Jupiter with Io, Ganymede and Europa, taken October 12, 2012.
Imaged with AT106 refractor, Imaging Source DK video camera and 2x Powermate; 800 images stacked and aligned with Registax, processed with Photoshop. Photo by Joe Lopinot.

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River Bend Astronomy Club is a member of the Astronomical League.
River Bend Astronomy club serves astronomy enthusiasts of the American Bottom region, the Mississippi River bluffs and beyond, fostering observation, education, and a spirit of camaraderie.

Elected Officers
PRESIDENT Jeff Menz
VICE-PRESIDENT Joe Lopinot
TREASURER Mike Veith
SECRETARY Mary Hebert

Volunteer Administrators
NEWSLETTER EDITOR Bill Breeden
LEAGUE CORRESPONDENT Rich Dietz
OUTREACH COORDINATOR Terry Menz
LIBRARIAN Rita Breeden

Founding Members
Ed Cunnius · Gary Kronk · Kurt Sleeter · Eric Young

Contacts
MAIL River Bend Astronomy Club
   Jeff Menz
   13721 Kayser Road
   Highland, IL 62249-4619
WEB www.riverbendastro.org
EMAIL rbac@riverbendastro.org

River Bend Astronomy Club is a member of the Astronomical League, dedicated to fostering astronomical education, providing incentives for astronomical observation and research, and assisting communication among amateur astronomical societies.
www.astroleague.org

River Bend Astronomy Club is a member of the NASA Night Sky Network, a nationwide coalition of amateur astronomy clubs bringing the science, technology and inspiration of NASA’s missions to the general public. See our online calendar on the NASA Night Sky Network at http://nightsky.jpl.nasa.gov/

Monthly Meetings
Saturday, May 11, 2013 • 7:00 PM
Saturday, June 8, 2013 • 7:00 PM
Saturday, July 6, 2013 • 7:00 PM
For meeting locations, please see our calendar at www.riverbendastro.org.

Looked Up Lately?
Join River Bend Astronomy Club
Want to learn more about astronomy? The members of River Bend Astronomy Club invite you to join. You won’t need expensive tools or special skills - just a passion for observing the natural world.

- Meetings offer learning, peeks through great telescopes, and fun under the stars.
- You will receive the club newsletter, Current Astronomy, packed with news and photos.
- Get connected with our member-only online discussion group.
- Borrow from the club’s multimedia library.
- Borrow from the club’s selection of solar telescopes.
- And that’s not all! Through club membership you also join the Astronomical League, with its special programs and colorful quarterly newsletter The Reflector to enrich your hobby.
- We meet monthly, observe regularly, email news and quips constantly, and generally have a good time. Won’t you join us?

Name________________________________________
Address______________________________________
City__________________State_______Zip__________
Phone________________________________________
Email address__________________________________
Where did you hear of our club?___________________
______________________________________________
How long have you been interested in astronomy?_____
Do you have optical equipment?___________________
Are you afraid of the dark? ___Yes   ___No (just kidding)
I am submitted my application for:                   
   _____Adult Membership(s)   ___Youth Membership(s)
   $20/year each   $15/year each
   (18 yrs. and up)   (17 yrs. and under)
I enclose a check for $________________ made out to:
Mike Veith, Treasurer, RBAC
Signature________________________________________
Date___________________________________________

Mail to: River Bend Astronomy Club
c/o Mike Veith, 1121 St. Louis St., Edwardsville, IL 62025.

Questions? Contact us by email at rbac@riverbendastro.org.
River Bend Astronomy Club Has A New Website!
By Joe Lopinot

The River Bend Astronomy Club is proud to unveil its new digital home on the internet. The new site has expanded features and functionality, allowing club members and the public to browse and communicate the latest news in astronomy and what’s new with the RBAC.

In order to gain greater visibility on the web, the RBAC site can be accessed through your Facebook or Google Plus accounts. Members or the public can register and log in through these accounts, making it more convenient for the general public to access the site. The home page features Quick Links to the RBAC pages on both Facebook and Google Plus; individuals can “Like” or “+1” the website, bringing public awareness to the club and direct persons with an interest in astronomy to our page.

The home page is arranged for easy access to all the features on the site and astronomy related links on the web. It includes feeds for current weather conditions in St. Louis, image feeds of the sun, the moon phase for tonight and astrophotos taken by club members. The main feature of the home page is our news feed, allowing club members to post astronomy and science stories they would like to share with others. The home page also features links to our membership application and a form for requesting outreach services through the club.

The River Bend Astronomy Club is a member of the Astronomical League and a link to the league’s website is provided. The site also provides easy access to the club’s calendar through the Night Sky Network link, allowing members and the public to see upcoming RBAC events. The new site includes a public forums area, a great place for club members to interact with the public by answering questions and sharing knowledge. There are also galleries for club members to post and share their astrophotos and pictures from club events. Finally, there is a resource page to find astronomy related links that will be updated regularly.

The club members would like to thank fellow member Dan Brandon for his great work in putting together our new website. The River Bend Astronomy Club hopes members and the public will visit and contribute to our new website and add it to their favorites, making it one of their first stops for astronomy related information on the internet.

Visit the new site at our same address, at www.riverbendastro.org.

The new River Bend Astronomy Club website features an updated look, access to the RBAC calendar on the NASA Night Sky Network, and a new forum for our members to interact with each other and with the public.
South St. Louis Outreach at Francis Park in 2013
UPDATE
By Bill Breeden

This is an updated schedule for Francis Park Stargazing in South St. Louis.

Please note that the sessions originally scheduled for November 6 and December 11, 2013 have been canceled.

These events are scheduled one Wednesday night per month, April through October, closest to the First Quarter Moon. Events are held from 7pm to 9:30pm.

2013 SCHEDULE
Remaining sessions for the year:
May 15, 2013 (5 day old Moon)
June 12, 2013 (4 day old Moon)
July 17, 2013 (9 day old Moon)
August 14, 2013 (8 day old Moon)
September 11, 2013 (6 day old Moon)
October 9, 2013 (4 day old Moon)

DIRECTIONS: Highway 40 or 44 to Hampton Ave south. Go south on Hampton to Eichelberger Ave. Turn right on Eichelberger Ave, then turn right on Tamm Ave. We set up at Tamm & Itaska in the park. You can't miss us!

Events are canceled for clouds, inclement or extreme weather conditions.

May 11 River Bend Meeting at Menz Observatory
By Jeff Menz

Terry and I invite you to the Menz home (see address below) for the regularly scheduled club meeting date of May 11, 2013. The forecast is once again for clouds and rain but we can sit around and talk about all things of interest to the group.

Gathering time is 6:45pm with the meeting start at 7:00pm. Refreshments are welcome but not an obligation for attendance.

Hope to see you then.

The address of Menz Observatory is:

13721 Kayser Road
Highland, IL 62249
Exploring the Water World
By Diane K. Fisher

In some ways, we know more about Mars, Venus and the Moon than we know about Earth. That’s because 70% of our solar system’s watery blue planet is hidden under its ocean. The ocean contains about 98% of all the water on Earth. In total volume, it makes up more than 99% of the space inhabited by living creatures on the planet.

As dominant a feature as it is, the ocean—at least below a few tens of meters deep—is an alien world most of us seldom contemplate. But perhaps we should.

The ocean stores heat like a “fly wheel” for climate. Its huge capacity as a heat and water reservoir moderates the climate of Earth. Within this Earth system, both the physical and biological processes of the ocean play a key role in the water cycle, the carbon cycle, and climate variability.

This great reservoir continuously exchanges heat, moisture, and carbon with the atmosphere, driving our weather patterns and influencing the slow, subtle changes in our climate.

The study of Earth and its ocean is a big part of NASA’s mission. Before satellites, the information we had about the ocean was pretty much “hit or miss,” with the only data collectors being ships, buoys, and instruments set adrift on the waves.

Now ocean-observing satellites measure surface topography, currents, waves, and winds. They monitor the health of phytoplankton, which live in the surface layer of the ocean and supply half the oxygen in the atmosphere. Satellites monitor the extent of Arctic sea ice so we can compare this important parameter with that of past years. Satellites also measure rainfall, the amount of sunlight reaching the sea, the temperature of the ocean’s surface, and even its salinity!

Using remote sensing data and computer models, scientists can now investigate how the oceans affect the evolution of weather, hurricanes, and climate. In just a few months, one satellite can collect more information about the ocean than all the ships and buoys in the world have collected over the past 100 years!

NASA’s Earth Science Division has launched many missions to planet Earth. These satellites and other studies all help us understand how the atmosphere, the ocean, the land and life—including humans—all interact together.

Find out more about NASA’s ocean studies at http://science.nasa.gov/earth-science/oceanography. Kids will have fun exploring our planet at The Space Place, http://spaceplace.nasa.gov/earth.

This image from September 2012, shows that the Arctic sea is the smallest recorded since record keeping began in 1979. This image is from NASA’s Scientific Visualization Studio at Goddard Space Flight Center.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.
RBAC’s Monthly Observing Lists
These lists include brighter deep-sky objects that transit near 10:00 PM each month.

**May Observing List**
Prepared by Bill Breeden

<table>
<thead>
<tr>
<th>Double Stars (Astronomical League’s Double Star List)</th>
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<tbody>
<tr>
<td>45. Delta Corvi SAO 157323 Algorah Const. CRB Type DS RA 12 29.9 Decl. -16° 31' Mag. 3.0 9.2</td>
</tr>
<tr>
<td>46. 24 Comae Berenices SAO 100160 Const. COM Type DS RA 12 35.1 Decl. +18° 23' Mag. 5.2 6.7</td>
</tr>
<tr>
<td>47. Gamma Virginis SAO 138917 Porrima Const. VIR Type DS RA 12 41.7 Decl. -01° 27' Mag. 3.5 3.5</td>
</tr>
<tr>
<td>48. Camelopardalis SAO 2101 Const. CAM Type DS RA 12 49.2 Decl. +83° 25' Mag. 5.3 5.8</td>
</tr>
<tr>
<td>49. Alpha Canum Venaticorum SAO 63256 Cor Caroli Const. CVN Type DS RA 12 56.0 Decl. +38° 19' Mag. 2.9 5.5</td>
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<th>Carbon Stars (Astronomical League’s Carbon Star List)</th>
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<tr>
<td>50. Zeta Ursae Majoris SAO 28737 Mizar Const. UMA Type DS RA 13 23.9 Decl. +54° 56' Mag. 2.3 4.0 4.0</td>
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</table>

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<thead>
<tr>
<th>Messier Objects</th>
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<tbody>
<tr>
<td>M3 NGC5272 Const. CVN Type GC RA 13 42.2 Decl. +28 23 Mag. 6.3</td>
</tr>
<tr>
<td>M40 WIC4 Const. UMA Type DS RA 12 22.4 Decl. +58 05 Mag. 9.1</td>
</tr>
<tr>
<td>M49 NGC4472 Const. VIR Type GAL RA 12 29.8 Decl. +08 00 Mag. 8.5</td>
</tr>
<tr>
<td>M51 NGC5194 Whirlpool Galaxy Const. CVN Type GAL RA 13 29.9 Decl. +47 12 Mag. 8.1</td>
</tr>
<tr>
<td>M53 NGC5024 Const. COM Type GC RA 13 12.9 Decl. +18 10 Mag. 7.6</td>
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<tr>
<td>M58 NGC4579 Const. VIR Type GAL RA 12 37.7 Decl. +11 49 Mag. 9.2</td>
</tr>
<tr>
<td>M59 NGC4621 Const. VIR Type GAL RA 12 42.0 Decl. +11 39 Mag. 9.6</td>
</tr>
<tr>
<td>M60 NGC4649 Const. VIR Type GAL RA 12 43.7 Decl. +11 33 Mag. 8.9</td>
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<td>M61 NGC4303 Const. VIR Type GAL RA 12 21.9 Decl. +04 28 Mag. 10.1</td>
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<tr>
<td>M63 NGC5055 Const. CVN Type GAL RA 13 15.8 Decl. +42 02 Mag. 9.5</td>
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<tr>
<td>M64 NGC4826 Black Eye Galaxy Const. COM Type GAL RA 12 56.7 Decl. +21 41 Mag. 8.8</td>
</tr>
<tr>
<td>M68 NGC4590 Const. HYA Type GC RA 12 39.5 Decl. -26 45 Mag. 8</td>
</tr>
<tr>
<td>M83 NGC5236 Const. HYA Type GAL RA 13 37.0 Decl. -29 52 Mag. 7.6</td>
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<tr>
<td>M84 NGC4374 Const. VIR Type GAL RA 12 25.1 Decl. +12 53 Mag. 9.3</td>
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<tr>
<td>M85 NGC4382 Const. COM Type GAL RA 12 25.4 Decl. +18 11 Mag. 9.3</td>
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<tr>
<td>M86 NGC4406 Const. VIR Type GAL RA 12 26.2 Decl. +12 57 Mag. 9.7</td>
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<tr>
<td>M88 NGC4501 Const. COM Type GAL RA 12 32.0 Decl. +14 25 Mag. 10.2</td>
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<td>M91 NGC4548 Const. COM Type GAL RA 12 35.4 Decl. +14 30 Mag. 9.5</td>
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<tr>
<td>M94 NGC4736 Const. CVN Type GAL RA 12 50.9 Decl. +41 07 Mag. 7.9</td>
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<tr>
<td>M98 NGC4192 Const. COM Type GAL RA 12 13.8 Decl. +14 54 Mag. 11.7</td>
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<td>M99 NGC4254 Const. COM Type GAL RA 12 18.8 Decl. +14 25 Mag. 10.1</td>
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<tr>
<td>M100 NGC4321 Const. COM Type GAL RA 12 22.9 Decl. +15 49 Mag. 10.6</td>
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<tr>
<td>M104 NGC4594 Sombrero Galaxy Const. VIR Type GAL RA 12 40.0 Decl. -11 37 Mag. 8.7</td>
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<tr>
<td>M106 NGC4258 Const. CVN Type GAL RA 12 19.0 Decl. +47 18 Mag. 8.6</td>
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<tr>
<th>Caldwell Objects</th>
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</thead>
<tbody>
<tr>
<td>C3 NGC4236 Const. DRA Type SG RA 12 16 42.00 Decl. +69 28 00.0 Mag. 9.7</td>
</tr>
</tbody>
</table>
C21 NGC4449 Const. CVN Type IG RA 12 28 12.00 Decl. +44 06 00.0 Mag. 9.4
C26 NGC4244 Const. CVN Type SG RA 12 17 30.00 Decl. +37 49 00.0 Mag. 10.6
C29 NGC5005 Const. CVN Type SG RA 13 10 54.00 Decl. +37 03 00.0 Mag. 9.8
C32 NGC4631 Const. CVN Type SG RA 12 42 06.00 Decl. +32 32 00.0 Mag. 9.3
C35 NGC4889 Const. COM Type EG RA 13 00 06.00 Decl. +27 59 00.0 Mag. 11.4
C36 NGC4559 Const. COM Type SG RA 12 36 00.00 Decl. +27 58 00.0 Mag. 9.8
C38 NGC4565 Const. COM Type SG RA 12 36 18.00 Decl. +25 59 00.0 Mag. 9.6
C45 NGC5248 Const. BOO Type SG RA 13 37 30.00 Decl. +08 53 00.0 Mag. 10.2
C52 NGC4697 Const. VIR Type EG RA 12 48 36.00 Decl. +05 48 00.0 Mag. 9.3
C60 NGC4038 The Antennae Const. CRV Type SG RA 12 01 54.00 Decl. -18 52 00.0 Mag. 11.3
C61 NGC4039 The Antennae Const. CRV Type SG RA 12 01 54.00 Decl. -18 53 00.0 Mag. 13
C77 NGC5128 Cen A Radio Source Const. CEN Type EG RA 13 25 30 Decl. -43 01 00.0 Mag. 7
C80 NGC5139 Omega Centauri Const. CEN Type GC RA 13 26 48.00 Decl. -47 29 00.0 Mag. 3.6
C83 NGC4945 Const. CEN Type SG RA 13 05 24.00 Decl. -39 28 00.0 Mag. 9.5
C84 NGC5286 Const. CEN Type GC RA 13 46 24.00 Decl. -51 22 00.0 Mag. 7.6
C99 Coal Sack Const. CRU Type DN RA 12 53 00.00 Decl. -30 00 00.0 Mag.
C105 NGC4833 Const. MUS Type GC RA 12 59 36.00 Decl. -72 48 00.0 Mag. 7.8

Royal Astronomical Society of Canada Objects
46. NGC4088 Const. UMA Type G-Sc RA 12 05.6 Decl. +50 33 Mag. 10.5
47. NGC4157 Const. UMA Type G-Sb RA 12 11.1 Decl. +50 29 Mag. 11.9
48. NGC4605 Const. UMA Type G-Sc RA 12 44.0 Decl. +32 10 Mag. 10.4
59. NGC4111 Const. CVN Type G-S0 RA 12 07.1 Decl. +43 04 Mag. 10.8
60. NGC4214 Const. CVN Type G-Irr RA 12 15.6 Decl. +36 20 Mag. 9.7
61. NGC4244 Const. CVN Type G-S RA 12 17.5 Decl. +37 49 Mag. 10.2
62. NGC4449 Const. CVN Type G-IrR RA 12 28.2 Decl. +44 06 Mag. 9.4
63. NGC4490 Const. CVN Type G-Sc RA 12 30.6 Decl. +41 38 Mag. 9.8
64. NGC4631 Const. CVN Type G-Sc RA 12 42.1 Decl. +32 32 Mag. 9.3
65. NGC4656/7 Const. CVN Type G-Sc RA 12 44.0 Decl. +32 10 Mag. 10.4
66. NGC5005 Const. CVN Type G-Sb RA 13 10.9 Decl. +37 03 Mag. 9.8
67. NGC5033 Const. CVN Type G-Sb RA 13 13.4 Decl. +36 36 Mag. 10.1
68. NGC4274 Const. COM Type G-Sb RA 12 19.8 Decl. +29 37 Mag. 10.4
69. NGC4414 Const. COM Type G-Sc RA 12 26.4 Decl. +31 13 Mag. 10.2
70. NGC4494 Const. COM Type G-E1 RA 12 31.4 Decl. +25 47 Mag. 9.8
71. NGC4559 Const. COM Type G-Sc RA 12 36.0 Decl. +27 58 Mag. 9.8
72. NGC4565 Const. COM Type G-Sb RA 12 36.3 Decl. +25 59 Mag. 9.6
73. NGC4725 Const. COM Type G-Sb RA 12 50.4 Decl. +25 30 Mag. 9.2
74. NGC4038/9 Antennae Galaxies Const. CRV Type G-Sc RA 12 01.9 Decl. -18 52 Mag. 10.7
75. NGC4361 Const. CRV Type PN RA 12 24.5 Decl. -18 48 Mag. 10.3
76. NGC4216 Const. VIR Type G-Sb RA 12 15.9 Decl. +13 09 Mag. 9.9
77. NGC4388 Const. VIR Type G-Sb RA 12 25.8 Decl. +12 40 Mag. 11
78. NGC4438 Const. VIR Type G-Sap RA 12 27.8 Decl. +13 01 Mag. 10.1
79. NGC4517 Const. VIR Type G-Sc RA 12 32.8 Decl. +00 07 Mag. 10.5
80. NGC4526 Const. VIR Type G-E7 RA 12 34.0 Decl. +07 42 Mag. 9.6
81. NGC4535 Const. VIR Type G-Sc RA 12 34.3 Decl. +08 12 Mag. 9.8
82. NGC4567/8 Const. VIR Type G-Sc RA 12 36.5 Decl. +11 15 Mag. -11
83. NGC4699 Const. VIR Type G-Sa RA 12 49.0 Decl. -08 40 Mag. 9.6
84. NGC4762 Const. VIR Type G-SBO RA 12 52.9 Decl. +11 14 Mag. 10.2
June Observing List
Prepared by Bill Breeden

Double Stars (Astronomical League’s Double Star List)

51. Kappa Bootis SAO 29045 Const. BOO Type DS RA 14 13.5 Decl. +51° 47’ Mag. 4.6 6.6
52. Iota Bootis SAO 29071 Const. BOO Type DS RA 14 16.2 Decl. +51° 22’ Mag. 4.9 7.5
53. Pi Bootis SAO 101138 Const. BOO Type DS RA 14 40.7 Decl. +16° 25’ Mag. 4.9 5.8
54. Epsilon Bootis SAO 83500 Izar Const. BOO Type DS RA 14 45.0 Decl. +27° 04’ Mag. 2.5 4.9
55. Alpha Librae SAO 158836 Zuben El Genubi Const. LIB Type DS RA 14 50.9 Decl. -16° 02’ Mag. 2.8 5.2
56. Xi Bootis SAO 101250 Const. BOO Type DS RA 14 51.4 Decl. +19° 06’ Mag. 4.7 7.0
57. Delta Bootis SAO 64589 Alrakis Const. BOO Type DS RA 15 15.5 Decl. +33° 19’ Mag. 3.5 8.7
58. Mu Bootis SAO 64686 Const. BOO Type DS RA 15 24.5 Decl. +37° 23’ Mag. 4.3 7.0
59. Delta Serpentis SAO 101623 Const. SER Type DS RA 15 34.5 Decl. +10° 32’ Mag. 4.2 5.2
60. Zeta Coronae Borealis SAO 64833 Const. CRB Type DS RA 15 39.4 Decl. +36° 38’ Mag. 5.1 6.0

Carbon Stars (Astronomical League’s Carbon Star List)

58. V Coronae Borealis SAO 64929 RA 15 49 31 Decl. +39 34 17 Mag. 6.9-12.6 Per. 358 Class C6 (N2e)

Messier Objects

M5 NGC5904 Const. SER Type GC RA 15 18.6 Decl. +02 05 Mag. 6.2
M101 NGC5457 Pinwheel Galaxy Const. UMA Type GAL RA 14 03.2 Decl. +54 21 Mag. 9.6
M102 NGC? 5866 Const. DRA Type GAL RA 15 06.5 Decl. +55 46 Mag. 10

Caldwell Objects

C66 NGC5694 Const. HYA Type GC RA 14 39 36.00 Decl. -26 32 00.0 Mag. 10.2
C88 NGC5823 Const. CIR Type OC RA 15 05 42.00 Decl. -55 36 00.0 Mag. 7.9

Royal Astronomical Society of Canada Objects

85. NGC5746 Const. VIR Type G-Sb RA 14 44.9 Decl. +01 57 Mag. 10.6
86. NGC5466 Const. BOO Type GC RA 14 05.5 Decl. +28 32 Mag. 9.1
87. NGC5907 Const. DRA Type G-Sb RA 15 15.9 Decl. +56 19 Mag. 10.4

Have you checked off all of the objects from these 12 monthly observing lists yet? Or perhaps you have checked off all of a certain category of objects from these lists, such as Double Stars? If so, we would like to know about it! Send your story to us at rbac@riverbendastro.org.