Hickson Compact Groups

The Astronomy Logbook Project

May 12, 2013

Contents

Preface

This is a log book for amateur astronomers intending to observe Hickson's Compact Groups.

This is a compilation of observation log forms for each of the Hickson Compact Groups, accompanied by useful information about the object, a star chart, and an image from the Digitized Sky Surveys. It may gain more features as time progresses

The description contains the parameter z, used as the measure of redshift in the astronomy community. For z in the range of 0 to 0.1, it's a good approximation that an increase by 0.01 in z corresponds to a distance of 133 million light years. Thus, an object with $z = 0.01$ is about 133 million light years away, $z = 0.02$ is about 266 million light years away, and so on.

The gray circle indicates a field-of-view of 1 degree, while the gray square box around the object indicates a field-of-view of 15 arcminutes, typical of most of the DSS imagery.

The data comes from the NASA HEASARC database[1], and has been clarified to be usable for non-profit and/or educational purposes.

Hope you have fun observing the Hickson Compact Groups.

–Akarsh Simha

[1]The HEASARC data is accessible at http://heasarc.gsfc.nasa.gov/

Legal

Most Importantly

- **You may not use this compilation for commercial / profit-making purposes!** This is because this compilation uses images from the Digitized Sky Surveys, and data from Dr. Wolfgang Steinicke's Revised NGC / IC. Please see http://gsss.stsci.edu/Acknowledgements/DSSCopyrights.htm and the NGC/IC section of http://www.klima-luft.de/steinicke/ (in the German) or http://www.klima-luft.de/steinicke/index_e.htm (in English) for details.
- **You may not distribute copies of this compilation without the Legal, Acknowledgment and Credits sections**
- **No part of the legal, acknowledgment and credits sections may be modified or deleted.** The only permissible changes are inclusions of your own acknowledgments and copyright statements, for both your contributions and acknowledgments for any compatibly licensed graphics that you may include.
- Subject to these terms, **you are permitted to make copies, distribute and modify** this compilation, with the exception that the right to modify the DSS or the NGC / IC data is contingent on the express permission of the copyright holders of the same.
- Links present in this document are provided for informational purposes only, and do not imply any sort of endorsement or affiliation with the website. If you make modifications to this work, **do not add links to explicitly commercial ventures** for commercial gains.

0.1 Data Sources and Copyrights

- **Images** from the *Digitized Sky Survey* used in this compilation come from the *POSS II* (Northern Hemisphere) and *UKSTU* (Southern Hemisphere) surveys. The following copyright statement is found on the DSS access portal at the STScI, USA (http://gsss.stsci.edu/Acknowledgements/DataCopyrights.htm)
  - *POSS-II Northern Hemisphere Surveys* – The compressed files of the "Palomar Observatory - Space Telescope Science Institute Digital Sky Survey" of the northern sky, based on scans of the Second Palomar Sky Survey are copyright (c) 1993-2003 by the California Institute of Technology and are distributed herein[2] by agreement. All Rights Reserved.
  - *Southern Hemisphere Surveys observed prior to 1993* – Southern Hemisphere Surveys were made with the UK Schmidt Telescope at the Anglo-Australian Observatory. Plates from these surveys have been digitized and compressed by the STScI. The digitized images are copyright (c) 1976-1993, jointly by the UK SERC/PPARC (formerly Science and Engineering Research Council/Particle Physics and Astronomy Research Council, and currently the Science and Technology Facilities Council), and are distributed herein by agreement. All Rights Reserved. Represented by the Wide Field Astronomy Unit at the Royal Observatory Edinburgh (ROE).

[2] i.e. at the MAST website: http://archive.stsci.edu/

  - *Southern Hemisphere Surveys observed since 1993* – The "Second Epoch Survey" of the southern sky was made by the Anglo-Australian Observatory (AAO) with the UK Schmidt Telescope. Plates from this survey have been digitized and compressed by the STScI. The digitized images are copyright (c) 1993-2004 by the Anglo-Australian Observatory Board, and are distributed herein by agreement. All Rights Reserved.

  Please note the data use policies of the DSS, available here: http://gsss.stsci.edu/Acknowledgements/DSSCopyrights.htm

  In complying with the DSS copyright policy, the creators of this compilation intends that this compilation be used only for **non-profit purposes**.

- **Star Catalog Data** used in the star charts come from three major catalogs: *Hipparcos*, *Tycho 2*, and *USNO NOMAD* and rendered using *KStars*.

  - *Hipparcos* and *Tycho 2* were obtained from the Astronomical Data Center run by the NASA. While the data center is now closed, at the time of download, the website said:

    "All ADC data are public domain unless otherwise stated in the "ReadMe" file. The data are for scientific use only and have no commercial value."

    As of January 2013, an archive of the old website is still accessible here: http://web.archive.org/web/20060908091808/http://adc.astro.umd.edu/adc/questions_feedback.html#policies1

  - *USNO NOMAD* was obtained from the US Naval Observatory (http://www.nofs.navy.mil/nomad/).

    The "Privacy and Security Notice" on USNO's website (http://ad.usno.navy.mil/privacy.shtml) reads:

    "All information presented on these pages is considered public domain and may be distributed or copied unless otherwise specified. Use of appropriate byline/photo/image credits is requested."

    No explicit statement is made about the NOMAD catalog in particular.

- **Deep-Sky Object Data** used in the star charts and the data table come mostly from the Revised NGC/IC catalog by Wolfgang Steinicke, and that data is Copyright (c) 2003 Wolfgang Steinicke. The visual magnitudes for objects, however, come from a newer version of the Revised NGC/IC catalog by Wolfgang Steinicke, released in January 2013, and that data is Copyright (c) 2003-2013 Wolfgang Steinicke ⟨steinicke-zehnle@t-online.de⟩. When unvailable, the visual magnitudes have been substituted with blue magnitudes, also from the same catalog.

  The data has been made freely available for **non-commercial use**.

  Data for non-NGC/IC objects is not from Dr. Steinicke's catalog, and was collected manually by hand from various sources, most notably SIMBAD and the SAC database.

  The Dreyer and SAC descriptions, and magnitudes wherever available come from the Saguaro Astronomy Club (SAC) database, and it is freely available for non-commercial use.

- **Logo of the Bangalore Astronomical Society** is Copyright (c) 2007-2013 Harshad R. Joglekar, and is licensed under Creative Commons Attribution-NonCommercial-NoDerivs 3.0, with the additional condition that the logo be used only to refer to the Bangalore Astronomical Society (http://bas.org.in), which is a registered non-profit organization in Bangalore, India.

  The full text of the license is available here: http://creativecommons.org/licenses/by-nc-nd/3.0/

  Please note the additional condition that the use of the logo in reference to anything other than the Bangalore Astronomical Society (henceforth referred to as BAS) is prohibited.

While the logo itself may not be used for commercial purposes, the author of the logo makes the exception that collections (as defined in section 1b of the license), such as this compilation, containing the logo may be used for commercial purposes.

- **The icon of KStars** used on the Acknowledgments page and possibly to represent a telescope is part of the Oxygen Project (http://www.oxygen-icons.org/) of KDE. The icon can be copied under the GNU LGPLv3 license, which is available here: http://www.gnu.org/copyleft/lesser.html

  Note the requirements for using this icon in printed material here: http://techbase.kde.org/Projects/Oxygen/Licensing#Use_on_Physical_Media

- **The binocular and eye icons** included on some of the pages are in the public domain. The binocular icon was obtained from the website http://openclipart.org/. The eye icon was created by Akarsh Simha using Inkscape.

- **Icons of downtown Austin** included on some of the pages, especially in the US Letter version were made from photographs by Akarsh Simha and are in the public domain.

- **The city skyline icon** included in the BAS version on some of the pages is Copyright (c) by the user soul_flow on Flickr (http://www.flickr.com/photos/soulflow).

  The original photograph is titled"Bangalore - Modern building" and is available at http://www.flickr.com/photos/soulflow/1410390525/ as of this writing.

  The photograph is licensed under CreativeCommons 2.0 Attribution ShareAlike. The terms of the license may be read at http://creativecommons.org/licenses/by-sa/2.0/deed.en.

  The photograph was posterized and vectorized by Akarsh Simha in order to create a vector graphic for use in this compilation.

0.2 Copyrights of the Compilation

The production of this compilation in itself is creative work. While the data content of the compilation does have varying licensing / copyright policies as detailed above, the compilation itself is licensed under Creative Commons 3.0 Attribution Share-Alike. The terms of the license are accessible here: http://creativecommons.org/licenses/by-nc/3.0/

Note that the license chosen for the act of compilation itself does allow for both commercial use and derivative works. In particular, this likely means that removing the DSS images from all pages, at the time of this writing, removes necessary restrictions on the commercial use of this compilation. However, the author is not a lawyer and does not warrant the accuracy of this claim. Please do your own checks before trying to use this document for commercial purposes.

Akarsh Simha may be reached at ⟨akarshsimha@gmail.com⟩.

0.3 NO WARRANTY

BECAUSE THE COMPILATION IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE COMPILATION, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE DATA AND THE COMPILATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND ACCURACY OF THE COMPILATION IS WITH YOU. SHOULD THE COMPILATION PROVE INACCURATE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE COMPILATION AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE, OR INABILITY TO USE, OR THE INACCURACY OF THE COMPILATION (INCLUDING BUT NOT LIMITED TO INACCURACIES OF SUBSEQUENTLY COMPUTED DATA AND LOSSES SUSTAINED BY YOU OR THIRD PARTIES), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Acknowledgements

The Bangalore Astronomical Society

The makers of this compilation acknowledge the Bangalore Astronomical Society (BAS) for the inspiration behind this idea. In particular, the makers thank the council members of the BAS during 2013.

Austin Astronomical Society

Akarsh Simha would like to thank Austin Astronomical Society for keeping his astronomy spirit alive, and providing some of the motivation much required to complete these logbooks. The members of the AAS gave him much necessary encouragement, many many valuable suggestions, and shared his excitement at the finished product. Austin Astronomical Society's webpage is found at http://austinastro.org.

The Digitized Sky Survey

The images used in this compilation come from the Digitized Sky Survey plates, in particular, those from the POSS-II and UKSTU surveys.

The Digitized Sky Survey was produced at the Space Telescope Science Institute under U.S. Government grant NAG W-2166. The images of these surveys are based on photographic data obtained using the Oschin Schmidt Telescope on Palomar Mountain and the UK Schmidt Telescope. The plates were processed into the present compressed digital form with the permission of these institutions.

The Second Palomar Observatory Sky Survey (POSS-II) was made by the California Institute of Technology with funds from the National Science Foundation, the National Aeronautics and Space Administration, the National Geographic Society, the Sloan Foundation, the Samuel Oschin Foundation, and the Eastman Kodak Corporation. The Oschin Schmidt Telescope is operated by the California Institute of Technology and Palomar Observatory.

The UK Schmidt Telescope was operated by the Royal Observatory Edinburgh, with funding from the UK Science and Engineering Research Council (later the UK Particle Physics and Astronomy Research Council), until 1988 June, and thereafter by the Anglo-Australian Observatory. The blue plates of the southern Sky Atlas and its Equatorial Extension (together known as the SERC-J), the near-IR plates (SERC-I), as well as the Equatorial Red (ER), and the Second Epoch [red] Survey (SES) were all taken with the UK Schmidt telescope at the AAO.

The images themselves were downloaded from the Mikulski Archive for Space Telescopes (MAST; http://archive.stsci.edu/).

The makers thank the DSS for making sky imagery freely available for non-profit activities, and also thank MAST for the excellent web service provided by them.

Deep-Sky Object Data

The makers thank Dr. Wolfgang Steinicke for providing the Revised NGC / IC catalog under terms making it free for non-commercial use.

The Dreyer and SAC descriptions, and some of the data for non-NGC/IC objects, come from the Saguaro Astronomy Club database. The makers thank the Saguaro Astronomy Club for providing their compilation for free non-commercial use.

KStars and other open-source tools

The makers particularly thank, the developers of KStars, (http://edu.kde.org/kstars) the software that made the rendition of star maps used in this compilation possible and made available, in an easy form, the data used in this compilation. KStars was also used to fetch appropriate DSS URLs for the objects. KStars is a cross-platform astronomy software licensed under the GNU General Public License v2 (https://www.gnu.org/licenses/gpl-2.0). It qualifies as free software.

The typesetting of the charts was done using LaTeX. `xmlstarlet` was used to parse XML for object descriptions generated by KStars. Inkscape and ImageMagick were used to convert between graphics formats. Inkscape was also used to generate several of the graphics used here. Several tools from the standard GNU suite, such as `bash`, wget, `sed` and `awk` proved very useful.

This compilation was generated using only free and open source software.

Credits

This is a list of people who contributed to this project, in no order of significance (except possibly chronological). (Feel free to add your name to the list if you forked this / made a derivative work!)

- Akarsh Simha ⟨akarshsimha@gmail.com⟩ – **original idea**; also responsible for creating the script that generates logbooks
- Kumar Appaiah – Several educative lessons on git, emacs, sed, and awk that made this compilation possible.
- Naveen Nanjundappa – several valuable suggestions
- Keerthi Kiran – feedback on printing on A4 paper, suggestion for naked eye visibility icons.
- Erika Rix – valuable suggestions. Messier Marathon order suggestion.
- Terry Phillips – Messier Marathon order suggestion.
- Mark Florian – many many valuable suggestions, especially on the preliminary sections.
- Joyce D Lynch – permission to use the AAS logo
- Jim Donahue – Vector graphic AAS logo, old (not used)
- Jim Spiegelmire – Current AAS logo
- Sivaramakrishnan Swaminathan – Suggestion for checklist table in landscape
- Many members of the Austin Astronomical Society who have contributed through their encouragement, support and feedback!

1

Glossary of Technical Terms

Some of the technical terms used in the compilation are explained *in brief* here. Many resources that offer more detailed explanations and further information are available on the internet. You could alternatively also use KStars' AstroInfo project, accessible from the KStars Help Menu. See http://edu.kde.org/kstars for more.

- **Right Ascension** and **Declination** together constitute the **Equatorial Geocentric Coordinates** used in astronomy. It is a *coordinate system* used to designate positions in the sky.

  Just like the location of a point on the earth is specified by the latitude and longitude, the location of a point in the sky is specified using the Right Ascension (RA) and Declination (Dec). Usually, these are denoted by the symbols α and δ.

  The declination is simply a projection of the earth's latitudes onto the sky. For example, the north celestial pole lies at a declination of $+90°$, and is in the direction vertically above when standing at the north pole of the earth, which has a latitude of $+90°$. Southern declinations are considered negative. Declination is usually measured in degrees.

  Unlike longitude, RA is measured in hours. Just like an arbitrary longitude is chosen to be zero degrees (namely the prime meridian), a point called the *First point of Aries* (usually denoted γ) is chosen to be the zero for RA. 1 hour corresponds to 15 degrees.

- **Precession; Epoch; J2000.0:** The axis about which the earth rotates is not stationary. Just like a spinning top, the earth wobbles causing the axis itself to move. This wobbling of the axis of the earth is described by motions called *precession* and *nutation*. Precession is the dominant of the two. As a result of precession, the pole star of today, Polaris, will no longer be near the pole several centuries later.

  The earth's axis traces a circle in the sky over a period of 26000 years. This might sound like a small effect over a couple years, but astronomical positions are measured with rather high precision. Thus, precession effects must be taken into account.

  Most catalogs of stars and deep-sky objects list the RA and Dec of objects, but the RA and Dec of these objects actually vary because of precession. To remedy this, the catalogs provide RA and Dec at a specific instant in time, called an *epoch*. Once the RA and Dec are known at this epoch, the RA and Dec at any other time may be calculated.

  A very common epoch is *J2000.0* which ocurred at the beginning of the year 2000. Most catalogs specify the RA and Dec at this instant of time. Already in the year 2013, we can see noticable differences in the current coordinates when compared to the catalog coordinates at 2000.0

- **Units of Angular Measure** are important, because distances and sizes in the sky are measured as an angle subtended at the earth.

For instance, the moon and the sun are both about $\frac{1}{2}^\circ$ in (angular) diameter – they subtend an angle of $\frac{1}{2}^\circ$ at the center of the earth.

The degree is the most common unit of angular measure. A degree is subdivided into 60 arcminutes. Arcminute is often denoted with a small apostrophe-like marking: $1^\circ = 60'$. An arcminute is further divided into 60 arcseconds. An arcsecond is often denoted with a double apostrophe: $1' = 60''$. Thus $1^\circ = 3600''$.

The earth rotates through 360° about its axis in 24 hours of time. Thus every hour of time corresponds to 15° of rotation of the earth. Thus, often in astronomy, the *hour* is used as a measure of angle, exactly equal to 15°. The sky, as viewed from earth, actually goes back to the same position in about 23 hours and 56 minutes, a duration known as the *sidereal day*, because the revolution of the earth adds to the rotation of the earth. However, when hour is used as a measure of angle, it is exactly equal to 15°. 60 minutes (of time) comprise an hour, and 60 seconds (of time) comprise a minute.

Angles are sometimes quoted as decimal values in degrees or hours (eg: 31.25°). The same angle may be quoted as a combination of integer degrees, (arc)minutes and (arc)seconds (eg: $31^\circ 15' 0''$) or hours, minutes (of time) and seconds (of time).

In this compilation, RA is usually specified in the hours-minutes-seconds system, whereas Declination is usually specified in the degrees-minutes-seconds system.

- **Magnitude scale** is almost always used in astronomy to express the brightnesses of astronomical objects. It's a logarithmic scale of brightness, which means increments in magnitude actually amount to multiplicative factors in brightness. In particular, in the magnitude scale, a difference of 5 in magnitude corresponds to 100× in brightness. The other important thing to note – the higher the magnitude of a star / object, the *fainter* it is! A magnitude 6 star is a $100x$ fainter than a magnitude 1 star.

  If two stars have magnitudes m_1 and m_2, the ratio of their brightnesses is given by

  $$\frac{I_2}{I_1} = 10^{0.4(m_1 - m_2)} \tag{1.1}$$

  Even if the object is an extended object (unlike a star, which almost always appears like a point through telescopes), the magnitude includes all the "light" (flux) from the object, no matter what the size of the object is. For extended objects, a definition of **surface brightness** is more convenient. Surface brightness, often measured in "magnitudes per square arcsecond" is a measure of how bright an object's surface is. So a large object "A" with the same magnitude as a small object "B", will still have a much larger (i.e. fainter) surface brightness than object "B".

2

Understanding and Using the Log Form

2.1 Description of the form

- **The title** carries the common name of the object (if any) and the primary catalog number
- **The subtitle** specifies the *type* of the object (eg: Planetary Nebula, Galaxy etc) and the constellation in which it lies.
- **Icons indicating observability** are shown on the right of the page.

Objects that are expected to be visible from dark sites with small binoculars (eg: 10×50) are indicated with this binocular icon.

Objects that are expected to be visible to the naked eye from dark skies ($\sim$ Bortle 3) are marked with this eye icon.

Objects that are expected to be visible from city sites with smaller telescopes (eg: $4'' \sim 6''$) are indicated with this city skyline icon, accompanied by a small telescope icon.

If the object is also expected to be visible in binoculars from city skies, a tiny version of the same binocular icon is displayed just above the telescope icon, next to the city skyline icon.

If the object is also expected to be visible with the naked eye from city skies, a tiny version of the same eye icon is displayed next to the city skyline icon.

—

If no icon is displayed, it indicates that the object most likely requires a telescope from dark skies, or data is unavailable about its visibility. Note that this should not discourage more advanced observers to attempt the object from city skies or with binoculars. Please consult various online forums for more information. Cloudy Nights (http://www.cloudynights.com/ubbthreads/ubbthreads.php) is one such forum.

- **The data table** lists some useful data about the object.

  The first two rows list the RA and Dec, first current as of the date of compilation, and then J2000.0.

  The "Size" field lists the size of the object in arcminutes. Imagine fitting the object into a rectangle in the sky. The larger (usually first) dimension, called the *major axis* specifies the length of the rectangle. The smaller dimension (*minor axis*) specifies the breadth of the rectangle. For example, $8' \times 3'$ means that the object will roughly fit into a rectangle with a length of 8 arcminutes and a breadth of 3 arcminutes in the sky.

  The "Position Angle" field specifies the orientation of the major axis of the object (the "length" of the rectangle mentioned above). It is measured in degrees, from North towards East. If it says 90°, it usually is invalid / unknown.

  The "Magnitude" field specifies the magnitude of the object. Usually, this is the visual magnitude and not the blue ("photographic" magnitude), except for some objects, usually indicated in the preface. Note this carefully, because the visual and blue magnitudes may differ somewhat substantially.

  The "Other Designation" field carries an alternate catalog designation of the object when available.

- **The sky chart** shows a map of the sky around the object.

  North is upwards in the map.

  The circle in the center represents a **circle of** 1° **diameter** on the sky.

  The black dots are stars. The green / red symbol in the center of the 1° circle represents the object. An effort is made to represent the size of the object accurately.

  The lines connecting stars are constellation lines, and help you visualize the constellations. Note that these are not standard and may differ across star charts. Always look up the name / designation of the star (or the RA/Dec of the object) to match against other charts.

  The fainter jagged, but solid, lines are the boundaries of constellations as defined by the IAU.

  The broken / dashed lines running up-down are lines of constant right ascension, just like longitudes on a map of the earth.

  The broken / dashed lines running left-right are lines of constant declination, just like latitudes on a map of the earth. If you see a thick horizontal line that extends through to the ends of the map, that represents the celestial equator. The celestial equator line has numbers marking hours of right ascension.

  The text in all block capitals (dark green) are the name of the constellation. Many a time you may see the text crossing a constellation boundary line – the **name always refers to the constellation to the right side** of the name.

- **A DSS image** is provided to give you a rough idea of what the object looks like. The appearance through your equipment, of course, could be drastically different depending on its capabilities! The DSS Image is an actual photo of the object taken with a fairly large, professional astronomical telescope. It is usually good to get a rough idea of what features may be visible and what may not be. Of course, it takes practice to realize which features in a DSS image you may actually expect to see through your telescope!

The dimensions of the region of the sky in the image (in arcminutes) are specified below the image (eg: $30' \times 15'$). The first dimension is the width.

Most of the time, blue POSS2/UKSTU DSS images are used. Red DSS images are used when the blue plates are unavailable. Blue plates will usually provide a better estimate of the observability of objects than red plates, as the eye is more sensitive to blue when in night-vision mode ("scotopic" vision). However, it should be borne in mind that DSS images are not really calibrated. The letters 'B', 'R' and 'I' in the caption of the DSS image, alongside the dimensions, indicate that the image is blue, red and infrared (respectively).

In the DSS images, **north is upwards**, as with the map.

- **The Observation Log** is where you log your own observations. Fill out the details as per your wishes. If you are using this logbook to earn a certification from some organization, please look up the organization's guidelines for logging. Sometimes, the log form may indicate fields that are required by the certifying organization – but please double check the organization's guidelines to be sure.

2.2 Using the form

2.2.1 Wide-field Charts

To use these forms, you will need to have wide-field star charts showing the constellations handy. Preferably the chart should have RA and Declination markings.

If you do not have a star atlases, you may purchase several commercially available star atlases, or print out the Free Mag 7 Star Atlas hosted at http://www.cloudynights.com/item.php?item_id=1052.

You could also use the wide-field star charts for the month, generated by this website: http://skymaps.com/.

Note that some of the wide-field star charts are designed to be held above your head and used – the cardinal points on the map may align up correctly only if you hold them above your head.

You may alternately also use computer software to obtain wide-field views. There are several free, open-source options, the most recommended for this purpose being Stellarium. Stellarium may be obtained for a variety of operating systems at http://www.stellarium.org. Other recommended options include KStars – http://edu.kde.org/kstars and SkyChart – http://www.ap-i.net/skychart/start, which also run on a variety of operating systems.

2.2.2 Visibility of Objects

To check if an object is visible at your latitude, you could find the lowest declination you can see by the formula

$$\text{Lowest Observable Declination} = 90^\circ - \text{Observation Latitude}. \tag{2.1}$$

Substitute your latitude without the sign, irrespective of whether it is northern or southern. In the southern hemisphere, you'll get the lowest northern declination visible. In the northern hemisphere, you'll get the lowest southern declination visible.

If the object is in the opposite hemisphere to where you are observing, check that its declination is closer to zero than the Lowest Observable Declination you calculated above.

Often, you cannot observe objects that are too close to the horizon. The atmosphere itself limits your observations somewhat to about 5°above the horizon (this is a very ballpark figure). Light-pollution domes can make things worse. Just subtract the number of degrees you lose near the horizon from the Lowest Observable Declination you calculated, to make your estimate more practical. High altitudes can sometimes help lower the horizon, so observing from a high altitude could add a few degrees to the Lowest Observable Declination.

Objects that do not qualify the criterion you calculate above can never be seen from your latitude, unless you fly pretty high above the ground! So you can eliminate such objects from your observing list, or save them for a cross-continental trip to the other hemisphere (or a long trip to a more tropical region).

Other objects, while visible from your latitude, may not be visible at the given time of the year etc. The best way to determine whether an object is visible at a given time from a given latitude is to use astronomy software. That is why knowing constellations is very helpful – so you can quickly figure out if a certain object is visible by checking if the constellation in which it resides is visible. Wide-field star charts generated for a given night (you need one for the evening and one for the early morning next day) will be able to help you quickly check up on visible constellations, so you can plan your observation.

If you like rough estimates, you can make one by knowing the RA of the sun. Block off 1 hour after sunset and before sunrise. 1 hour of time (almost exactly) corresponds to 1 hour of RA so if the object's RA lies outside this twilight zone, you are likely to be able to observe it. This kind of an estimate does not work well at high latitudes, at times away from the equinoxes. The use of computer software is strongly recommended.

2.2.3 Locating the Constellations, finding a reference star

First, make sure you are aware of the cardinal directions around you.

In the northern hemisphere, an easy way to identify north is to look for the Big Dipper, a famous asterism of 7 stars, that is part of the constellation Ursa Major. If the Big Dipper is not visible, Cassiopeia is a good alternative. The constellation has the shape of an M, Σ, W or Ƹ depending on the orientation.

In the southern hemisphere, you may look for the Southern Cross (Crux) to identify south.

Once you have identified north / south, also identify east / west and find out if your wide-field chart is designed to be held above your head and used.

Use your wide-field star atlas to identify the constellation patterns in the sky. Remember that the constellation patterns differ across various sky maps.

Prominent patterns that are easy to identify are the Great Square of Pegasus, Cassiopeia, Orion, the head of Taurus the bull, Auriga, the Southern Cross, the Big Dipper, Corvus, Scorpius, the Teapot in Sagittarius. Use these as landmarks to find your way around the sky.

Identify a bright star (the bigger the circles, the brighter the stars they represent), which we will refer to as the *reference star*, within the finder chart embedded in the log. Locate the star in your wide-field charts, and thereby locate it on the sky.

2.2.4 Finding the object

Once you have located the reference star, recalling that the sky maps have north on the top, orient the book correctly to map what you see in the sky with the sky chart in the logbook.

Then, a variety of options are at your disposal. One is to try to find the location of the object in the sky precisely, by using a bunch of stars, and point the telescope / binoculars to that location. For example, if you see on the chart that the object is exactly between two stars, you could just point your telescope exactly to that location on the sky, using the two stars for reference. Another technique is *star hopping* – work a route from the reference star to the object using various other stars as landmarks.

Many an internet resource can help explain these techniques better.

Finally, you may need to pan the telescope a bit, or move your binoculars around a bit to actually locate the object.

Remember that many telescopes and some finder scopes produce inverted or mirrored images. Some people often find it useful to identify unambiguous patterns that have directionality to them of stars and just position relatively. Others like to orient the map correctly, and then account for the reflection or inversion

of their telescopes in their head. If you would rather have an erect field, there are erecting prisms available from many vendors for standard (1.25" and 2") telescope focusers.

If the object is rather faint, you may need to precisely zero in on it by using the star field around the object. To see the star field around the object, the easiest way is to use software. The DSS images may occasionally help you in this regard.

2.2.5 Observing the object

Averted vision, also known as *peripheral vision* is an important observing technique. Use internet resources to understand and master this technique.

Note that the magnitude is not a true indicator of the brightness of the object as seen with a telescope. A large object "A" with the same magnitude as a fainter object "B", will appear much fainter than "B" because the light is spread over a larger area.

In the description provided in the logging form, for some objects, you may notice a number of abbreviations specified. These constitute J L E Dreyer's description of the object, and these descriptions are very helpful to get a feel for what the object actually looks like. Note that J L E Dreyer had larger telescopes and was observing from dark skies when making these descriptions. However, the descriptions are more apt than magnitudes when determining how bright an object is. Many resources on the internet have explanations for the abbreviations used in Dreyer's descriptions. Here is one such resource: http://spider.seds.org/ngc/des.html.

3

List of Objects by Constellation

NOTE: Numbers in square brackets are page numbers

Eridanus

Hercules

Hydra

Leo

Lepus

Lynx

Orion

Pegasus

Pisces

Piscis Austrinus

Sagittarius

Serpens Caput

Sextans

Taurus

HCG 33 [83]

Ursa Major

HCG 41 [99]
HCG 45 [107]
HCG 49 [115]
HCG 50 [117]
HCG 56 [129]
HCG 60 [137]
HCG 66 [149]

Ursa Minor

HCG 84 [185]

Virgo

HCG 58 [133]
HCG 62 [141]
HCG 64 [145]
HCG 67 [151]

4

List of Objects by Type

NOTE: Numbers in square brackets are page numbers

Galaxy Cluster

5

List of Common Names

The following table is ordered alphabetically by common name.

Table 5.1: Objects by common name

Common Name	Catalog Designation	Page
Copeland's Septet	HCG 57	131
Seyfert's Sextet	HCG 79	175
Stephan's Quintet	HCG 92	201
The Box	HCG 61	139

6

Checklist of Objects

Use this checklist to look up page numbers, to look up essential information, and to make entries of the dates of your first and subsequent observations.

Table 6.1: Checklist of Objects

Sl. No.	Object	Type	Constellation	Mag.	Size	Page	Obs. Date	Second Obs.
1	HCG 1	Galaxy Cluster	Andromeda	14	$2.9' \times 2.9'$	19		
2	HCG 2	Galaxy Cluster	Pisces	13	$7.1' \times 7.1'$	21		
3	HCG 3	Galaxy Cluster	Cetus	13	$3.8' \times 3.8'$	23		
4	HCG 4	Galaxy Cluster	Cetus	13	$3.6' \times 3.6'$	25		
5	HCG 5	Galaxy Cluster	Pisces	13	$1.6' \times 1.6'$	27		
6	HCG 6	Galaxy Cluster	Cetus	13	$1.6' \times 1.6'$	29		
7	HCG 7	Galaxy Cluster	Cetus	12	$5.7' \times 5.7'$	31		
8	HCG 8	Galaxy Cluster	Andromeda	13	$1.2' \times 1.2'$	33		
9	HCG 9	Galaxy Cluster	Cetus	14	$2.1' \times 2.1'$	35		
10	HCG 10	Galaxy Cluster	Andromeda	11	$10.9' \times 10.9'$	37		
11	HCG 11	Galaxy Cluster	Cetus	12	$4.9' \times 4.9'$	39		
12	HCG 12	Galaxy Cluster	Cetus	13	$2.6' \times 2.6'$	41		
13	HCG 13	Galaxy Cluster	Cetus	14	$2.5' \times 2.5'$	43		
14	HCG 14	Galaxy Cluster	Cetus	13	$6.7' \times 6.7'$	45		
15	HCG 15	Galaxy Cluster	Cetus	13	$7.7' \times 7.7'$	47		
16	HCG 16	Galaxy Cluster	Cetus	11	$6.4' \times 6.4'$	49		
17	HCG 17	Galaxy Cluster	Aries	15	$1' \times 1'$	51		

Continued on the following page

Table 6.1: Checklist of Objects

Sl. No.	Object	Type	Constellation	Mag.	Size	Page	Obs. Date	Second Obs.
18	HCG 18	Galaxy Cluster	Aries	13	$2' \times 2'$	53		
19	HCG 19	Galaxy Cluster	Cetus	13	$3.1' \times 3.1'$	55		
20	HCG 20	Galaxy Cluster	Aries	14	$1.5' \times 1.5'$	57		
21	HCG 21	Galaxy Cluster	Eridanus	11	$10.8' \times 10.8'$	59		
22	HCG 22	Galaxy Cluster	Eridanus	11	$5' \times 5'$	61		
23	HCG 23	Galaxy Cluster	Eridanus	12	$7.1' \times 7.1'$	63		
24	HCG 24	Galaxy Cluster	Eridanus	14	$2.4' \times 2.4'$	65		
25	HCG 25	Galaxy Cluster	Cetus	13	$6.4' \times 6.4'$	67		
26	HCG 26	Galaxy Cluster	Eridanus	13	$1.9' \times 1.9'$	69		
27	HCG 27	Galaxy Cluster	Eridanus	15	$3.8' \times 3.8'$	71		
28	HCG 28	Galaxy Cluster	Eridanus	14	$1.2' \times 1.2'$	73		
29	HCG 29	Galaxy Cluster	Eridanus	15	$0.8' \times 0.8'$	75		
30	HCG 30	Galaxy Cluster	Eridanus	12	$4.5' \times 4.5'$	77		
31	HCG 31	Galaxy Cluster	Eridanus	14	$0.9' \times 0.9'$	79		
32	HCG 32	Galaxy Cluster	Lepus	13	$3' \times 3'$	81		
33	HCG 33	Galaxy Cluster	Taurus	14	$2.1' \times 2.1'$	83		
34	HCG 34	Galaxy Cluster	Orion	13	$1.2' \times 1.2'$	85		
35	HCG 35	Galaxy Cluster	Lynx	14	$2.2' \times 2.2'$	87		
36	HCG 36	Galaxy Cluster	Cancer	13	$1.9' \times 1.9'$	89		
37	HCG 37	Galaxy Cluster	Cancer	12	$3.2' \times 3.2'$	91		
38	HCG 38	Galaxy Cluster	Leo	14	$2.9' \times 2.9'$	93		
39	HCG 39	Galaxy Cluster	Hydra	15	$1' \times 1'$	95		
40	HCG 40	Galaxy Cluster	Hydra	12	$1.7' \times 1.7'$	97		
41	HCG 41	Galaxy Cluster	Ursa Major	12	$4.1' \times 4.1'$	99		
42	HCG 42	Galaxy Cluster	Hydra	11	$6' \times 6'$	101		
43	HCG 43	Galaxy Cluster	Sextans	13	$3.5' \times 3.5'$	103		
44	HCG 44	Galaxy Cluster	Leo	10	$16.4' \times 16.4'$	105		
45	HCG 45	Galaxy Cluster	Ursa Major	14	$3.4' \times 3.4'$	107		
46	HCG 46	Galaxy Cluster	Leo	14	$3.6' \times 3.6'$	109		
47	HCG 47	Galaxy Cluster	Leo	13	$2.3' \times 2.3'$	111		
48	HCG 48	Galaxy Cluster	Hydra	12	$5' \times 5'$	113		
49	HCG 49	Galaxy Cluster	Ursa Major	15	$0.9' \times 0.9'$	115		
50	HCG 50	Galaxy Cluster	Ursa Major	16	$0.7' \times 0.7'$	117		
51	HCG 51	Galaxy Cluster	Leo	13	$4.5' \times 4.5'$	119		
52	HCG 52	Galaxy Cluster	Leo	13	$3.2' \times 3.2'$	121		

Continued on the following page

Table 6.1: Checklist of Objects

Sl. No.	Object	Type	Constellation	Mag.	Size	Page	Obs. Date	Second Obs.
53	HCG 53	Galaxy Cluster	Leo	12	$12.9' \times 12.9'$	123		
54	HCG 54	Galaxy Cluster	Leo	15	$0.7' \times 0.7'$	125		
55	HCG 55	Galaxy Cluster	Draco	15	$0.9' \times 0.9'$	127		
56	HCG 56	Galaxy Cluster	Ursa Major	13	$2.1' \times 2.1'$	129		
57	HCG 57 (Copeland's Septet)	Galaxy Cluster	Leo	13	$5.5' \times 5.5'$	131		
58	HCG 58	Galaxy Cluster	Virgo	14	$8.8' \times 8.8'$	133		
59	HCG 59	Galaxy Cluster	Leo	14	$2.1' \times 2.1'$	135		
60	HCG 60	Galaxy Cluster	Ursa Major	14	$2.3' \times 2.3'$	137		
61	HCG 61 (The Box)	Galaxy Cluster	Coma Berenices	11	$3.8' \times 3.8'$	139		
62	HCG 62	Galaxy Cluster	Virgo	12	$3.7' \times 3.7'$	141		
63	HCG 63	Galaxy Cluster	Centaurus	14	$2.9' \times 2.9'$	143		
64	HCG 64	Galaxy Cluster	Virgo	14	$1.7' \times 1.7'$	145		
65	HCG 65	Galaxy Cluster	Hydra	14	$1.7' \times 1.7'$	147		
66	HCG 66	Galaxy Cluster	Ursa Major	14	$1' \times 1'$	149		
67	HCG 67	Galaxy Cluster	Virgo	12	$3.3' \times 3.3'$	151		
68	HCG 68	Galaxy Cluster	Canes Venatici	10	$9.2' \times 9.2'$	153		
69	HCG 69	Galaxy Cluster	Bootes	13	$1.9' \times 1.9'$	155		
70	HCG 70	Galaxy Cluster	Canes Venatici	13	$3.4' \times 3.4'$	157		
71	HCG 71	Galaxy Cluster	Bootes	13	$5' \times 5'$	159		
72	HCG 72	Galaxy Cluster	Bootes	13	$1.8' \times 1.8'$	161		
73	HCG 73	Galaxy Cluster	Bootes	13	$4.8' \times 4.8'$	163		
74	HCG 74	Galaxy Cluster	Serpens Caput	13	$1.9' \times 1.9'$	165		
75	HCG 75	Galaxy Cluster	Serpens Caput	14	$2.2' \times 2.2'$	167		
76	HCG 76	Galaxy Cluster	Serpens Caput	14	$3.3' \times 3.3'$	169		
77	HCG 77	Galaxy Cluster	Serpens Caput	15	$0.8' \times 0.8'$	171		
78	HCG 78	Galaxy Cluster	Draco	14	$3.5' \times 3.5'$	173		
79	HCG 79 (Seyfert's Sextet)	Galaxy Cluster	Serpens Caput	13	$1.3' \times 1.3'$	175		
80	HCG 80	Galaxy Cluster	Draco	13	$1.7' \times 1.7'$	177		
81	HCG 81	Galaxy Cluster	Hercules	14	$0.9' \times 0.9'$	179		
82	HCG 82	Galaxy Cluster	Hercules	13	$3.1' \times 3.1'$	181		
83	HCG 83	Galaxy Cluster	Hercules	15	$1.9' \times 1.9'$	183		
84	HCG 84	Galaxy Cluster	Ursa Minor	15	$2.4' \times 2.4'$	185		
85	HCG 85	Galaxy Cluster	Draco	14	$1.3' \times 1.3'$	187		
86	HCG 86	Galaxy Cluster	Sagittarius	13	$4' \times 4'$	189		
87	HCG 87	Galaxy Cluster	Capricornus	13	$1.5' \times 1.5'$	191		

Continued on the following page

Table 6.1: Checklist of Objects

Sl. No.	Object	Type	Constellation	Mag.	Size	Page	Obs. Date	Second Obs.
88	HCG 88	Galaxy Cluster	Aquarius	12	$5.2' \times 5.2'$	193		
89	HCG 89	Galaxy Cluster	Aquarius	15	$4.8' \times 4.8'$	195		
90	HCG 90	Galaxy Cluster	Piscis Austrinus	10	$7.4' \times 7.4'$	197		
91	HCG 91	Galaxy Cluster	Piscis Austrinus	12	$5.2' \times 5.2'$	199		
92	HCG 92 (Stephan's Quintet)	Galaxy Cluster	Pegasus	12	$3.2' \times 3.2'$	201		
93	HCG 93	Galaxy Cluster	Pegasus	12	$9' \times 9'$	203		
94	HCG 94	Galaxy Cluster	Pegasus	13	$2.8' \times 2.8'$	205		
95	HCG 95	Galaxy Cluster	Pegasus	13	$1.5' \times 1.5'$	207		
96	HCG 96	Galaxy Cluster	Pegasus	12	$2.3' \times 2.3'$	209		
97	HCG 97	Galaxy Cluster	Pisces	12	$5.2' \times 5.2'$	211		
98	HCG 98	Galaxy Cluster	Pisces	12	$2.4' \times 2.4'$	213		
99	HCG 99	Galaxy Cluster	Pegasus	13	$2.4' \times 2.4'$	215		

7

Logging Forms

This section contains the actual logging forms.

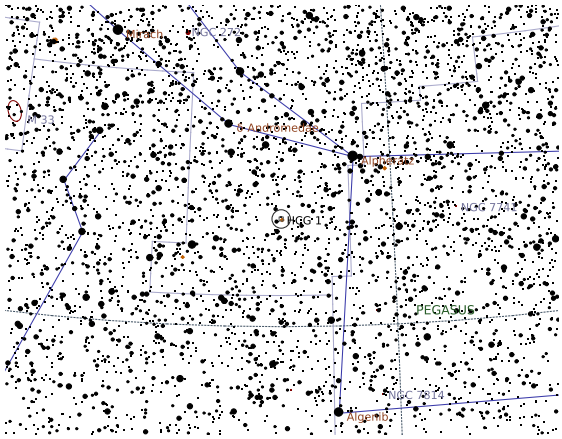
Note that the page numbers for each chart are listed in the Checklist section.

HCG 1

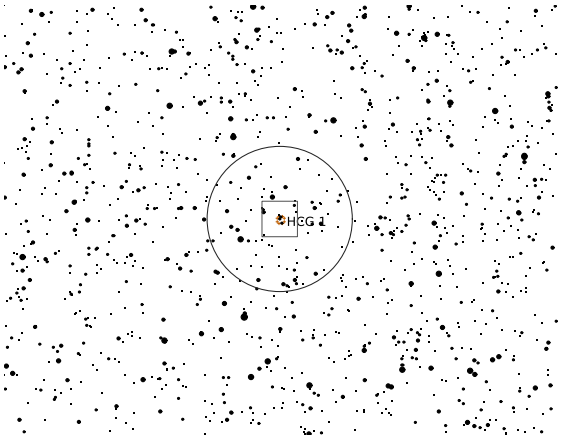
Galaxy Cluster in Andromeda

Right Ascension (current)	$00^h\,26^m\,42^s$	Declination (current)	$25°\,47'\,23''$
Right Ascension (J2000.0)	$00^h\,26^m\,00^s$	Declination (J2000.0)	$25°\,43'\,05''$
Size	$2.9' \times 2.9'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

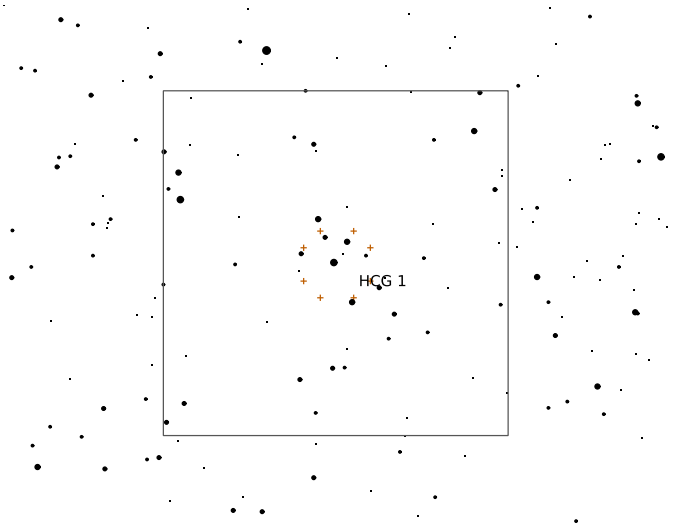
Description: z = 0.0339



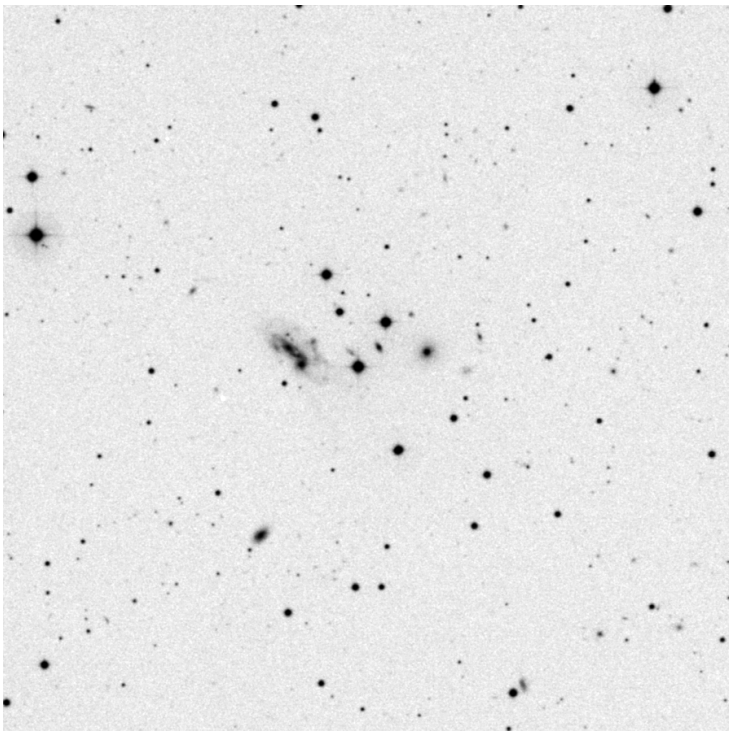
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

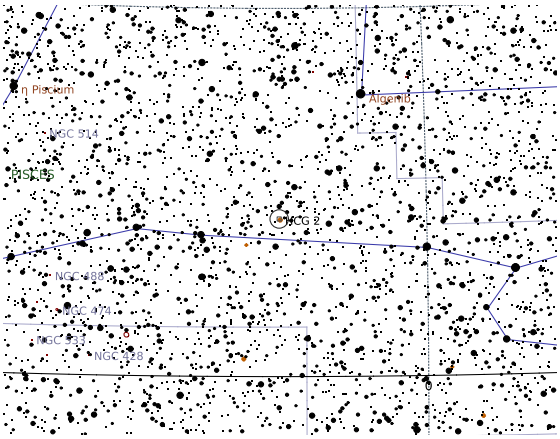
_____

HCG 2

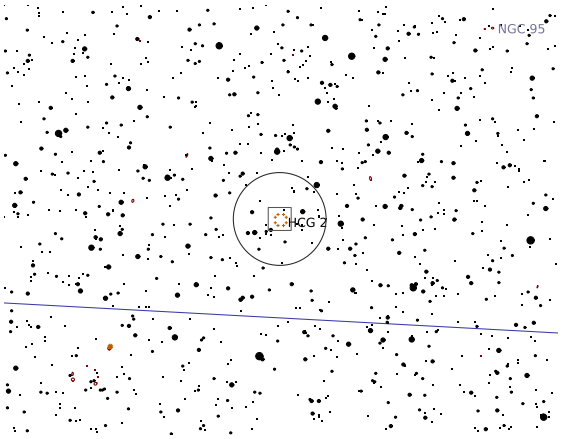
Galaxy Cluster in Pisces

Right Ascension (current)	$00^h\,32^m\,11^s$	Declination (current)	$8°\,30'\,14''$
Right Ascension (J2000.0)	$00^h\,31^m\,30^s$	Declination (J2000.0)	$8°\,25'\,53''$
Size	$7.1' \times 7.1'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

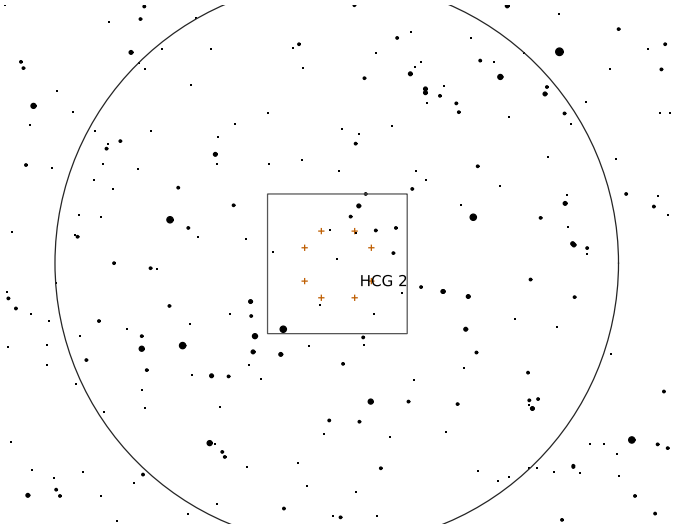
Description: z = 0.0144



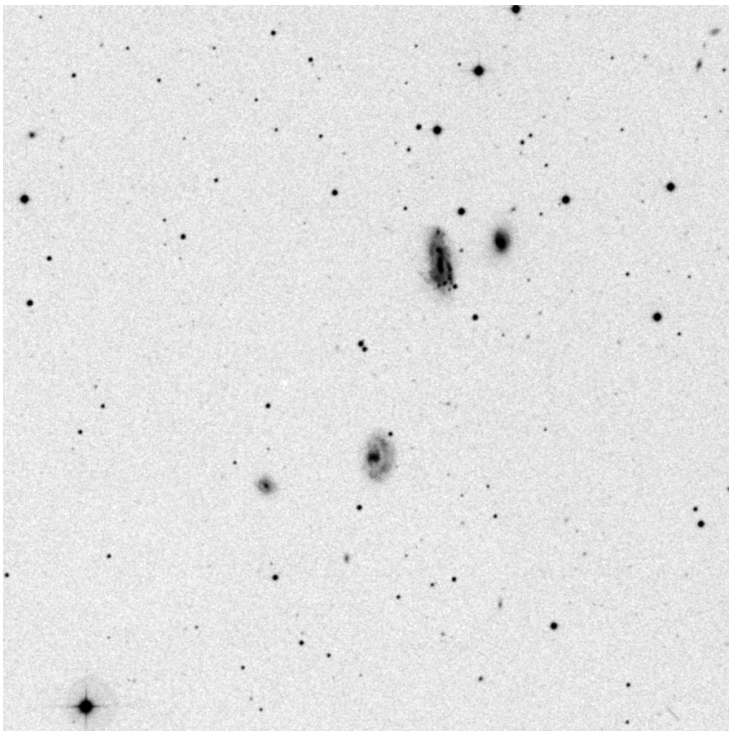
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

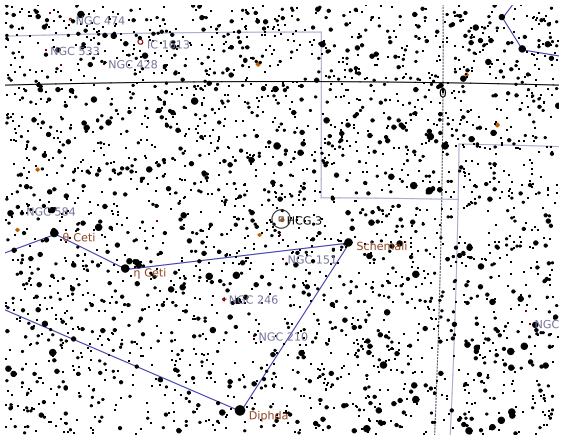
_____

HCG 3

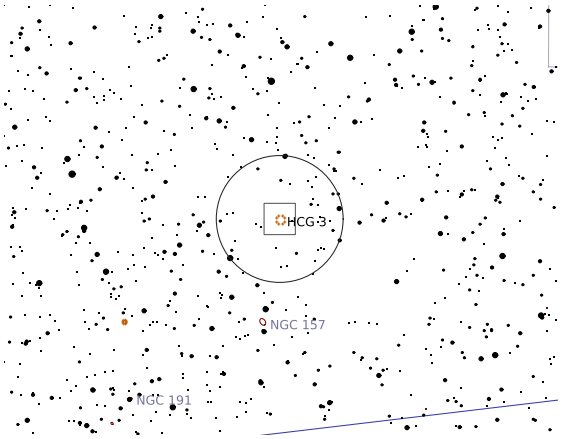
Galaxy Cluster in Cetus

Right Ascension (current)	$00^{h}\,34^{m}\,51^{s}$	Declination (current)	$-7°\,31'\,09''$
Right Ascension (J2000.0)	$00^{h}\,34^{m}\,11^{s}$	Declination (J2000.0)	$-7°\,35'\,35''$
Size	$3.8' \times 3.8'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

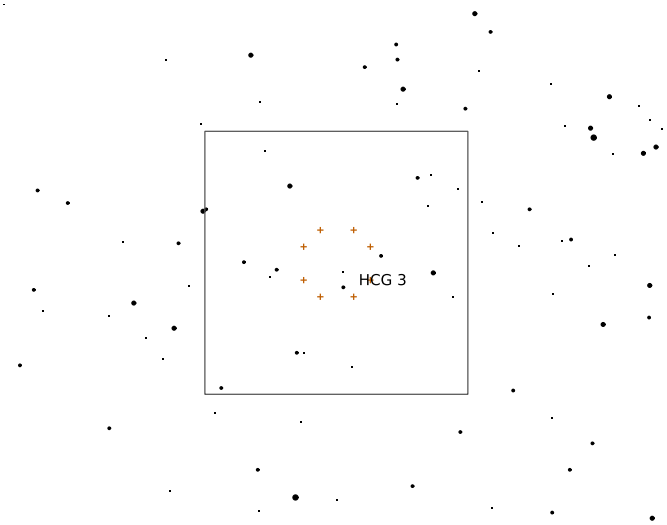
Description: z = 0.0255



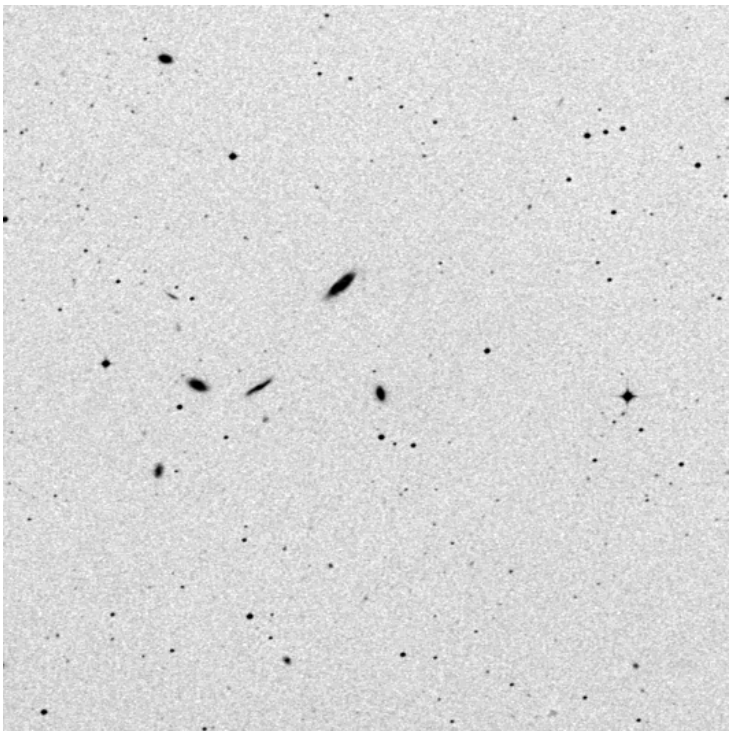
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

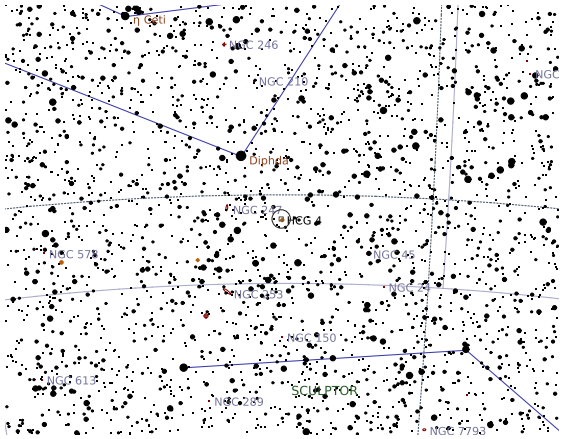
_____

HCG 4

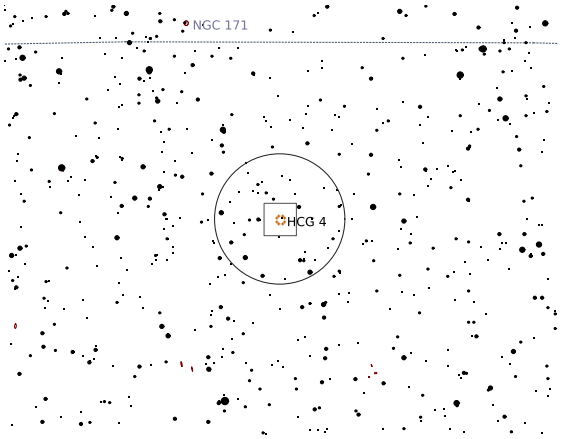
Galaxy Cluster in Cetus

Right Ascension (current)	$00^h\,34^m\,55^s$	Declination (current)	$-21°\,22'\,19''$
Right Ascension (J2000.0)	$00^h\,34^m\,16^s$	Declination (J2000.0)	$-21°\,26'\,48''$
Size	$3.6' \times 3.6'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

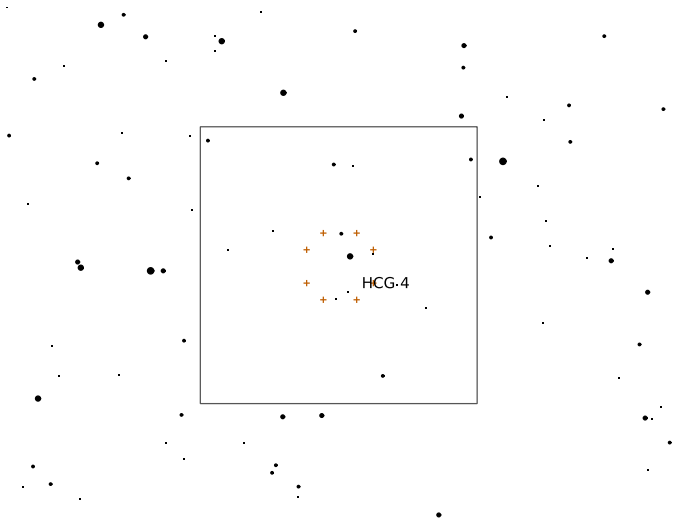
Description: z = 0.0280



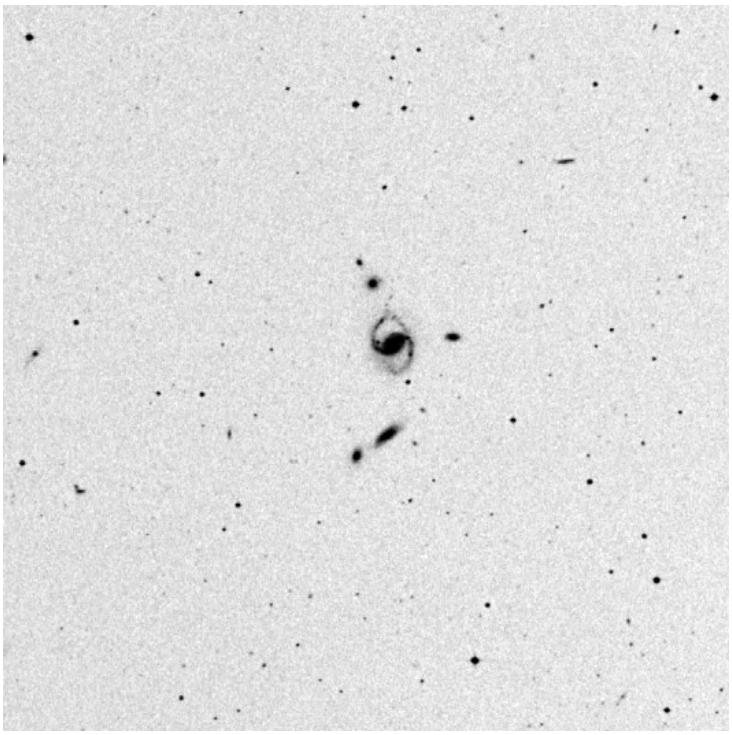
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

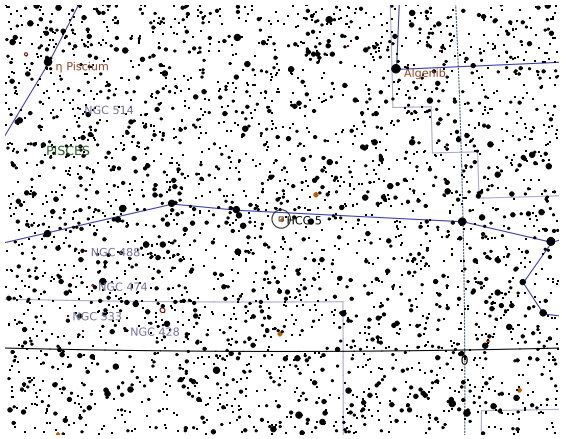
_____

HCG 5

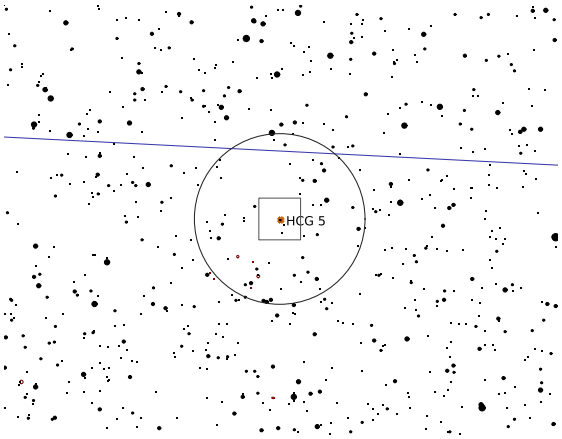
Galaxy Cluster in Pisces

Right Ascension (current)	$00^h\,39^m\,35^s$	Declination (current)	$7°\,08'\,09''$
Right Ascension (J2000.0)	$00^h\,38^m\,54^s$	Declination (J2000.0)	$7°\,03'\,49''$
Size	$1.6' \times 1.6'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

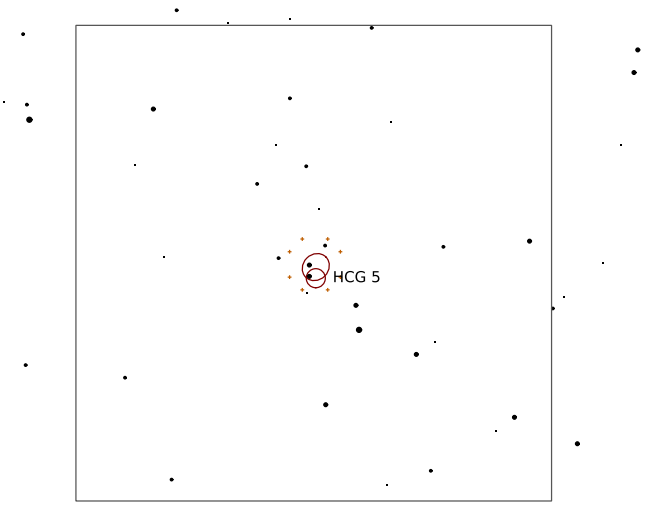
Description: z = 0.0410



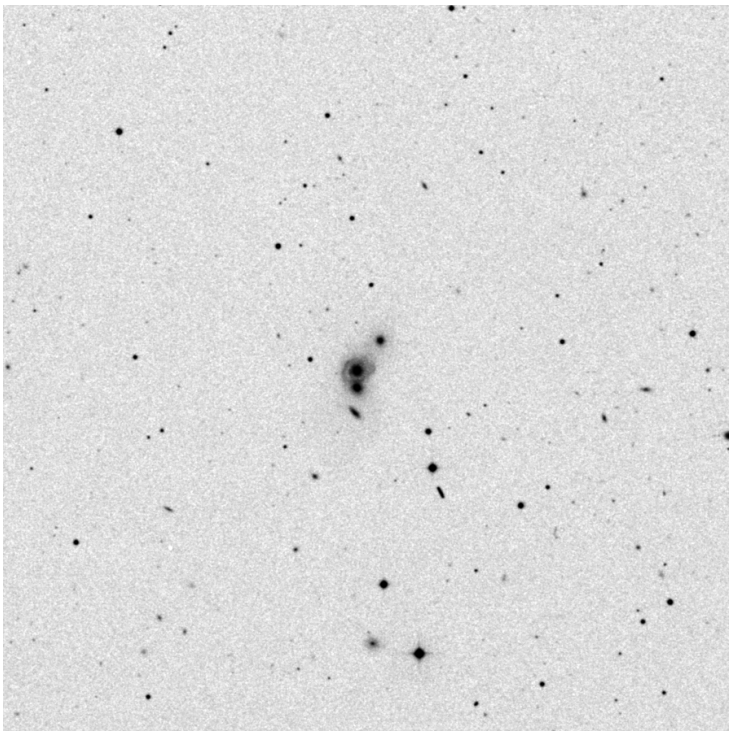
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

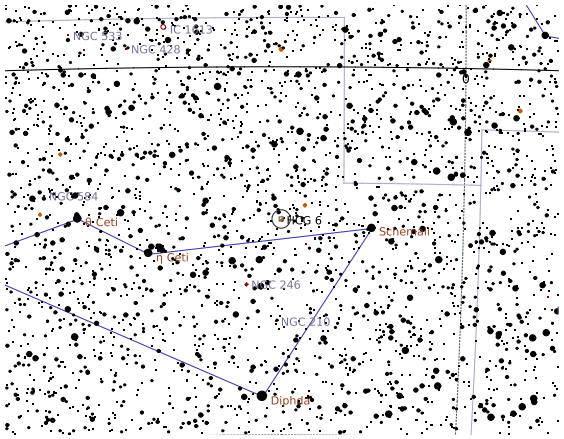
_____

HCG 6

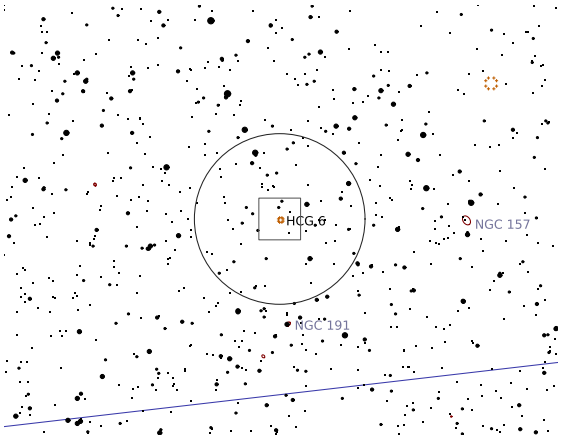
Galaxy Cluster in Cetus

Right Ascension (current)	$00^{h}\,39^{m}\,50^{s}$	Declination (current)	$-8°\,19'\,18''$
Right Ascension (J2000.0)	$00^{h}\,39^{m}\,10^{s}$	Declination (J2000.0)	$-8°\,23'\,43''$
Size	$1.6' \times 1.6'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

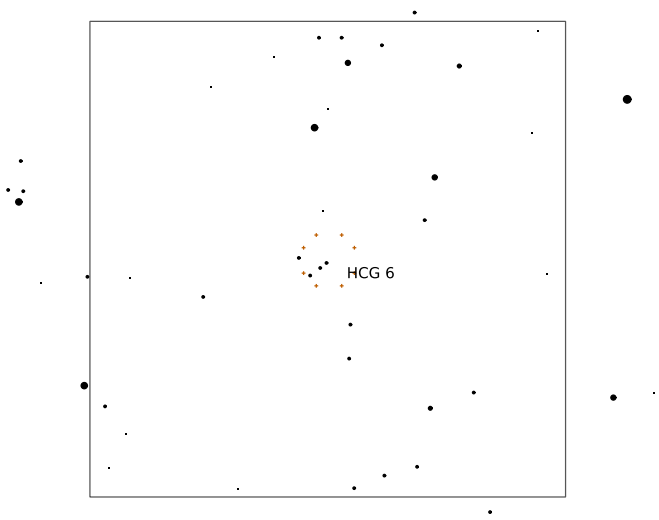
Description: z = 0.0379



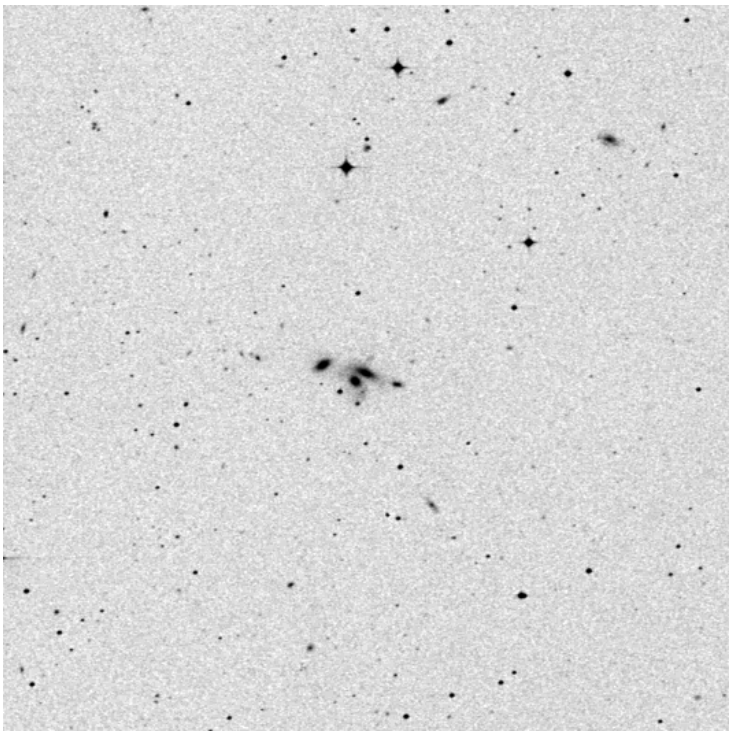
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

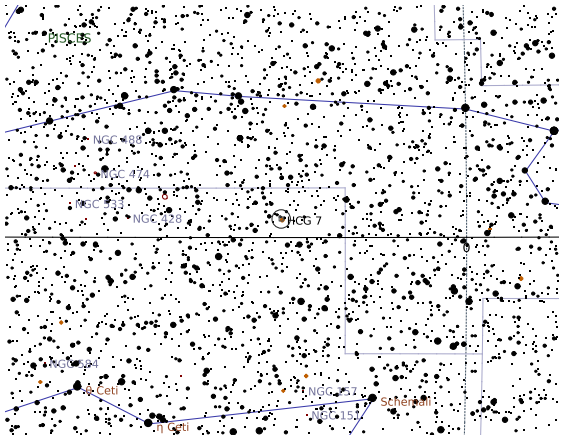
_____

HCG 7

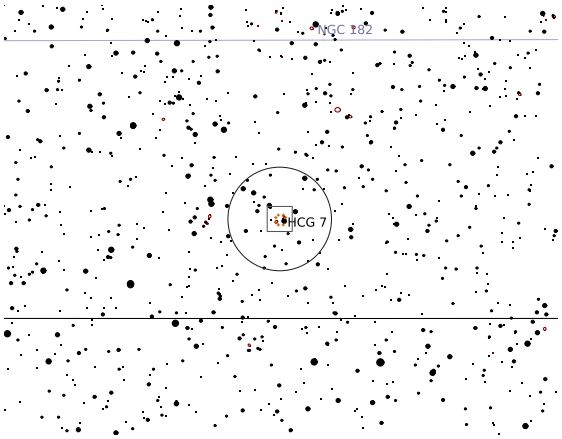
Galaxy Cluster in Cetus

Right Ascension (current)	$00^h\,40^m\,04^s$	Declination (current)	$0°\,57'\,02''$
Right Ascension (J2000.0)	$00^h\,39^m\,23^s$	Declination (J2000.0)	$0°\,52'\,41''$
Size	$5.7' \times 5.7'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

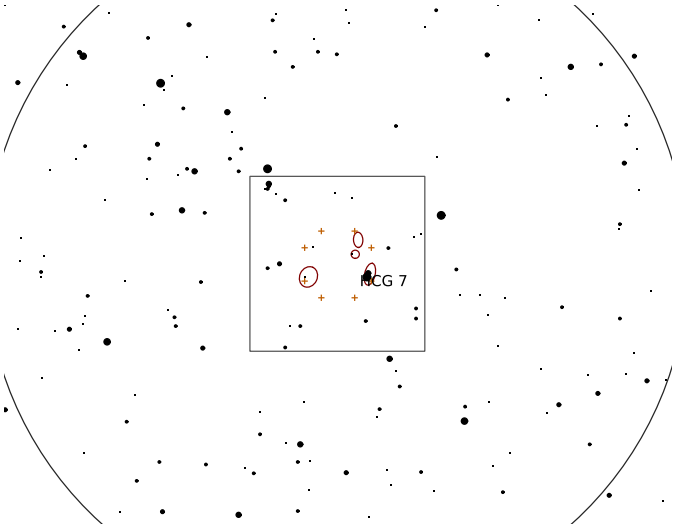
Description: z = 0.0141



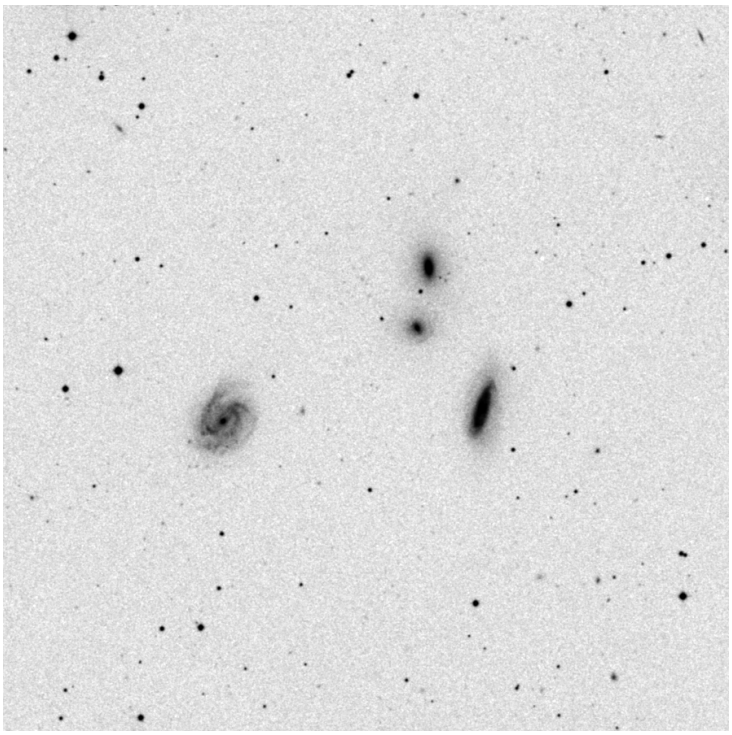
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

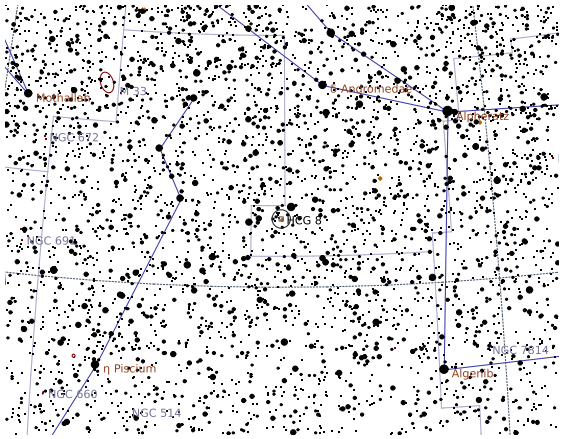
_____

HCG 8

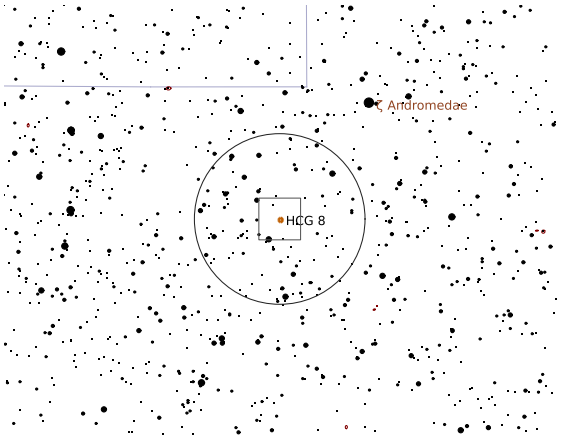
Galaxy Cluster in Andromeda

Right Ascension (current)	$00^{h}\,50^{m}\,19^{s}$	Declination (current)	$23^{\circ}\,39'\,05''$
Right Ascension (J2000.0)	$00^{h}\,49^{m}\,36^{s}$	Declination (J2000.0)	$23^{\circ}\,34'\,51''$
Size	$1.2' \times 1.2'$	Position Angle	0°
Magnitude	13	Other Designation	–

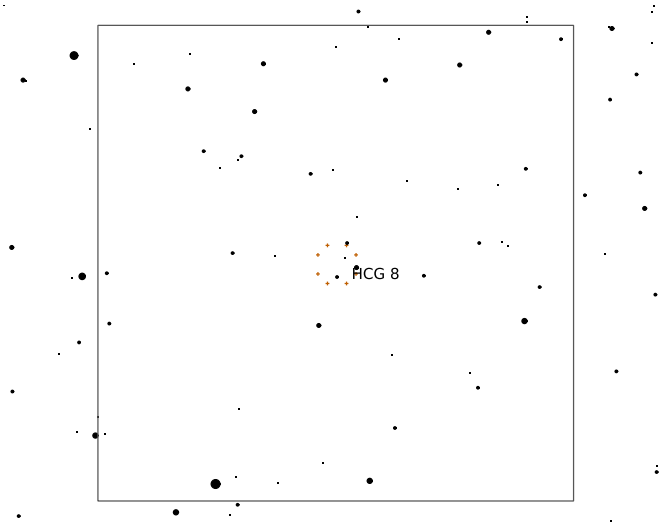
Description: z = 0.0545



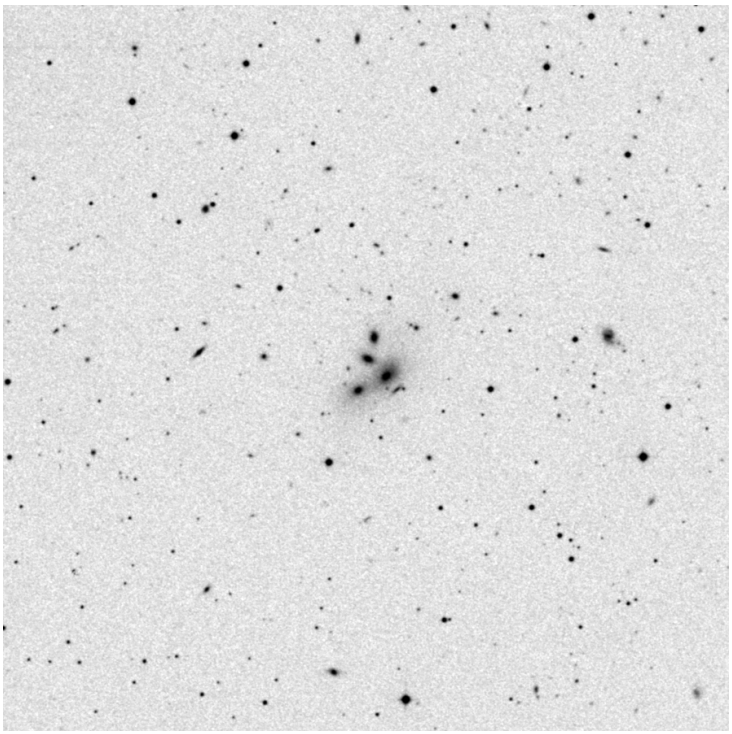
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

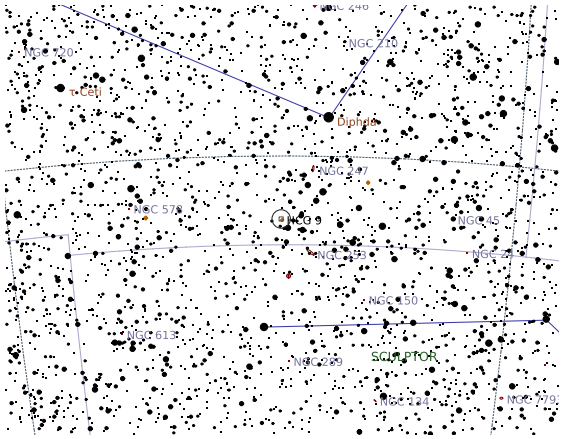
_____

HCG 9

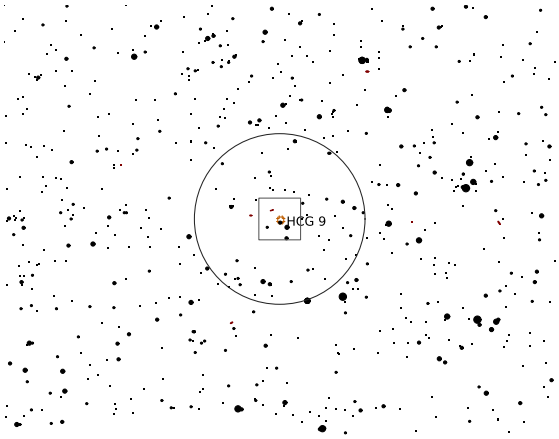
Galaxy Cluster in Cetus

Right Ascension (current)	$00^{h}\,54^{m}\,56^{s}$	Declination (current)	$-23°\,28'\,40''$
Right Ascension (J2000.0)	$00^{h}\,54^{m}\,18^{s}$	Declination (J2000.0)	$-23°\,33'\,04''$
Size	$2.1' \times 2.1'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

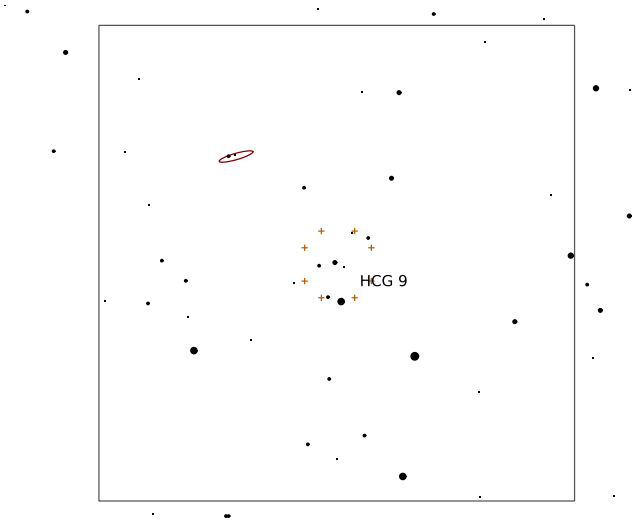
Description: z = 0.0000



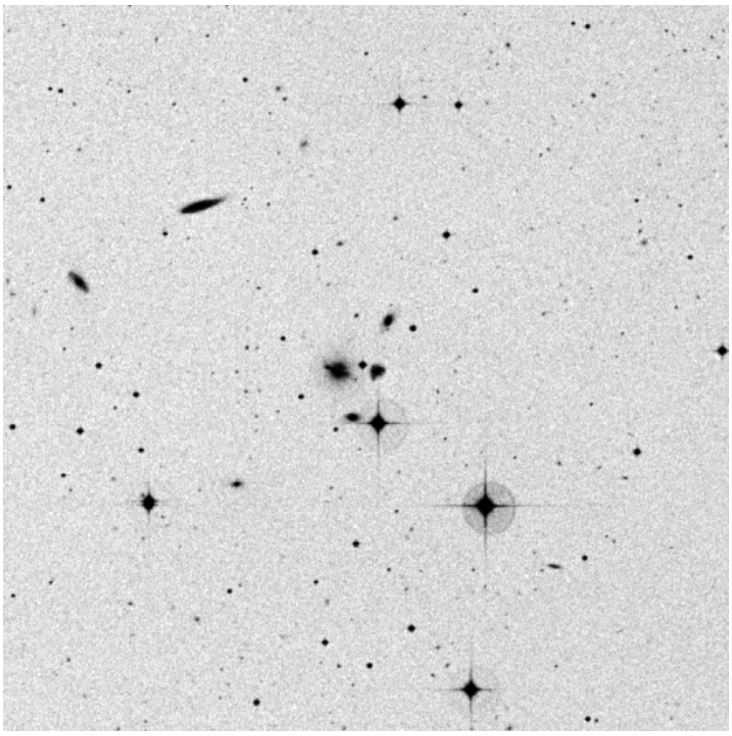
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

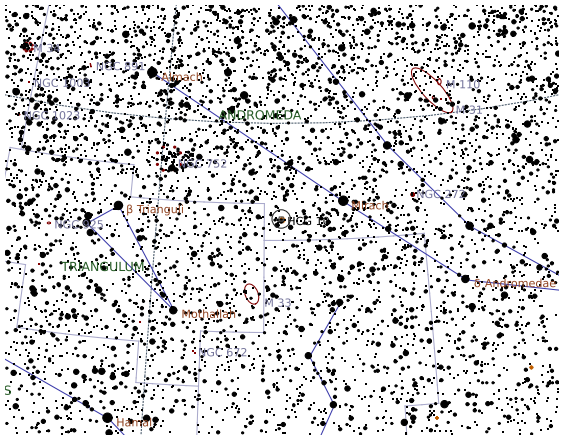
_____

HCG 10

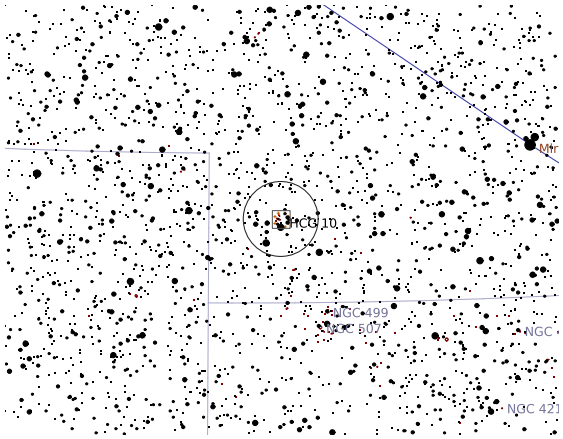
Galaxy Cluster in Andromeda

Right Ascension (current)	$01^h\,26^m\,52^s$	Declination (current)	$34°\,45'\,27''$
Right Ascension (J2000.0)	$01^h\,26^m\,07^s$	Declination (J2000.0)	$34°\,41'\,27''$
Size	$10.9' \times 10.9'$	Position Angle	0°
Magnitude	11	Other Designation	–

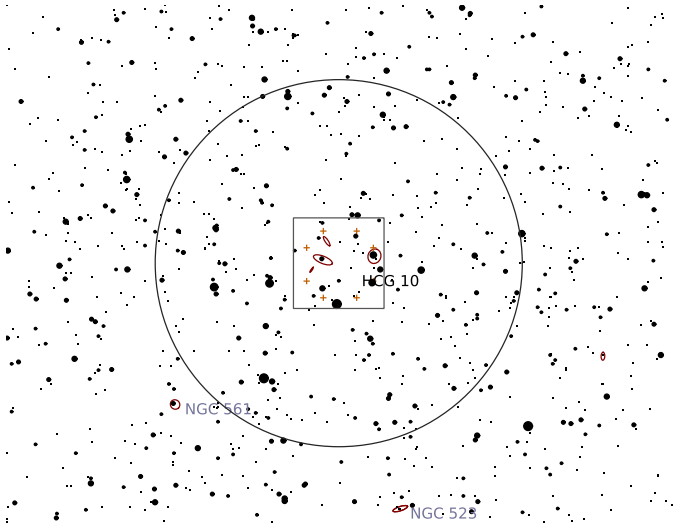
Description: z = 0.0161



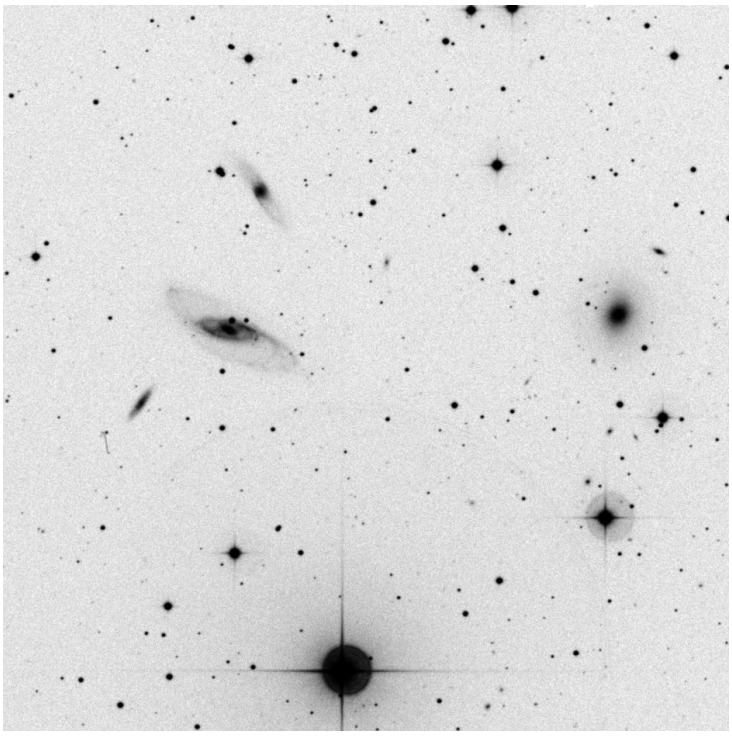
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.9' \times 15.9'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

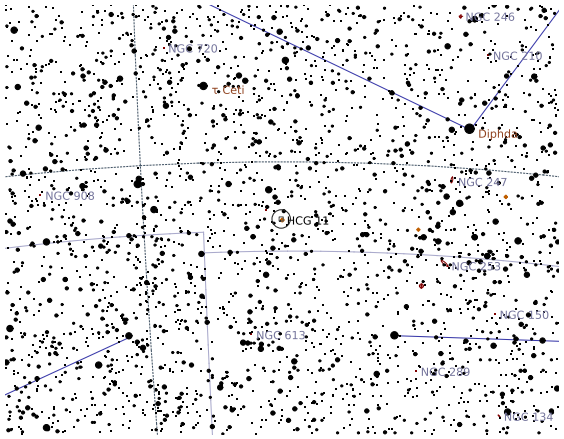
_____

HCG 11

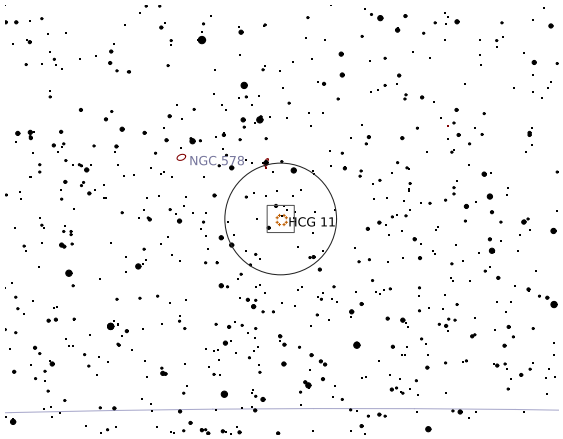
Galaxy Cluster in Cetus

Right Ascension (current)	$01^{h}\,27^{m}\,11^{s}$	Declination (current)	$-23^{\circ}\,09'\,41''$
Right Ascension (J2000.0)	$01^{h}\,26^{m}\,34^{s}$	Declination (J2000.0)	$-23^{\circ}\,13'\,52''$
Size	$4.9' \times 4.9'$	Position Angle	0°
Magnitude	12	Other Designation	–

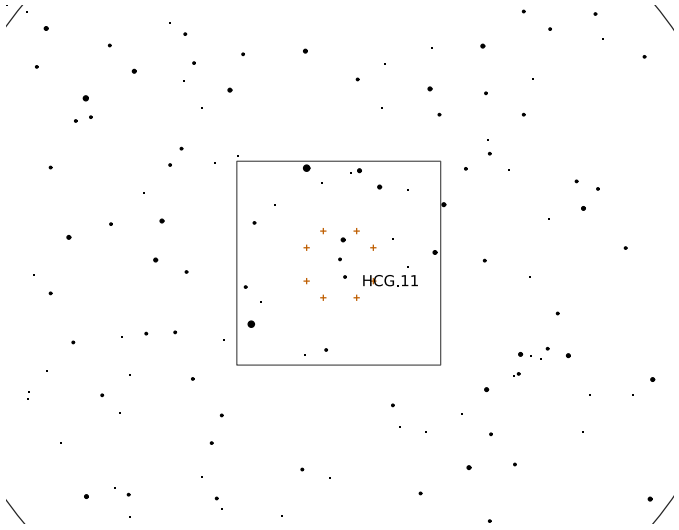
Description: z = 0.0000



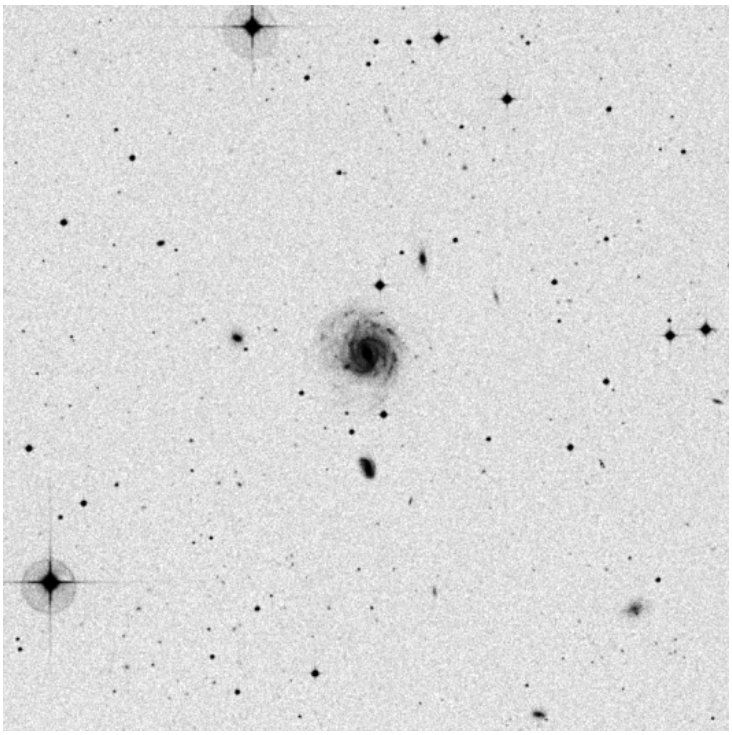
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

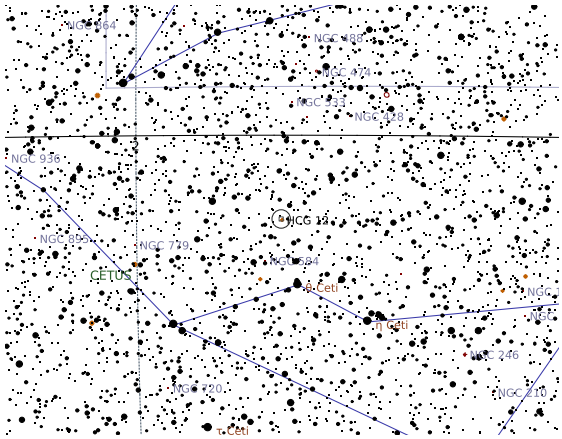
_____

HCG 12

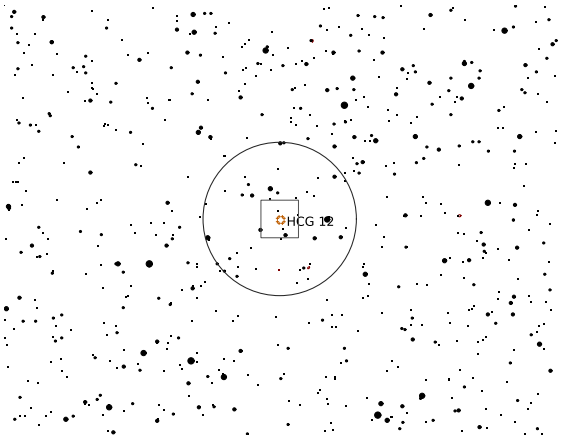
Galaxy Cluster in Cetus

Right Ascension (current) Right Ascension (J2000.0)	$01^h\,28^m\,13^s$ $01^h\,27^m\,33^s$	Declination (current) Declination (J2000.0)	$-4°\,36'\,07''$ $-4°\,40'\,14''$
Size Magnitude	$2.6' \times 2.6'$ 13	Position Angle Other Designation	0° –

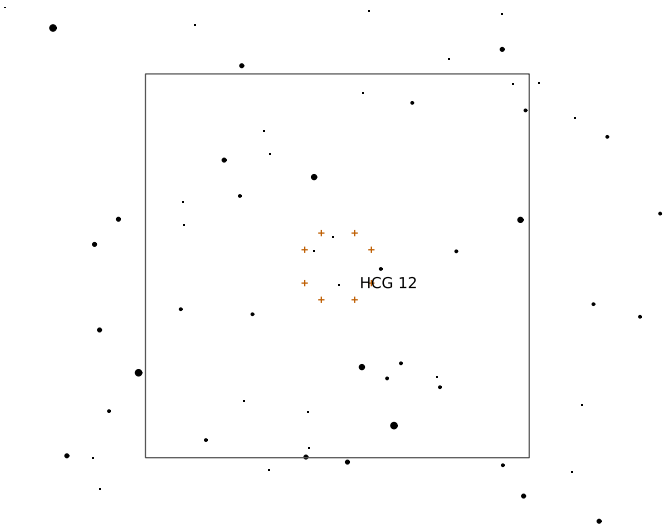
Description: z = 0.0485



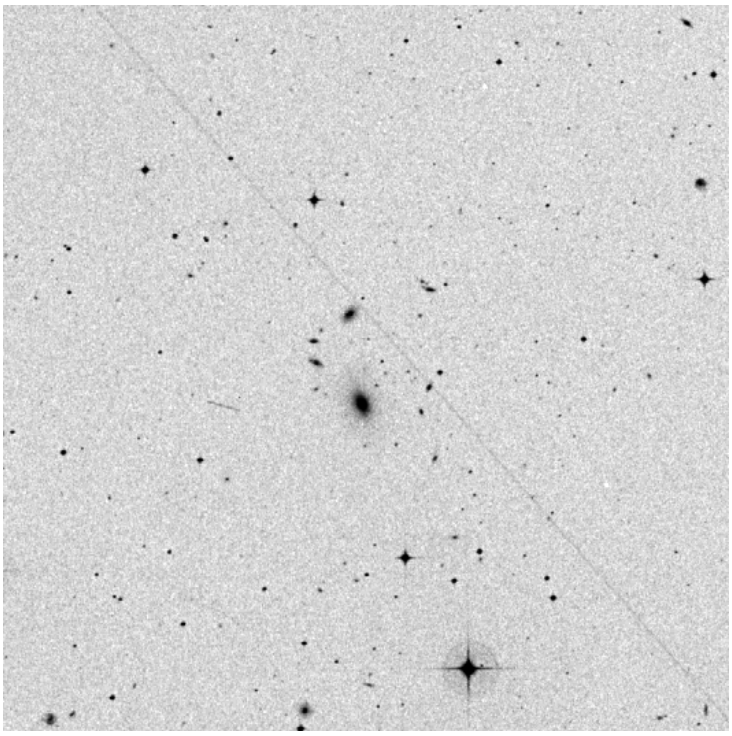
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

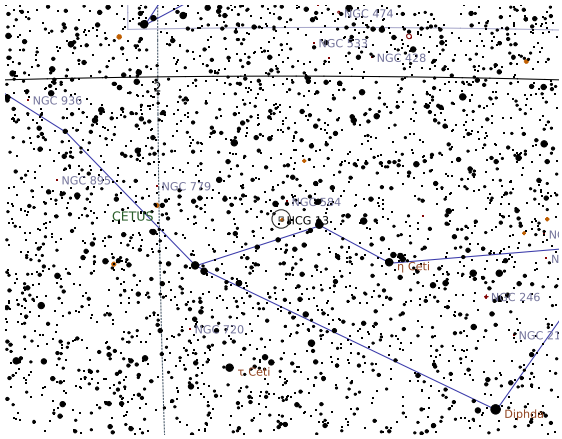
_____

HCG 13

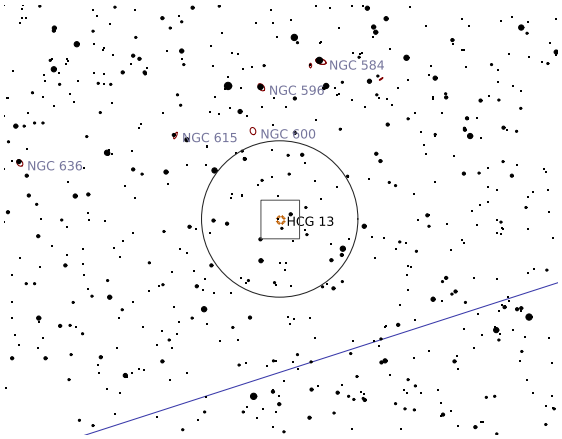
Galaxy Cluster in Cetus

Right Ascension (current)	$01^{h}\,33^{m}\,01^{s}$	Declination (current)	$-7°\,48'\,47''$
Right Ascension (J2000.0)	$01^{h}\,32^{m}\,22^{s}$	Declination (J2000.0)	$-7°\,52'\,52''$
Size	$2.5' \times 2.5'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

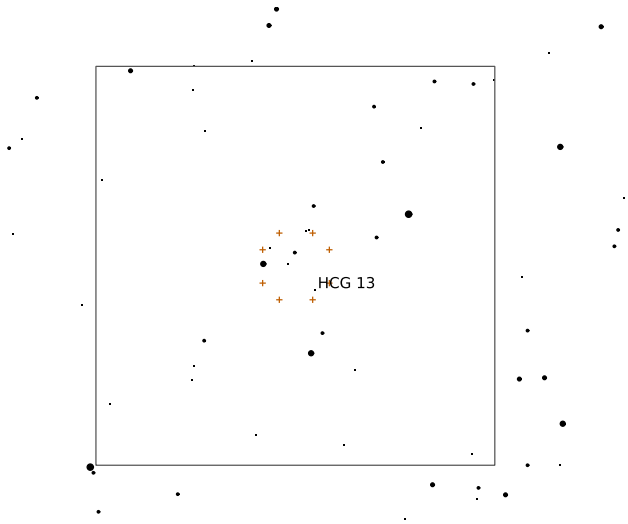
Description: z = 0.0411



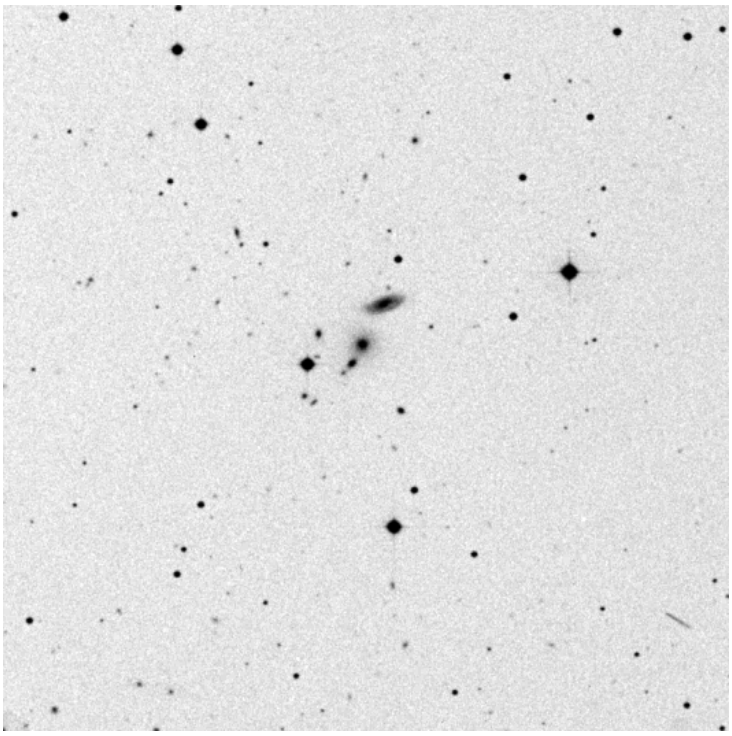
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

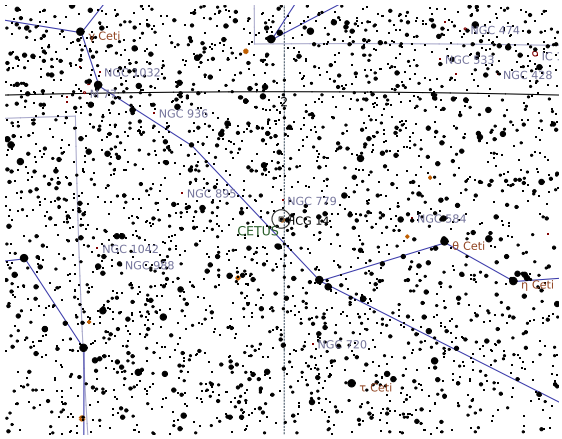
_____

HCG 14

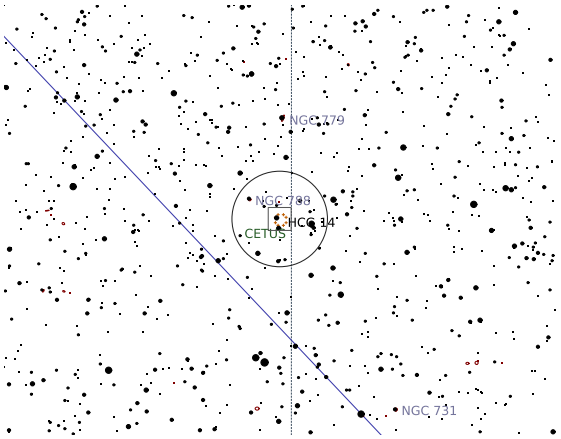
Galaxy Cluster in Cetus

Right Ascension (current)	$02^{h}\,00^{m}\,27^{s}$	Declination (current)	$-6°\,57'\,54''$
Right Ascension (J2000.0)	$01^{h}\,59^{m}\,47^{s}$	Declination (J2000.0)	$-7°\,01'\,43''$
Size	$6.7' \times 6.7'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

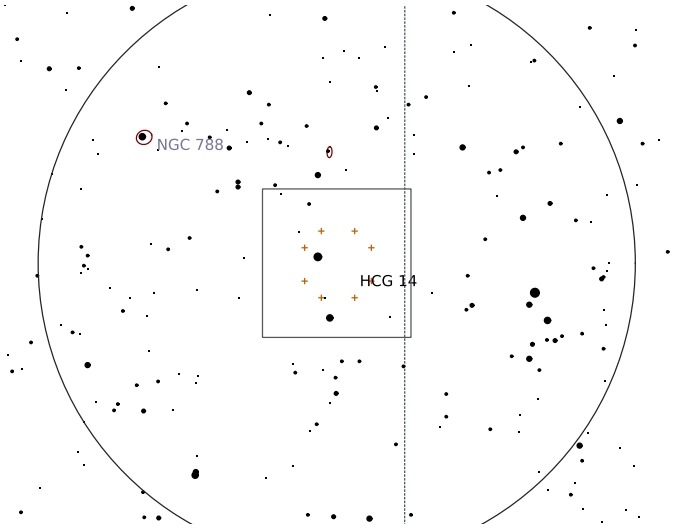
Description: z = 0.0183



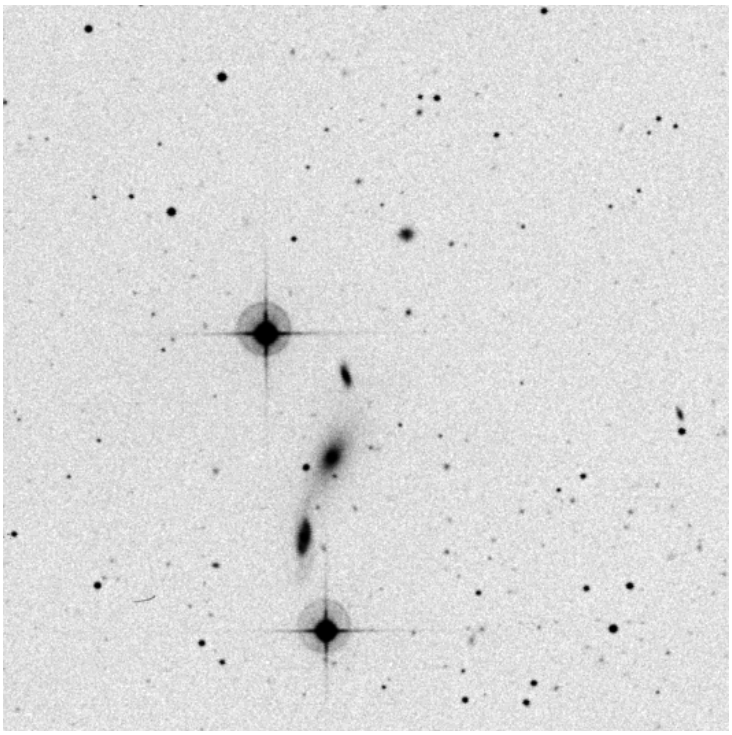
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

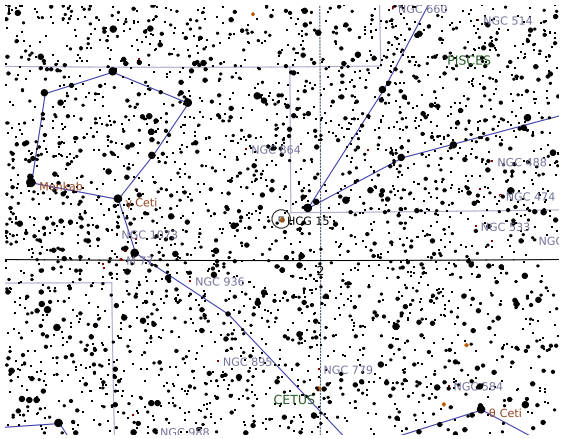
_____

HCG 15

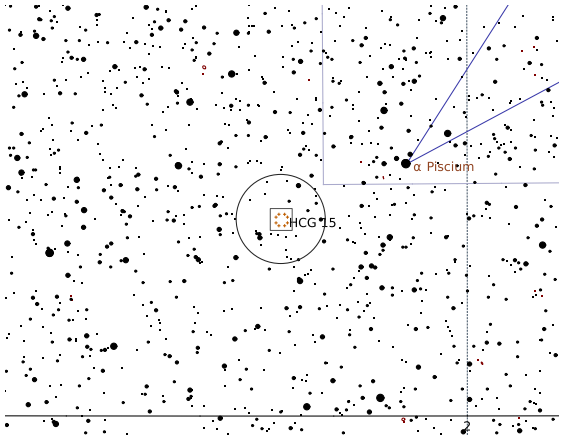
Galaxy Cluster in Cetus

Right Ascension (current)	$02^h\,08^m\,19^s$	Declination (current)	$2°\,12'\,00''$
Right Ascension (J2000.0)	$02^h\,07^m\,39^s$	Declination (J2000.0)	$2°\,08'\,18''$
Size	$7.7' \times 7.7'$	Position Angle	0°
Magnitude	13	Other Designation	–

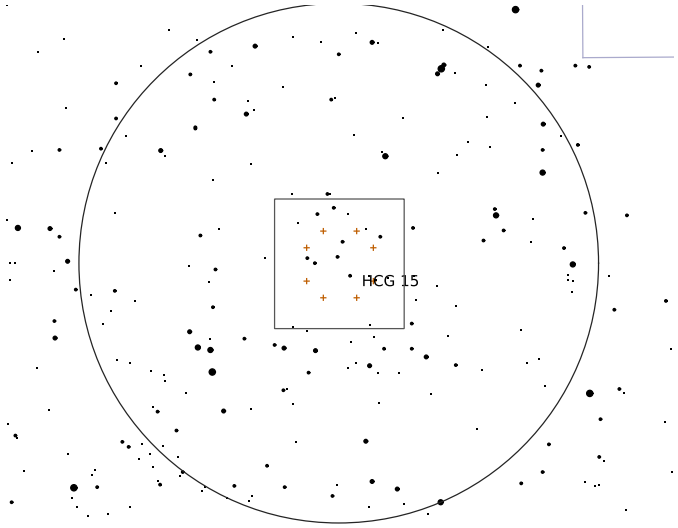
Description: z = 0.0228



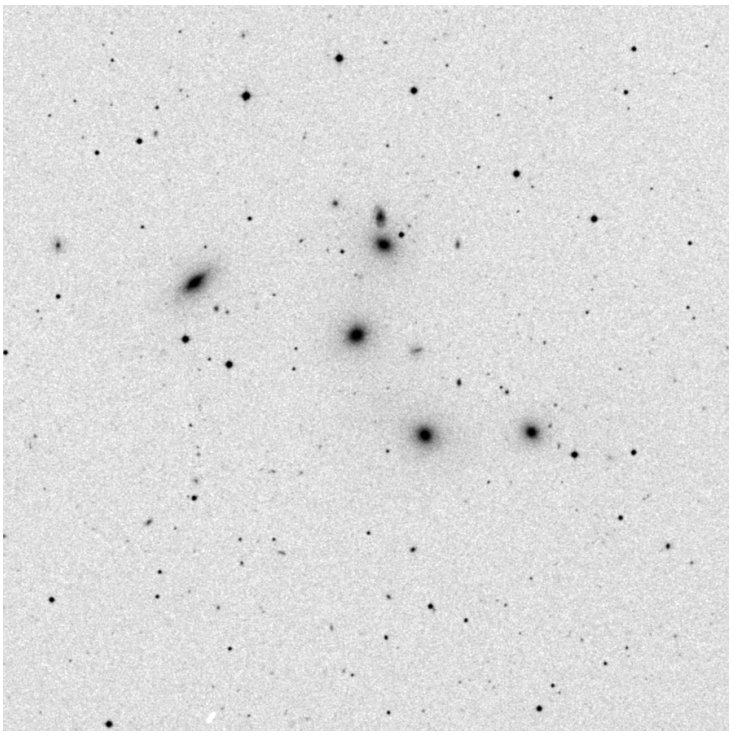
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

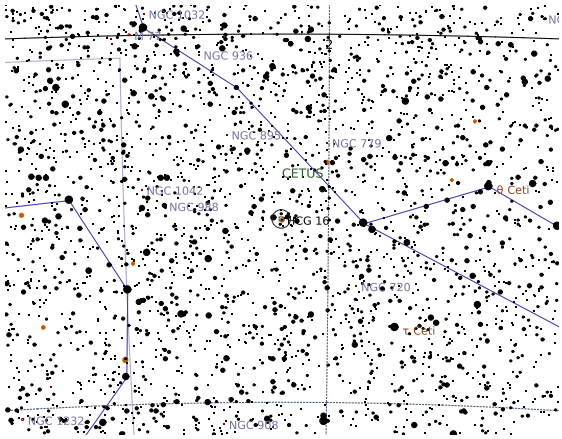
_____

HCG 16

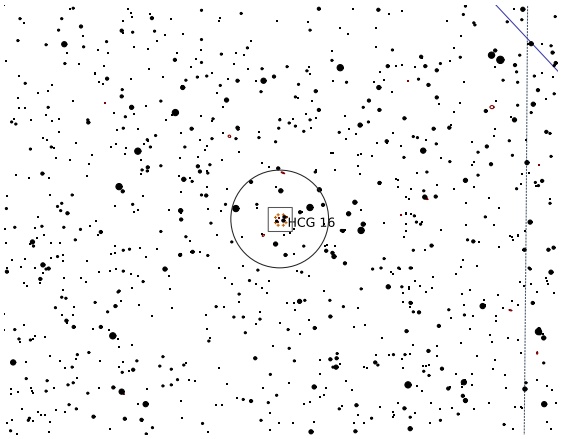
Galaxy Cluster in Cetus

Right Ascension (current)	$02^h\,10^m\,12^s$	Declination (current)	$-10°\,06'\,04''$
Right Ascension (J2000.0)	$02^h\,09^m\,33^s$	Declination (J2000.0)	$-10°\,09'\,47''$
Size	$6.4' \times 6.4'$	Position Angle	$0°$
Magnitude	11	Other Designation	–

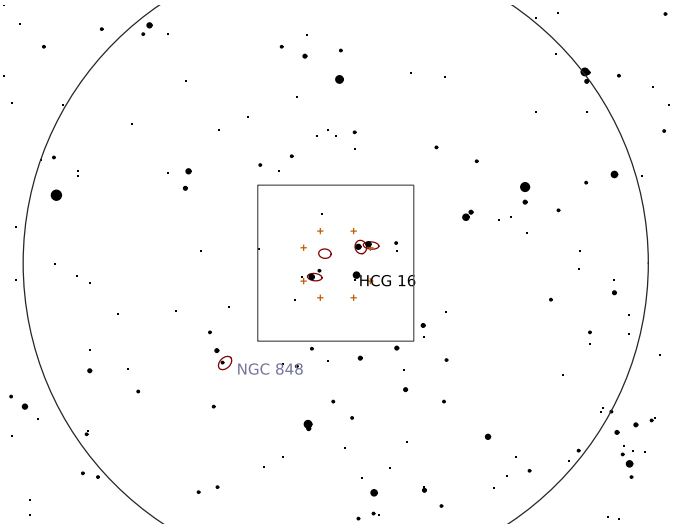
Description: z = 0.0132



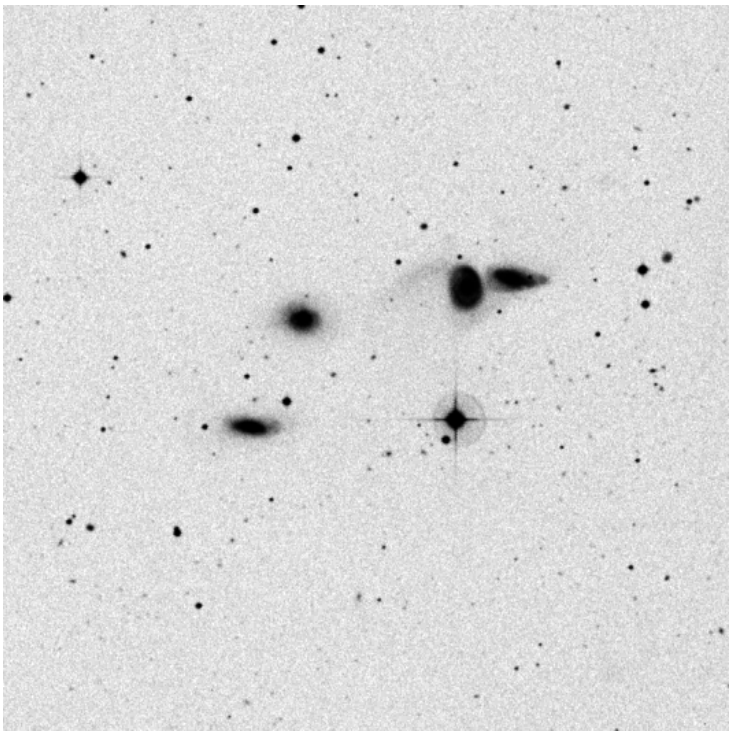
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

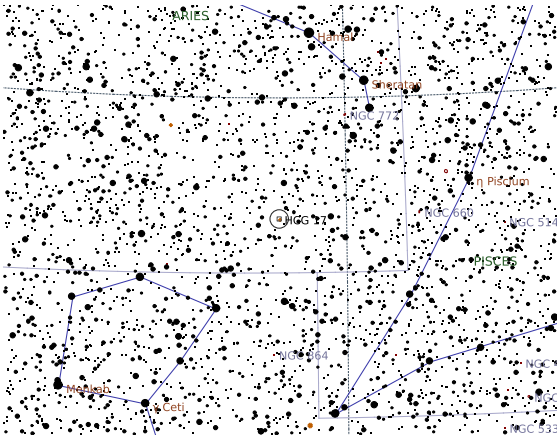
_____

HCG 17

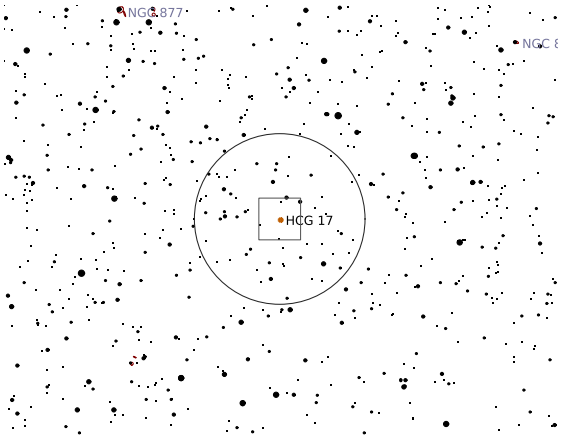
Galaxy Cluster in Aries

Right Ascension (current)	$02^h\,14^m\,49^s$	Declination (current)	$13°\,22'\,24''$
Right Ascension (J2000.0)	$02^h\,14^m\,06^s$	Declination (J2000.0)	$13°\,18'\,48''$
Size	$1' \times 1'$	Position Angle	0°
Magnitude	15	Other Designation	–

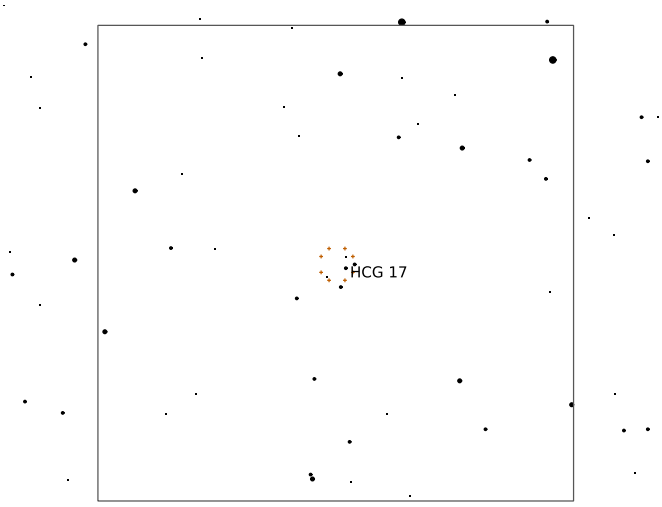
Description: z = 0.0603



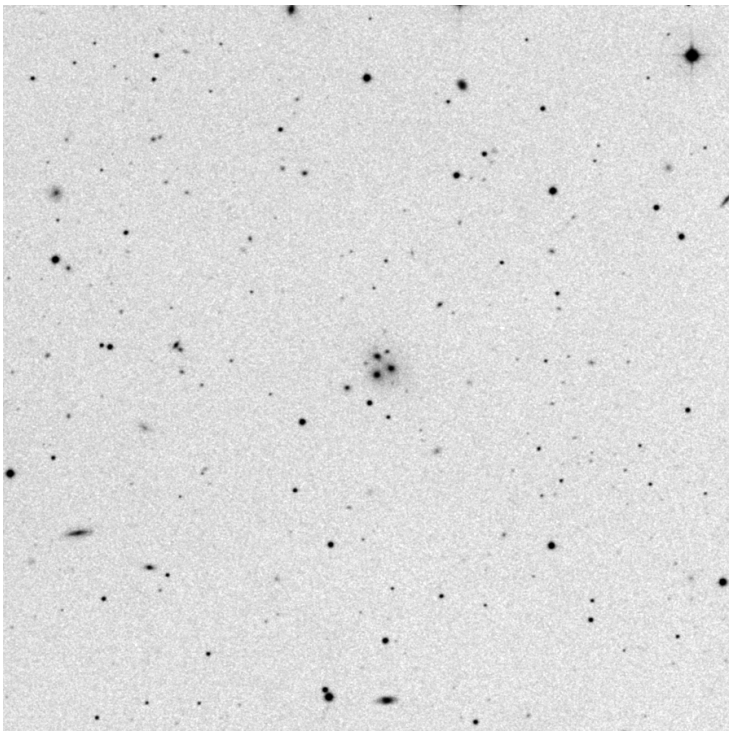
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

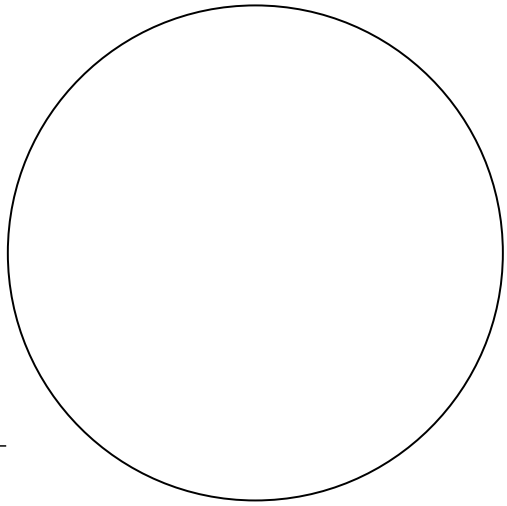
* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____



Sketch

FOV: _____

* Description: _____

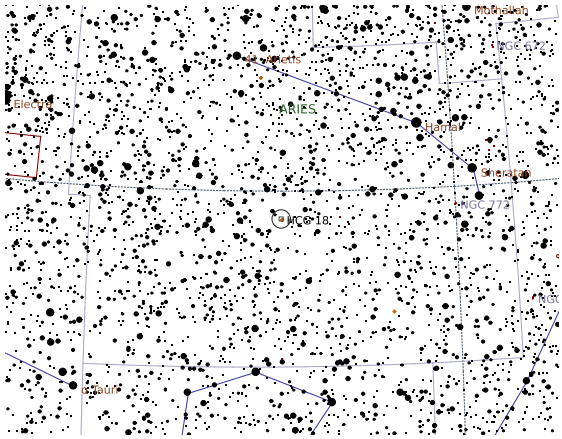
_____

HCG 18

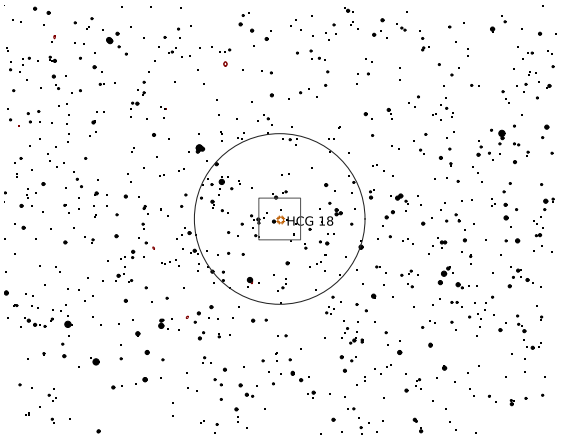
Galaxy Cluster in Aries

Right Ascension (current)	$02^h\,39^m\,51^s$	Declination (current)	$18°\,26'\,17''$
Right Ascension (J2000.0)	$02^h\,39^m\,06^s$	Declination (J2000.0)	$18°\,22'\,59''$
Size	$2' \times 2'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

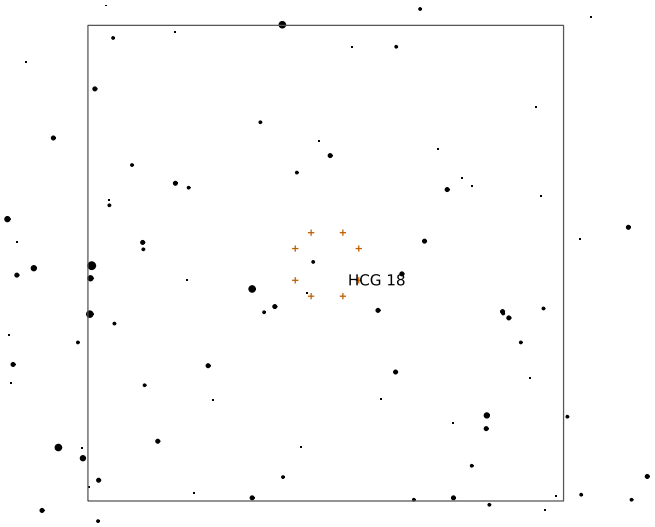
Description: z = 0.0000



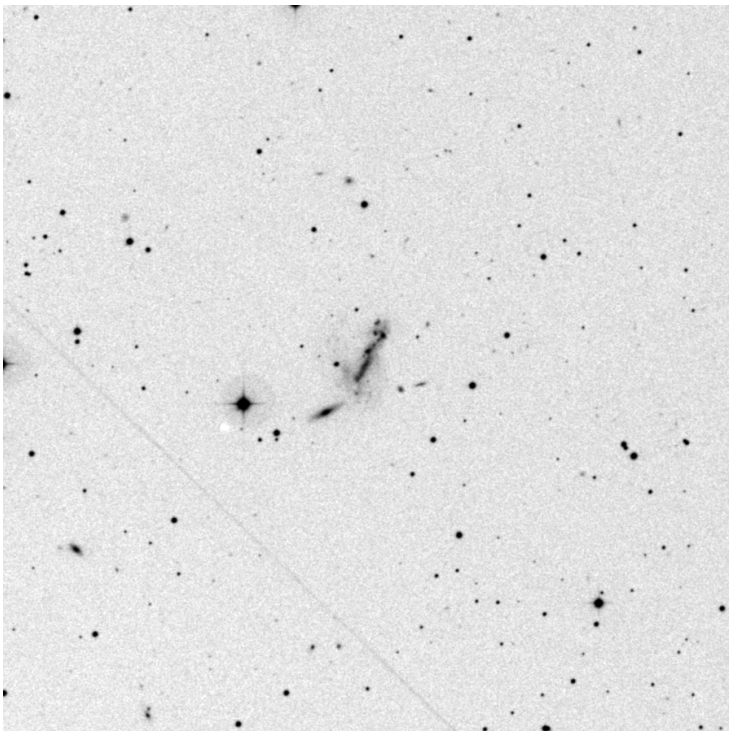
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

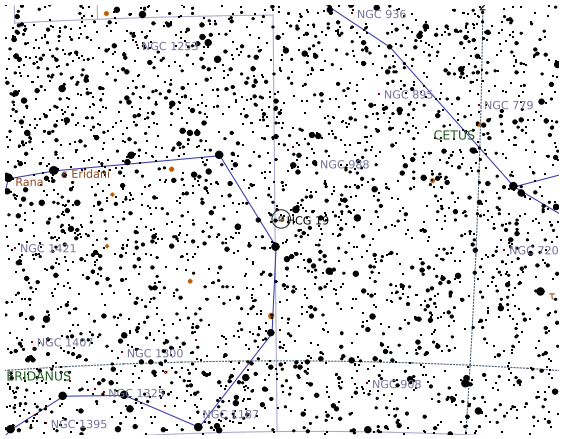
_____

HCG 19

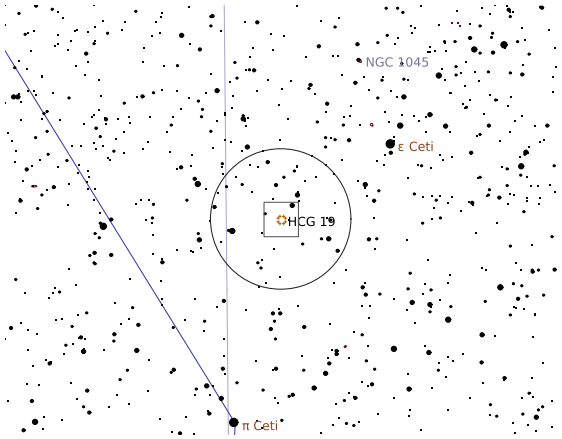
Galaxy Cluster in Cetus

Right Ascension (current)	$02^h\,43^m\,22^s$	Declination (current)	$-12°\,21'\,24''$
Right Ascension (J2000.0)	$02^h\,42^m\,45^s$	Declination (J2000.0)	$-12°\,24'\,43''$
Size	$3.1' \times 3.1'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

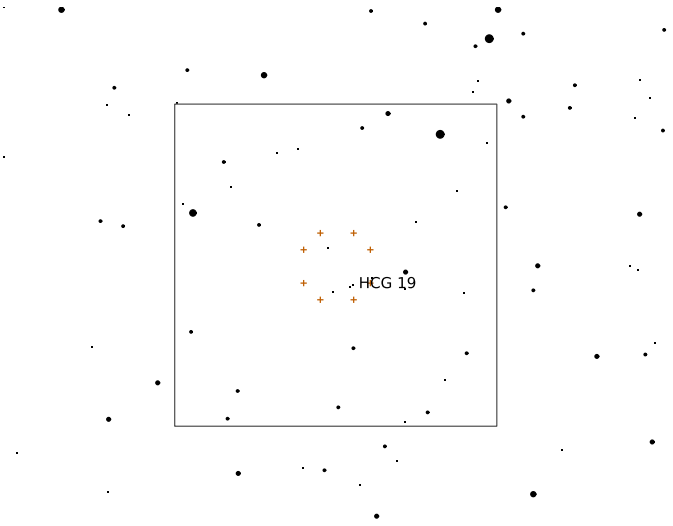
Description: z = 0.0000



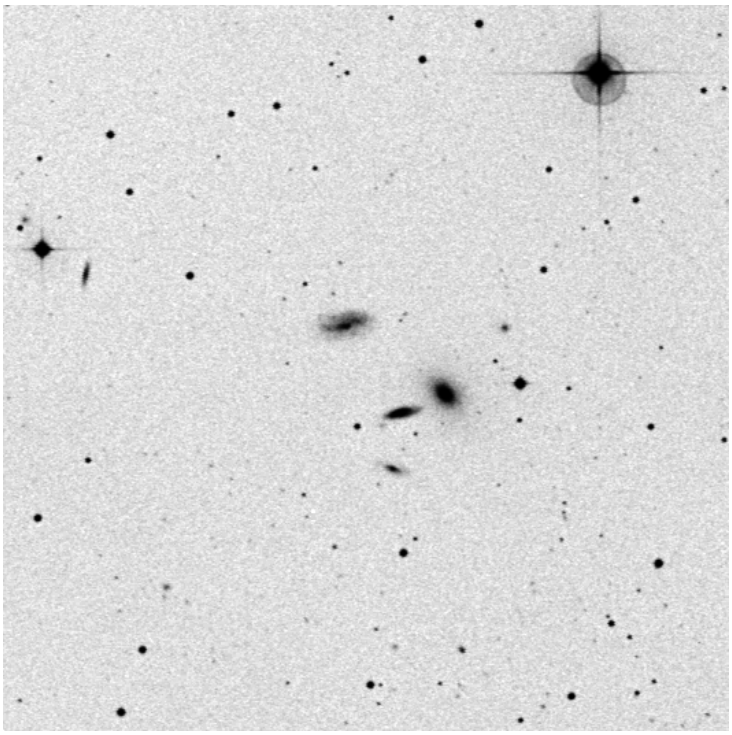
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

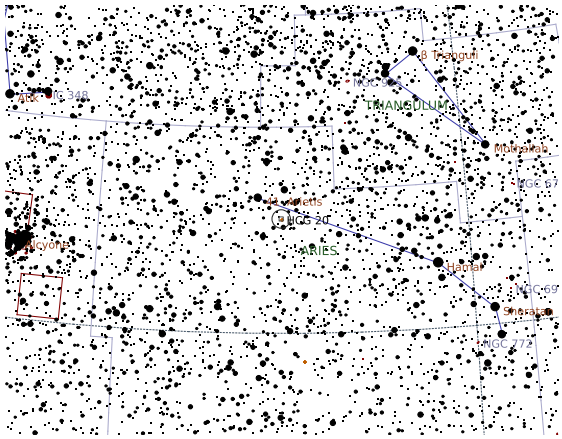
_____

HCG 20

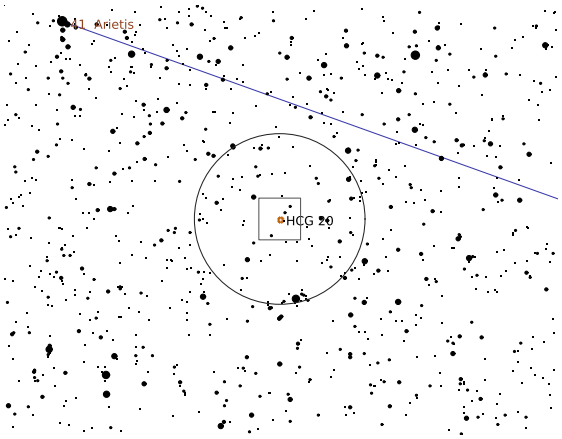
Galaxy Cluster in Aries

Right Ascension (current)	$02^h\,45^m\,01^s$	Declination (current)	$26°\,09'\,25''$
Right Ascension (J2000.0)	$02^h\,44^m\,15^s$	Declination (J2000.0)	$26°\,06'\,11''$
Size	$1.5' \times 1.5'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

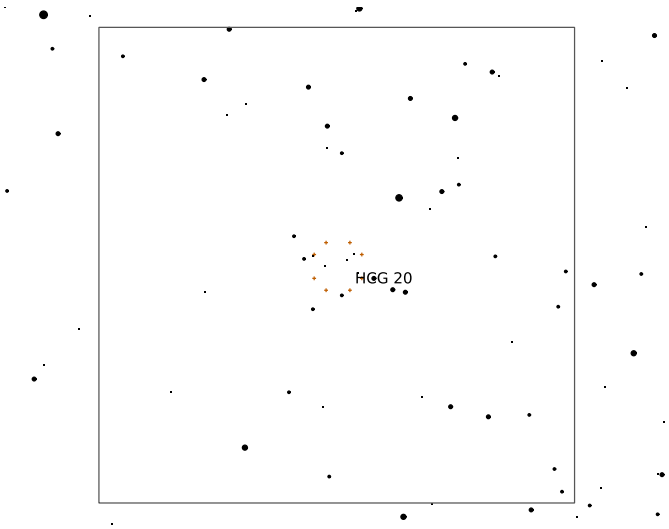
Description: z = 0.0484



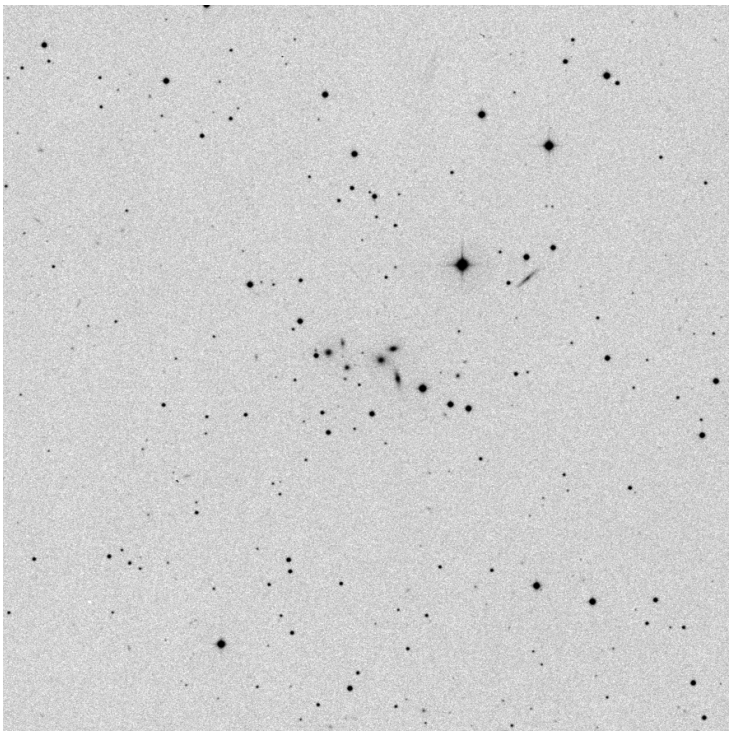
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

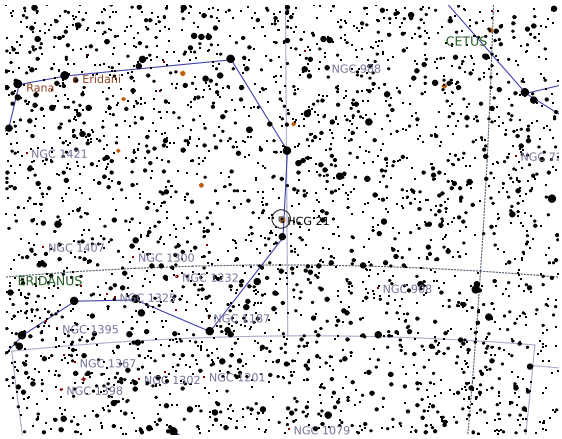
_____

HCG 21

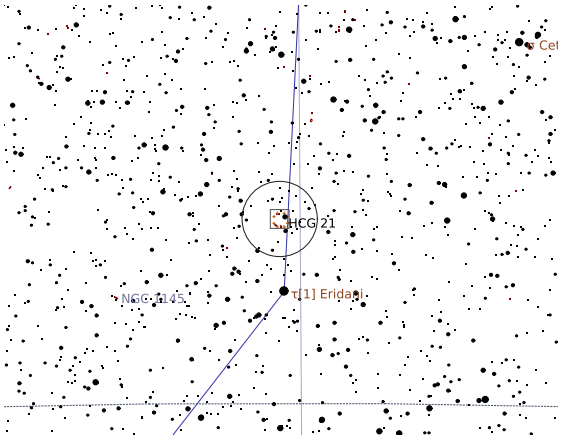
Galaxy Cluster in Eridanus

Right Ascension (current)	$02^h\,45^m\,54^s$	Declination (current)	$-17°\,33'\,53''$
Right Ascension (J2000.0)	$02^h\,45^m\,17^s$	Declination (J2000.0)	$-17°\,37'\,10''$
Size	$10.8' \times 10.8'$	Position Angle	0°
Magnitude	11	Other Designation	–

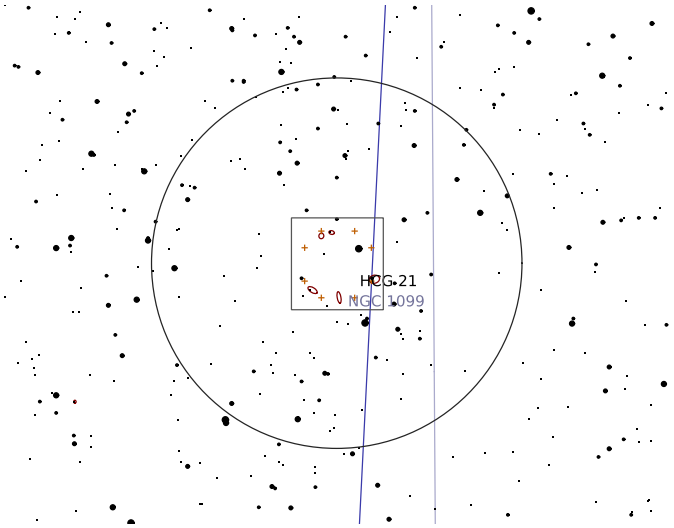
Description: z = 0.0251



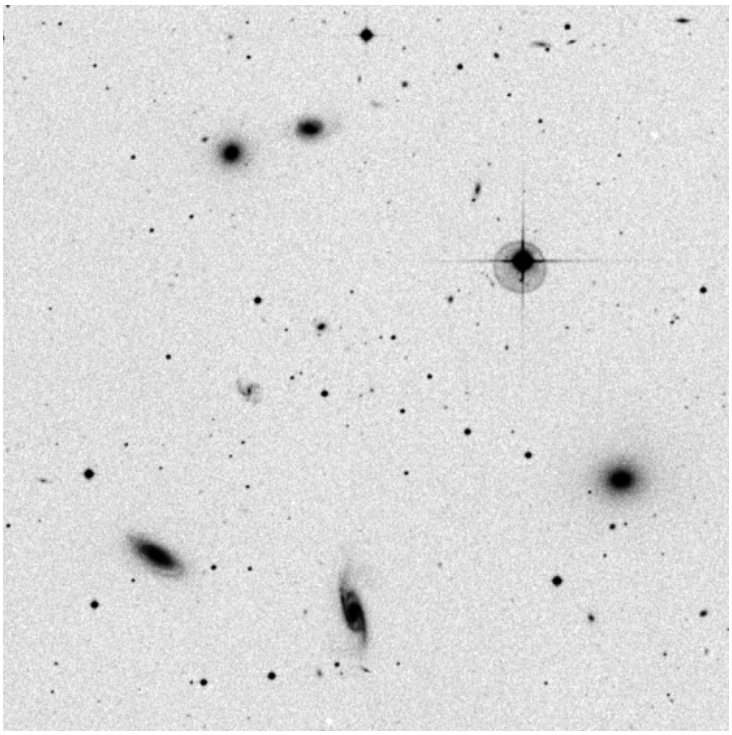
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.8' \times 15.8'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

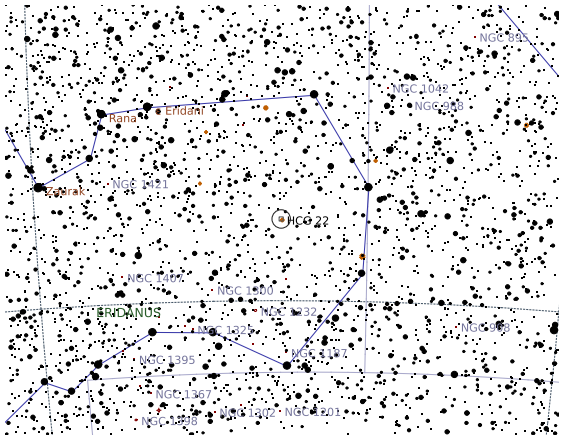
_____

HCG 22

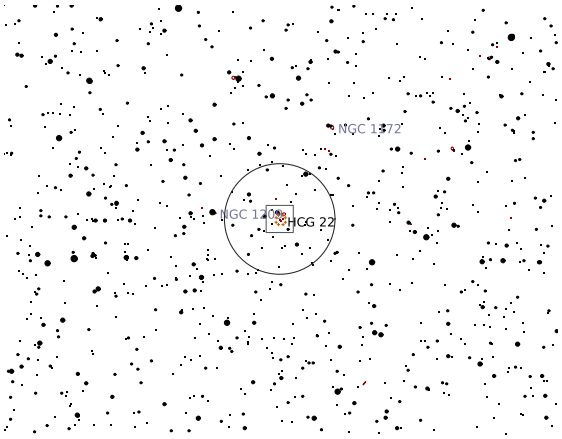
Galaxy Cluster in Eridanus

Right Ascension (current)	$03^{h}\,04^{m}\,08^{s}$	Declination (current)	$-15°\,37'\,32''$
Right Ascension (J2000.0)	$03^{h}\,03^{m}\,31^{s}$	Declination (J2000.0)	$-15°\,40'\,33''$
Size	$5' \times 5'$	Position Angle	$0°$
Magnitude	11	Other Designation	–

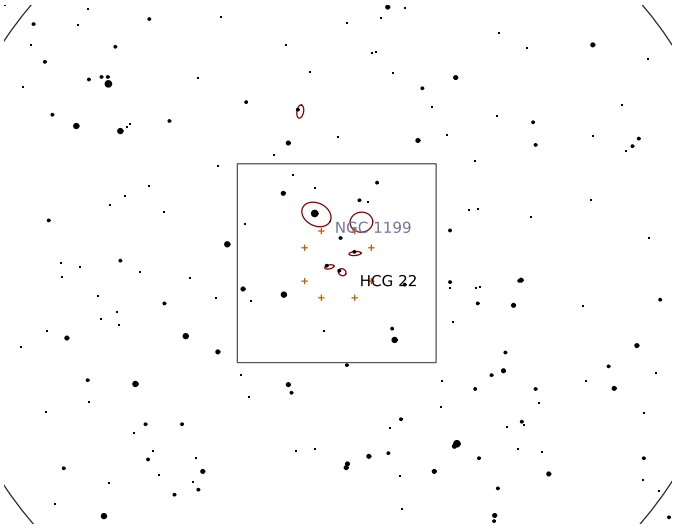
Description: z = 0.0090



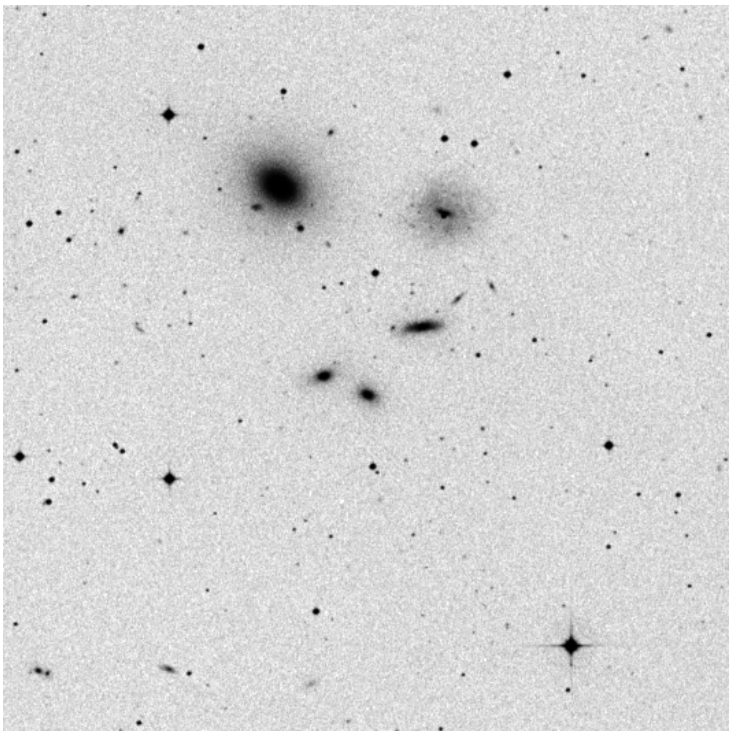
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

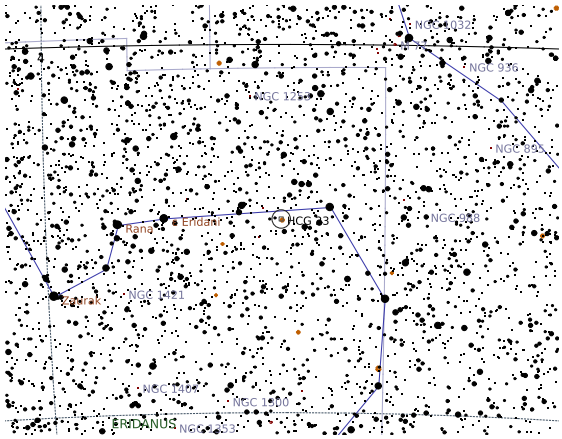
_____

HCG 23

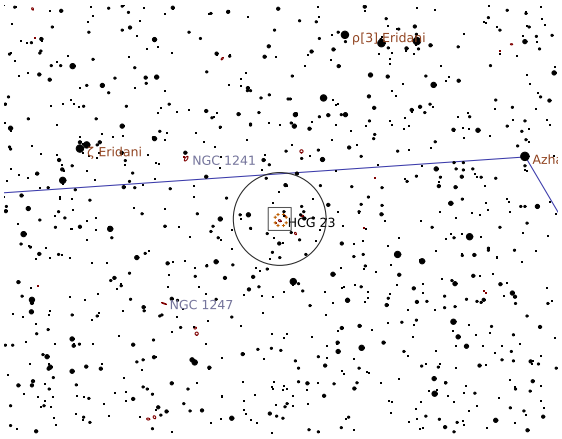
Galaxy Cluster in Eridanus

Right Ascension (current)	$03^{h}\,07^{m}\,44^{s}$	Declination (current)	$-9°\,32'\,10''$
Right Ascension (J2000.0)	$03^{h}\,07^{m}\,06^{s}$	Declination (J2000.0)	$-9°\,35'\,08''$
Size	$7.1' \times 7.1'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

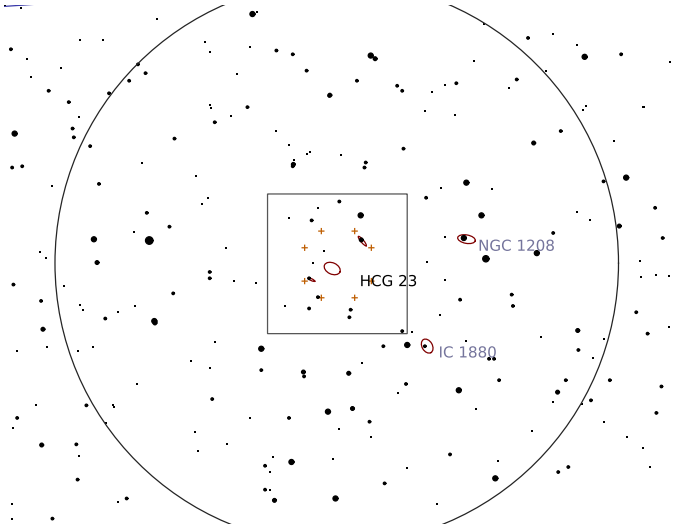
Description: z = 0.0161



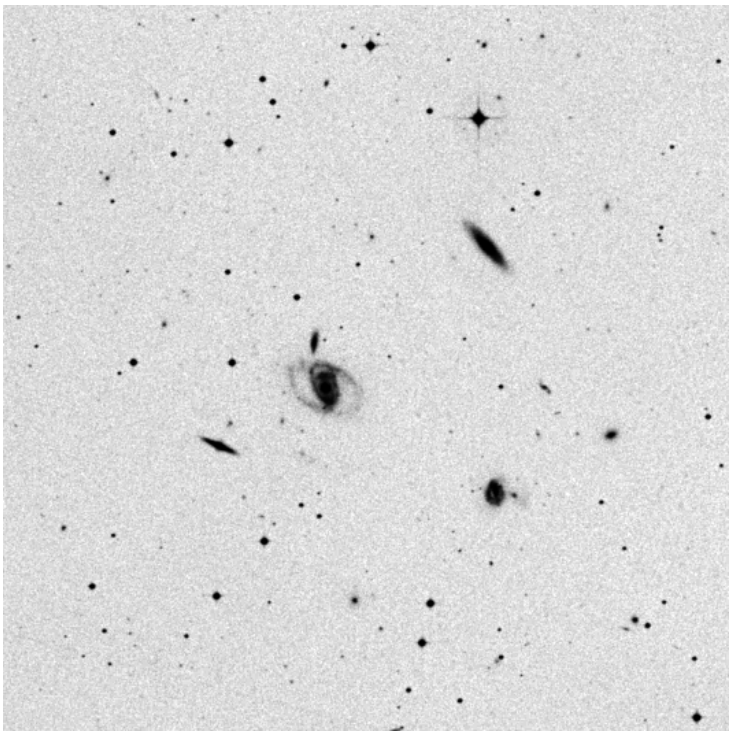
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

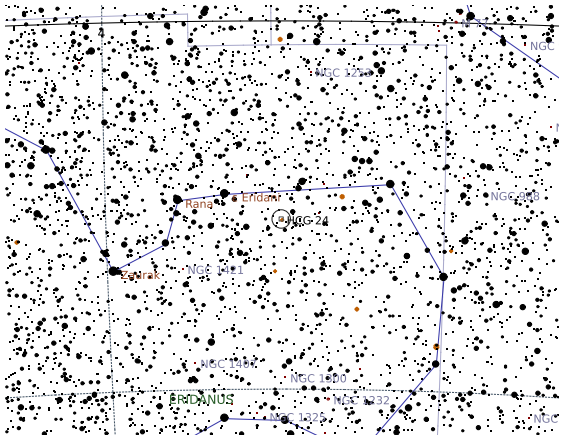
_____

HCG 24

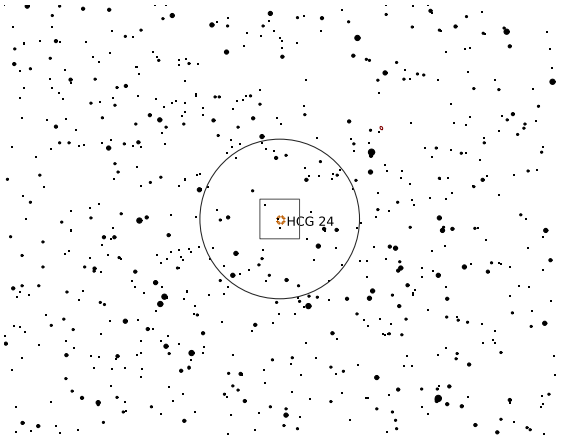
Galaxy Cluster in Eridanus

Right Ascension (current)	$03^h\,20^m\,56^s$	Declination (current)	$-10°\,49'\,08''$
Right Ascension (J2000.0)	$03^h\,20^m\,18^s$	Declination (J2000.0)	$-10°\,51'\,53''$
Size	$2.4' \times 2.4'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

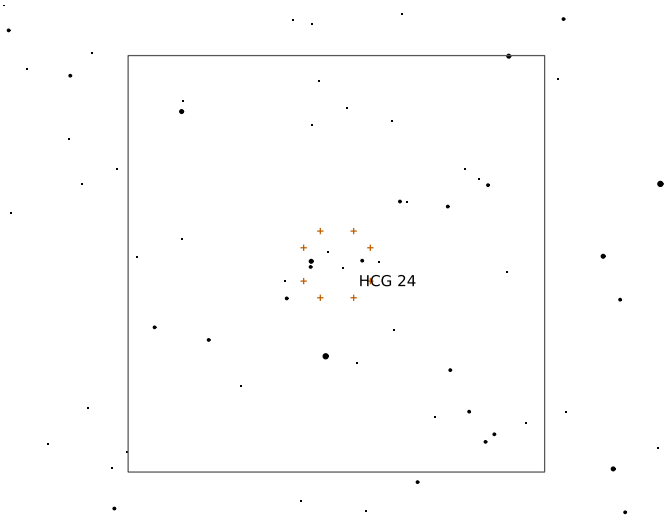
Description: z = 0.0305



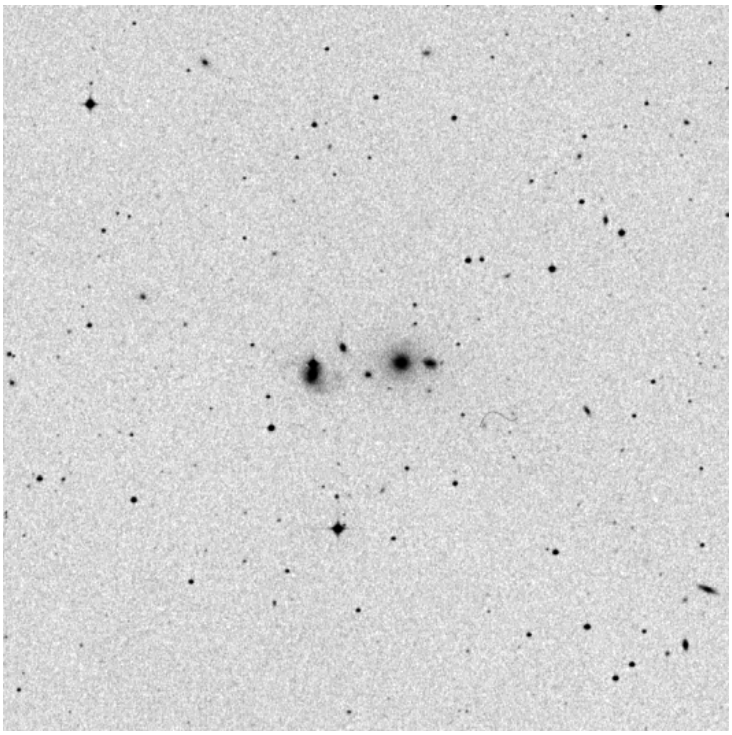
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

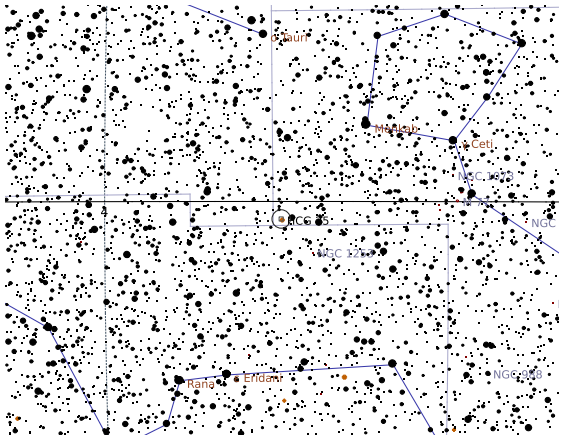
_____

HCG 25

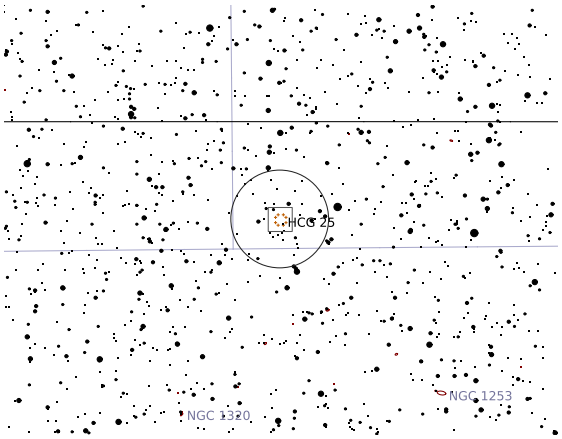
Galaxy Cluster in Cetus

Right Ascension (current)	$03^{h}\,21^{m}\,23^{s}$	Declination (current)	$-1^{\circ}\,00'\,22''$
Right Ascension (J2000.0)	$03^{h}\,20^{m}\,43^{s}$	Declination (J2000.0)	$-1^{\circ}\,03'\,07''$
Size	$6.4' \times 6.4'$	Position Angle	0°
Magnitude	13	Other Designation	–

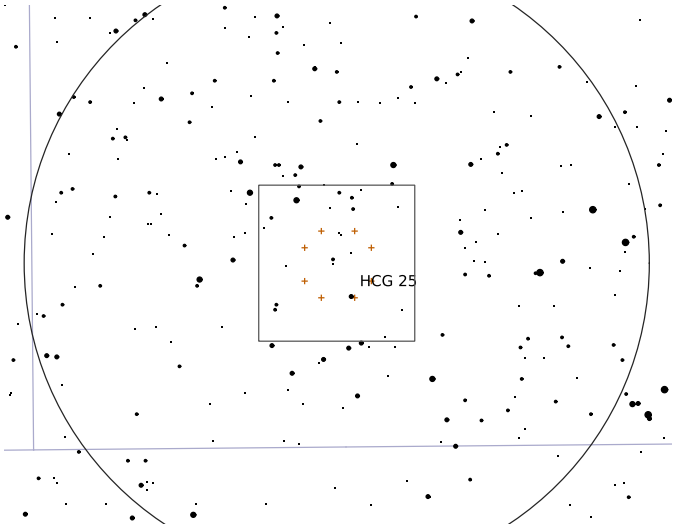
Description: z = 0.0212



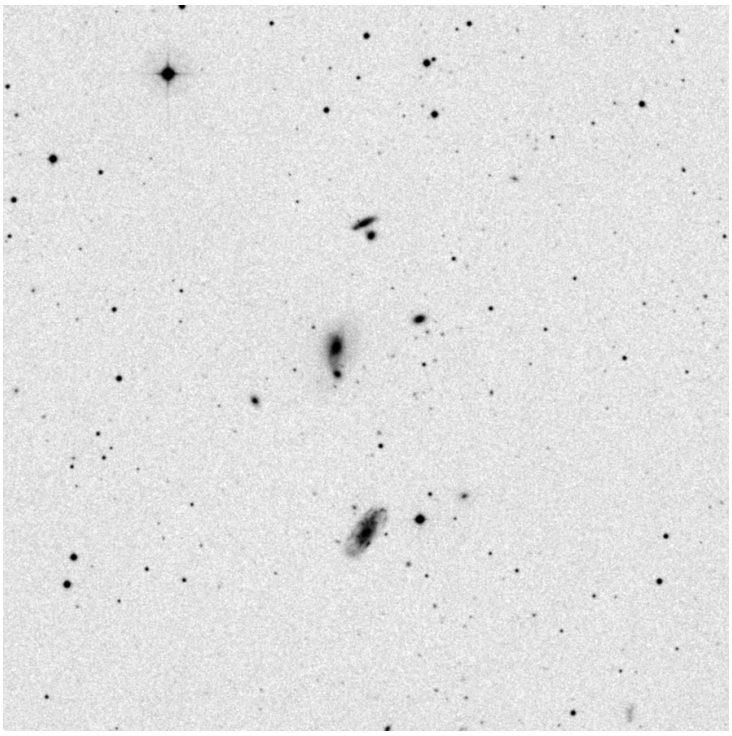
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

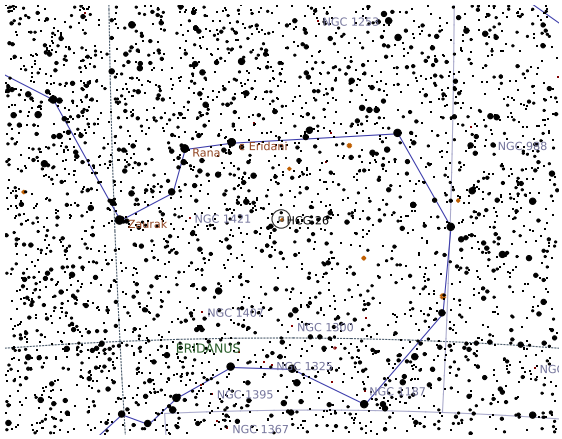
_____

HCG 26

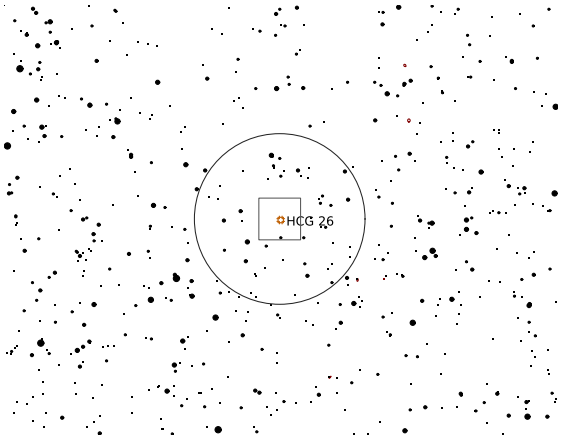
Galaxy Cluster in Eridanus

Right Ascension (current)	$03^h\,22^m\,31^s$	Declination (current)	$-13°\,36'\,01''$
Right Ascension (J2000.0)	$03^h\,21^m\,54^s$	Declination (J2000.0)	$-13°\,38'\,45''$
Size	$1.9' \times 1.9'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

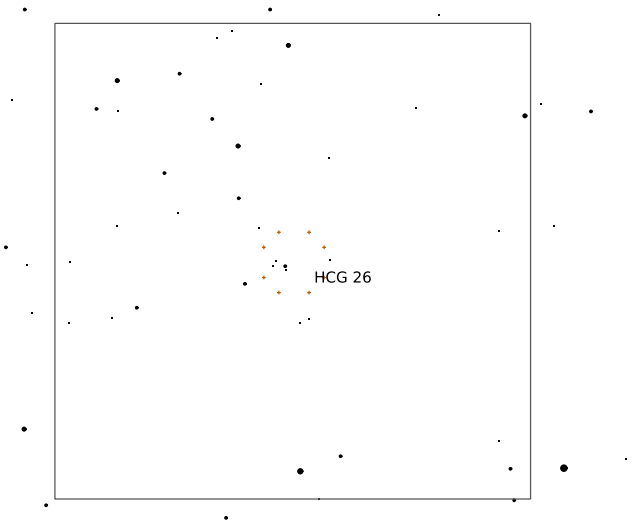
Description: z = 0.0316



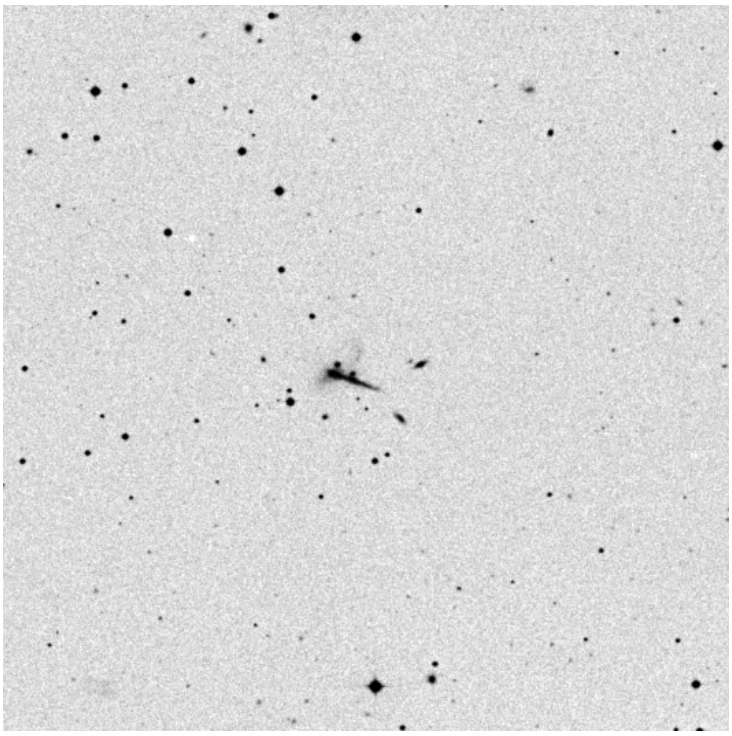
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

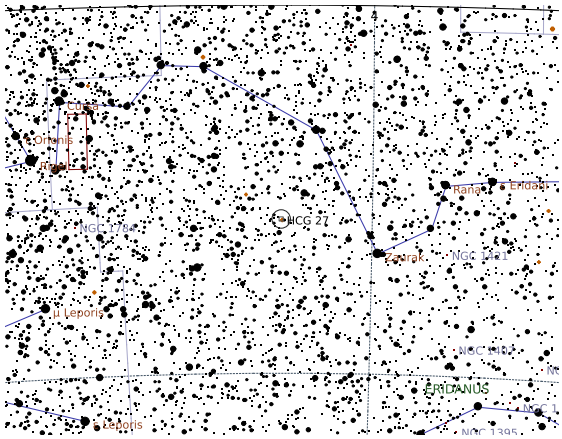
_____

HCG 27

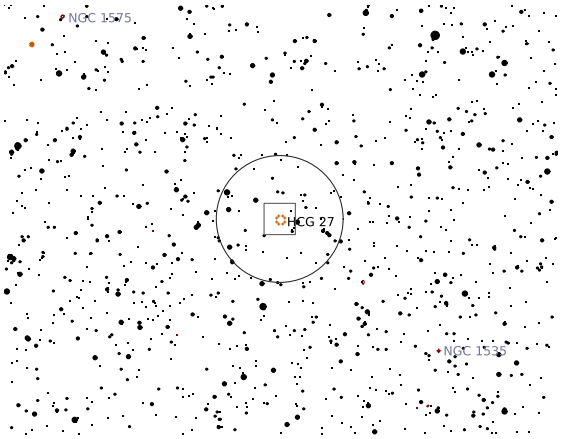
Galaxy Cluster in Eridanus

Right Ascension (current)	$04^h\,19^m\,58^s$	Declination (current)	$-11°\,40'\,50''$
Right Ascension (J2000.0)	$04^h\,19^m\,21^s$	Declination (J2000.0)	$-11°\,42'\,35''$
Size	$3.8' \times 3.8'$	Position Angle	$0°$
Magnitude	15	Other Designation	–

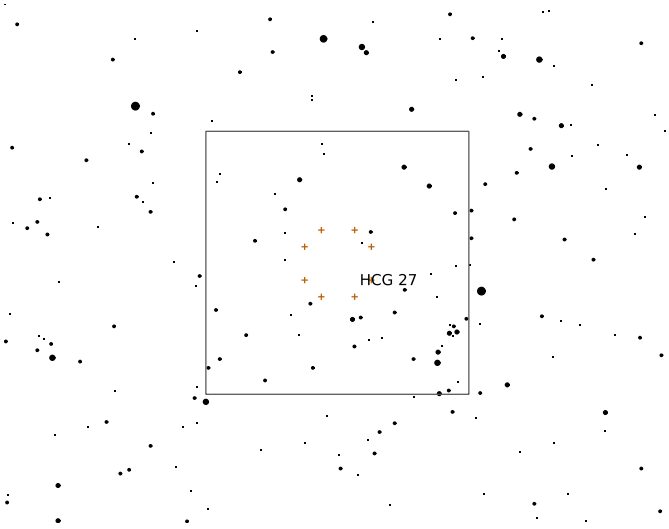
Description: z = 0.0874



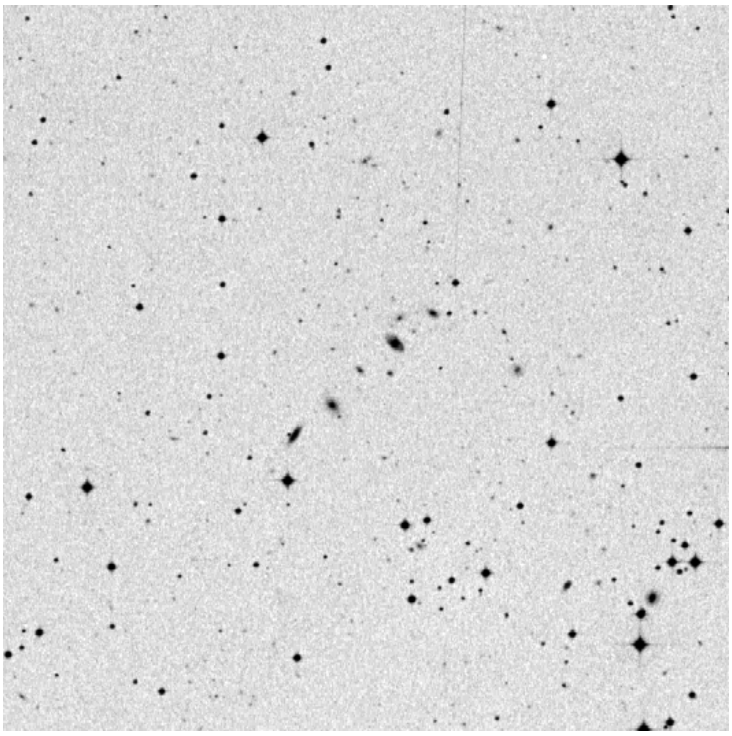
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

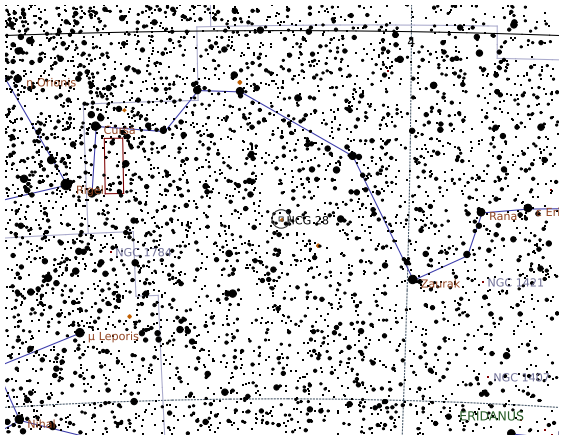
_____

HCG 28

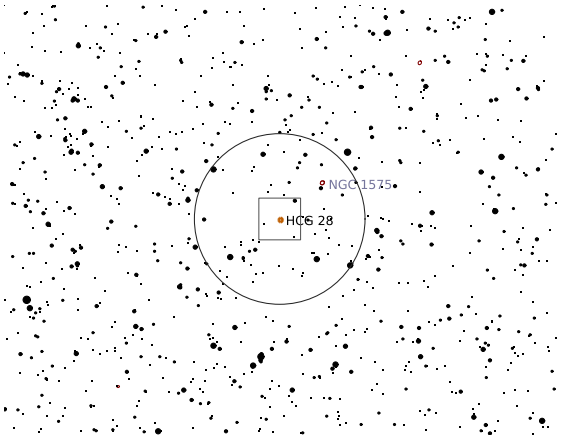
Galaxy Cluster in Eridanus

Right Ascension (current)	$04^h\,27^m\,56^s$	Declination (current)	$-10°\,17'\,24''$
Right Ascension (J2000.0)	$04^h\,27^m\,19^s$	Declination (J2000.0)	$-10°\,19'\,00''$
Size	$1.2' \times 1.2'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

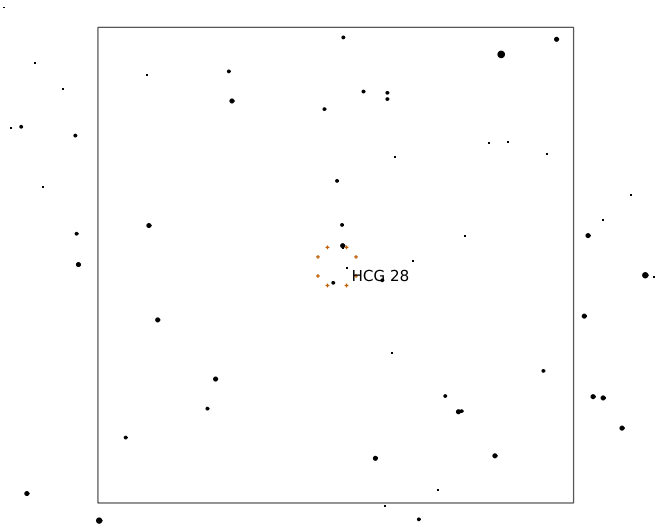
Description: z = 0.0380



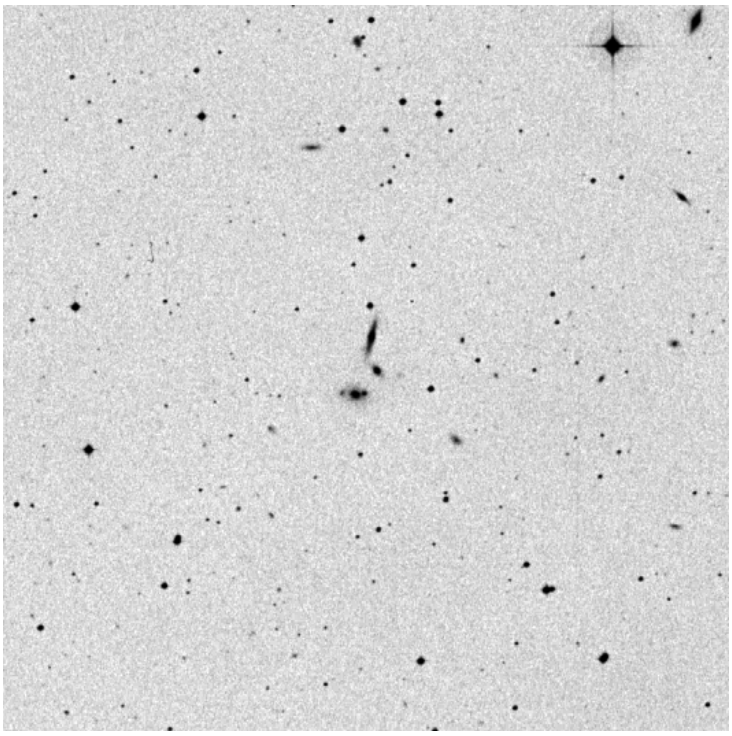
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

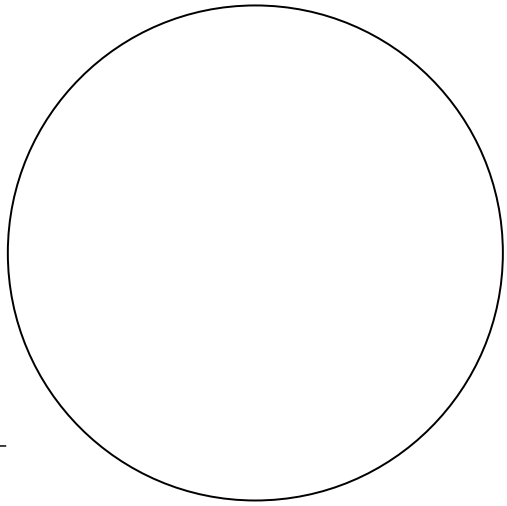
* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____



Sketch

FOV: _____

* Description: _____

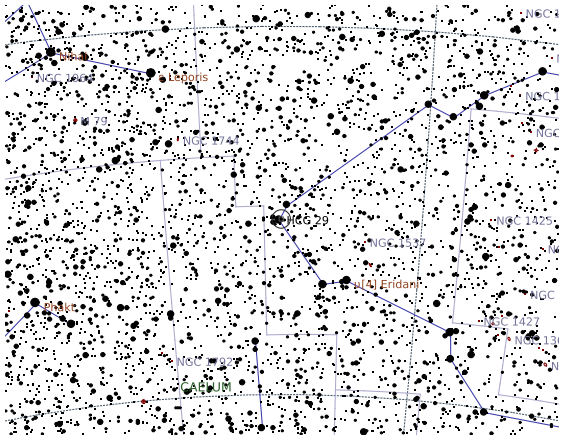
_____

HCG 29

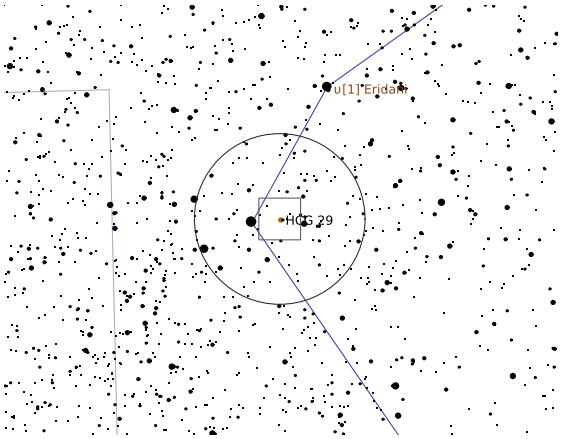
Galaxy Cluster in Eridanus

Right Ascension (current)	$04^h\,35^m\,16^s$	Declination (current)	$-30°\,31'\,24''$
Right Ascension (J2000.0)	$04^h\,34^m\,46^s$	Declination (J2000.0)	$-30°\,32'\,50''$
Size	$0.8' \times 0.8'$	Position Angle	$0°$
Magnitude	15	Other Designation	–

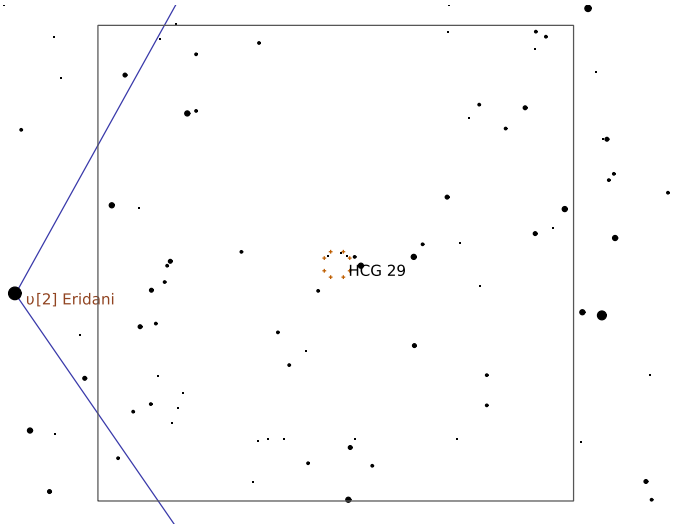
Description: z = 0.1047



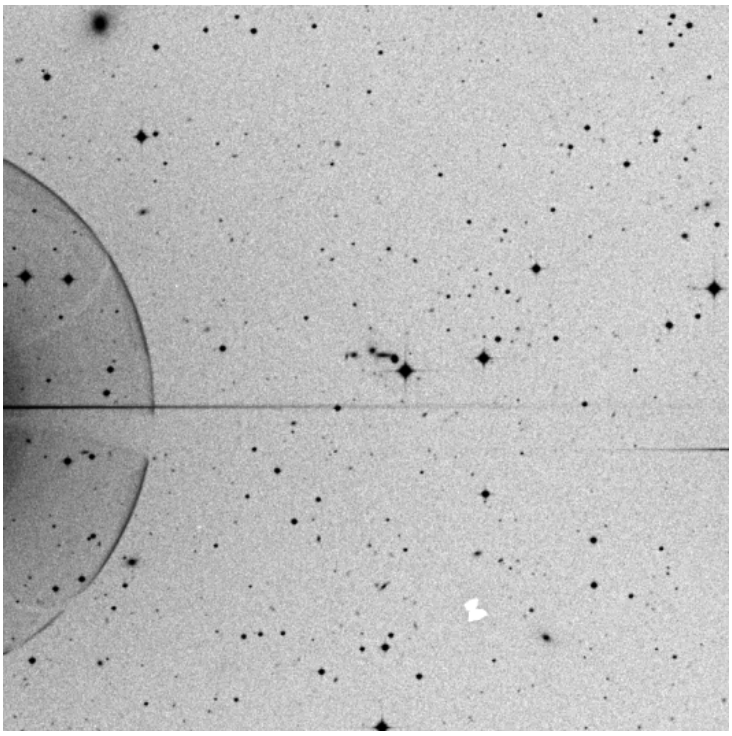
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

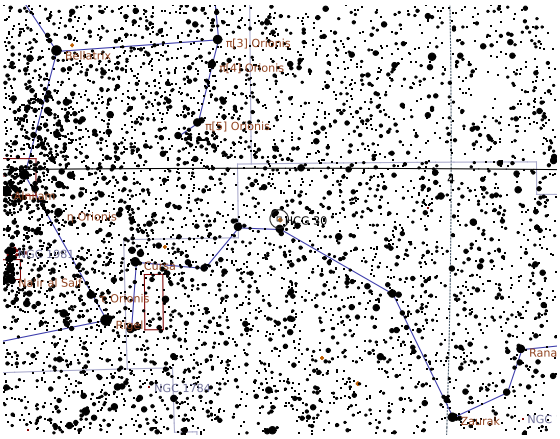
_____

HCG 30

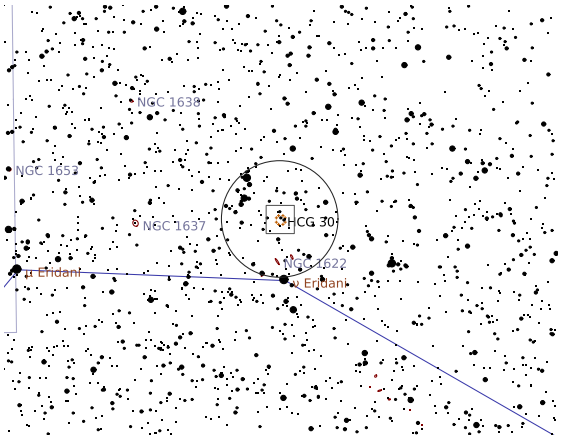
Galaxy Cluster in Eridanus

Right Ascension (current)	$04^{h}\,37^{m}\,08^{s}$	Declination (current)	$-2°\,48'\,31''$
Right Ascension (J2000.0)	$04^{h}\,36^{m}\,28^{s}$	Declination (J2000.0)	$-2°\,49'\,57''$
Size	$4.5' \times 4.5'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

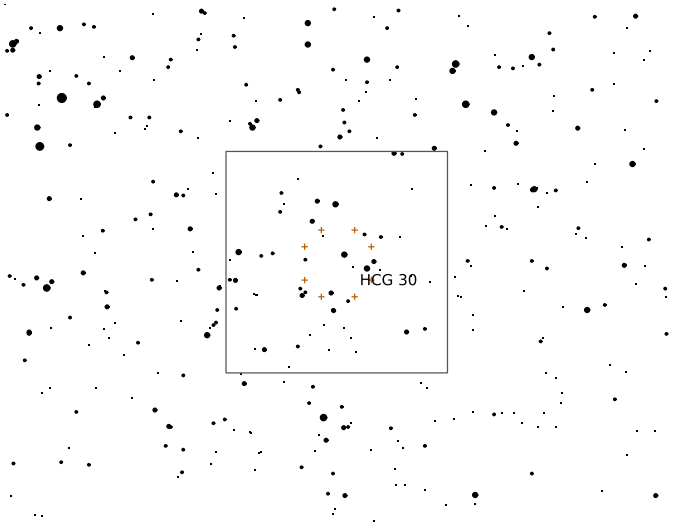
Description: z = 0.0154



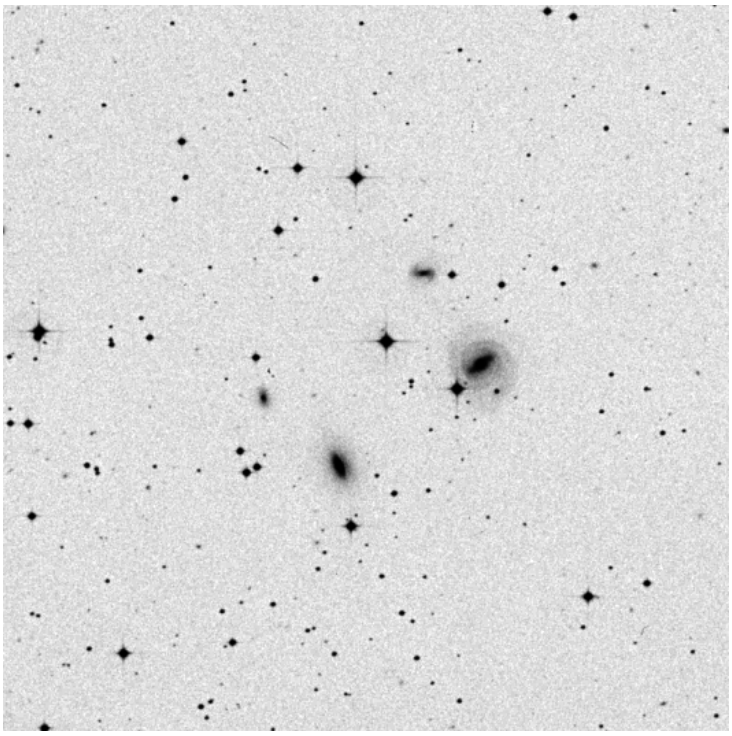
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

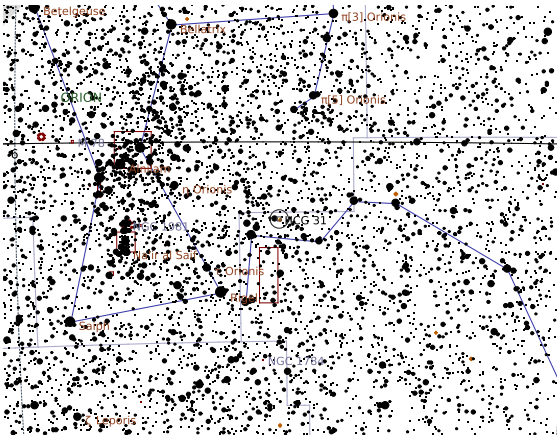
_____

HCG 31

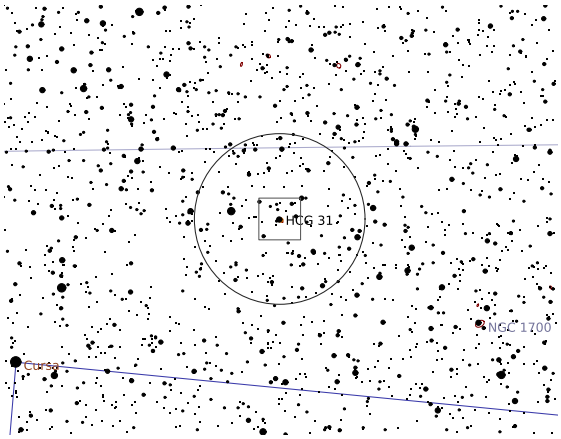
Galaxy Cluster in Eridanus

Right Ascension (current)	$05^{h}\,02^{m}\,16^{s}$	Declination (current)	$-4°\,14'\,27''$
Right Ascension (J2000.0)	$05^{h}\,01^{m}\,36^{s}$	Declination (J2000.0)	$-4°\,15'\,24''$
Size	$0.9' \times 0.9'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

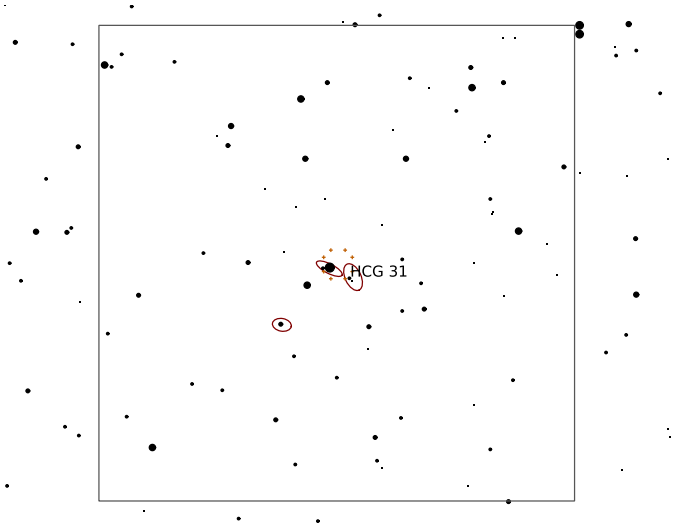
Description: z = 0.0137



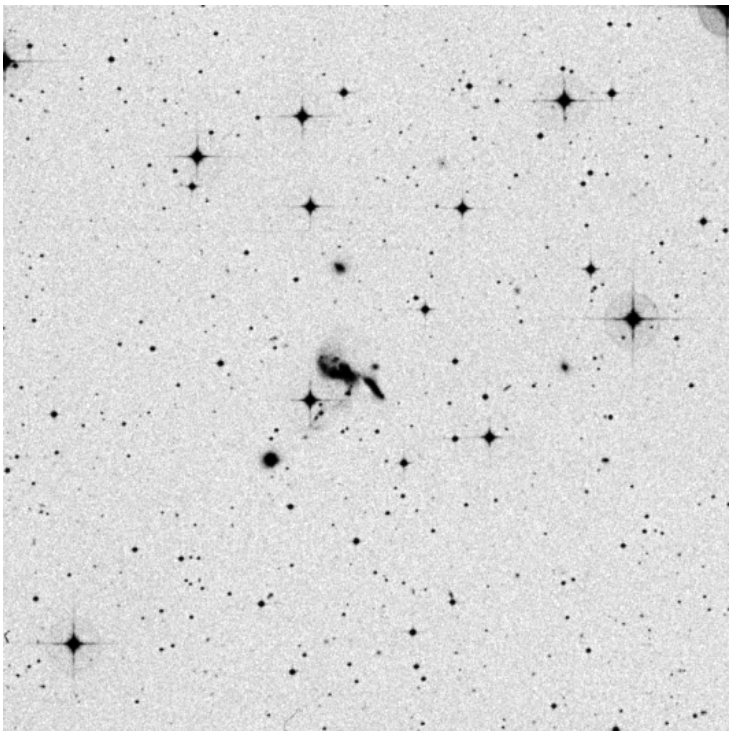
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

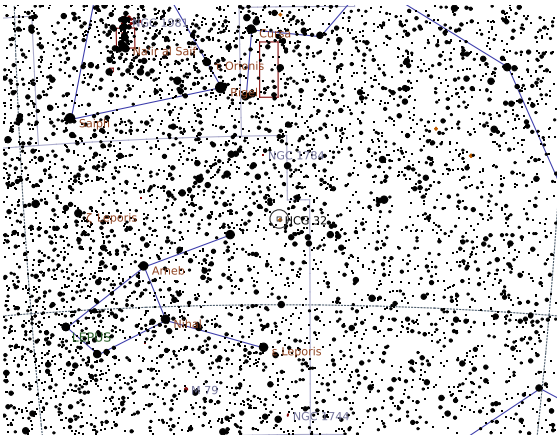
_____

HCG 32

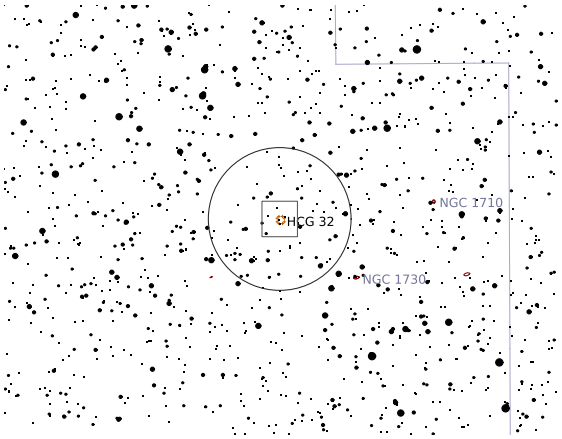
Galaxy Cluster in Lepus

Right Ascension (current)	$05^{h}\,02^{m}\,18^{s}$	Declination (current)	$-15°\,24'\,16''$
Right Ascension (J2000.0)	$05^{h}\,01^{m}\,42^{s}$	Declination (J2000.0)	$-15°\,25'\,12''$
Size	$3' \times 3'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

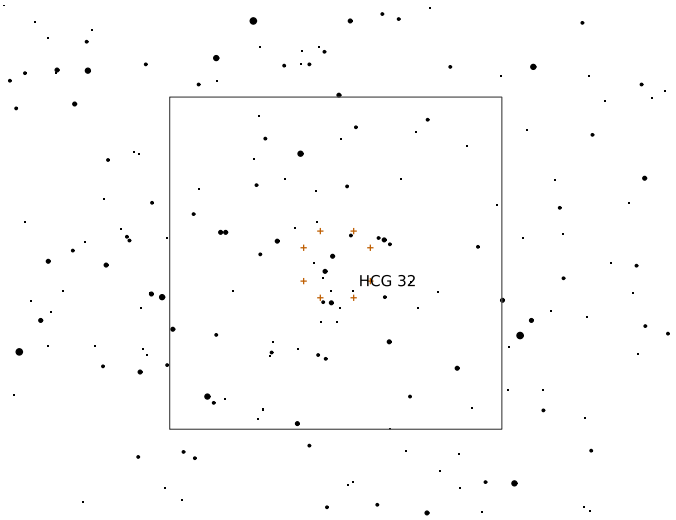
Description: z = 0.0408



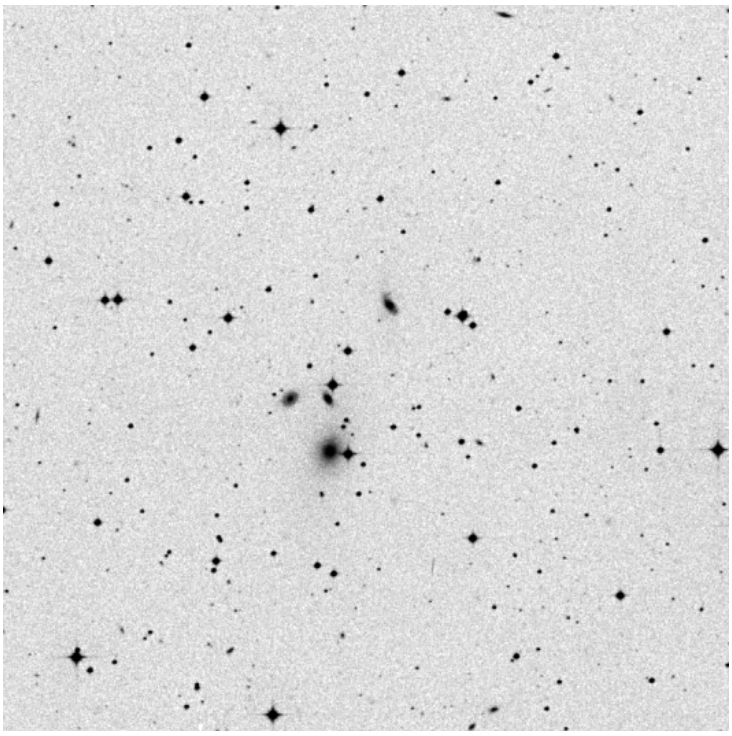
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

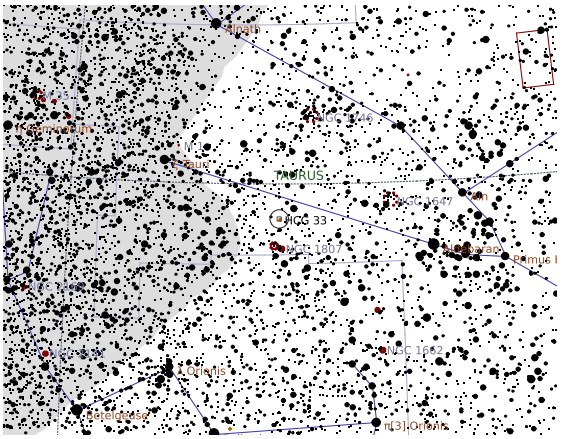
_____

HCG 33

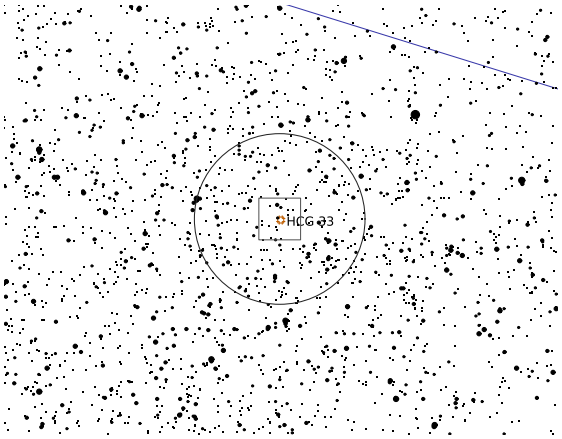
Galaxy Cluster in Taurus

Right Ascension (current)	$05^h\,11^m\,34^s$	Declination (current)	$18°\,02'\,53''$
Right Ascension (J2000.0)	$05^h\,10^m\,47^s$	Declination (J2000.0)	$18°\,02'\,05''$
Size	$2.1' \times 2.1'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

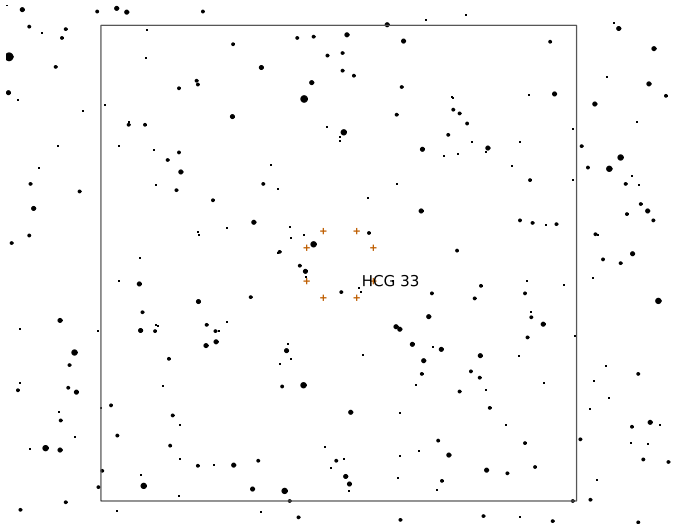
Description: z = 0.0260



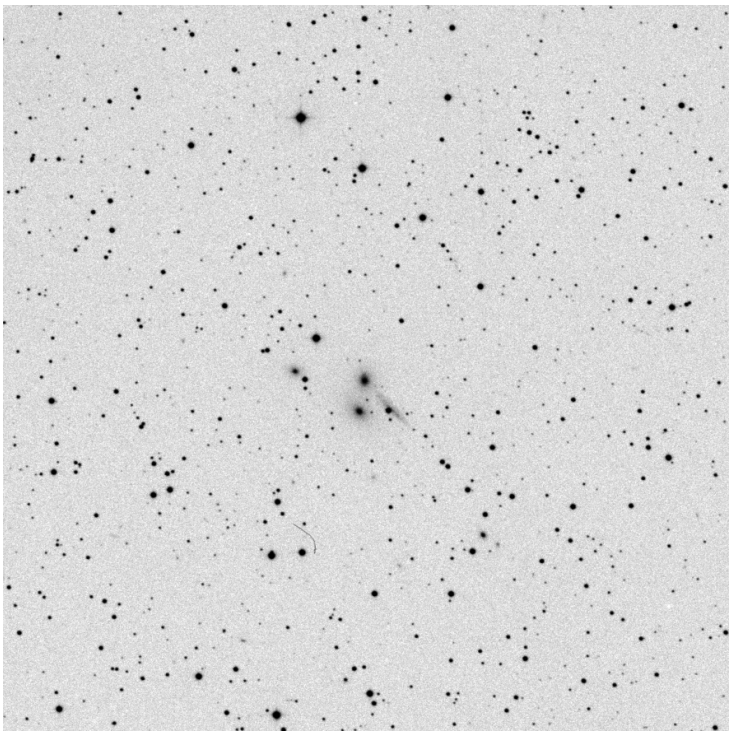
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

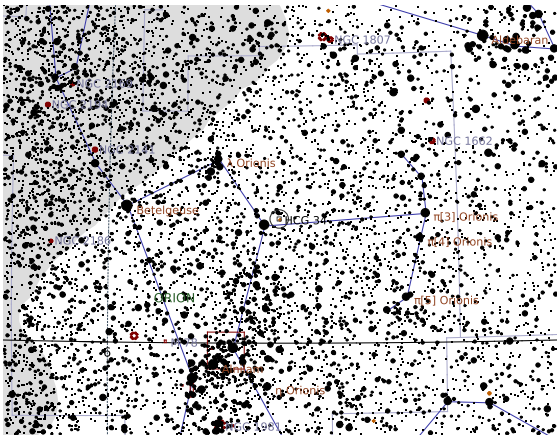
_____

HCG 34

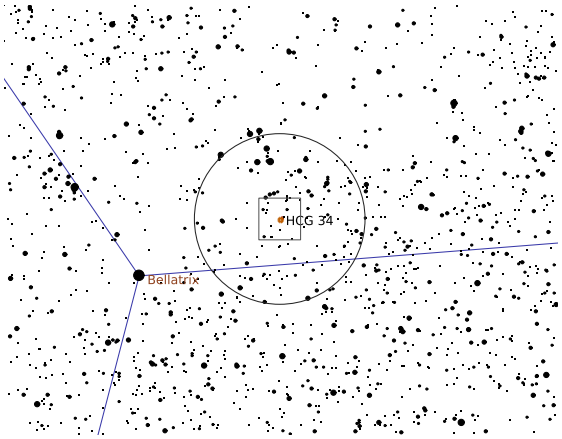
Galaxy Cluster in Orion

Right Ascension (current)	$05^{h}\,22^{m}\,30^{s}$	Declination (current)	$6^{\circ}\,41'\,11''$
Right Ascension (J2000.0)	$05^{h}\,21^{m}\,47^{s}$	Declination (J2000.0)	$6^{\circ}\,40'\,37''$
Size	$1.2' \times 1.2'$	Position Angle	0°
Magnitude	13	Other Designation	–

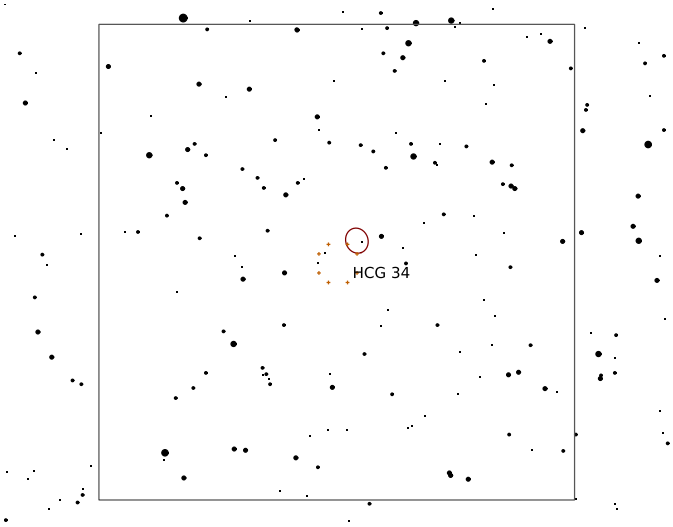
Description: z = 0.0307



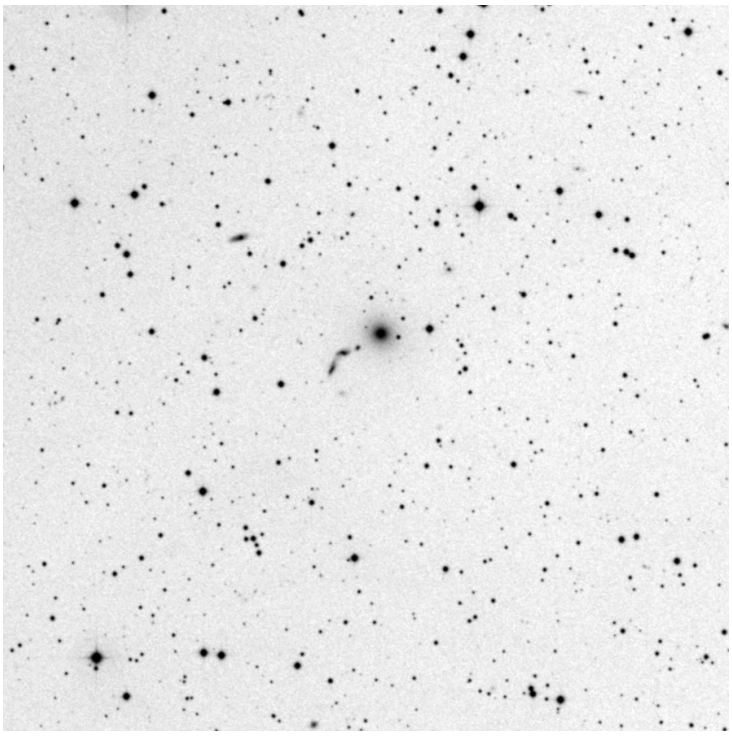
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

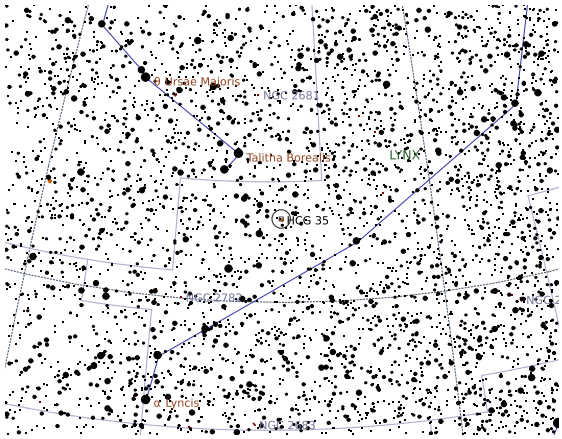
_____

HCG 35

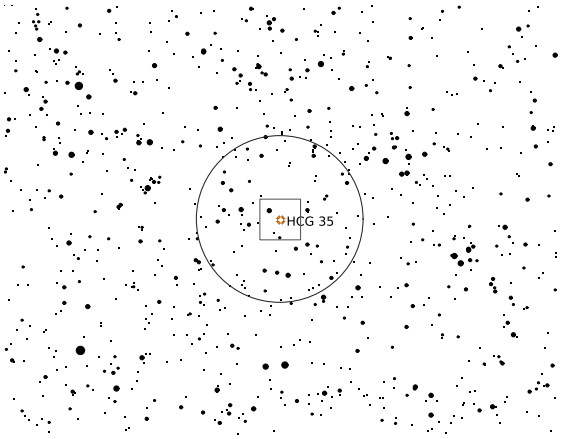
Galaxy Cluster in Lynx

Right Ascension (current)	$08^h\,46^m\,14^s$	Declination (current)	$44°\,28'\,22''$
Right Ascension (J2000.0)	$08^h\,45^m\,19^s$	Declination (J2000.0)	$44°\,31'\,18''$
Size	$2.2' \times 2.2'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

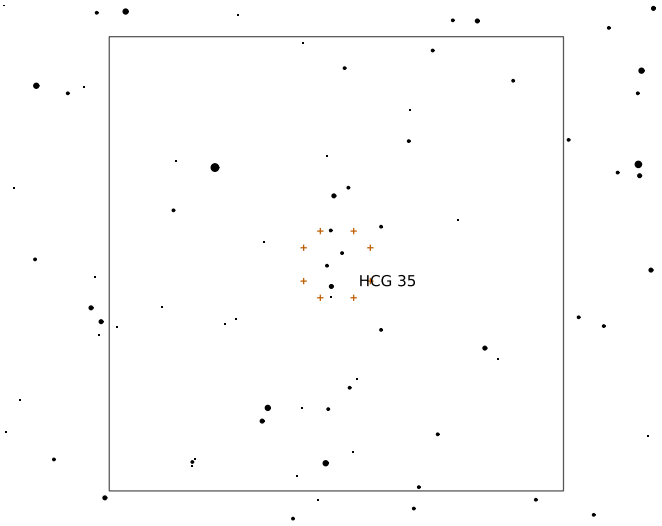
Description: z = 0.0542



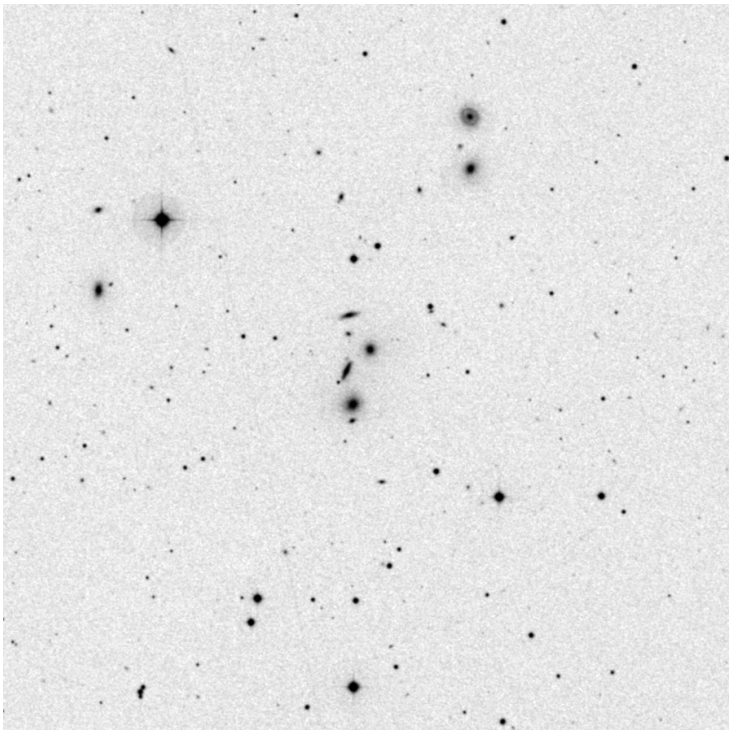
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

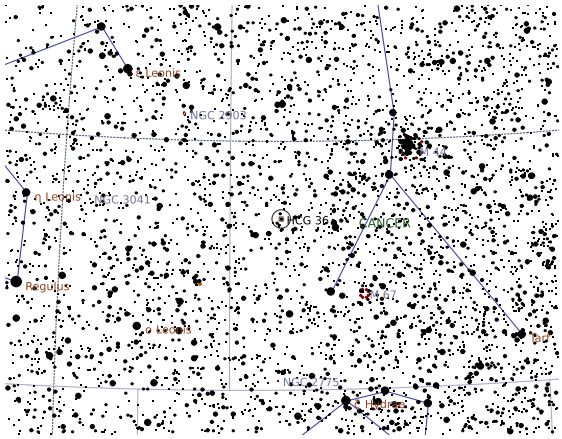
_____

HCG 36

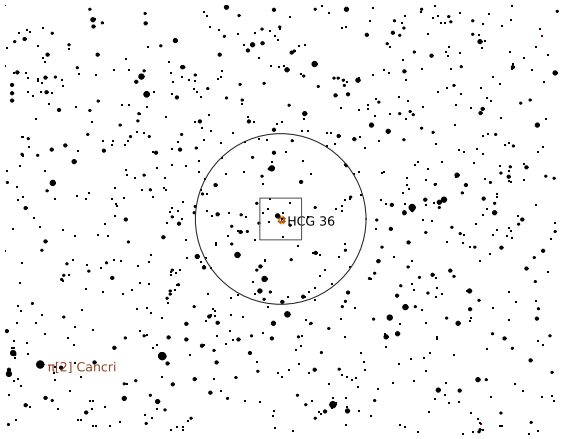
Galaxy Cluster in Cancer

Right Ascension (current)	$09^{h}\,10^{m}\,08^{s}$	Declination (current)	$15^{\circ}\,44'\,19''$
Right Ascension (J2000.0)	$09^{h}\,09^{m}\,23^{s}$	Declination (J2000.0)	$15^{\circ}\,47'\,44''$
Size	$1.9' \times 1.9'$	Position Angle	0°
Magnitude	13	Other Designation	–

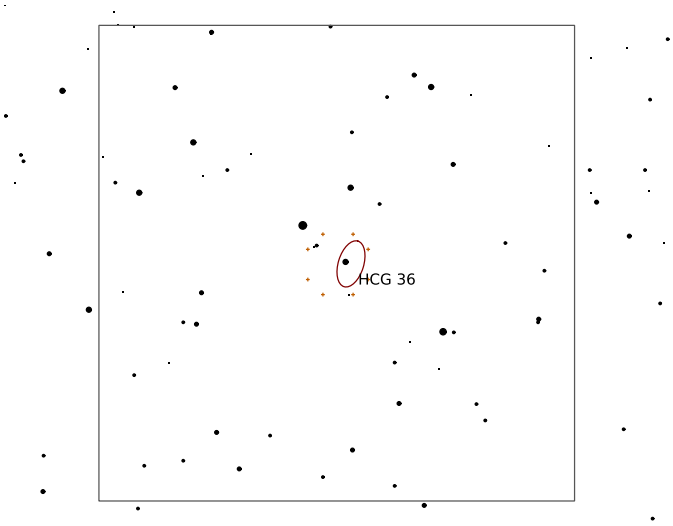
Description: z = 0.0000



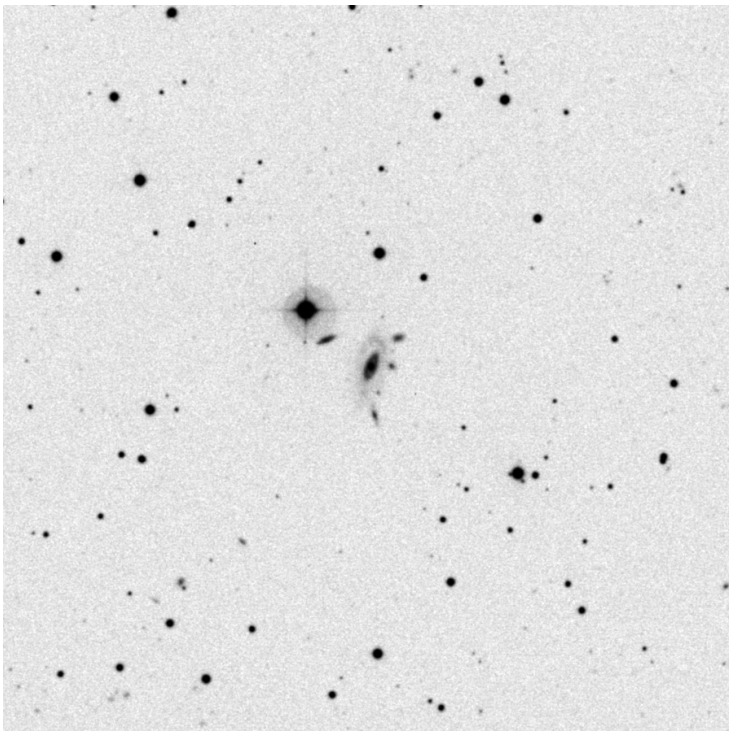
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

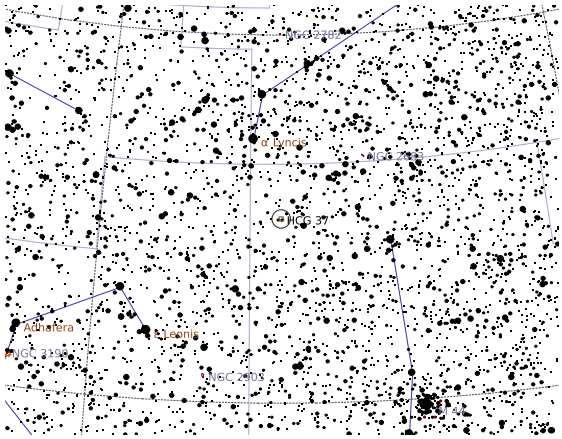
_____

HCG 37

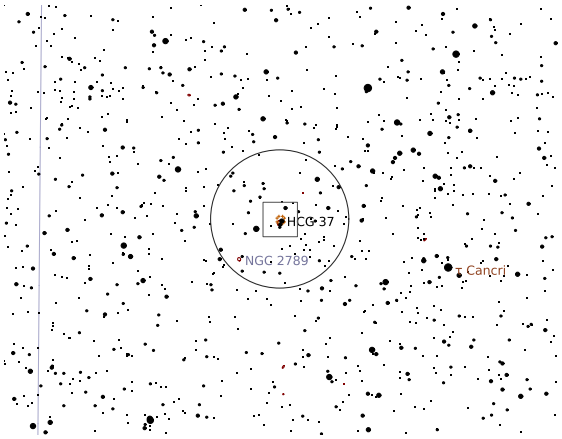
Galaxy Cluster in Cancer

Right Ascension (current)	$09^h\,14^m\,24^s$	Declination (current)	$29°\,57'\,28''$
Right Ascension (J2000.0)	$09^h\,13^m\,35^s$	Declination (J2000.0)	$30°\,00'\,51''$
Size	$3.2' \times 3.2'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

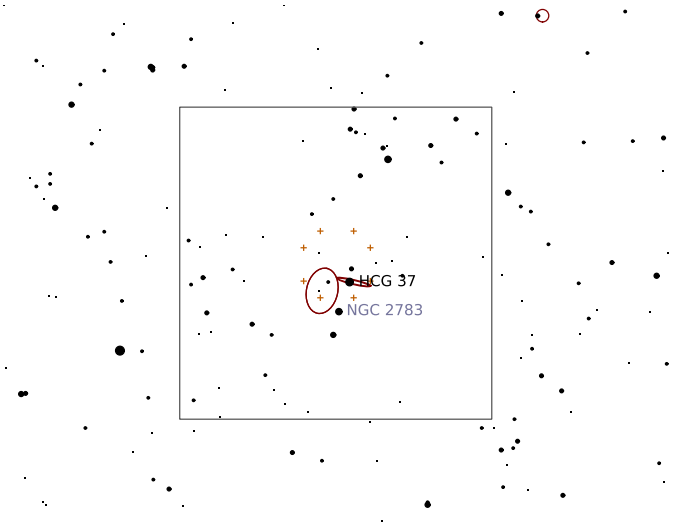
Description: z = 0.0223



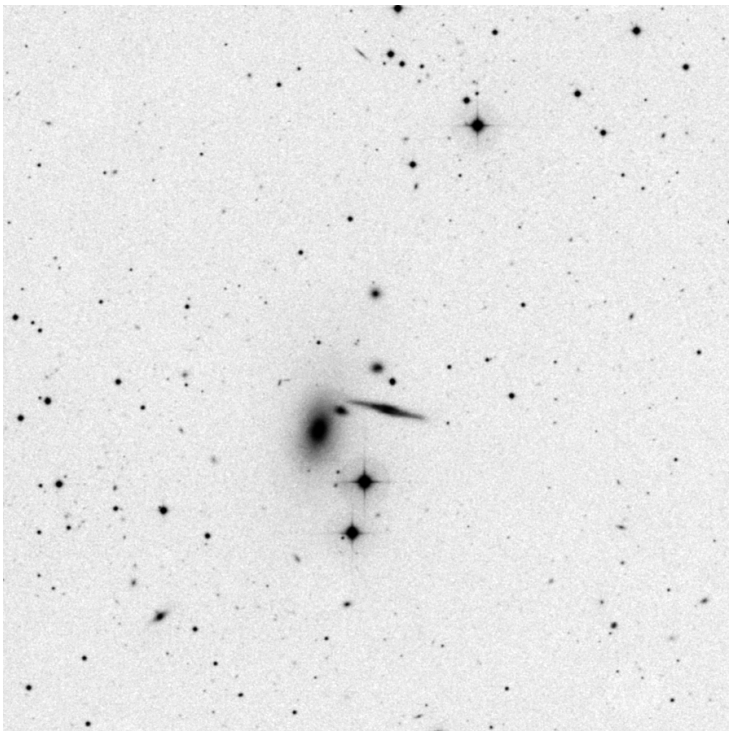
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

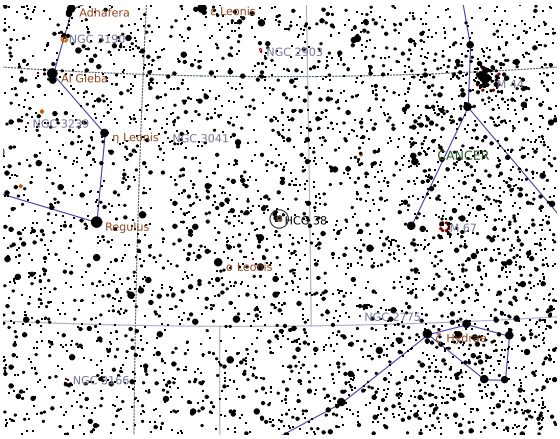
_____

HCG 38

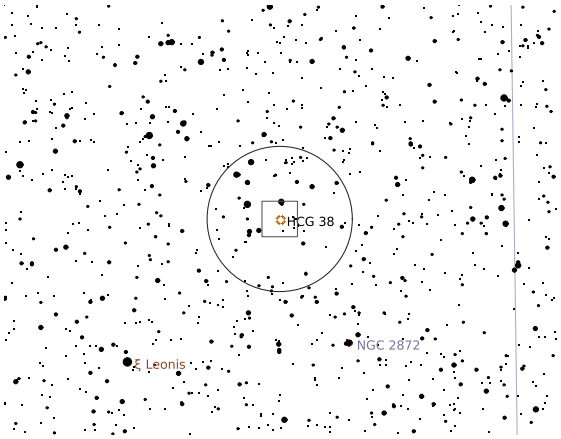
Galaxy Cluster in Leo

Right Ascension (current)	$09^h\,28^m\,22^s$	Declination (current)	$12°\,13'\,11''$
Right Ascension (J2000.0)	$09^h\,27^m\,38^s$	Declination (J2000.0)	$12°\,16'\,51''$
Size	$2.9' \times 2.9'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

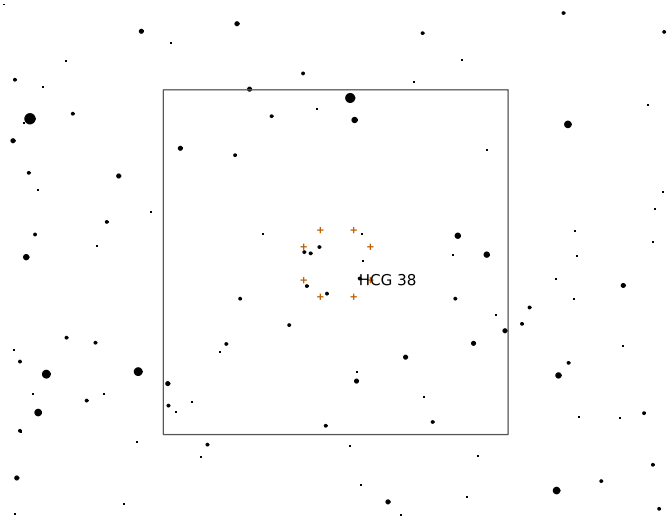
Description: z = 0.0292



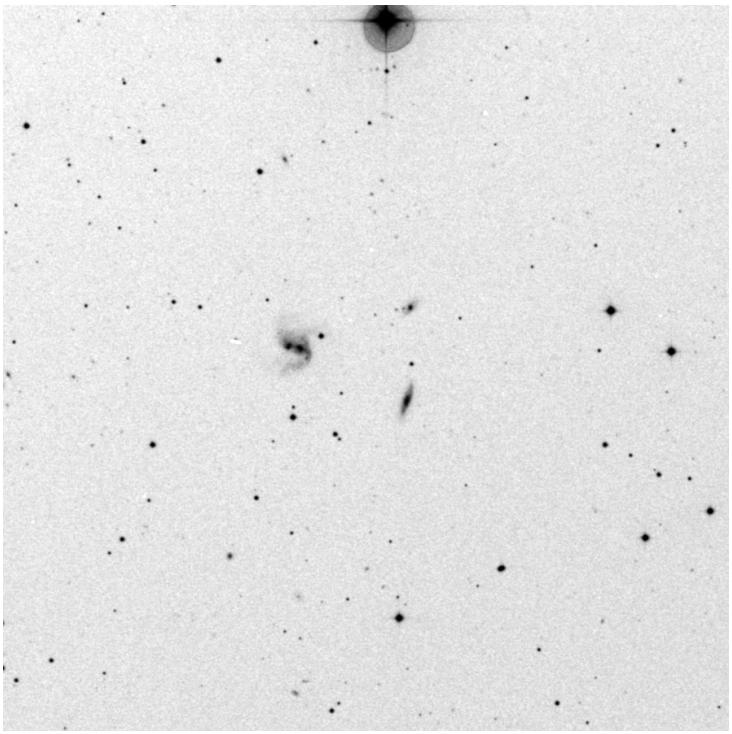
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

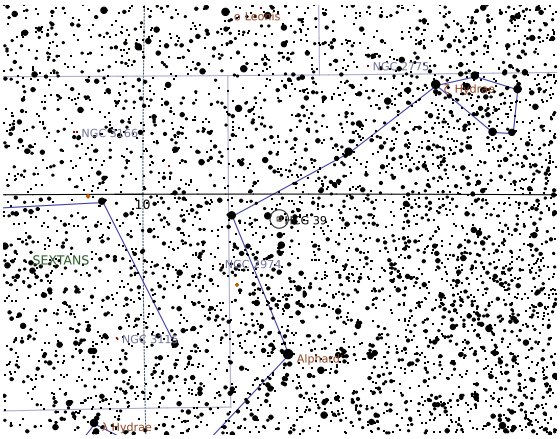
_____

HCG 39

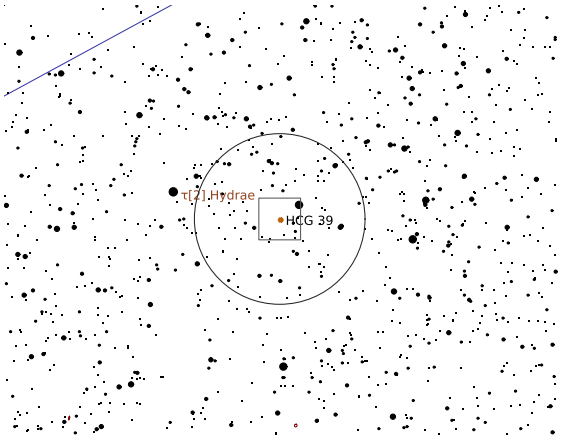
Galaxy Cluster in Hydra

Right Ascension (current)	$09^{h}\,30^{m}\,10^{s}$	Declination (current)	$-1^{\circ}\,24'\,25''$
Right Ascension (J2000.0)	$09^{h}\,29^{m}\,28^{s}$	Declination (J2000.0)	$-1^{\circ}\,20'\,40''$
Size	$1' \times 1'$	Position Angle	0°
Magnitude	15	Other Designation	–

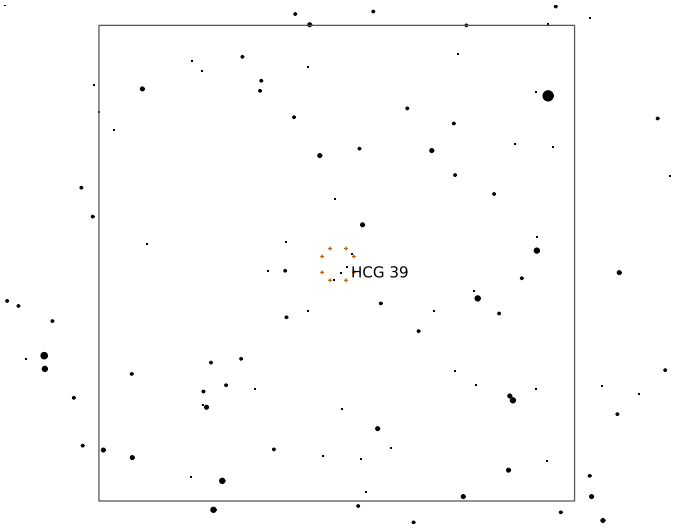
Description: z = 0.0701



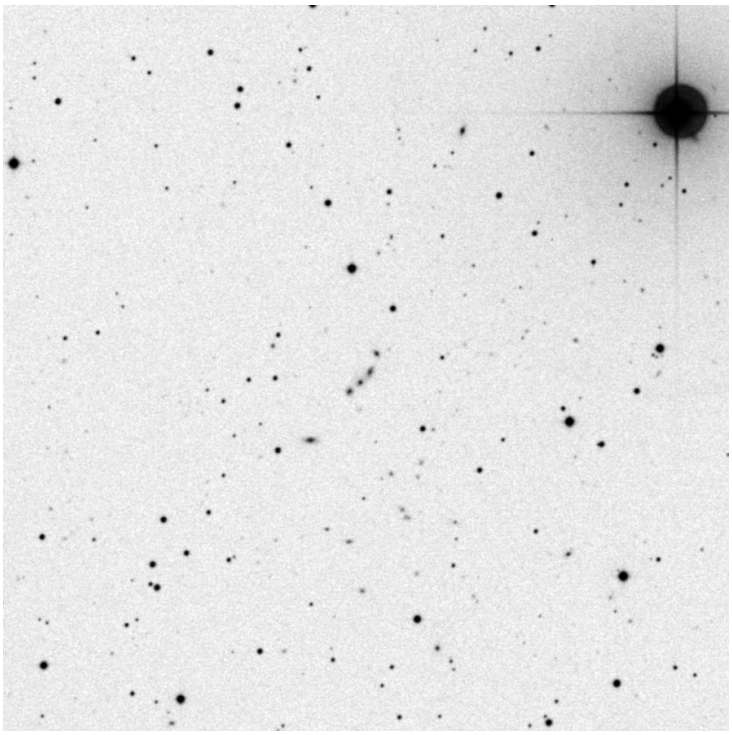
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

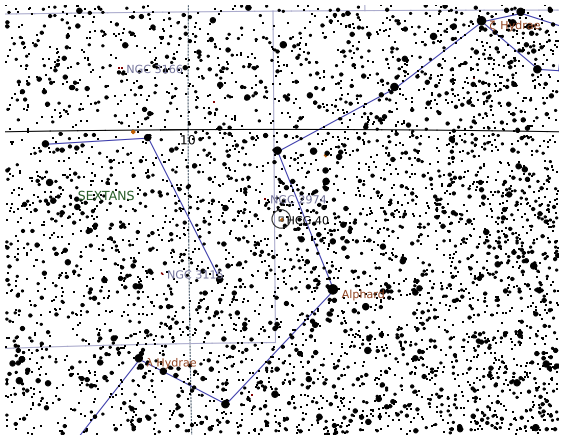
_____

HCG 40

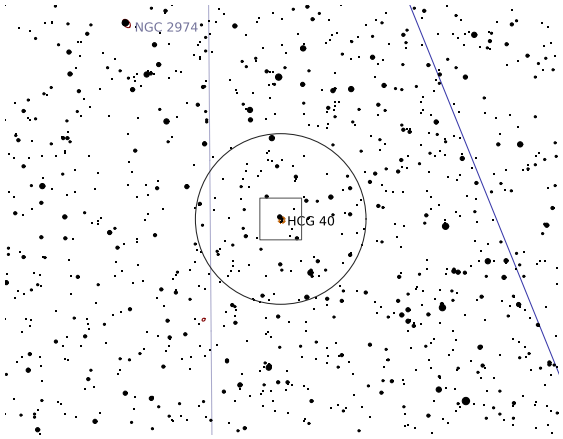
Galaxy Cluster in Hydra

Right Ascension (current)	$09^{h}\,39^{m}\,35^{s}$	Declination (current)	$-4^{\circ}\,54'\,59''$
Right Ascension (J2000.0)	$09^{h}\,38^{m}\,54^{s}$	Declination (J2000.0)	$-4^{\circ}\,51'\,07''$
Size	$1.7' \times 1.7'$	Position Angle	0°
Magnitude	12	Other Designation	–

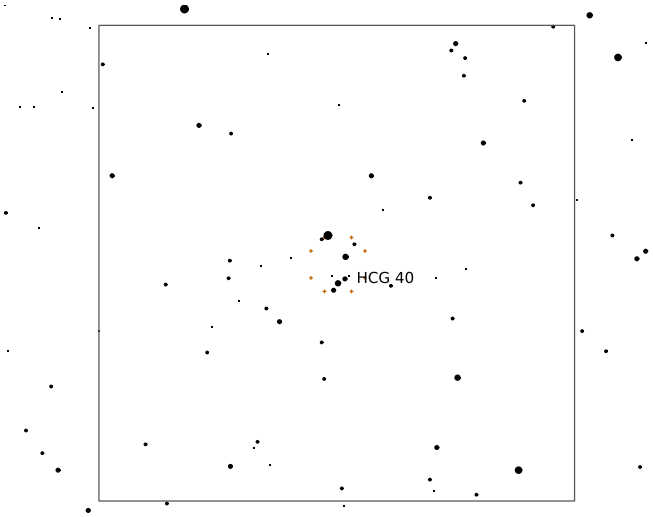
Description: z = 0.0223



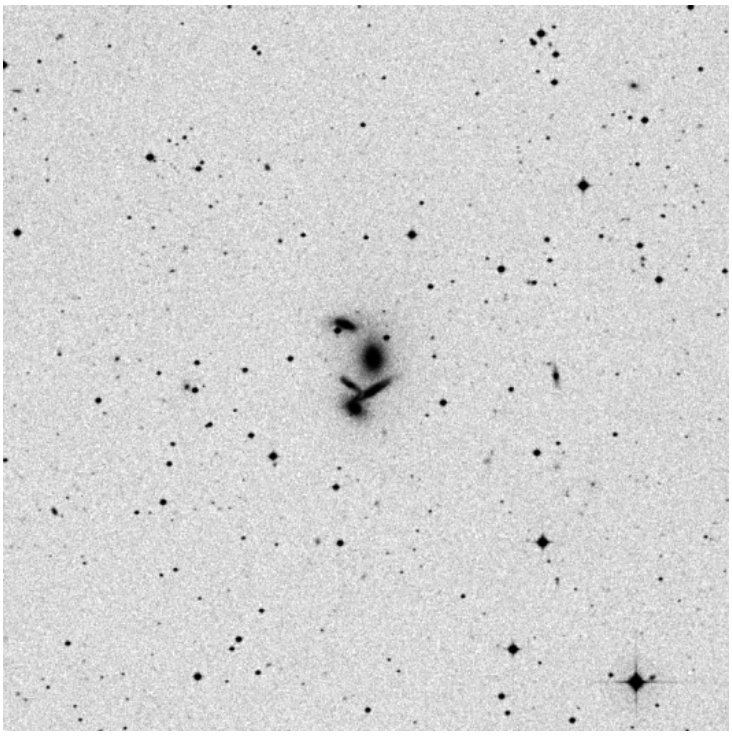
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

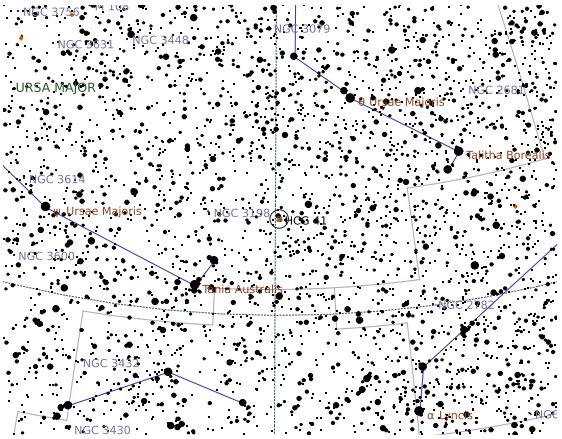
_____

HCG 41

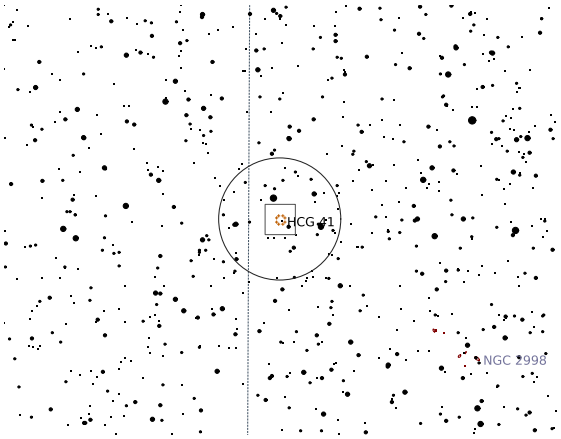
Galaxy Cluster in Ursa Major

Right Ascension (current)	$09^h\,58^m\,30^s$	Declination (current)	$45°\,10'\,34''$
Right Ascension (J2000.0)	$09^h\,57^m\,39^s$	Declination (J2000.0)	$45°\,14'\,22''$
Size	$4.1' \times 4.1'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

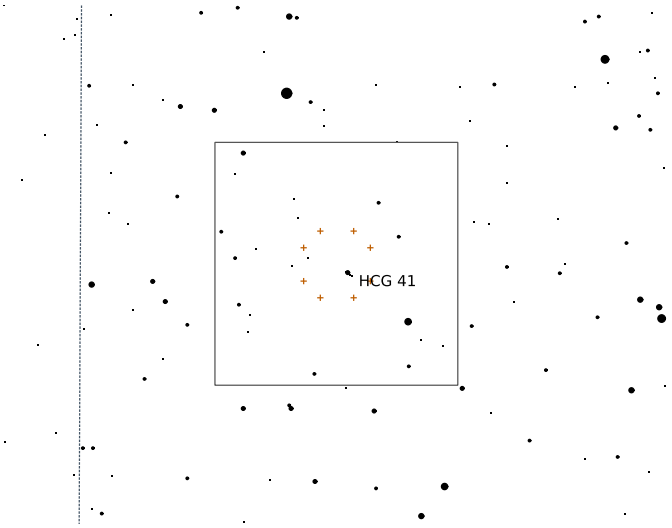
Description: z = 0.0000



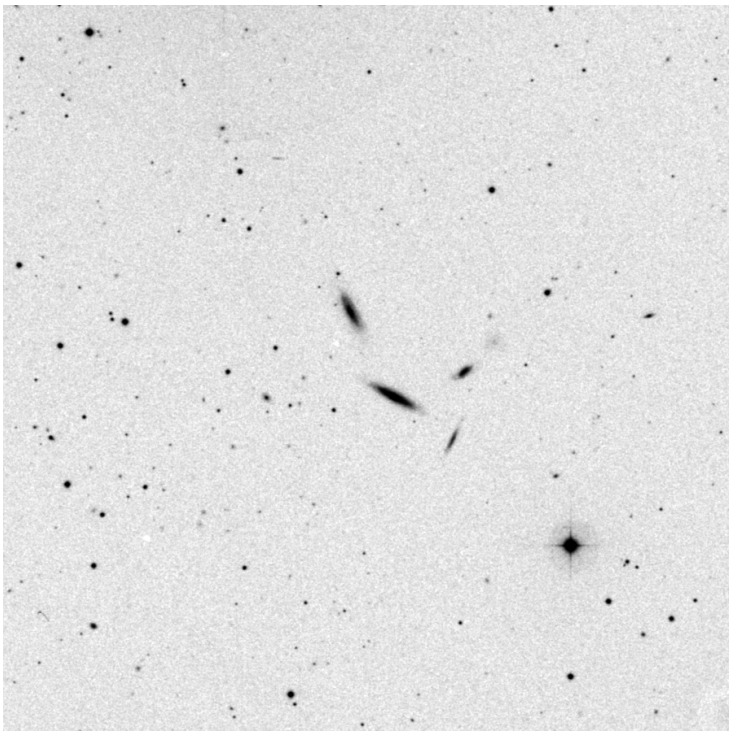
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

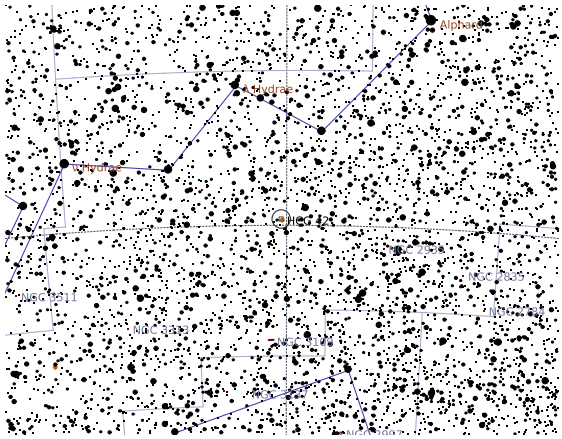
_____

HCG 42

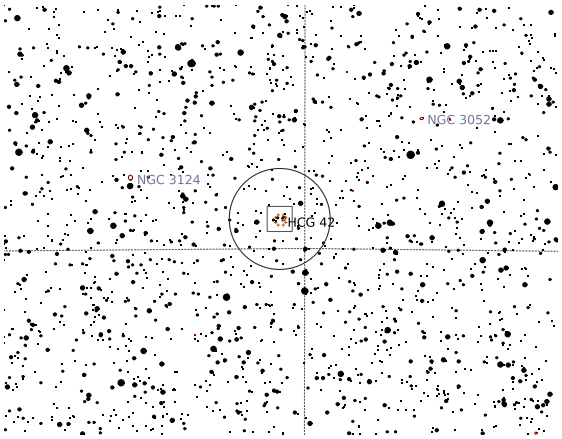
Galaxy Cluster in Hydra

Right Ascension (current)	$10^{h}\,01^{m}\,00^{s}$	Declination (current)	$-19°\,43'\,07''$
Right Ascension (J2000.0)	$10^{h}\,00^{m}\,21^{s}$	Declination (J2000.0)	$-19°\,38'\,57''$
Size	$6' \times 6'$	Position Angle	$0°$
Magnitude	11	Other Designation	–

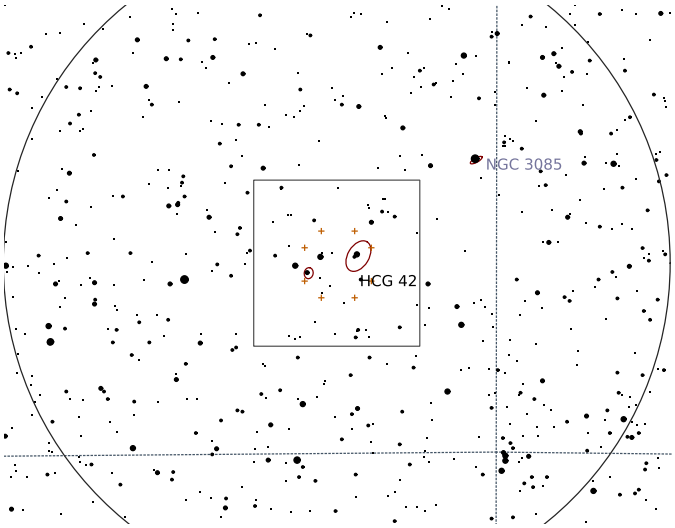
Description: z = 0.0133



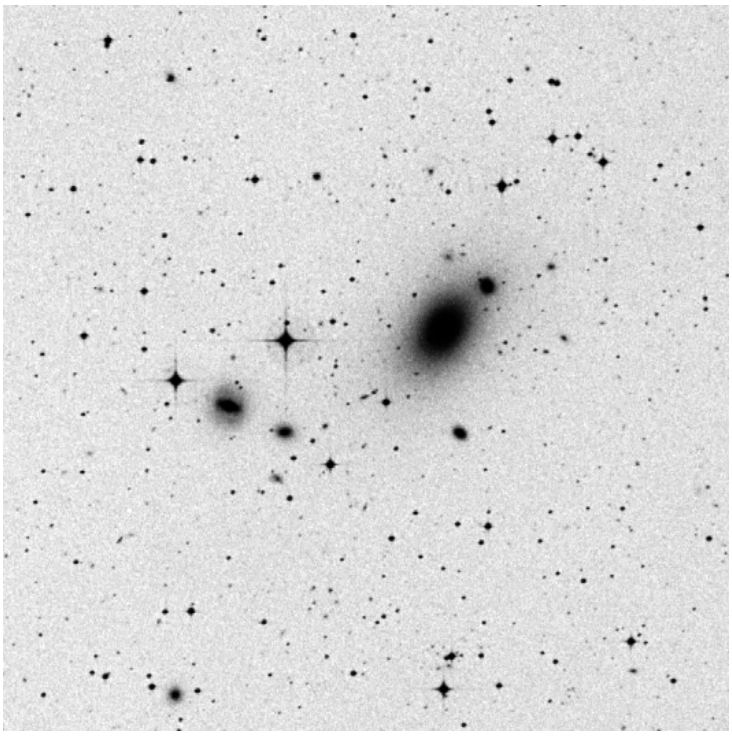
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

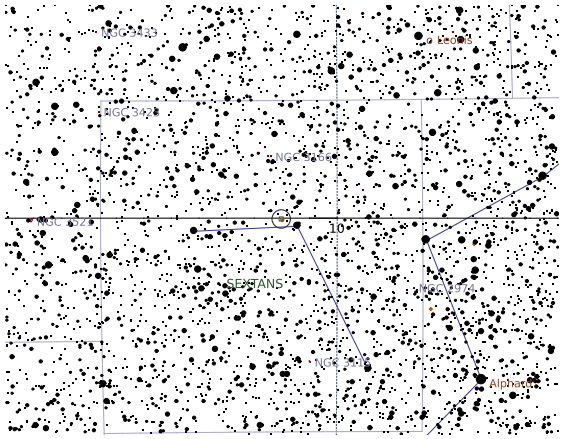
_____

HCG 43

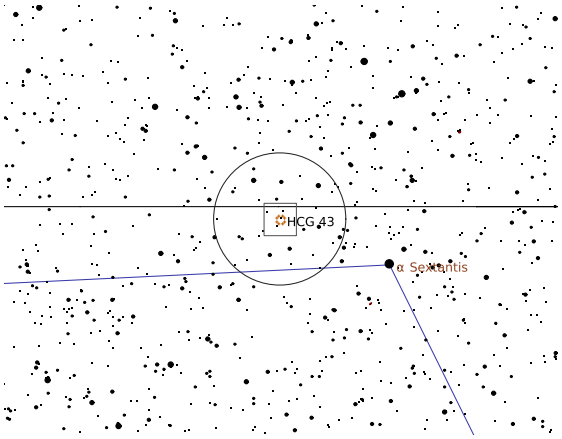
Galaxy Cluster in Sextans

Right Ascension (current)	$10^{h}\,11^{m}\,55^{s}$	Declination (current)	$-0°\,06'\,04''$
Right Ascension (J2000.0)	$10^{h}\,11^{m}\,13^{s}$	Declination (J2000.0)	$-0°\,01'\,54''$
Size	$3.5' \times 3.5'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

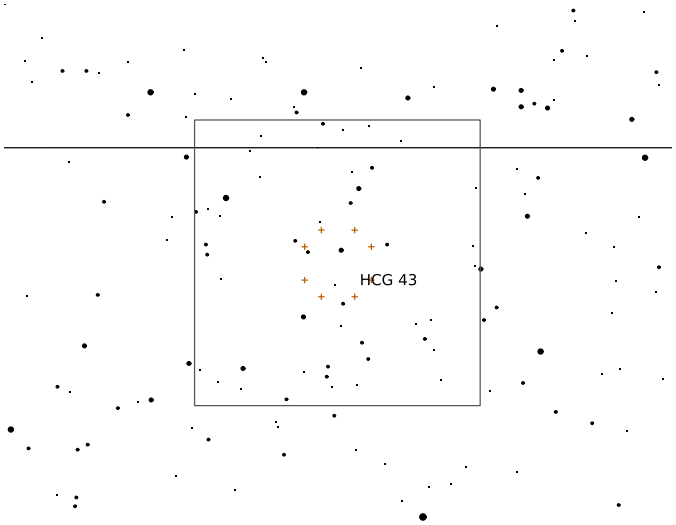
Description: z = 0.0330



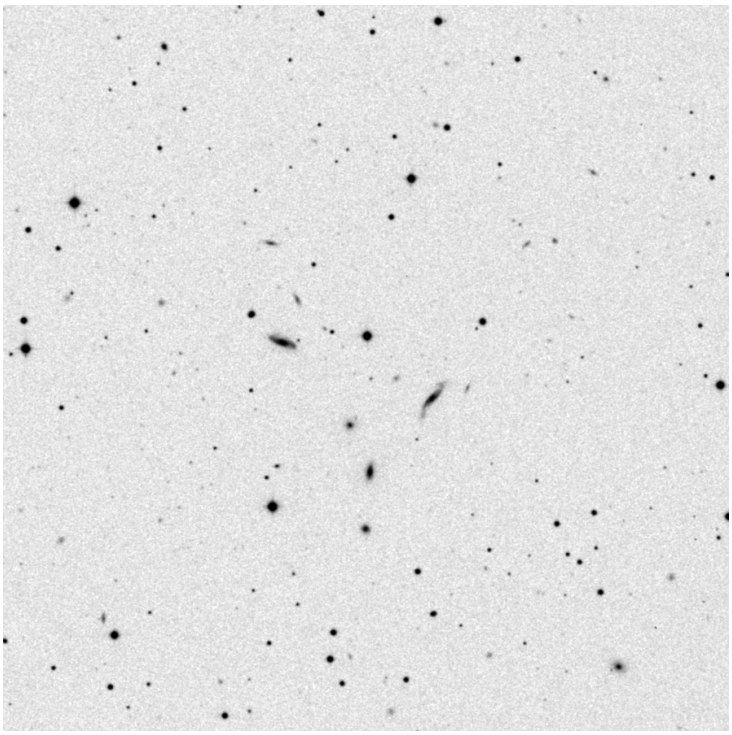
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

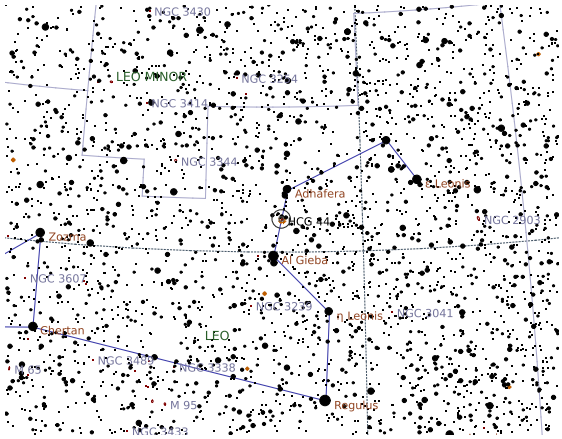
_____

HCG 44

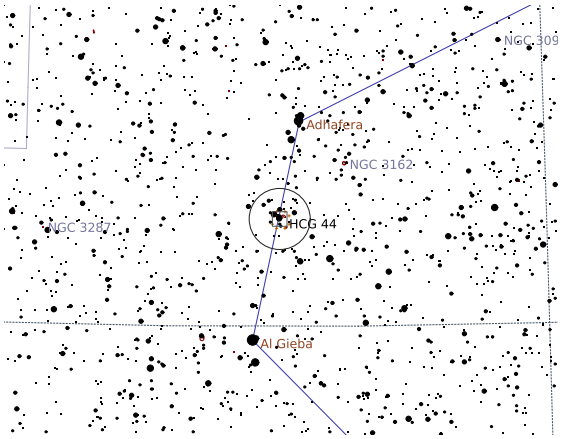
Galaxy Cluster in Leo

Right Ascension (current) Right Ascension (J2000.0)	$10^h\,18^m\,45^s$ $10^h\,18^m\,00^s$	Declination (current) Declination (J2000.0)	$21°\,44'\,37''$ $21°\,48'\,44''$
Size Magnitude	$16.4' \times 16.4'$ 10	Position Angle Other Designation	0° –

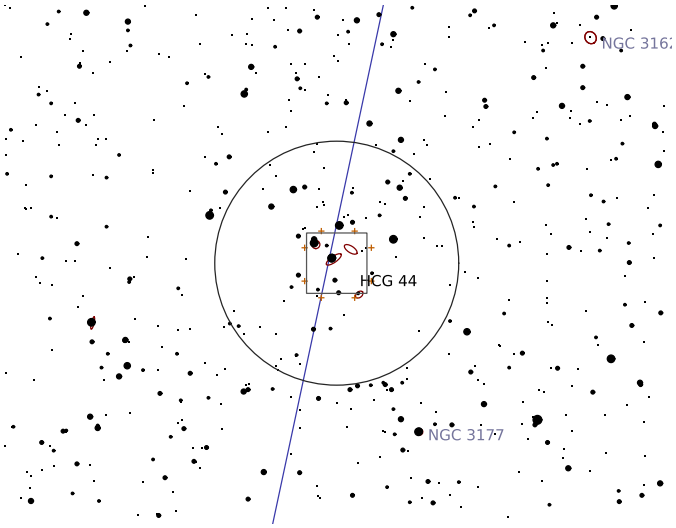
Description: z = 0.0046



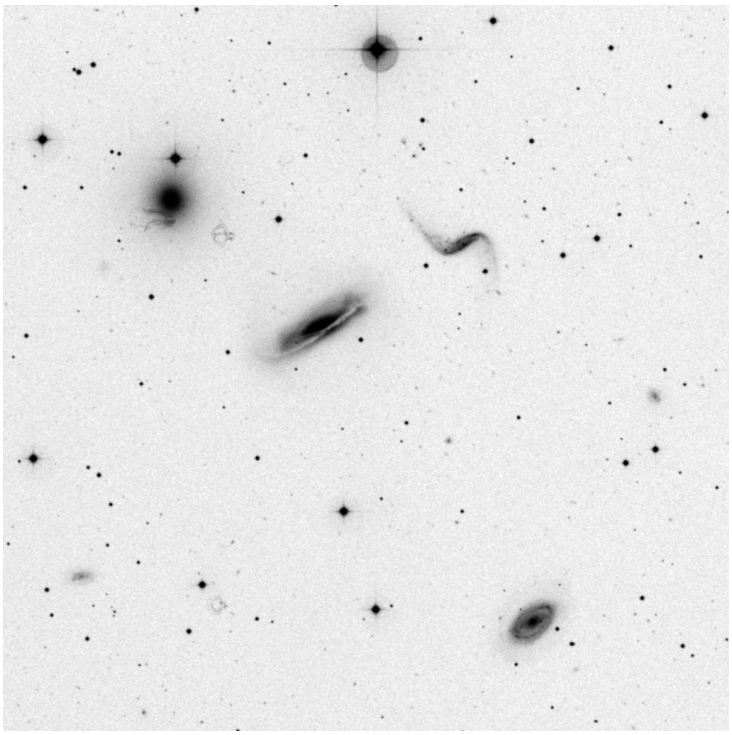
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($21.4' \times 21.4'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

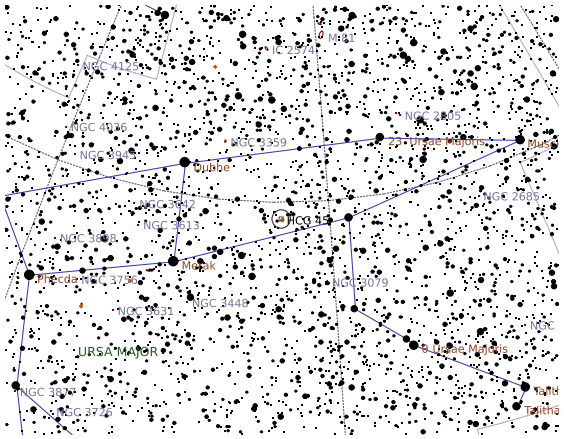
_____

HCG 45

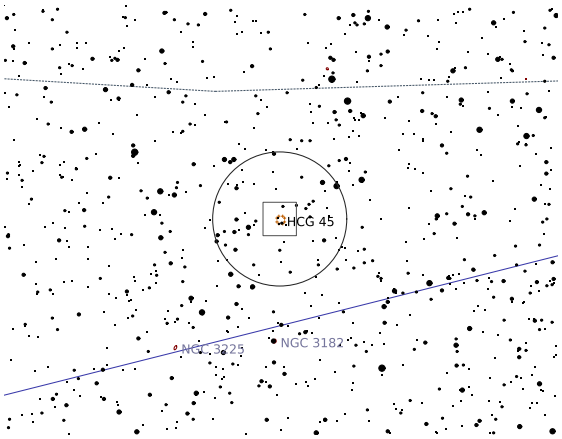
Galaxy Cluster in Ursa Major

Right Ascension (current)	$10^h\,20^m\,05^s$	Declination (current)	$59°\,02'\,39''$
Right Ascension (J2000.0)	$10^h\,19^m\,11^s$	Declination (J2000.0)	$59°\,06'\,35''$
Size	$3.4' \times 3.4'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

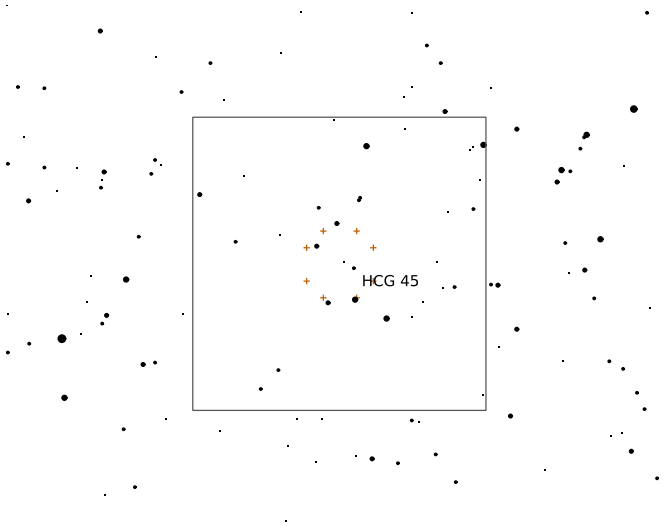
Description: z = 0.0732



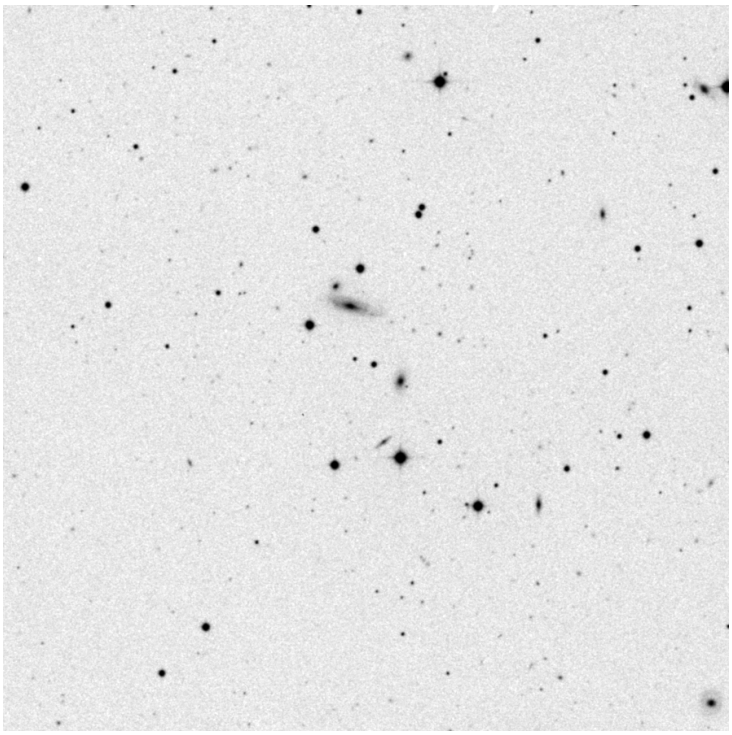
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

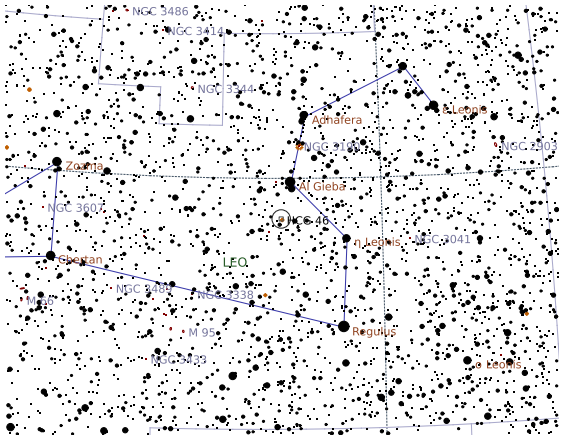
_____

HCG 46

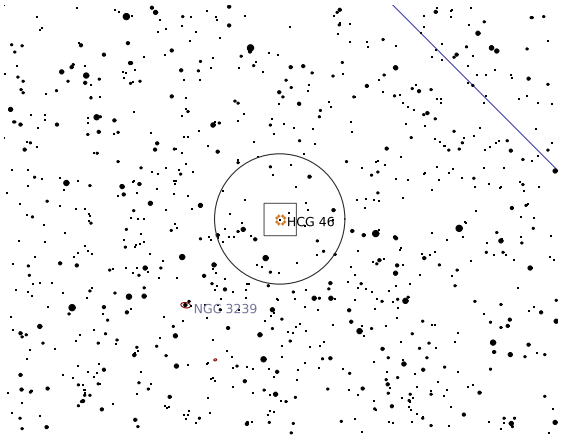
Galaxy Cluster in Leo

Right Ascension (current)	$10^h\,22^m\,46^s$	Declination (current)	$17°\,44'\,44''$
Right Ascension (J2000.0)	$10^h\,22^m\,01^s$	Declination (J2000.0)	$17°\,48'\,54''$
Size	$3.6' \times 3.6'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

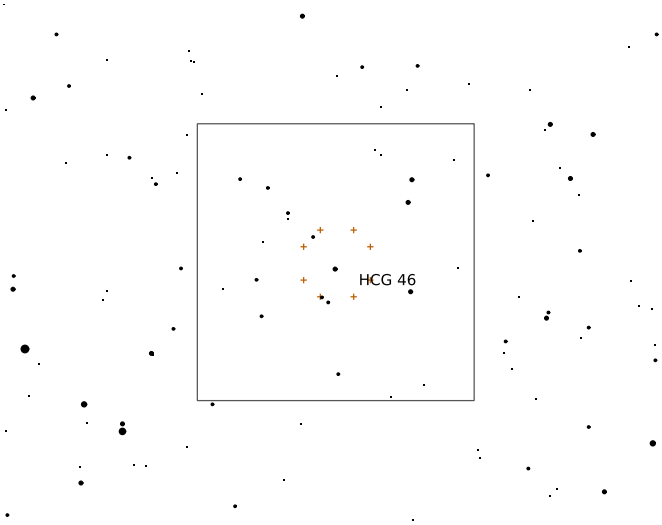
Description: z = 0.0270



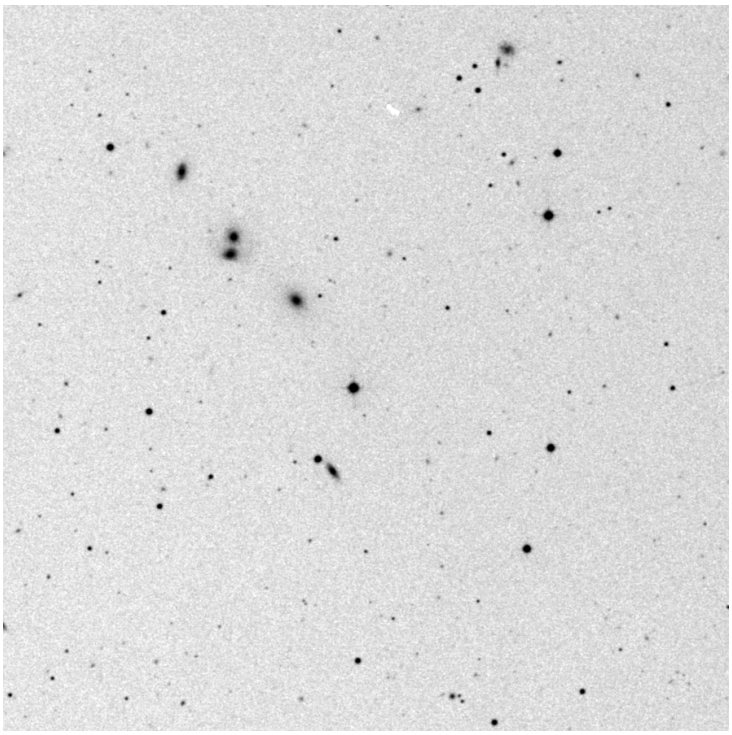
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

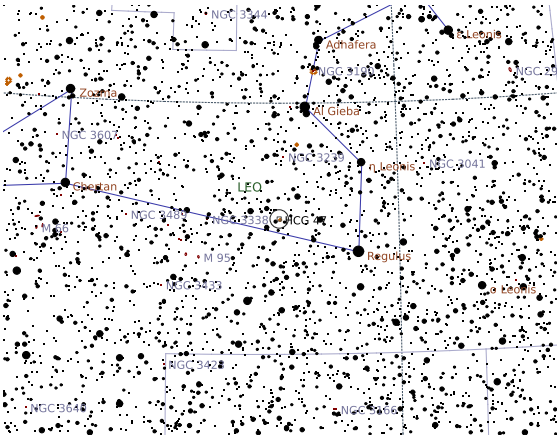
_____

HCG 47

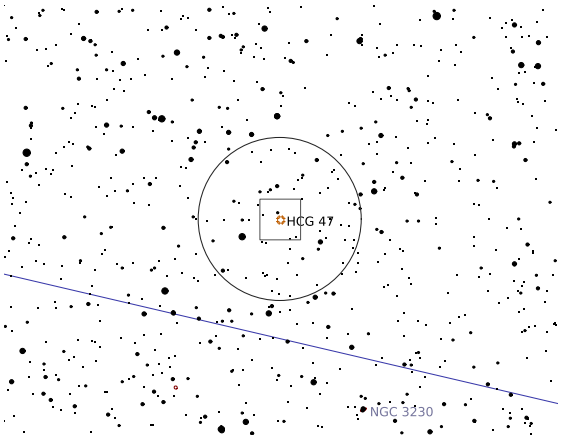
Galaxy Cluster in Leo

Right Ascension (current)	$10^h\,26^m\,32^s$	Declination (current)	$13°\,39'\,41''$
Right Ascension (J2000.0)	$10^h\,25^m\,48^s$	Declination (J2000.0)	$13°\,43'\,54''$
Size	$2.3' \times 2.3'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

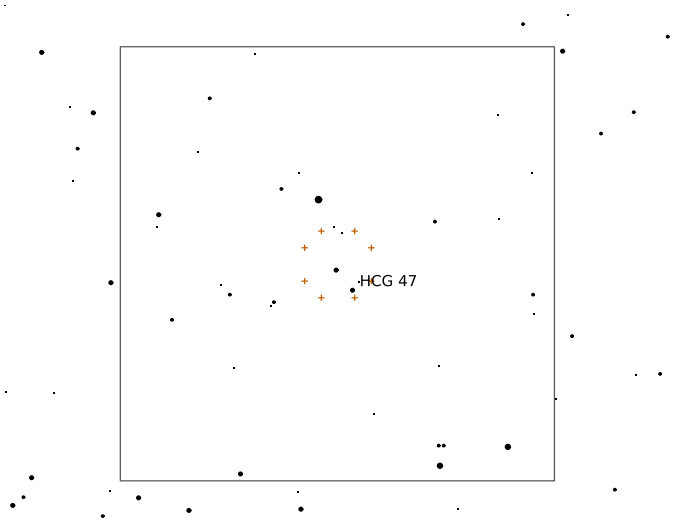
Description: z = 0.0317



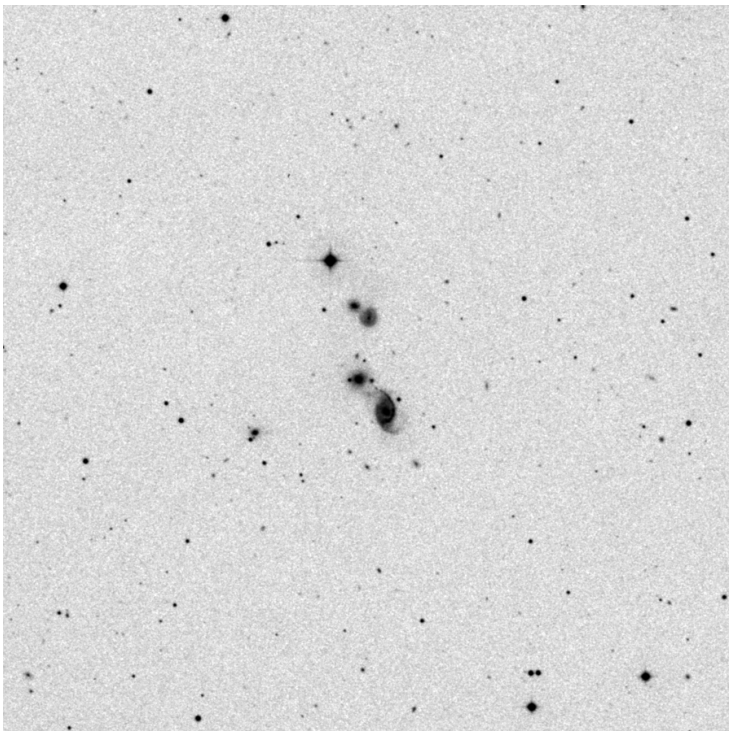
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

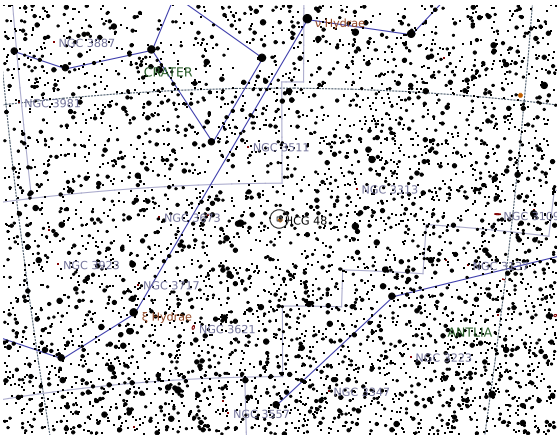
_____

HCG 48

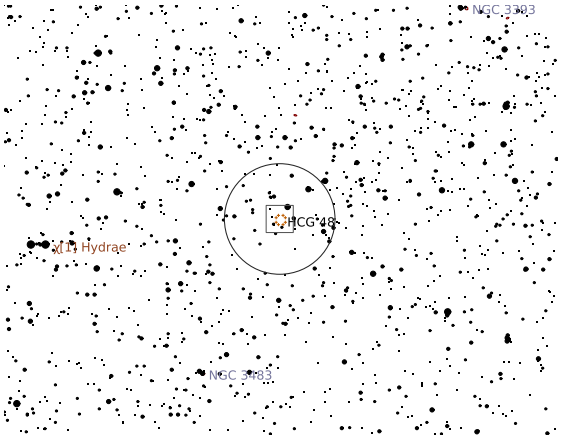
Galaxy Cluster in Hydra

Right Ascension (current)	$10^{h}\,56^{m}\,28^{s}$	Declination (current)	$-27°\,09'\,51''$
Right Ascension (J2000.0)	$10^{h}\,55^{m}\,48^{s}$	Declination (J2000.0)	$-27°\,05'\,15''$
Size	$5' \times 5'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

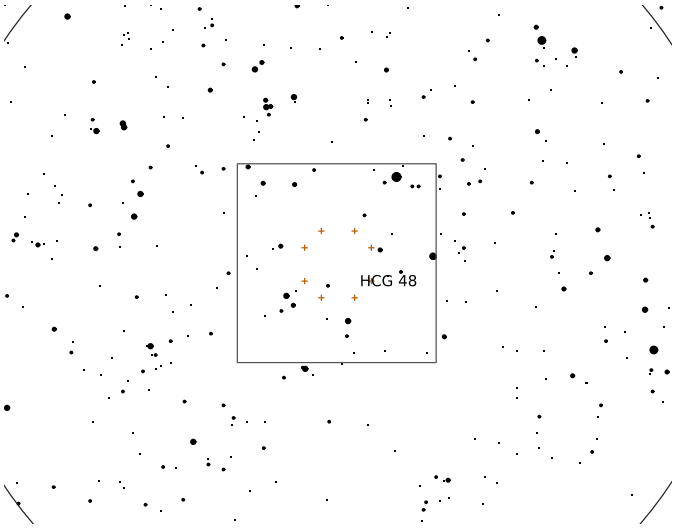
Description: z = 0.0094



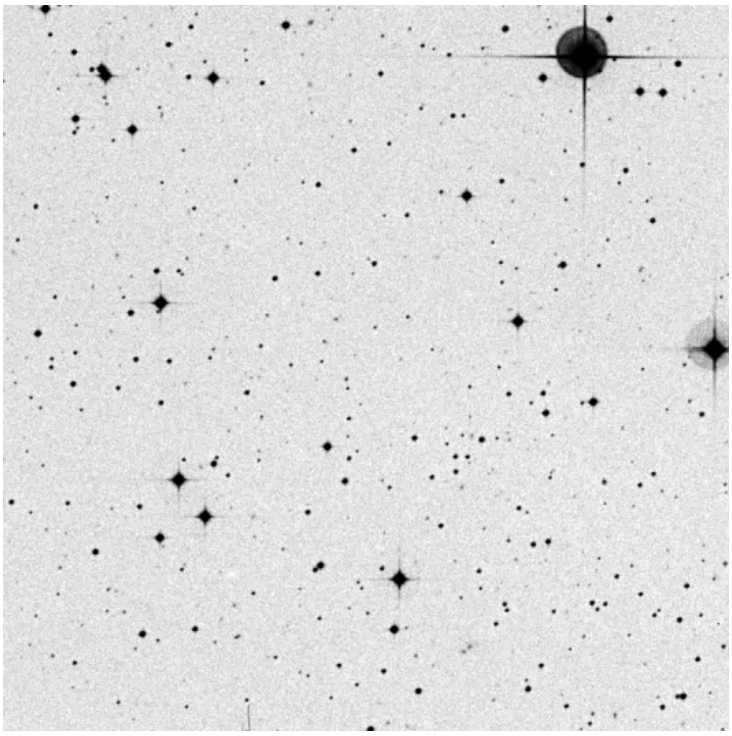
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

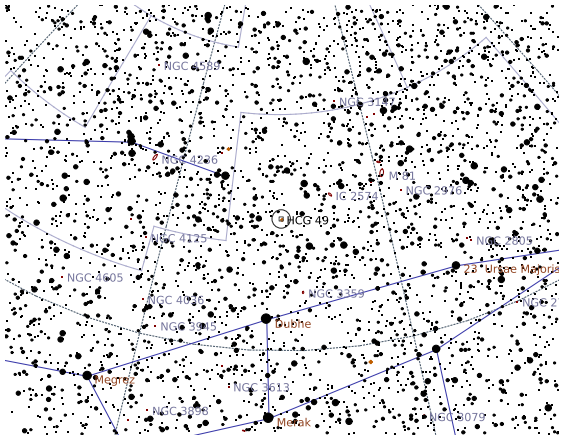
_____

HCG 49

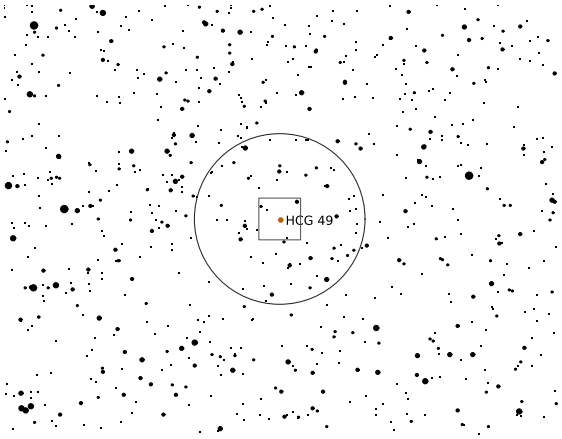
Galaxy Cluster in Ursa Major

Right Ascension (current)	$10^{h}\,57^{m}\,30^{s}$	Declination (current)	$67°\,06'\,36''$
Right Ascension (J2000.0)	$10^{h}\,56^{m}\,36^{s}$	Declination (J2000.0)	$67°\,10'\,45''$
Size	$0.9' \times 0.9'$	Position Angle	$0°$
Magnitude	15	Other Designation	–

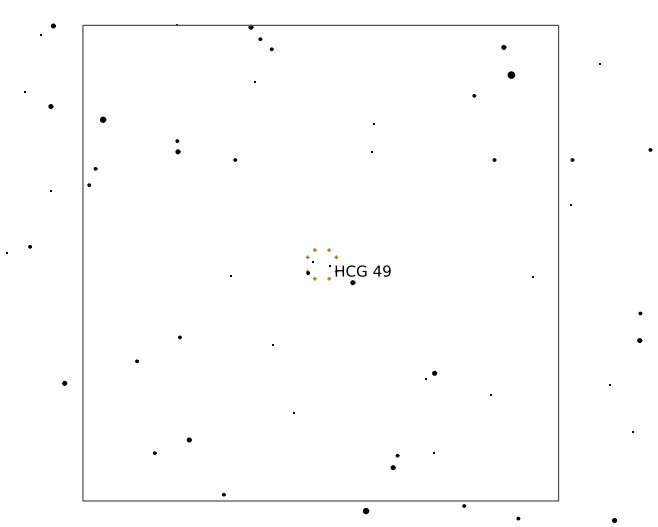
Description: z = 0.0332



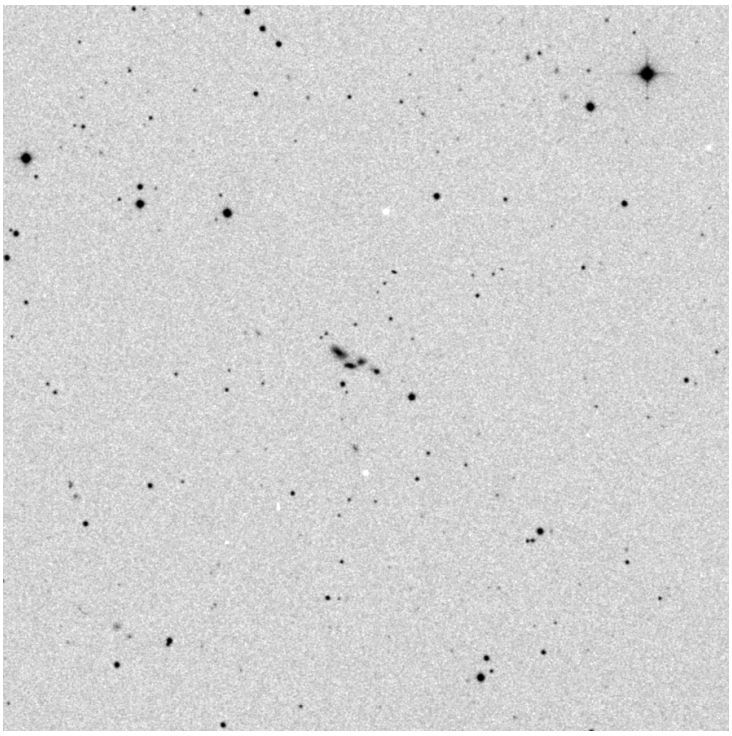
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

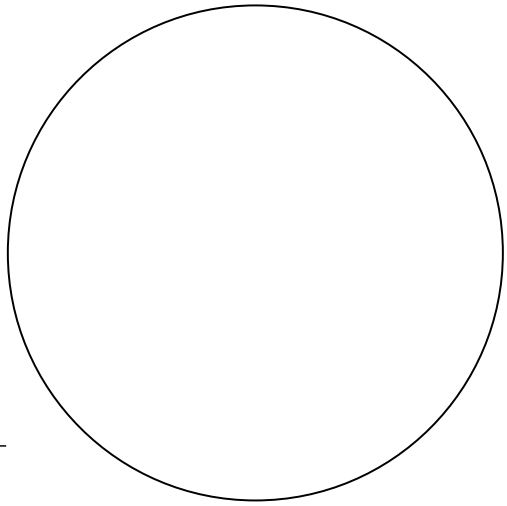
* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____



Sketch

FOV: _____

* Description: _____

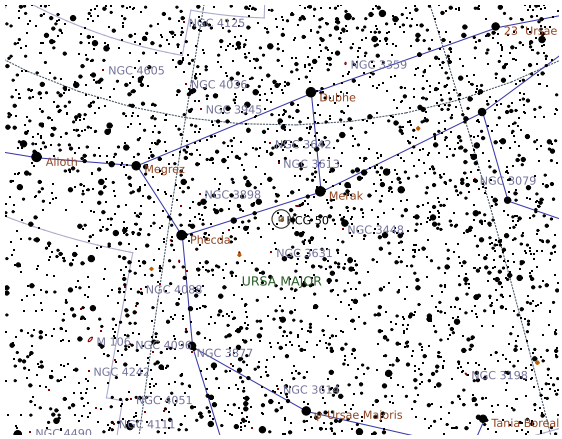
_____

HCG 50

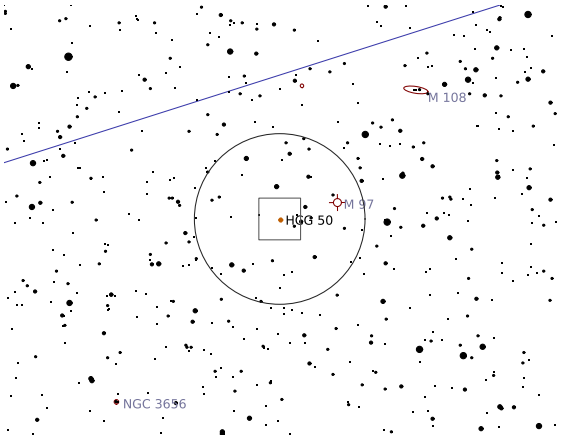
Galaxy Cluster in Ursa Major

Right Ascension (current)	$11^h\,17^m\,52^s$	Declination (current)	$54°\,50'\,49''$
Right Ascension (J2000.0)	$11^h\,17^m\,06^s$	Declination (J2000.0)	$54°\,55'\,07''$
Size	$0.7' \times 0.7'$	Position Angle	0°
Magnitude	16	Other Designation	–

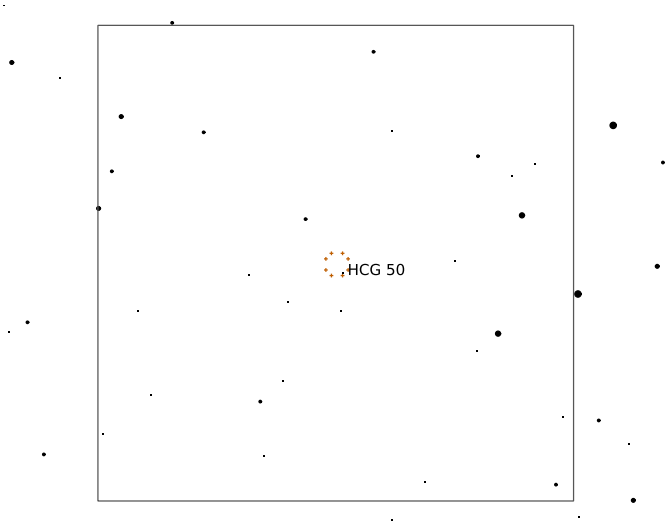
Description: z = 0.1392



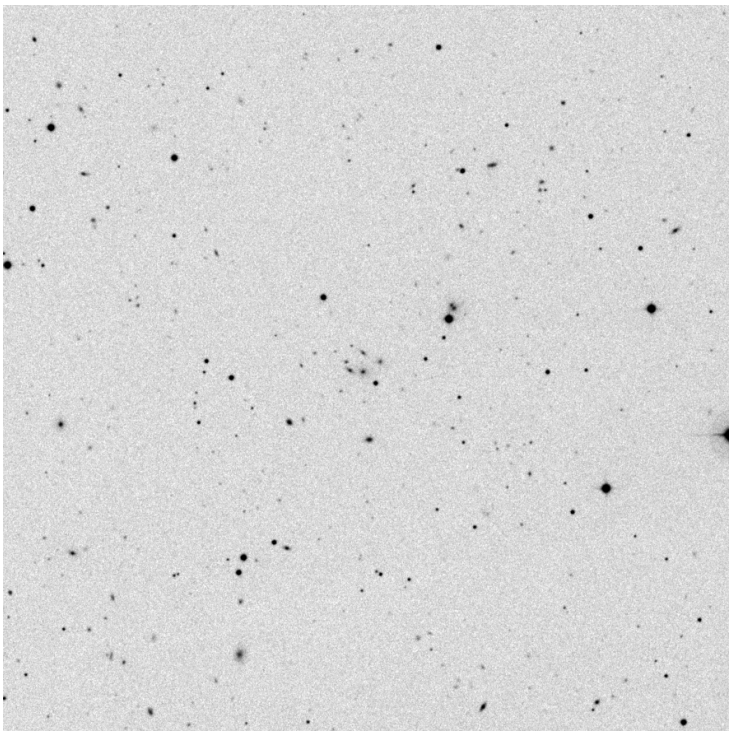
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

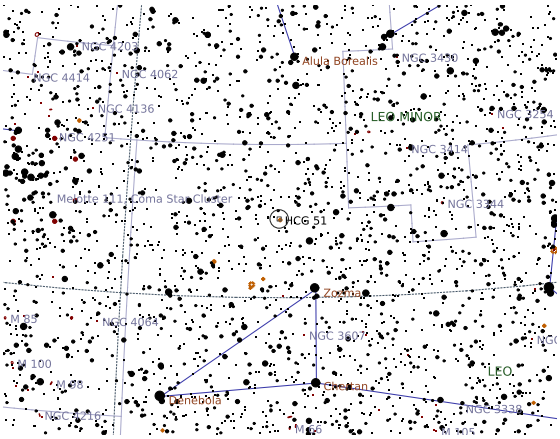
_____

HCG 51

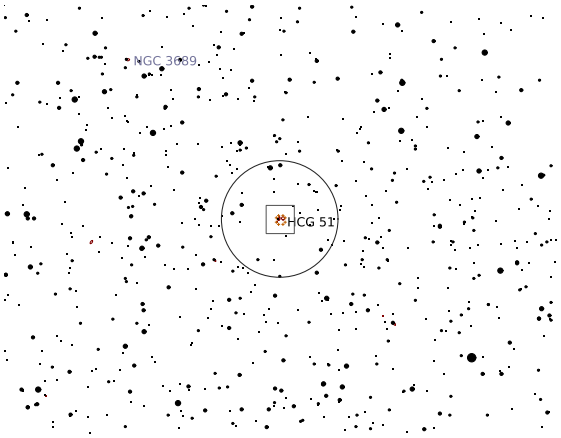
Galaxy Cluster in Leo

Right Ascension (current)	$11^h\,23^m\,04^s$	Declination (current)	$24°\,13'\,08''$
Right Ascension (J2000.0)	$11^h\,22^m\,20^s$	Declination (J2000.0)	$24°\,17'\,35''$
Size	$4.5' \times 4.5'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

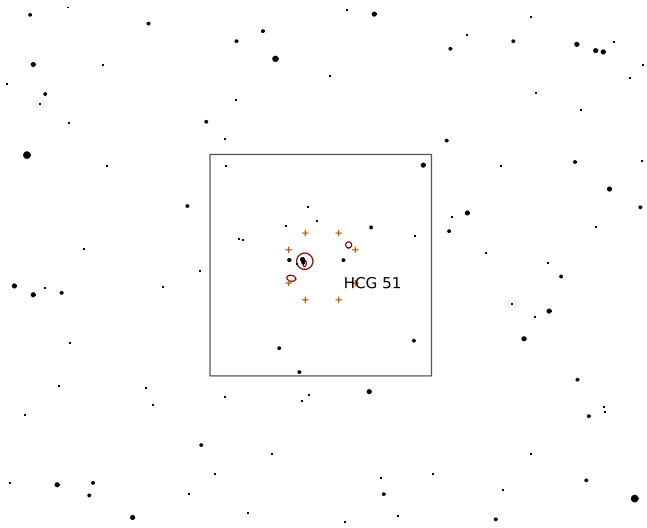
Description: z = 0.0258



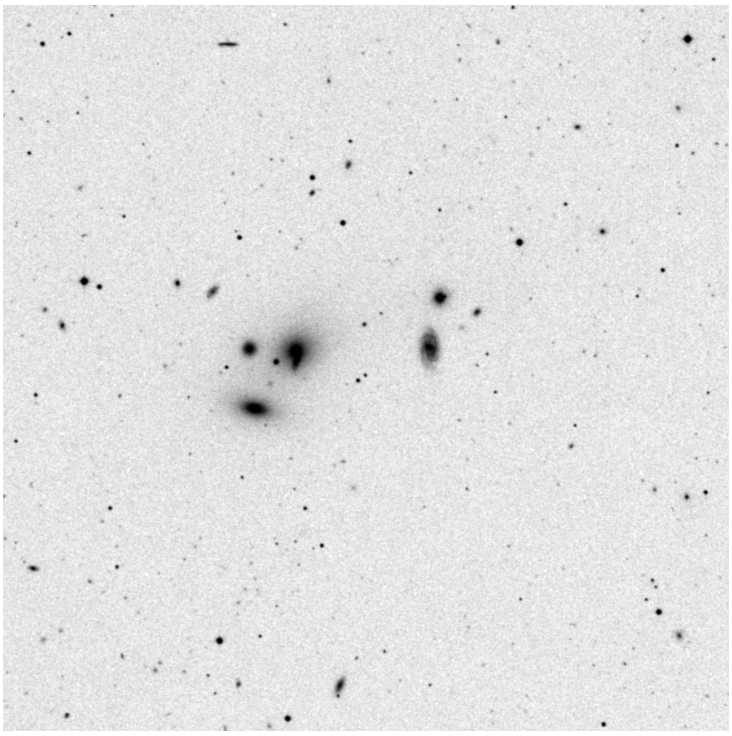
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

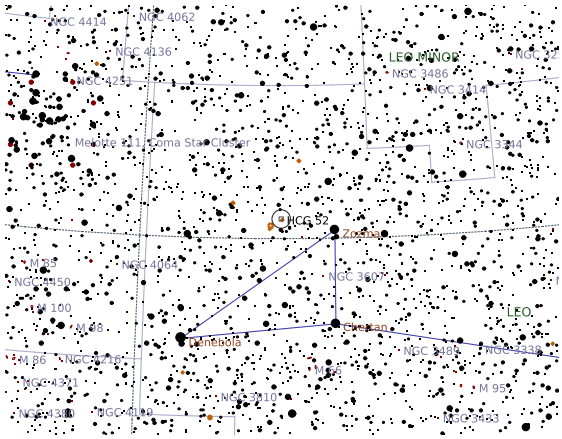
_____

HCG 52

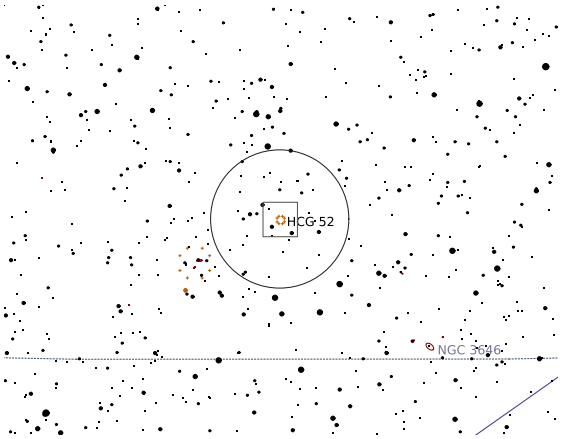
Galaxy Cluster in Leo

Right Ascension (current) Right Ascension (J2000.0)	$11^h\,27^m\,01^s$ $11^h\,26^m\,18^s$	Declination (current) Declination (J2000.0)	$21°\,00'\,52''$ $21°\,05'\,21''$
Size Magnitude	$3.2' \times 3.2'$ 13	Position Angle Other Designation	0° –

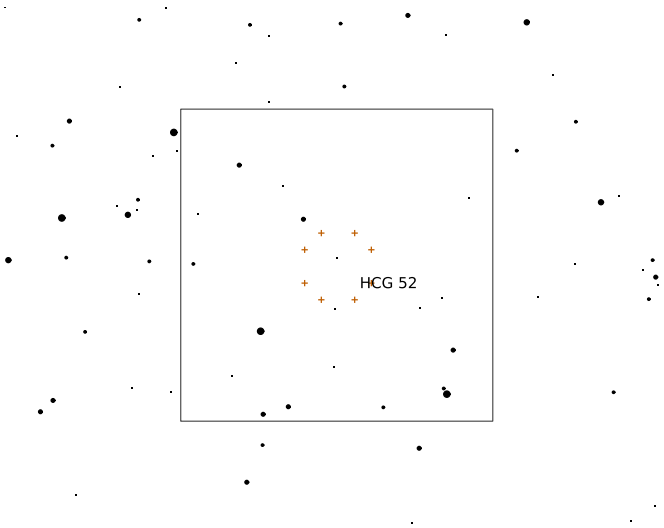
Description: z = 0.0430



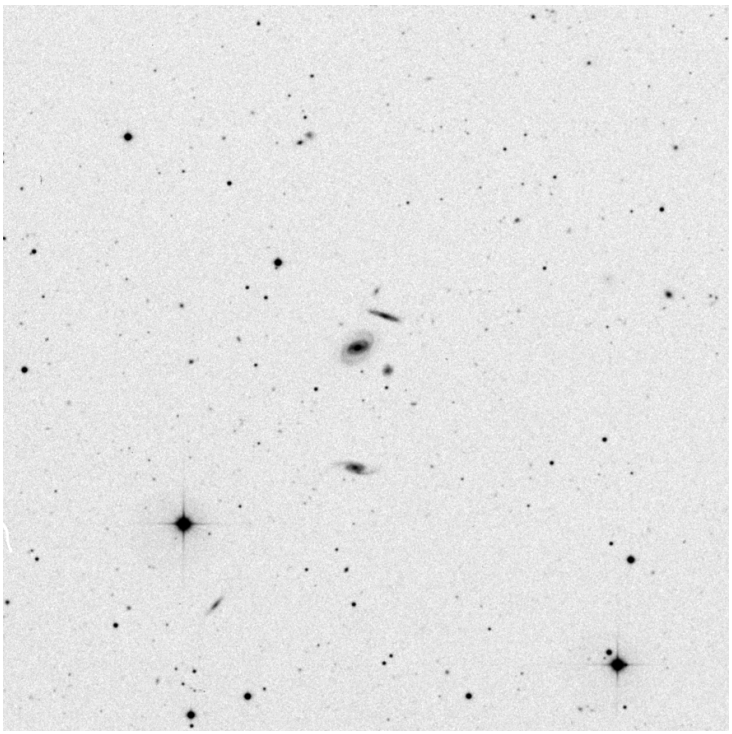
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

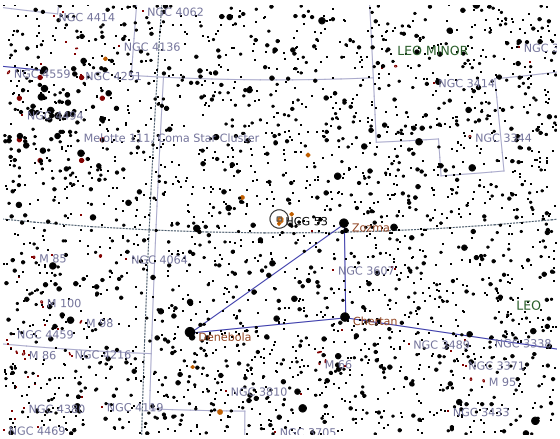
_____

HCG 53

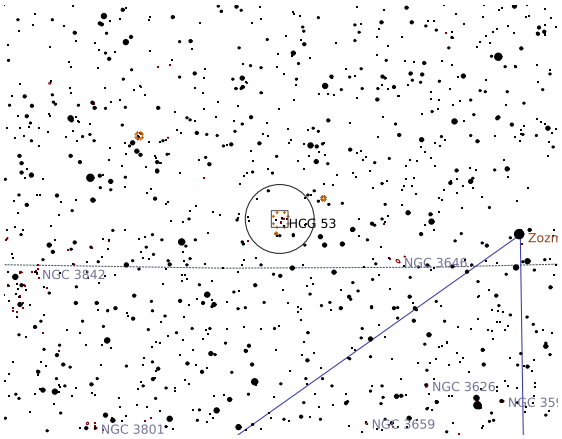
Galaxy Cluster in Leo

Right Ascension (current) Right Ascension (J2000.0)	$11^h\,29^m\,41^s$ $11^h\,28^m\,58^s$	Declination (current) Declination (J2000.0)	$20°\,42'\,05''$ $20°\,46'\,35''$
Size Magnitude	$12.9' \times 12.9'$ 12	Position Angle Other Designation	0° –

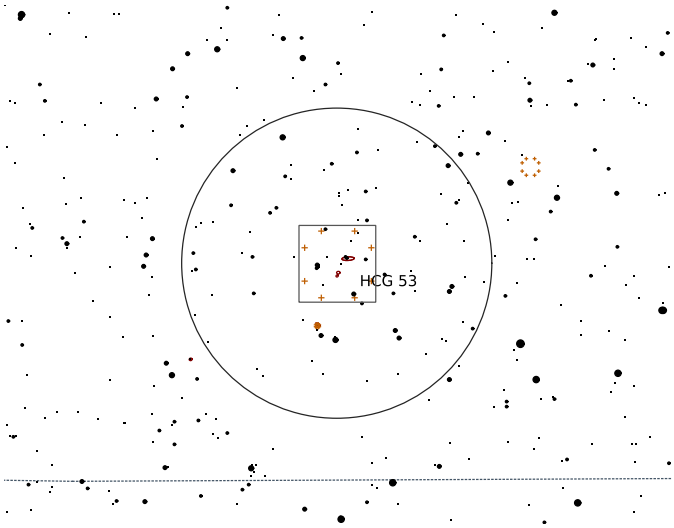
Description: z = 0.0206



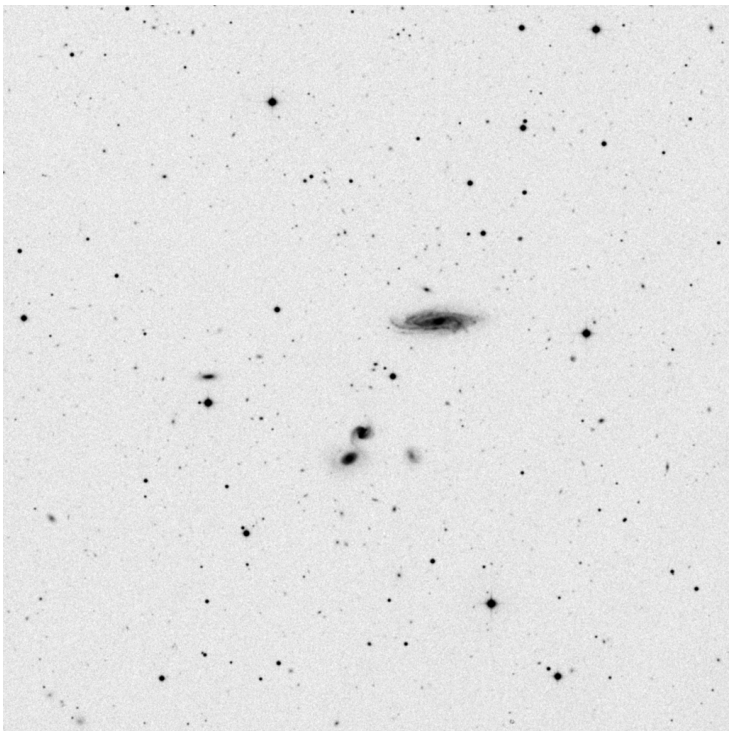
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($17.9' \times 17.9'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

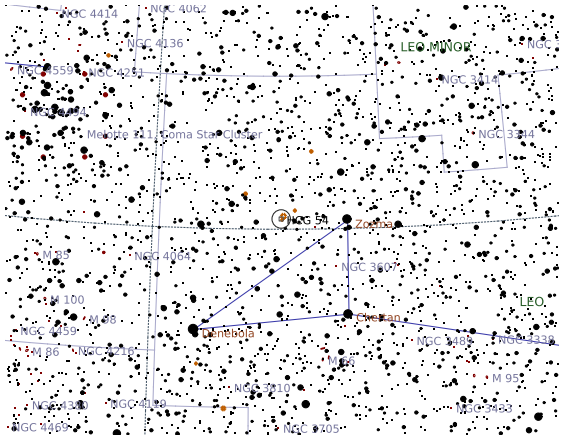
_____

HCG 54

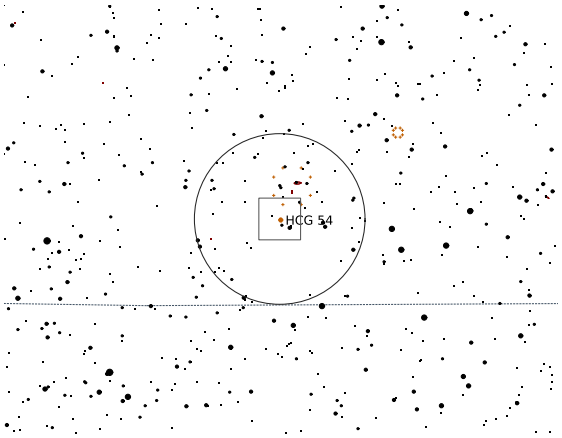
Galaxy Cluster in Leo

Right Ascension (current)	$11^h\,29^m\,58^s$	Declination (current)	$20°\,30'\,13''$
Right Ascension (J2000.0)	$11^h\,29^m\,15^s$	Declination (J2000.0)	$20°\,34'\,43''$
Size	$0.7' \times 0.7'$	Position Angle	0°
Magnitude	15	Other Designation	–

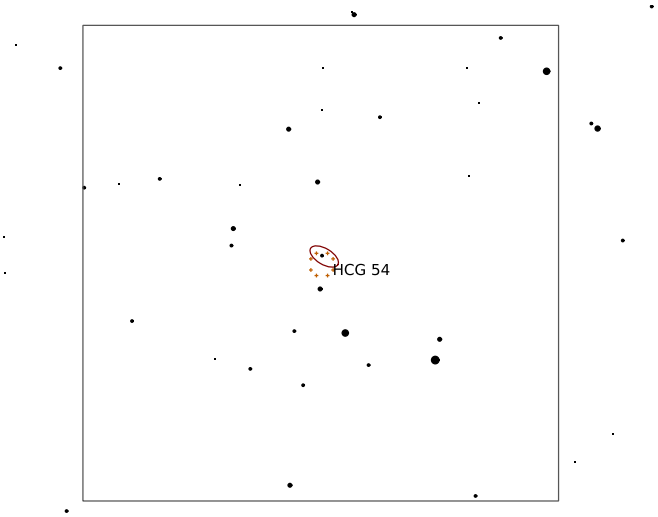
Description: z = 0.0049



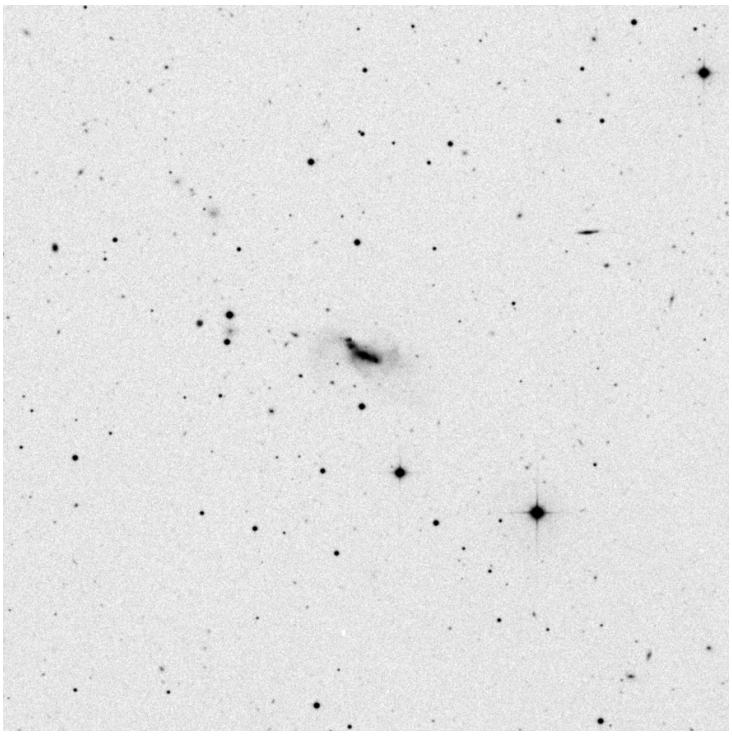
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

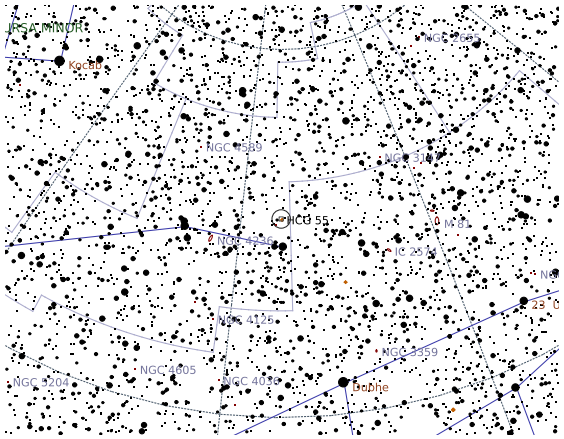
_____

HCG 55

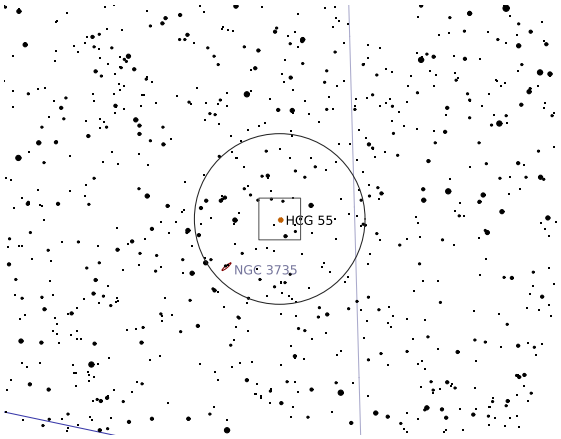
Galaxy Cluster in Draco

Right Ascension (current)	$11^h\,32^m\,56^s$	Declination (current)	$70°\,44'\,26''$
Right Ascension (J2000.0)	$11^h\,32^m\,07^s$	Declination (J2000.0)	$70°\,48'\,43''$
Size	$0.9' \times 0.9'$	Position Angle	$0°$
Magnitude	15	Other Designation	–

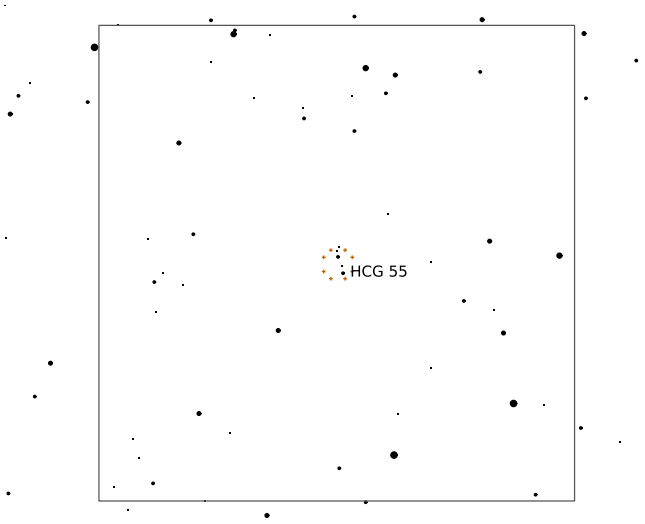
Description: z = 0.0526



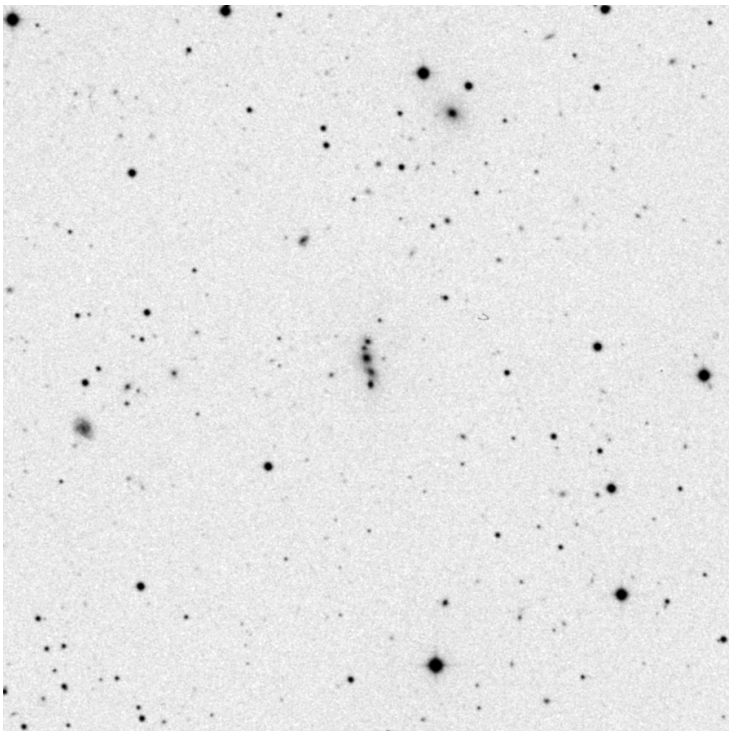
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

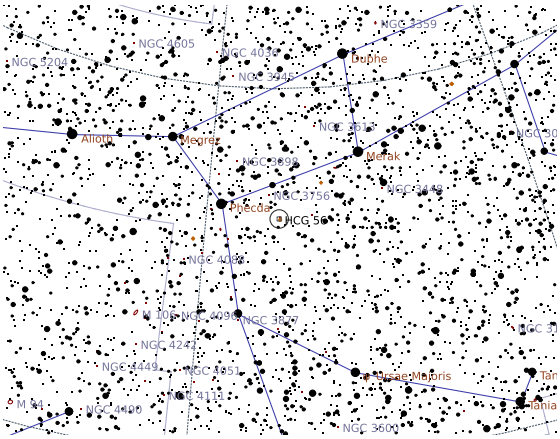
_____

HCG 56

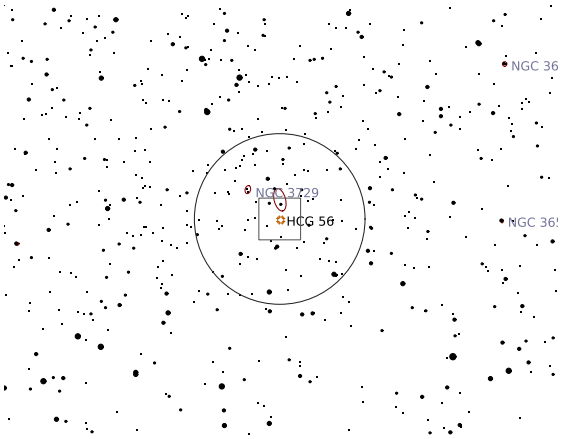
Galaxy Cluster in Ursa Major

Right Ascension (current)	$11^h\,33^m\,16^s$	Declination (current)	$52°\,52'\,34''$
Right Ascension (J2000.0)	$11^h\,32^m\,31^s$	Declination (J2000.0)	$52°\,56'\,55''$
Size	$2.1' \times 2.1'$	Position Angle	0°
Magnitude	13	Other Designation	–

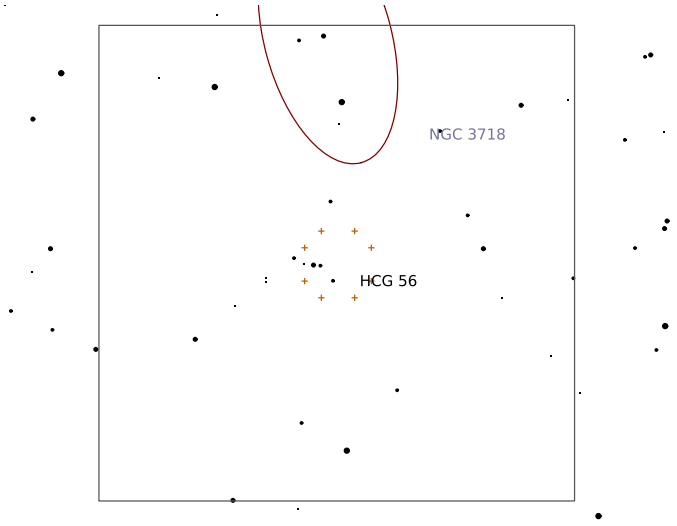
Description: z = 0.0270



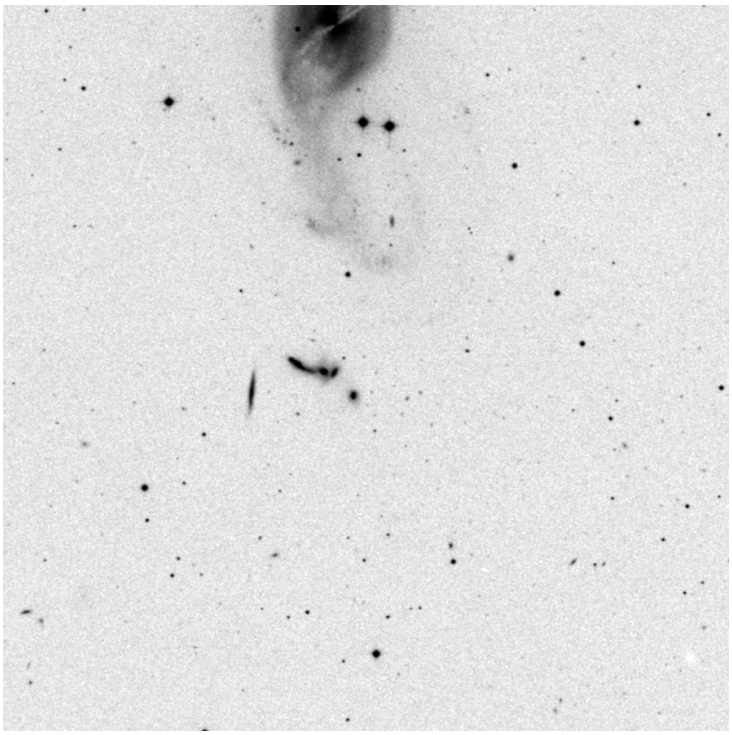
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

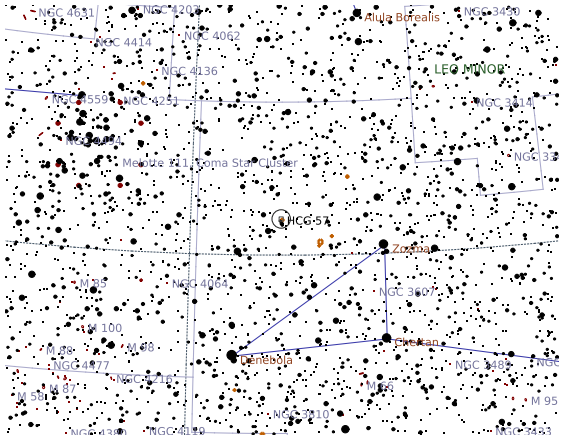
_____

HCG 57 (Copeland's Septet)

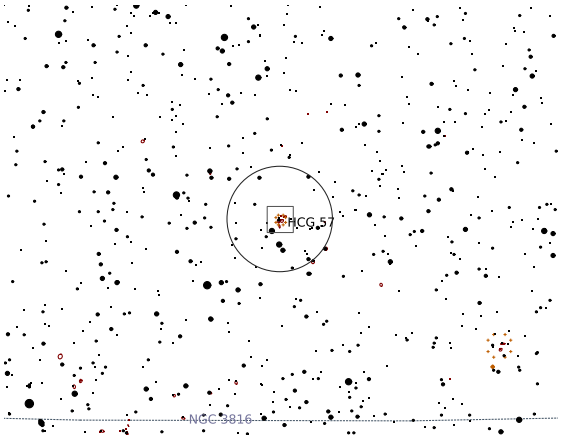
Galaxy Cluster in Leo

Right Ascension (current)	$11^h\,38^m\,33^s$	Declination (current)	$21°\,54'\,36''$
Right Ascension (J2000.0)	$11^h\,37^m\,50^s$	Declination (J2000.0)	$21°\,59'\,06''$
Size	$5.5' \times 5.5'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

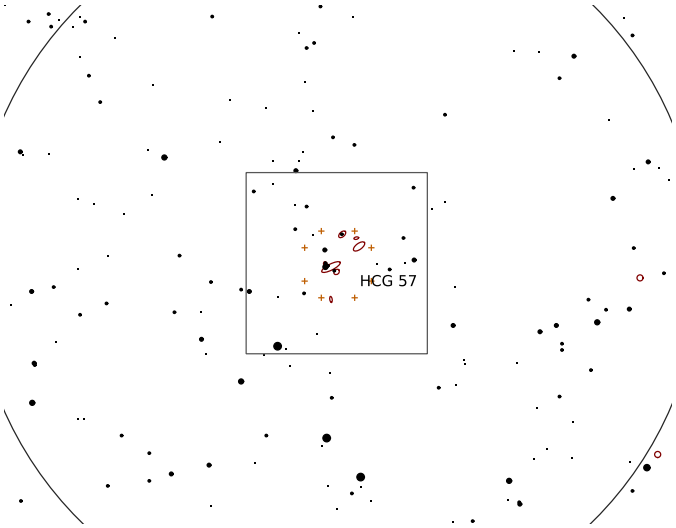
Description: z = 0.0304



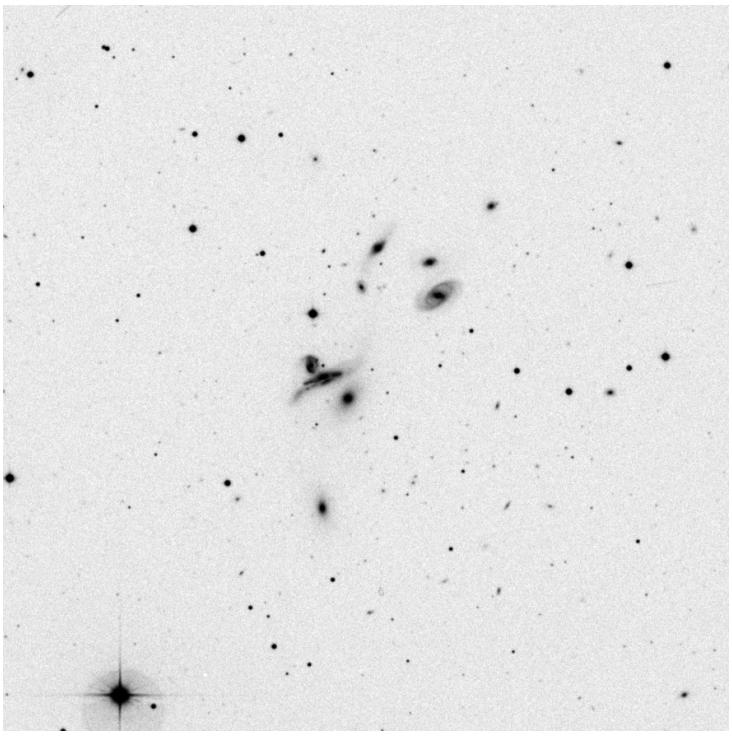
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

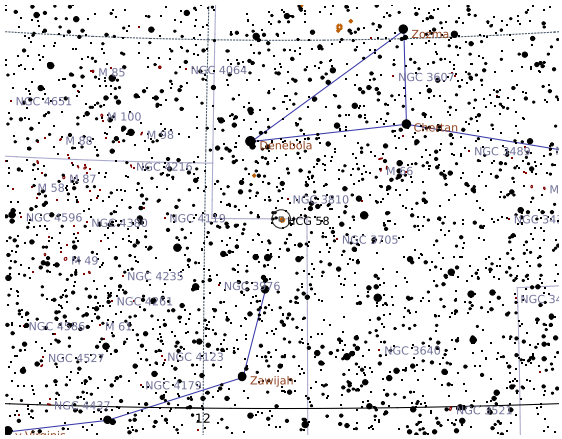
_____

HCG 58

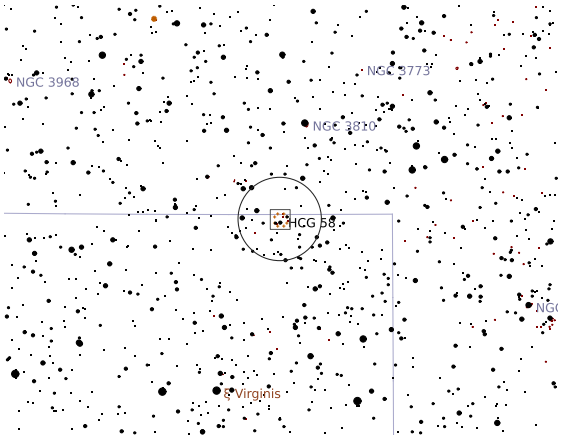
Galaxy Cluster in Virgo

Right Ascension (current)	$11^h\,42^m\,54^s$	Declination (current)	$10°\,14'\,27''$
Right Ascension (J2000.0)	$11^h\,42^m\,11^s$	Declination (J2000.0)	$10°\,19'\,01''$
Size	$8.8' \times 8.8'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

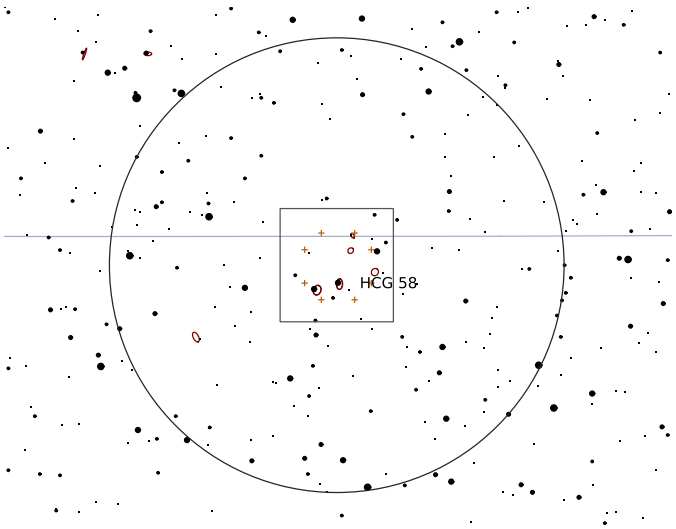
Description: z = 0.0207



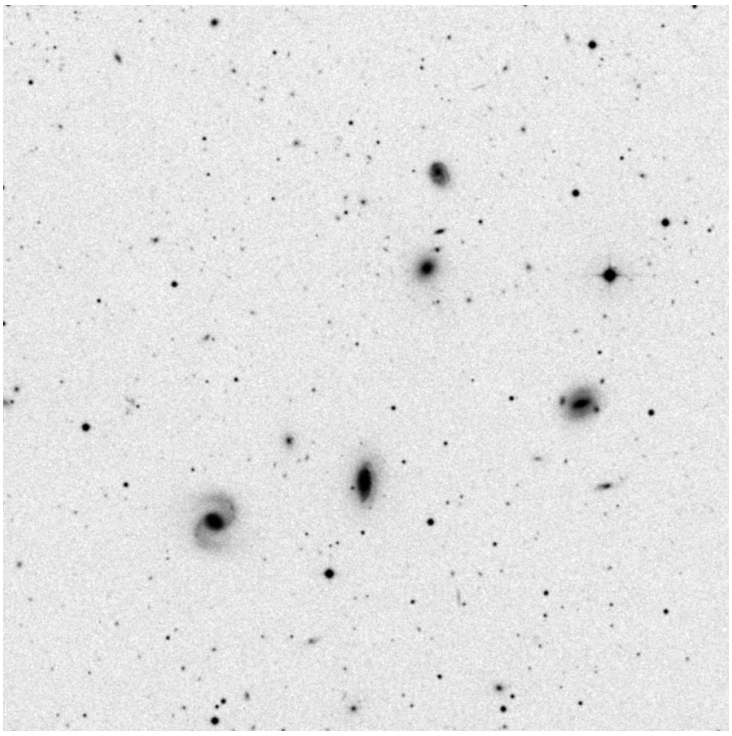
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

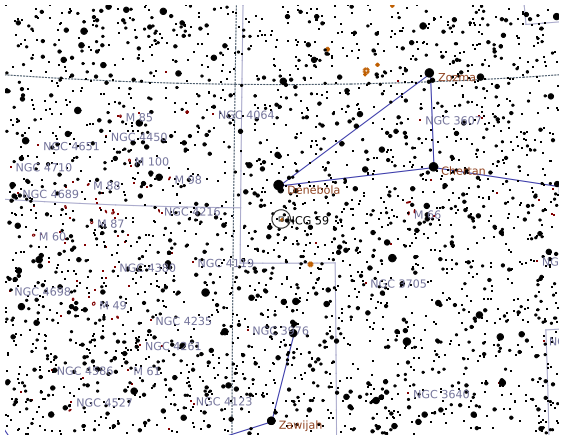
_____

HCG 59

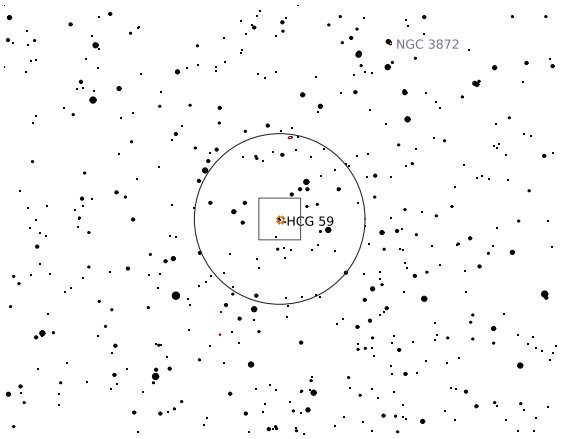
Galaxy Cluster in Leo

Right Ascension (current)	$11^h\,49^m\,08^s$	Declination (current)	$12°\,39'\,00''$
Right Ascension (J2000.0)	$11^h\,48^m\,25^s$	Declination (J2000.0)	$12°\,43'\,34''$
Size	$2.1' \times 2.1'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

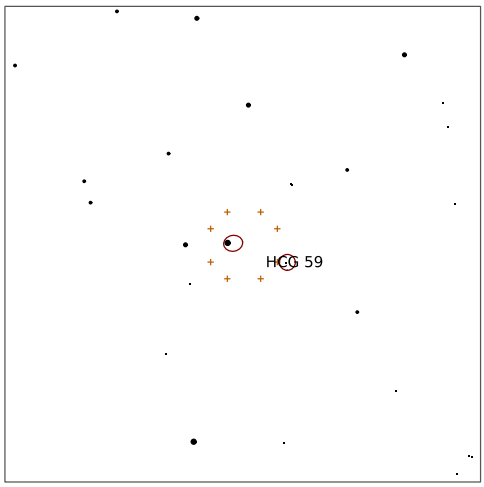
Description: z = 0.0135



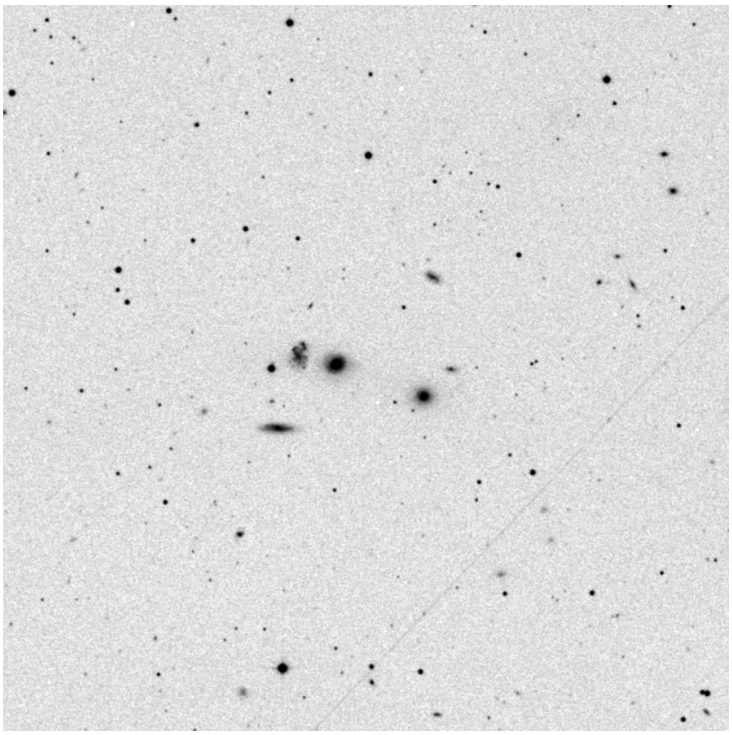
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

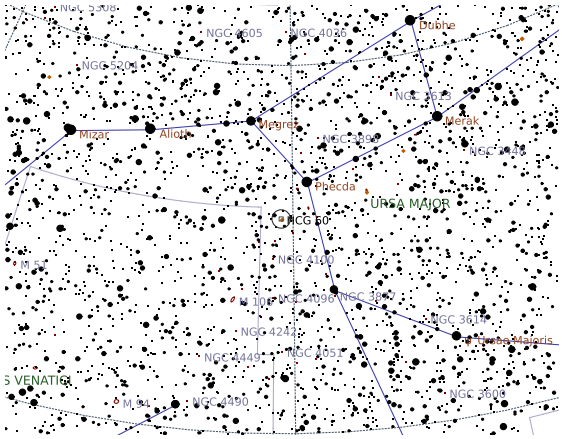
_____

HCG 60

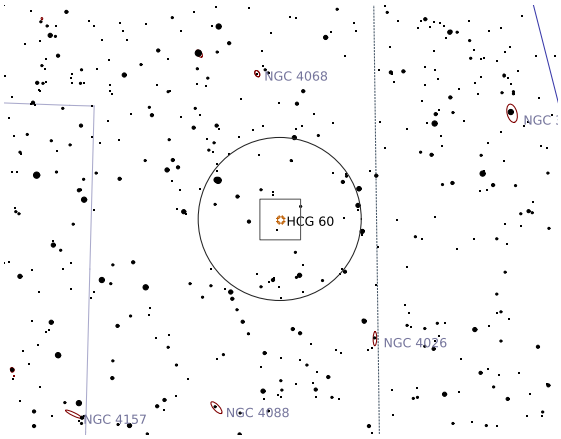
Galaxy Cluster in Ursa Major

Right Ascension (current)	$12^h\,03^m\,47^s$	Declination (current)	$51°\,37'\,12''$
Right Ascension (J2000.0)	$12^h\,03^m\,05^s$	Declination (J2000.0)	$51°\,41'\,35''$
Size	$2.3' \times 2.3'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

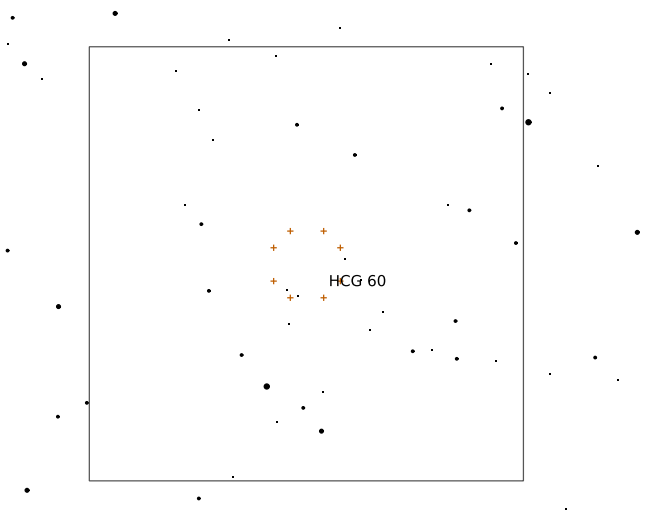
Description: z = 0.0625



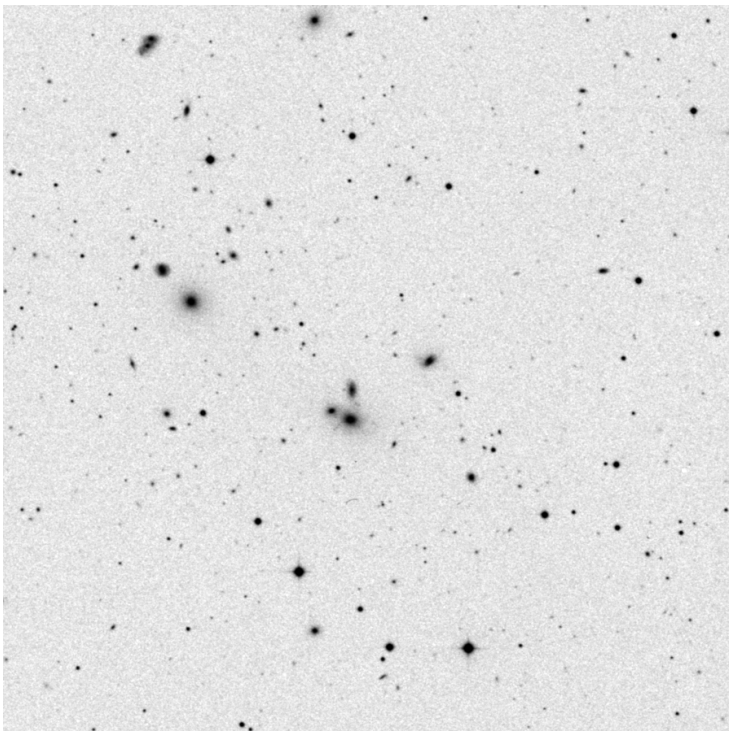
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

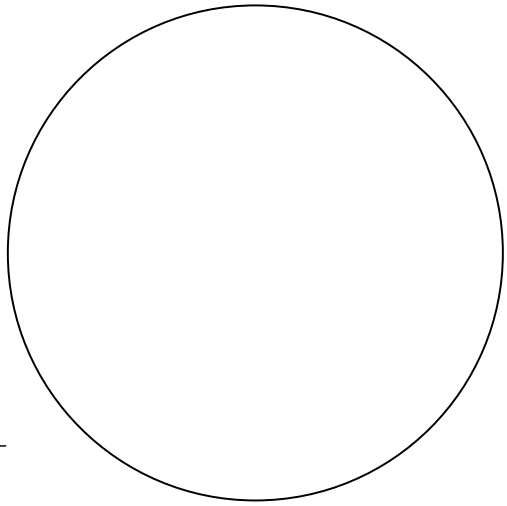
* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____



Sketch

FOV: _____

* Description: _____

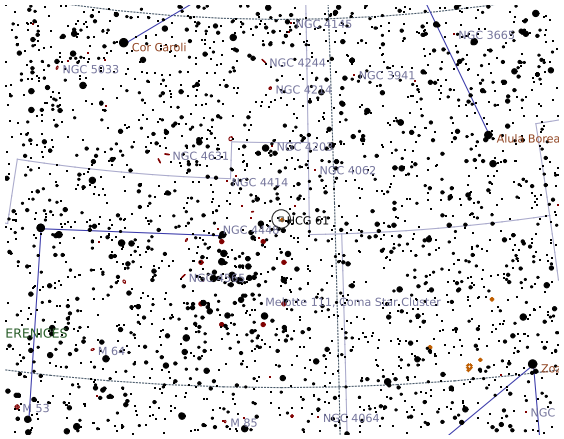
_____

HCG 61 (The Box)

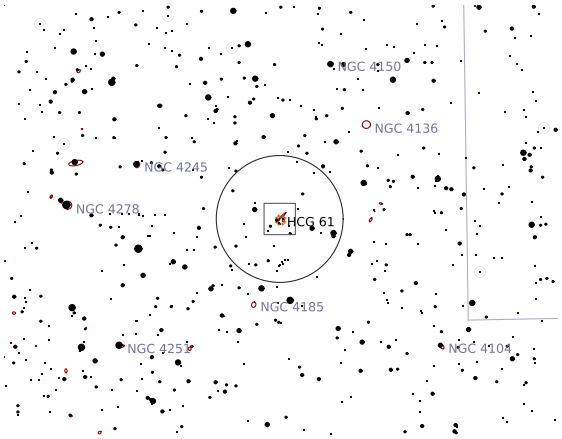
Galaxy Cluster in Coma Berenices

Right Ascension (current)	$12^h\,13^m\,05^s$	Declination (current)	$29°\,06'\,11''$
Right Ascension (J2000.0)	$12^h\,12^m\,23^s$	Declination (J2000.0)	$29°\,10'\,40''$
Size	$3.8' \times 3.8'$	Position Angle	$0°$
Magnitude	11	Other Designation	–

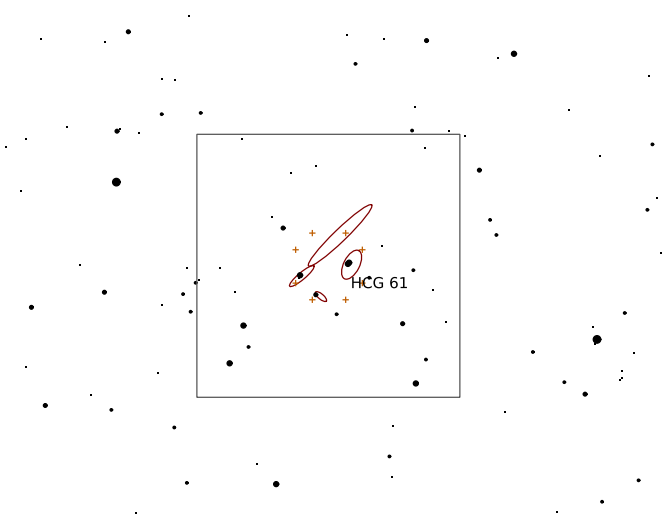
Description: z = 0.0130



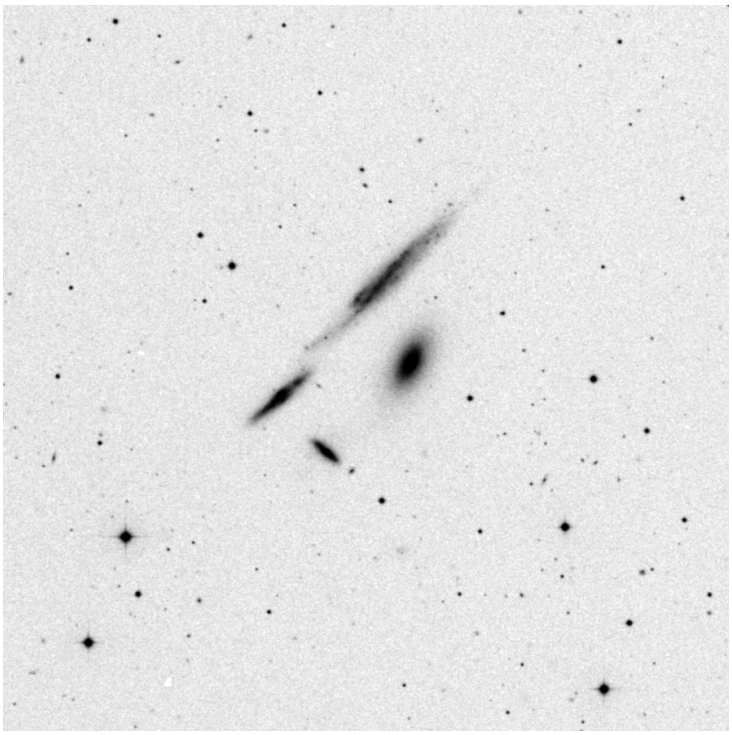
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

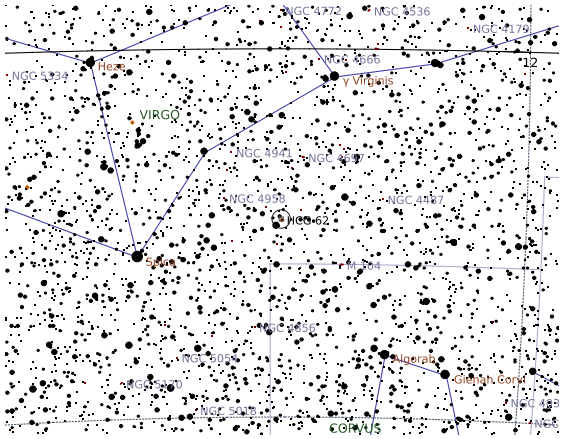
_____

HCG 62

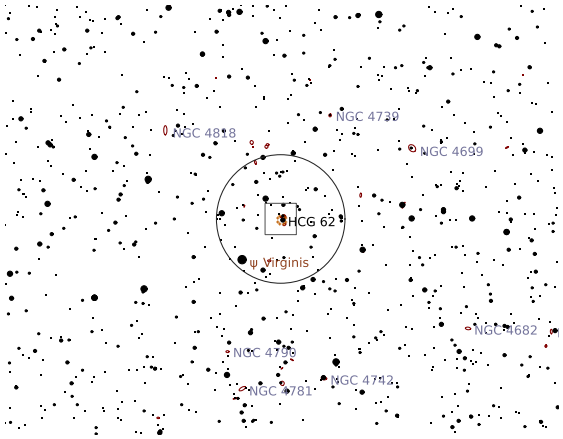
Galaxy Cluster in Virgo

Right Ascension (current)	$12^{h}\,53^{m}\,51^{s}$	Declination (current)	$-9°\,17'\,57''$
Right Ascension (J2000.0)	$12^{h}\,53^{m}\,08^{s}$	Declination (J2000.0)	$-9°\,13'\,27''$
Size	$3.7' \times 3.7'$	Position Angle	0°
Magnitude	12	Other Designation	–

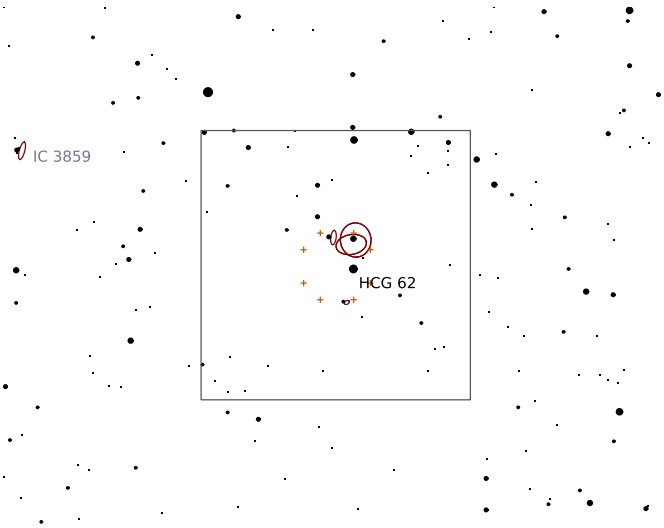
Description: z = 0.0137



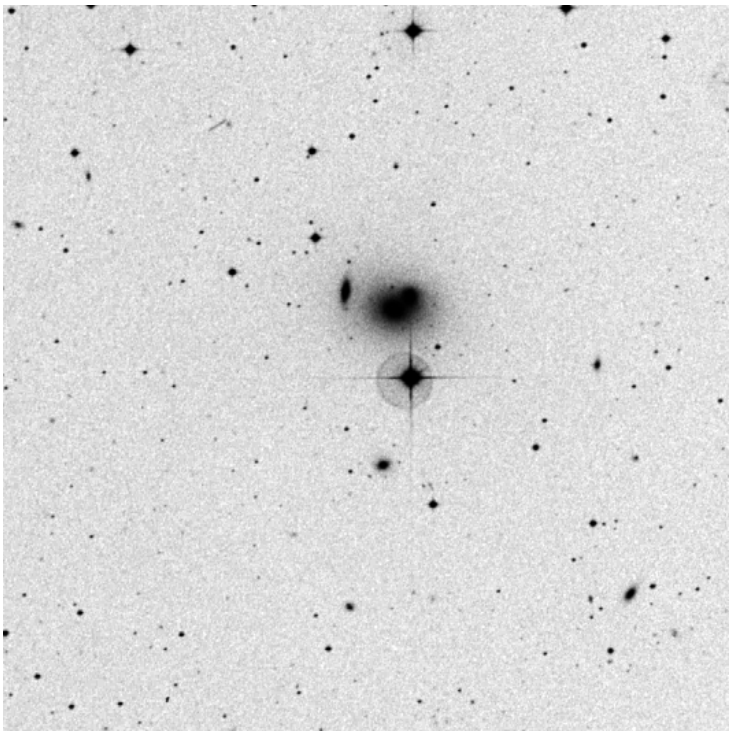
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

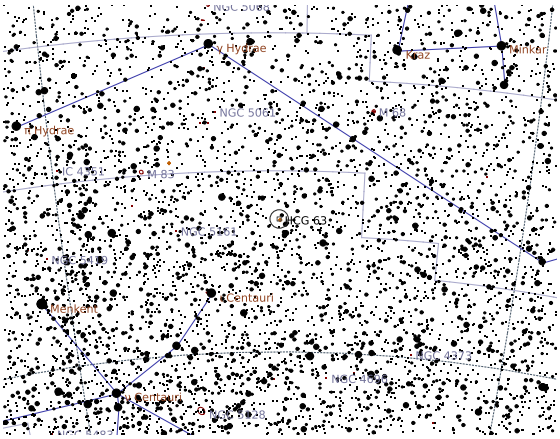
_____

HCG 63

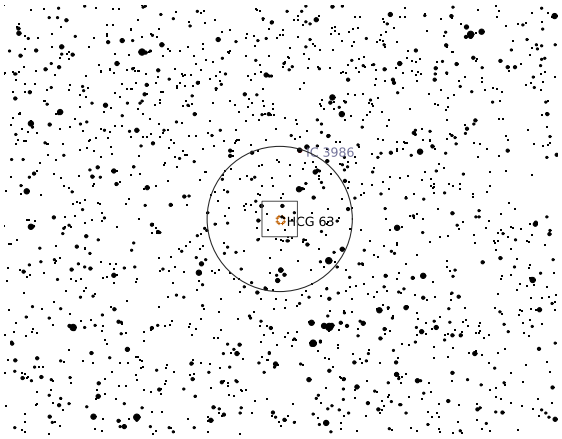
Galaxy Cluster in Centaurus

Right Ascension (current)	$13^h\,02^m\,56^s$	Declination (current)	$-32°\,50'\,36''$
Right Ascension (J2000.0)	$13^h\,02^m\,10^s$	Declination (J2000.0)	$-32°\,46'\,05''$
Size	$2.9' \times 2.9'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

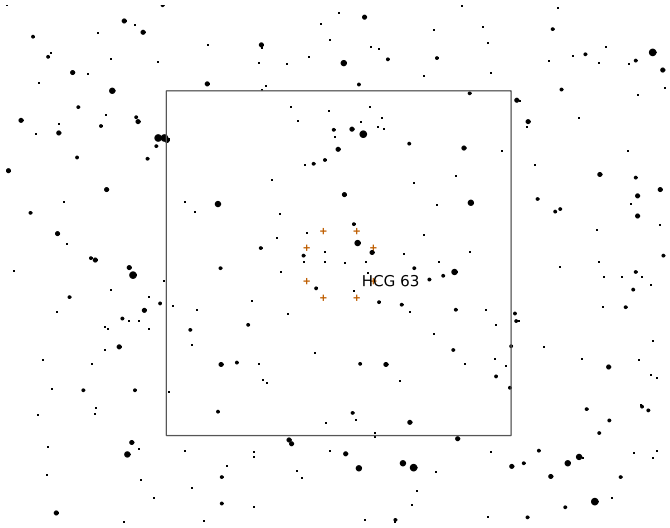
Description: z = 0.0311



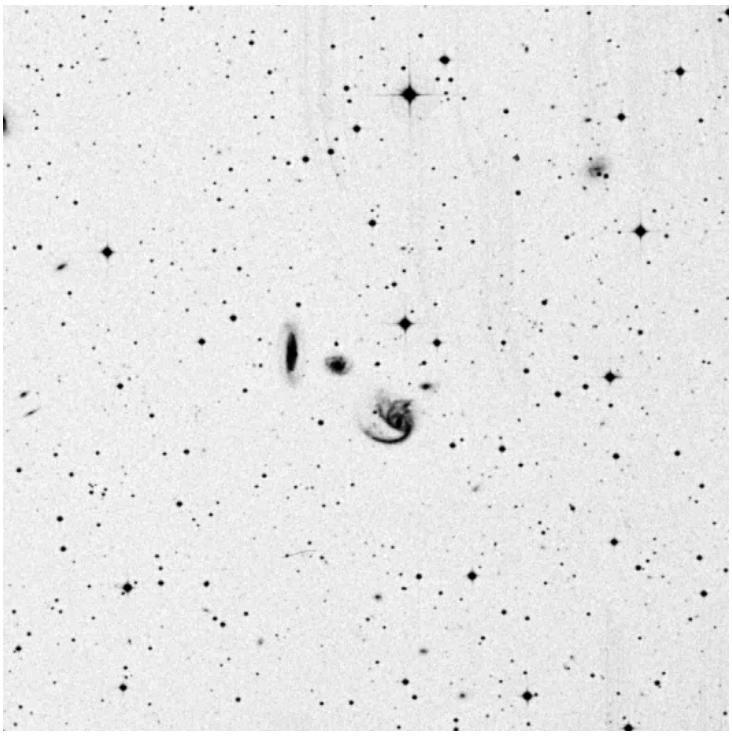
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

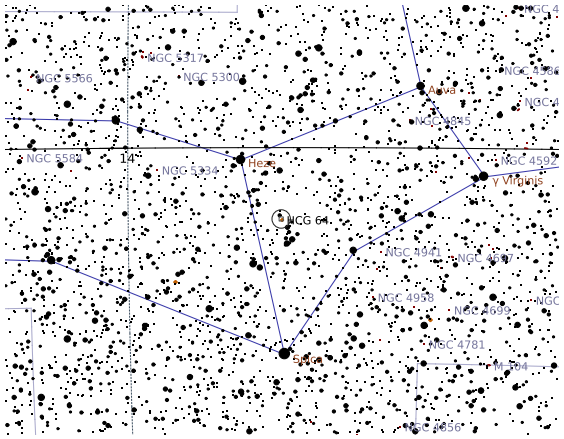
_____

HCG 64

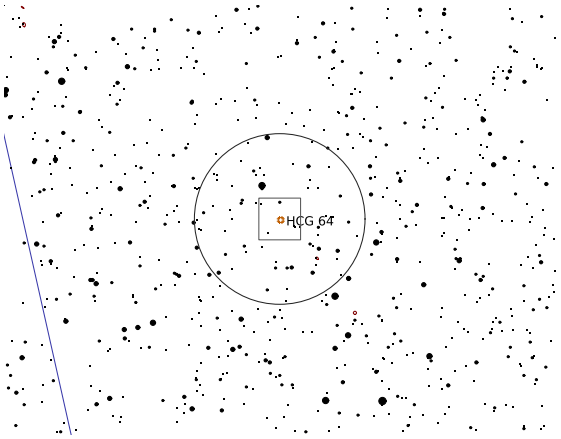
Galaxy Cluster in Virgo

Right Ascension (current)	$13^h\,26^m\,26^s$	Declination (current)	$-3°\,55'\,44''$
Right Ascension (J2000.0)	$13^h\,25^m\,43^s$	Declination (J2000.0)	$-3°\,51'\,28''$
Size	$1.7' \times 1.7'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

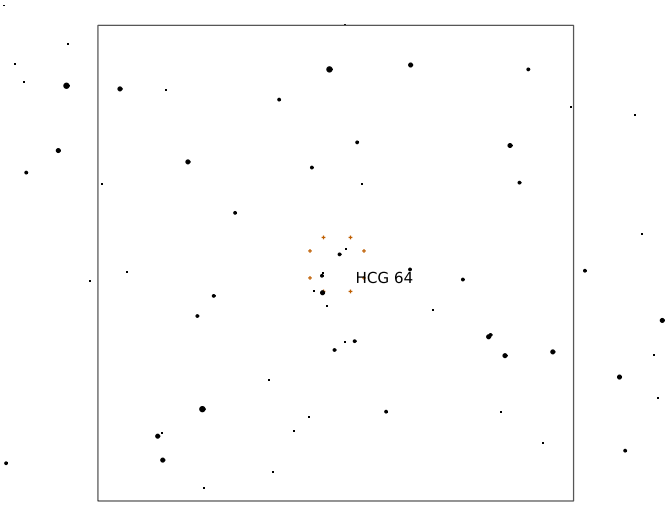
Description: z = 0.0360



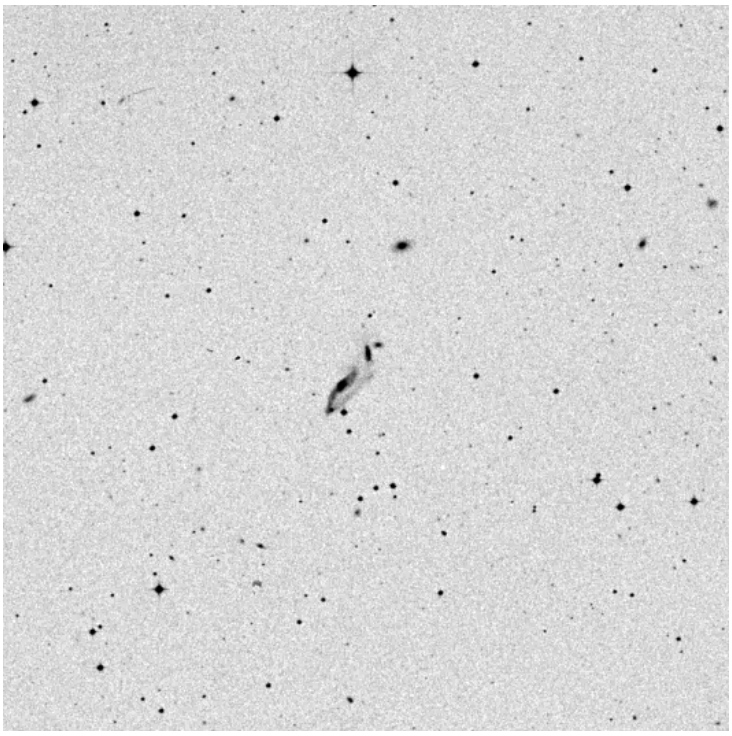
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

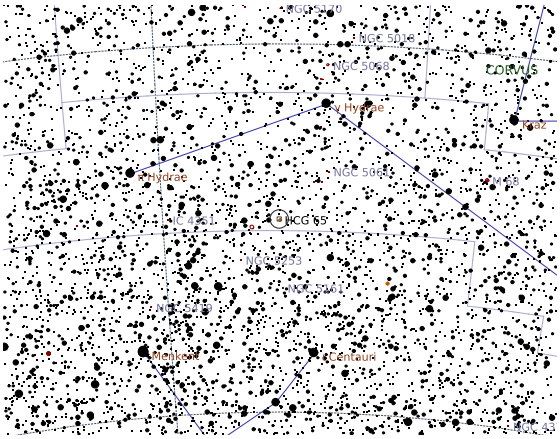
_____

HCG 65

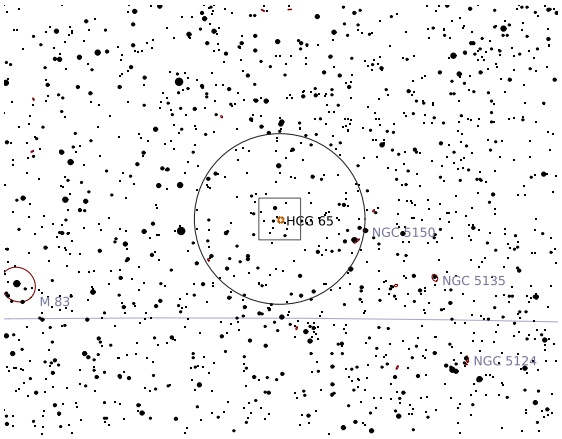
Galaxy Cluster in Hydra

Right Ascension (current)	$13^h\,30^m\,41^s$	Declination (current)	$-29°\,34'\,17''$
Right Ascension (J2000.0)	$13^h\,29^m\,53^s$	Declination (J2000.0)	$-29°\,29'\,59''$
Size	$1.7' \times 1.7'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

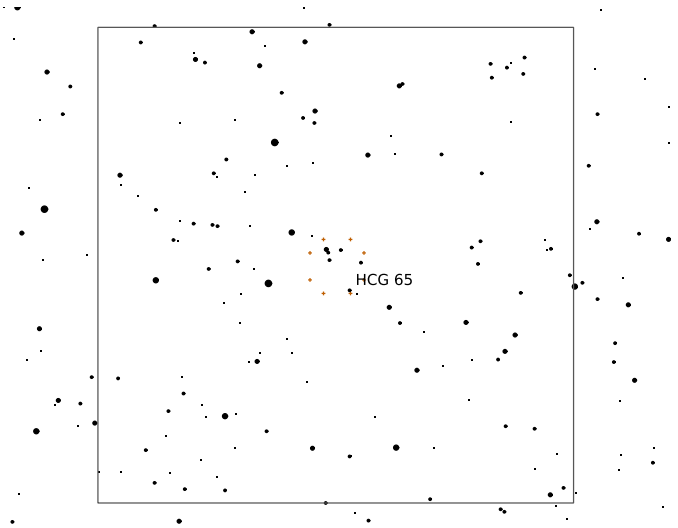
Description: z = 0.0475



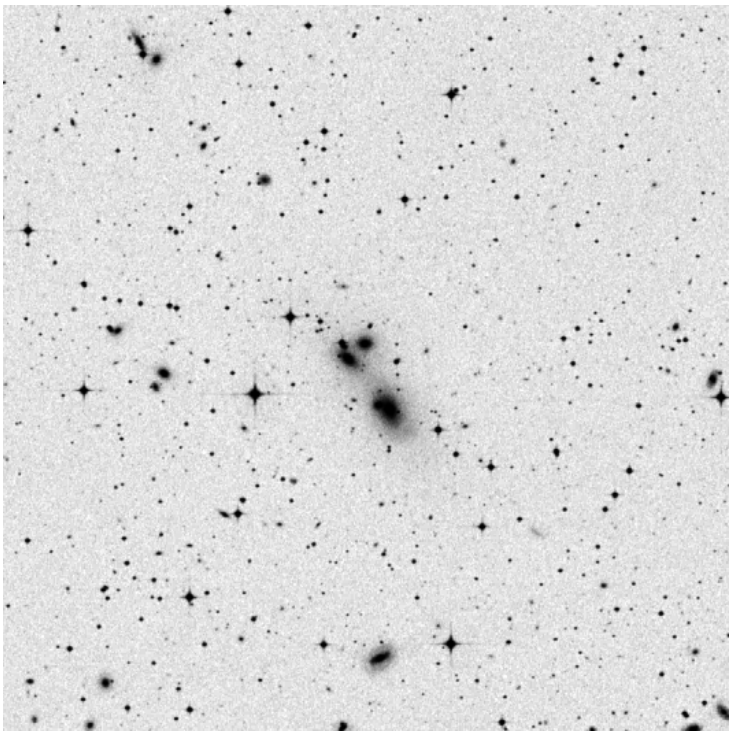
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

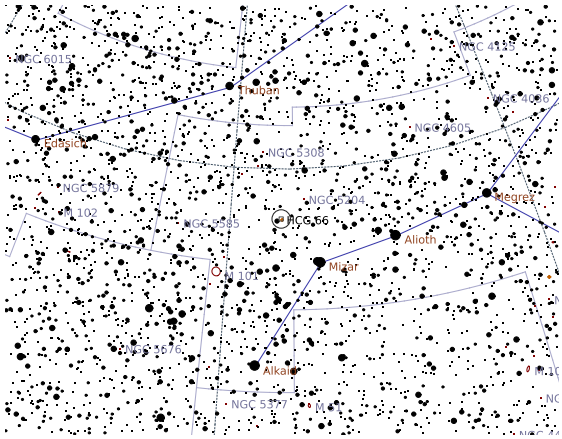
_____

HCG 66

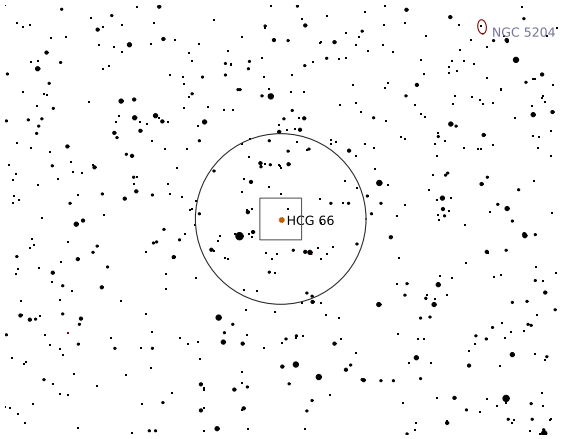
Galaxy Cluster in Ursa Major

Right Ascension (current)	$13^h\,39^m\,04^s$	Declination (current)	$57°\,14'\,16''$
Right Ascension (J2000.0)	$13^h\,38^m\,33^s$	Declination (J2000.0)	$57°\,18'\,16''$
Size	$1' \times 1'$	Position Angle	0°
Magnitude	14	Other Designation	–

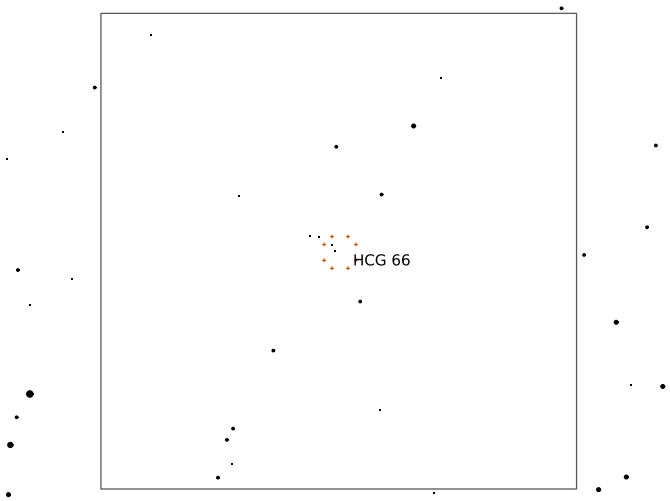
Description: z = 0.0699



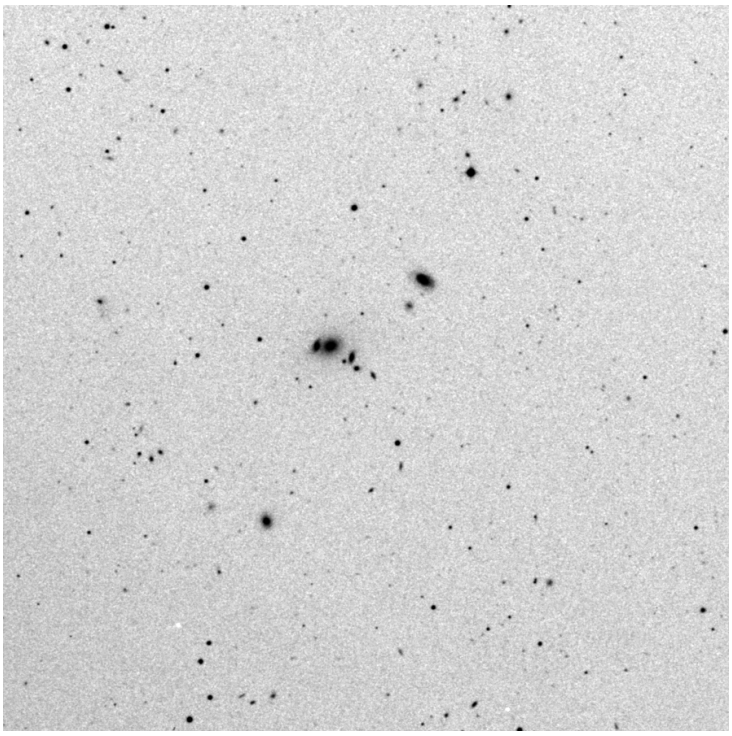
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

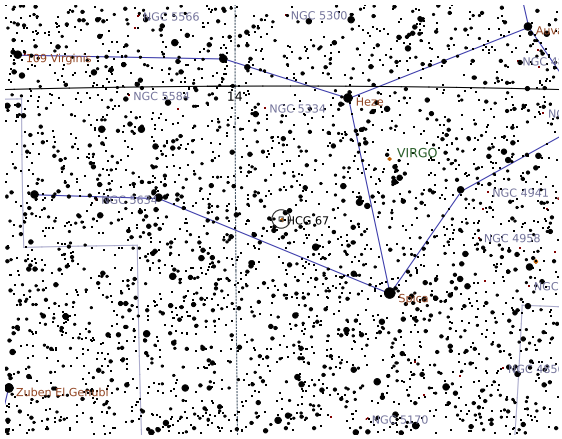
_____

HCG 67

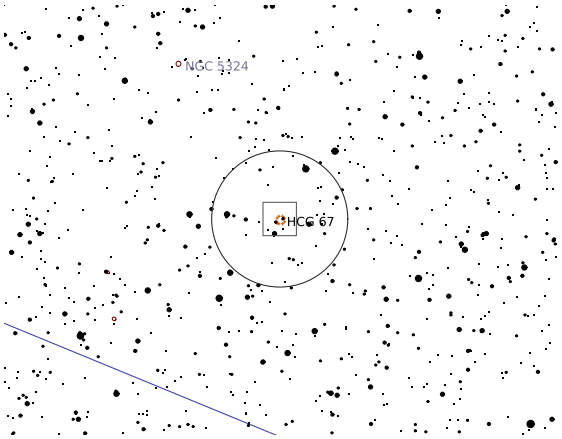
Galaxy Cluster in Virgo

Right Ascension (current)	$13^h\,49^m\,47^s$	Declination (current)	$-7°\,16'\,24''$
Right Ascension (J2000.0)	$13^h\,49^m\,03^s$	Declination (J2000.0)	$-7°\,12'\,20''$
Size	$3.3' \times 3.3'$	Position Angle	0°
Magnitude	12	Other Designation	–

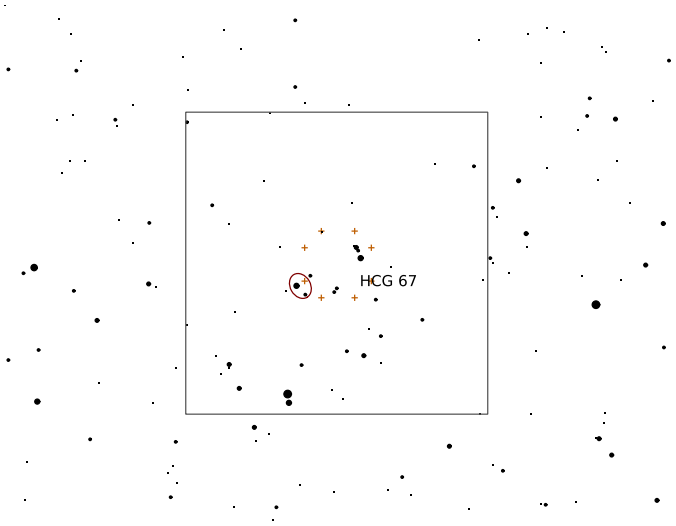
Description: z = 0.0245



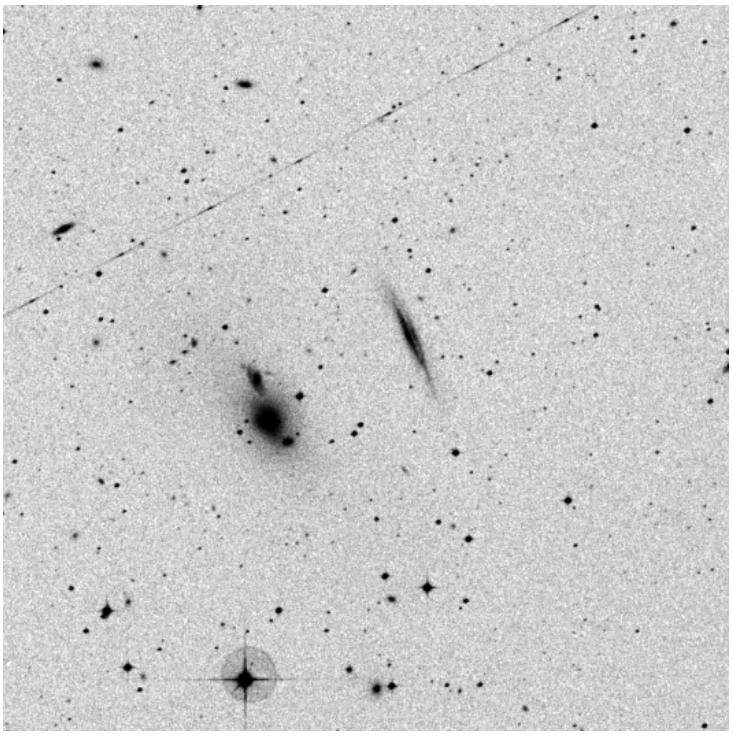
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

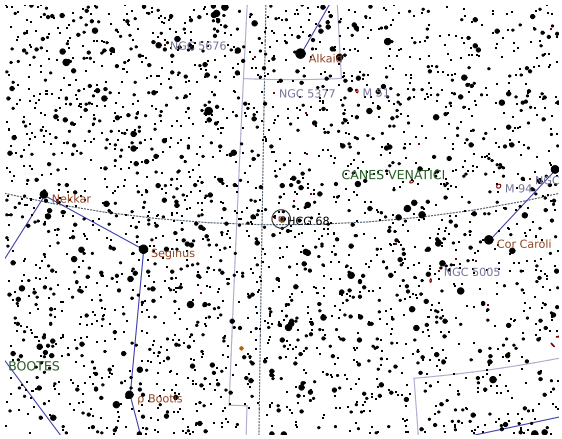
_____

HCG 68

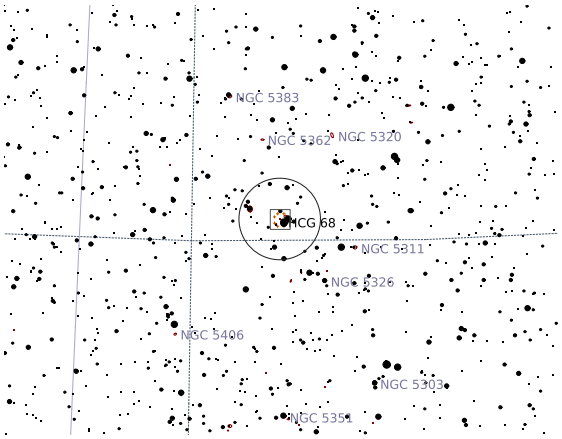
Galaxy Cluster in Canes Venatici

Right Ascension (current)	$13^h\,54^m\,16^s$	Declination (current)	$40°\,15'\,46''$
Right Ascension (J2000.0)	$13^h\,53^m\,40^s$	Declination (J2000.0)	$40°\,19'\,41''$
Size	$9.2' \times 9.2'$	Position Angle	0°
Magnitude	10	Other Designation	–

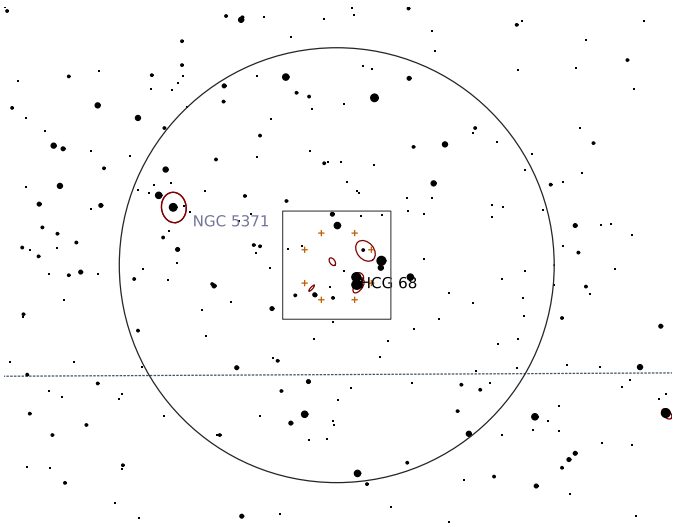
Description: z = 0.0080



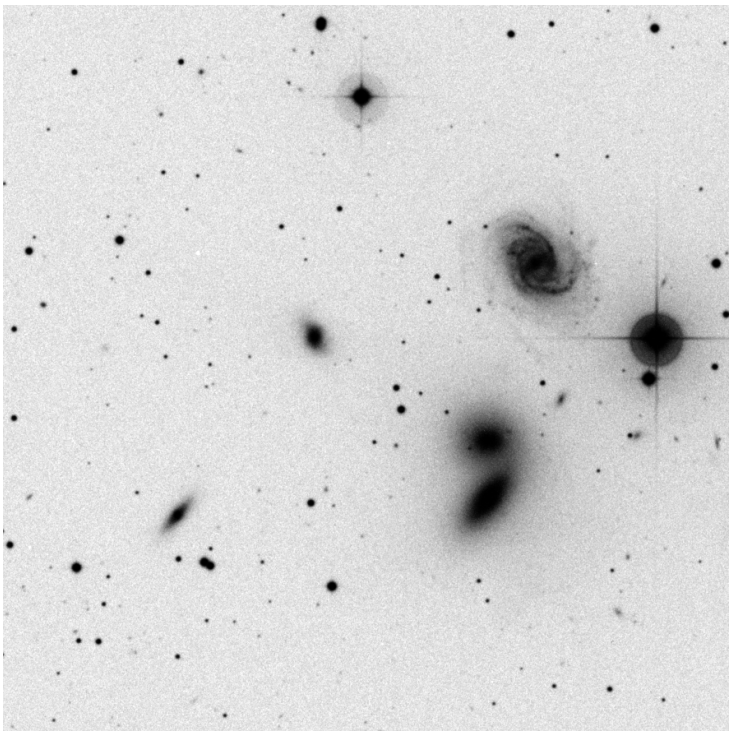
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

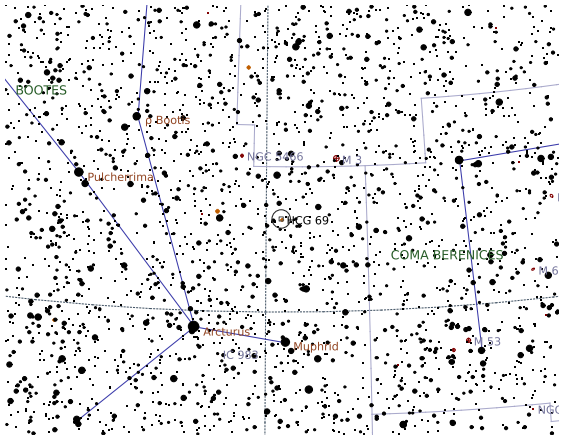
_____

HCG 69

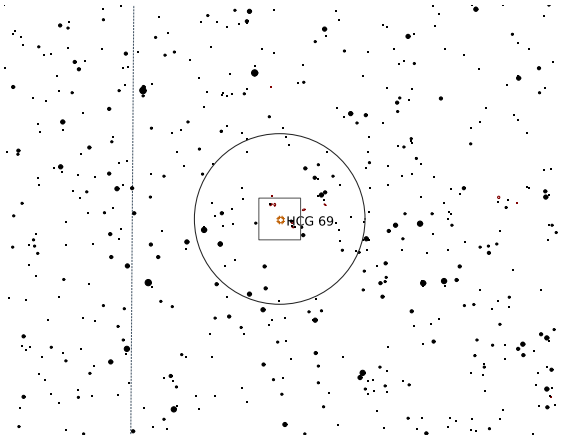
Galaxy Cluster in Bootes

Right Ascension (current)	$13^h\,56^m\,09^s$	Declination (current)	$24°\,59'\,50''$
Right Ascension (J2000.0)	$13^h\,55^m\,30^s$	Declination (J2000.0)	$25°\,03'\,46''$
Size	$1.9' \times 1.9'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

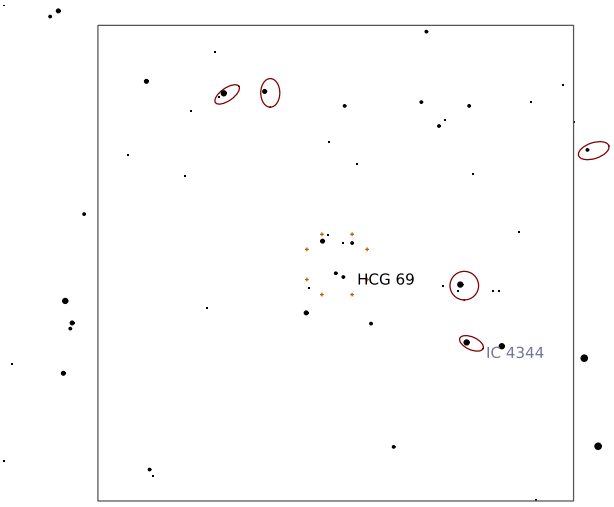
Description: z = 0.0294



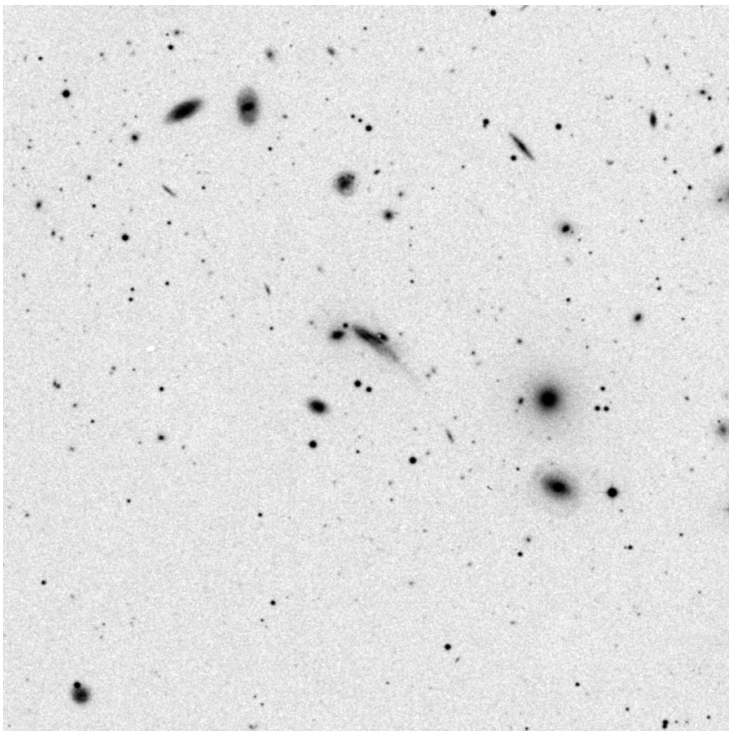
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

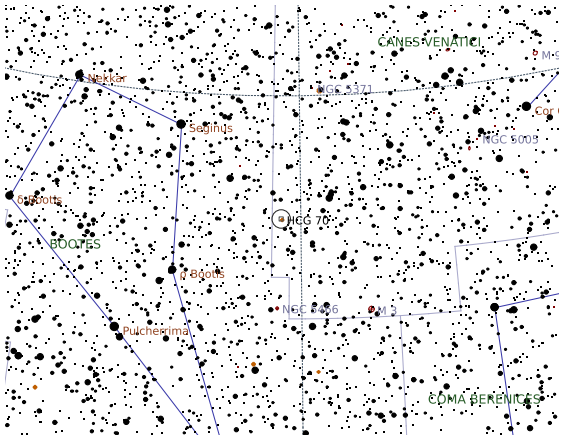
_____

HCG 70

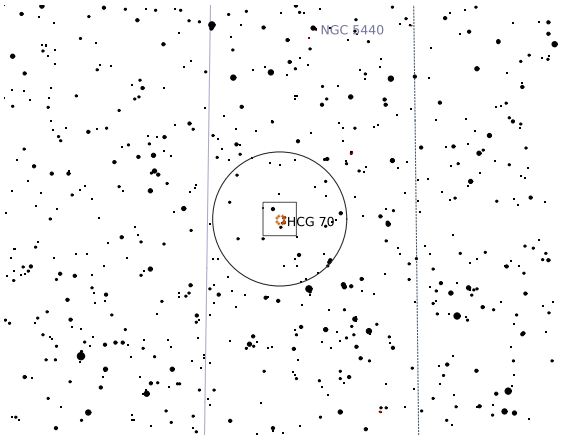
Galaxy Cluster in Canes Venatici

Right Ascension (current)	$14^h\,04^m\,50^s$	Declination (current)	$33°\,15'\,50''$
Right Ascension (J2000.0)	$14^h\,04^m\,13^s$	Declination (J2000.0)	$33°\,19'\,40''$
Size	$3.4' \times 3.4'$	Position Angle	0°
Magnitude	13	Other Designation	–

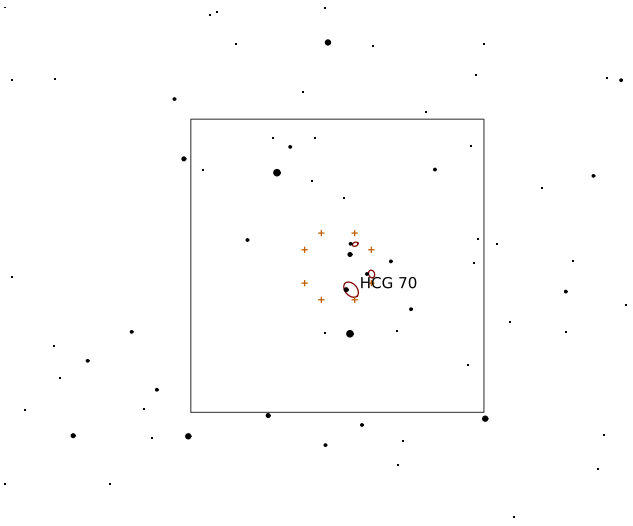
Description: z = 0.0636



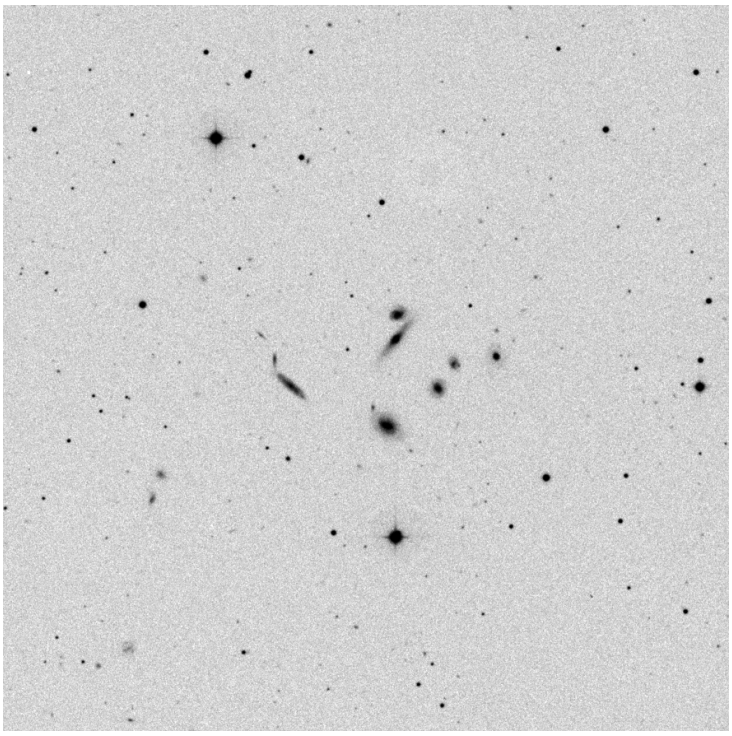
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

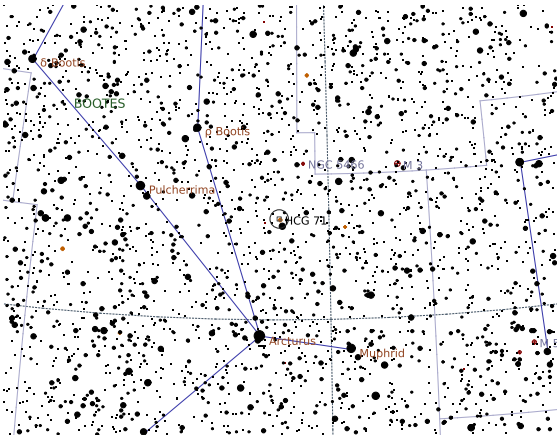
_____

HCG 71

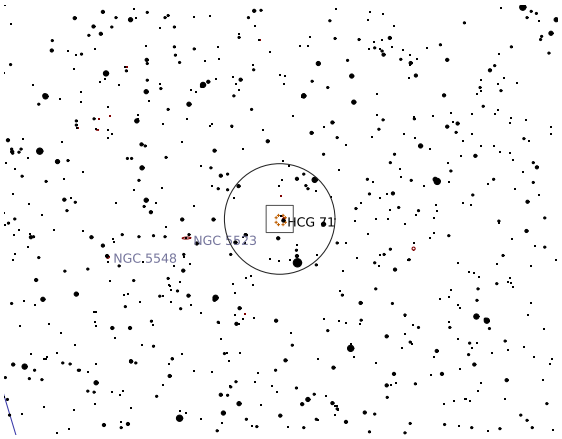
Galaxy Cluster in Bootes

Right Ascension (current)	$14^h\,11^m\,42^s$	Declination (current)	$25°\,25'\,19''$
Right Ascension (J2000.0)	$14^h\,11^m\,04^s$	Declination (J2000.0)	$25°\,29'\,06''$
Size	$5' \times 5'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

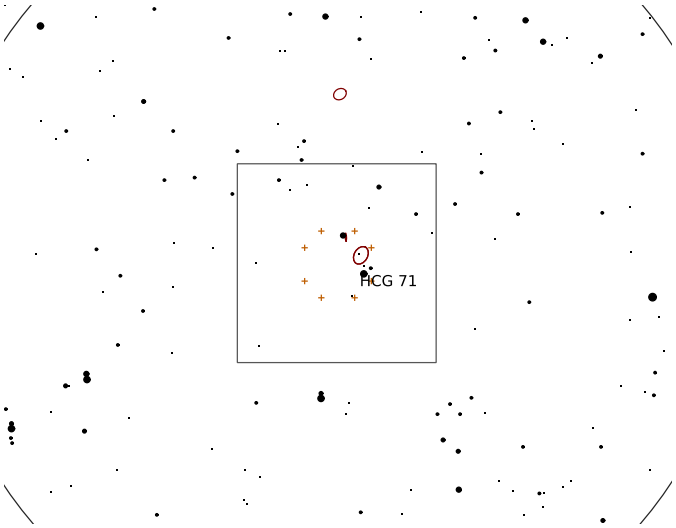
Description: z = 0.0301



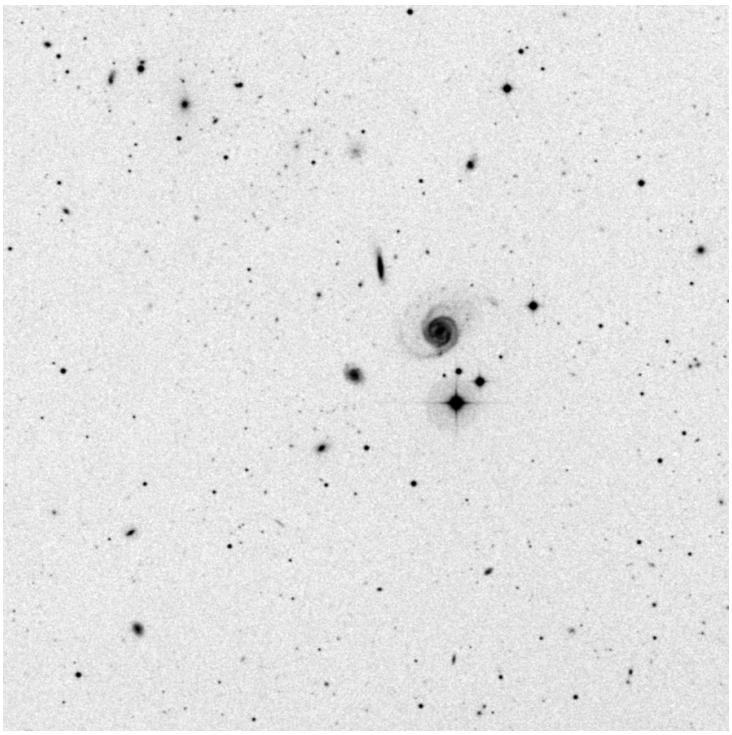
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

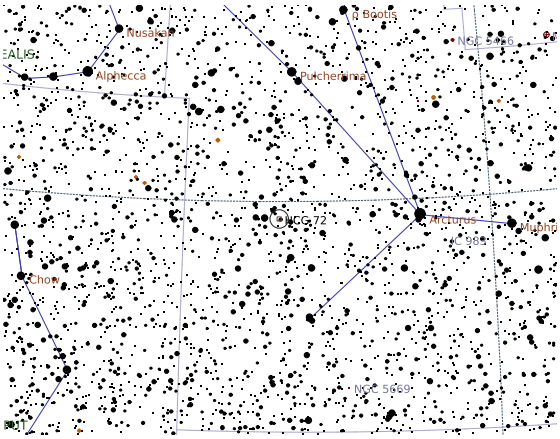
_____

HCG 72

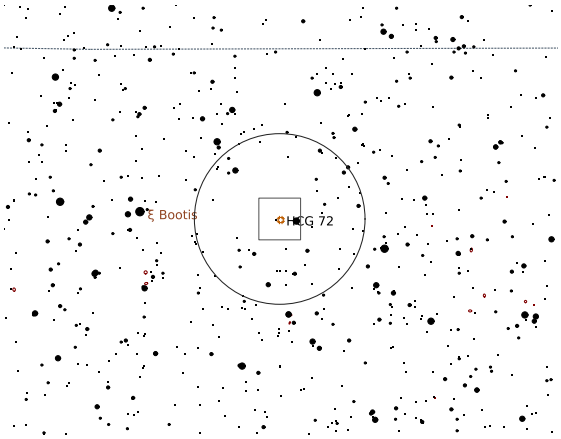
Galaxy Cluster in Bootes

Right Ascension (current)	$14^h\,48^m\,34^s$	Declination (current)	$19°\,00'\,12''$
Right Ascension (J2000.0)	$14^h\,47^m\,55^s$	Declination (J2000.0)	$19°\,03'\,34''$
Size	$1.8' \times 1.8'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

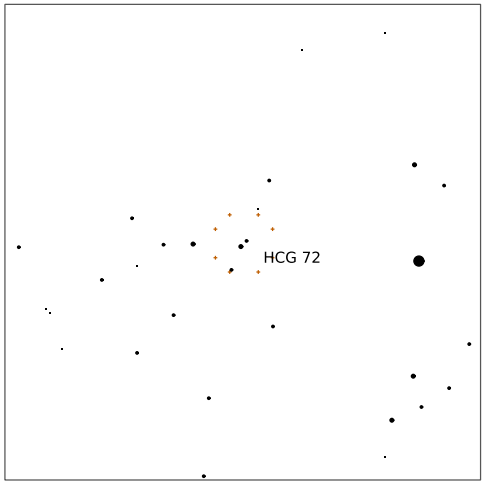
Description: z = 0.0421



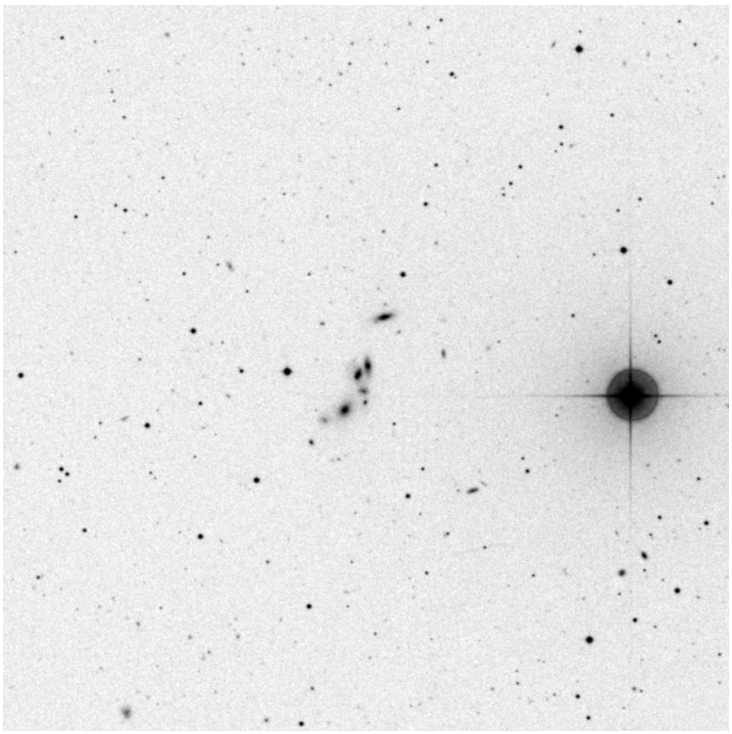
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

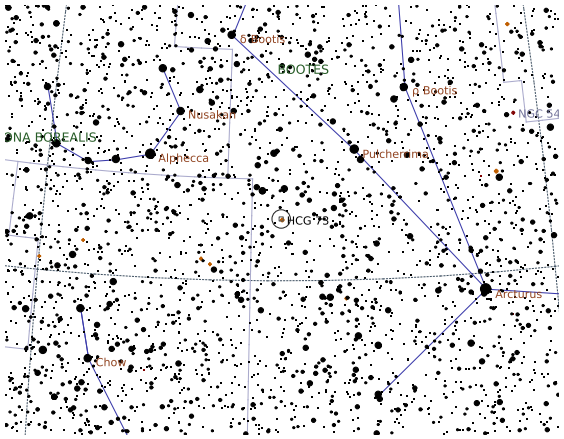
_____

HCG 73

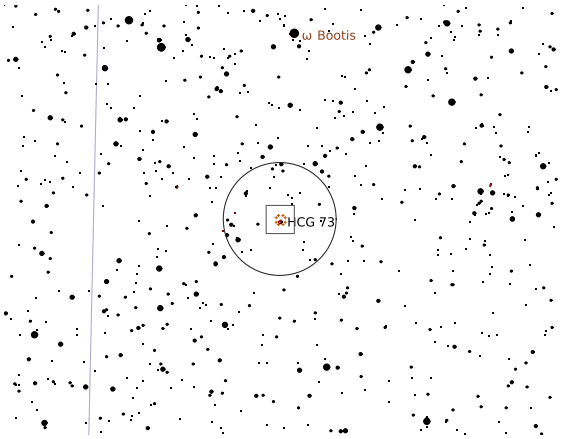
Galaxy Cluster in Bootes

Right Ascension (current)	$15^h\,03^m\,17^s$	Declination (current)	$23°\,18'\,04''$
Right Ascension (J2000.0)	$15^h\,02^m\,40^s$	Declination (J2000.0)	$23°\,21'\,13''$
Size	$4.8' \times 4.8'$	Position Angle	0°
Magnitude	13	Other Designation	–

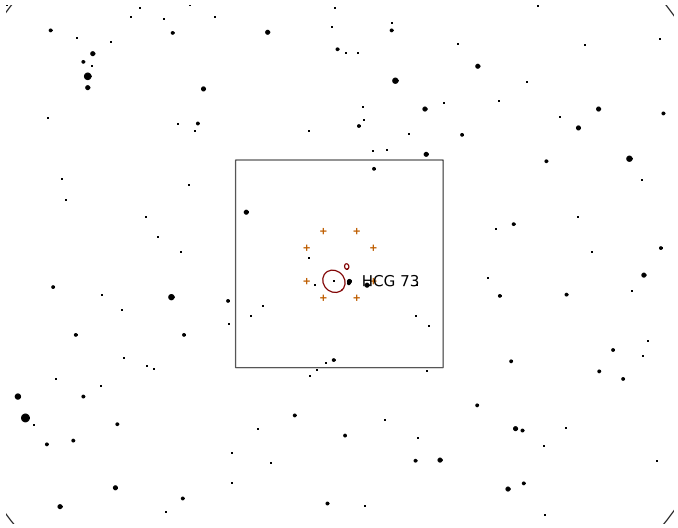
Description: z = 0.0449



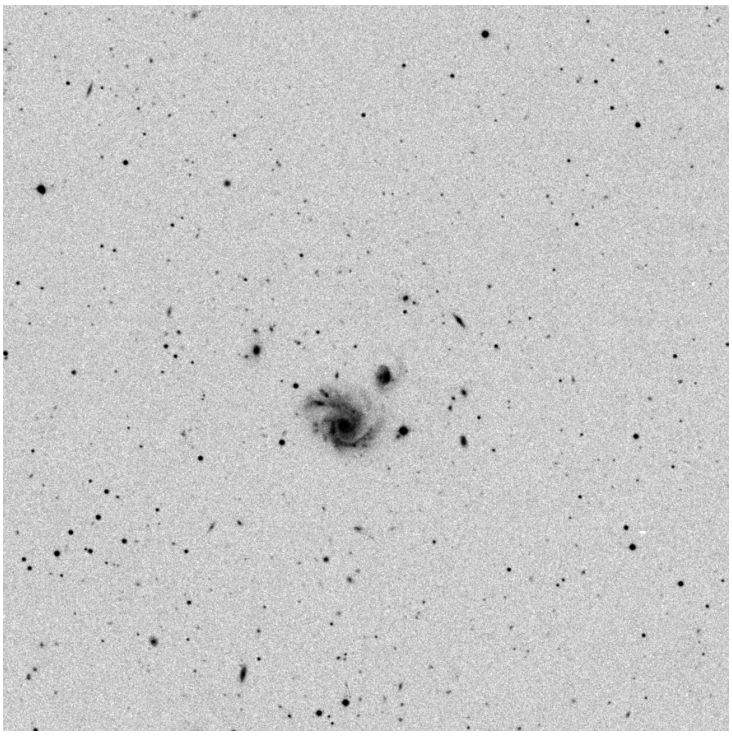
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

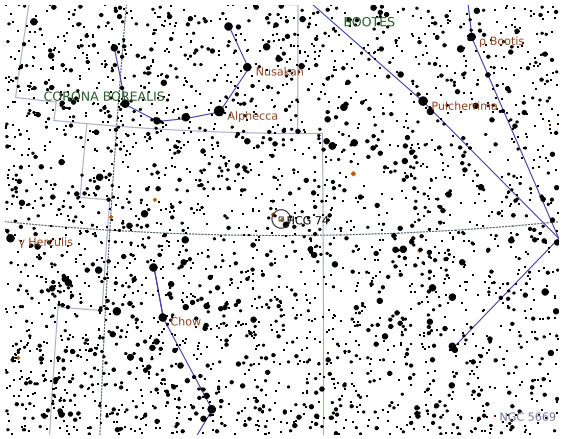
_____

HCG 74

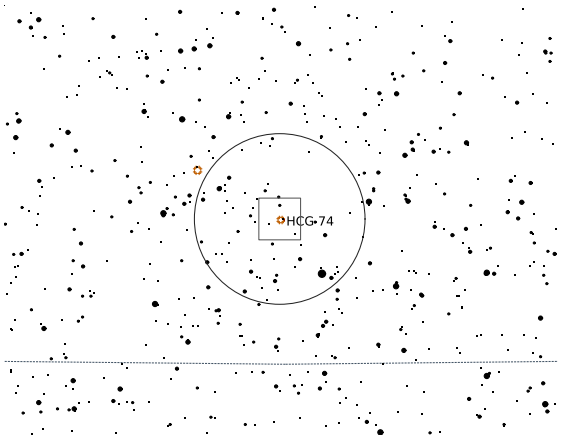
Galaxy Cluster in Serpens Caput

Right Ascension (current)	$15^h\,20^m\,06^s$	Declination (current)	$20°\,50'\,42''$
Right Ascension (J2000.0)	$15^h\,19^m\,28^s$	Declination (J2000.0)	$20°\,53'\,37''$
Size	$1.9' \times 1.9'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

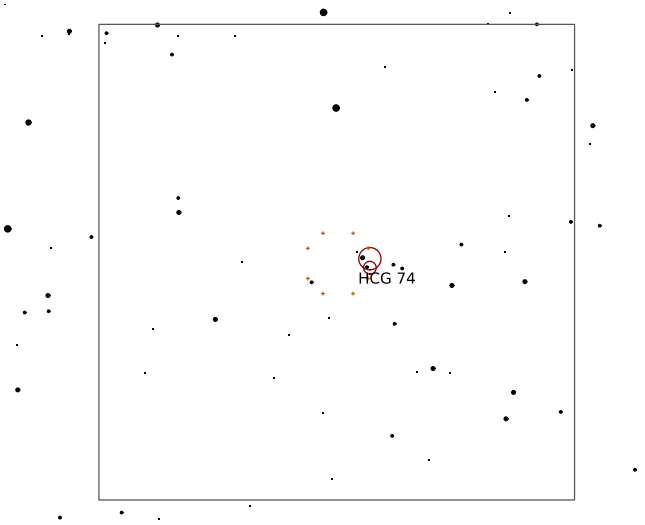
Description: z = 0.0399



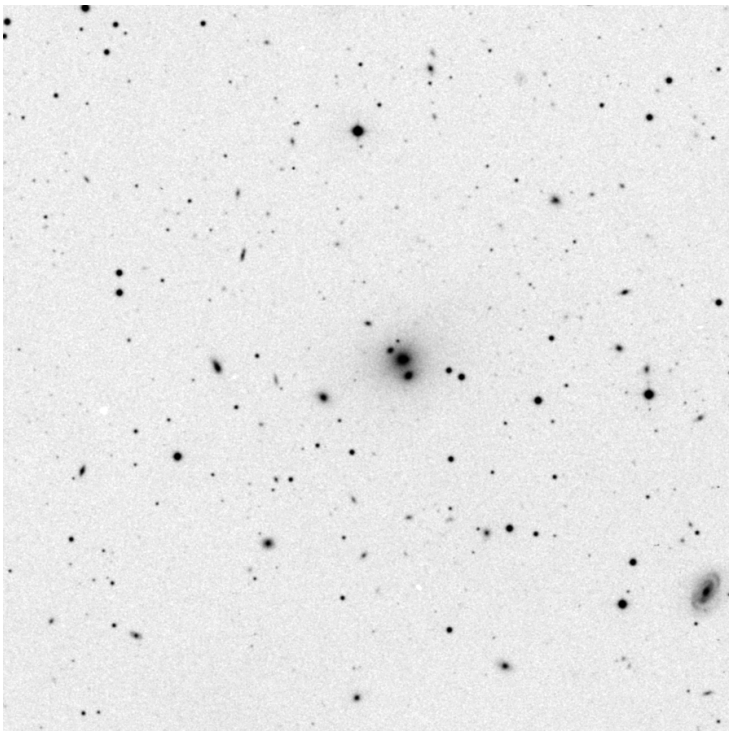
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

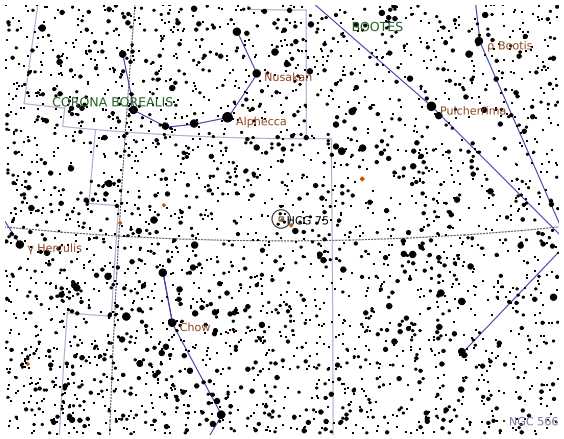
_____

HCG 75

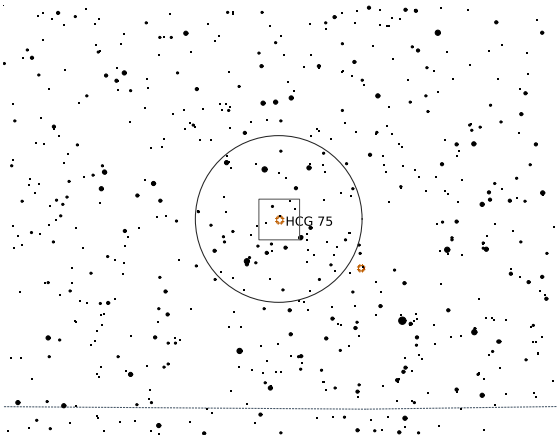
Galaxy Cluster in Serpens Caput

Right Ascension (current)	$15^h\,22^m\,11^s$	Declination (current)	$21°\,08'\,07''$
Right Ascension (J2000.0)	$15^h\,21^m\,33^s$	Declination (J2000.0)	$21°\,11'\,00''$
Size	$2.2' \times 2.2'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

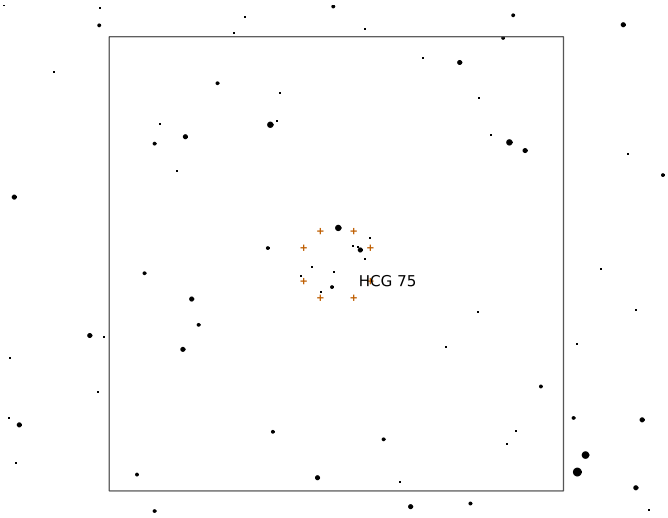
Description: z = 0.0416



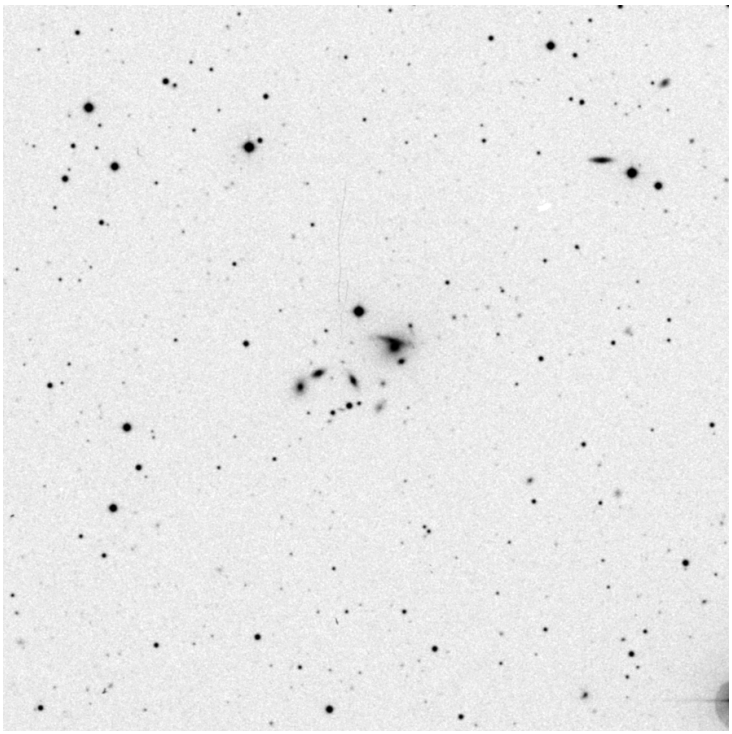
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

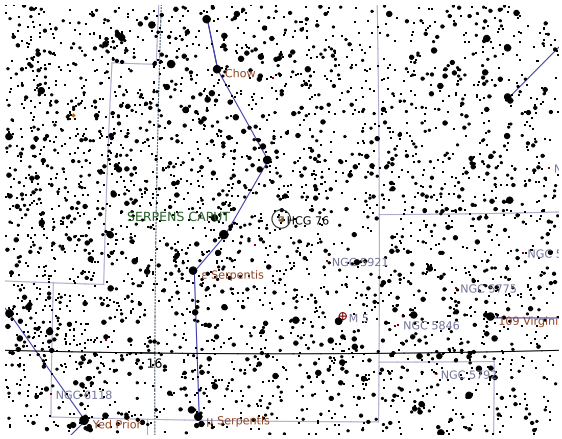
_____

HCG 76

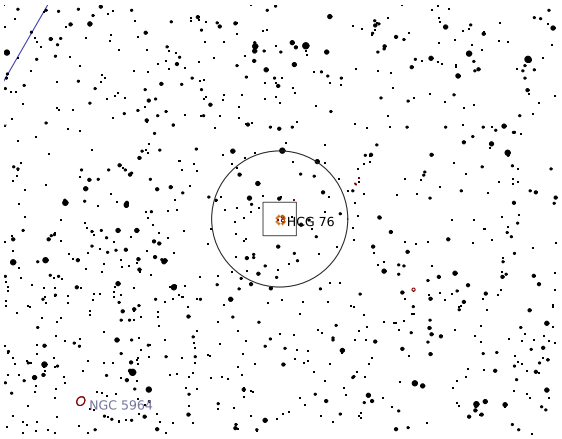
Galaxy Cluster in Serpens Caput

Right Ascension (current)	$15^h\,32^m\,23^s$	Declination (current)	$7°\,15'\,45''$
Right Ascension (J2000.0)	$15^h\,31^m\,41^s$	Declination (J2000.0)	$7°\,18'\,29''$
Size	$3.3' \times 3.3'$	Position Angle	0°
Magnitude	14	Other Designation	–

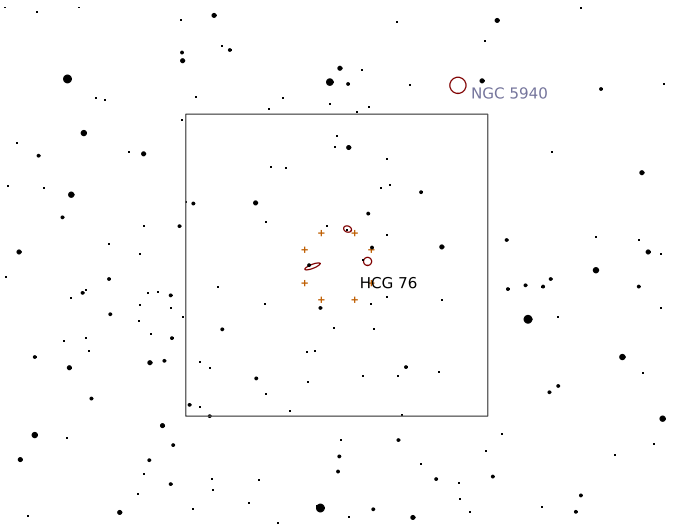
Description: z = 0.0340



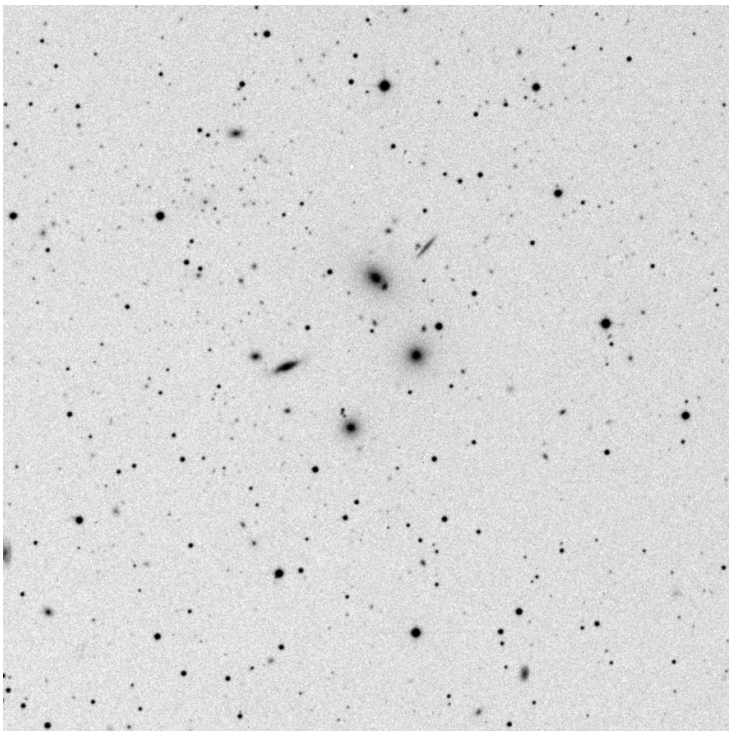
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

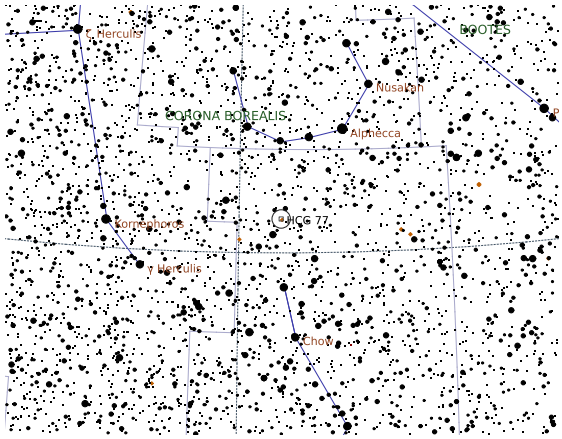
_____

HCG 77

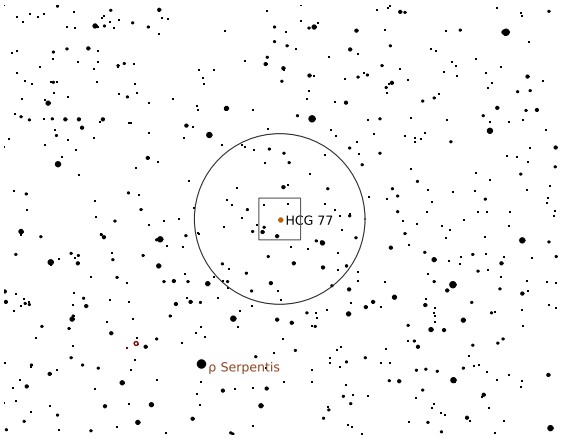
Galaxy Cluster in Serpens Caput

Right Ascension (current)	$15^{h}\,49^{m}\,54^{s}$	Declination (current)	$21^{\circ}\,47'\,15''$
Right Ascension (J2000.0)	$15^{h}\,49^{m}\,17^{s}$	Declination (J2000.0)	$21^{\circ}\,49'\,42''$
Size	$0.8' \times 0.8'$	Position Angle	0°
Magnitude	15	Other Designation	–

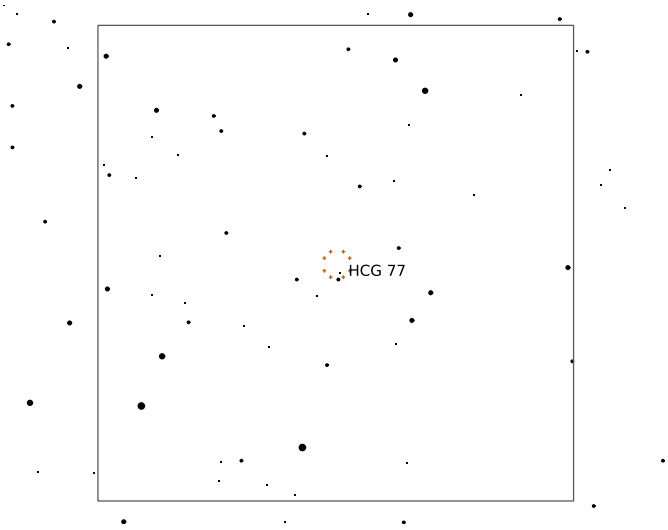
Description: z = 0.0000



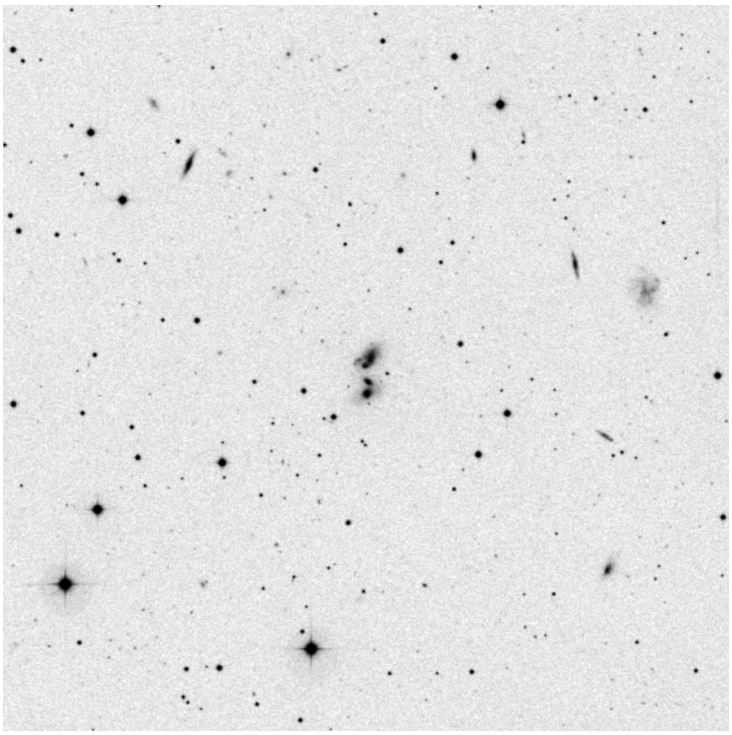
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

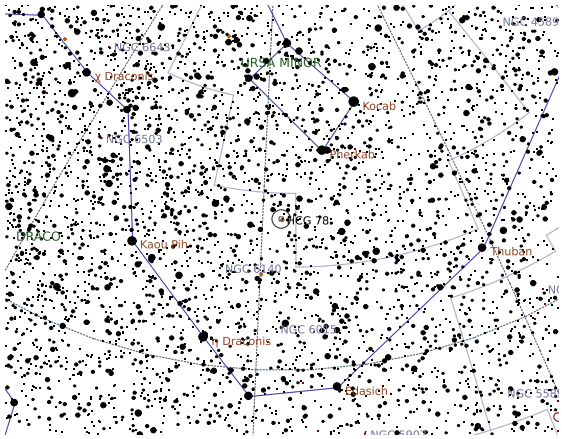
_____

HCG 78

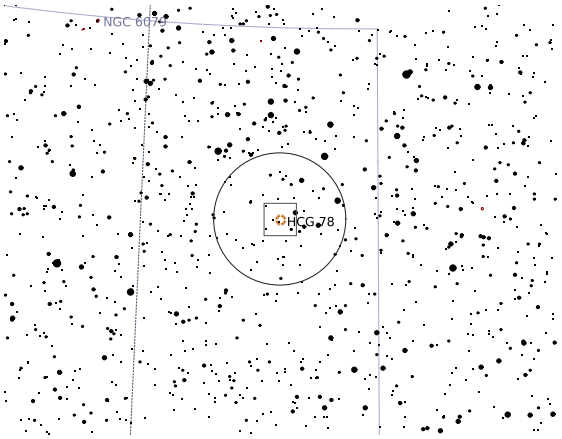
Galaxy Cluster in Draco

Right Ascension (current)	$15^{h}\,48^{m}\,34^{s}$	Declination (current)	$68°\,10'\,03''$
Right Ascension (J2000.0)	$15^{h}\,48^{m}\,28^{s}$	Declination (J2000.0)	$68°\,12'\,28''$
Size	$3.5' \times 3.5'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

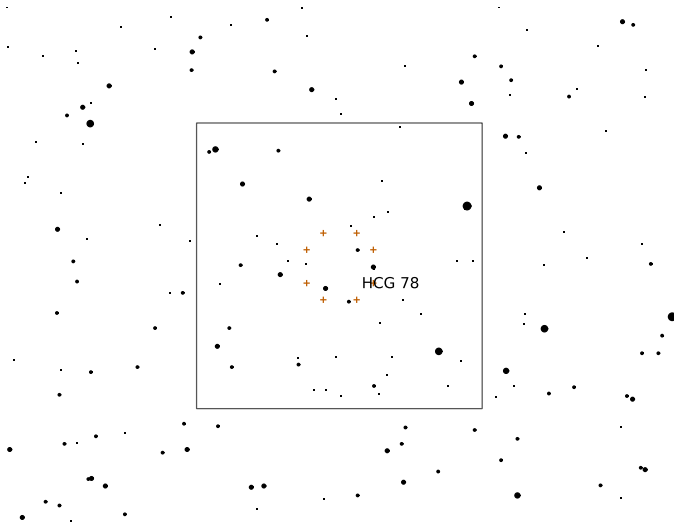
Description: z = 0.0000



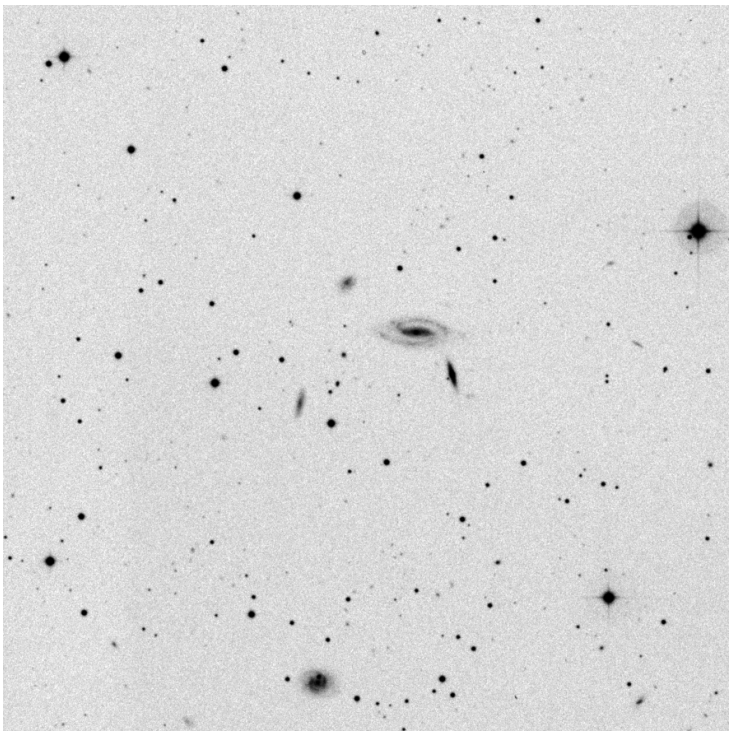
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

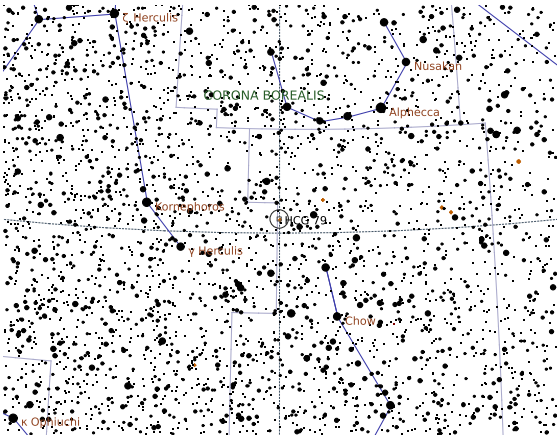
_____

HCG 79 (Seyfert's Sextet)

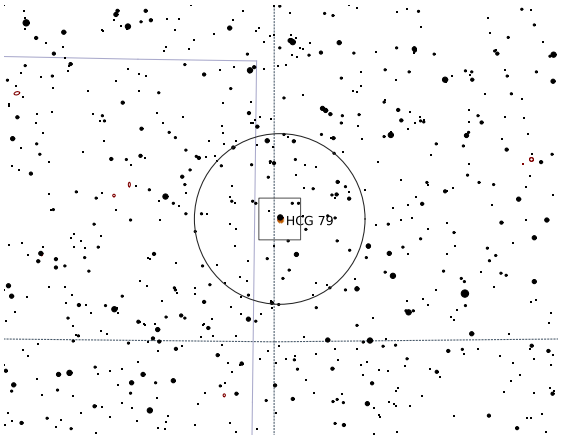
Galaxy Cluster in Serpens Caput

Right Ascension (current)	$15^h\,59^m\,50^s$	Declination (current)	$20°\,42'\,49''$
Right Ascension (J2000.0)	$15^h\,59^m\,12^s$	Declination (J2000.0)	$20°\,45'\,06''$
Size	$1.3' \times 1.3'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

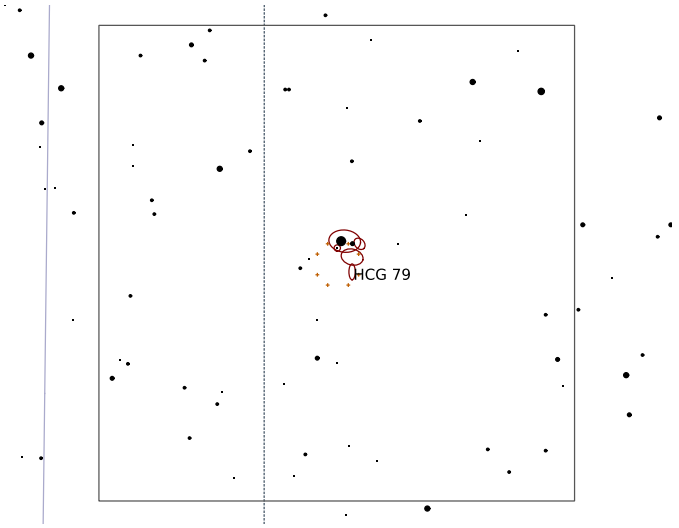
Description: z = 0.0145



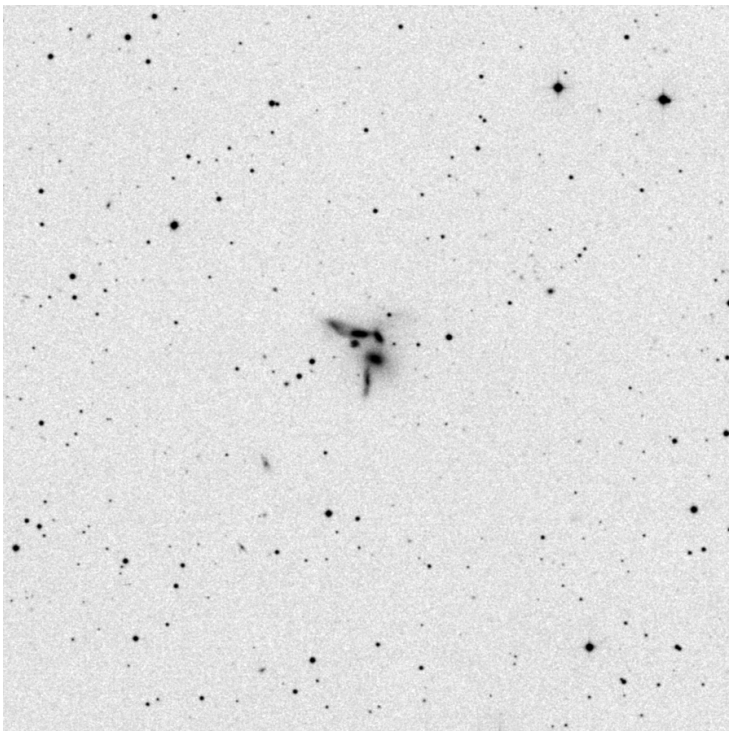
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

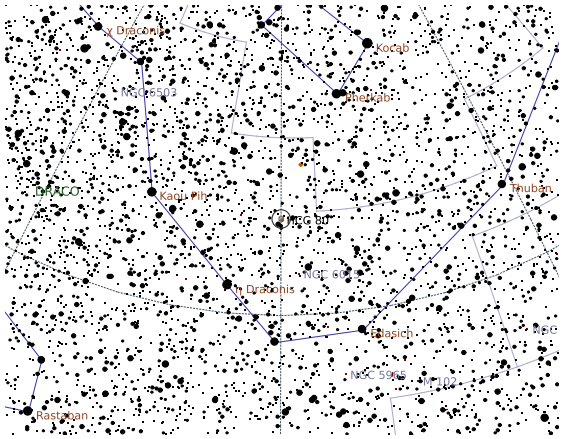
_____

HCG 80

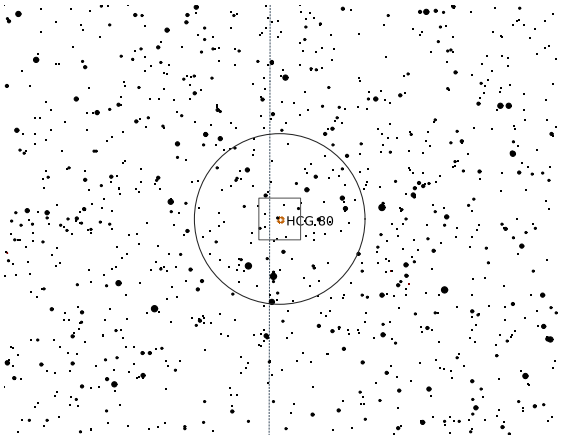
Galaxy Cluster in Draco

Right Ascension (current)	$15^h\,59^m\,22^s$	Declination (current)	$65°\,11'\,18''$
Right Ascension (J2000.0)	$15^h\,59^m\,12^s$	Declination (J2000.0)	$65°\,13'\,33''$
Size	$1.7' \times 1.7'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

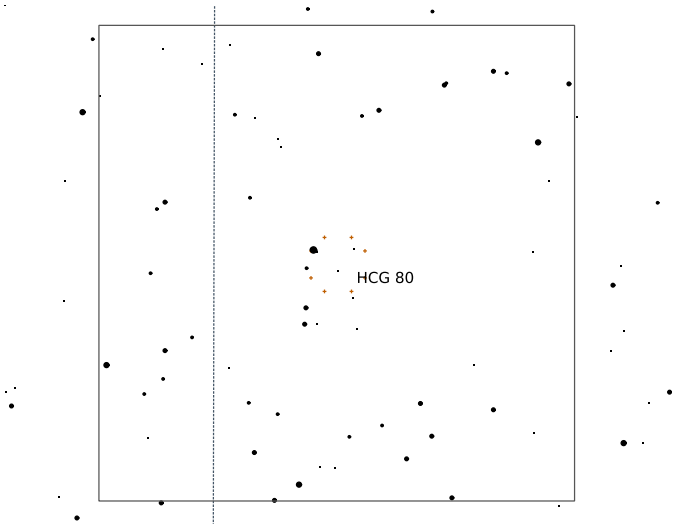
Description: z = 0.0310



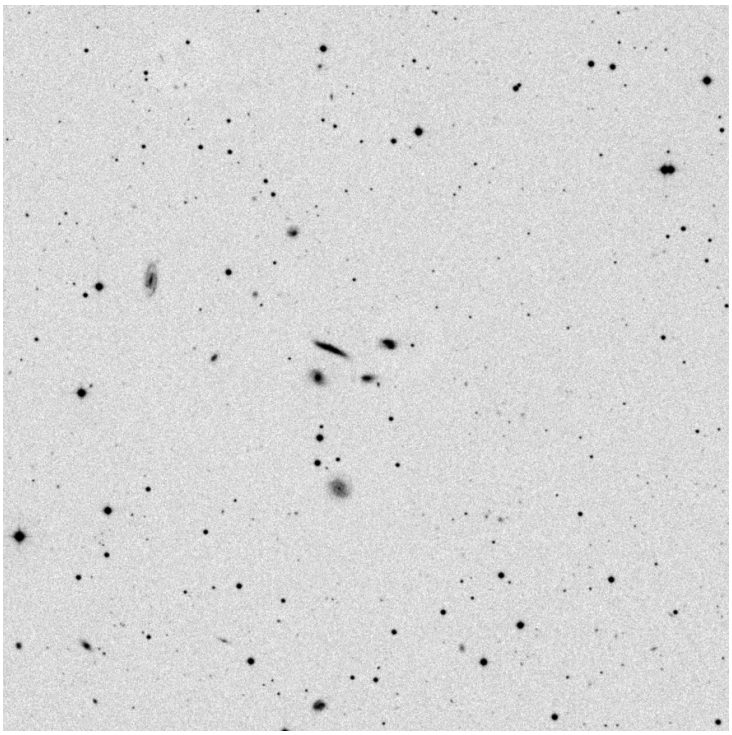
Wide-field chart



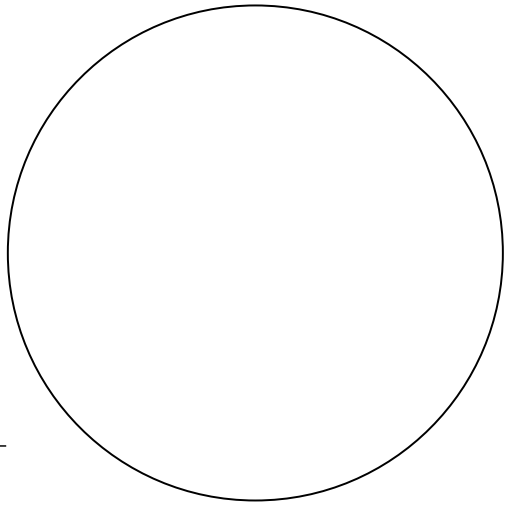
Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)



Sketch

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____ FOV: _____

* Description: _____

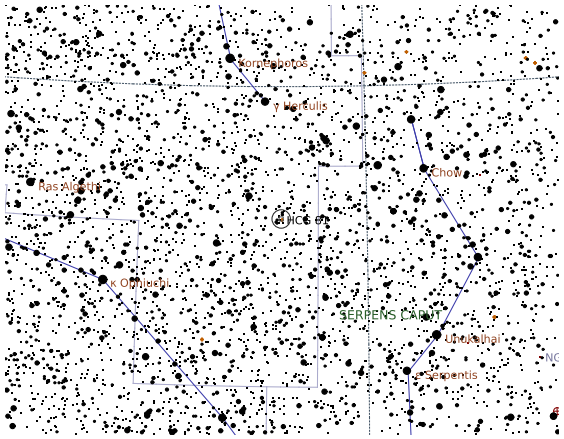
_____

HCG 81

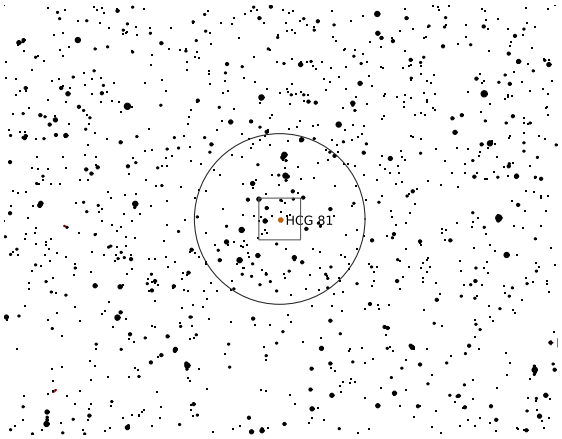
Galaxy Cluster in Hercules

Right Ascension (current)	$16^h\,18^m\,52^s$	Declination (current)	$12°\,45'\,42''$
Right Ascension (J2000.0)	$16^h\,18^m\,13^s$	Declination (J2000.0)	$12°\,47'\,39''$
Size	$0.9' \times 0.9'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

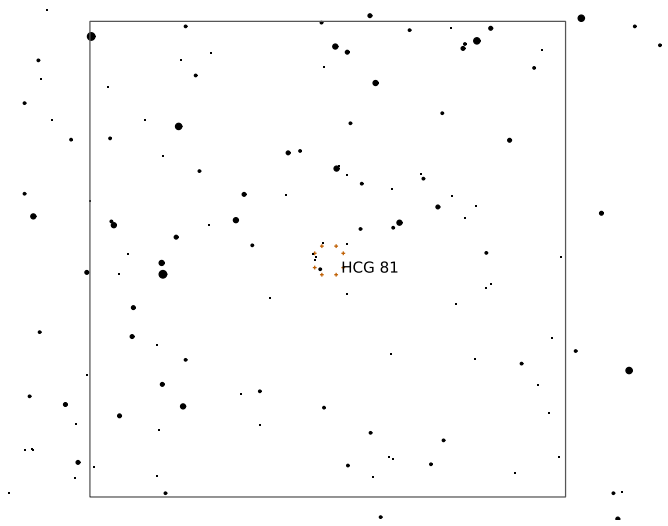
Description: z = 0.0499



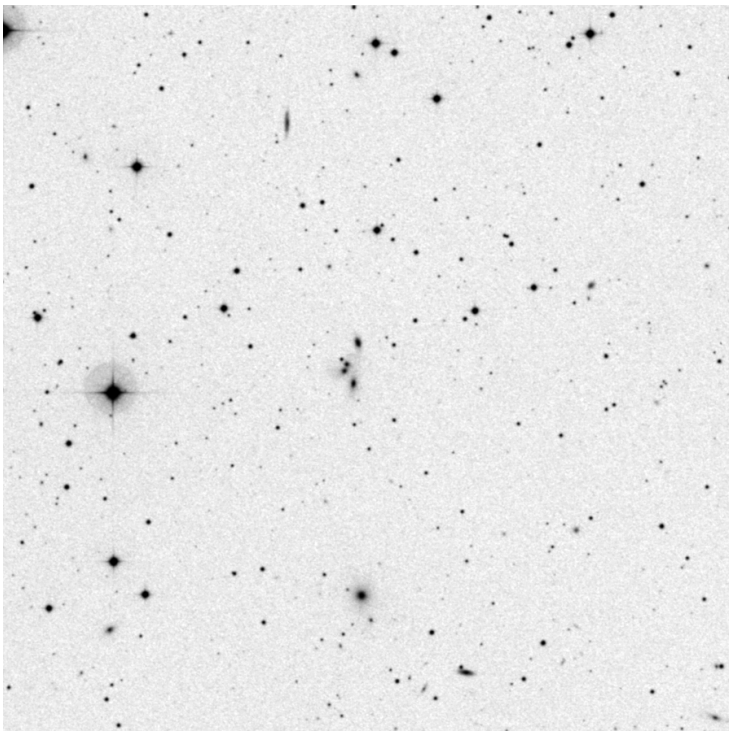
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

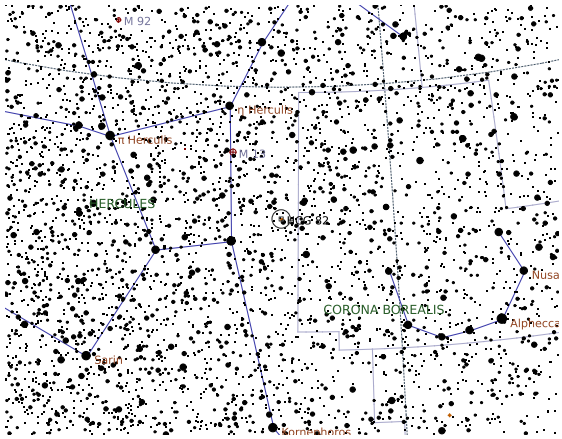
_____

HCG 82

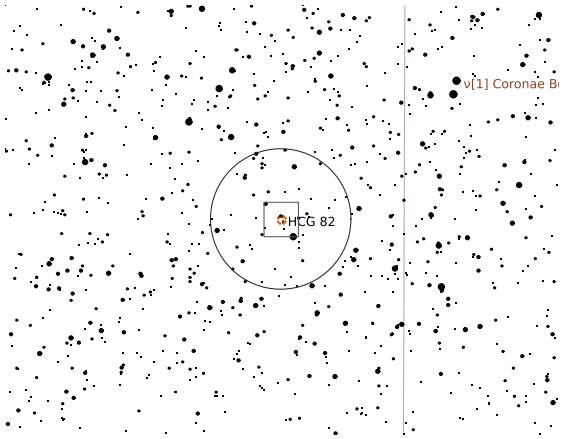
Galaxy Cluster in Hercules

Right Ascension (current)	$16^h\,28^m\,54^s$	Declination (current)	$32°\,47'\,38''$
Right Ascension (J2000.0)	$16^h\,28^m\,22^s$	Declination (J2000.0)	$32°\,49'\,25''$
Size	$3.1' \times 3.1'$	Position Angle	0°
Magnitude	13	Other Designation	–

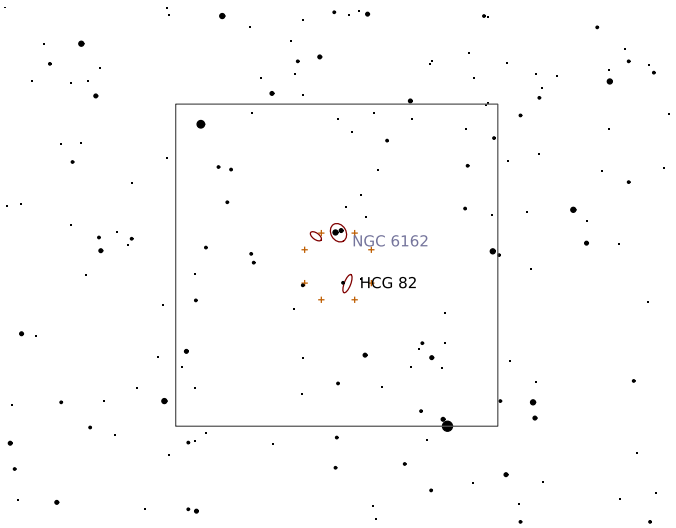
Description: z = 0.0362



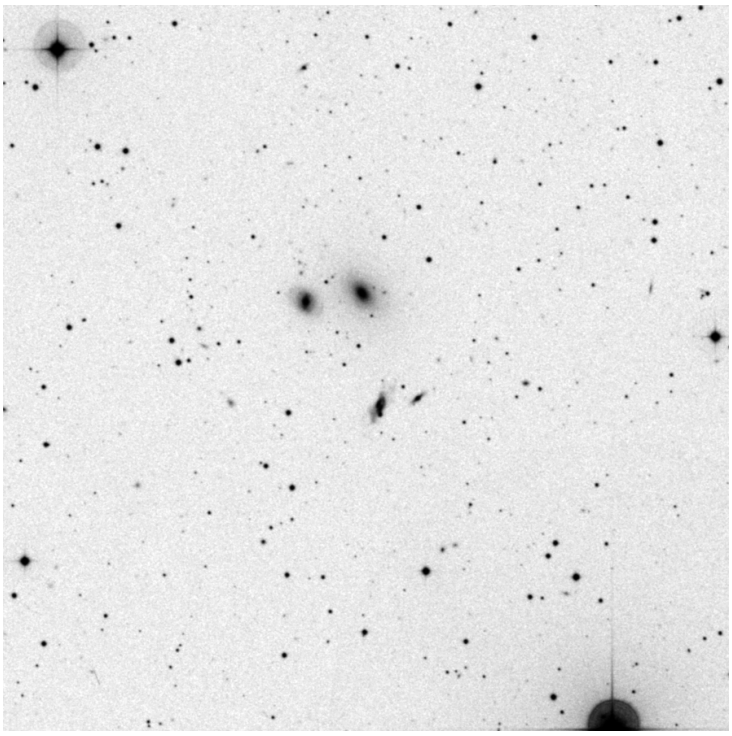
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

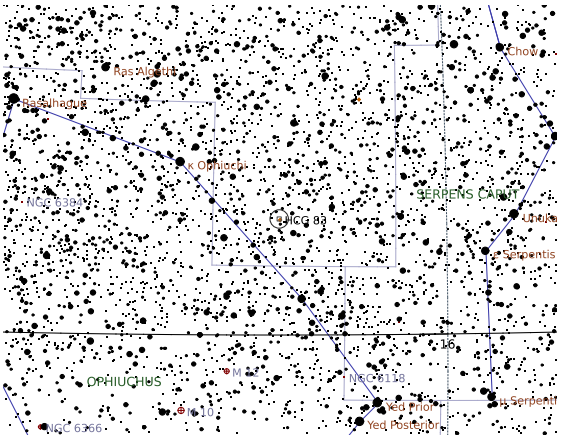
_____

HCG 83

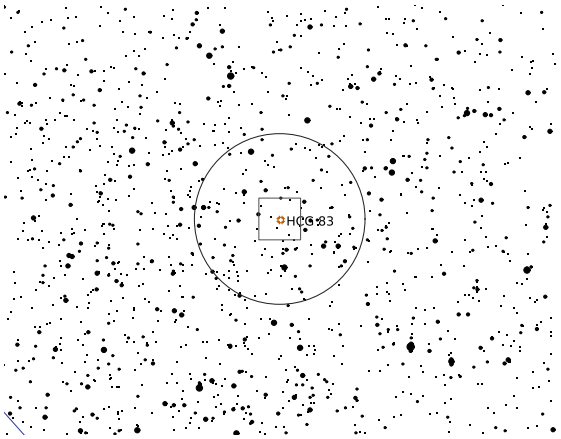
Galaxy Cluster in Hercules

Right Ascension (current)	$16^{h}\,36^{m}\,22^{s}$	Declination (current)	$6°\,14'\,35''$
Right Ascension (J2000.0)	$16^{h}\,35^{m}\,40^{s}$	Declination (J2000.0)	$6°\,16'\,12''$
Size	$1.9' \times 1.9'$	Position Angle	$0°$
Magnitude	15	Other Designation	–

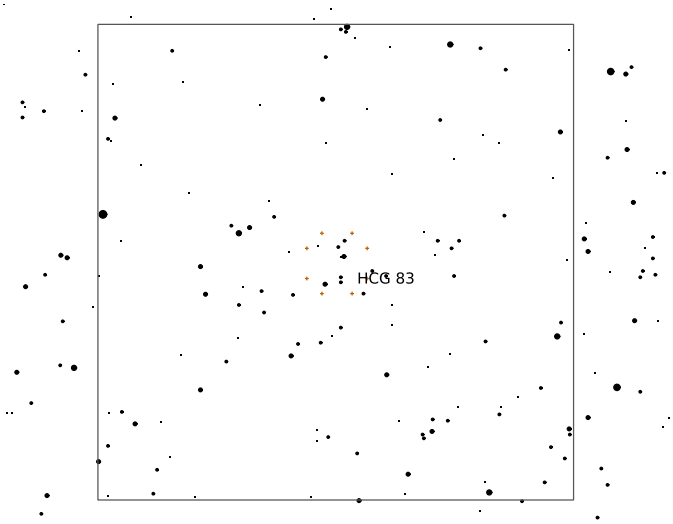
Description: z = 0.0531



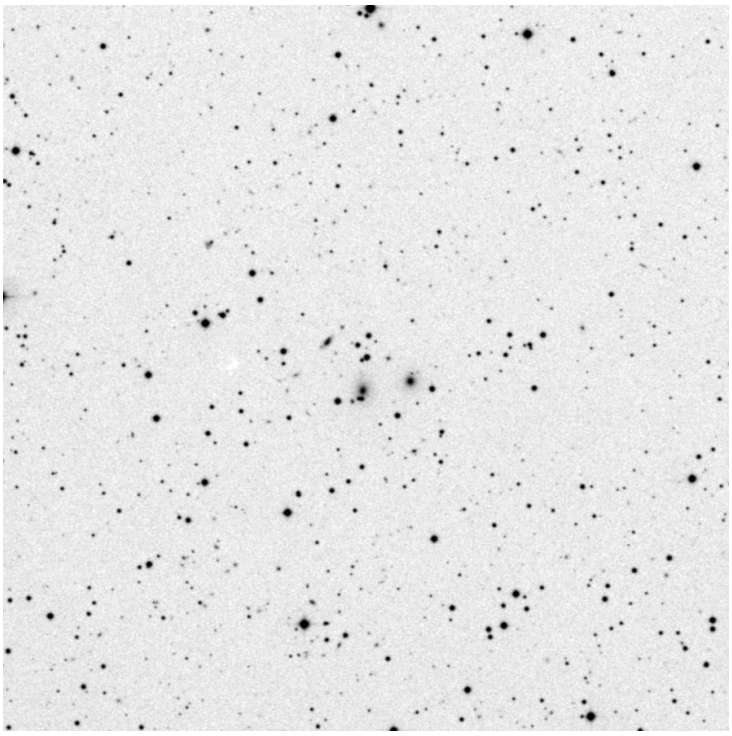
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

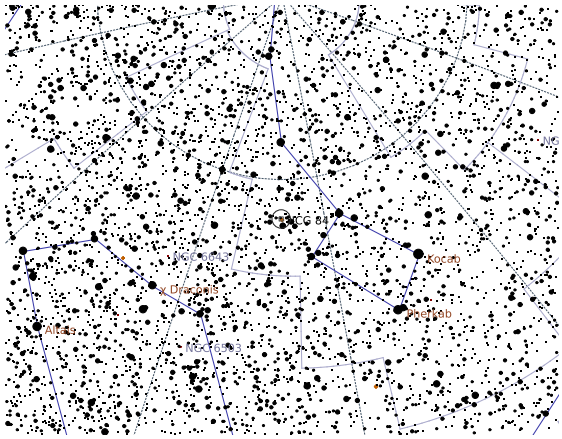
_____

HCG 84

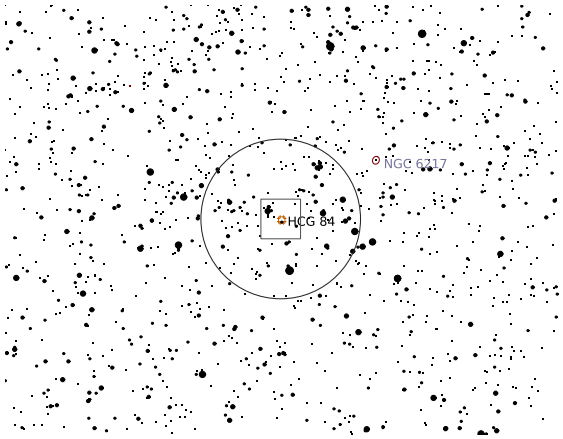
Galaxy Cluster in Ursa Minor

Right Ascension (current)	$16^h\,43^m\,35^s$	Declination (current)	$77°\,48'\,40''$
Right Ascension (J2000.0)	$16^h\,44^m\,08^s$	Declination (J2000.0)	$77°\,50'\,10''$
Size	$2.4' \times 2.4'$	Position Angle	0°
Magnitude	15	Other Designation	–

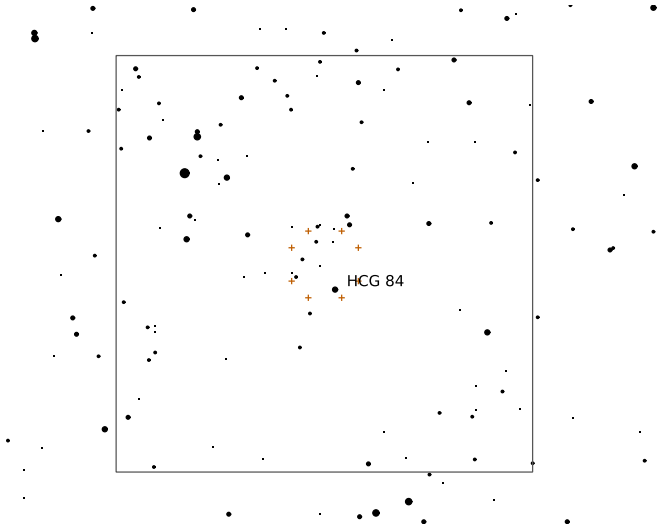
Description: z = 0.0556



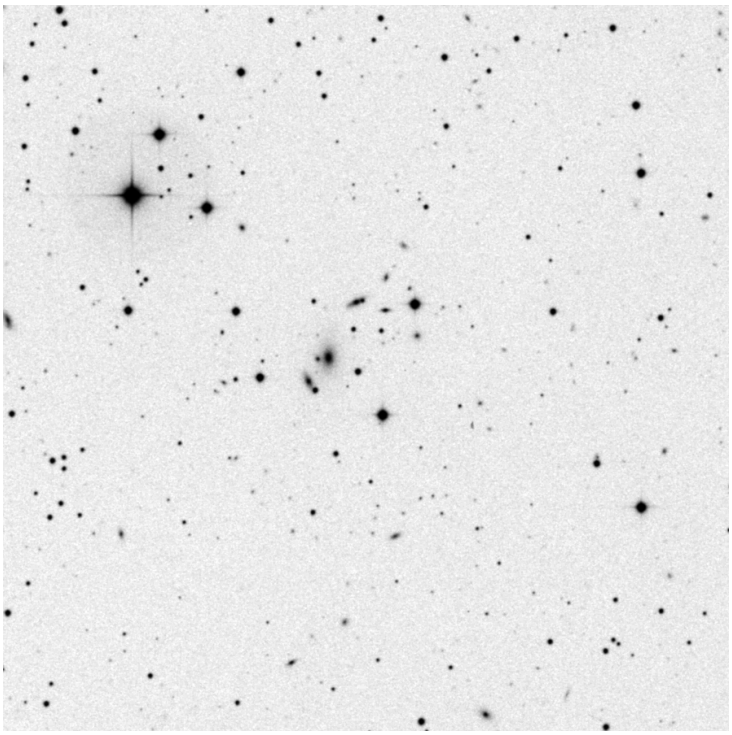
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

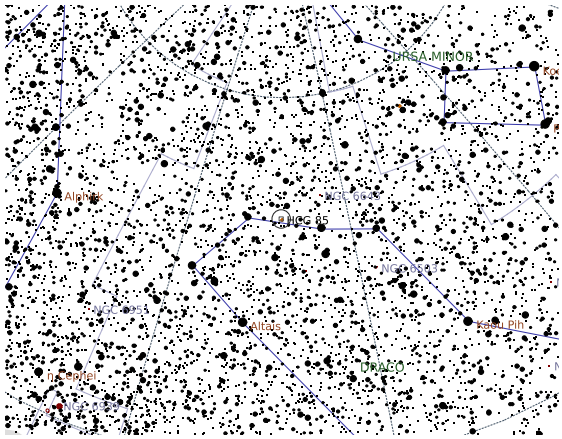
_____

HCG 85

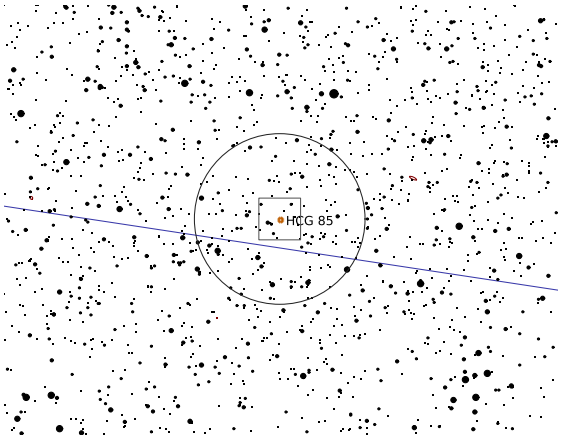
Galaxy Cluster in Draco

Right Ascension (current)	$18^h\,50^m\,08^s$	Declination (current)	$73°\,21'\,50''$
Right Ascension (J2000.0)	$18^h\,50^m\,22^s$	Declination (J2000.0)	$73°\,21'\,00''$
Size	$1.3' \times 1.3'$	Position Angle	$0°$
Magnitude	14	Other Designation	–

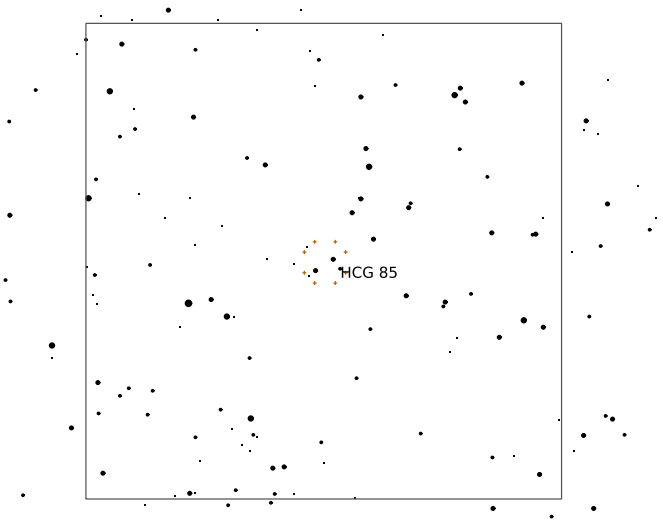
Description: z = 0.0393



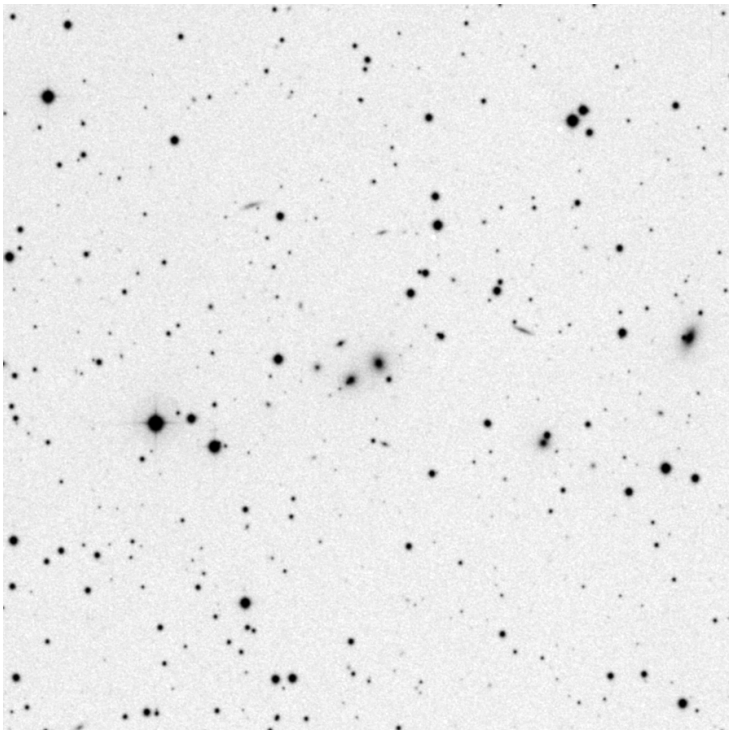
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

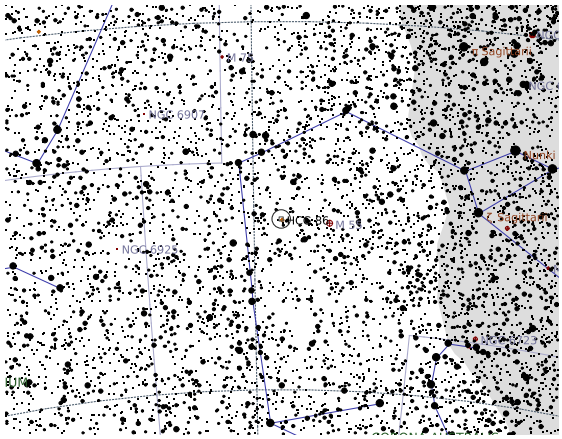
_____

HCG 86

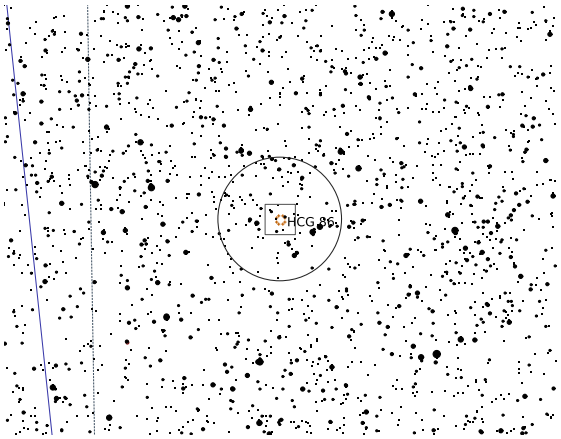
Galaxy Cluster in Sagittarius

Right Ascension (current)	$19^h\,52^m\,51^s$	Declination (current)	$-30°\,47'\,15''$
Right Ascension (J2000.0)	$19^h\,51^m\,59^s$	Declination (J2000.0)	$-30°\,49'\,34''$
Size	$4' \times 4'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

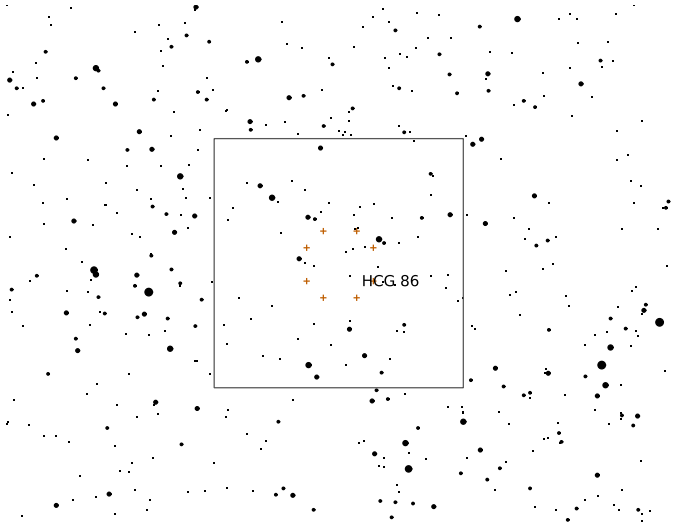
Description: z = 0.0199



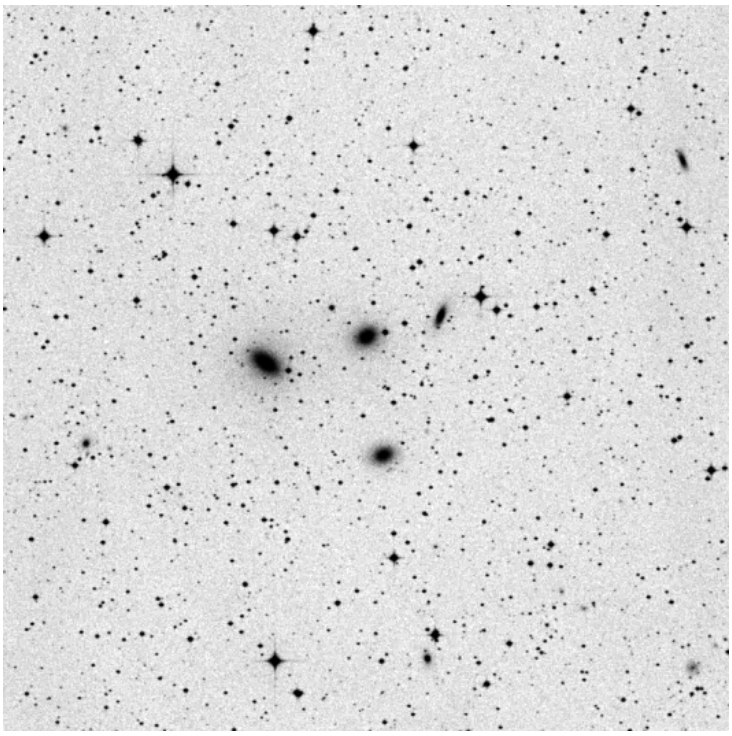
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

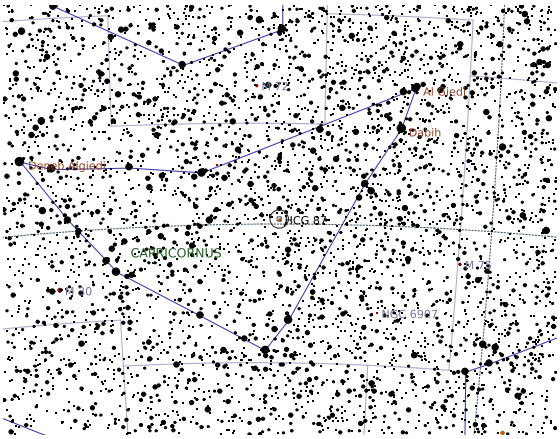
_____

HCG 87

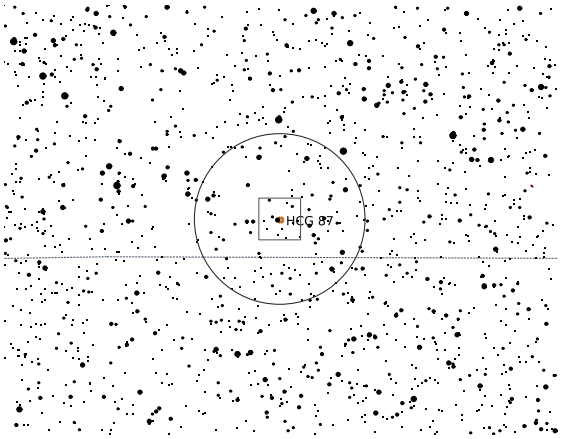
Galaxy Cluster in Capricornus

Right Ascension (current)	$20^{h}\,48^{m}\,58^{s}$	Declination (current)	$-19°\,47'\,16''$
Right Ascension (J2000.0)	$20^{h}\,48^{m}\,11^{s}$	Declination (J2000.0)	$-19°\,50'\,26''$
Size	$1.5' \times 1.5'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

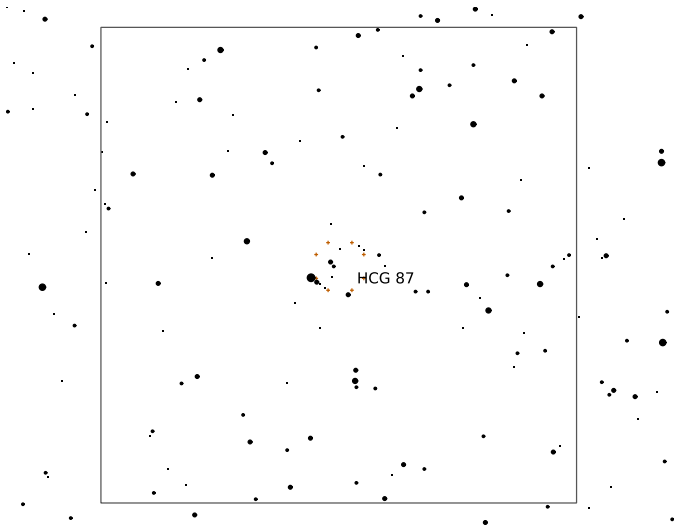
Description: z = 0.0296



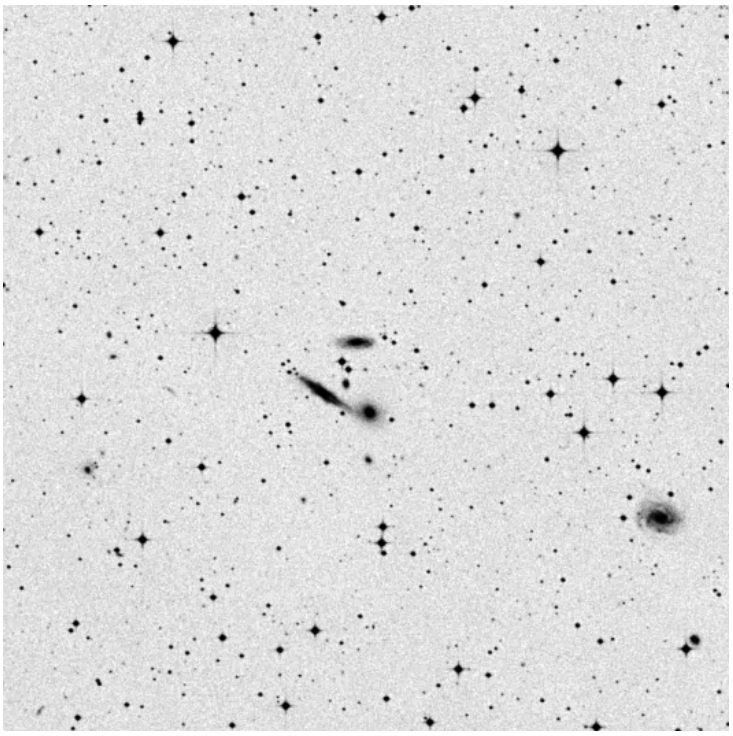
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

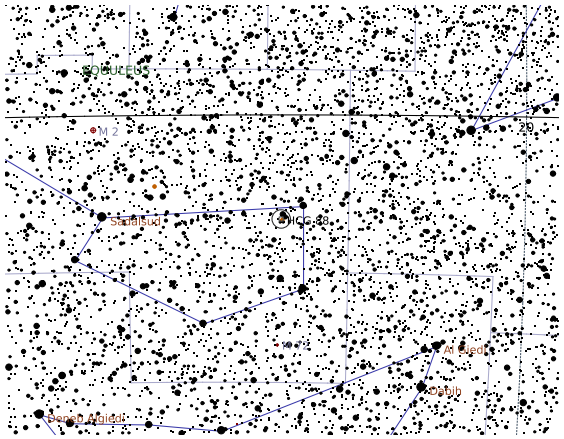
_____

HCG 88

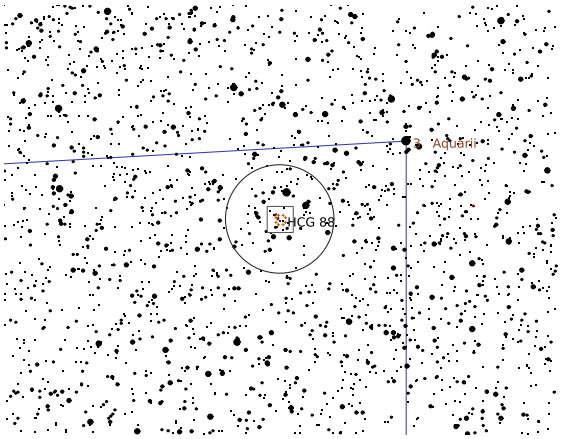
Galaxy Cluster in Aquarius

Right Ascension (current)	$20^{h}\,53^{m}\,06^{s}$	Declination (current)	$-5°\,42'\,19''$
Right Ascension (J2000.0)	$20^{h}\,52^{m}\,22^{s}$	Declination (J2000.0)	$-5°\,45'\,28''$
Size	$5.2' \times 5.2'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

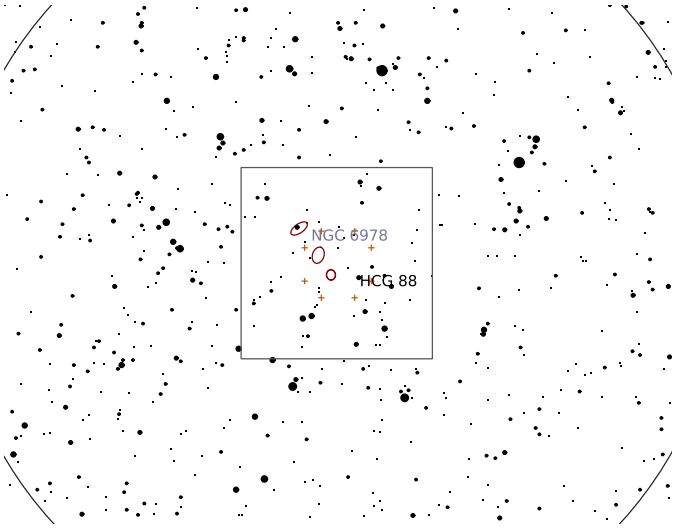
Description: z = 0.0201



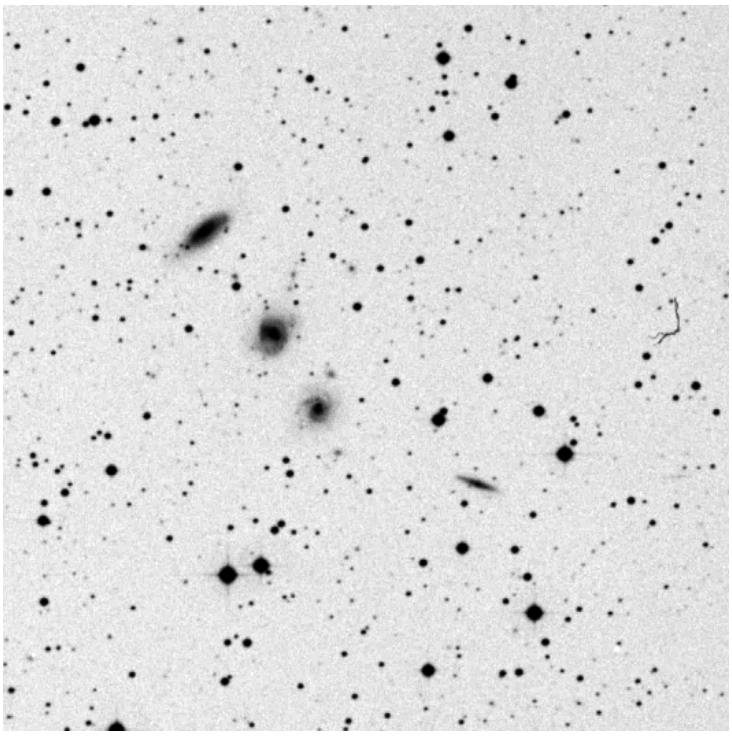
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

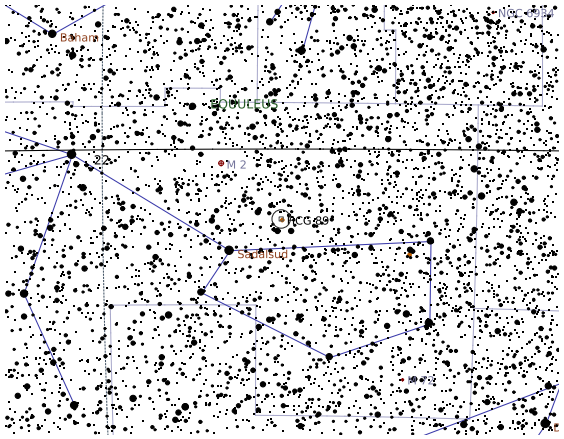
_____

HCG 89

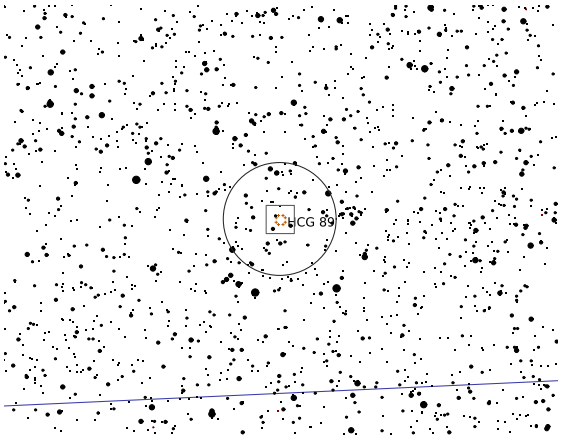
Galaxy Cluster in Aquarius

Right Ascension (current)	$21^h\,20^m\,53^s$	Declination (current)	$-3°\,51'\,02''$
Right Ascension (J2000.0)	$21^h\,20^m\,10^s$	Declination (J2000.0)	$-3°\,54'\,32''$
Size	$4.8' \times 4.8'$	Position Angle	$0°$
Magnitude	15	Other Designation	–

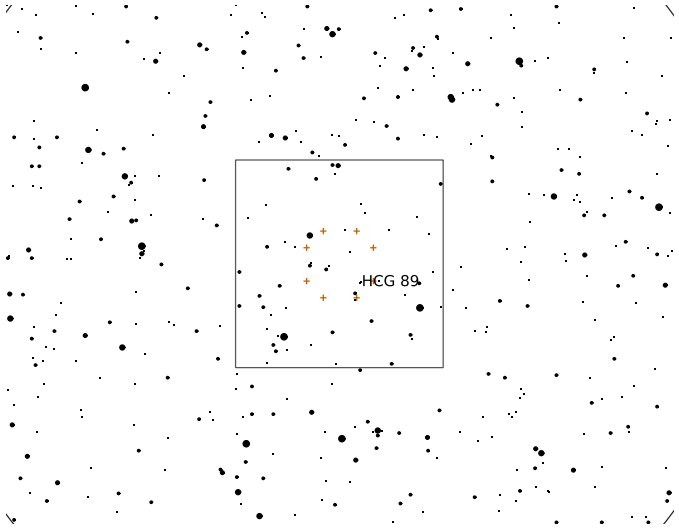
Description: z = 0.0297



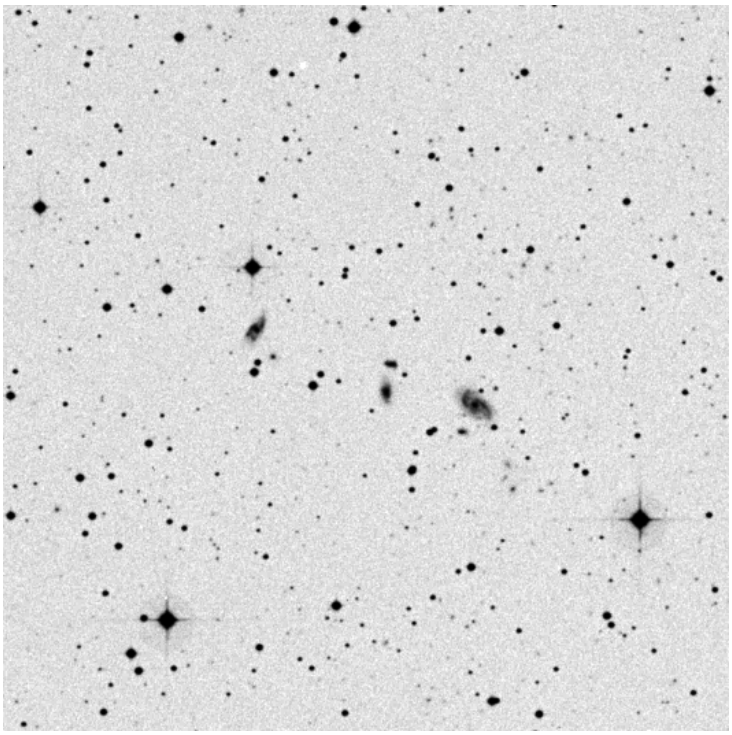
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

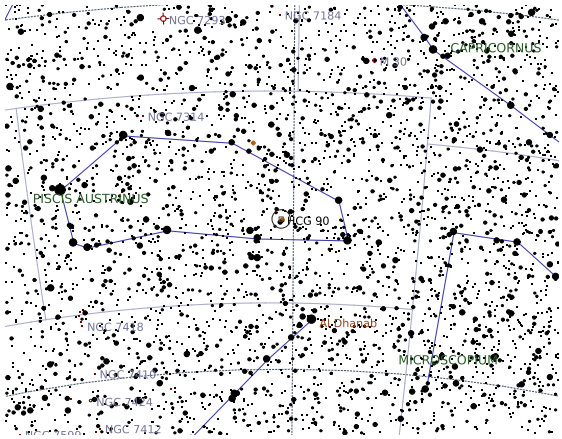
_____

HCG 90

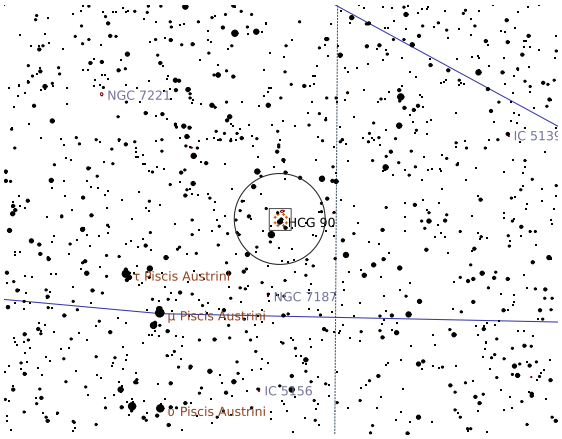
Galaxy Cluster in Piscis Austrinus

Right Ascension (current)	$22^h\,02^m\,52^s$	Declination (current)	$-31°\,53'\,53''$
Right Ascension (J2000.0)	$22^h\,02^m\,05^s$	Declination (J2000.0)	$-31°\,58'\,00''$
Size	$7.4' \times 7.4'$	Position Angle	0°
Magnitude	10	Other Designation	–

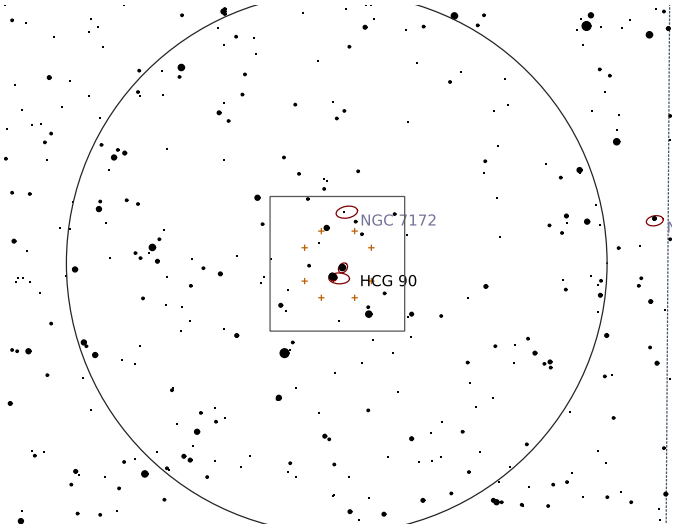
Description: z = 0.0088



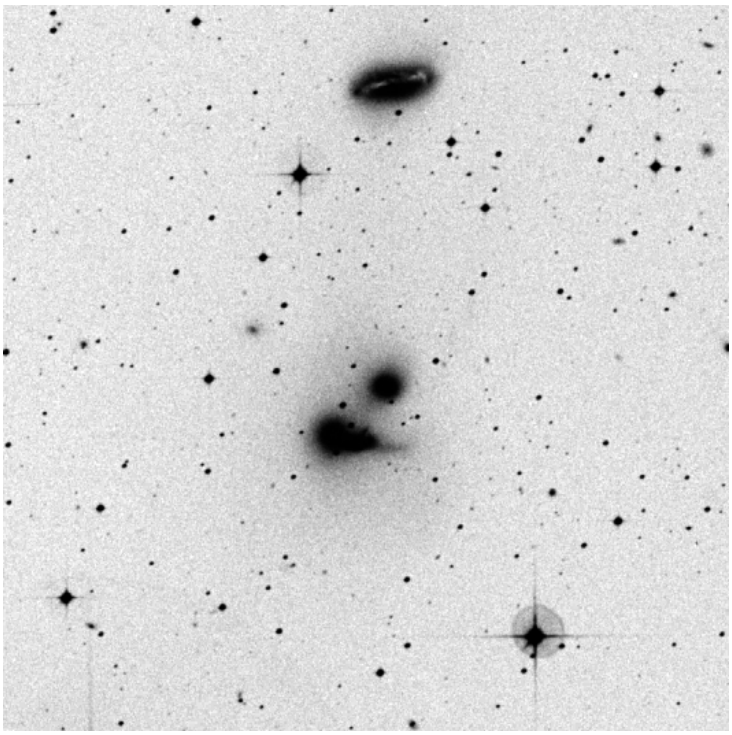
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

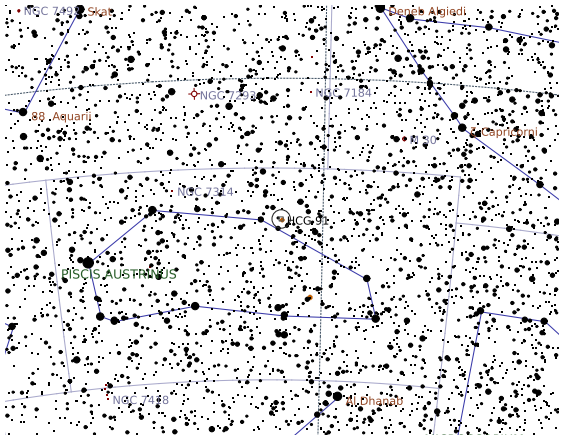
_____

HCG 91

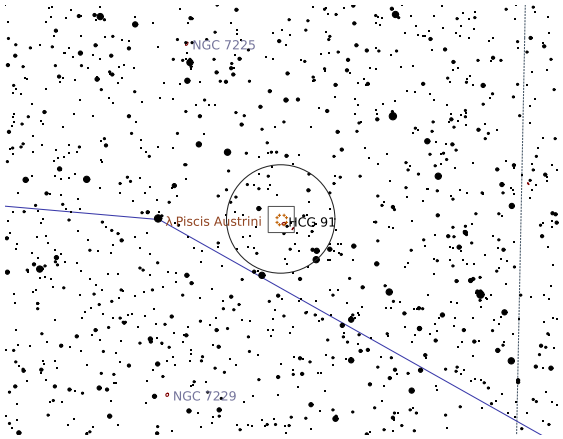
Galaxy Cluster in Piscis Austrinus

Right Ascension (current)	$22^h\,09^m\,58^s$	Declination (current)	$-27°\,42'\,23''$
Right Ascension (J2000.0)	$22^h\,09^m\,12^s$	Declination (J2000.0)	$-27°\,46'\,33''$
Size	$5.2' \times 5.2'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

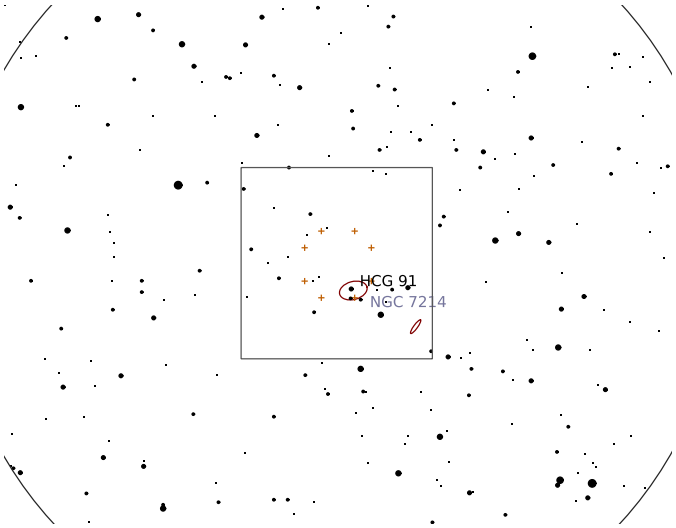
Description: z = 0.0238



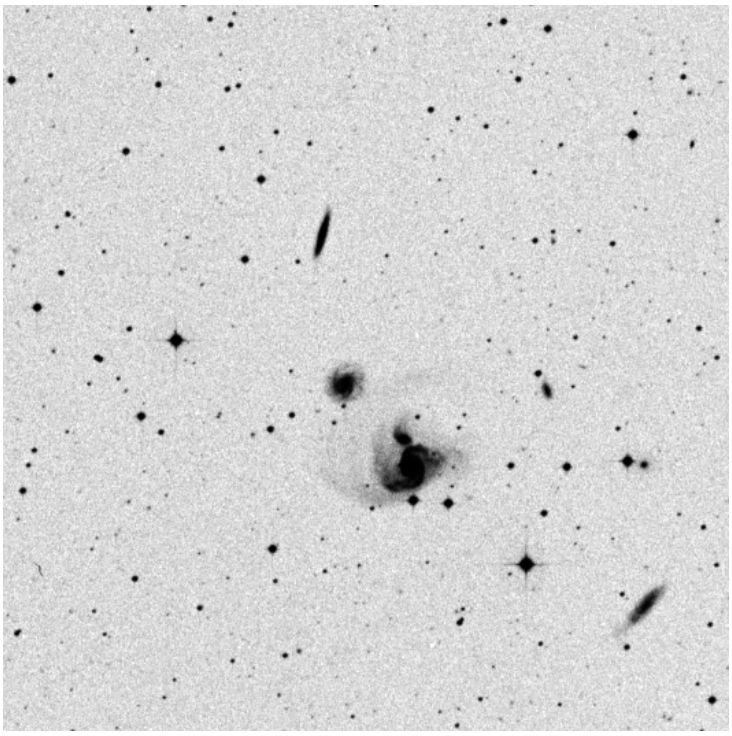
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

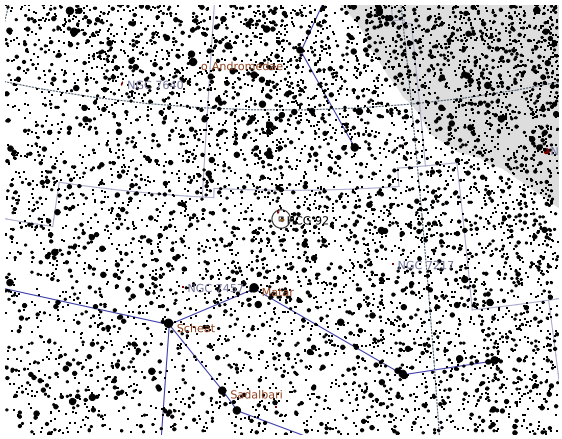
_____

HCG 92 (Stephan's Quintet)

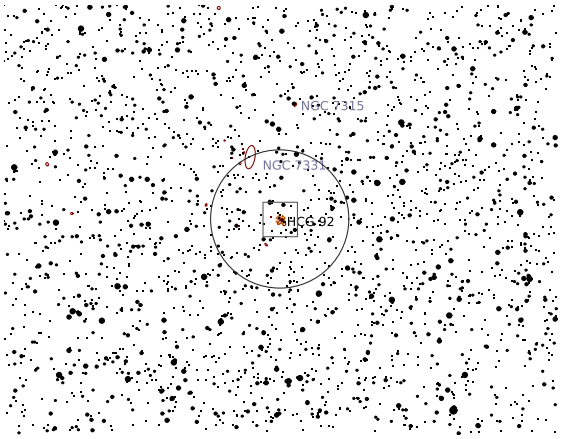
Galaxy Cluster in Pegasus

Right Ascension (current)	$22^h\,36^m\,37^s$	Declination (current)	$34°\,01'\,58''$
Right Ascension (J2000.0)	$22^h\,36^m\,00^s$	Declination (J2000.0)	$33°\,57'\,57''$
Size	$3.2' \times 3.2'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

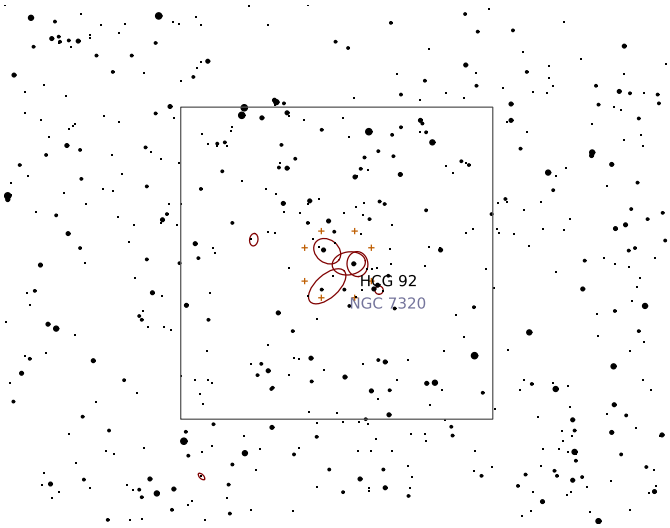
Description: z = 0.0215



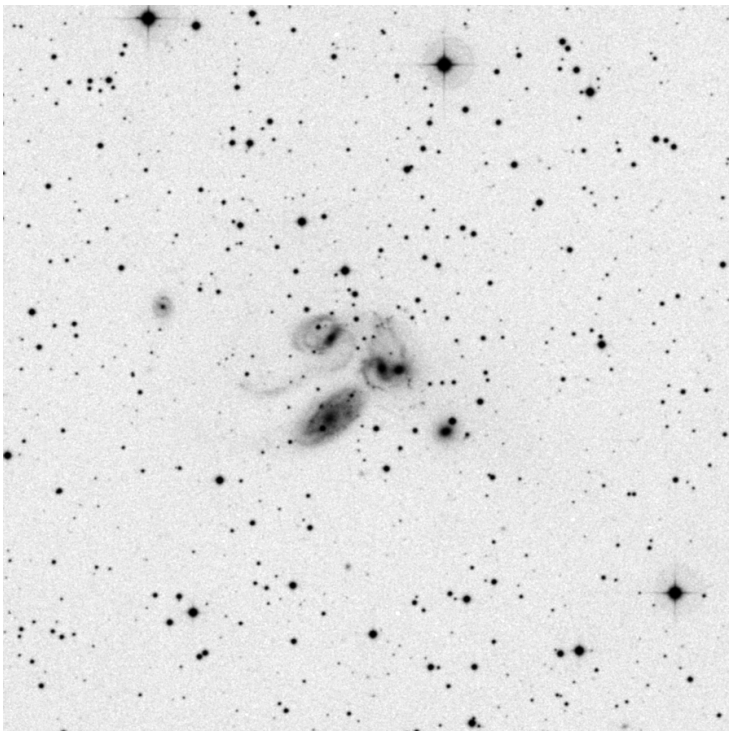
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

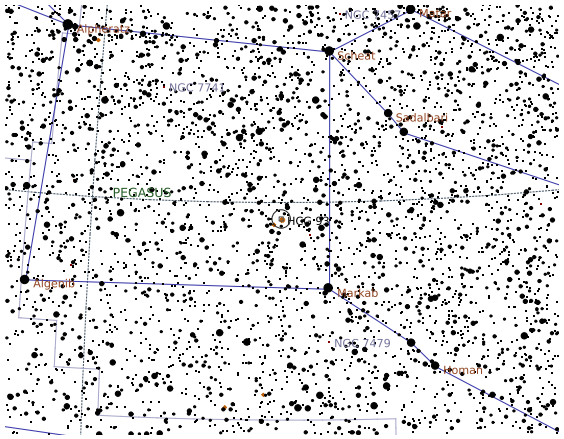
_____

HCG 93

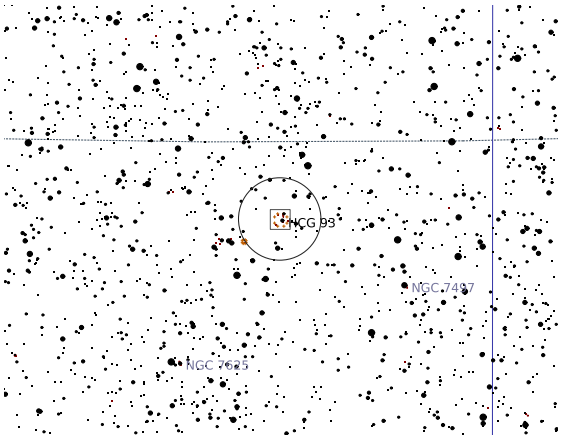
Galaxy Cluster in Pegasus

Right Ascension (current)	$23^h\,16^m\,04^s$	Declination (current)	$19°\,03'\,17''$
Right Ascension (J2000.0)	$23^h\,15^m\,24^s$	Declination (J2000.0)	$18°\,58'\,59''$
Size	$9' \times 9'$	Position Angle	0°
Magnitude	12	Other Designation	–

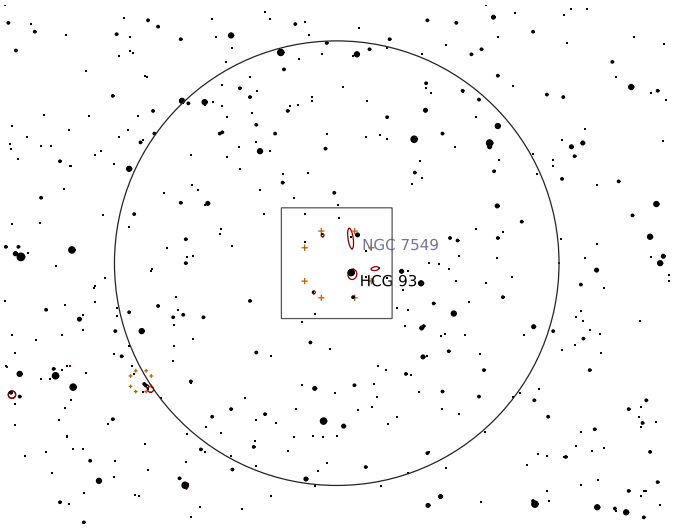
Description: z = 0.0168



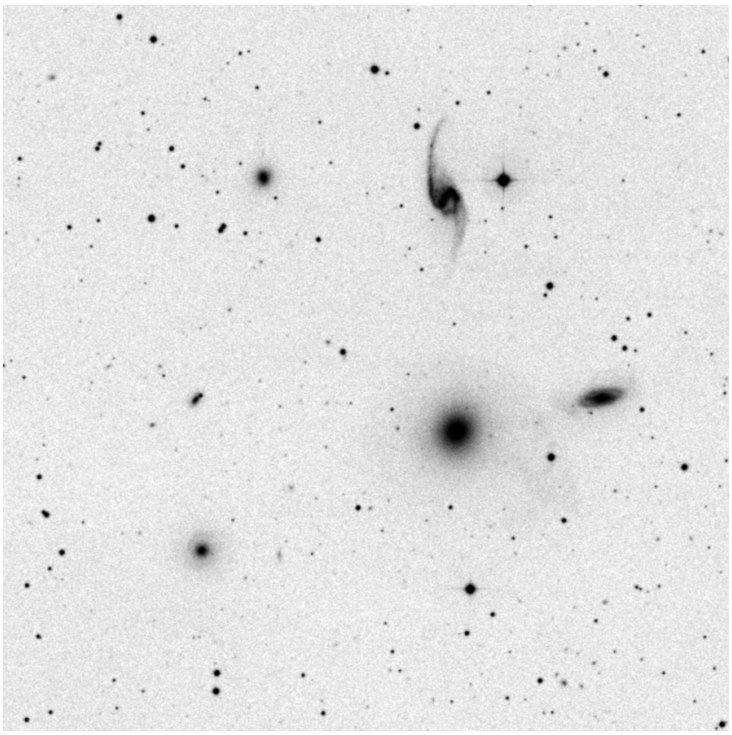
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

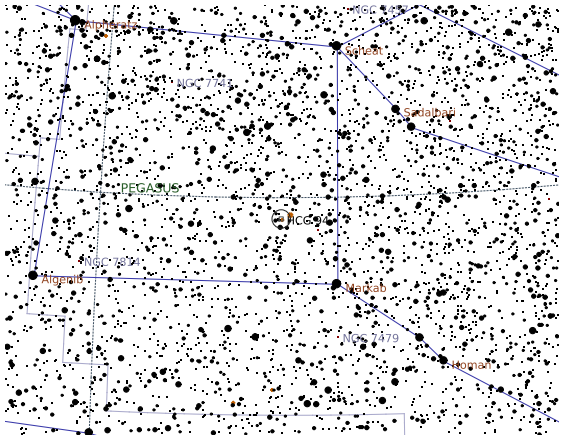
_____

HCG 94

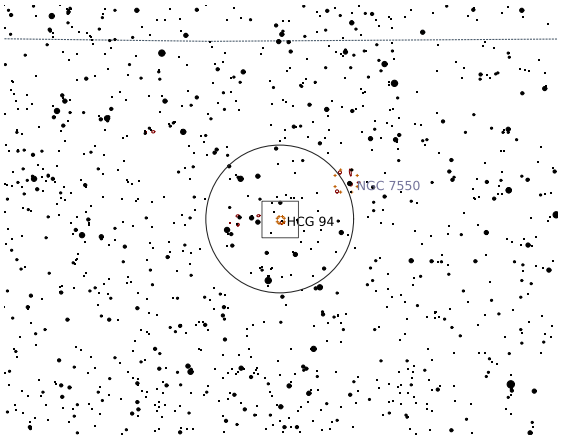
Galaxy Cluster in Pegasus

Right Ascension (current)	$23^h\,17^m\,56^s$	Declination (current)	$18°\,47'\,29''$
Right Ascension (J2000.0)	$23^h\,17^m\,16^s$	Declination (J2000.0)	$18°\,43'\,11''$
Size	$2.8' \times 2.8'$	Position Angle	0°
Magnitude	13	Other Designation	–

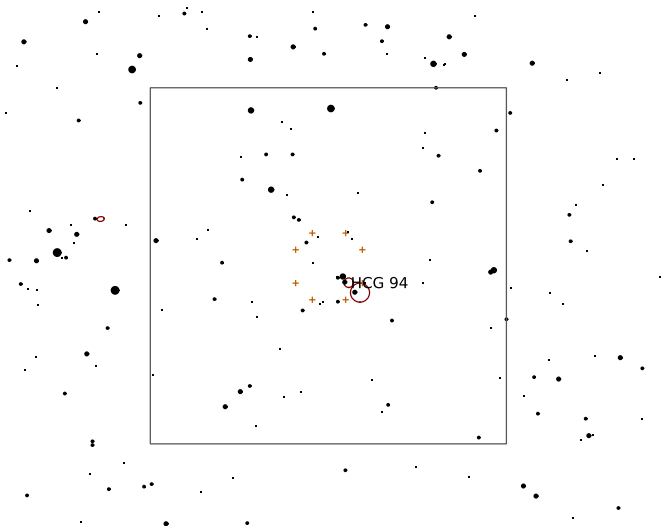
Description: z = 0.0417



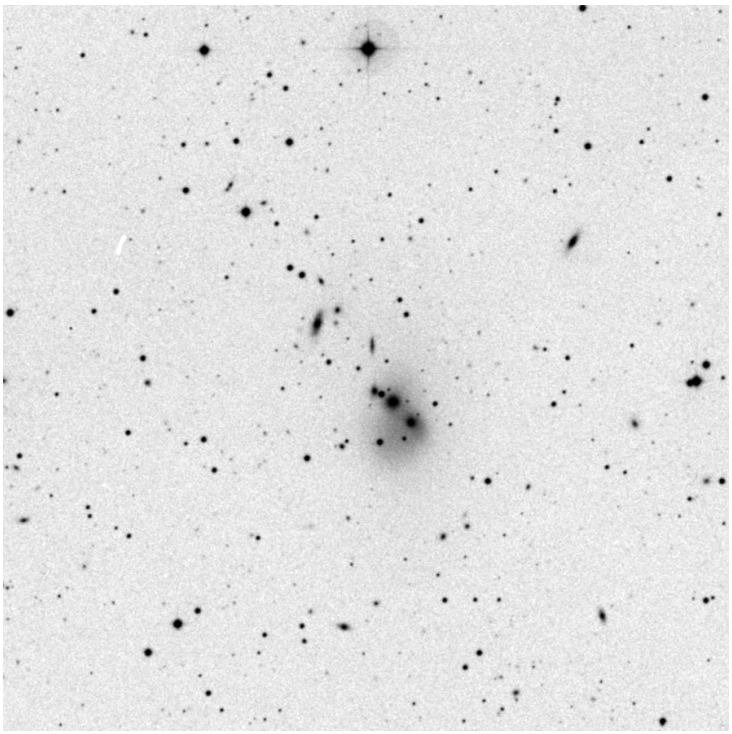
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

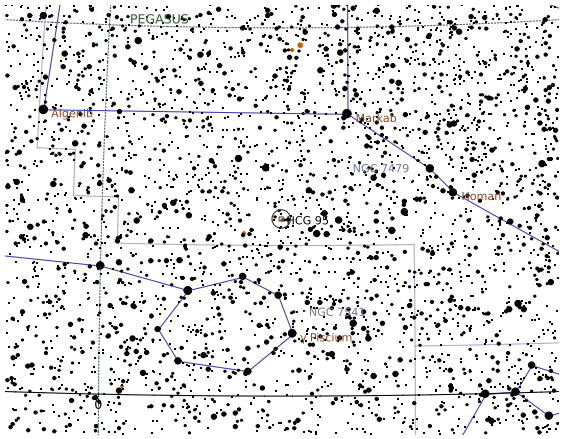
_____

HCG 95

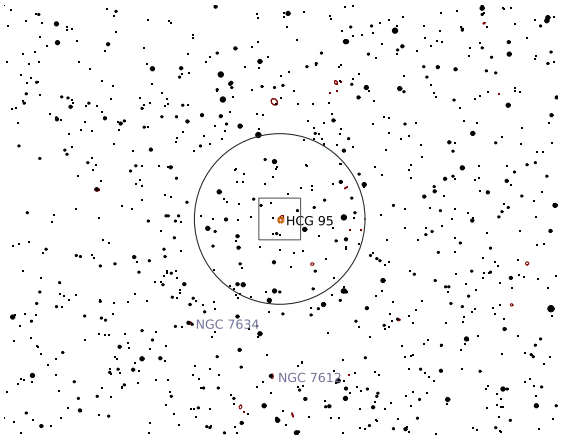
Galaxy Cluster in Pegasus

Right Ascension (current)	$23^h\,20^m\,12^s$	Declination (current)	$9°\,33'\,52''$
Right Ascension (J2000.0)	$23^h\,19^m\,31^s$	Declination (J2000.0)	$9°\,29'\,31''$
Size	$1.5' \times 1.5'$	Position Angle	0°
Magnitude	13	Other Designation	–

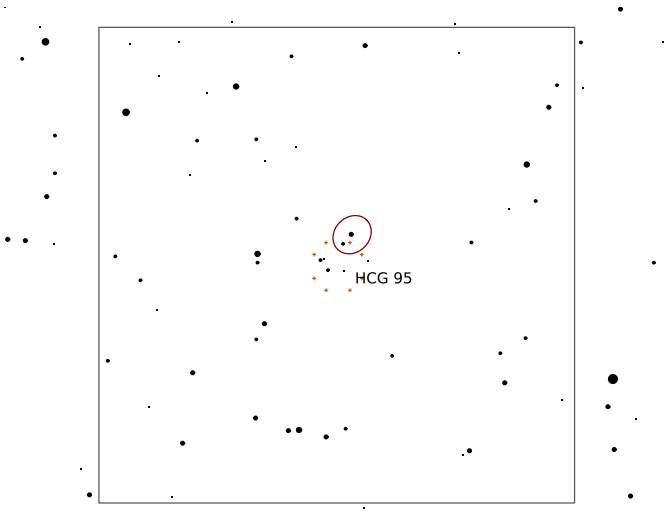
Description: z = 0.0396



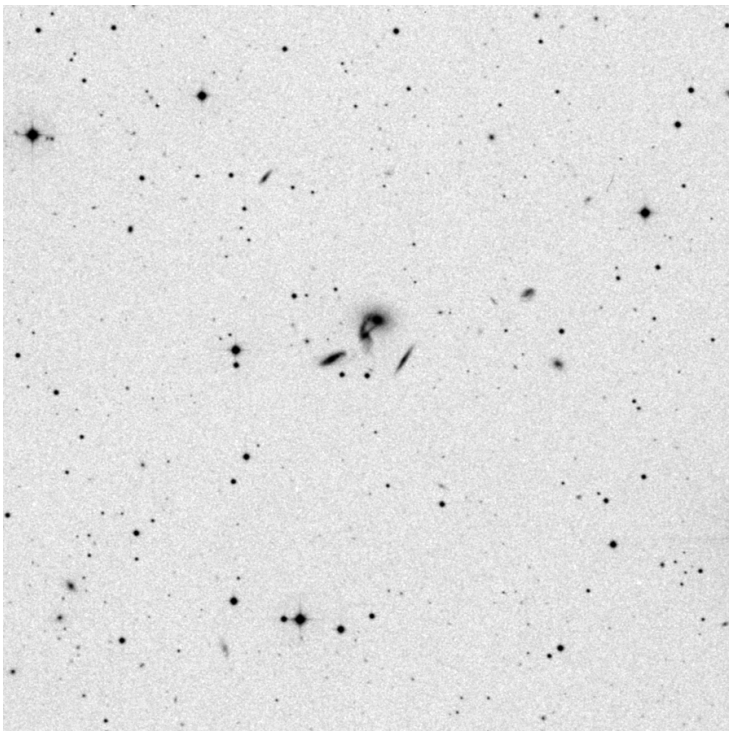
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

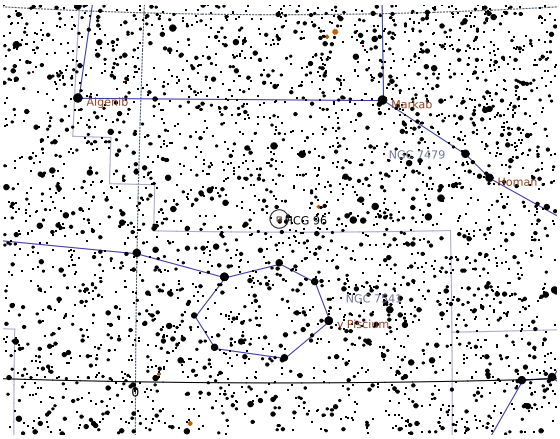
_____

HCG 96

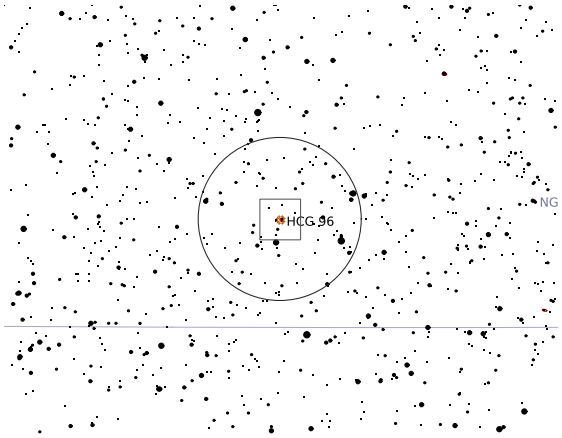
Galaxy Cluster in Pegasus

Right Ascension (current)	$23^h\,28^m\,39^s$	Declination (current)	$8°\,50'\,50''$
Right Ascension (J2000.0)	$23^h\,27^m\,58^s$	Declination (J2000.0)	$8°\,46'\,27''$
Size	$2.3' \times 2.3'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

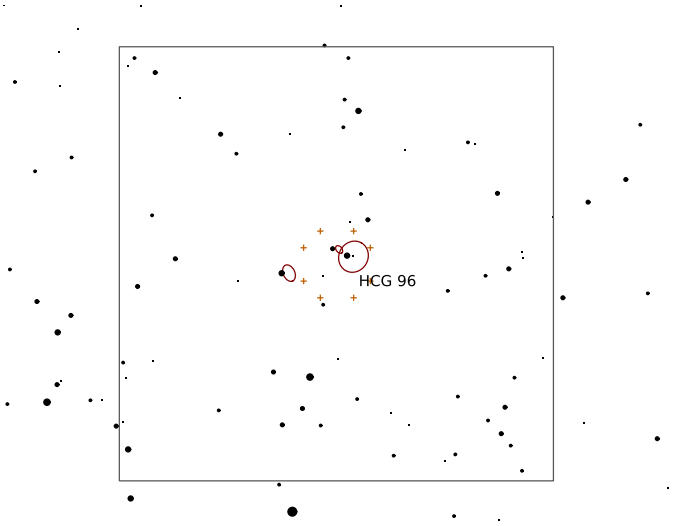
Description: z = 0.0292



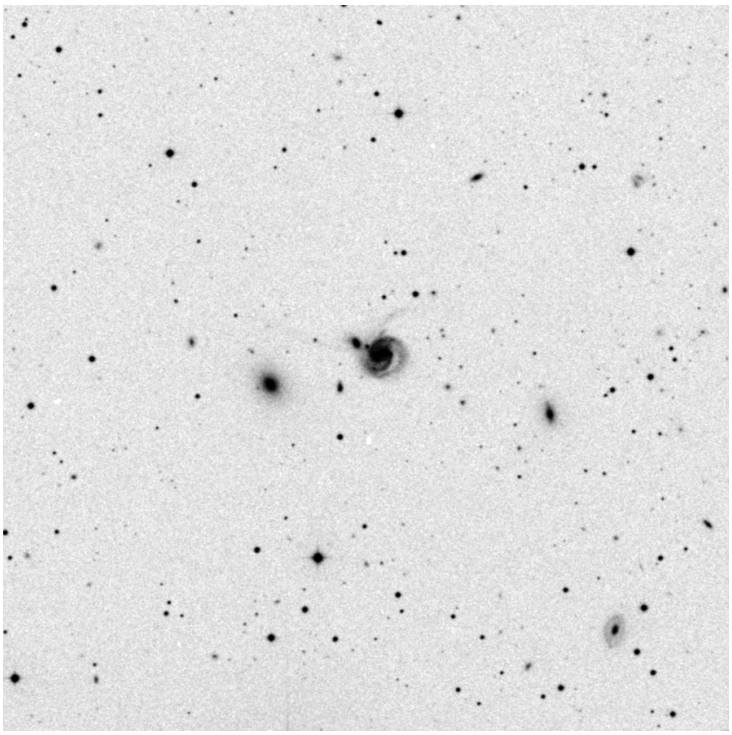
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

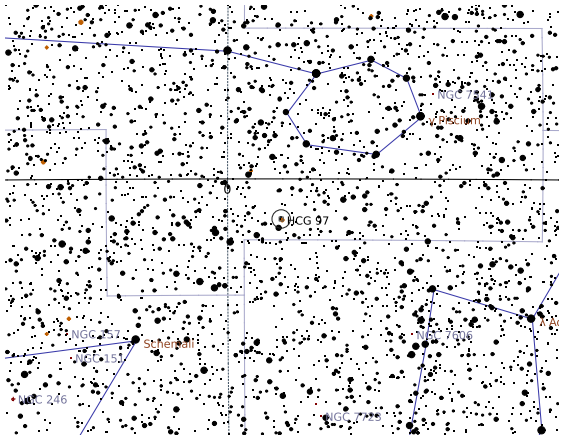
_____

HCG 97

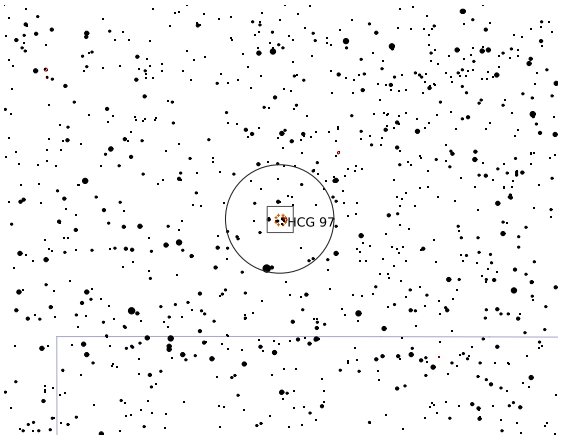
Galaxy Cluster in Pisces

Right Ascension (current)	$23^{h}\,48^{m}\,08^{s}$	Declination (current)	$-2°\,13'\,51''$
Right Ascension (J2000.0)	$23^{h}\,47^{m}\,26^{s}$	Declination (J2000.0)	$-2°\,18'\,20''$
Size	$5.2' \times 5.2'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

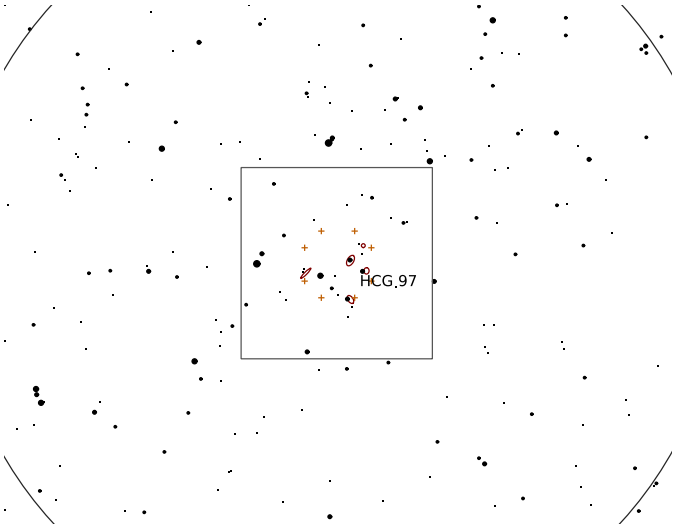
Description: z = 0.0218



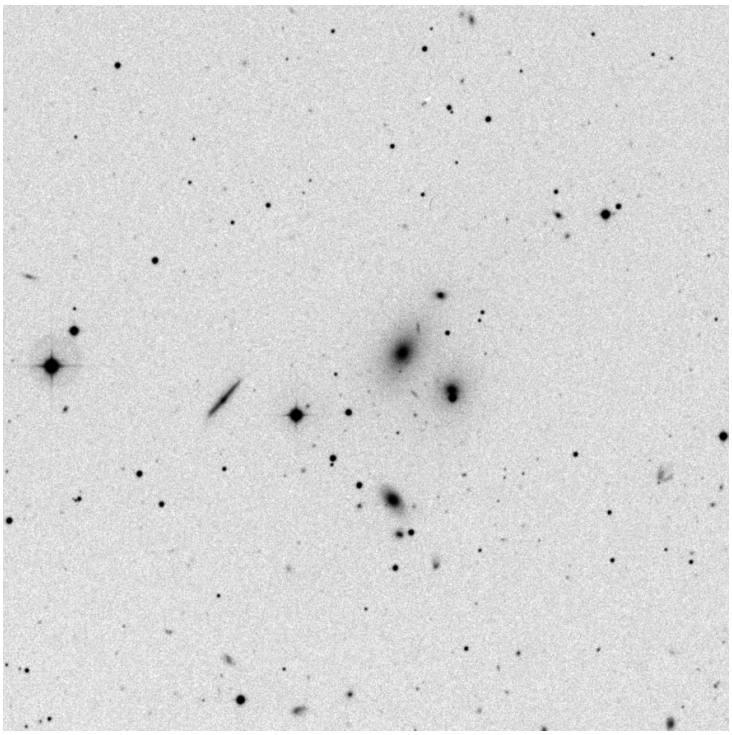
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

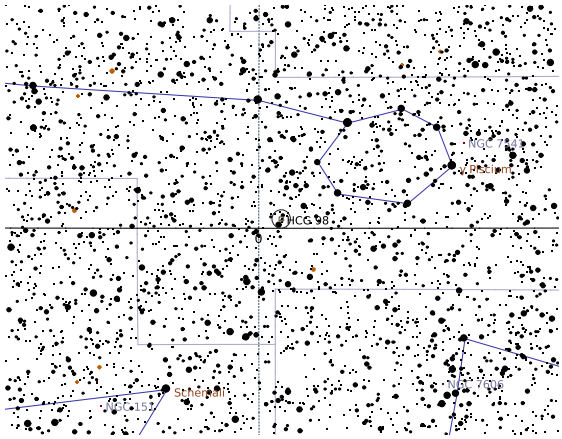
_____

HCG 98

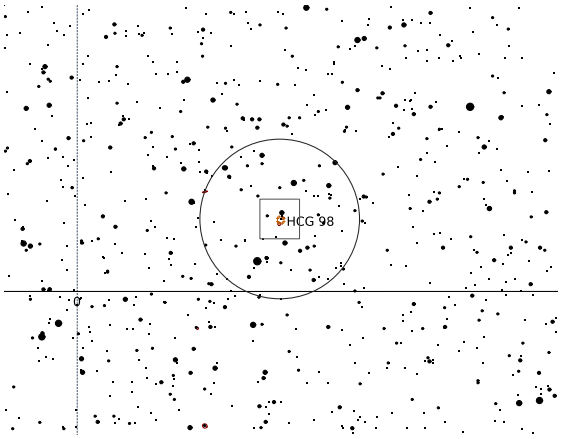
Galaxy Cluster in Pisces

Right Ascension (current)	$23^h\,54^m\,53^s$	Declination (current)	$0°\,26'\,51''$
Right Ascension (J2000.0)	$23^h\,54^m\,12^s$	Declination (J2000.0)	$0°\,22'\,24''$
Size	$2.4' \times 2.4'$	Position Angle	$0°$
Magnitude	12	Other Designation	–

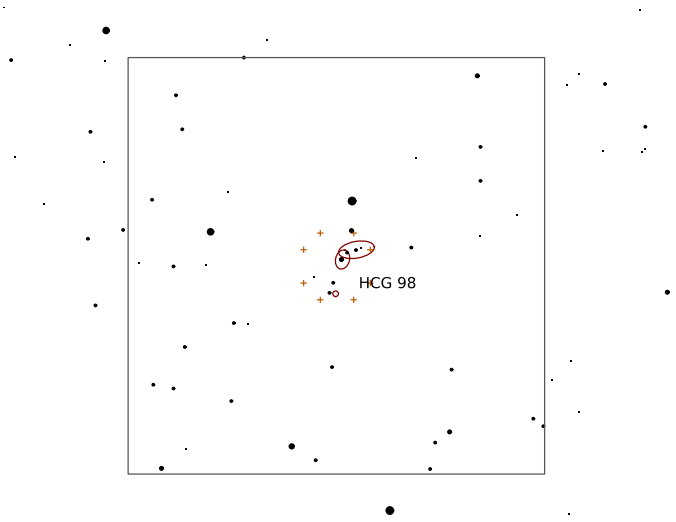
Description: z = 0.0266



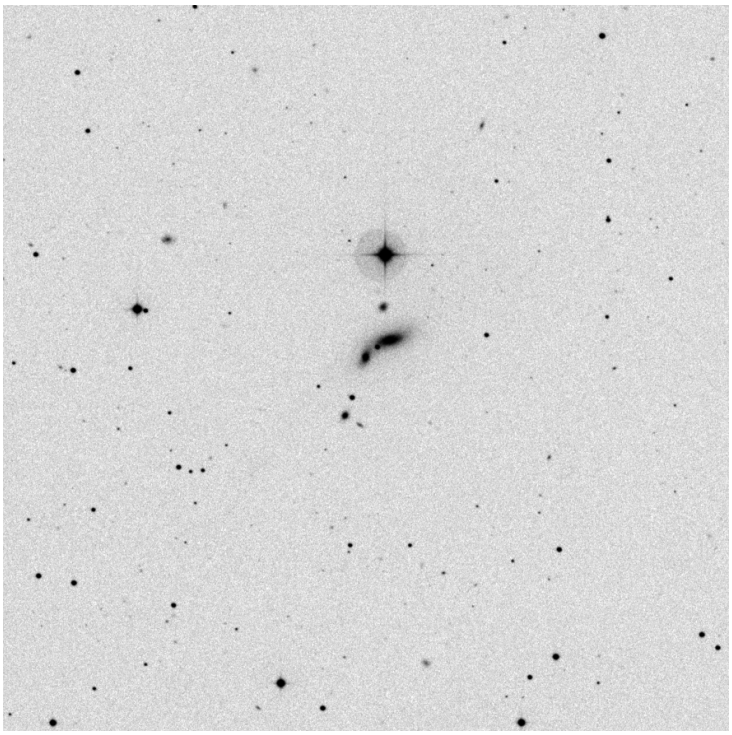
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Observation Location: _____

Sketch

FOV: _____

* Description: _____

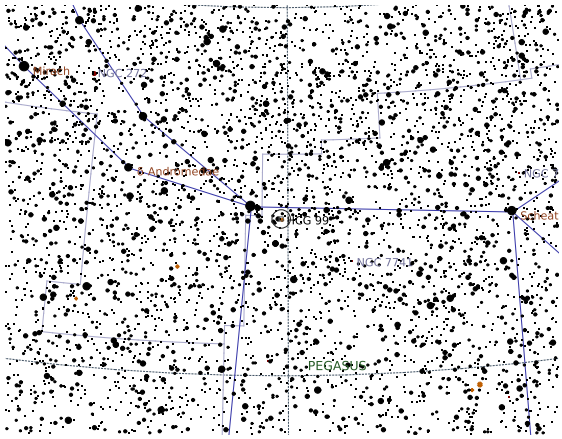
_____

HCG 99

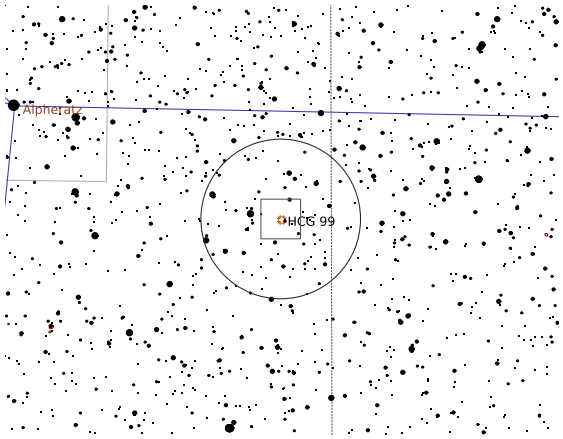
Galaxy Cluster in Pegasus

Right Ascension (current)	$00^h\,01^m\,24^s$	Declination (current)	$28°\,27'\,40''$
Right Ascension (J2000.0)	$00^h\,00^m\,43^s$	Declination (J2000.0)	$28°\,23'\,20''$
Size	$2.4' \times 2.4'$	Position Angle	$0°$
Magnitude	13	Other Designation	–

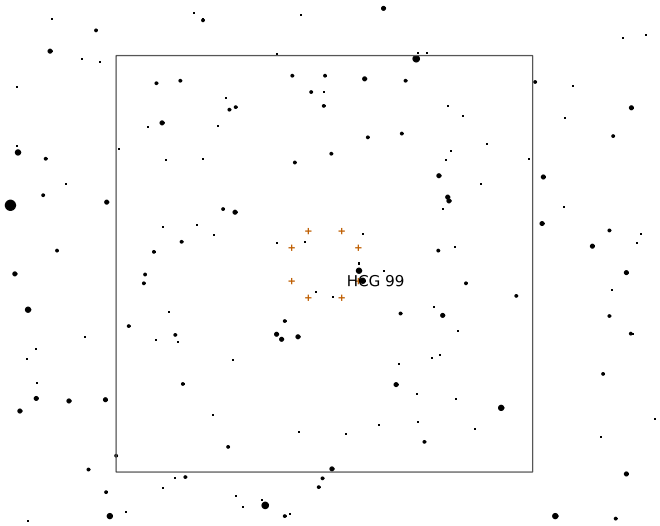
Description: z = 0.0290



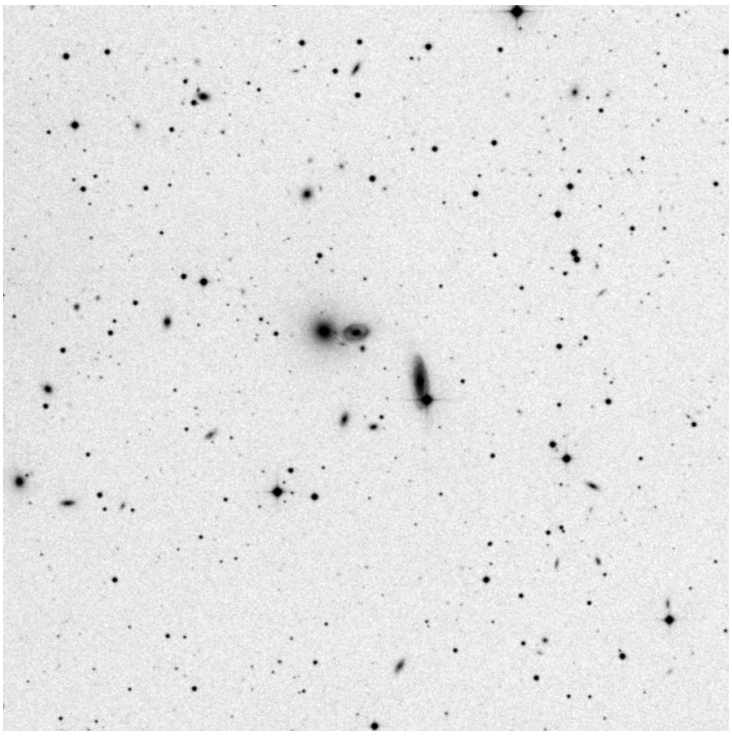
Wide-field chart



Intermediate chart



Zoomed-in chart



DSS Image ($15.0' \times 15.0'$)

* Date: _____

* Time: _____

* Aperture: _____

* Power: _____

Equipment Details: _____

_____

* Seeing: _____

Sketch

Observation Location: _____ FOV: _____

* Description: _____

_____

