

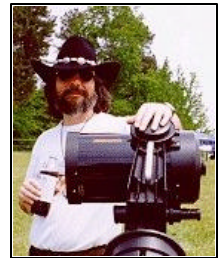
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Skywatch  
1207 Selma Street  
Mobile, AL 36604  
U.S.A.

Rod Mollise's

# Skywatch



## SAFIX IS HERE!

### Spherical Aberration? What Spherical Aberration?

### The Aries SAFX

Rod Mollise



Most active amateur astronomers have heard of the *Chromacor*, the device produced by Valery Deryuzhin at Aries Optical in the Ukraine that purportedly turns an achromatic refractor (especially an inexpensive Chinese achromatic refractor) into an APO analog. This device, I'm told by achro fans, works very well, pretty much doing what it's advertised to do, amazingly enough. There are a couple of catches (there always are): the scope's owner needs to be able to quantify the amount of spherical aberration

present in the objective and order the proper Chromacor for the situation (overcorrected or under corrected or null), and the scope and Chromacor need to be properly collimated with each-other. But neither of these prerequisites is a big problem for someone who can follow instructions and who knows a little about scopes. The Chromacor has been somewhat controversial, yes, but this has more to do with personalities and amateur astronomy politics, in my opinion, than with any shortcomings in the Aries product.

But I'm not really the person who should be talking about Chromacors, since I don't have much interest in refractors, and am certainly not an expert when it comes to them. I own a nice little Short Tube 80 and that is it. I thought the idea of the Chromacor was

somewhat interesting, though, since I am always intrigued by innovative, inexpensive solutions for equipment needs and problems. But I certainly didn't go out and get a Chinese achromat and Chromacorr to play with. Didn't need an Aries doo-dad. But then I heard about the SAFIX

Spherical aberration is something that troubles amateur astronomers no matter which design of scope they use. In any telescope, if the objective, primary mirror, or combination of lenses and mirrors yields a final image that is too much like what is produced by a spherical



mirror or lens, you've got Big Problems in River City. All rays of light will not come to focus at the same point, meaning your images are not and *never will be* sharp. This is the **Hubble disease**, and it affects more amateur telescopes than most of us would like to admit. In the past, spherical aberration was something that just had to be lived with. Unless you could refigure the mirror or objective or have it replaced by the manufacturer, you were stuck. Admittedly, spherical aberration is more harmful for high-power planetary viewing than it is for the deep sky observer, but, as was grimly evident in the pre-servicing-mission HST images, SA, spherical aberration, can ruin any high-power view.

Does your scope suffer from SA? Only you can determine the true facts of the case. And the way to do it is with *star-testing*, observing the



appearance of the diffraction rings produced by a slightly out of focus star on both "sides" of focus, inside and outside. If your scope is free or nearly free of spherical aberration, the rings will look identical on either side of focus. Simple enough. In practice though, things can be a little more complicated. Seeing and scope cool-down must be good before a star-test can be attempted, and, if your scope is not perfect,

determining just *how* imperfect it is can get a little hairy. Patterns produced by obstructed and unobstructed scopes will look different, and there will also be differences in what the star's rings look on either side of focus depending on whether your system is overcorrected (outer zones of the mirror have a longer focus) or under corrected (outer zones have a shorter focus).

Luckily, the basics of star-testing can be learned easily enough. If you're fortunate, there will be an experienced amateur (what we used to call an "advanced amateur") in your club who can show you the ropes in hands-on fashion. If there's nobody like that around, the next best thing is a book, Dick Suiter's *Star Testing Astronomical Telescopes* (Willman-Bell, ISBN 943396-44-1). This is a great book, and every amateur should have a

copy, even if it *does* get a little deep in the first couple of chapters, a little staring at unfocused stars with your scope, and perhaps a few afternoons playing with Cor Berevoets' **Aberrator**, a **freeware**

program that simulates star-test optical problems on your PC (<http://aberrator.astronomy.net/index.html>), and you should be star-testing with the best of 'em.

But so what? You learn to test your scope. You learn to identify and quantify spherical aberration. Your scope has it. What have you accomplished other than to make yourself unhappy and in the market for a replacement for the telescope

that you used to think was good? Until recently, there wasn't anything you *could* do, other than, as above, exchange, replace or refigure. Again, *until recently*. Not long ago, Valery announced that Aries planned to follow-up the Chromacor with something called the "SAFIX." It would be similar to the Chromacor, but instead of removing *color*, this device would remove *spherical aberration!* "SAFIX," "**Spherical Aberration FIX**," get it? That made me sit up and take notice.

I think my telescopes, all eleven of them, are pretty good optically, though none is in the "premium" class. But I'm not a rose-colored glasses kind of guy. I know that all of them display at least a little under or over correction. Or, to put it bluntly, none of them is optically perfect, and all have some degree of SA. But what if I could magically remove all that nasty spherical aberration? And how about all the really problematical scopes out there? How about those 15-20 year-old SCTs still floating around? The Powerstars and LX5s and LX6es that can be had for a song? Something that could potentially bring those 80s Meade and Celestron OTAs that suffer from *Halleyitis* (that is, significant amounts of spherical aberration) back to life? Sign me up!

Some time went by and I didn't hear much more about the SAFIX, but then Valery contacted me earlier this year and asked if I'd like to evaluate one. "Sure," said I. And it wasn't long before I had this supposed miracle-worker in hand, shipped from Aries' U.S. dealer, Astrobuffet

<http://www.astrobuffet.com>

Unfortunately weather, seeing and my schedule conspired to keep me from using the device very seriously for a while. I don't know what's with the seeing down here lately. Here in the heart of Possum Swamp on the hot and muggy Gulf Coast, the seeing can be rock solid for extended periods. But that has not

been the case of late. Oh, it's humid enough, and there are plenty of mosquitoes, but the air has been quite unsettled at higher altitudes, apparently. But with Mars on its way, I knew lots of folks would be very interested in this gadget, so I kept after it, hauling the Ultima 8 and Nexstar 11 out at every opportunity until I had accumulated enough data and experience on the SAFIX to give you an educated idea of its effectiveness.

What did I find inside the box from Astrobuffet? As shown in Plate 1, in addition to the SAFIX, there were extension tubes and a Ronchi tester—more on the latter two items in a moment. Basically, I was impressed. When it comes to scopes, eyepieces and other equipment, what counts is how well something performs optically. But, let's face it, most amateurs—including me—want their hard-earned astro-goodies to look *cool*. Sure, that 35 Panoptic is a hell of a performer, but isn't at least part of the fun impressing your brother and sister amateurs with how awesome it looks? I was a little uneasy about this facet of the SAFIX until I'd had a chance to see one for myself. There wasn't much scuttlebutt about the SAFIX on the 'net. But I did hear a couple of depressing rumors that indicated that the SAFIX looked "rough" or even "homemade." Forget these rumors. That's all they are and they are dead wrong. This Ukrainian-made device is very professionally done. It is attractive and easily equal to comparably-priced gear from the U.S., Japan or Western Europe when it comes to fit and finish. You'll be *proud* to show it off.

How does this thing work? As far as fitting to the scope, the SAFIX works very simply. You use it just like a barlow. It goes in your focuser, and you put your eyepieces in the SAFIX (see Plate 2). But there's one big difference between this thing and a barlow: the barrel is adjustable. It rotates and has a graduated scale marked 1 - 5 on both sides of zero;

allowing you to adjust/apply for over or under correction. It's a little like a zoom eyepiece in its construction.

This barrel adjustment works so smoothly that I was concerned about accidentally moving it off the "sweet spot," the proper setting for a particular scope's degree of over/under-correction, in the course of observing, and wondered if maybe a positive-detent type of adjustment would have been better. In practice, this was not a problem, however. I never accidentally moved the SAFIX off its chosen setting. Again, the feel is great. It was fun just to twist the barrel adjustment back and forth to feel the buttery smooth action.

Actually, the SAFIX differs from a barlow in one other regard. Eyepieces aren't inserted directly into it, but into barrels that screw into the SAFIX body. These barrels come in different lengths for different focal ratios (longer focal ratio telescopes require longer barrels). Aries includes barrels for f/5-7, f/8-9, and f/10-15 in the basic package. I noted that the unit I received did not come with the 10-15 barrel, and contacted Valery. I was concerned since I'd be testing the SAFIX mainly on f/10 SCTs. He told me that unless my scope was really "bad," the f/8-9 barrel should work fine, and indeed it did.

For SCT users, Aries suggests that you may want to use the SAFIX (which, if I haven't mentioned it before, is a 1.25" device) in a 1.25" diagonal in order to keep your scope near its optimum-design focal length. But I don't like 1.25" diagonals. I hate 'em as a matter of fact. Unless I'm using lightweight 1.25" plossls, my eyepieces just never seem secure, especially in the stock Chinese diagonals that Meade and Celestron ship with their scopes these days. So I chose to use the SAFIX in a 2" diagonal plugged into the EyeOpener on the C11 or an Intes 2" visual back on the C8. I did compare results with the SAFIX in a

1.25" setup, and didn't notice any difference.

Looks good, but how easy is it set-up? To adjust for your scope's particular SA "profile?" I was a little daunted at the thought of trying to figure this thing out. Make that scared. I've read Suiter's book, but the nuances of star testing and optical quality leave my head spinning (before the first shot of Rebel Yell, even!). I needn't have worried. It just wasn't that bad or hard. I devoted an evening to getting the feel for adjusting the SAFIX, but you're probably smarter and have sharper eyes than I do and will probably have it nicely tuned-in in 10 or 15 minutes. "Tune" is a good word to describe the SAFIX's operation. Think of adjusting it as being analogous to tuning your guitar.

Yes, before you can enjoy the benefits of the SAFIX you have to "tune up," calibrate it for your scope's degree of spherical aberration. There are two ways of doing this. One is via the star test. Adjust until the outer ring looks the same on both sides of focus. Another way of looking at this, especially the pattern produced by an SCT, is that you should adjust the SAFIX until the outer ring of the diffraction pattern is equally "fuzzy" on both sides of focus. You don't want sharp on one side and fuzzy on the other.

Star test not your cup of tea? There's an alternative. You can purchase a Ronchi grating from Aries (75 US\$ if purchased with your SAFIX). This isn't just a piece of plastic grating material, it is a nicely-made and housed glass Ronchi tester. It's installed in an eyepiece-like barrel, and takes the place of an eyepiece in the SAFIX. It works simply and easily: adjust focus until the characteristic bands-on-illuminated-disk appear—you will normally place the Ronchi inside focus to achieve this—and adjust SAFIX until band are straight. With a

normal grating, you often have to use a green or yellow filter in order to make the bands easy to see, but the SAFIX tester is already tinted yellow so there's no need for a filter.

Which method worked best? Generally speaking, I preferred the star test. It wasn't hard, and seemed more precise to me. But on nights when the seeing wasn't quite what it could have been, the Ronchi came in very handy. While good seeing is critical for successful adjustment, no matter which method you use, I found that I could often adjust the SAFIX accurately under less-than optimum seeing conditions with the Ronchi. Under the same conditions, the star test method just didn't cut it—I couldn't figure out exactly what was going on with the bouncing, boiling diffraction pattern. I would suspect that for many people the Ronchi may be the preferred means of adjustment. Telescope cool-down is critical for both methods. A telescope's degree of spherical aberration will change as the scope cools. However you choose to adjust the SAFIX, once you find the proper setting, you obviously don't have to do the calibration again unless you change scopes. Now that I think about it, during scope cool-down you actually may want to tweak the SAFIX setting a bit for best images, resetting it to your normal value once the mirror assumes its "real" shape. I haven't tried this, but can't think of any reason why it shouldn't work, and it would be a nice side-benefit of the SAFIX.

My experiences, real-life experiences, with the SAFIX in the field? I tested mainly on Jupiter, which is the most "critical" object in the sky—lots of low contrast detail. I started out with the Nexstar 11. The SAFIX did make a difference, but it was only adjusted a short distance off zero. This is NOT a criticism of the SAFIX, but a testament to the good quality of Celestron's optics at the moment. Let me add right here, that just about ANY SCT will have

some degree of spherical aberration. Period. Why? An SCT can only be perfectly corrected for spherical aberration at one spacing of the mirrors. Move the primary mirror (to focus) and the scope MUST become either over or under-corrected. Unless you're lucky enough to have a situation where all your eyepieces come to focus very near this optimum mirror-spacing, which is where an image at the focal plane of a 35mm camera attached to the scope with a standard T adapter (whatever "standard" is) is in focus, you will not be perfectly corrected.

But my NS11 does star test pretty well, no matter how you slice it. Now, my beloved Ultima 8? Well, that was a somewhat different story. I've always thought its optics are dang good. But, no, they are not perfect, or at least not as good SA-wise as those on the NS11. And my use of a 2" visual back/adaptor and 2 inch accessories probably doesn't help, either. The SAFIX definitely improved my views of Jupe in this scope. Noticeably better. It simply made "good" "better." It seemed, especially, to help when seeing was not so hot. I'm not really sure why that should be, but it was what I observed. But the SAFIX improved the images this scope delivered anytime. Yes, I could normally see four or five belts without the SAFIX, but with it in place I was seeing more detail in the belts, their complex edges, festoons, and more. It seemed to make subtle color contrasts more noticeable, too. It also allowed me to use higher powers. As I mentioned above, the seeing hasn't really been that great this year, but when it was reasonable the U8 took 400x plus with aplomb—with the SAFIX riding on the rear cell, that is. Oh, the SAFIX seemed to work equally well with any of the eyepieces I used, from a Nagler to a Chinese Plossl. Naturally, the better the eyepiece the better the image, but that's the case with or without the SAFIX, of course. Images didn't look dimmer

with the SAFIX in place, but it did seem to impart a slightly warm, yellowish tint to Jupiter. I did not find this objectionable, however.

While the SAFIX looks like a barlow, it ain't a barlow. It's nothing like one, optically. And some scopes will have problems reaching focus with it in place. In this regard, don't think "barlow," think "binoviewer." The SAFIX moves the focus-point in, and your scope must be able to accommodate this change. Any SCT or moving-mirror-focusing MCT is home free. There's a big focus change when you insert the SAFIX, but nothing your scope won't handle. Newtonians? I suspect that you'll have problems depending on your scope's focuser/optical setup. It would definitely NOT reach focus with my Short Tube 80 refractor. But I'd guess that many refractors will have the requisite focus-travel. These problems are easy enough to cure, just as you would if you wanted to use a binoviewer—shorten tube, move mirror up tube, go to a low profile focuser, etc.

Do you need a SAFIX? That depends. If you're mainly a deep sky observer using medium powers and 2 inch accessories, probably not. If, however, you are at least moderately interested in the planets—or high power viewing in general—and want to wring every last bit of performance out of your scope, I think you should consider it. This thing works and will help almost any scope. Naturally, the more SA your scope has, the more FIX this will apply. At 450 dollars in the U.S. without the Ronchi attachment, the SAFIX is not cheap, but compared to the prices that many amateurs are willing—nay, EAGER—to pay for top-of-the-line eyepieces these days, it is not bad, either. Actually, depending on your scope and observing interests, this might do more for you than that groovy new Nagler Type XXI. It is well-designed, well-made and is definitely something you can keep and use for the rest of your



observing career. You never know when that Halley-vintage C8 or 2080 will arrive on your doorstep, and, based on my testing I think this little thing can turn the Great Red Spot in one of these sad, old scopes from, "I think I see it" to "OH YEAH!"

Any criticisms? The SAFIX appears to work as advertised, so there isn't a whole lot to criticize. I do note that the review unit I received did not include any instructions at all. A good instruction manual will be critical for many folks to get the most out of the SAFIX—underline that, CRITICAL--and I hope they supply a really well-written one with normal production models. Bottom Line? The Aries SAFIX is a quality piece of gear. I recommend it.

## The 0<sup>th</sup> Annual Great Lakes Gaze

**Tom Trusock**  
[trusock@hatchet.badaxe.k12.mi.us](mailto:trusock@hatchet.badaxe.k12.mi.us)

Imagine a pleasant campground in mid-Michigan, one that is well away from the light domes of Saginaw, Detroit, Lansing and Grand Rapids, and yet no farther

from any of these cities than three hours. The actual star party site sits on a hill, separated from the lights of the campground by a heavy blanket of trees. Now imagine pristine skies, with limiting magnitudes approaching 6.6 on the best of nights. Mere Flights of Fancy™ you say? Well, I can assure you such a place does exist. (Although I can't personally vouch for the limiting magnitude on the best nights – it was a trifle humid this evening.) This little out of the way campground near Gladwin Michigan has become one of the defacto gathering spots for the Michigan\_Astronomy yahoo group, and the future site of a new statewide star party. This past weekend a group of us were up there to meet (many of us for the first time), evaluate the site and observe.

My story begins on a Saturday afternoon, the second day of the gathering. Due to some complications, I had planned on being there Friday, but was unable to attend till Saturday.

As the sun started to set, Mark (who felt privileged to act as our very own harbinger of doom <g>) informed us that there was an excellent chance of us being zipped out this evening – evidently there was a major event

inbound from the sun – it looked like after driving from all over Michigan, to escape the light domes prevalent in the southern lower peninsula - we were still going to be shut out from light pollution in the form of an Aurora! You could hear mutters all around the site. "Dammit – if I want to see light pollution, I'd go to Detroit!" was a common comment among many, each quite vocal in their frustration. Irritation aside though - we could only stand and wait. As the sun set, and the sky turned from light to dark blue in the south, soon we could see a green auroral arc like a curtain in the northern sky – across Ursa Major, through Cassiopeia and beyond. The grumbles grew – folks settled into lawn chairs, and more than a couple of beers were popped. "This damn thing had better be good..." I heard someone mutter.

And then – Jim said – "Is it me, or is there some red there?" And the storm was on. Was it "good"? Well, it was simply amazing. With reds, greens and blues shooting high overhead, it was *easily* one of the best I have ever seen (even including my years in Michigan's Upper Peninsula). Grabbing the camera out of the truck and borrowing a tripod from Jason I managed to get my camera pointed skyward – but unlike Jim, who took some nice digital shots (handheld yet) I won't know what I've got till I get the film developed.

Frankly, it looked to be a spectacular shutout – for an hour or more, nary a person so much as thought about their scope (except perhaps Paul with his new 18" Starmaster – and I think he can be excused for that <g>). I think we all kind of figured this was it for the night. At least we would all get a good nights sleep. But... after a time it started to die down. We turned to each other, somewhat bemused. Were we actually going to be able to observe? Could the astro gods actually be THAT kind? Somewhat tentatively at first, as if





we didn't really trust the skies, scopes were uncovered, eyepieces hauled out and equipment cases opened. Occasionally we would turn and glance north as if we, by a mere look, could ensure that the aurora wouldn't intrude on us again. Irregardless of our wary glances, it was kind enough to remain quiescent for the remainder of the evening.

As the observing began in earnest - here and there you could hear the coffee grinders as the LX200's started up and slewed to targets. From the far end of the field I could occasionally hear Paul shout: "Oh... MY... GOD!!!" and laugh like a kid with a new toy. (Which, of course, he was.) I'd guess that an 18" Starmaster can provide a fair amount of happiness - I know his did for me this evening - I can only imagine what joy it can bring to the lucky owner. Me, I had the chance to find out what happens when you plug your encoders in backwards, and then proceed to leave the DSC turned on for a couple of days ( I'll give you a hint - not much. )

Jason, Joe and I had all setup somewhat near each other. Joe was on the south end of our little "refractor row", I was on the north and Jason in the middle. (Later Mark brought over his homemade 83mm achro to complete the gathering.) We were curious about how Jason's VX102FI would compare to my TV102, and how Joes little 6" Zambuto dob would stack up to both. Jason and I discovered little difference optically between our scopes (once Joe had loaned him an AP Maxbright to make up for my Everbright - the 8% (or so) difference in reflectivity between his Antares and the MaxBright was quite evident), it really was pretty much a draw between them. Mechanically, the TeleVue came out a little ahead. Jason and I both liked the TV focuser much more than the one on the Vixen - I can still hear Jason trying to figure out how to get AI to

put the TV focuser on his VX102. The TV102 was quite a bit smaller (and lighter especially if you take into account the extra money gone from my pocketbook after the purchase <g>).

M13, the double double and Saturn were the comparison targets through my TV102 and Jason's

side, he recently bought an alt-az mount for grab and go with his VX102, while I've acquired a small GEM. Truthfully though - there were no losers in this competition - unless you count the folks that weren't able to make it up for Saturday night and missed the views.



VX102fl. In either scope, there was about as much resolution of m13 as I've seen in a 4" refractor. The double double was an easy split even at comparatively low powers - 92x for Jason (10mm radian) and 97x for me (9mm nagler). That Vixen is quite a scope. Then towards morning, we got a chance to see a spectacular tack sharp Saturn in both APO's, and in Joe's little apo-eater. In case you are wondering who won the little shootout, for several reasons, I flatly refuse to call it (optically) between the Vixen and the TeleVue. I will say that I felt the 6" dob was a worthwhile surprise contender and while it didn't exactly wipe the floor with our APO's, it made it's superior resolution known. I will also say that Jason's GP mount is sure a lot friendlier for targets at 300x than my telepod - I got to play "catch the speeding Saturn", while Jason sat back and gave me a hard time about my DSC's <g>. On the flip

Joe was gracious in loaning me his 31mm nagler to compare to my panoptic 35. In the tv102, (from this site anyway) the differences weren't nearly as obvious as I thought they were going to be. I actually breathed a sight of relief. I had assumed that once I had a chance to look through the vaunted Nagler 31mm nothing else would do. But honestly, for me - while the Panoptic 35 is not quite as spectacular, it does the job well enough. OTOH, I think I cost Joe a few bucks when he borrowed my 3-6 nagler zoom later in the evening. Jason's 30mm LV was the surprise entry and certainly the "best buy" out of all three - sharp, great contrast, and costs about 1/3 of the Panoptic 35 (to say nothing of the Nagler).

At one point during the evening, I wandered over to Dale's 10" Meade LX200 while he and Mark were studying a large low surface brightness galaxy. (Bernards Galaxy

if I remember correctly.) They were wondering if they had nailed it. As someone who spends a fair amount of time with a pitifully small amount of aperture looking for extremely dim things, I could see that there certainly was an almost granular brightening toward the center of the field. It almost looked like vingetting, but pretty clearly wasn't. I returned to Dale's SCT a couple of times over the evening and was rewarded with a great view of M42 with a UHC filter and one of the best views of Saturn I have ever seen an SCT provide - evidently no one told it that it wasn't supposed to be able to do that. Rumor is Dale's got that scope up for sale for a really good price. If I needed another 10" scope (and if my wife wouldn't shoot me if I came home with it), I'd certainly be interested.

Paul's 18" Starmaster was understandably a popular scope, and presented me with one of my best ever views of M57. Stars were found throughout the field, and the thing that amazed me was the amount of structure on the ring itself. Little tattered remnants of nebula strung here and there along the edges of the ring. It was quite spectacular. Several folks glimpsed the central star in the 18", but interestingly enough, I didn't see it. Perhaps I didn't take a long enough look, or the seeing was bad during my turn. The 18" Starmaster also provided me with an excellent wide field view of NGC7331 and just off to the side, in a curled row, lay a very, very tiny Stephen's Quintet. Later the 18" was to provide me with one of the best views of M13 I've seen. Countless stars simply filled the FOV, w/ the propeller CLEARLY visible. I'll restate the obvious here and say that Carl Zambuto and Rick Singmaster do good work.

Wandering down to Mark's water heater (ummm I mean - 16" inch dob), I was treated to an oval M27 - the nebulosity between the extensions was brighter than I've ever seen. Here was where I got

one of the bigger surprises of the night - where I didn't see the central star in m57 with Paul's Starmaster, I did catch a couple of fleeting glimpses in Mark's 16" dob - I have a feeling I just didn't spend enough time with the Starmaster. Mark's little 83mm homemade refractor also threw up some wonderful low power views.

Drifting over to Joe's scopes (the ones that actually HAD mounts <g>) I took a peak at the double double through his 7" Mak - to be honest, it was a nice view but I wasn't all that impressed with it. It wasn't bad but not as nice as some of the other optics on the field. (There were a TON of good optics on the field - everybody had brought their Sunday best.) OTOH, I was extremely impressed with Joe's little 6" dob with the Zambuto mirror. It was the first time I've ever made an offer for a scope on the spot, I was only half joking - I still don't know what I would have sold if he had said yes, but figured there was little danger of that (I would have found a way to sneak it in the door, it's a lot smaller than Dale's 10" SCT). I knew what he paid, and offered him more than that - and he laughed at me. I don't blame him a bit. It was an \*extremely\* nice little scope, and he would have been nuts to part with it for what I offered him. I gathered Joe felt the same way.

I missed getting a chance to check out the views through Pat's 12.5 - I think he was out doing the same thing I was for most of the night - bumming views off other folks scopes. Nearly every time I ran into him (with the exception of the gab session in the middle of the night) that's pretty much what he was doing and I don't blame him a bit. (How could I since I was doing the same thing?).

I also never got a chance to try Tom's 1x90, but I do want to thank him (and Joe and Jason) for the loan of their electricity and "dew guns". Man, that had to be one of

the most humid nights I've seen. Next time I head up there, I'll have a dew gun of my own.

Unfortunately Bob wasn't feeling too well, and slept for part of the night - only coming out of hibernation in time to witness Saturn. I missed the chance to look through that big Discovery of his, but I certainly hope he's feeling better - I'll catch up with you sometime soon on that big dob, Bob. Some time early in the morning, he cussed at Jason and I while he voiced his interest in joining the "I paid way too much for 4" of aperture" club (as for me, "I'm not only a member, I'm the president"), while simultaneously (and humorously) trying to figure out exactly how to break it to his wife.

About 1:30 things slowed down for a few of us and we sat around and swapped stories trying to stay awake for Saturn. Even though I had just met most of these folks, I knew I was surrounded by friends. Great guys, every one and making your acquaintance (again for some) was a pleasure. Thanks everyone! (Just in case I forgot to say it while I was there).

When Saturn cleared the tree line the pace picked up again as folks lined up behind the APO's and Joe's unassuming little dob. As Saturn climbed higher and higher we were able to just pour on the magnification and I was privileged to see some of the best views of the ringed planet I had ever seen. The TV102 was in its glory, the Vixen was strutting its stuff, but without a doubt Joe's little dob was simply amazing. All three showed great color on Saturn, banding across the surface, and the rings - my god, the rings... the Cassini division seemed big enough to drive a truck through (arguments on SAA notwithstanding), the Crepe ring made it's shadowy appearance and the Encke minima could even be glimpsed.

I can't tell you who was the last one awake – I chickened out of waiting for Jupiter and left sometime after Orion had cleared the horizon – sometime around 4am. I should have stayed though, as I lay in the camper trying to sleep, images of Saturn just kept popping into my head. I was thinking too about the night and the scopes I'd seen. If it had been my place to give awards, Joe would have to get the "Best Buy Award" for that little Zambuto gem he found, Jason would get the runner up "Best Buy Award" for that nice little Vixen Apo, I'd probably get the "I paid way too much for 4" Award" for my TV102 and Paul would have to be the proud winner of the "I paid too much for my 18" for his awesome 18" Starmaster. (Don't be fooled for a moment though – I know I feel my TV102 was worth every penny, and I'm sure Paul feels the same about his Starmaster.) Which was the best scope on the field? I honestly can't pick. You might as well ask who the nicest guy on the field was. With thoughts of scopes, DSO's and Saturn drifting through my head, I finally drifted off for an hour or so sometime after the sun came up.

Clear Skies

Tom T.

*For more information on the upcoming Great Lakes Gaze (September 26, 27, and 28, 2003), including speakers, schedules and fees, see <http://www.boonhill.net> or contact [trusock@hatchet.badaxe.k12.mi.us](mailto:trusock@hatchet.badaxe.k12.mi.us)*



## The Next Generation Of Nexstar GPS Telescope Control: *hcAnywhere*:

by Jeff Richards

### Background

In late February of 2003, a good friend of mine, Mike Zeidler, from north of the border asked me if I would like to be involved with beta testing an exciting new software package. This software would allow for complete computer control of the NexStar GPS series of telescopes without a hand controller! I was intrigued needless to say, and gladly accepted the invitation. Mike introduced me to the software authors Andre Paquette and Ray St.Denis. Ray and Andre then proceeded to explain the goal of this new software package was to fully emulate all the functions of the hand controller for the NexStar GPS and iSeries telescopes while residing entirely on your computer.

I downloaded the software package and installed it on my Dell Inspiron 8100 laptop. The interface is a complete replica of the NexStar hand controller and operates exactly the same. The software shows remarkable attention to detail and even mimics the button presses when buttons are selected with the mouse. You have two options to connect hcAnywhere to your telescope. You can connect the serial port of your computer to the

PC Port of the telescope base using a programming cable. With this setup, you do not need to connect the real hand controller to the telescope as hcAnywhere will directly control the motor controllers in the telescope. The programming cable is the same one used for updating the firmware in the telescope and is available from a number of sources. Celestron is currently offering this cable free of charge to NexStar GPS owners through June 30, 2003. Alternatively, you can use a standard serial cable to connect the computer's serial port to the bottom of the telescope's hand controller. This arrangement is particularly useful for the iSeries NexStar telescopes that do not have a PC Port.

Every command and menu option that is available to the real hand controller is available to hcAnywhere. You can store user items and calibration results just like the real hand controller. This means that hcAnywhere must be trained just like the real hand controller (i.e. calibrate north, calibrate level, and backlash settings). These items are stored on your hard drive in the hcAnywhere file for quick access by the program. In other words, if you can operate the real hand controller you can operate hcAnywhere.

hcAnywhere is an awesome package for the astro-imager. You can control every function of the telescope directly from your computer with a single cable. For instance, now you can sit comfortably and relax during those imaging sessions without having to get up to go to the telescope to change autoguide rates or start Periodic Error Correction playback. No longer will you have to try and read a sluggish LCD display on those cold winter nights. hcAnywhere will help to make you more productive during those precious few hours available for imaging. hcAnywhere also simplifies the cable cluster created in a normal



imaging set up. You don't have to have the hand controller stuck in between the cabling from your computer to the telescope. One simple cable to the scope is all that's required.

So you find this somewhat mundane? What good does this do if all it does is replace the hand controller? Well it doesn't stop there. The boys up north have been able to include every possible option the beta testers asked for to make hcAnywhere more capable and user friendly.

### Wireless Control

Here's where the fun starts. hcAnywhere can be controlled with a wireless Logitech Wingman game controller. Imagine having a controller in your hand that does not have a wire connected to it. Your hands no longer have to be tethered to the telescope to control it. Almost every usable feature of the hand controller can be operated with the multiple buttons on the Wingman. The following important buttons are available with the Wingman: Align, Enter, Undo, and Info. The right joystick controls the telescope's movement just like the movement buttons on the hand controller. The six action buttons on the top of the Wingman allow you to select the slew rate to work with as well as the ability to toggle between four different usable menu options: Menu, Object List, Planet List, and "Take a Tour".

### Custom Tours

The tour function of the real hand controller has been expanded to allow the user to select from the

factory Celestron tour or from any number of other tours that the user can create. A separate but integrated program, called hcTour, will allow the user to build numerous custom tours from a filtered list of the stored NexStar database. hcTour also allows the user to import other tours as well. You can now create and share exciting astronomical tours with your other NexStar buddies!

There are numerous filters that allow the user to determine how best to cut the enormous database down to a useable size. Each filter can be selected individually, and the data can also be sorted by the desired column. You can edit information for an object contained in the database to give you more flexibility in creating your tours. You



can switch filters while creating a tour to allow you to completely customize an evenings observing session. Items can be added to your tour individually or by using the standard Microsoft conventions for multiple items (control + left click or control + shift to set the range of multiple items). The database includes the over 40,000 objects included in the NexStar hand controller memory and new entries can be made or imported by the user.

hcAnywhere is capable of selecting any number of tours stored in the

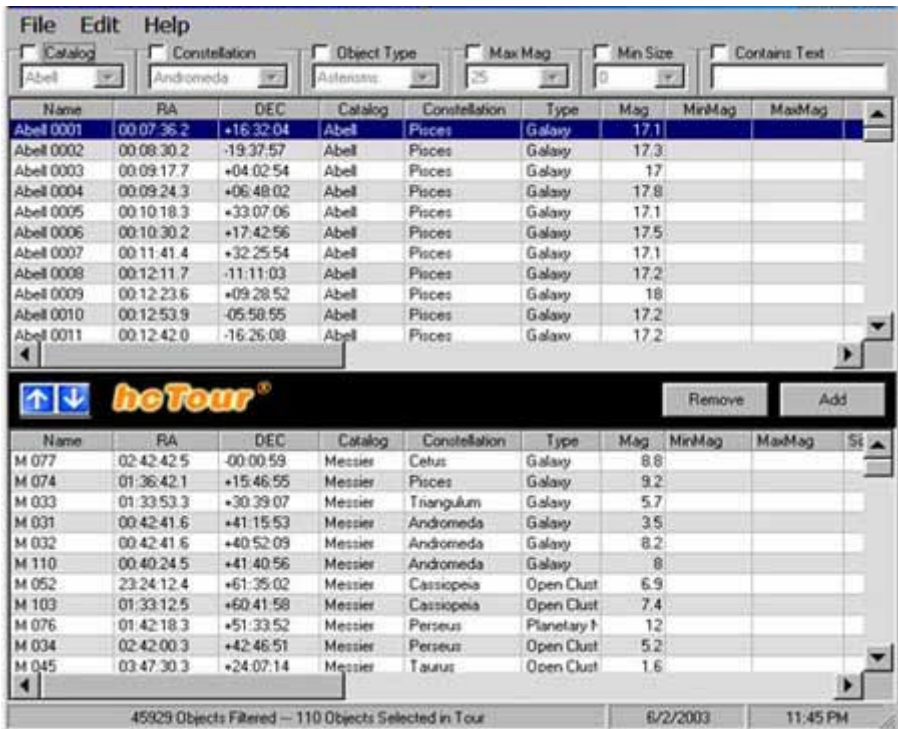
tour folder. Each tour has a limitation of 200 objects, but there is no limit to the number of tours accessible to hcAnywhere. These tours can be posted to user groups and easily exchanged between users.

Numerous standard tours are already available on the Astrogeeks website (<http://www.astrogeeks.com/>) and more will be added as users send them in for sharing. Expect to see these tours show up in the [Cloudy Nights NexStar GPS Telescopes forum](#) as well.

### hcAnywhere Speaks!

So now you're thinking that it will be a pain to have to go back and forth to look at the computer to figure out what you are doing, right? Well Andre and Ray have thought of that as well. They've embedded Text to Speech in hcAnywhere that allows it to talk to you. This is where the software really shines (as if the other items aren't good enough!). Every scrolling text that is displayed on the hand controller is now spoken to you by the computer. You never have to look at the hand controller when doing an alignment. The program [speaks](#) to you to guide you through every step. The default voice is "Mary", but the package also includes "Mike" and "Microsoft Sam". I have found that Mary does the best job of correctly speaking the various astronomical terms.

Imagine a viewing session with the kids with Jupiter as the first target object. You select Jupiter from the Planet List. hcAnywhere tells you it is acquiring Jupiter and lets you know when the object is centered. Press the Info button and hcAnywhere tells you all the pertinent facts about Jupiter. No longer do you have to read from the



scrolling text when you need to answer that question “you should know the answer to”. hcAnywhere will tell the kids exactly what they want to know. Speech can be turned off for those late star parties where you don’t want to bother the neighbors.

Even when speech is disabled, hcAnywhere makes it easier to read the information stored on an object. Instead of having to read a scrolling display, just place your cursor over hcAnywhere’s display and a bubble will pop up showing all the text in simple paragraph format.

**Planetarium Software**

Ray and Andre didn’t stop there. hcAnywhere has a built in virtual serial port that gives any software package that connects to the telescope the ability to connect directly to hcAnywhere. From the settings screen, you tell hcAnywhere what communication port number to create. The virtual com port established is clearly displayed at the bottom of the hcAnywhere hand controller.

When you open your planetarium software (TheSky, Starry Night Pro, SkyMap Pro, etc), just tell it to connect to this com port instead of

your computer’s serial port. You will now have full robotic control of your telescope using your favorite planetarium software with the interface residing completely inside your computer.

**The Downside**

Too good to be true? Well there are some limitations. hcAnywhere is a fairly intensive program and runs best on computers with at least a Pentium III processor and with speeds of at least 450 MHz. It is a Windows based program and will not run on Macintosh or Linux computers. The virtual serial port also requires a Windows NT based operating system such as Windows XP or Windows 2000. To make the program realize its potential, it is highly recommended that you purchase the Wingman wireless controller to take full advantage of all the features of hcAnywhere. The Wingman is indispensable as it is almost impossible to complete an alignment routine while walking back and forth to the computer. This will add about \$40 to the cost of the program. hcAnywhere requires a cable to connect your computer to your telescope so care must be exercised to prevent damaging this cable or tripping over it in the dark. Hopefully full wireless control can be

implemented with the next version. Since hcAnywhere is not a full screen program, it’s night vision mode will leave the wallpaper visible on Xp computers. This means that you will have to set your wallpaper to "none", or a dark image, in order to make the night vision mode most effective.

**The Particulars**

hcAnywhere can be downloaded from the Astrogeeks website. The program is fully functional for a 45 day trial period. The \$59 registration fee provides continued use of the full feature set (speech, custom tours, wireless gamepad, virtual serial port). The basic hand controller functions will continue to work in the unregistered version.

**Summary**

I have been thoroughly impressed with hcAnywhere. It’s fun to use and the kids will get a kick out of the speech function. Anything that helps to grab the attention of the young about astronomy is wonderful in my book. I also like the idea of having a “spare” hand controller available while I’m attending those week long star parties. I think hcAnywhere would be a big hit at functions like Astronomy Day or other public star parties. I give hcAnywhere my highest recommendation.

**Remembering the Maria**

**Chuck Taylor**

As to the introductions below, some of my notes are corny, but for those finding their way around the moon for the first time, you will find they help the names to stick. I apologize to those who already know these names and need no helps to remember them. But some on the list are struggling to remember which Mare is which

and even a dumb and corny line helps it stick in the memory.

**MARE CRISIUM**

For many, in any test, the first question is the hardest. In fact, for those with a fear of tests, it can be a real crisis. And as the new moon starts to wax, the first of our maria to become totally visible is Mare Crisium, the Sea of Crisis. This should help make it easier to remember. It appears as an oval, but this is due to foreshortening. In fact, it is out of round in the other direction, being longer east-west than north-south.

**MARE TRANQUILLITATIS**

By the time you have half of the moon illuminated, a set of seas appears. Although it is not the "official" rabbit, I always see the Sea of Tranquility as the head of a rabbit, with the Seas of Fertility and Nectar as the ears. For those of us who remember 1969, this is a special place as in was there in Mare Tranquillitatis that we as a race first walked on the moon.

**MARE FECUNDITATUS**

Red Skelton told the story of two rabbits who were chased into a briar patch by a pack of wolves. The first rabbit turned to the second and said, "Do you want to make a break for it or wait a bit until we outnumber them?" And what could serve as the first ear of the rabbit to appear (as the moon grows from the New Moon) but the Sea of Fertility?

**MARE NECTARIS**

By now you can taste the sweet taste of success as you recognize the Seas of the Moon. And so, the second ear of the rabbit is the Sea of Nectar. In Lunar history, the Nectarian Period is about 3.9-3.8 billion years ago. It started with the impact that formed Mare Nectaris and ended with the Imbrium basin

being formed. For the most part, anything older than Nectaris has been obliterated by the bombardment of the Nectarian Period.

Sinus Iridium, Pico, Vallis Alpes and many other fine sights ring this magnificent basin. It's almost more than you can imagine, but imagine Imbrium and the alliteration will help



**MARE SERENITATIS**

Going back to the image of the bunny rabbit with the Sea of Tranquility as the head, we come now to the body. And with that, we have a stuffed bunny rabbit, ready to sit on a child's bed. And what could be more serene than an image like that. And so, the body of our rabbit is the Sea of Serenity, Mare Serenitatis.

the name stick. The basin was formed by a massive impact approximately 3.85 billion years ago, marking the close of the Nectarian Period. This was the end of the heavy bombardment that formed the big impact basin that later filled with lava to become the seas we know and love. Other than Orientalis (which doesn't show well from earth) the Imbrium is the youngest of the big basins. The Nectarian Period was followed by the Imbrium Period, which is when the basins flooded.

**MARE FRIGORIS**

As the month continues and the moon becomes gibbous, a new sea appears, near the very top. If this were the earth, since it is near the pole, it would be frozen. And so we come to the Sea of Cold, Mare Frigoris (think "frigid").

**OCEANUS PROCELLARUM**

While the others are "Seas," only one is big enough to be the big ocean and that is Oceanus Procellarum, the sea of storms. This giant structure will be the last of the seas/ocean to remain as the moon wanes to a small crescent.

**MARE IMBRIUM**

From day 9-13, The Sea of Rains puts on a fine display. Plato. Archimedes,

**MARE NUBIUM**





Out of the Ocean of Storms blows the Sea of Clouds, Mare Nubium, heading towards Tycho. If you think of Tycho as the very new crater with the impact site being hot and needing to be cooled down, it makes sense that the clouds should blow over it to cool it down (or are they clouds of steam formed by the heat of the impact?)

star parties that it is a real hit to point out where Neil Armstrong and Buzz Aldrin first stood on the moon).



## Invisible Tornadoes

By Tony Phillips

The biggest problem with tornados-next to the swirling 300-mph winds-is that it's hard to see them coming.

But soon scientists will be able to foresee, not merely tornados, but the severe storms that spawn them, hours before there's even a cloud in the sky! Mind you, this isn't a vague "30 percent chance of rain today" type forecast. Thanks to a new satellite technology being co-developed by NASA, NOAA and the U.S. Navy, emergency personnel will actually watch the invisible beginnings of a storm unfold.

"They're going to know where the storm centers are forming before the storms are there," says James Miller, project manager for Earth Observing 3 (EO3), a satellite that will test out this new technology in 2005 or 2006.

Unlike the tiny water droplets that make up clouds, the water vapor that feeds storms is invisible to the human eye. Water vapor is easy to detect, however, at infrared (IR) wavelengths. EO3 will use an IR-sensitive device called GIFTS-short for Geosynchronous Imaging Fourier Transform Spectrometer-to make 3D movies of temperature, pressure, and water vapor in Earth's atmosphere.

Three or four hours before the storm clouds are visible, meteorologists will notice water vapor converging toward an area. This water vapor, which provides the "fuel" for the coming storm, is too close to the ground for

today's weather satellites to see. Then meteorologists will check precisely how the air temperature over that area varies vertically (something else ordinary satellites can't do). This temperature variation determines whether the humid air will rise to form storm clouds. And when these conditions look ominous, the meteorologists can alert the public.

The goal of EO3 is to "test drive" this new technology and prove that it works. If successful, NOAA plans to incorporate GIFTS-style sensors into its next generation of weather satellites.

These future satellites will give meteorologists exactly what they need in order to give the people exactly what they need: an earlier warning that tornados may be on the way.

GIFTS and EO3 are managed by NASA's New Millennium Program. NASA and NOAA will operate EO3 during its first year in geosynchronous orbit above the United States. If the technology works as planned, the U.S. Navy will assume control of EO3, move the satellite to a point above the Indian Ocean, and use it to monitor weather in shipping lanes there.

For adults, the EO3 web site at <http://nmp.jpl.nasa.gov/eo3> has more about the mission and the GIFTS instrument. For children, The Space Place web site at [spaceplace.nasa.gov/eo3\\_compression.htm](http://spaceplace.nasa.gov/eo3_compression.htm) has a jazzy, interactive "squishy ball" demo of the data compression methods that will be used on EO3.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

### MARE HUMORUM

Finally we come to this little sea. And for the bad puns and corny stories, we have the humor of Humor. And as you can see, it is the smallest Mare we have mentioned, appropriate for the little bit of actual humor contained in my lame and corny depictions. Actually, the Latin term means the Sea of Moisture, which is appropriate since it lies between the Ocean of Storms and the Sea of Clouds.

There you have it, the Big Ten we start with:

1. Mare Crisium
2. Mare Tranquillitatis
3. Mare Fecunditatis
4. Mare Nectaris
5. Mare Serenitatis
6. Mare Frigoris
7. Mare Imbrium
8. Oceanus Procellarum
9. Mare Nubium
10. Mare Humorum

For those still trying to remember which is which, tape a map up on your bedroom wall. If you don't have a small map, find a photo of the full moon on the Internet and print it out. Then tape it on the wall, where you can't read the names. In a few nights you will have them down pat. For the moon, these are the equivalent of the constellations. Later, when you are looking for Proclus and someone says it is dead center between Mare Crisum and Mare Tranquillitatis, you will know exactly where it is. And just being able to locate Mare Nectaris and Mare Imbrium allows you to point out these two major epochs in lunar history. (You will also find at





**IMAGE CAPTION:** This severe tornado hit south of Dimmitt, Texas, on June 2, 1995.

## Down with Love!

Rod Mollise

*"Hey, Rod and other SCT historians: that is a Celestron shown in the movie "Down With Love," but the movie is supposed to be set in 1962. Could this scope have existed then?"*

So...it's CAT history you want?! Stand back while I look in the archives! <Rod turns the huge winch--a mechanism that resembles that seen in the original Frankenstein movie--that pulls open the trap door leading to the CATacombs deep, deep beneath Chaos Manor South>

Let's see...1962 was really just a tad early. If you look at the March '63 Sky and Telescope (you *did* keep your copy, didn't you?), you'll see that the cover story was about Tom Johnson's prototype 18.5" SCT.

But it didn't take him long to start things up. Sky and 'Scope for January '64 holds the first Celestron ad. Well, actually not "Celestron" or even "Celestron Pacific." At this point, Mr. J. was still using the name "Valor Electronics." The advertised scope is a 20 and it looks sweet on its big fork mount with dudes in white coats hovering over

it. The scope in question, the CELESTRONIC 20, was a combo type-interchangeable secondary affair with a Schmidt Camera focus, a Newt focus and SCT focus.

As for the cute baby featured in the movie (the *Celestron*, not *Ms. Zellweger*, I mean!), the CP C10, it was later still, as the next scope after the Celestronic 20 was the storied C22. It was December '64, in fact, before the (f/12) C10 appeared. It was "cheap" in today's terms as far as the dollar figure, \$1670.00 (without pier/wedge), goes. But...well...imagine just how much that was back in '64! That was about half the price of a 1965 Ford Mustang. Or the full price of a lowly VW Bug!

So, in answer to your question, the C10 in the movie was a wee bit of an anachronism. But maybe the well-heeled "Tony Randall" character paid Tom Johnson big bucks for a C10 prototype!



Going to a party — Star Party, that is. This photograph illustrates the compactness of the complete Celestron 10 (clock drive and tube assembly). Even compact car owners can now enjoy a large telescope — the instrument will ride nicely in the bucket seat of your compact car.



# My Back Pages

"Crimson flames tied through my ears  
Rollin' high and mighty traps  
Pounced with fire on flaming roads  
Using ideas as my maps  
"We'll meet on edges, soon," said I  
Proud 'neath heated brow.  
Ah, but I was so much older then,  
I'm younger than that now."



*Nothing warms the heart more than the traditional Summertime American family vacation. Unfortunately, those two scoundrels, Beavis and Butthead had decided that our trip to Nashville's ALCON 2003 must sure include them. What to do? I needed that hermetically sealed mayo jar (kept on Funk and Wagnal's porch for a fortnight). So I put up with seemingly thousands of miles of: "Heh-heh," "Dillweed," and "You Suck" emanating from the backseat. But it was worth it for another dose of...*

## Rumours

**We try to restrict ourselves to breezy rumors** about the astronomy world, but sometimes the sad and serious intervenes. We received the following with sadness and a great sense of loss:

"On June 4, 2003, the amateur astronomer community lost one of its most distinguished members with the passing of Thomas Roland Cave III. Cave, who was a lifelong planetary observer and a world-renowned [telescope](#) maker, died of cardiac arrest and complications from diabetes.

Born in Kansas City, Missouri, on February 3, 1923, Cave spent his first six years in Pittsburgh, Kansas. His family moved to Hollywood, California, in 1929, and then to Long

Beach, California, just in time for him to start seventh grade."

Most people, naturally, think of Tom Cave as the maker of fine reflecting telescopes. The commercial and critical success of the Newtonians, especially, he made in the glory

years of the 50s to the 70s is undeniable. But that's only part of the story. Tom was an active planetary observer of high skill, and those of us whose special love is the Solar System will really feel the loss of his contributions to our field.

**On a happier note**, Celestron has finally released the software that will allow Nexstar users to upgrade their telescopes' firmware over the Internet. This had been promised for a long time, and the Nexstar troops were starting to get restless, to put it mildly. But not only did they release it with an apology from Rick Hedrick for taking so long, Celestron offered everybody who asked for one (via email) a free programming cable (required to update the scope from a PC) through June 30. That definitely put the NS gang back in a good mood vis-à-vis Celestron!

Big issue, and we're out of space and time for now, but check in next time for more of the same—if you dare!



*Lunar Eclipse: Courtesy of Kent Sauter, Mobile Astronomical Society.*