May 2007

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S*T*A*R
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http://www.starastronomy.org

May's Meeting

The next S*T*A*R club meeting will be 8 PM Thursday May 3, 2007 at King of Kings Lutheran Church, 250 Harmony Rd. in Middletown.

The speaker is Ed Carlos, and his topic is "Measuring Galaxy Mass Using the SDSS Server".

Editor's Note

Thanks to Randy, Ernie Rossi, and John Batinsey for sending in Spectrogram material this month, and a special thanks to Randy for writing the Events and other articles for every issue this year. Please send in more articles, everyone!

I will edit next month's issue and then I will be off to college, so please step forward and volunteer to take the reins of the Spectogram! Like the hobby of astronomy, editing the Spectrogram can take up as much or as little time as you put into it.

June Issue

The deadline for the next edition of the *Spectrogram* is Wednesday, May 30th. Please email any contributions to Daniel_handlin@hths.mcvsd.org, As always, any and all contributions are welcome!

HST Image of Carina Nebula Dust
Image credit: NASA/ Hubble Heritage Team

Calendar

Sep 7, 2006 - – Clif Aschraft – "Restoring the Tuthill Telescope"

5 Oct, 2006 – Dr. Kenneth Kremer – "Exploring Mars and the Search for Life"

2 Nov, 2006 – Dr. Sebestien Lepine – " The Search for Nearby Stars"

7 Dec, 2006 – Kevin Kilkenny – "New Horizons' Journey to Pluto"

4 Jan, 2007 – Daniel Kirby – "Pirates of the Solar System Caribbean"

1 Feb, 2007 – Gavin Warnes – "Collimating your Telescope"

1 Mar, 2007 – David Britz – "Motions of the Earth and Moon"

5 Apr, 2007 – Dr. Eric Lerner- "The Big Bang Never Happened"

3 May, 2007 – Ed Carlos - "Measuring Galaxy Mass Using the SDSS Server"

7 Jun, 2007 – AGM Business Meeting

Image Courtesy NASA

Barred Spiral NGC 1672
Image courtesy NASA/ Hubble Heritage

Launch of STS-104 (Atlantis)
Image courtesy NASA

R. Erik Zimmermann, Ph.D. Memorial

By J. Randolph Walton (Randy)

A memorial for Erik, ASTRA's first leader and a speaker at STAR, is planned for May 19 (Sat) from 3:00 PM to about 5:00 PM at the OCC Planetarium. Light refreshments will follow the service. The program is still under development, but there will be time for ASTRA members and others to say a few words about Erik. More information is to follow on the A.S.T.R.A. Message Board. You can read about Erik at http://www.astra-nj.org/ErikZimmermann.html. We need a "head-count", so anyone planning on attending, please contact Rich Brady at (732) 840-0137 or at webmaster@astra-nj.org. Please indicate if you want to speak. RSVP by May 12.

Fighting Light Pollution!
Choose the winning approach

By John Batinsey

The New Jersey Chapter of the Illuminating Engineering Society of North America (IES) asked me to make a presentation to their members at a meeting held in Eatontown on March 20, 2007, to explain the way we have been successfully controlling Light Pollution since 1993. The following is a summary of the presentation.

* * *

Introduction

Most media coverage about Light Pollution present the issue primarily as an astronomy problem, heavily emphasizing the need for dark skies. Those amateur astronomers who have lobbied local and state officials with this message have experienced very little success in New Jersey. Pushing too hard for dark skies is often perceived by non-astronomers as a "Light Versus Darkness Issue", rather than a "Good Lights Versus Bad Lights Issue".

Why we need to control LightPpollution

Light Pollution affects everyone and controlling it benefits everyone. This is how the Eatontown Environmental Commission presented the problem to our local governing body. We then proceeded to explain why we needed to adopt an ordinance to solve this problem.

1. First we clearly defined Light Pollution as:

Misdirected and excessive outdoor lighting that causes:

- *Glare*

- *Light Trespass (a Nuisance)*

- *Energy Waste*

- *Unnecessary Sky Glow*

Light Pollution is understood by many to simply mean "sky glow", but misdirected and excessive lighting causes **all** of the above adverse components.

2. The ordinance would follow the guidelines of the IES, widely recognized as the foremost authority on lighting in the US. The IES works closely with the CIE (International Lighting Commission) in providing the world with credible lighting recommendations for all categories of application.

3. We explained the key elements of the ordinance that would require:

- The use of cutoff (shielded) lights for all pole and wall mounted installations.

- Confining all other illumination to the intended target and not spilling light in unwanted directions.

- Not exceeding IES Illuminance and Luminance recommendations.

- Retail and industrial lighting be significantly reduced after business hours.

4. We showed examples of "good" and "bad" lighting, to illustrate how well IES recommendations improved visibility and provided more than adequate illumination for safety and security; and which also avoided glare, light trespass and energy waste. Here are some illuminance levels to compare the waste of energy.

Type of Facility	Average Allowed In Eatontown	Average Allowed Elsewhere
Fast Food Restaurants	20.0	2.5
Car Dealers - Front Row	120.0	20.0
Gas Stations (Pump Island)	150.0	20.0
Shopping Malls	10.0	2.5

5. Lighting Plan submissions would require a full description and picture of every light. Another requirement would be a computer generated photometric grid showing illuminance points every ten feet and a computed average. The grid would provide a means to review uniformity. When applicable, lights to be turned off after business hours would also be identified.

How the ordinance has worked

The lighting plan review process has shown to be effective and fairly simple to administer. Any problems found are discussed with the lighting designer and usually resolved before meeting with the Planning Board. At the beginning, some engineers/designers complained that they never had to submit such information before. In some cases, when the designer was unfamiliar with providing such data, we suggested that they ask the manufacturer to supply a photometric grid (since they want to sell light fixtures). This proved to be a successful solution.

Existing lighting (Grandfathered) causing Light Pollution

A second lighting ordinance covering a "Glare Nuisance", applicable to all objectionable existing lighting, (whenever installed) was adopted in 2006. It applies to the following categories.

- Business lighting affecting roadways and other business property.

- Business lighting affecting residential property.

- Electric Utility Floodlights affecting roadways and all other property.

Additional information available

Additional information is available from the ANJEC Resource Center, such as the "Outdoor Lighting Ordinance Guide"(17 pages). This "Guide" contains a Model Outdoor Lighting Ordinance similar to Eatontown's. It contains many references and quotes from IES publications and is arranged by category. It also includes a recent change that addresses Homeland Security concerns. Another "tool" that would be helpful is the 2 page "Identifying Good & Bad Light Fixtures" showing pictures of various lights.

Perhaps it would be helpful to conduct a training seminar to illustrate how simple the process of review and enforcement actually is. Some actual lighting plan examples could be shown. Eatontown has reviewed at least 200 lighting plans and "walking" through the process could be useful. In addition, a tour of Eatontown lighting would enable attendees to see the effectiveness of IES illuminance recommendations. If you would be interested in participating, contact ANJEC.

It's time for Environmental Commissions to become active

Join us in fighting Light Pollution. Much of the outdoor lighting in New Jersey is a train wreck, with some retailers still installing outrageous floodlights in parking lots, unshielded wall-packs and or excessive levels of lighting with the direct glare source highly visible from roadways and other properties. State and local roadway lights should not cause glare problems. Electric Utilities continue to carelessly install their floodlights in easement zones and elsewhere to illuminate parking lots with no regard to glare issues. It's time to fix this problem. The only way this can work is by adopting an ordinance.

Deep Sky Video Camera

By Ernie Rossi

I have been involved in astronomy for more than 5 decades and that includes serious observing. As an avid observer, you're always looking for the darkest skies and the largest telescope you can afford. The more aperture the more photons of light you collect and the fainter detail around galaxies, nebula, and clusters you will realize. Over the many years my telescopes grew in size from 3.5" (my first telescope) to 25" my largest aperture telescope of present. I've had a total of at least 75 telescopes in my lifetime, and I

still own approximately 35 with 11 of them 6" or more in aperture.

Even with the Dobsonian revolution of cheaper mounts and bringing down the cost of a large telescope that a few decades ago would have only been available to astronomical institutions or very wealthy individuals, images from astrophotography with smaller scopes far exceeded visual astronomy. Friends of mine, with telescopes less than half the size I was using, in very dark skies were showing far more detail that I could see when they observed in light-polluted areas. The difference was that they would spend usually several hours imaging, then more time processing that image. I was at least getting my fill of photons instantly and I felt even though I couldn't see that much detail I could see many more objects in one night than astrophotographers could see in months.

A 25" telescope is a lot of telescope to haul around. I felt that anything larger really belongs in a permanent observatory like my friend Tom Clark with his 42" telescope in Chiefland. I was using a 25" telescope and I still wasn't able to satisfy myself on seeing structure in many galaxies like CCD images from rather small telescopes. I heard about the I/3 electronic eyepiece that would allow me to go several magnitudes deeper and I decided to purchase one. I was tired of looking at very faint fuzzies, using averted vision when friends of mine were showing me the same images using CCD cameras except with marvelous detail.

The I/3 helped somewhat. It was good on points of light, globular clusters, open clusters, dim moons around Uranus and Neptune and some galaxies that had lots of red stars, However, it didn't give me the images I was hoping for. I'd heard of video cameras that were taking great images of the planets after you processed them for several hours but I'm a visual observer, and I am not inclined to wait great lengths of time and go through long exposures and processing. I want almost instant gratification.

Several years ago at a local star party at NJAA observatory in New Jersey under a 5 magnitude sky I was observing M 57 with my 15" Dobsonian reflector and next to me was a gentleman with a 12" SCT who had a cheap surveillance camera and small monitor. Even if I had my 25" scope instead of the 15", I doubt if I could have seen M 57's central star, but there on his monitor was the central star and it only took him a couple of seconds. I was hooked-I had to try out this new technology.

Several months later at another star party I was using my 25" scope and another observer, was using a 11" SCT and the Stellacam 2 video camera, and was taking amazing images that I couldn't hope to see. Shortly after this I moved down to Florida to a 55+ Adult community and started an astronomy club. Several people had problems climbing ladders, and one person was in a wheel chair, and I decided it was time to get a very good video camera and large monitor. I had to decide what drive system I would utilize; and I finally decided I would go with my 20" F/5 Obsession since it would be easier to use than my 25". I would decide once I got some experience using the camera if I wanted to add a drive system to some of my other scopes. I decided to go with the Servo-Cat Go-To system and sky commander digital setting circles. I found out that Mike Zamitt of Star Structure telescopes does this installation, and I contacted him, and finally the installation was completed.

My next step now was what video camera would I select, and it came down to just two, the Mallin or Stellacam. Talking to owners of these camera's at Chiefland I decided on going monochrome (better detail than color) and calling up Adirondack Video astronomy who sells the Stellacam 2 and finding out more information. John Cordiale, co-owner of Adirondack Video, told me that in several months a new camera called the Stellacam 3 would be available that would far exceed the Stellacam 2. John told me the new camera would not be limited to 256 frames, but have an unlimited integrated frame system that would be able to pick up more detail and fainter objects.

Stellacam
Image Credit: Astrovid

About a month later I received a call from Adirondack Video that three cameras were available. So in November of 2006 I received my camera along with their 12" Pegasus monitor. It took a short time to get used to the camera, harnessing the wiring, small field of view, and critical focusing. I was able to make the camera more user-friendly by ordering an Atik .5 focal reducer since my focal length was 2540 MM to make the scope an f/2.5. This helped by increasing the field of view and the brightness. For the critical focus I would first locate the object using a wide-field eyepiece, then centering the object. I had measured the exact spot the camera comes into focus on the eyepiece holder and put a Velcro strip along the side of the focuser so I could only focus in to that point.

To use a focal reducer you will need approximately another inch of in-travel to come to focus. I already had my poles on my scopes cut ½" since I needed the in-travel for my I/3 eyepiece and Naglar 31 MM eyepiece. At first I still didn't have quite enough in travel but I was able to move my mirror forward since it was near the farthest back position in the mirror cell.

I first tried the camera where I live in a light-polluted sky even with the moon out. I could just about find M 81 & M82 visually, they were so dim. I centered M 82, put the camera in and WOW, it just blew me away, I had practically CCD camera images that are from a dark sky. The image filled the entire 12" screen. M 81 was showing a dust lane and arms some very faint ones. I turned the camera to M 51. M 51, and NGC 5195 just about fit on the screen. I could see all the arms, the bridge across the galaxies, and dust lanes in vivid detail and very bright. My friends and I couldn't believe they were witnessing these images under such terrible conditions.

On March 17, the camera had its first try under a really dark sky at Chiefland Astronomy Village. The images were so spectacular several CCD imagers wanted me to count off 10 seconds and they just couldn't believe the images since the same mages would have taken them many hours, not counting all the processing the following day. Several of the Mallin video cam enthusiasts came over, thinking I was embellishing the performance of the camera. Their jaws dropped when they saw the images. Some said that these were the best images they had ever seen in a video camera.

The performance got back to the manufacturer of the Mallin Cam via Bob Schilling who owns a Mallin Cam, which also has color images. To have color images the camera must give up some resources so some of the detail is lost. The manufacturer of Mallin cam made a special monochrome camera with longer frame settings to hopefully beat the new Stellacam 3. Adirondack Video also heard that Bob Schilling and I at our next meeting in Chiefland decided to have a shootout using similar scopes and focal reducers. Adirondack Video decided to send me their only camera, the newest version of the Stellacam 3, with an integrated thermal cooling system. Under adverse conditions the cooled unit would keep the camera working at optimum performance. The shootout was scheduled for April 14 at Chiefland. However, when I got there everyone was packing up due to a big storm expected that evening. So now the next shootout is scheduled for May 18, weather permitting.

From the testing I've done, the camera provides almost instant gratification far above anything you would expect. Even with a scope of 4" aperture you can equal scopes 10 x larger in several seconds. Just think that in a 6-inch scope and dark sky you could easily get down to 18 magnitude. So far, my estimate using my 20" scope at Chiefland is around 20-21 magnitude in about 10-15 seconds.

For us visual observers who don't like waiting but would like to see images of galaxies, nebula, clusters that match long-exposure photographs this is the next great leap in astronomical technology. Everyone is thinking cost, but how much would it cost to buy a telescope 10 x larger, not counting where to put it, and transport it etc.? The cost for the deep sky video camera is around the cost of a fairly inexpensive CCD camera.

Clouds from Top to Bottom

By Patrick L. Barry

During the summer and fall of 2006, U.S. Coast Guard planes flew over the North Pacific in search of illegal, unlicensed, and unregulated fishing boats. It was a tricky operation—in part because low clouds often block the pilots' view of anything floating on the ocean surface below.

To assist in these efforts, they got a little help from the stars.

Actually, it was a satellite—CloudSat, an experimental NASA mission to study Earth's clouds in an entirely new way. While ordinary weather satellites see only the tops of clouds, CloudSat's radar penetrates clouds from top to bottom, measuring their vertical structure and extent. By tapping into CloudSat data processed at the Naval Research Laboratory (NRL) in Monterey, CA, Coast Guard pilots were better able to contend with low-lying clouds that might have otherwise hindered their search for illegal fishing activity.

In the past, Coast Guard pilots would fly out over the ocean not knowing what visibility to expect. Now they can find out quickly. Data from research satellites usually takes days to weeks to process into a usable form, but NASA makes CloudSat's data publicly available on its QuickLook website and to users such as NRL in only a matter of hours—making the data useful for practical applications.

"Before CloudSat, there was no way to measure cloud base from space worldwide," says Deborah Vane, project manager for CloudSat at NASA's Jet Propulsion Laboratory.

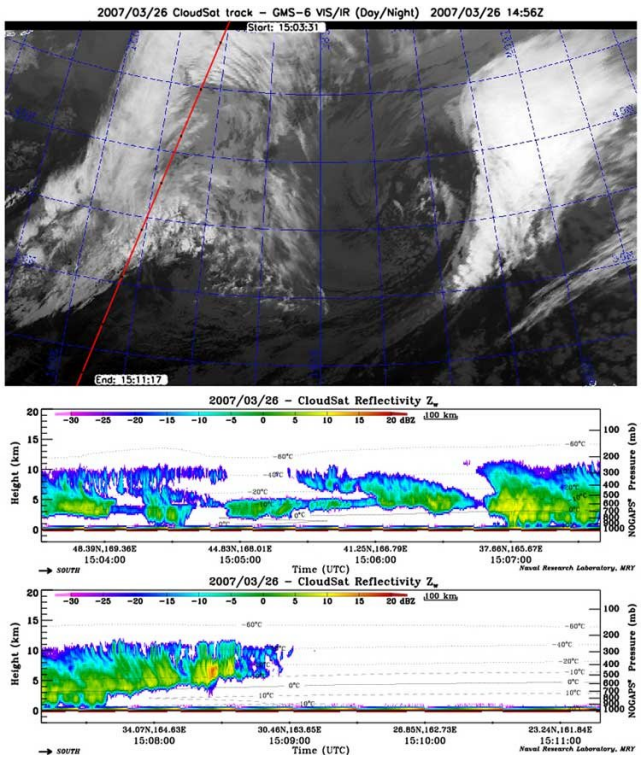
CloudSat's primary purpose is to better understand the critical role that clouds play in Earth's climate. But knowledge about the structure of clouds is useful not only for scientific research, but also to operational users such as Coast Guard patrol aircraft and Navy and commercial ships at sea.

"Especially when it's dark, there's limited information about storms at sea," says Vane. "With CloudSat, we can sort out towering thunderclouds from blankets of calmer clouds. And we have the ability to distinguish between light rain and rain that is falling from severe storms." CloudSat's radar is much more sensitive to cloud structure than are radar systems

operating at airports, and from its vantage point in space, Cloudsat builds up a view of almost the entire planet, not just one local area. “That gives you weather information that you don't have in any other way.”

There is an archive of all data collected since the start of the mission in May 2006 on the CloudSat QuickLook website at cloudsat.atmos.colostate.edu. And to introduce kids to the fun of observing the clouds, go to spaceplace.nasa.gov/en/kids/cloudsat_puz.shtml.

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



Caption:
A CloudSat ground track appears as a red line overlaid upon a GMS-6 (a Japanese weather satellite) infrared image. CloudSat is crossing the north-central Pacific Ocean on a descending orbit (from upper-right to lower-left) near a storm front. The radar data corresponding to this ground track (beginning in the center panel and continuing into the lower panel) shows a vertical cloud profile far more complex than the two-dimensional GMS-6 imagery would suggest. Thicker clouds and larger droplets are shown in yellow/red tones, while thinner clouds are shown in blue.

Science Corner: Habitable Planet Discovered!

By Daniel Handlin

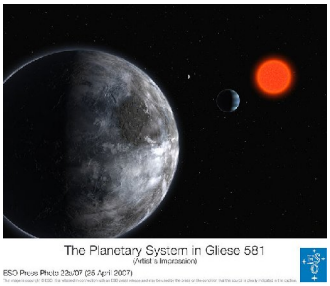
This month featured an extremely exciting astronomical event: the discovery of a potentially habitable extrasolar planet.

Gliese 581c is a planet with a minimum mass of 5.03 Earth masses orbiting the M2.5 red dwarf Gliese 581. The planet was discovered with the radial velocity method that has been used to find most extrasolar planets to date, and has now become extraordinarily sensitive. The planet orbits at only .07 AU from its sun (e=.16 +/- .07), with a 12.93 day year, but because it orbits a dim red dwarf, this extremely close distance puts the planet within the star’s habitable zone. Thus, liquid water could potentially exist on its surface, and the planet itself is sufficiently small that astronomers believe it should have a rocky, Earthlike composition.

The discovering team estimates the planet has an equilibrium temperature of about 270 K, which should be a lower limit since it does not take into account any greenhouse effect (in the case of the Earth, the natural greenhouse effect raises the temperature by about 32 kelvins). The Gliese 581 system is estimated to be about 4.3 billion years old, which certainly would have been sufficient time for life to evolve (compared to our own solar system’s 4.6 billion years of age. It is not known if the planet transits its sun as seen from Earth.

A key question mark about the planet is the effect of tidal forces on its temperatures. Because it is so close to its star, it is possible that the planet is tidally locked to it, always presenting the same face to its sun. Habitability would then depend on whether it has a sufficiently thick atmosphere to evenly distribute heat.

There are three other known planets in the Gliese system; the other two have masses of 16 and 8 Earth masses. The planet is relatively close to the Earth, at only 20.5 light years in distance. This makes Gliese 581c a very exciting target for future exoplanetary studies.



Artist’s conception of Gliese 581c
Image Credit: ESO

2007 May Celestial Events

By J. Randolph Walton (Randy)

Day	Date	Time (EDT)	Event
Wed	2	05:42	Moon Set
		06:09	Full Moon
Sat	5	05:56	Sunrise
		07:00	Eta-Aquarid meteors peak (ZHR 60)
		19:58	Sunset
		23:40	Moon Rise
Thu	10	00:27	Last Quarter Moon
		02:21	Moon Rise
Sat	12	02:10	Saturn Sets
		03:13	Moon Rise
		03:40	Mars Rises
		05:48	Sunrise
		15:19	Moon Set
		20:05	Sunset
		21:10	Mercury Sets
		22:00	Jupiter Rises
		23:40	Venus Sets
Wed	16	15:27	New Moon
		20:33	Moon Set
Sat	19	01:40	Saturn Sets
		03:25	Mars Rises
		05:42	Sunrise
		07:50	Moon Rise
		20:12	Sunset
		21:30	Jupiter Rises
		21:45	Mercury Sets
		23:00	Moon 1 Deg. N of Venus
		23:45	Venus Sets
		23:54	Moon Set
Wed	23	12:24	Moon Rise
		17:03	First Quarter Moon
Sat	26	01:15	Saturn Sets
		02:41	Moon Set
		03:12	Mars Rises
		05:37	Sunrise
		15:25	Moon Rise
		20:18	Sunset
		21:00	Jupiter Rises
		22:10	Mercury Sets
		23:46	Venus Sets
Thu	31	20:35	Moon Rise
		21:04	Full Moon

Moon Phases

Apr 17 Apr 24 May 2 May 10

May 16 May 23 June 1 June 8

Are you a S*T*A*R Member?

S*T*A*R is the proud owner of a monstrous 25" Dobsonian Obsession reflector – which YOU can gain access to as a S*T*A*R member! Meetings are the first Thursday of each month, except July and August, at 8:00 PM at the King of Kings Lutheran Church, 250 Harmony Rd. in Middletown. Meeting generally consist of lectures and discussion by members or guest speakers on a variety of interesting astronomical topics. S*T*A*R is a member of United Astronomy Clubs of New Jersey (UACNJ), the Astronomical League (AL), and the International Dark Sky Association (IDA).

Memberships: ( )Individual....$25
( ) Family...$35

Name_____

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Make checks payable to: STAR Astronomy Society, Inc. and mail to P.O. Box 863, Red Bank, NJ 07701

In the Eyepiece

Here is a list of objects for this month. This is reproduced from www.skyhound.com with the kind permission of its creator and author of SkyTools Greg Crinklaw.

Object(s)	Class	Con	RA	Dec	Mag
Izar	Multiple Star	Bootes	14h44m59.2s	+27°04'27"	2.4
Xi Boo	Multiple Star	Bootes	14h51m23.4s	+19°06'02"	4.5
44 Boo	Multiple Star	Bootes	15h03m47.4s	+47°39'15"	4.8
M 3	Globular Cluster	Canes Venatici	13h42m11.8s	+28°22'24"	6.3
NGC 5466	Globular Cluster	Bootes	14h05m27.7s	+28°31'49"	9.2
39 Boo	Multiple Star	Bootes	14h49m41.3s	+48°43'15"	5.7
M 53	Globular Cluster	Coma Berenices	13h12m56.2s	+18°09'56"	7.7
Pi 1 Boo	Multiple Star	Bootes	14h40m43.6s	+16°25'06"	4.5
Whirlpool (M51)	Galaxy	Canes Venatici	13h29m52.4s	+47°11'41"	8.9
The Pinwheel (M101)	Galaxy	Ursa Major	14h03m12.5s	+54°20'53"	8.3
NGC 5474 & Co.	Galaxies near M101	Ursa Major	14h05m01.4s	+53°39'45"	11.3
NGC 5529	Galaxy	Bootes	14h15m34.2s	+36°13'35"	12.7
IC 5217	Planetary nebula	Lacerta	22h23m55.7s	+50°58'00"	12.6
NGC 5774 & 5775	Galaxy Pair	Virgo	14h53m42.6s	+03°34'55"	12.8
NGC 5371	Galaxy	Canes Venatici	13h55m39.8s	+40°27'43"	11.5
Hickson 68	Galaxy Group	Canes Venatici	13h53m40.9s	+40°19'41"	10.5
NGC 5634	Globular Cluster	Virgo	14h29m38.1s	-05°58'42"	9.5
NGC 5053	Globular Cluster	Coma Berenices	13h16m28.2s	+17°41'44"	9.0
Arp 84	Interacting Galaxies	Canes Venatici	13h58m38.0s	+37°25'28"	12.1
IC 972	Planetary Nebula	Virgo	14h04m26.0s	-17°13'41"	14.9
UGC 7321	Superthin Galaxy	Com	12h17m34.1s	+22°32'26"	14.1