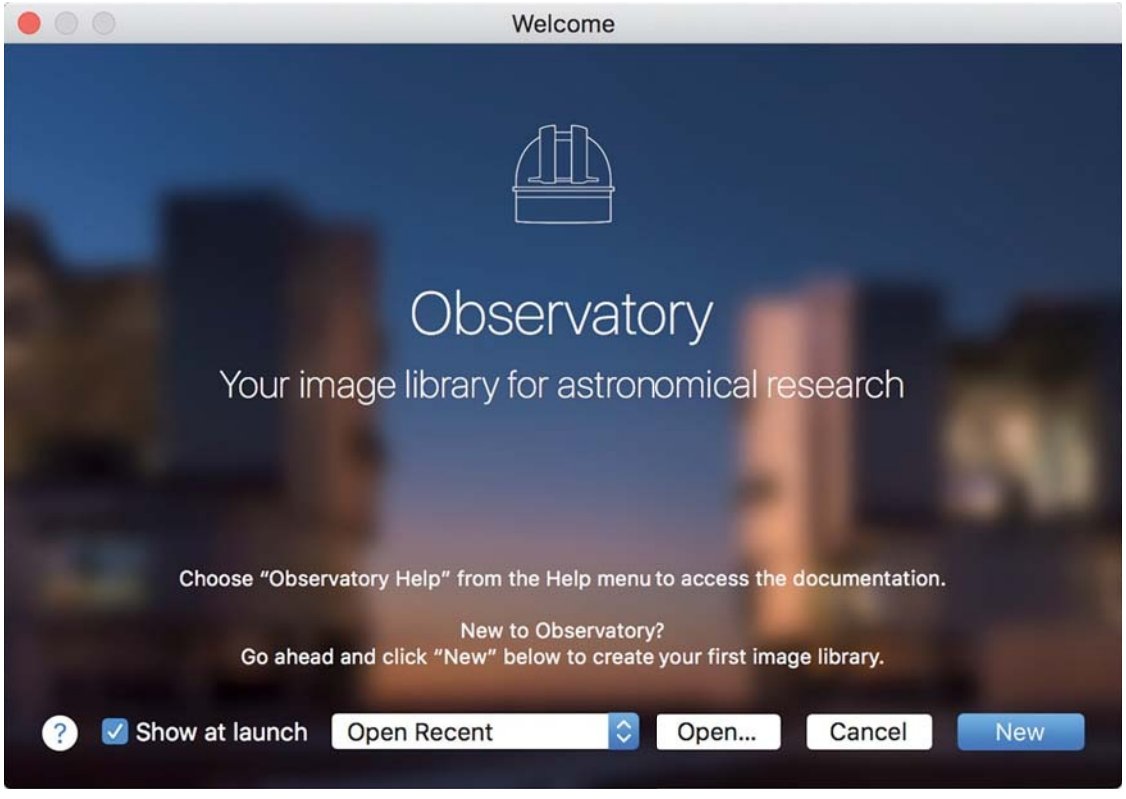
Managing Images with Observatory

This program for Mac computers helps you to organize your image data, and more.



Observatory 1.1.1
By Code Obsession

U.S. Price: $79.99
codeobsession.com

What We Like:
Finder Previews
Online database searches
Overlays for plate-solved images

What We Don't Like:
Interface not always intuitive
Plate solving was tricky
Extraneous features

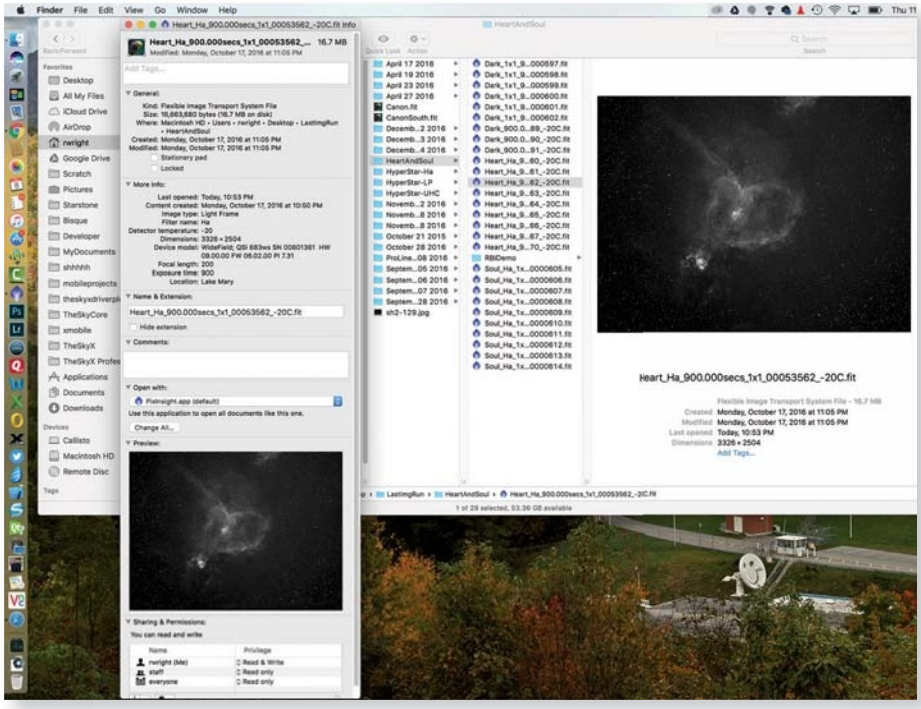
FOR SOME, astrophotography is a hobby, a pastime that keeps us busy and out of trouble. For others, it's a passion, maybe even an all-consuming passion. For those latter people, among whom I include myself, tend to accumulate a lot of data. Years of imaging every clear night will generate a lot of FITS files (FITS is the standard image file format for astronomical images). Hard-drive storage is cheap these days, so it's not unreasonable that some seasoned astrophotographers may have hundreds of gigabytes or even terabytes of astronomical data amassed over the years.

How on earth do you keep track of it all, or find anything? For those who think hierarchically, there are folders upon folders based on objects or regions of the sky. Or perhaps you organize by camera/optic, or maybe just by date-based folders. For "normal" photographers there are myriad tools for organizing photo shoots or projects. My smartphone can show me all the photos I've ever taken with dogs in them, and I never even tagged any of them with "dog." We live in the future. None of these tools, however, would know what to do with FITS files, much less try and create a system whereby they can be searched easily. But now there is finally such a tool, and it's called *Observatory*.

▲ *Observatory* is an astronomical-image management program for Mac computers running OS X 10.11 or later, with a 64-bit processor.

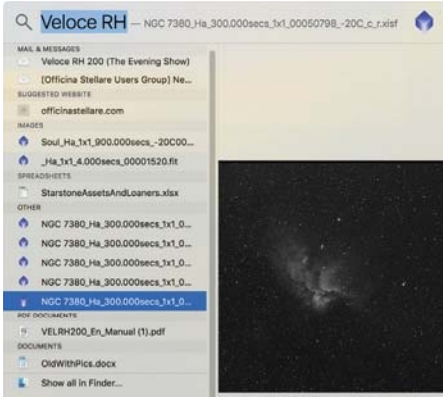
With so much astronomical software being only available for Windows, it's nice to see a high-quality tool available for the Mac. Since I prefer to use a Mac on a day-to-day basis myself, I was especially keen to see what *Observatory* had to offer.

ALL PHOTOS BY THE AUTHOR



◀ *Observatory* adds functionality to your Mac. After installation, your desktop's Finder will display a preview of FITS images as it does for any other common image type. You can also access useful FITS metadata via "Get Info".

▼ The program also enables the MacOS *Spotlight* feature to locate FITS files based on keywords in the FITS header. For example, you can search for all images taken with a specific telescope or camera.



Shell Extensions

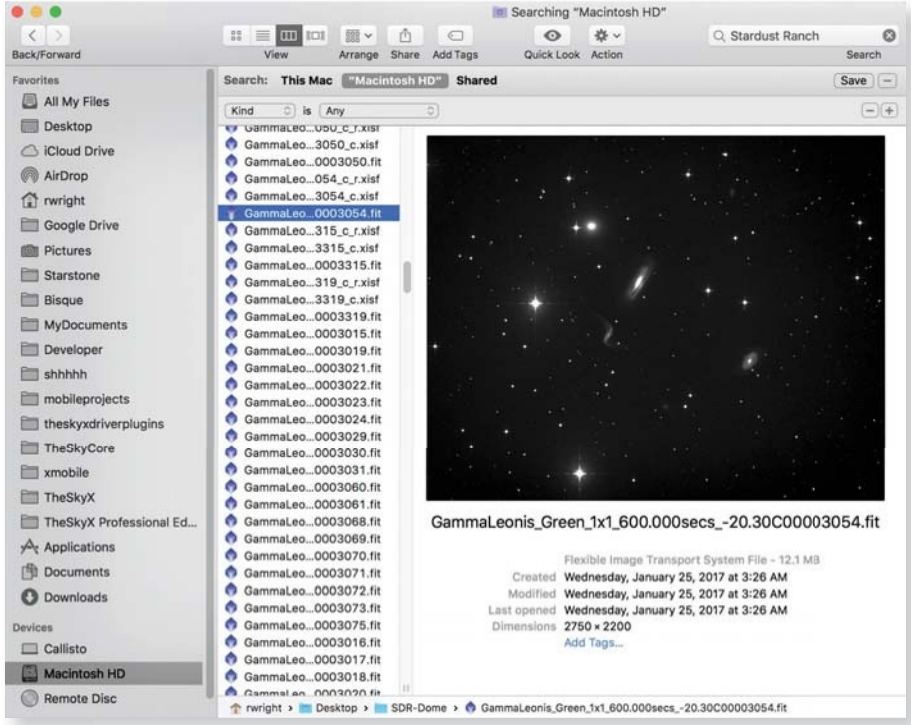
The most exciting two features of the software to me actually aren't part of the main application at all. Simply installing the program extends the Mac user environment by adding image preview support in *Finder*, and *Spotlight* support for FITS headers.

Preview support is fantastic. When navigating your files with the Mac's *Finder*, a nice auto-stretch is applied to your astronomical images, and they can be previewed just like you'd expect any image format to be, such as JPEG or TIFF. When you install *Observatory*, this support includes both the FITS format, which is standard with most astro-imaging software, and the *PixInsight* native format XSIF, as well as the SBIG native formats for *CCDOPS* users. It's also amazingly fast, even for large image files.

In addition to an image preview, "Get Info" will display some of the most pertinent information from the FITS header, such as image type, filter name, exposure, etc. How many times have you had to open a FITS file just to inspect the header for some of these items?

While this is quite useful, even more amazing is that *Spotlight* can now extend its search to the FITS headers in the images on your hard drive. This includes all the FITS files on your system, not just the ones managed by *Observatory*! Be advised this doesn't happen instantly; it takes some time (potentially days) for *Spotlight* to catalog all your images in the background.

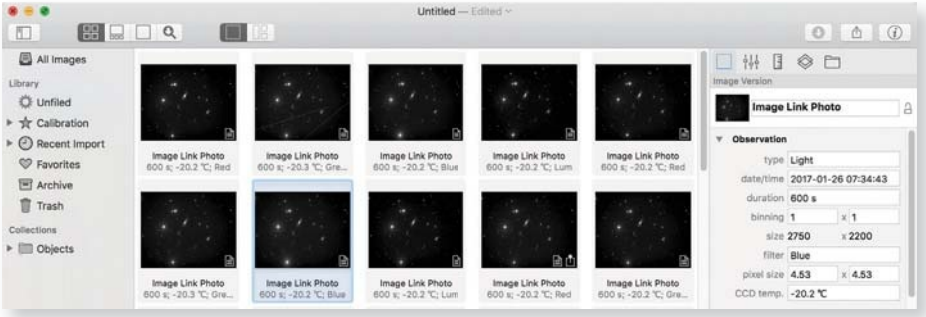
Spotlight is one of my favorite features of the Mac to begin with. If I can remember just a scrap of information about some document or email, *Spotlight* can find it for me. It will locate almost instantly Word documents, emails,



▲ Searching your hard drive for a specific location will now not only turn up documents with that keyword, but also FITS files with that keyword in the header.

and even a website I've visited from my browser history. It's my habit to set up the *TheSkyX*'s camera control so that my FITS images are tagged in the header with not just the essential camera and filter settings, but also my location and the optic and camera I used. Do I want to find all the images I shot with an Officina Stellare RH-200 using a Finger lakes Instrumentation ML16200 camera, or maybe just images taken at a specific star party? It's no problem!

All FITS keywords aren't stored, but many of the more useful ones are. For example, ORIGIN is indexed, so I can almost instantly locate all files taken at my Stardust Ranch observatory.



▲ Much like other photo organizers, *Observatory* presents all your astronomical images as thumbnails. Because FIT files are linear and dark before post-processing, an auto-stretch is automatically applied to the preview, allowing you enough information to recognize the field.

The Library

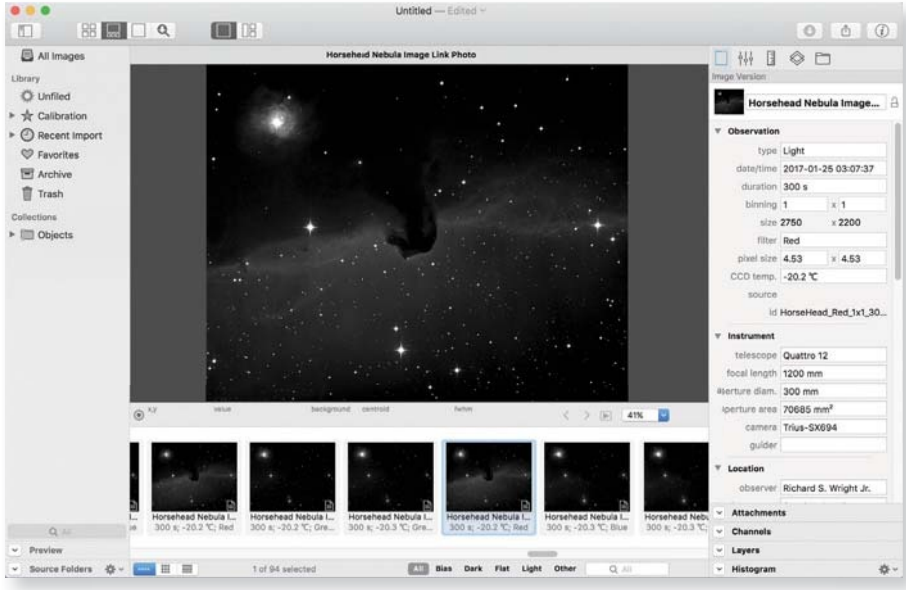
The core purpose of *Observatory* is to serve as an organized library of your FITS archives. Somewhat like the application *Photos* on the Mac, you can preview all the images in your collection and organize them by albums based on object types. When you first start *Observatory* it will ask you if you want to start importing images or add a source folder.

To get started, you have to add a source folder and then import the images into it. The rationale for this two-step process at first eluded me.

The library file you can save here does not contain all the images, but only the metadata for where the images are. I could, for example, add other images to this collection, say from other imaging runs or of the same object using different telescopes and cameras. I could also add reference images here from one of a number of online image archives.

Once you've set up a folder full of FITS files, *Observatory* will apply a screen stretch (which does not alter the actual files) and display them as thumbnails. Double-clicking an image or changing the view mode will display an "editor" for more detailed image inspection. Moving the mouse around over the image displays information like the background counts, as well as the centroid and FWHM values for stars in the field.

Observatory also features "Smart Folders" and will use object names and metadata to try and categorize your images to things like dark or emission nebula, or galaxies. I found this feature to be mostly hit or miss (not quite as accurate as my iPhone's "dog" filter, but give it time), so I prefer to assign objects to the smart folders myself.



▲ Double-clicking any thumbnail in *Observatory* opens a larger preview and displays additional image details from the file's metadata, such as FITS headers when selecting FITS files.

The Virtual Observatory

Another major feature of *Observatory* lets users add images from a number of online sources. Searching with the Virtual Observatory feature will teach you a great deal about the professional community and the kinds of data being produced by the world's astronomical institutions for research. Some of it, I should stress, is very useful for imagers looking for interesting source data. All of it is of course useful or interesting for analysis if your imaging goals are more science-related, though a fast internet connection is recommended. Searching is easy enough — type in the name (common or astronomical) or the coordinates of your desired target and off it goes to search any of the 11 available repositories you have selected.

A browser window lists the images found and other useful information, including the date the image was acquired, instruments used, coordinates, and image scale. You can scroll down through the list, and many of the images will have previews available that are displayed in the lower left of the window. Clicking the small preview will bring up a larger version of the image, and you can also transfer the image to *Preview* (the Mac default image viewing program), and of course import it into your own library.

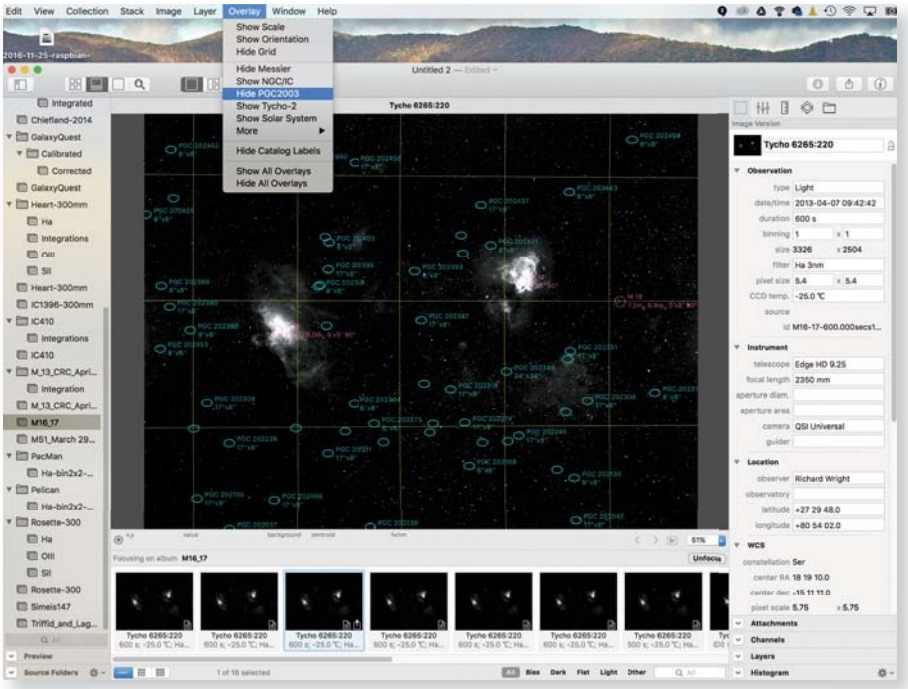
Wait, are you serious? Is that a 14,400 × 10,800 pixel Hubble image at a scale of 0.05 arcseconds per pixel?! A little Curves in *Photoshop* and look Ma, I can process Hubble data too! In fact, this is probably the easiest way I've come across to find raw Hubble data in a usable form for us mere mortals.

Matching Images

Observatory calls plate solving (providing an astrometric solution) "Matching" the image. Honestly, I was only able to make this work once, even after adding the optional 9-gigabyte USNO UCAC4 dataset. There are a number of hints, and one of the prerequisites is knowing the RA/Dec of the field for a starting point (which can automatically be extracted from the FITS header). Fortunately, whether you use *Image Link*, *PinPoint*, or Astrometry.net to plate solve, the embedded WCS (World Coordinate System) stored in the FITS headers is recognized by *Observatory*, so there are a number of other readily available ways to achieve this goal.

Having an image "matched" enables another of my favorite features: overlays. There are a number of nice overlays available — Messier objects, PGC galaxies, Tycho-2 star designations, solar system objects, and RA/Dec Grid, an orientation arrow, and image scale.

The overlays, along with some information about the image including your own added notes, are displayed when you export the image to a PDF, which I thought was another nice and time-saving feature.

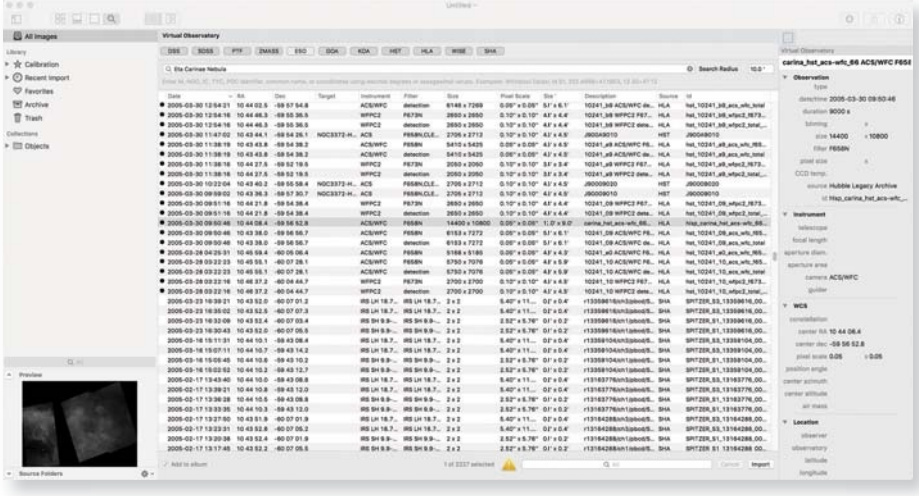


▲ Another of the program's excellent features is its ability to create custom overlays with labels and coordinate information. This works once an image has been plate-solved, or "matched".

Conclusion

This is a tremendous set of features, and I would recommend *Observatory* to any Mac-loving astrophotographer based on these alone. *Observatory* also offers the ability to calibrate and stack images in the library. I haven't focused on these features because I honestly question their presence, as I feel they distract from the core strengths of the application. There is so much more to preprocessing than simply calibration and stacking, and I wonder where the author is headed. Better in my opinion to keep *Observatory* focused on managing my collection, and offer another product if the desire is to begin competing in the image-processing market. On the other hand, I must admit getting your subs calibrated, stacked, and ready for additional work is also a compelling factor, and for the price of *Observatory* you do get a decent native calibration and stacking program for MacOS.

While the user interface seemed a bit counter-intuitive to me at times, it is a fantastic image management tool and great for online data mining. My only critique is I'd rather see the author focus more on the core strengths and utilities of the program, and leave processing to other packages, or break this functionality out into a complementary product.



▲ Browsing online data sources with Virtual Observatory could not be made much easier than this. You can easily get lost in the treasure trove of online images available from many professional observatories, including raw data from the Hubble Space Telescope.

■ **RICHARD S. WRIGHT, JR.** is a software developer for Software Bisque. He writes a monthly blog on astrophotography at https://is.gd/3yZO2K.