



## **NASAView v.3.2.0**

**for the Planetary Data System**



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## 1.1 Overview

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### About NASAView

NASAView was developed as a simple display tool for data contained in the PDS archive with a requirement that it run on multiple hardware platforms and convert between machine specific data formats as necessary. This application was built using the PDS Label Library Light (L3), PDS Object Access Library (OAL), and the XVT Portability Toolkit <sup>TM</sup>.

The PDS OAL and L3 libraries provide access to PDS labeled data products and represent the standard software libraries available for the production and use of the PDS archive. The L3 library reads and parses a product label and allows access to label information using standard function calls. The OAL, using the label information, manipulates the actual science data at three levels. At the lowest level or stream layer, physical record format differences such as <CR><LF> versus <LF> record delimiters are addressed. At the next higher level or structure layer, data format differences such as byte-order is addressed. Finally at the object layer, data products can be manipulated using object-based function calls.

The XVT Portability Toolkit <sup>TM</sup>, a commercial product, provides the cross platform GUI development environment for NASAView. It allows an interface to be developed on one platform and to then be ported to another supported platform with little effort. Most important for this application, it utilizes the native windowing system on the target platform. This provides a user with the expected look-and-feel on a specific platform while also providing the same application functionality across platforms.

Please send comments, change requests and bug reports to the [PDS Operator](mailto:pds_operator@jpl.nasa.gov) at [pds\\_operator@jpl.nasa.gov](mailto:pds_operator@jpl.nasa.gov).

## 1.2 Release Notes

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### Release Notes

The purpose of this section is to provide a description of a NASAView release including any impact that the new or modified capabilities will have on the Discipline Nodes or the PDS user community. An itemized list of changes for this release and past releases can be found on the [Release Changes](#) page. If viewing this document in PDF form, see the appendix for details.

### Release 3.2.0

This is a maintenance release of NASAView, which includes support for the Linux 64-bit platform and numerous bug fixes.

Other updates include the following:

- Removal of the the help menu feature.  
The help menu now only displays the current release version and copyright notice. Detailed documentation regarding NASAView is available in a PDF file or HTML pages and can be found in the *docs/* directory of the distribution package.
- A bigger and more readable Histogram window across all platforms.

Bug fixes have also been made in this release, including fixes to display MGS MOLA images and MOC images properly and better recognition of opening TABLE-type objects when selecting them from the hierarchy menu.

The liens for this release are as follows:

- PDS CD Volume Support on the Mac

On the Mac platform, NASAView crashes after selecting a label or image file located on a CD from one of the older PDS Volumes. The error message that appears is the following:

```
FATAL ERROR: MSG 0x003482ec [CAT 3/4 STD
33516]
Category: XVT release 3 assert (Signaled assert 4)
Function: XVT_app_create
File: /Users/build_user/builds/dsc_osx/svn/src/
ptk/mac/kfsys.c line: 411
```

Volume Sets that are known to cause this error are CDs of Magellan, Viking Orbiter, Voyager, and Galileo REDR images or labels. The work around is to copy the files from the CD to the local Mac machine running NASAView.

## 1.3 Installation

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### Installation

This section describes how to install the NASAView software contained in the *nasaview* package. The following topics can be found in this section:

- [System Requirements](#)
- [Unpacking the NASAView Package](#)
- [Miscellaneous Notes](#)

### System Requirements

The following table shows a list of platforms that NASAView currently supports:

Platform	Version
Windows	Built on XP with Service Pack 3. Requires at least Service Pack 2.
Mac OS X	Built on 10.4.11. Tested on G5 running 10.3.9.
Solaris	Built and tested on 2.7.
Linux (32-bit)	Built on Red Hat 7.3. Tested on Red Hat Enterprise 3.
Linux (64-bit)	Built and tested on Red Hat Enterprise 4.

The Linux and Solaris releases of NASAView require X Windows and the Motif window manager to be installed in order to function properly. NASAView is not guaranteed to run under other X Window systems, but there are rumors of success. In addition, if NASAView is to be displayed on a remote terminal, the remote terminal must have an X Windows emulator installed.

### Unpacking the NASAView Package

Download the *nasaview* package from the [PDS Software Download](#) web page. The binary distribution is available in either zip or tar/gzip packages depending on the platform. Unpack the selected binary distribution file according to the selected platform below.

#### Windows



Unpack the selected binary distribution file by either double-clicking it on the desktop or executing the following command:

```
C:\> unzip nasaview-3.2.0_win.zip
```

The commands above result in the creation of the *nasaview-3.2.0\_win* directory with the following directory structure:

- **README.txt**

A README file directing the user to the available documentation for the project.

- **LICENSE.txt**

The copyright notice from the [California Institute of Technology](#) detailing the restrictions regarding the use and distribution of this software. Although the license is strictly worded, the software has been classified as Technology and Software Publicly Available (TSPA) and is available for *anyone* to download and use.

- **docs/**

This document directory contains a local web site with the NASAView Guide and other configuration management related information. Just point your favorite browser to the *index.html* file in this directory.

- **nasaview.exe**

The NASAView executable file.

- **\*.dll**

Support libraries. These files can be moved to the *C:\Windows\System* directory if desired but are probably better off left in this location.

- **FHA01118.LBL**

Test label.

## Mac OS X

Unpack the selected binary distribution file by either double-clicking it on the desktop or executing the following command:

```
[node: ~] tar -xzf nasaview-3.2.0_mac.tar.gz
```

The commands above result in the creation of the *nasaview-3.2.0\_mac* directory with the following directory

structure:

- **README.txt**

A README file directing the user to the available documentation for the project.

- **LICENSE.txt**

The copyright notice from the [California Institute of Technology](#) detailing the restrictions regarding the use and distribution of this software. Although the license is strictly worded, the software has been classified as Technology and Software Publicly Available (TSPA) and is available for *anyone* to download and use.

- **docs/**

This document directory contains a local web site with the NASAView Guide and other configuration management related information. Just point your favorite browser to the *index.html* file in this directory.

- **NASAView**

The NASAView executable file.

## Linux

Unpack the selected binary distribution file with the following command:

```
[node: ~] tar -xzf nasaview-3.2.0_linux.tar.gz
```

The commands above result in the creation of the *nasaview-3.2.0\_linux* directory with the following directory structure:

- **README.txt**

A README file directing the user to the available documentation for the project.

- **LICENSE.txt**

The copyright notice from the [California Institute of Technology](#) detailing the restrictions regarding the use and distribution of this software. Although the license is strictly worded, the software has been classified as Technology and Software Publicly Available (TSPA) and is available for *anyone* to download and use.

- **docs/**

This document directory contains a local web site with the NASAView Guide and other configuration management related information. Just point your favorite browser to the *index.html* file in this directory.

- **nasaview**

The NASAView executable file.

- **nasaview.uid**  
Resource file for the NASAView application.
- **\*.so**  
Support libraries.
- **FHA01118.LBL**  
Test label.

## Solaris

Unpack the selected binary distribution file with the following command:

```
[node: ~] tar -xzf nasaview-3.2.0_solaris.tar.gz
```

The commands above result in the creation of the *nasaview-3.2.0\_solaris* directory with the following directory structure:

- **README.txt**  
A README file directing the user to the available documentation for the project.
- **LICENSE.txt**  
The copyright notice from the [California Institute of Technology](#) detailing the restrictions regarding the use and distribution of this software. Although the license is strictly worded, the software has been classified as Technology and Software Publicly Available (TSPA) and is available for *anyone* to download and use.
- **docs/**  
This document directory contains a local web site with the NASAView Guide and other configuration management related information. Just point your favorite browser to the *index.html* file in this directory.
- **nasaview**  
The NASAView executable file.
- **nasaview.uid**  
Resource file for the NASAView application.
- **\*.so**  
Support libraries.
- **FHA01118.LBL**

Test label.

## Miscellaneous Notes

NASAView can be invoked as a Web Browser helper application by specifying the following in a browser:

- File Type: application/PDS
- Action: NASAView
- Extensions: LBL, IMG

## 1.4 Use and Operation

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### Use and Operation

NASAView provides a Graphical User Interface (GUI) enabling users to view PDS label products. This section describes how to use NASAView. The following topics can be found in this section:

- [Tool Setup](#)
- [Tool Execution](#)
- [Tool Interface](#)
- [Common Errors](#)
- [Mac OS X Quirks](#)

### Tool Setup

In order to execute NASAView on Solaris and Linux machines, the user's environment must be configured appropriately. Windows and Mac OS X users, however, do not need to setup their environment. This section describes how to setup the user environment on Solaris and Linux machines. The commands for setting environment variables must not contain spaces or line continuation characters in the value for the variable.

#### Solaris and Linux Setup

This section details the environment setup for Solaris and Linux machines. The following steps need to be performed:

- Set the UIDPATH Environment Variable
- Set the LD\_LIBRARY\_PATH Environment Variable

#### ***Set the UIDPATH Environment Variable***

The *UIDPATH* environment variable is used by Motif to locate the NASAView resource file named *nasaview.uid*.

The following command demonstrates setting the *UIDPATH* environment variable by appending to its current setting. In this example, the *nasaview.uid* file is located in the *nasaview* directory:

```
[node:~] setenv UIDPATH ${UIDPATH}:$HOME/nasaview/%U
```

```
[node:~] echo $UIDPATH
```

Note: The %U symbol must be used when setting the *UIDPATH* environment variable. This represents a value that is substituted at runtime by NASAView.

### ***Set the LD\_LIBRARY\_PATH Environment Variable***

The *LD\_LIBRARY\_PATH* environment variable is used to locate the NASAView-dependent libraries. The following command demonstrates how to set this variable, by appending to its current setting.

This example appends the location of the NASAView-dependent libraries found in the *nasaview* directory:

```
[node:~] setenv LD_LIBRARY_PATH ${LD_LIBRARY_PATH}:%HOME/nasaview  
[node:~] echo $LD_LIBRARY_PATH
```

Once the *UIDPATH* and *LD\_LIBRARY\_PATH* environment variables have been set, the tool can be executed as demonstrated in the following example:

```
[node: /home/user/nasaview] ./nasaview \  
<optional PDS label file specification>
```

### **Windows Setup**

There are no environment variables that need to be set in order to execute NASAView on a Windows machine. All the dependency files for NASAView should be sitting in the same location as the NASAView executable file.

The preferred method to run NASAView is to double-click the NASAView executable file. The alternative method is to specify the NASAView executable file through the command-line as demonstrated in the following example:

```
C:\nasaview> nasaview <optional PDS label file specification>
```

### **Mac OS X Setup**

There are no environment variables that need to be set in order to execute NASAView on a Mac OS X machine. To launch the application, double-click the NASAView executable file.

## Tool Execution

This section is intended to provide users with helpful tips on how to use NASAView when it opens more 'elaborate' PDS labels: labels that do not simply have just a single IMAGE or TABLE object.

### Examples

This section provides documentation on how to use NASAView against more elaborate PDS labels, such as:

- Displaying Multiple Objects
- Displaying a Multi-banded Image

#### *Displaying Multiple Objects*

When there are multiple objects in a PDS label, NASAView automatically determines which object to display, using the following rules:

- The first IMAGE object in the label will be displayed regardless of any other objects that exist.
- If no IMAGE object exists, then the first TABLE object in the label will be displayed.

In order to display the rest of the objects, use the *Previous Table/Next Table* buttons (only applies to TABLE objects) and/or use the *Object Hierarchy* menu option. See the [Using the Object Hierarchy Menu Option](#) for more details.

#### *Displaying a Multi-banded Image*

Before a multi-banded image is displayed, the multi-banded image GUI window appears. See the [Multi-banded Image Interface](#) for more information on how to use this interface.

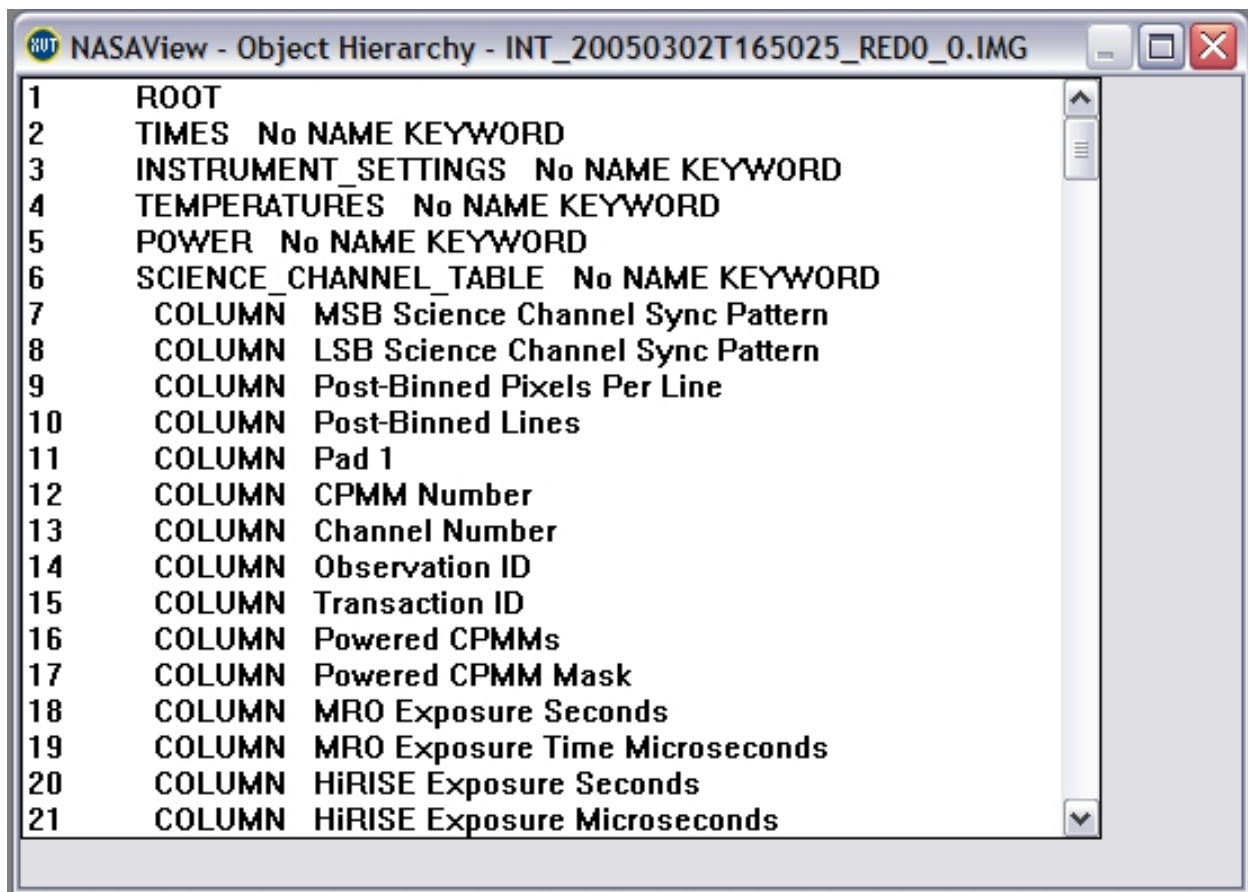
The band strengths must be set to at least 1, otherwise unexpected behavior will result.

### Using the Object Hierarchy Menu Option

The *Object Hierarchy* menu option is used to display other objects found in a PDS label. This menu option is most commonly used when a PDS label contains both an IMAGE and a TABLE object. This section describes how to use this menu option.

#### *Open the Object Hierarchy Window*

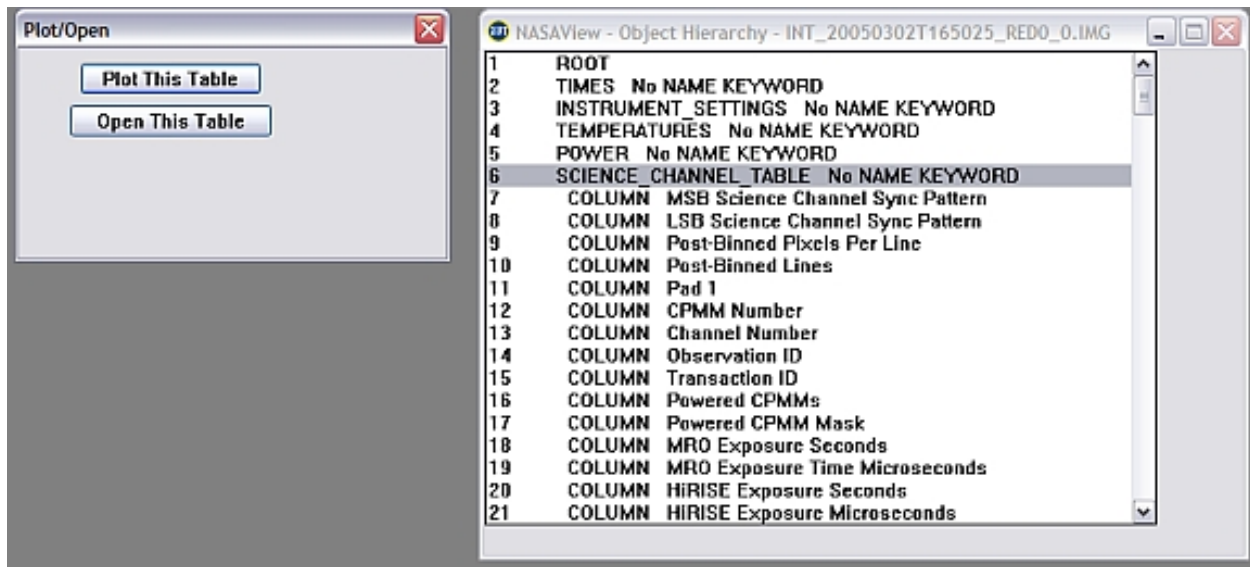
Go to the *Label* menu in the menu bar and select the *Object Hierarchy* option. When you do this, a new window should appear:



***Double-click the Object To Be Displayed***

Place the mouse pointer over the object to be displayed and double-click the mouse. At this point, another window will appear:





***Push the Open This Table button.***

In this example, the Table Display window should appear after the button is pushed. If an IMAGE object was selected, then the image will automatically be displayed.

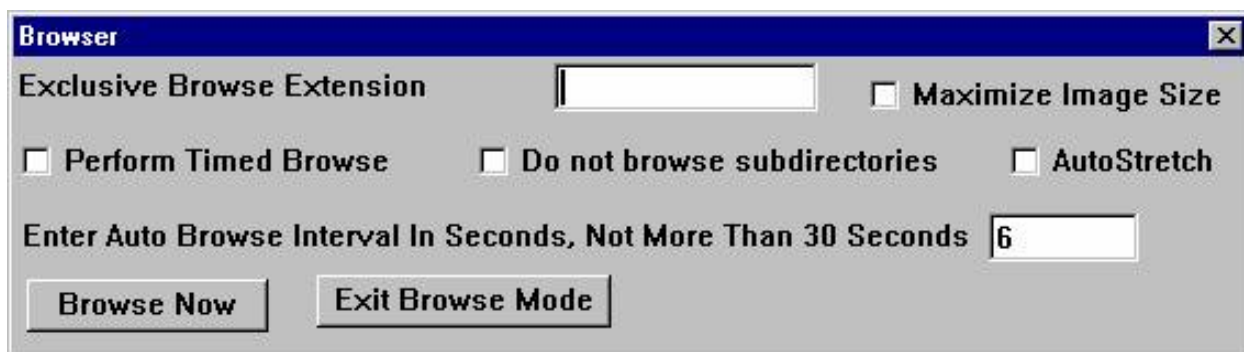
### **Automated Browse Feature**

NASAView provides an automated method of opening multiple PDS labels in a directory. This section describes how to use the automated browsing feature of NASAView.

Select the *Automated CD Browse* option from the *File* menu of NASAView. A new window should appear:



Select a directory then click **OK**. Another window will open to select the browse options:



This window contains the following options:

- Exclusive Browse Extension

Specify the extension that the file must have in order to be opened. The entry is case sensitive. If this field is left blank, then NASAView will attempt to display all files in the directory.

For example, if the desire is to open files that end in *.LBL*, enter *LBL* in the text box.

- Maximize Image Size

Image windows are normally opened at a pre-selected size. If this option is selected, the application window will be expanded to full size and the image windows will fill as much of the application window as necessary to show the full image.

- Perform Timed Browse

Selecting this option allows NASAView to display all files that have an attached or detached label. Files not meeting this criteria will be skipped and the user will be notified. If this option is not selected, then the user will be prompted to display or skip a file.

- Do not browse subdirectories

This option limits the displaying of files to only the selected directory. The default is to display files in the selected directory and all of its sub-directories.

- AutoStretch

This option will stretch each image without user intervention.

- Enter Auto Browse Interval In Seconds, Not More Than 30 Seconds

This option controls how long each object will be displayed. The default time is 6 seconds. An interval up to 30 seconds is allowed.

- Browse Now

This button starts the auto browse feature.

- Exit Browse

This button will exit the auto browse function.

If the *Perform Timed Browse* option is selected, a window should appear:



This window will be present during an auto browse session. The following options are available:

- Exit Auto Browse

This button will stop the auto browse feature.

- Pause

This button will temporarily stop the auto browse feature so that a new interval can be entered.

- Continue

This button will resume the auto browse if it was paused.

- Enter Auto Browse Interval in Seconds

This button changes how long each image will be displayed. Pause the auto browse first before entering a

new interval.

- Apply New Interval

This button will apply the new auto browse interval value entered.

If the *Perform Timed Browse* option is not selected, one of two manual browser control windows will appear:



This window will be displayed if the file to be displayed contains a PDS label or has a detached label associated with it.

This window contains the following buttons:

- Display It  
This button displays the selected file.
- Skip It  
This button does not display the selected file.
- Skip All Files With This Extension  
This button skips all files with the same extension as the selected file. This is case sensitive.
- Skip The Rest Of This Directory  
This button will not display anymore files in this directory. NASAView will move onto the next sub-directory if allowed or will move on to the next directory.
- Stop Browsing  
This button will stop the auto browse feature.

The other manual browser control window that could be displayed is the following:



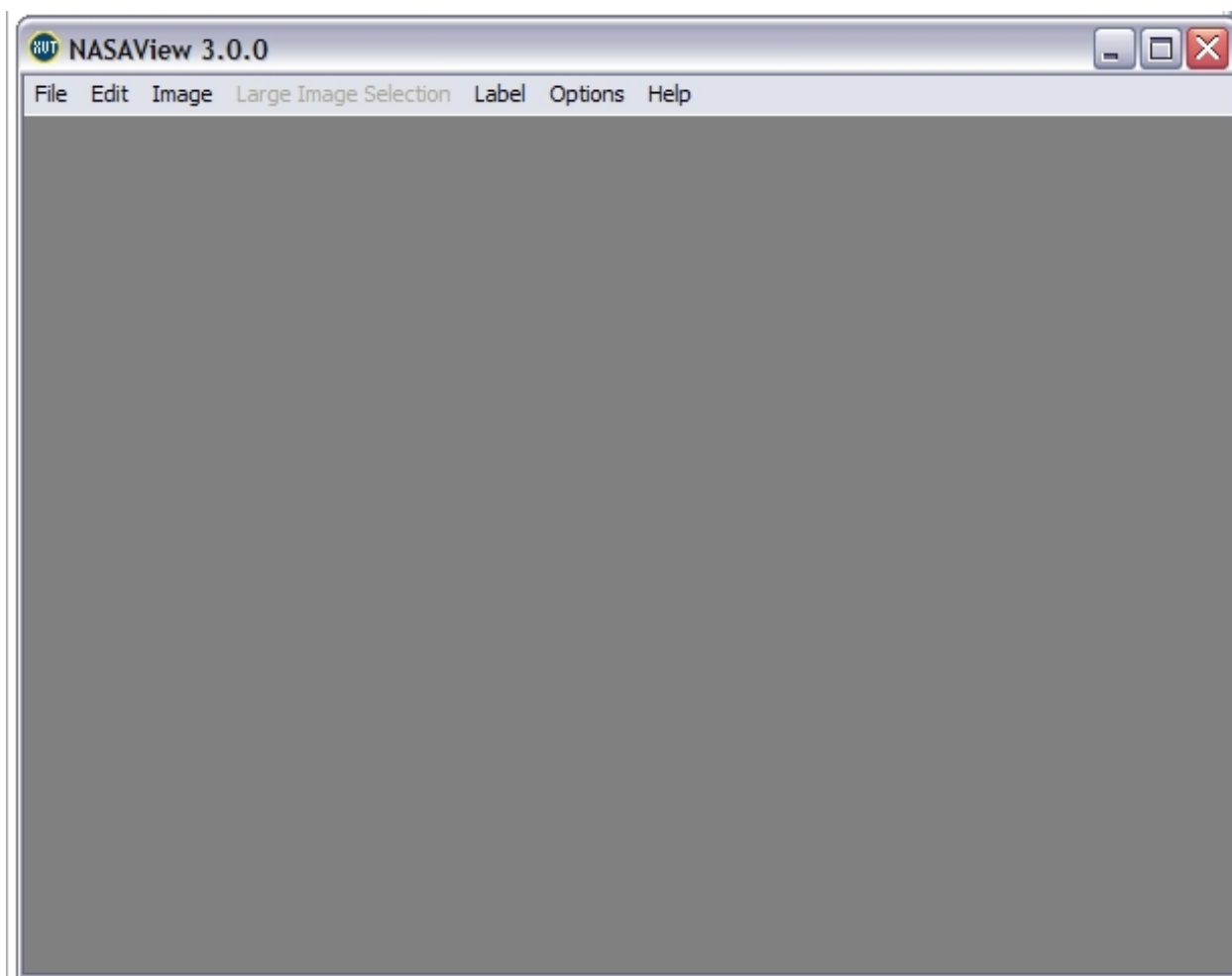
This window will be displayed if the selected file does not have a displayable image or table associated with its label.

This window contains the following buttons:

- **Skip It**  
This button does not display the selected file.
- **Skip All Files With This Extension**  
This button skips all files with the same extension as the selected file. This is case sensitive.
- **Skip The Rest Of This Directory**  
This button will not display anymore files in this directory. NASAView will move onto the next sub-directory if allowed or will move on to the next directory.
- **Make A Label For This Raw Image File**  
This button will present the user with a template and directions for creating a PDS label for a raw image file.
- **Make A Label For This FITS File**  
This button will present the user with a template and directions for creating a PDS label for a FITS file.
- **Stop Browsing**  
This button will stop the auto browse feature.

## Tool Interface

The Graphical User Interface (GUI) of NASAView allows the user to display and examine Planetary Data System (PDS) archive products. After launching the tool, the NASAView main window should appear on the user's desktop:



This window is what a user would see if running on a Windows machine. For users running on Solaris, Linux, and a Mac OS X, the main window will look different. The window will appear more native to the target platform to give the user an expected look-and-feel for that machine.

The main window consists of the following menus:

- File
  - Open Object

This menu option displays an object found in a PDS label. The selected file must contain a PDS label or it must be a PDS label file (\*.lbl) or there must be a PDS label file (.lbl) with the same name as the selected file. If a text file is selected it will be opened as a text file.
  - Open text

This menu option displays text files.
  - Make a PDS Label
    - For a FITS Image

This menu option will make a PDS label for a FITS image. Select a FITS file and NASAView will make a label for the file.

- For a Raw Image

This menu option will present a template for a minimal PDS label along with directions for completing the template.

- Automated CD Browse

This menu option allows automated browsing of files in a CD or directory. See the Tool Execution section for a detailed description on using this feature.

- Close

This menu option closes the current open file.

- Save GIF

This menu option saves the current image in a GIF file format. The file will have the same name as the original, but will have a .GIF extension. The image that will be saved is the image in memory. This image is not the same as the displayed image if the image has been stretched or otherwise altered.

- Save GIF as

This menu option saves the current image in a GIF file format under a user-specified file name. The default will be the name of the original file. The image that will be saved is the image in memory. This image is not the same as the displayed image if the image has been stretched or otherwise altered.

- Save JPEG

This menu option saves the current image in a JPEG file format. The file will have the same name as the original, but will have a .JPG extension. The image that will be saved is the image in memory. This image is not the same as the displayed image if the image has been stretched or otherwise altered.

- Save JPEG as

Save the current image in a JPEG file format under a user-specified file name. The default will be the name of the original file. The image that will be saved is the image in memory. This image is not the same as the displayed image if the image has been stretched or otherwise altered.

- Exit

This menu option exits the application.

The *Print Setup* and *Print* menu options are disabled and not functional at this time.

- Edit

This menu consists of the standard options (Undo, Cut, Copy, Paste, Delete) which functions as they do in any other application.

The *Undo* option is not functional at this time.

- Image

This menu consists of options that allow a user to stretch an image.

Except for multi-banded images, all images are displayed in 255 shades of gray. An image with pixel values ranging from 0 to 254 has one shade for each value. An image with a range from 0 to 1016 has one shade for every 4 values. An image with a range of 0 to 101,600 has one shade for every 400 values. If in the case of this last image the actual range was 101,092 to 101,600, a lot of the detail would be lost because all the data is in the last 508 values, which would be represented by only 2 shades of gray. If this image is normalized, the new range is now 0 to 508. This new range would yield 1 shade of gray for every 2 pixel values. This would bring out more detail.

- Stretch Display

This menu option causes the display to be normalized. The pixel values get re-distributed to completely utilize all 255 gray scale values. The user can also use the histogram feature to manually control the stretch. See the description of the *View Histogram* option under the *Options* menu for more information.

Stretching an image tends to improve image detail. Some images appear completely obscure until they are stretched and may show a lot of detail after stretching.

- Invert Display

This menu option reverses the colors in a 256 gray scale display.

- Undo Display

This menu option restores the display using the memory image as a source.

- Stretch Image

This menu option stretches the displayed image, but also causes the image in memory to be stretched. This allows a user to save the stretched image as a JPEG or GIF image file.

- Large Image Selection

This menu is enabled only when a portion of an image can be displayed at a time. This occurs when an image is found to be greater than 10,000 lines and/or line samples. The options under this menu provide the capability to display the rest of an image. By default, the first 5000 lines and/or line samples is displayed.

- Next Line Samples

This menu option displays the next 5000 line samples of the current image.

- Previous Line Samples

This menu option displays the previous 5000 line samples of the current image.

- Next Lines

This menu option displays the next 5000 lines of the current image.



- Previous Lines

This menu option displays the previous 5000 lines of the current image.

- Select Lines and Line Samples

This menu option allows an image to be displayed using user-specified line and line sample ranges. When this option is selected, the following window should appear on the user's desktop:

**Lines and Line Samples Selection**

**Enter The Start and Stop Line and Line Sample Values**

**Note: Difference between start and stop values must be less than 10000**

Total Number of Lines in Image      45431

Total Number of Line Samples in Image      16577

**Current Ranges**

Start Line	1
Stop Line	5000
Start Line Sample	1
Stop Line Sample	5000

Start Line     

Stop Line     

Start Line Sample     

Stop Line Sample     

**OK**

This window tells the user the total number of lines and line samples in the image and what ranges are currently being displayed. Given this information, input the desired ranges for the lines and line samples in the 4 white boxes located to the right of the screen. Click *OK* when finished. NASAView will display the image with the user specified ranges in a new image window.

- Label

- Object Parameters

This menu option displays the keywords and keyword values for the PDS object currently being displayed.

- Object Hierarchy

This menu option displays a list of PDS objects in the file being displayed. If the object has sub-objects, such as COLUMN objects in a TABLE object, then those will be listed also.

This menu option also allows a user to display other objects in a PDS label.

- Full Label

This menu option displays the PDS label for the current file.

- Band Min/Max

This menu option is associated with multi-banded images. It allows each band to be stretched. To achieve the best results, it is recommended to stretch all three bands to the same degree.

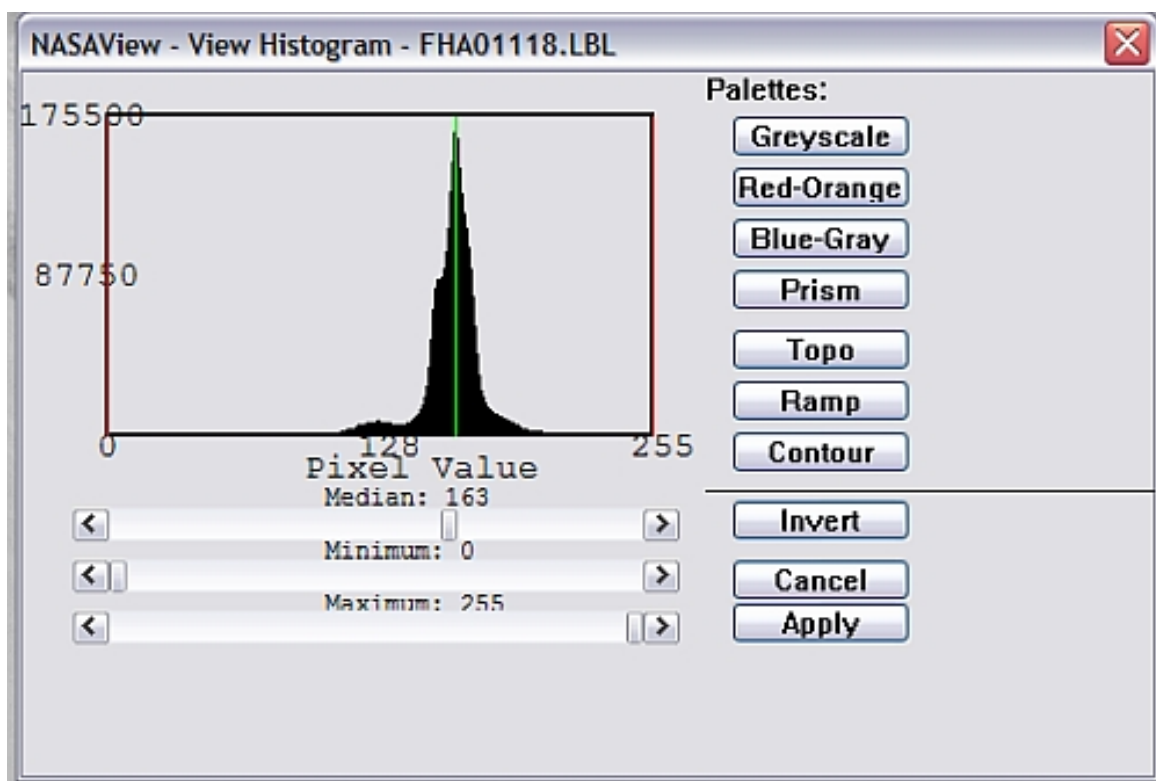
- Options

A different set of options is available depending upon the type of file opened.

When an IMAGE/QUBE object is displayed, the following options are available:

- View Histogram

This menu option provides a graphic display of the pixel value distribution. When this option is selected, the following window should appear on the user's desktop:



As shown in the above window, there are 3 controls that allow adjustment of the distribution. The top control, labelled *Median*, allows the median of the data to be moved through the 256 available values of a pixel. The middle control, labelled *Minimum*, allows the minimum value to be redefined, causing the low end of the data to be clipped. The bottom control, labelled *Maximum*, allows the maximum value to be redefined, causing the high end of the data to be clipped.

The buttons found on the right allows the user to apply the following palettes: Greyscale, Red-Orange, Blue-Grey, Prism, Topo, Ramp, and Contour.

- Show Side Data

This menu option is only associated with QUBE objects. This option displays the keywords associated with the QUBE side data.

- Hide/Show Qube Controls

This menu option is only associated with QUBE objects. This option controls whether or not the *QUBE Control* Window is visible.

The *Parse Times as Seconds* and *Show Integers as Unsigned Hex* menu options are not functional at this time.

When TEXT files are displayed, the following options are available:

- Show <LF><CR>

This menu option controls whether or not to display carriage return/line feed characters in a file. The default is to show them. These characters will be shown as <LF> and <CR> if they are present in the file and this feature is turned ON. When the file is saved, <LF> and <CR> will be written to the file.

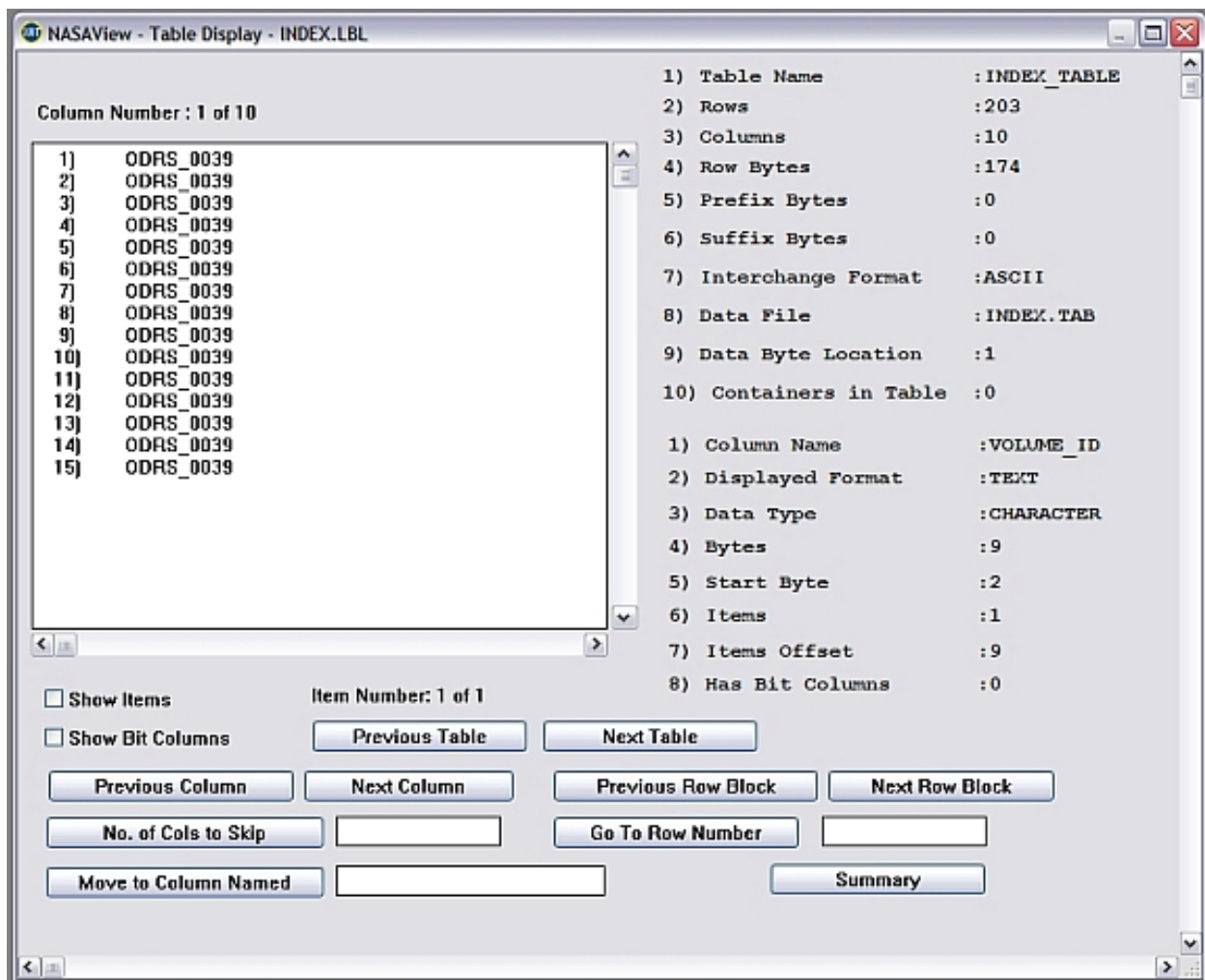
Although the *Font* menu option appears, it is not functional at this time.

- Help

This menu option displays the current NASAView version and copyright notice.

### Table Display Interface

This section describes the Table Display GUI interface when a TABLE object is opened in NASAView. When a TABLE object is opened, a window should appear similar to the following:



NASAView displays one column of data at a time. The indicator at the top tells which column is currently being displayed. In addition, 15 rows of data is displayed at a time.

The right of the screen shows two sets of information. The top-half represents information about the TABLE object and the bottom-half represents information about the current COLUMN/BIT COLUMN object being displayed.

The Table Display window features the following check boxes:

- Show Items

This check box allows the display of items in a COLUMN or BIT COLUMN object. The total number of items is indicated by the *Items* attribute.

When this box is checked, the *Previous Column* and *Next Column* buttons are used to display the previous and next item, respectively. The *Item Number:  $x$  of  $y$*  display found to the right of this check box indicates which item is being displayed, where  $x$  represents the current item on display and  $y$  represents the total number of items.

Un-checking this box will stop the *Previous Column* or *Next Column* buttons from displaying the previous and next item, respectively.

- Show Bit Columns

This check box allows the display of BIT COLUMN objects. The *Has Bit Columns* attribute indicates the total number of BIT COLUMN objects found in the COLUMN object.

When this box is checked, the data of the first BIT COLUMN object found in the current COLUMN object will be displayed. The *Previous Column* and *Next Column* buttons are used to display the previous and next bit column, respectively. At the top of the screen, it will show the current bit column being displayed.

Un-checking this box returns the display back to the data of the current COLUMN object.

Note: If this box is checked and there are no BIT COLUMN objects inside the current data on display, then the *Previous Column* and *Next Column* buttons will not work. The *Show Bit Columns* box will need to be un-checked in order for these buttons to work again.

The Table Display window features the following buttons:

- Previous Table

This button displays the previous TABLE object if there are multiple TABLE objects in a PDS label.

- Next Table

This button displays the next TABLE object if there are multiple TABLE objects in a PDS label.

- Previous Column

This button displays the previous COLUMN object, BIT COLUMN object, or item data.

- Next Column

This button displays the next COLUMN object, BIT COLUMN object, or item data.

- Previous Row Block

This button displays the previous 15 rows of data for a COLUMN object, BIT COLUMN object, or item.

- Next Row Block

This button displays the next 15 rows of data for a COLUMN object, BIT COLUMN object, or item.

- No. of Cols to Skip

This button gives the user the ability to skip over a user-specified number of columns in order to display the desired column. Specify the desired number of columns to skip in the text box located to the right of this button. Then click the button. Inputting a positive integer number will skip over columns to the right of the current column being displayed. A negative integer number will skip over columns to the left of the current column being displayed.

As an example, if column 10 is currently being displayed and a 5 is entered, column 15 will be displayed. If a -3 is entered, column 7 will be displayed.

- Go To Row Number

This button allows the user to specify the starting row number of the data to be displayed. Specify the starting row number in the text box located to the right of this button. Then click the button.

As an example, if 10 is entered, then rows 10 through 25 of the data will be displayed.

- Move to Column Named

This button displays the COLUMN object that matches the user specified column name. Enter the column name to be displayed in the text box located to the right of this button. Then click the button. If the name entered matches the NAME attribute of a COLUMN object in the PDS label, then it will be displayed.

This button is not intended to search across both BIT COLUMN and COLUMN objects. The *Show Bit Columns* box must be selected first before attempting to use this button to search for BIT COLUMN objects with a specific name. In addition, this button will only search the set of BIT COLUMN objects within the current COLUMN object. It will not look to the BIT COLUMNS within the next COLUMN object and so forth to look for the specified name.

- Summary

This button summarizes the data in a COLUMN object, BIT COLUMN object, or item and displays it. The type of summary performed depends on the data type of the column, bit column, or column item. Numeric data types such as integer and real will result in a summary that includes the minimum, maximum, and average values. Character data types will result in a summary that includes only value counts: a table of data values and the number of times each occurred in the column, bit column, or column item. Datetime types will result in a summary that includes minimum and maximum values plus an occurrence count table for values that did not appear to be dates or times. Boolean data types will result in occurrence counts.

## Multi-banded Image Interface

This section describes the GUI interface when a multi-banded image is being opened in NASAView. When a multi-banded image is being opened, a window like the following should appear before the image is displayed:



The window consists of buttons to increase/decrease the band strength and band intensity for red, green, and blue.

The buttons that control the band strength for each color increase/decrease by 1 with each click of the button.

Note: The band strengths should never be set to 0. Unexpected behavior will occur.

The buttons that control the band intensity for each color increase/decrease by 0.1 with each click of the button.

Alternatively, there are text boxes found to the right of the buttons where the band strengths and intensities can be entered manually.

The *Apply Selections* button is used to apply the current settings to the image and displays it. The current settings are found to the left of the buttons.

## Common Errors

At this point, there seems to be a common error when using NASAView on some Linux platforms. When the "Open Object" menu option is selected, a File Chooser GUI window appears to prompt the user to select a file. At this point, multiple error messages like the following appear on the user terminal window:

```
Warning:
  Name: FilterText
  Class: XmTextField
  Character '\165' not supported in font.  Discarded.

Warning:
  Name: FilterText
  Class: XmTextField
  Character '\170' not supported in font.  Discarded.

Warning:
  Name: FilterText
  Class: XmTextField
  Character '\57' not supported in font.  Discarded.
```

When this occurs, the GUI window does not behave properly. The user will be unable to choose a file or select another directory to browse.

The exact cause of the issue is unknown, but in the cases seen, the error was due to the *LANG* environment variable being set to *en\_US.UTF-8*. This represents the installation default locale. It is believed that certain versions of Motif, the X window manager, have an issue with this environment variable setting.

The solution that has been known to work is to change the *LANG* environment variable to *en\_US* or *C*.

The following command sets the *LANG* environment variable to *en\_US*

```
[node:~] setenv LANG en_US

[node:~] echo $LANG
```

## Mac OS X Quirks

There is a quirk to be aware of when executing NASAView on the Mac OS X platform. Due to a bug in the XVT software, images on the Mac platform will only be displayed up to about 2000 lines x 2000 line samples. The rest of the image can be viewed using the *Large Image Selection* menu. Refer to the [Tool Interface](#) section for a detailed description on this menu option.



## 1.5 Appendix A - Release Changes










### Release History

Version	Date	Description
3.2.0	2008-10-01	This is a maintenance release of NASAView, which includes support for the Linux 64-bit platform and numerous bug fixes.
3.1.0	2008-07-28	This is a maintenance release of NASAView, which fixes issues found during beta testing of release 3.0.0.
3.0.0	2008-06-09	This release of NASAView represents the beta release for JPEG-2000 and improved Mac OS X support.
2.14.0	2007-06-20	Maintenance release for NASAView.
2.13.0	2006-03-23	Maintenance release for NASAView.
2.12.0	2005-10-13	Maintenance release for NASAView.
2.11.0	2005-03-01	Maintenance release for NASAView.
2.10.0	2004-10-04	Maintenance release for NASAView.
2.9.0	2004-05-06	Maintenance release for NASAView.
2.8.0		Maintenance release for NASAView.
2.7.0	2003-06-05	Maintenance release for NASAView.
2.6.8	2003-04-04	Maintenance release for NASAView.
2.6.7	2003-03-06	Maintenance release for NASAView.
2.6.6	2003-02-17	Maintenance release for NASAView.
2.6.5	2003-01-18	Maintenance release for NASAView.
2.6.4	2003-01-13	Maintenance release for NASAView.
2.6.3	2002-11-03	Maintenance release for NASAView.
2.6.2	2002-10-15	Maintenance release for NASAView.
2.6.1	2002-09-17	Maintenance release for NASAView.
2.5.8	2001-12-01	Maintenance release for NASAView.





Version	Date	Description
<a href="#">2.5.3c</a>	2000-05-01	Maintenance release for NASAView.
<a href="#">2.5.3b</a>	2000-04-01	Maintenance release for NASAView.
<a href="#">2.5.3</a>	2000-01-01	Maintenance release for NASAView.
<a href="#">2.5.2</a>	1999-07-01	Maintenance release for NASAView.
<a href="#">1.2.5b</a>	1998-10-01	Maintenance release for NASAView.
<a href="#">1.2b</a>	1998-02-01	Maintenance release for NASAView.
<a href="#">1.1.2.b</a>	1997-06-01	Maintenance release for NASAView.

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## Release 3.2.0 - 2008-10-01


Type	Changes	By
	Add support for 64-bit Linux platform.	<a href="#">mcayanan</a>
	<b>PDSN-143-</b> The View Histogram pop-up window is too small and cannot be resized.	<a href="#">mcayanan</a>
	The band strengths in the Band Selection window now default to a value of <i>1</i> instead of a value of <i>0</i> . This allows a user to simply click on the <i>Apply Selection</i> button to display the multi-banded images.	<a href="#">mcayanan</a>
	<b>PDSN-117-</b> Scrolling block to scroll the display window horizontally doesn't work when viewing table objects.	<a href="#">mcayanan</a>
	<b>PDSN-130-</b> NASAView does not display an object named "HEADER_TABLE" when selecting it from the hierarchy menu.	<a href="#">mcayanan</a>
	<b>PDSN-138-</b> The 'Close' menu option does not work when a PDS label is displayed using the 'Full Label' option.	<a href="#">mcayanan</a>
	<b>PDSN-144-</b> NASAView crashes when attempting to open certain MOC images.	<a href="#">mcayanan</a>
	<b>PDSN-156-</b> Help menu in the Mac version of NASAView causes a program crash.	<a href="#">mcayanan</a>
	<b>PDSN-159-</b> NASAView does not display MGS MOLA images correctly.	<a href="#">mcayanan</a>

## Release 3.1.0 - 2008-07-28











Type	Changes	By
	<b>PDS-126-</b> Create a more detailed user guide.	<a href="#">mcayanan</a>
	<b>PDS-137-</b> NASAView crashes when attempting to save an image as a JPEG.	<a href="#">mcayanan</a>
	<b>PDS-139-</b> NASAView does not handle JPEG-2000, multi-banded images.	<a href="#">mcayanan</a>
	<b>PDS-140-</b> Qube file crashes NASAView.	<a href="#">mcayanan</a>

## Release 3.0.0 - 2008-06-09


Type	Changes	By
	<b>PDS-112-</b> Support for JPEG-2000 in accordance with SCR 3-1003.	<a href="#">mcayanan</a>
	<b>PDS-113-</b> Support for Mac OS X 10.3.9 and above.	<a href="#">mcayanan</a>
	<b>PDS-122-</b> NASAView no longer requires both image display direction keywords to be present in a label to determine the proper orientation of an image. SAMPLE_DISPLAY_DIRECTION and LINE_DISPLAY_DIRECTION now have default values of RIGHT and DOWN, respectively. An error message will be displayed if there is a conflict in values. For example, if SAMPLE_DISPLAY_DIRECTION is "RIGHT", and LINE_DISPLAY_DIRECTION is also set to "RIGHT" or "LEFT", then an error message is produced.	<a href="#">mcayanan</a>
	<b>PDS-125-</b> The content of the error message that appears when a required format file cannot be found has been changed to be more helpful to the user. It now says "Line < line number > : Unable to locate required format file: < name of file >".	<a href="#">mcayanan</a>
	<b>PDS-123-</b> A program crash was occurring when a label encountered CONTAINER objects with long names.	<a href="#">mcayanan</a>
	<b>PDS-127-</b> Fix to display 32-bit, multi-banded images properly.	<a href="#">mcayanan</a>

Type	Changes	By
	<b>PDSN-132</b> - Fix to display a label from a MOC image properly when selecting the 'Full Label' menu item.	<a href="#">mcayanan</a>




## Release 2.14.0 - 2007-06-20

Type	Changes	By
	Handle SAMPLE_DISPLAY_DIRECTION and LINE_DISPLAY_DIRECTION keywords, which allows images to be displayed with the preferred orientation.	<a href="#">mcayanan</a>
	The NASAView on the Mac platform is now a "gamma" release. It has been updated to reflect the current functionality seen on the other NASAView versions.	<a href="#">mcayanan</a>
	Change image information display from 'x' and 'y' to 'sample' and 'line', respectively.	<a href="#">mcayanan</a>
	Properly find label fragments not co-located with the label.	<a href="#">mcayanan</a>
	Check for LINE_INTERLEAVED and SAMPLE_INTERLEAVED band types once the multi-banded image is already open and we are re-selecting the band values again.	<a href="#">mcayanan</a>
	Properly display SPREADSHEET objects when the label begins with a HEADER object.	<a href="#">mcayanan</a>
	Properly display multi-banded images.	<a href="#">mcayanan</a>
	Properly display bit columns with multiple items.	<a href="#">mcayanan</a>
	Properly display column values when a user enters a row value greater than 7 digits in length in the "Go To Row Number" box.	<a href="#">mcayanan</a>
	Properly Display 8-byte integer values.	<a href="#">mcayanan</a>






## Release 2.13.0 - 2006-03-23

Type	Changes	By
	NASAView now has the ability to display images that are greater than 32767 lines and/or line samples. It will display these large images as a partial by first displaying the first 5000 lines and/or line samples. Users have the ability to browse through a large image by a new menu item called "Large Image Selection". See the NASAView users guide for more information on this new menu item.	<a href="#">mcayanan</a>
	Fixed NASAView to properly display the correct IMAGE-type object if there are multiple IMAGE objects contained within a label. This is performed by opening up the hierarchy menu and then selecting any of the IMAGE type objects in the table.	<a href="#">mcayanan</a>
	Fixed NASAView to prevent program crash when browsing through some Qube files. Problem crash when dealing with Qubes is not always consistent, but we've been able to fix some that we were able to catch.	<a href="#">mcayanan</a>
	Fixed NASAView to properly display the correct x, y (line and line sample values) and DN values to the user when placing the mouse over an image.	<a href="#">mcayanan</a>
	When you open a qube, display the spectrogram data, and then click on the "fwd" button to see the next band, NASAView would complain about not enough bytes being read. This was an error in the OAL library, which has been fixed for this version.	<a href="#">mcayanan</a>
	When dealing with tables with only 1 column, but multiple items, NASAView would not go back to the previous item. This has been fixed.	<a href="#">mcayanan</a>



## Release 2.12.0 - 2005-10-13

Type	Changes	By
	Users can now select SPREADSHEET objects from the hierarchy menu.	<a href="#">mcayanan</a>
	Updated the "About" section to include a new software disclaimer message.	<a href="#">mcayanan</a>
	Made a bug fix where NASAView would sometimes incorrectly display LSB UNSIGNED INTEGER data.	<a href="#">mcayanan</a>




## Release 2.11.0 - 2005-03-01

Type	Changes	By
	Added support for Band-Interleaved-by-Pixel Qubes.	<a href="#">dschultz</a>
	Re-compiled to create a Windows Installer package file (.msi). This gets rid of the user having to download the msvcrt70.dll file, which is needed to run NASAView on a Windows platform. With this setup file, it will place all dependent and necessary files needed to run NASAView onto a single directory.	<a href="#">mcayanan</a>
	Fixed capability to properly display the THEMIS RDR qube and the MER Mini-TES Qube.	<a href="#">dschultz</a>
	Fixed capability to properly display a TABLE object when selecting from the hierarchy menu.	<a href="#">mcayanan</a>
	Warning message now displays to the user if a label that contains a ^STRUCTURE pointer cannot be found.	<a href="#">dschultz</a>


## Release 2.10.0 - 2004-10-04

Type	Changes	By
	Added capability to handle SPREADSHEET objects.	<a href="#">mcayanan</a>
	Continued improving NASAView's Qube-handling capabilities.	<a href="#">dschultz</a>


## Release 2.9.0 - 2004-05-06

Type	Changes	By
	Restored capability to display integer columns as unsigned hex.	<a href="#">mcayanan</a>
	Made minor code changes to allow compilation on the MAC systems.	<a href="#">dschultz</a>
	Replaced tab characters with spaces when printing text to XVT GUI since it is not supported in UNIX and LINUX systems.	<a href="#">dschultz</a>


**Release 2.8.0 -**

Type	Changes	By
	Fixed bug to correctly display values of type MSB_INTEGER and LSB_INTEGER.	<a href="#">mcayanan</a>



**Release 2.7.0 - 2003-06-05**

Type	Changes	By
	Fixed bugs in MOC decompression and table plotting, hierarchy display, and hierarchy object selection.	<a href="#">dschultz</a>


**Release 2.6.8 - 2003-04-04**

Type	Changes	By
	Fixed a bug involving THEMIS qube display.	<a href="#">dschultz</a>


**Release 2.6.7 - 2003-03-06**

Type	Changes	By
	Fixed a bug in container processing.	<a href="#">mcayanan</a>
	Fixed a bug in opening a compressed MOC image.	<a href="#">dschultz</a>


**Release 2.6.6 - 2003-02-17**

Type	Changes	By
	Table handling has been completely rewritten. It is now a GUI representation of TBTOOL.	<a href="#">mcayanan</a>


## Release 2.6.5 - 2003-01-18

Type	Changes	By
	Made changes to speed up qube processing, particularly THEMIS RDR qubes with 32 bit real numbers.	<a href="#">dschultz</a>


## Release 2.6.4 - 2003-01-13

Type	Changes	By
	Added processing for THEMIS RDR qubes.	<a href="#">dschultz</a>

## Release 2.6.3 - 2002-11-03


Type	Changes	By
	Added processing for THEMIS EDR qubes.	<a href="#">dschultz</a>

## Release 2.6.2 - 2002-10-15



Type	Changes	By
	Table processing is now working properly.	

## Release 2.6.1 - 2002-09-17





Type	Changes	By
	Ability to read THEMIS cubes.	



## Release 2.5.8 - 2001-12-01

Type	Changes	By
	Ability to detect some compressed MOC images. If the auto detect does not work use the "select MOC image" menu item.	
	SAVE GIF AS and SAVE JPEG AS now work properly.	






## Release 2.5.3c - 2000-05-01

Type	Changes	By
	Ability to create a PDS Label for a raw image file.	
	Ability to create a PDS Label for a FITS image file.	





## Release 2.5.3b - 2000-04-01




Type	Changes	By
	BIT COLUMNS - Open Object, select Hierarchy, select column	
	MOC IMAGES - A file will be opened in your working directory. It will contain a decompressed image with the same name as the file that was selected except that the extension will be .tmp. The file will not be deleted by NASAView.	

## Release 2.5.3 - 2000-01-01



Type	Changes	By
	Multi Spectrum images can now be displayed if: they are 8 or 16 bit images or they are BAND_SEQUENTIAL. They may be stretched and image histograms may be displayed and used to manipulate the image	
	When displaying a label, or text object the native LF, CR characters may be replaced with < LF > < CR > for ease of viewing.	
	Date/time values in tables were being truncated.	
	Selecting an object from an displayed index object caused the object to be cleared from the display.	
	Selecting SHOW SIDEDATA for a non cube object caused the program to abort.	

## Release 2.5.2 - 1999-07-01



Type	Changes	By
	Objects may be selected from an open index list.	
	Objects may be selected from the Hierarchy list.	
	Row/Line numbers have been added to table displays.	
	Table display column width increased to allow full name to be displayed.	
	Program has been ported to SOLARIS 2.6 Common Desktop Environment.	
	Histogram/Palette window size increased.	
	Label data could not be displayed after opening a table.	
	Text objects not always displayed properly.	
	Program crashed if no END OBJECT.	

Type	Changes	By
	Attempt to write GIF file caused program to crash.	
	Display image topo problem appeared to be a data problem.	
	16 bit signed integer image problem was a label related problem.	


## Release 1.2.5b - 1998-10-01





Type	Changes	By
	Enhanced CUBE display.	
	Real 32 bit image display.	

## Release 1.2b - 1998-02-01

Type	Changes	By
	Displays TABLEs, TIME SERIES, SPECTRUM, and Galileo CUBE objects.	
	Under Options, NASAView now a) calculates an image histogram, b) allows contrast stretches via either scroll bar movement or min/max boundary line dragging, c) allows change to brightness via scroll bar movement or median indicator line dragging, and d) application of a number of color palettes.	

## Release 1.1.2.b - 1997-06-01

Type	Changes	By
	NASAView can be invoked as a Web Browser helper application by specifying: File Type - application/PDS, Action - nasaview, Extensions - lbl, img.	

Type	Changes	By
	NASAView can be invoked from a command line along with a PDS product file name.	
	NASAView scales a 16 bit image to an 8-bit image in memory before displaying the image as a pixmap. The specification of MINIMUM and MAXIMUM pixel values in the label will save NASAView from having to search the raw image for these values.	
	The stretch function can now be performed against either the pixmap image being displayed (modifies only a color lookup table and so can be undone but can not be applied successively) or for the image in memory (modifies image so cannot be undone but can be applied successively). The stretch algorithm is an 8-bit contrast stretch with the upper and lower 5% saturated.	
	The "save gif" and "save gif as" functions use the 8-bit in-memory image as a source. This allows a stretched image to be saved as a gif file.	