009_090_12_03.asci** file. Click **Add Source**.

4. Define the field names and units.

   a. In the **Point Data** window, select **Space** for the **Delimiter**.

   b. Under **Start line**, click the down arrow once to skip over the header line.

   c. In the lower panel of the **Point Data** window, fill in the fields exactly as shown below. Note that the items in these fields are case-sensitive. Do not use the pull down menus, as the choices are very limited.



d. Select ***Preferences -> Save Current***. Enter **PWinds** for the **Name** and click **OK**.

e. Click **OK** at the bottom of the **Point Data** window.

5. Open the **Layout Model Editor** to define how the data is displayed.

   a. In the ***Field Selector***, select ***Point Data*** in the **Fields** panel.

   b. In the lower-right panel, select the ***Layout Model*** tab and click the down arrows to select **Location**. Click the down arrows again and select **Edit**. This will open the **Layout Model Editor**.

6. Add a windbarb to your layout model.

   a. In the left panel of the **Layout Model Editor**, click **Windbarb**. *Left Click* in the window to place the windbarb object. *Left Click+Drag* to move the windbarb to the center of the box.

   b. In the ***Display*** tab of the **Properties Dialog – WindBarb Symbol** window, click the down arrow for **U or windspeed parameter**. Select ***Current Fields -> N18_N_2009_090_12_03.asci -> Speed***.

   c. Click the down arrow for **V or direction parameter**. Select ***Current Fields -> N18_N_2009_090_12_03.asci -> True Heading Angle – Direction***. Click **OK** to close the **Properties Dialog** window.

7. Add the pressure value to your layout model.

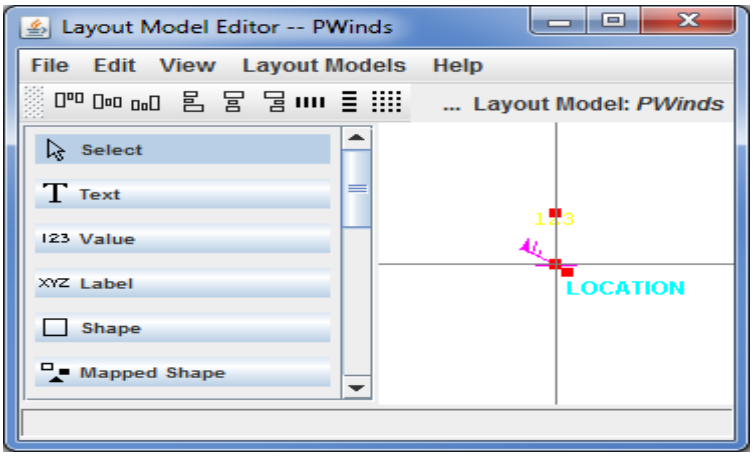
   a. In the left panel of the **Layout Model Editor**, click **Value**. *Left Click* in the window to place the value object. Drag the object to above the windbarb.

   b. In the ***Display*** tab of the **Properties Dialog – Value Symbol** window, click the down arrow for **Parameter**. Select ***Current Fields -> N18_N_2009_090_12_03.asci -> Pressure -- Pressure***.

   c. Under **Unit**, select **hectoPascals**

   d. Click on **Foreground Color** box and select a yellow color. Click **OK**.

   e. Click **OK** to close the **Properties Dialog** window.



8. Save your new layout model.

   a. In the **Layout Model Editor**, select ***File -> Save As***. Enter *PWinds* for the **Layout Model name**. Click **OK**.

   b. Close the **Layout Model Editor** window.

9. Create the display.

a. In the **Fields** panel of the ***Field Selector***, select the ***Point Data*** field.

b. Select the **Point Data Plot** display type.

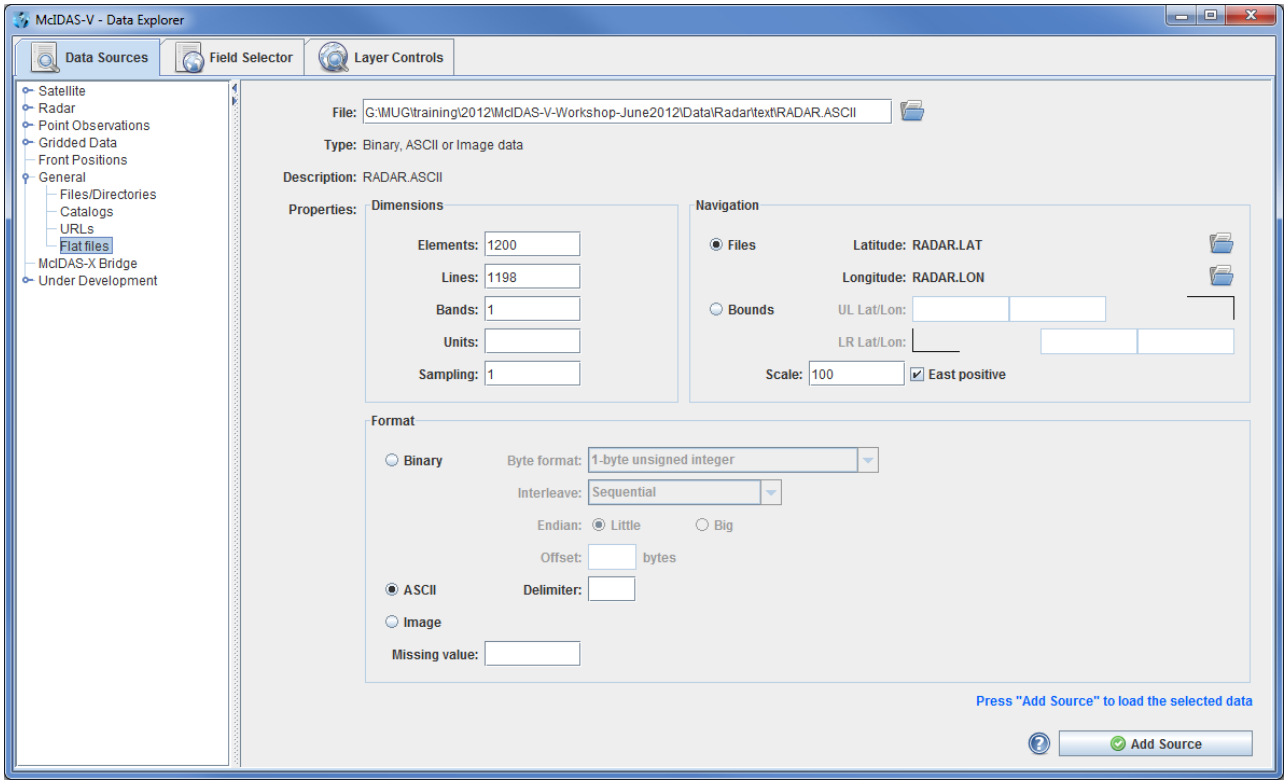
c. In the lower-right panel of the ***Field Selector***, open the ***Layout Model*** tab. Click the down arrows and select **PWinds <local>**. Click **Create Display**. The default display is a world projection with wind barbs and pressures plotted. As you zoom in you will see more stations appear in the plot.

Displaying radar imagery from a text file

10. Remove all layers and data sources from the previous displays. If you have created more than one tab, close the extra tabs by clicking the "X" in the right corner of the tab.

11. To add the data source for the *<local path>*/**Data/Generic/Radar/text/RADAR.ASCII** file, in the ***Data Sources*** tab of the **Data Explorer**, open the ***General -> Flat files*** chooser. In the Flat files chooser:

- Click **Open File** icon next to **File** field and navigate to *<local path>*/**Data/Generic/Radar/text/RADAR.ASCII**.
- In the **Dimensions** section of the **Properties** panel, enter *1200* for **Elements** and *1198* for **Lines**.
- In the **Navigation** section of this tab, ensure **Files** is selected.
- Click the **Open File** icon for **Latitude** and navigate to *<local path>*/**Data/Generic/Radar/text/RADAR.LAT**.
- Click the **Open File** icon for **Longitude** and navigate to *<local path>*/**Data/Generic/Radar/text/RADAR.LON**.
- Change the **Scale** value to *100* and check the **East positive** box.
- In the **Format** section, select **ASCII**.
- Click **Add Source**.



12. Display the radar data.

    a. In the **Fields** panel of the ***Field Selector*** tab, click key icon next to ***RADAR.ASCII*** to expand the field and select ***Flat data***.

    b. In the **Displays** panel, select ***Image Display***.

    c. Click **Create Display**.

13. The default display is a world projection, but this data is only over Oklahoma in the south-central United States. Change the projection of the **Main Display** to Oklahoma.

    a. In the **Main Display**, navigate to the ***Projections -> Predefined -> US -> States -> N-Z -> Oklahoma*** menu item.

    b. Zoom in on the data by using *Shift+Left Click+Drag* to create a bounding box around the data.

14. Change the color bar to display the radar data using typical colors used for a base reflectivity display.

    a. In the **Legend**, *Right Click* on the gray scale color bar.

    b. Select ***Radar -> Base Reflectivity 16 Levels***.

Problem Sets

The previous examples were intended to give you a general knowledge of how to load and display data. The problem sets below are intended to introduce you to new topics related to the data, as well as challenge your knowledge of McIDAS-V. We recommend that you attempt to complete each problem set before looking at the solutions, which are provided below the problem set.

1. Using the data contained within <*local path*>**/Data/Generic/Radar**, create a map display tab containing two panels. Display a loop of radar reflectivity in the left panel, and radar velocities in the right panel. For the velocities, change the color bar to the *Velocity_Example.xml* color bar in the <*local path*>**/Data/Generic/Radar/ColorTable** directory.

2. Using the data contained within <*local path*>**/Data/Generic/Reports**, create a new map display tab containing two panels. Display hail reports in the left panel and tornado reports in the right panel. Create a new layout model for displaying hail and tornado, making each of them a different shape, coloring the hail by size, and coloring the tornados by EF level. Once each is displayed, display all of the reports over the 24-hour period at once, and change the Time Animation properties in a way that there is only one frame for the 24 hours of data.

3. Save your display as a ****.mcvz*** bundle, including every data source in the bundle. Once your bundle is saved, exit McIDAS-V. Restart McIDAS-V and load in your ****.mcvz*** bundle.

Problem Set #1 – Solution

Using the data contained within <*local path*>**/Data/Generic/Radar**, create a map display tab containing two panels. Display a loop of radar reflectivity in the left panel, and radar velocities in the right panel. For the velocities, change the color bar to the *Velocity_Example.xml* color bar in the <*local path*>**/Data/Generic/Radar/ColorTable** directory.

1. Create a new 2 panel map display tab.

    a. In the **Main Display** window, select the ***File -> New Display Tab -> Map Display -> Two Panels*** menu item.

    b. Close the any previously existing tabs.

2. Select a loop of radar reflectivity data to display in the left panel of the **Main Display**.

    a. In the **Main Display** window, *Left Click* on the left panel to activate it.

    b. Add the radar reflectivity data source.

    - In the ***Data Sources*** tab of the **Data Explorer**, go to the ***Radar -> Level II -> Local*** chooser.
    - In the **Station** field, select **I'm Feeling Lucky**.
    - Navigate to the <*local path*>**/Data/Generic/Radar/Reflectivity** directory.
    - Use *Shift+Left Click* to select all of the files listed (2011/05/22 22:24Z – 23:07Z).
    - Click **Add Source**.

3. Display the radar reflectivity data.

    a. In the **Fields** panel of the ***Field Selector***, select ***BaseReflectivity***.

    b. In the **Displays** panel, select the ***Radar Sweep View in 2D*** display type.

    c. In the ***Times*** tab, select **Use Default** from the dropdown menu to display every time.

    d. Click **Create Display**.

4. Select a loop of radar velocities to display in the right panel of the **Main Display**.

    a. In the **Main Display** window, *Left Click* on the right panel to activate it.

    b. Add the radar velocity data source.

    - In the ***Data Sources*** tab of the **Data Explorer**, go to the ***Radar -> Level II -> Local*** chooser.
    - In the **Station** field, select **I'm Feeling Lucky**.
    - Navigate to the <*local path*>**/Data/Generic/Radar/Velocity** directory.
    - Use *Shift+Left Click* to select all of the files listed (2011/05/22 22:24Z – 23:07Z).
    - Click **Add Source**.

5. Display the radar velocity data.

    a. In the **Fields** panel of the ***Field Selector***, select ***StormMeanVelocity***.

    b. In the **Displays** panel, select the ***Radar Sweep View in 2D*** display type.

    c. In the ***Times*** tab, select **Use Default** from the dropdown menu to display every time.

    d. Click **Create Display**.

6. Change the color bar used for the radar velocity display to the *Velocity_Example.xml* color bar found in the <*local path*>**/Data/Generic/Radar/ColorTable** directory.

    a. In the ***Layer Controls*** tab of the **Data Explorer** for the radar velocity data in panel 2, click the **Radial Velocity** button next to **Color Table** and select **Edit Color Table**.

    b. In the **Color Table Editor**, select the ***File -> Import…*** menu item.

    c. In the **Color table import** window, navigate to <*local path*>**/Data/Generic/Radar/ColorTable/Velocity_Example.xml**. Click **Open**.

    d. Close the **Color Table Editor** window.

7. Interrogate the displays and determine the location of the tornado from the radar reflectivity and velocity data.

Problem Set #2 – Solution

Using the data contained within <*local path*>**/Data/Generic/Reports**, create a new map display tab containing two panels. Display hail reports in the left panel and tornado reports in the right panel. Create a new layout model for displaying hail and tornado reports, making each of them a different shape, coloring the hail by size, and coloring the tornados by EF level. Once each is displayed, display all of the reports over the 24-hour period at once, and change the Time Animation properties in a way that there is only one frame for the 24 hours of data.

1. Create a new 2 panel map display tab.

    a. In the **Main Display** window, select the ***File -> New Display Tab -> Map Display -> Two Panels*** menu item.

2. In the left panel of the **Main Display**, add in hail reports from 2011/05/22.

    a. In the **Main Display** window, *Left Click* on the left panel of the newly created tab to activate it.

    b. Add the hail data source.

        - In the ***Data Sources*** tab of the **Data Explorer**, go to the ***General -> Files/Directories*** chooser.
        - Navigate to the <*local path*>**/Data/Generic/Reports/hail.csv** file.

- Click **Add Source**.

3. Create a new layout model to display the hail data.

   a. In the **Main Display** window, select the ***Tools -> Station Model Template*** menu item.

   b. In the **Layout Model Editor** window, select the ***File -> New*** menu item.

   c. In the **New Layout Model** window, enter in a name of *Hail* in the **Layout Model Name** field. Click **OK**.

   d. In the **Layout Model Editor**, *Left Click* on **Shape** on the left side of the window to select the item, and *Left Click* in the middle of the panel in the window to place the object.

      - In the ***Display*** tab of the **Properties Dialog** window, change the **Shape** to *Filled Square* and change **Scale Size By** to *0.4*.
      - In the ***Color By*** tab, click the button to the right of **Map Value of** field, and select ***Current Fields -> hail.csv -> Hail***.
      - Change the **Data Range** to values of *0* and *4.5* to match up with the size of hail reported during the timeframe.
      - Click **OK** to close the **Properties Dialog** window.

   e. In the **Layout Model Editor** window, select the ***File -> Save*** menu item, and close the window.

4. Display the hail data.

   a. In the ***Field Selector*** tab of the **Data Explorer**, select the ***Point Data*** field in the **Fields** panel.

   b. In the **Displays** panel, select ***Point Data Plot***.

   c. In the ***Layout Model*** tab, click the to the right of **None**, and select **Hail <local>**.

   d. Click **Create Display**.

5. Change how the hail data is displayed to show all hail reports over the 24 hour period at once and only have one time step.

   a. In the ***Layer Controls*** tab of the **Data Explorer** for the hail data in Panel 1, select the ***Layout*** tab and uncheck the **Declutter** checkbox to display all of the data at each time step.

   b. In the ***Times*** tab, change the **Show** option to **Multiple**. This will plot all of the hail reports at once, regardless of the time they occurred.

   c. To remove all of the unnecessary time steps, in the **Main Display** window, click the button in the Time Animation widget to get to the **Time Animation Properties** window.

   d. In the ***Define Animation Times*** tab, select **Define your own list of times**, and change the **Interval** field to 1 day and click **OK**.

6. Add in tornado reports from 2011/05/22 to the right panel of the **Main Display**.

    a. In the **Main Display** window, *Left Click* on the right panel to activate it.

    b. Add the tornado data source.

    - In the ***Data Sources*** tab of the **Data Explorer**, select the ***General -> Files/Directories*** chooser.
    - Navigate to the <*local path*>**/Data/Generic/Reports/tornados.csv** file.
    - Click **Add Source**.

7. Create a new layout model to display the tornado data.

    a. In the **Main Display** window, select the ***Tools -> Station Model Template*** menu item.

    b. In the **Layout Model Editor** window, select the ***File -> New*** menu item.

    c. In the **New Layout Model** window, enter in a name of *Tornado* in the **Layout Model Name** field. Click **OK**.

    d. In the **Layout Model Editor**, *Left Click* on **Shape** on the left side of the window to select the item, and *Left Click* in the middle of the panel to place the object.

    - In the ***Display*** tab of the **Properties Dialog** window, change the **Shape** to *Filled Triangle*.
    - In the ***Color By*** tab, click the button to the right of **Map Value of** field, and select ***Current Fields -> tornados.csv -> EF***.
    - Change the **Data Range** to values of *0* and *5* to match up with the EF values of tornados reported during the timeframe.
    - Click **OK** to close the **Properties Dialog** window.

    e. In the **Layout Model Editor** window, select the ***File -> Save*** menu item, and close the window.

8. Display the tornado data.

    a. In the ***Field Selector*** tab of the **Data Explorer**, select the ***Point Data*** field in the **Fields** panel.

    b. In the **Displays** panel, select ***Point Data Plot***.

    c. In the ***Layout Model*** tab, click the to the right of **None**, and select **Tornado <local>**.

    d. Click **Create Display**.

9. Repeat the same process used in step 5 to change how the tornado data is displayed to show all tornado reports over the 24 hour period at once and only have one time step.

10. Zoom in over the region where the tornado was visible using the radar data to see if there are any tornado or wind reports reported.

Problem # 3 – Solution

Save your display as a *.mcvz bundle, including every data source with the bundle. Once your bundle is saved, exit McIDAS-V. Restart McIDAS-V and load in your *.mcvz bundle.

1. Save your display as a zipped bundle.

    a. In the **Main Display** window, select the ***File -> Save Bundle…*** menu item.

    b. In the **Save** window, select a file name and directory.

    c. In the **Files of Type** field, select **McIDAS-V Zipped Data Bundles (*.mcvz)**. This needs to be saved as a zipped data bundle because we want to include the data.

    d. Click **Save**.

    e. In the **Save Data** window, select **Save All Displayed Data** at the top to include all data (radar, tornado and hail data) with the bundle and click **OK**.

2. Exit McIDAS-V.

3. Restart McIDAS-V.

4. Load in the bundle that you just saved.

    a. In the **Main Display** window, select the ***File -> Open File…*** menu item.

    b. In the **Open File** window, navigate to the bundle that you saved in step 1, select the bundle and click **Open**. Select **Replace Session** if prompted.

    c. This bundle should load in the data loaded into the session at the time the bundle was saved, as well as the displays and the configuration of the windows (number of tabs and panels). A bundle can contain any data that can be displayed with McIDAS-V. See the table below for a list of all data types that McIDAS-V can display.

Below is a list of supported data types, formats, and the method to access them in McIDAS-V.

Data Type	Description	Supported Formats	Access Method
Gridded	Numerical weather prediction models, climate analysis, gridded oceanographic datasets, NCEP/NCAR Reanalysis	netCDF	local files, HTTP, TDS Servers
		GRIB (versions 1&2)	local files, TDS Servers
		Vis5D	local files, HTTP
		GEMPAK	local files, TDS Servers
Satellite Imagery	Geostationary and polar orbiter satellite imagery, derived satellite products	ADDE	ADDE servers, local & remote
		McIDAS AREA	local files, local & remote ADDE
		AIRS	local files
		GINI	local files, TDS servers
		AMSR-E Level 1b	local ADDE
		AMSR-E Level 2a	local ADDE
		AMSR-E Rain Product	local ADDE
		EUMETCast LRIT	local ADDE
		Meteosat OpenMTP	local ADDE
		Meteosat Second Generation (MSG) Level 1b	local ADDE
		Metop AVHRR Level 1b	local ADDE
		MODIS L1b MOD02 (MODIS Level 1b)	local ADDE
		MODIS L2 MOD04 (Level 2 Aerosol)	local ADDE
		MODIS L2 MOD06 (Level 2 Cloud Top Properties)	local ADDE
		MODIS L2 MOD07 (Level 2 Atmospheric Profile)	local ADDE
		MODIS L2 MOD28 (Level 2 Sea Surface Temperature Products)	local ADDE
		MODIS L2 MOD35 (Level 2 Cloud Mask)	local ADDE
		MODIS L2 MODR (Level 2 Corrected Reflectance)	local ADDE
		MSG HRIT FD and HRV	local ADDE
		MTSAT HRIT	local ADDE
		NOAA AVHRR Level 1b	local ADDE
		SSMI (TeraScan netCDF)	local ADDE
		TRMM (TeraScan netCDF)	local ADDE
Radar	Radar images	Level II	local files or TDS (bzip2 compressed or uncompressed)
		Level III/TDWR	ADDE Servers, local files or TDS
		Universal Format (UF)	local files
		DORADE	local files

Data Type	Description	Supported Formats	Access Method
Point Observational	Surface observations (METAR and SYNOP), earthquake observations	ADDE	ADDE servers
		netCDF (Unidata, AWIPS/MADIS formats)	local files
		Text (ASCII, CSV), Excel spreadsheet	local files
	Global balloon soundings (RAOB)	ADDE	ADDE servers
		netCDF (Unidata, AWIPS/MADIS formats)	local files
		CMA text format	local files
	NOAA Profiler Network winds	ADDE	ADDE servers
Trajectory	Aircraft observations	netCDF (RAF convention)	local files
		Text (ASCII, CSV)	local files
GIS	Data typically used in Geographic Information Systems (GIS)	ESRI Shapefile	local files, HTTP
		USGS DEM	local files
QuickTime	QuickTime movies (without extensions)	QuickTime	local files, HTTP

Zooming, Panning, and Rotating Controls

Zooming	Panning	Rotating
	Mouse	
Shift-Left Drag: Select a region by pressing the ***Shift*** key and dragging the left mouse button. **Shift-Right Drag:** Hold ***Shift*** key and drag the right mouse button. Moving up zooms in, moving down zooms out.	**Control-Right Mouse Drag:** Hold ***Control*** key and drag right mouse to pan.	**Right Mouse Drag:** Drag right mouse to rotate.
	Scroll Wheel	
Scroll Wheel-Up: Zoom Out. **Scroll Wheel-Down:** Zoom In.		**Control-Scroll Wheel-Up/Down:** Rotate clockwise/counter clockwise. **Shift-Scroll Wheel-Up/Down:** Rotate forward/backward clockwise.
	Arrow Keys	
Shift-Up: Zoom In. **Shift-Down:** Zoom Out.	**Control-Up arrow:** Pan Down. **Control-Down arrow:** Pan Up. **Control-Right arrow:** Pan Left. **Control-Left arrow**: Pan Right.	**Left/Right arrow:** Rotate around vertical axis. **Up/Down arrow:** Rotate around horizontal axis. **Shift-Left/Right arrow:** Rotate Clockwise/Counterclockwise.