REFLECTIONS / REFRACTIONS

University Lowbrow Astronomers

July 2011

Volume 35 Issue 7

The Lightholder Bucket

by Doug Scobel

What the heck is a Lightholder bucket? Sounds kinda like a light bucket, which is a slang-ish term for a large Dob, which is a slang-ish term for a large Dobsonian telescope, the ubiquitous alt-azimuth mounted Newtonian reflector. But what in the world is a Light*holder* bucket?

I'll explain that a little later. First we have to go back to "the beginning". No, not *that* far back, just about three years ago, to the 2008 Black Forest Star Party. I vowed to myself as I was packing up to leave for home that that would be the last star party for Papa Smurf, my 1980's vintage 13-inch Dob. Its design is rather dated, with a solid tube, and after using it for nearly 25 years, it had seemed to have put on weight. Having downsized my transport vehicle, it seemed also to take up more and more cargo room in the back of the car. It's fine for running back and forth to local sites for the evening, but not for longer camping trips such as the BFSP. Besides all the usual paraphernalia such as tracking platform, eyepiece case, equipment cases, chair, star charts, and whatnot, I also need to carry camping gear, sleeping bag, pillow, clothes, food, and so on. It is a very real challenge trying to make room for everything.

<—Papa Smurf takes up about two thirds of the floor space in the back of my Pontiac Vibe. Not a lot of room for everything else, particularly for camping trips.

While Papa Smurf really isn't much heavier than it was 25 years ago (could it be that I'm simply getting less tolerant of lugging the beast around? – nah!), the amount of cargo room it occupies in the back of the car is indeed a real problem. I resolved in 2008 that it would be replaced within the year with a modern, more portable, truss-tube design. It might be a rebuild with the same 13 inch optics, or it might be a whole new (presumably bigger) scope. But it would have to be lighter, and it would absolutely *have* to present a smaller footprint in the back of the car when transported.

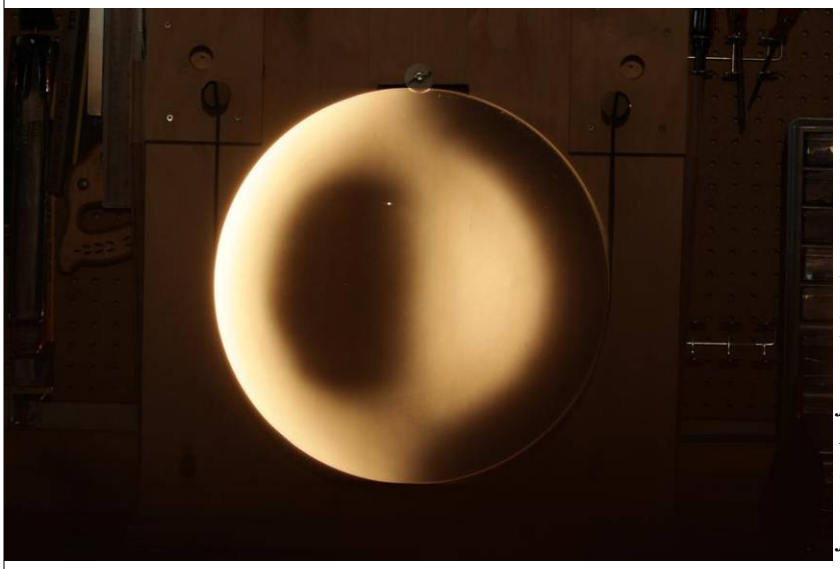
Well, I've never been accused of putting a plan into action too quickly (just ask my wife Debi), so it's just now that I'm well on my way to completing the project. But let's go back again. My first thought was to rebuild the 13 inch. But the more I thought about it the less enthusiastic I was about that option. After all, it would be essentially the same scope, regardless of the design. Having used it since 1984, I thought I was ready for something new. And of course, when it comes to Dobs, most would agree that "new" means "bigger". But how much bigger? I've always thought a 14.5" is the ideal size, as even at moderately fast focal ratios around f/4.5, most folks can stand on the ground and still see into the

eyepiece when the scope is pointed to the zenith. But 14.5 inches is barely more than 13, so that's not a big enough jump. I reasoned that an 18 inch would be enough bigger to be noticeable at the eyepiece. And I wasn't really interested in anything bigger than that because the price starts to get prohibitive and the overall weight and dimensions start becoming unmanageable. I'm not getting any younger, you know. So I had been looking at mirrors off and on, in the 17.5-18 inch range. But the amount of money that a good one would cost scared me a little, and I never quite pulled the trigger. Then in the spring of 2010, the new scope bug bit me again, and I started looking at mirrors on AstroMart. Not much in the way of 18-inchers were available, but I came across a 16" f/4.6 that sounded really, really nice.

Now 16 inches isn't that much larger than 13, but the surface area is about 50% more, about half a magnitude's worth. And if the mirror has a good figure, the additional sharpness compared to my 13 inch (which really isn't all that good) should provide somewhat better images. And I'm comfortable with the dimensions of the scope. Not as big as an 18, but 16 inches of aperture is still considered a "big" Dob, albeit the smallest of that class. It will be significantly lighter than Papa Smurf, and it's footprint in the back of the car will definitely be smaller too.

So I contacted the mirror's seller, and asked for numbers on the mirror. He sent me numbers. They were good numbers. No, they were *really* good numbers. Almost too good to be true numbers. So I contacted him again, asking for a bio, what his experience was in mirror making, etc. He sent me a lot of information on what his credentials are, and why I should trust him. And trust him I did. I know a little bit about what it takes to make a good mirror, and he didn't blow any smoke. Just factual information that convinced me that I would be making a good purchase.

And a good purchase it proved to be. After receiving the mirror I put it on the test stand and took my own knife-edge measurements. I obtained essentially the same numbers as he quoted me. Like I said, they are really good numbers. The mirror's figure is nearly a straight line through the middle of the Millies-LaCroix tornado. It is easily better than 1/10 wave peak-to-valley, which is about as much as anyone should say based on Foucault measurements. The edge looks better than any of the mirrors I've made. Nice, smooth figure. For those of you who have no idea what I'm talking about, the bottom line is that after bench testing it appears to be for all intents and purposes a perfect mirror.



<—***Mmmmm… doughnut! The primary mirror's figure is very smooth – and very nearly perfect! Notice the brightly lit ring on the right side of the mirror – that indicates a very sharp (i.e., not turned down) edge. (The missing part of the diffraction ring on the right side is an artifact of how I photographed the mirror using the Foucault tester. Visually the ring extended evenly all the way around.)***

Now that I had a mirror, I had another choice to make. Should I build the scope from scratch, or build it from a kit? I went back and forth several times, and finally came down on the side of building it from a kit. Specifically, an AstroSystems TeleKit. I did a lot of searching on AstroMart and Cloudy Nights forums looking for opinions and reviews of the TeleKit and virtually all such write-ups were positive. The common theme was a sturdy, attractive, and functional telescope. And after looking at everything that came with the standard kit, I would be hard-pressed to build one from scratch for less money. I also imagined that building from scratch would require a lot more time on my part and certainly more trial and error. In the end it was a slam-dunk, really.

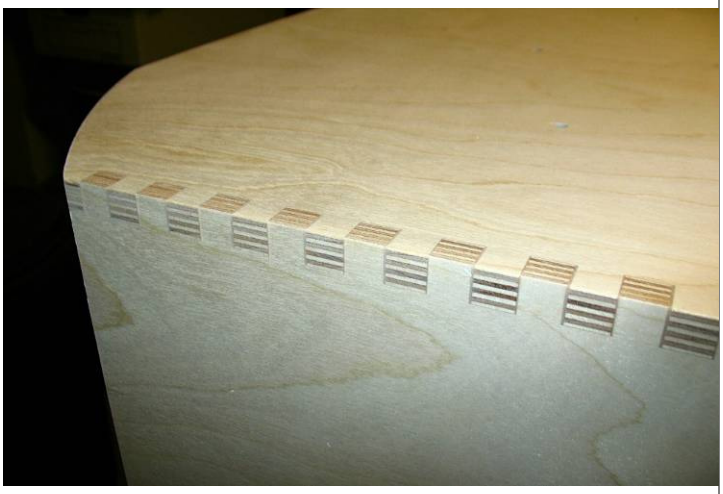
I didn't receive the kit until around Christmas time 2010, so while I haven't had a lot of free time to work on it I'm finding enough to make steady progress on it. I was planning on doing a step-by-step article on what I've done so far, but instead I'll just hit a couple highlights here and refer you to an online photo album where I can go into more detail.

First off, AstroSystems does a really good job of packing and shipping the kit. Mine arrived in four large boxes, plus a

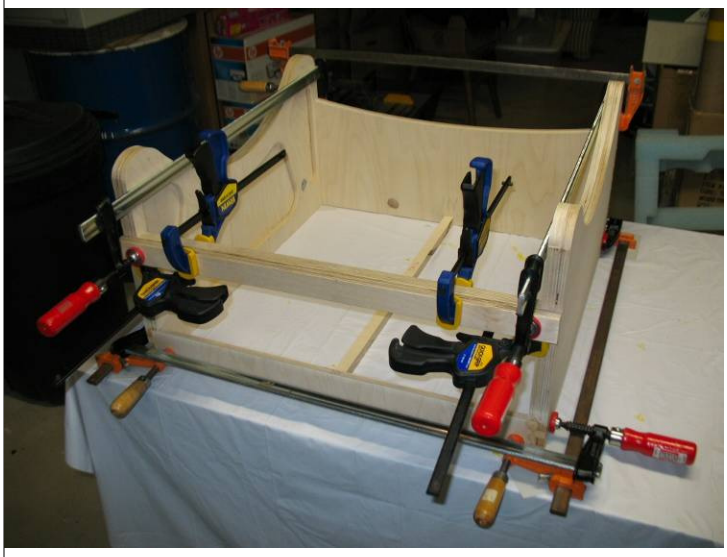
fifth package that contained the truss tubes. Everything was very well packed, with nothing damaged. And it all arrived about when he said it would, with their lead time being about 2-3 months.

All of the wood parts, all Baltic Birch plywood, are beautiful! They're all CNC machined, including all the finger joints, and virtually all holes are pre-drilled. There's very little carpentry work to do other than gluing, clamping, and assembly. Everything fit perfectly the first time, I didn't have to do any sanding or trimming to make things fit correctly. And the finish is very good - only a light sanding is needed before applying wood finish.

The finger joints are a hallmark of TeleKits. Besides being very attractive, they are really strong! The wood will break before the joint does.—>



Now I will say that while not essential, prior experience with woodworking is a big plus. There's a lot of gluing and clamping and squaring to do. All of the large wood structures (mirror box, rocker box, and upper cage) are held together with epoxy (supplied with the kit), so experience with using epoxies helps too. But if you are careful, and neat, you will end up with structures that are beautiful to look at and nearly indestructible. And with very little exposed hardware.

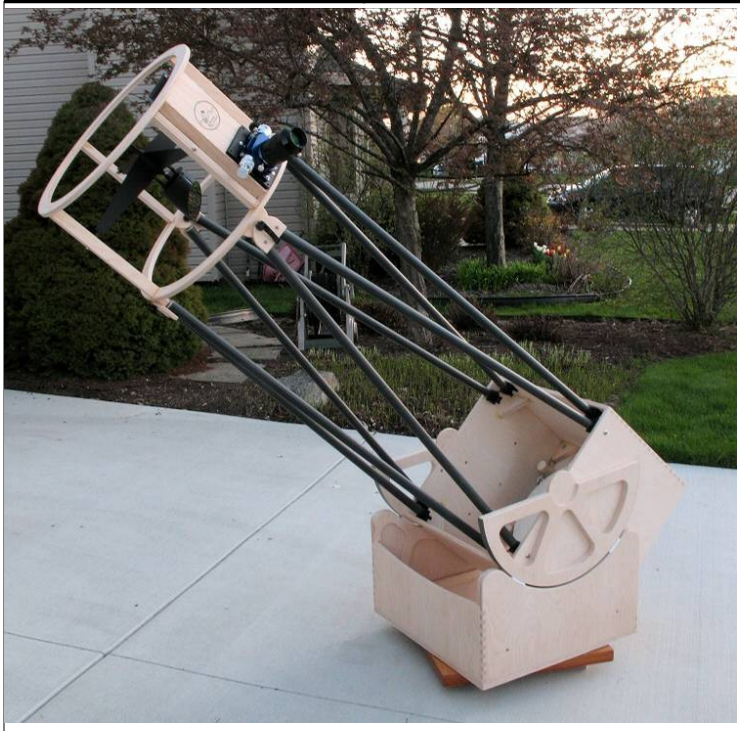


<—As you can see you need to do a fair amount of clamping and squaring during assembly. Taking your time here will pay dividends with a structurally sound and stable telescope later.

The instruction booklet is very detailed, but sometimes does not match the kit. I think the kit design has evolved over the years but the instruction booklet has not kept up. Not to worry, a call to Randy or Alan at AstroSystems will clear up any questions you have. I modified a few items while building, to suit my persnickety personality. But that's the beauty of building a scope yourself, even from a kit. The kit provides the baseline, but you can change things you don't like or add things you deem to be missing. This makes it your scope, with your own personality.

So where does the scope stand now? Right now I'm in the middle of applying the polyurethane to all the wood subassemblies. The instructions are broken up into building this sub-component, e.g., the upper cage, finishing it, then doing its final assembly. Then they move you on to the next sub-component, say, the mirror box, build it, finish it, and so on, until you've built everything. But I didn't want to be applying polyurethane in the house in the winter – my family and I really didn't want to be breathing all those vapors. So I've built each sub-assembly enough to get a working scope put together for very basic focus testing. And now that I've verified that the scope will actually work, it's all disassembled and I'm in the middle of applying the finish to all the wood parts out in the garage. Once that's done, I can do all the final assembly work. I'm hoping I can have it done by the end of summer, in time for a late-August star party. But I'm not promising anything.

So finally, back to the original question. What *is* a Lightholder bucket? Well, the name of the mirror maker is John Lightholder. It turns out that he is gaining quite a reputation for making really good mirrors. A what a great name for a



mirror maker! I wonder if he had it changed because of his profession. Probably not, so how serendipitous for him. For now, I'm calling the scope the Lightholder Bucket. When it is done, I'll give it a "real" name. But I won't reveal that until it is finished. Stay tuned.

<—Here's the scope completed enough to ensure that my eyepieces all come to a focus – and they do! Now it's time for finishing and final assembly.

For a photo album showing my progress so far, and some of my modifications/additions, check out my online photo album at:

http://tinyurl.com/3lnjer6

(Editor's note: This is a very timely article in that the Club's newly refigured 17" mirror is ready for coatings and then it will need to be housed in something … the club has given some thought to purchasing a Telekit … we have the funds and the resources to make a very nice club scope. Personally, I say "lets do it!"

LOWBROWS ON TOUR, PART 4

By Charlie Nielsen - June 1, 2011

Welcome to part 4 of my report on our club's outreach activities. This time I was going to report on our last Ann Arbor Schools event for this academic year. Alas, the event was cancelled. The students were so busy trying to catch up on their assignments to finish the year that the teachers felt the timing was not good, and we may not have the full attention of the students. This was scheduled for Lakewood Elementary and they will now be scheduling for our tour next year. This just leaves us with one class at Wines, which our main schools contact and me will do on our own. We have not selected a date as of this writing, but it should be soon as there are only 2 weeks of school left. Next year we will be presenting to 5th grade students exclusively. Both our team and the teachers and Enrichment Facilitators agree that this is the appropriate age group to work with. The objective of Ann Arbor Schools is to make our program a regular part of the 5th grade curriculum. I think we should take that as a huge compliment.

Though our AA Schools program drew to a close, we still had Hazel Park Schools. This was our 4th year in a row that we made an appearance at their camp which is located right at the base of Mt. Holly Ski Resort, which is about midway between Pontiac and Flint. The first year brought us thunderstorms, so our organizer for this event, Mark Deprest did one of his talks about constellations and mythology. The next 2 years brought us beautiful clear skies. This time we had 2 events scheduled for 2 different schools, on consecutive Tuesdays. Mark was unable to attend the first event so Jim Forrester took over the organizational duties. The first event was May 17, which brought us cloudy skies. Even worse, while we were there, it started to rain. But the Lowbrows were prepared for this possibility! We set up small telescopes and targets inside their building, and showed the students the slide show about telescope handling and safety that we use for AA Schools. In addition, we had set up our laser kit to show how lenses and mirrors bend light, and our NSN Toolkit that uses glass and mirrors to demonstrate how optics work. We broke up the 50 students present into 3 groups and had them rotate around the activities. It got very loud in the building, but I think they had fun, and learned something. I know *we* had fun. Our team for this event was composed of Jim Forrester, Dave Snyder, Don Foey, John Wallbank, Jason Maguran, Ken Ruble, and me.

On May 24 the same crew of Lowbrows, plus Mark Deprest gathered at Camp Hazelwood for our second event. This time the weather cooperated very nicely. We had a number of different types of scopes set up to show them Saturn and a few deep sky objects. We did not have a lot of time considering how late it gets dark this time of year, but the time we did have with them was very productive and the kids were very pleased and pretty well behaved. As usual, Saturn really blew them away and we heard the usual comments about whether we were tricking them with a photograph. The crew stuck around for while after the kids had to return to their cabin to absorb a few more photons while we had them. This is one of the rare events that we actually get paid for. We were presented a check for $100 for *each* event!

This concludes "Lowbrows On Tour", but certainly not our ongoing public outreach activities. I will report on these activities, but I think the article title is getting old. Stay tuned for a report in August about our 2 events coming up at Leslie Science and Nature Center, and by then, maybe more.

Cherry Springs Star Party 2011

By Clayton W. Kessler

I thought the Lowbrows would like a brief report on the festivities in Pennsylvania this spring. Jeff Thrush and I packed our traveling sales wagon and went off as a "vendor" to this star party. I realize the Lowbrows usually have a fair sized contingent at the fall "Black Forest Star Party" at this same site but we were alone in this springtime trip. Observing wise no one missed much. The "Michigan Nebula" – with added downpour for spice – was present and accounted for. Still – there were over 200 attendees and we managed to have a good time despite the weather!

We arrived on Tuesday evening before the official Thursday start. The field had quite a few campsites set up already as you can see.

We tried to setup our camp in the same location that "Camp Lowbrow" was last fall. Unfortunately the ground was very "squishy" and had about a half inch of standing water on it. On the advice of Conrad from the Harrisburg club we moved up the hill to "higher" ground. (OK – higher by a few inches – it WAS drier)

We should have set up our imaging rigs as this was the best night of the week. We did take the opportunity to move about and look through OPT's – I had some nice views of Saturn in the early evening. After the nice evening I was excited to get setup on Wednesday and the early part of the day was quite nice. By the time evening came around however things were not looking promising so the mount got setup but the scopes stayed in their cases. We had a good time hooking up with fellows we met last fall. Jim, Don and the boys from the Hamilton Ontario club pass on their greetings to all the Lowbrows they met at Black Forest.

On Thursday we setup our booth in the vendor tent. We learned a lot from the other vendors and got some good suggestions for other Star Parties to attend. Despite the low attendance we had a nice steady stream of people through the tent for the entire weekend.

Other vendors present were Astro Gizmos, AstroZap, Sky Stones (Dave was very interesting), Skies Unlimited, Cherry Springs Optics, Wood Wonders (from Pinkney) and Earthwin Optical (Bill Denkmeyer's new company).

Friday and Saturday were very much like Thursday – a little sun, a lot of clouds and some rain. The closest to an astrophoto I got was a cool rainbow shot just before sunset. You can just see a hint of a double rainbow in the wide shot.

It is a little hard to make out but you can see the rain drips on the vendor tent roof. Most of the rain was steady but light and could be mostly ignored.

Saturday night looked like there might be some sucker hole possibilities. We ended up packing and leaving after the door prize drawing as it had been pretty dry all day and was a good time to snatch the camper out of the soft ground.

No report on this event would be complete without mentioning the trip out. We chose to take the route through southern New York. This had good points and bad ones. Interstate 86 was in very poor shape – but it looks like there will be some large re-paving projects that are already started. As is my habit – when we crossed the New York border I started looking for a "Welcome Center" to get a state map. After 20 miles I had about given up when that familiar blue sign showed up in the distance. We pulled off and immediately wondered if we took the correct exit. The drive was wide, well paved and had very fancy lighting on each side. Up ahead was what looked like a high end resort! Once we arrived we were treated to the fanciest and nicest rest area I have ever visited!

Inside were inlayed ceramic floors, fancy oak trim, vaulted ceilings, wonderful rest rooms, vending areas, TV areas with seating and a manned information desk with – yes – maps! This whole thing overlooked a "finger lake" that stretched for miles in each direction with a great scenic lookout in the front.

As we resumed our trip we speculated on the fancy rest area in contrast to the very poor road surface. Jeff made the comment that the next rest area probably wouldn't even have toilets! Sure enough the next rest area sign announced – "No Facillities"!!!

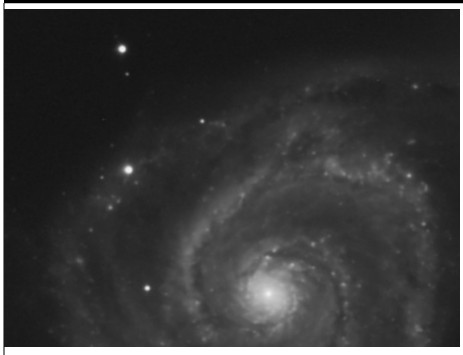
At any rate despite the weather I had a great time and I am looking to returning at the end of August for BFSP.

Supernova in M51 Observed June 1, 2011, 1:43-5:08 UT with 10m exposures and L filter

Frank Freestar8n

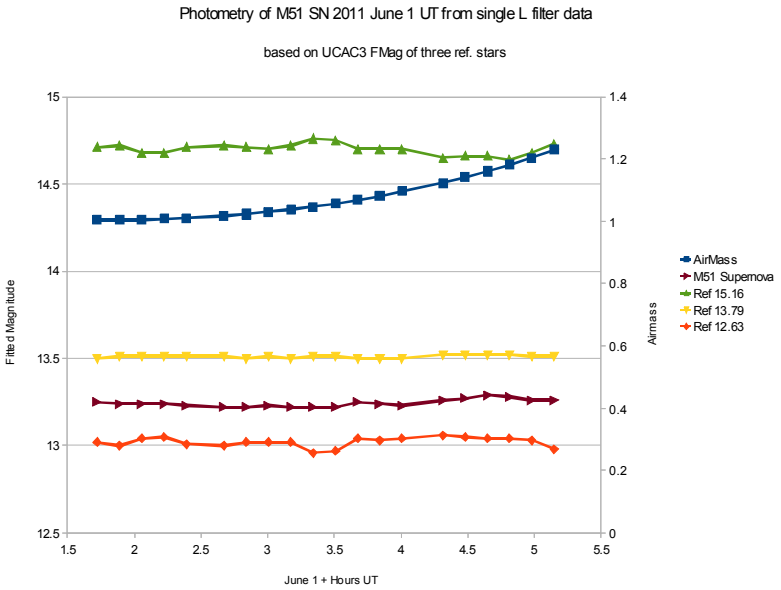
I was imaging M51 with my Celestron 11 telescope on the night of May 31 in the northeast U.S. and fortuitously captured the supernova in 10-minute exposures starting at June 1, 1:43 UT. The images on that evening were all captured with an Astronomik type 2c Luminance filter with approximate bandpass of 380-680nm. This is a write up showing the images and rough differential photometry with nearby reference stars. Based on these measurements the SN was at mag. 13.24 early June 1, and mag. 14.60 early June 4.

This is a color image based on luminance data from 20x10m exposures on June 1, combined with color data captured June 4 from 3x10m exposures in each channel. The camera is a StarlightXpress SXVF-h9 with a cooled, shutterless Sony ICX285 interline CCD.

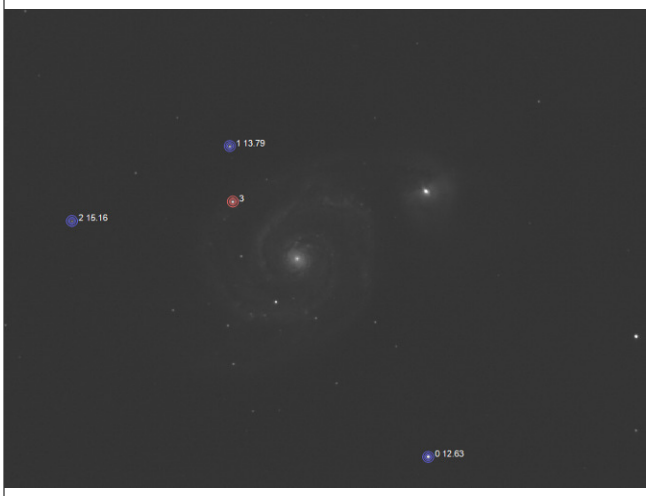


Processed image from Luminance data only – 20x10m June 1, 1:43-5:08 UT.

I estimated the magnitude of the supernova using the 20 luminance exposures based on three reference stars. I used the UCAC fit magnitude, which is based on 579-642nm. The result is shown in the next plot.



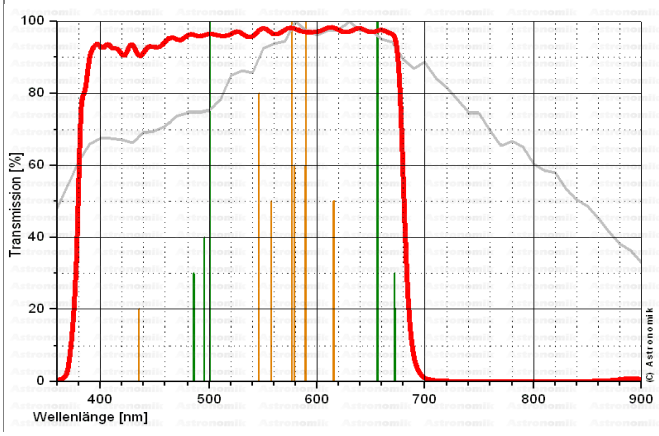
The mean magnitude early on June 1 UT was 13.24, and I measured it again on June 4 with the same reference stars at magnitude 14.60.

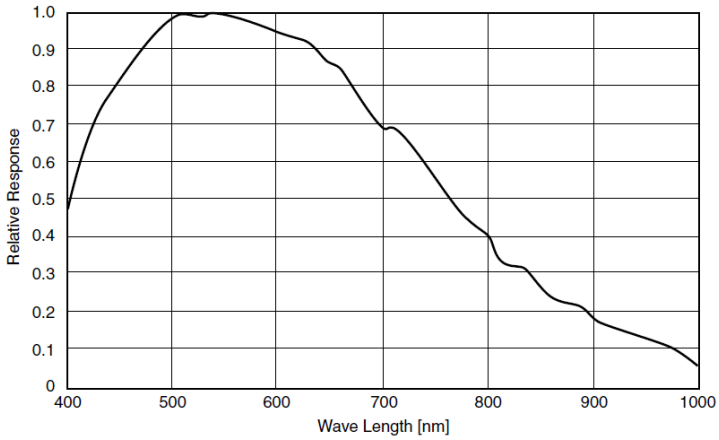


This is a view of the three reference stars, along with their UCAC3 f.mag values.

The SXVF-h9 camera has measured gain of 0.39 e/ADU and read noise of 13.5e. The C11 telescope had an f/6.3 reducer yielding 0.84" per pixel at f/5.7. Conditions were excellent on the night of May 31, with transparent and steady skies at approximate darkness of 19.5 mag/square arc-second. I used off-axis guiding with MetaGuide software yielding approximately 2" fwhm in the 10m exposures. Maxim DL software captured the images. I calibrated the images with bias and flats in Images Plus, with a master dark as a reference for hot pixel removal. I created the master flat as a pure average of 15 dawn flats. Photometry on all stars used an annulus with central radius 5 pixels, gap of 3, and outer radius of 3 pixels.

The Sony CCD has a relative response curve shown by: ———->





Furthermore, the Astronomik Luminance filter has bandpass shown by:

<———

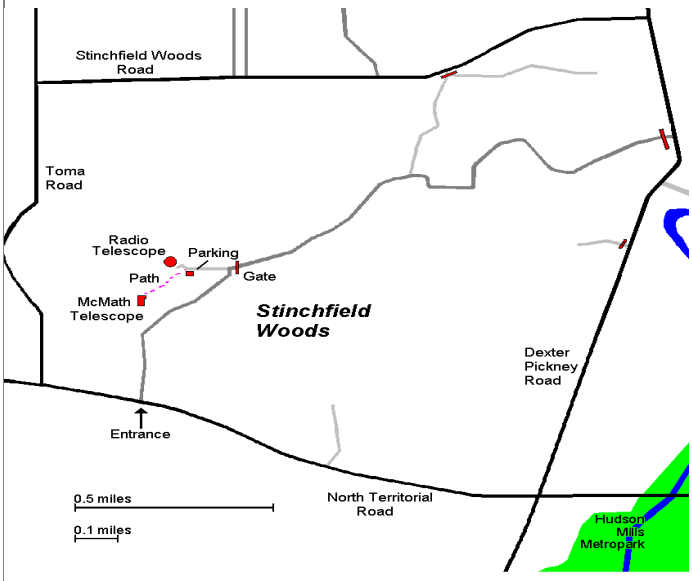
Given the high altitude of M51 during the image capture and its low airmass, it may be possible to improve on the photometric results by appropriate estimates of the spectral response of the imaging system. I can also improve it by calibrating the system using standard stars and photometric filters on another night.

Mark Bialek on the night of June 29, 2011 took this image from the observing field between the radio dishes … during the exposure Mark illuminated the dish with a red flashlight, for this artistic shot!

Places & Times

Dennison Hall, also known as The University of Michigan's Physics & Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. Dennison Hall can be found on Church Street about one block north of South University Avenue in Ann Arbor, MI. The meetings are usually held in room 130, and on the 3rd Friday of each month at 7:30 pm. During the summer months and when weather permits, a club observing session at the Peach Mountain Observatory will follow the meeting.

Peach Mountain Observatory is the home of the University of Michigan's 25 meter radio telescope as well as the University's McMath 24" telescope which is maintained and operated by the Lowbrows. The observatory is located northwest of Dexter, MI; the entrance is on North Territorial Rd. 1.1 miles west of Dexter-Pinckney Rd. A small maize & blue sign on the north side of the road marks the gate. Follow the gravel road to the top of the hill and a parking area near the radio telescopes, then walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.



Public Open House / Star Parties

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mountain observatory, but are usually cancelled if the sky is cloudy at sunset or the temperature is below 10 degrees F. For the most up to date info on the Open House / Star Party status call: (734)332-9132. Many members bring their telescope to share with the public and visitors are welcome to do the same. Peach Mountain is home to millions of hungry mosquitoes, so apply bug repellent, and it can get rather cold at night, please dress accordingly.

Membership

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, $12 per year for students and seniors (age 55+) and $5 if you live outside of the Lower Peninsula of Michigan.

This entitles you to the access to our monthly Newsletters on-line at our website and use of the 24" McMath telescope (after some training).

A hard copy of the Newsletter can be obtained with an additional $12 annual fee to cover printing and postage. Dues can be paid at the monthly meetings or by check made out to University Lowbrow Astronomers and mailed to:

The University Lowbrow Astronomers

c/o Doug Scobel

P.O. 131446

Ann Arbor, MI 48105

Membership in the Lowbrows can also get you a discount on these magazine subscriptions:

Sky & Telescope - $32.95 / year

Astronomy - $34.00 / year or $60.00 for 2 years

For more information contact the club Treasurer. Members renewing their subscriptions are reminded to provide the renewal notice along with your check to the club Treasurer. Please make your check out to: "University Lowbrow Astronomers"

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest.

Call or Email the Newsletter Editor: **Mark S Deprest (734)223-0262 or msdeprest@comcast.net** to discuss length and format. Announcements, articles and images are due by the 1st day of the month as publication is the 7th.

Telephone Numbers

President:	Charlie Nielsen	(734) 747-6585
Vice Presidents:	Jim Forrester	(734) 663-1638
	Jason Maguran	
	Jack Brisbin	
	Belinda Lee	(313)600-9210
Treasurer:	Doug Scobel	(734)277-7908
Observatory Director:	Mike Radwick	
Newsletter Editor:	Mark S Deprest	(734) 223-0262
Key-holders:	Jim Forrester	(734) 663-1638
	Fred Schebor	(734) 426-2363
	Charlie Nielsen	(734) 747-6585
Webmaster	Dave Snyder	(734) 747-6537

Lowbrow's Home Page

http://www.umich.edu/~lowbrows/

Email at:

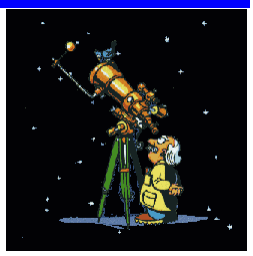
Lowbrow-members@umich.edu

University Lowbrow Astronomers

University Lowbrow Astronomers
c/o Doug Scobel
P.O. Box 131446
Ann Arbor, MI 48105

dugndebi@yahoo.com

Reflections & Refractions



Website
www.umich.edu/~lowbrows/

Just enjoying a look at the sun! Some of our guests from our CLEAR mini-star party in Atlanta, MI — Image by Dave Snyder

University Lowbrow Astronomers
P.O. Box 131446
Ann Arbor, MI 48105

Check your membership expiration date on the mailing label