# Texas Star Party
# Advanced Observing Program

# Years 2000 to 2006

List created by Larry Mitchell

Star charts compiled by Alvin Huey

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# Introduction

This is a quick compilation of all Texas Star Party Advanced Observing (AO) lists compiled by Larry Mitchell to encourage you to go out and challenge yourself to seek them out visually through the eyepiece.

As Larry said, please star hop to the object versus using a computer or a Goto system. You will learn the sky well if you do that. Use the upper left chart (or top chart) as the first step to point your telescope in the right place, then use the bottom chart with your finder scope or a low-power eyepiece to zero in on the object. The provided DSS image is typically 15' (or more for extended objects). Since this is a quick compilation, I didn't take the time to notate the actual field, but this gives you more than enough information to find the object.

Each "chapter" is a year, and each PDF contains six or seven years. The first volume is from 2000 to 2006, the second is from 2007 to 2012, and the third is from 2013 to 2018. The 2019 to 2021 Advanced Observing Lists are curated lists of the best of the best of 2000 to 2018 AO programs.

I should note several things in this *quick* compilation.

- Each year, the original TSP AO list by Larry is provided at the beginning of each chapter.
- Many of the objects in Larry's lists are in one or more of our observing guides, so I merely copied/pasted from them. So some charts may be inconsistent in formatting from page to page, but captures the essence of the object.
- I have included the **Urano 2** (Uranometrica 2000.0, the Second Edition) and the interstellarium Deep Sky Atlas (**iDSA**) page numbers. The object may not necessarily be plotted on the charts, but the page number references the part of the sky where the object is located.
- A few AO lists are entirely captured in one or more of our guides, so I included a chart with the page numbers of the corresponding guide. For example, the 2004 AO program is for globular clusters; the entire AO list is in the globular cluster guide. Same with 2010 super-thin galaxies.
- This compilation is only available as a PDF.

# ADVANCED OBSERVING: RINGS OVER T.S.P. 2000

## *(Observe at least 25 objects – Your Choice)*

***NEBULA:***

| Name | | Location 2000 | Const. | *Class | Size | Mag. | Cent Star | Uran. |
|---|---|---|---|---|---|---|---|---|
| NGC2610 | Pk239+13.1 | 08 33 23 - 16 08 57 | Hya | 4 + 2 | 58.0" | 13.6(p) | 15.9 | U276 |
| Shapley I | Pk329+2.1 | 15 51 41 – 51 31 23 | Nor | 4 | 72.0" | 13.6(p) | 14.0 | U432 |
| NGC6337 | The "Cheerio" | 17 22 17 – 38 29 01 | Sco | 4 | 51.0" | 11.9(p) | 14.9 | U376 |
| NGC6369 | He 2-232 | 17 29 20 – 23 45 35 | Oph | 4 + 2 | 38.0" | 12.9(p) | 15.6 | U388 |
| Minkowski 1-64 | PK64+15.1 | 18 50 02 + 35 14 37 | Lyr | 4 | 36.2" | 12.8(p) | | U117 |
| M57 – Central Star | | 18 53 56 + 33 01 48 | Lyr | 4 | 71.0" | 9.7(p) | 14.7 | U117 |
| Abell 50 | NGC6742 | 18 59 29 + 48 27 57 | Dra | 2c | 36" | 15.0(p) | 20.0 | U83 |
| Abell 53 | Pk40-0.1 | 19 06 46 + 06 23 53 | Aql | 4 | 31.0" | 16.9(p) | 20.9 | U206 |
| MCG-2-50-3 | In NGC6822 | 19 44 34 – 14 42 21 | Sgr | | 1.1 x 1.0" | 14.2 | | U297 |
| Abell 69 | Pk76+1.1 | 20 19 57 + 38 24 06 | Cyg | 4 | 42.0" | 20.1(p)? | 21.0 | U119 |
| Abell 70 | Pk38-25.1 | 20 31 33 – 07 05 16 | Aql | 4 | 43.0" | 14.3(p) | 18.4 | U299 |

**Class: 2 = Smooth Disk, 3 = Irregular disk/traces of ring structure, 4 = Ring Structure*

***RING GALAXIES:***

| Name | | Location 2000 | Const. | Class | Size | Mag. | R.V. | *Dist. | Uran. |
|---|---|---|---|---|---|---|---|---|---|
| II Hz 4 | | 08 58 34 + 37 05 10 | Lyn | Ring | 0.6 x 0.5' | 15.8 | +12878 | 599.7 | U103 |
| NGC2793 | UGC4894 | 09 16 46 + 34 25 54 | Lyn | Sb | 1.2 x 1.1' | 13.6(p) | +1677 | 78.1 | U103 |
| "Vela Ring" | AM1006-380 | 10 09 05 – 38 24 34 | Ant | Rop | 1.2 x 1.1' | 13.4(p) | +4845 | 69.2 | U365 |
| MCG-6-23-8 | ESO 316-44 | 10 11 02 – 39 41 37 | Ant | Rop | 1.2 x 0.8' | 14.0(p) | | | U365 |
| VV 330A | UGC5609 | 10 24 25 + 78 36 36 | Dra | S? | 1.2x 0.7' | 14.4(p) | +2729 | 127.1 | U8 |
| MAC 1135-3302 | | 11 35 21 – 33 02 04 | Hya | Ring | 0.9 x 0.5' | 15.0 | | | U367 |
| AM 1135-284 | | 11 37 42 – 29 05 01 | Hya | Ring | 0.5 x 0.4' | 16.5(p) | | | U367 |
| VII Zw 466 | | 12 32 05 + 66 24 14 | Lyn | Ring | 0.5 x 0.4' | 15.8(p) | +14490 | 674.8 | U25 |
| Double | AM1358-221 | 14 01 08 – 22 33 34 | Vir | Ring | 1.1 x 0.8' | 15.8 | +10940 | 509.5 | U331 |
| | MCG-4-33-27 | 14 01 26 – 22 34 19 | Vir | Ring | 0.8 x 0.4' | 15.2(p) | | | U331 |

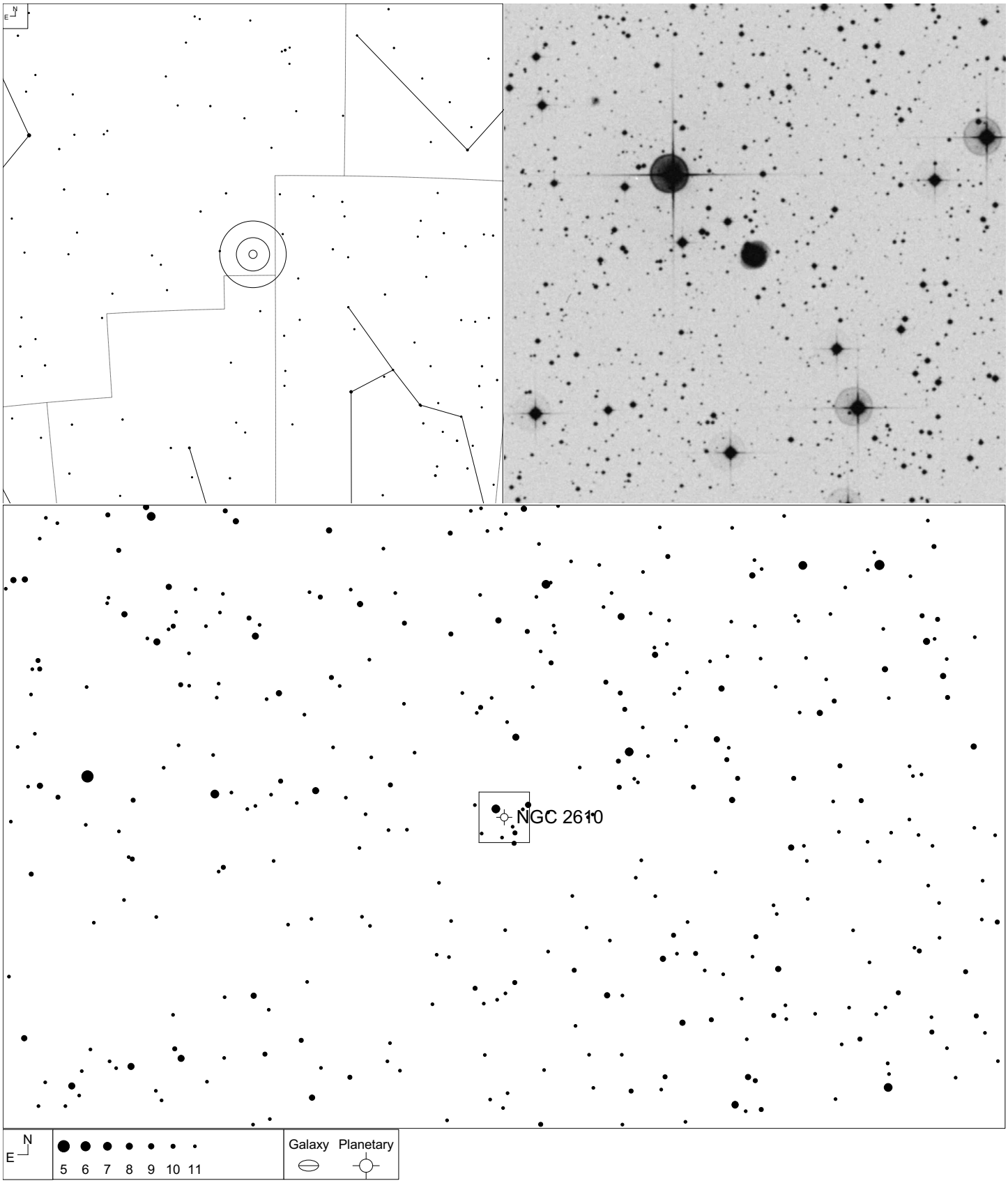
***POLAR RING GALAXIES:***

| Name: | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| "Helix Galaxy" | NGC2685 | 08 55 35 + 58 44 02 | Uma | Pec. | 4.5 x 2.4' | 11.4(v) | +869 | 40.5 | U44 |
| ESO 500 – 41 | | 10 26 56 - 24 05 20 | Hya | RSAR | 1.0 x 0.6' | 14.3(p) | | | U325 |
| Arp 87 | NGC3808 | 10 40 45 + 22 26 48 | Leo | Dbl | 0.9 x 0.6' | 12.5 | +7189 | 334.8 | U147 |
| Mayall's Object | Arp 148 | 11 03 54 + 40 51 00 | Uma | Ring | 0.8 x 0.4' | 15.4(p) | +10357 | 482.3 | U73 |
| NGC3861 | in Abell 1367 | 11 45 04 + 19 58 26 | Leo | Sb | 2.4 x 1.2' | 13.5(b) | +5068 | 236.0 | U147 |
| NGC4650A | | 12 44 49 – 40 42 52 | Cen | S.OP | 2.0 x 0.7' | 13.9(b) | +2837 | 132.1 | U402 |
| Arp 193 | IC883 | 13 20 36 + 34 08 10 | Cvn | Pec. | 1.6 x 1.6' | 14.4(p) | +6892 | 321.0 | U109 |
| NGC5122 | | 13 24 15 – 10 39 15 | Vir | S | 2.4 x 0.8' | 14.6 | +2939 | 136.9 | U285 |
| NGC5544 / NGC5545 | | 14 17 03 + 36 35 17 | Boo | Sa/Sbc | 1.0 x 1.0' | 14.2 | +3121 | 145.3 | U110 |
| "Hoag's Object | A1515+2146 | 15 17 14 + 21 35 08 | Ser | | 1.0 x 0.9' | 15.0(b) | +12740 | 593.3 | U154 |
| I Zw 133 | NGC6028 | 16 01 29 + 19 21 34 | Her | SO | 1.3 x 1.1' | 14.4(b) | +448 | 20.9 | U155 |

**Distance: $H_o$ = 70 Km $s^{-1}$ Mpc / Listed $10^6$ light years*

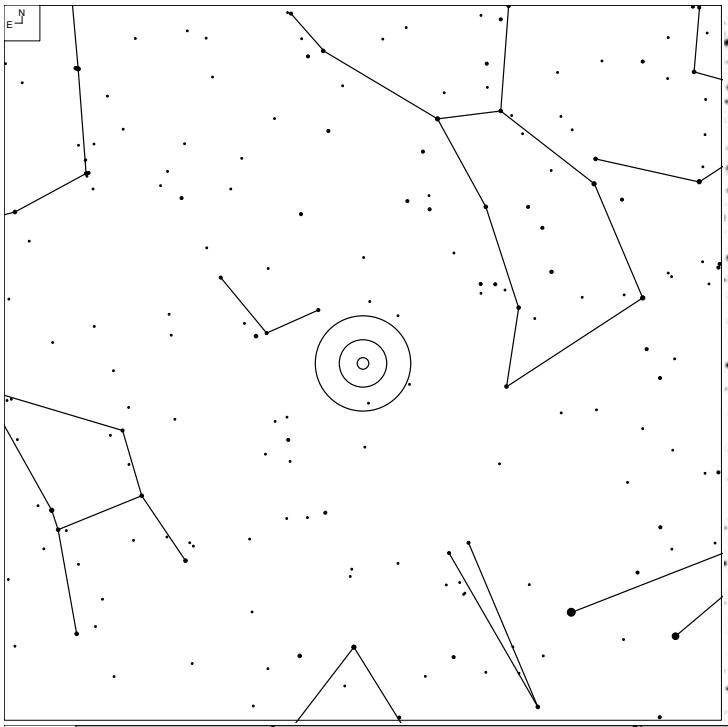
**Good Luck !** ★☆◇✻✸✶✹○✷ **Larry Mitchell – H.A.S. , F.B.A.C.**

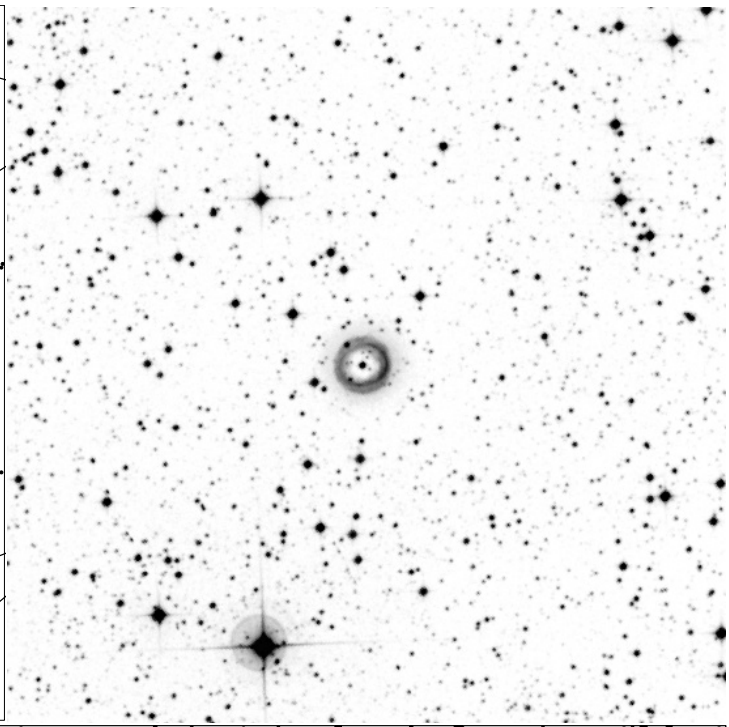
# NGC 2610 (Hydra)

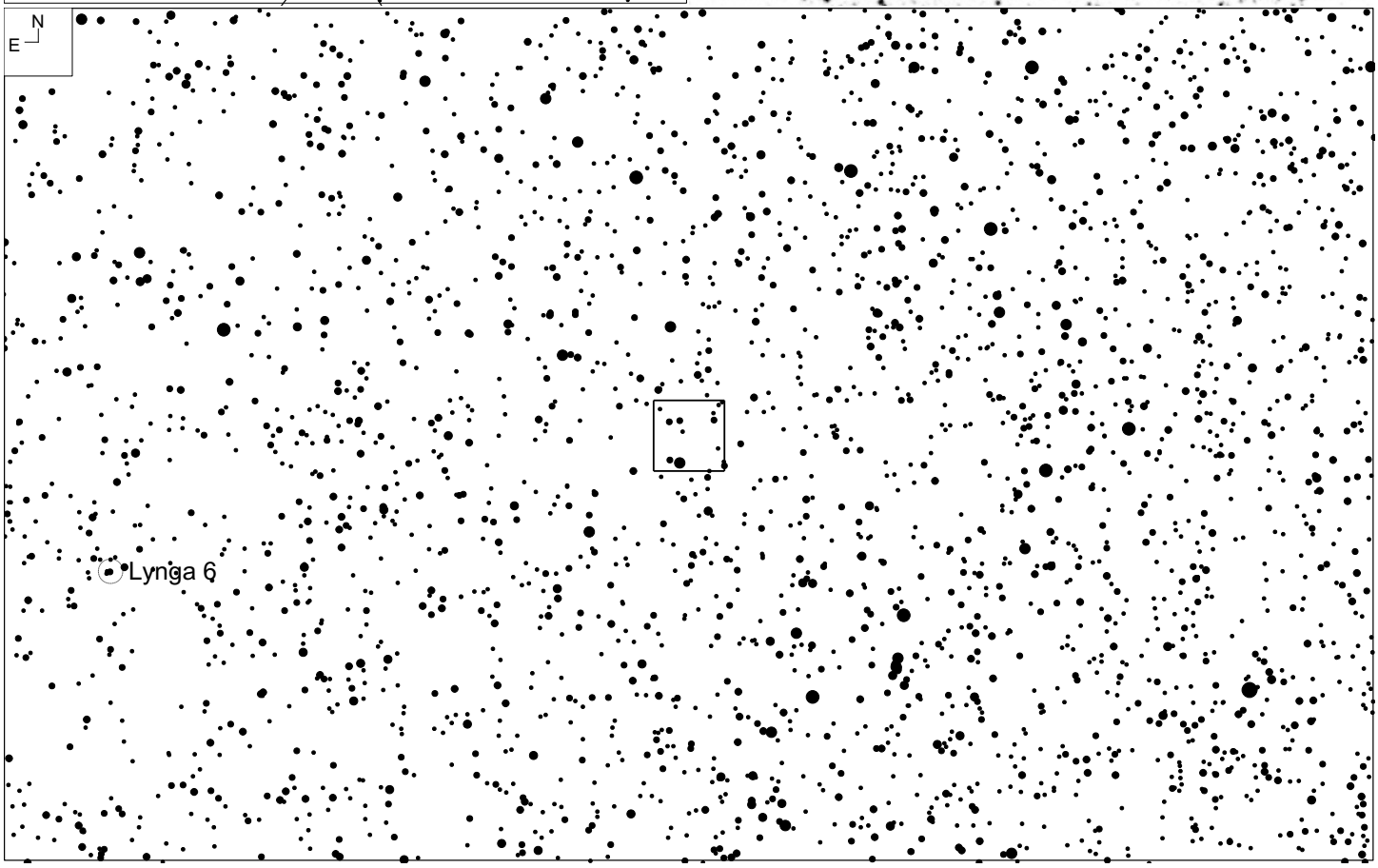



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 239+13.1 | 4+2 | 08 33 23.4 | -16 08 58 | 12.7v | 15.9 | 58” | 134 | 71 |

# Shapley 1 (Norma)

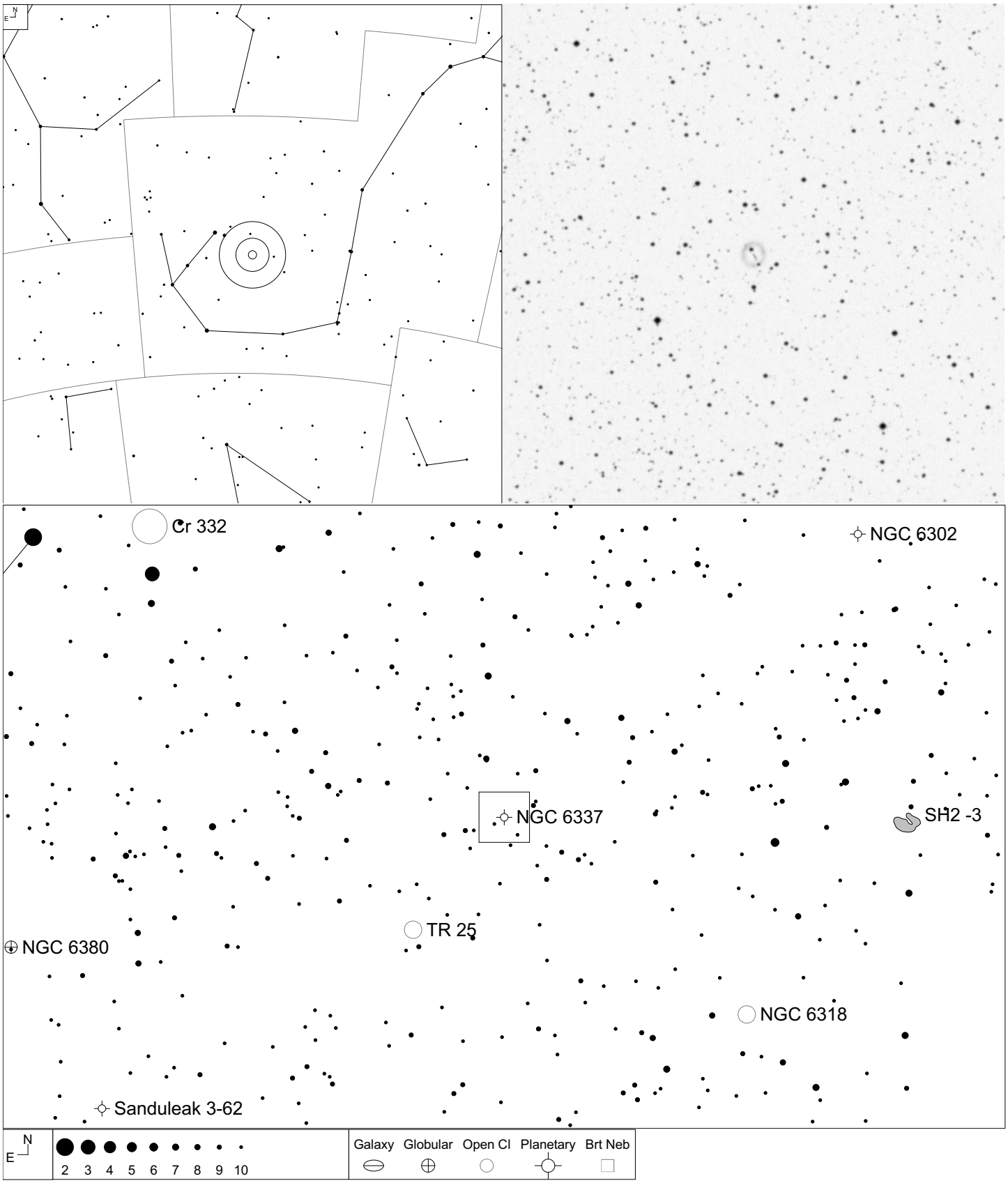






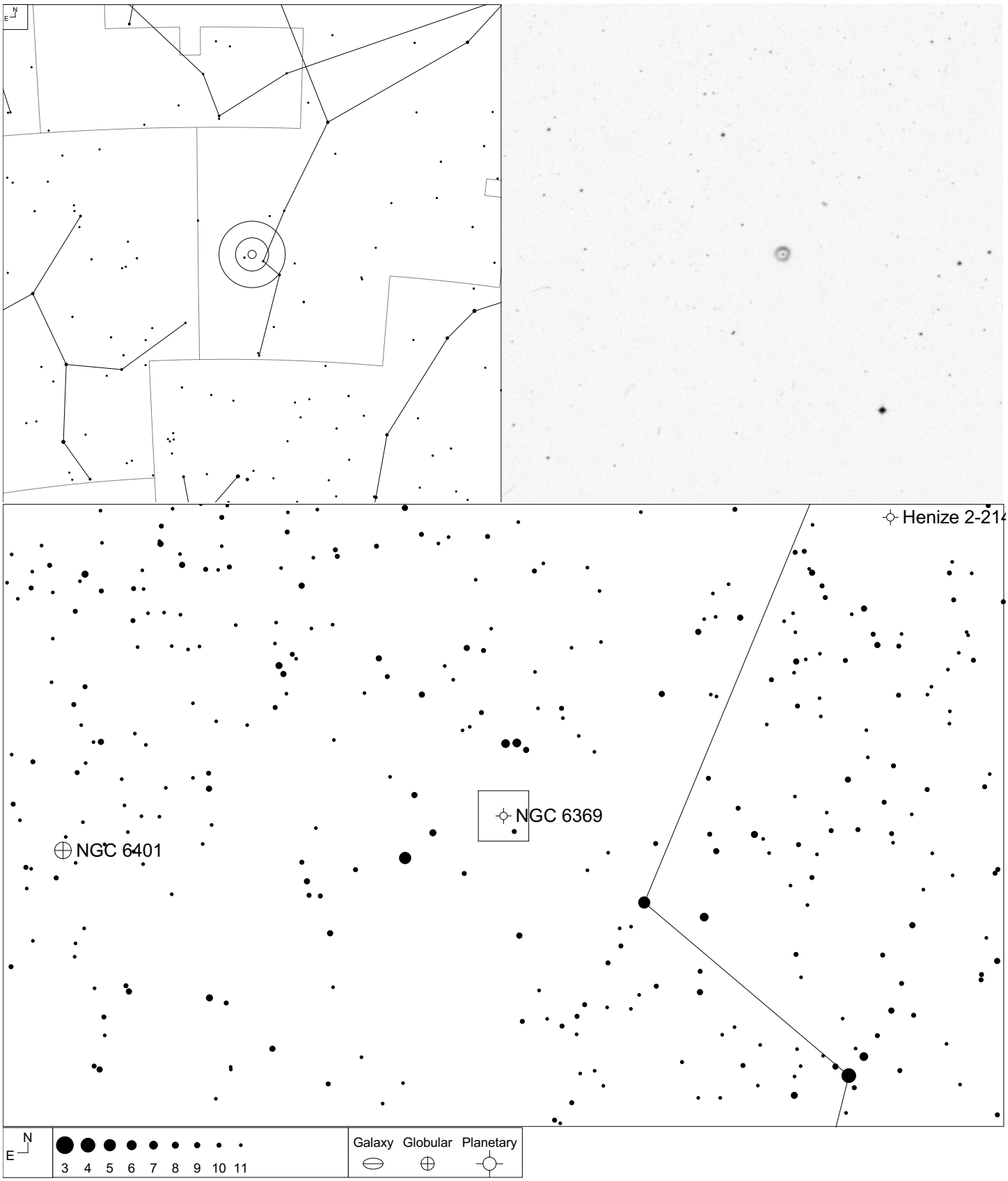

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 329+2.1 | 4 | 15 51 41 | -51 31 23 | 13.6p | 14.0 | 72” | 196 | 92 |

# NGC 6337 (Scorpius)



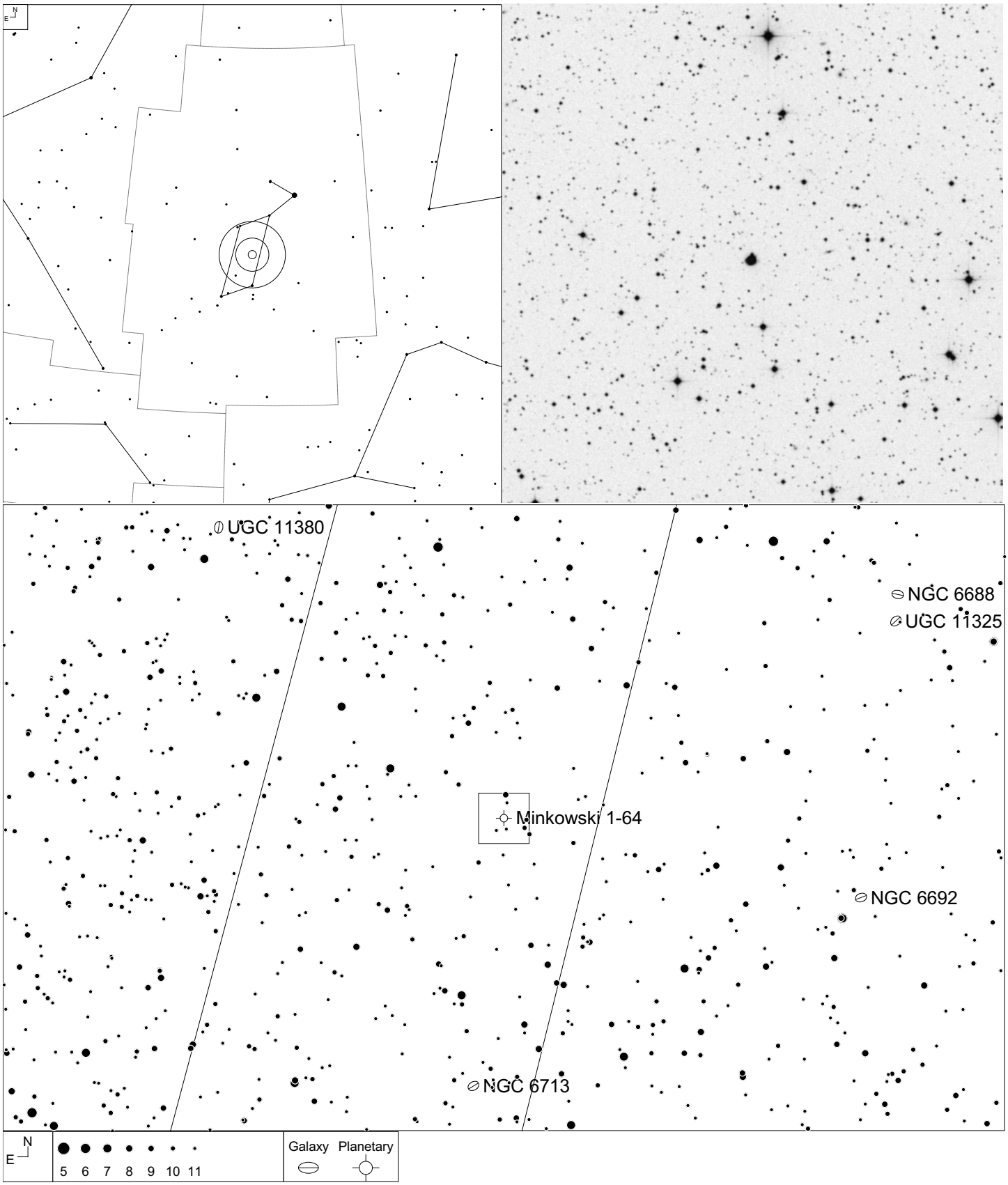

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 349-1.1 | 4 | 17 22 15.6 | -38 29 02 | 12.3v | 14.9 | 51” | 164 | 91 |

# NGC 6369 (Ophiuchus)



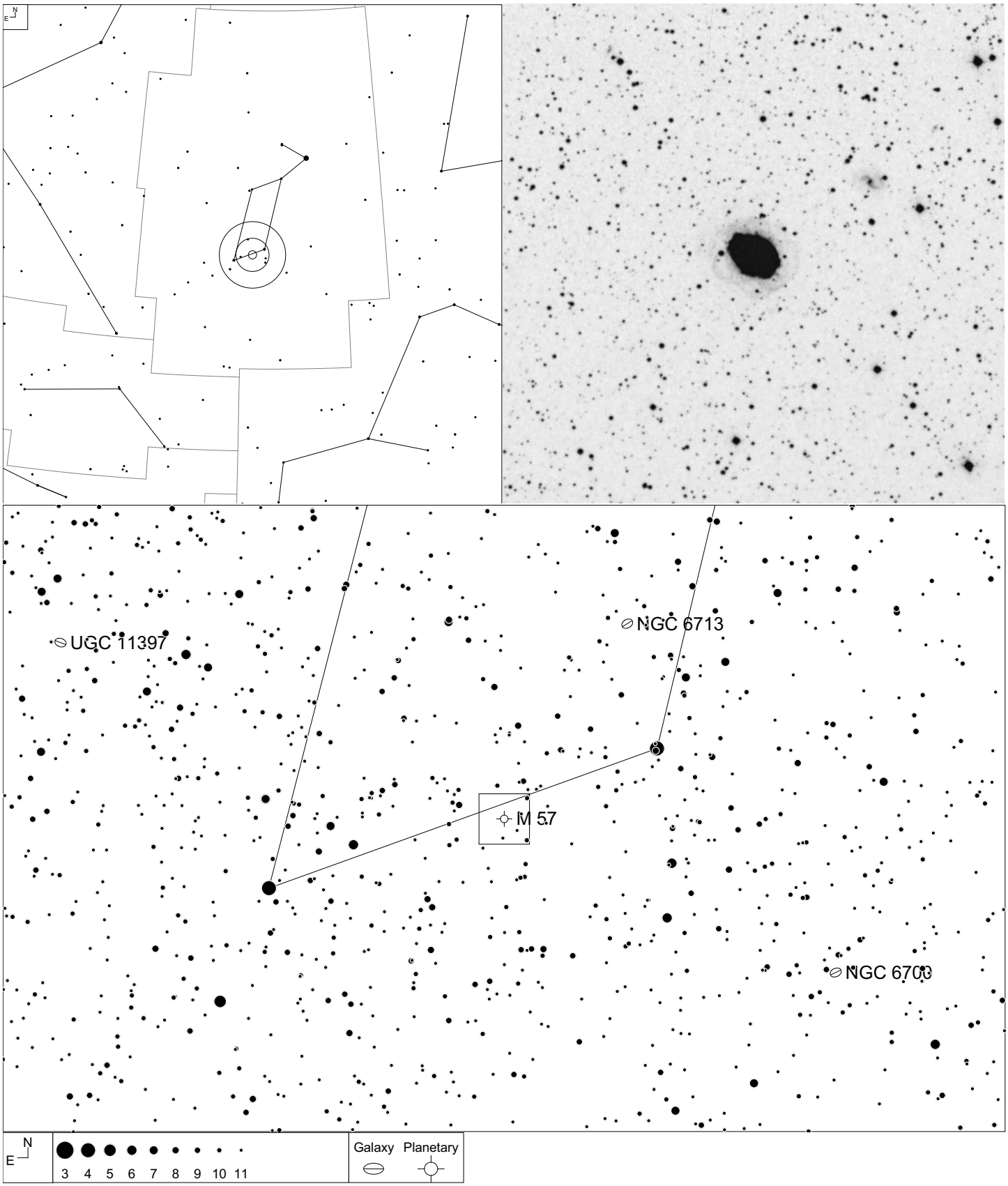

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 2+5.1 | 4+2 | 17 29 20.5 | -23 45 34 | 11.4v | 15.9 | 38” | 146 | 79 |

# Minkowski 1-64 (Lyra)



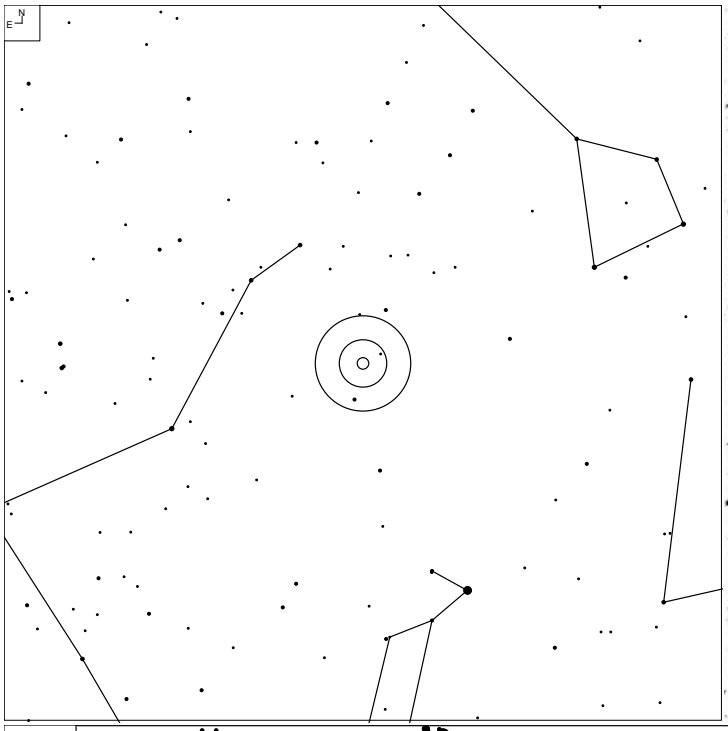

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 64+15.1 | 4 | 18 50 02.3 | +35 14 33 | 13.3v | - | 24” | 49 | 30 |

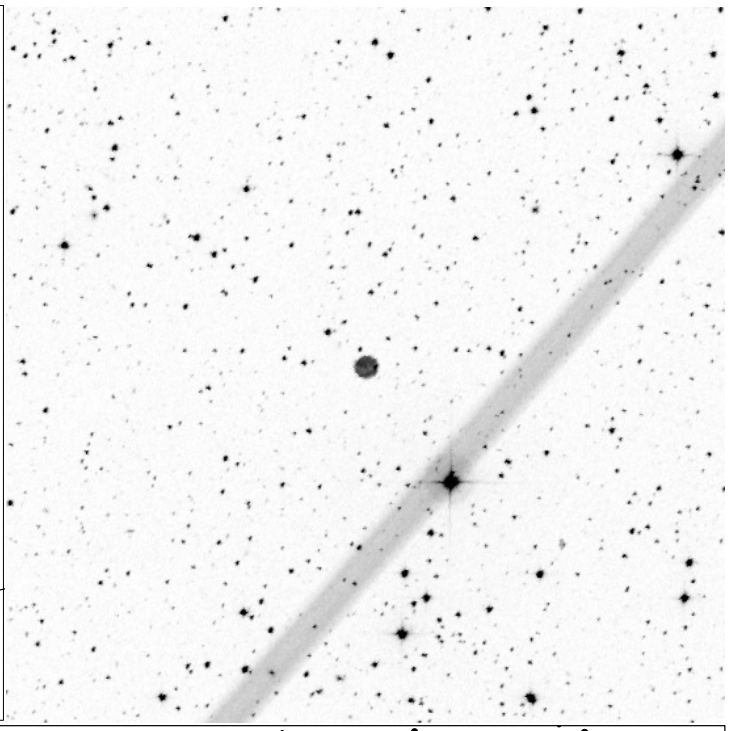
# M57 (Lyra)

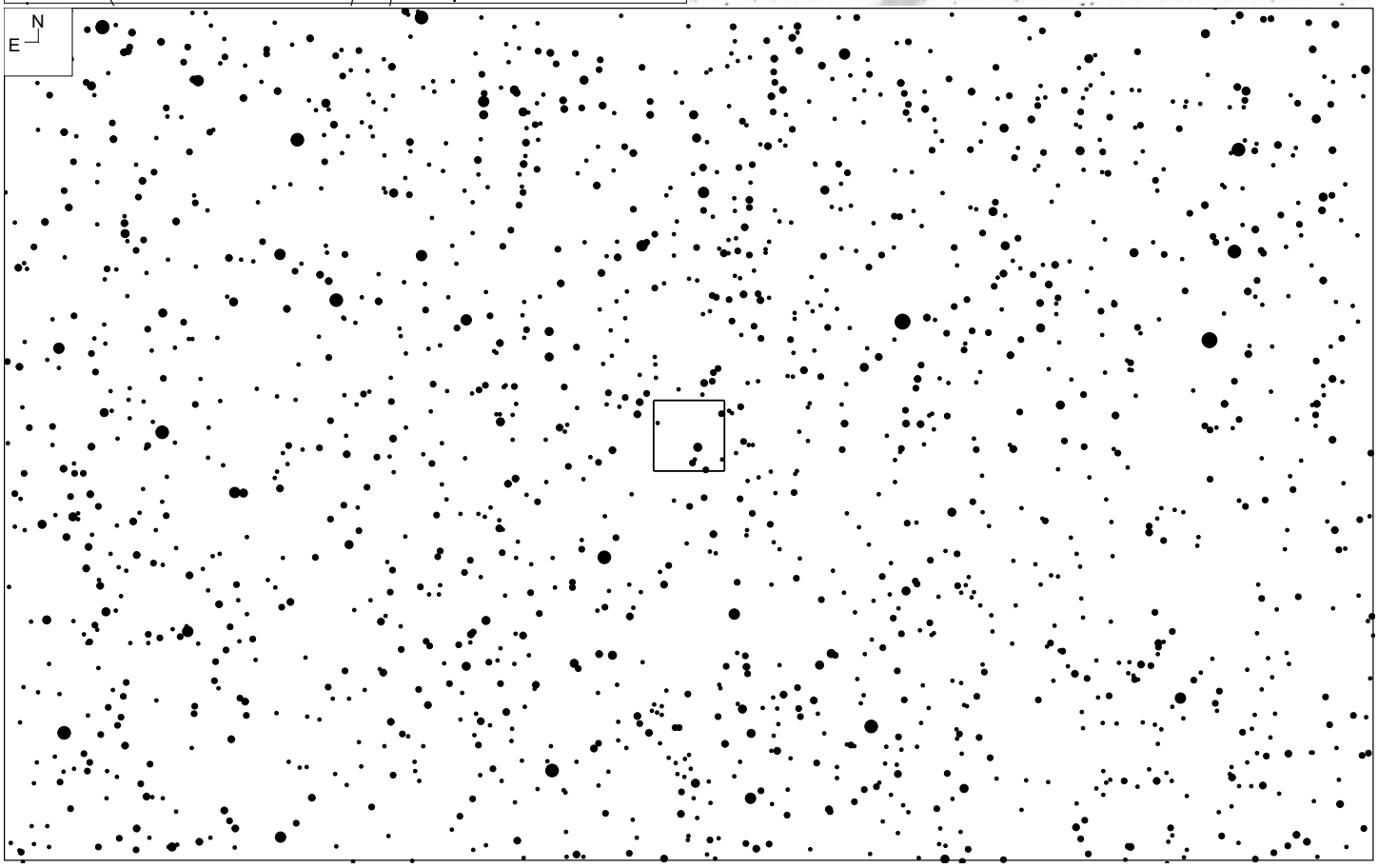



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 63+13.1 | 4+3 | 18 53 35.2 | +33 01 44 | 8.8v | 14.7 | 1.8 x 1.4’ | 49 | 30 |

# Abell 50 (Draco)

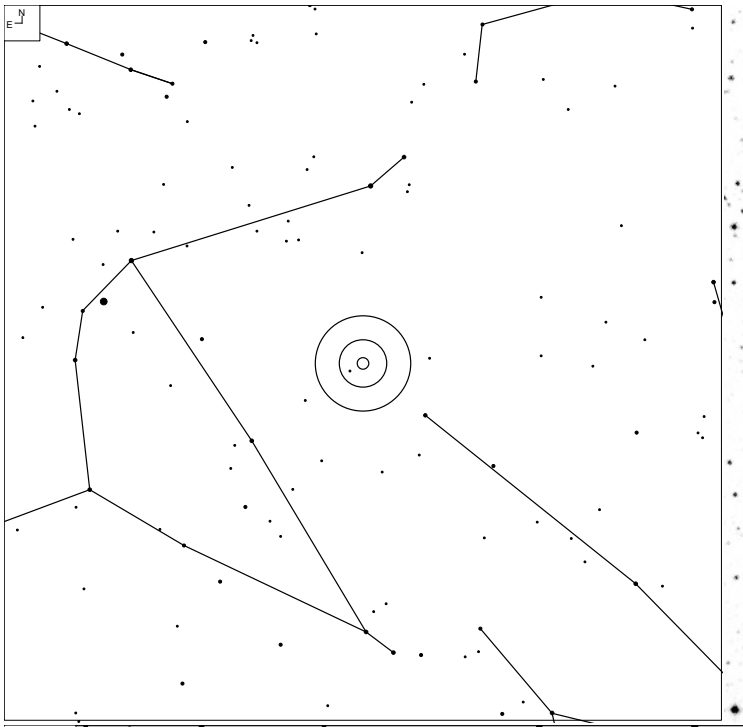


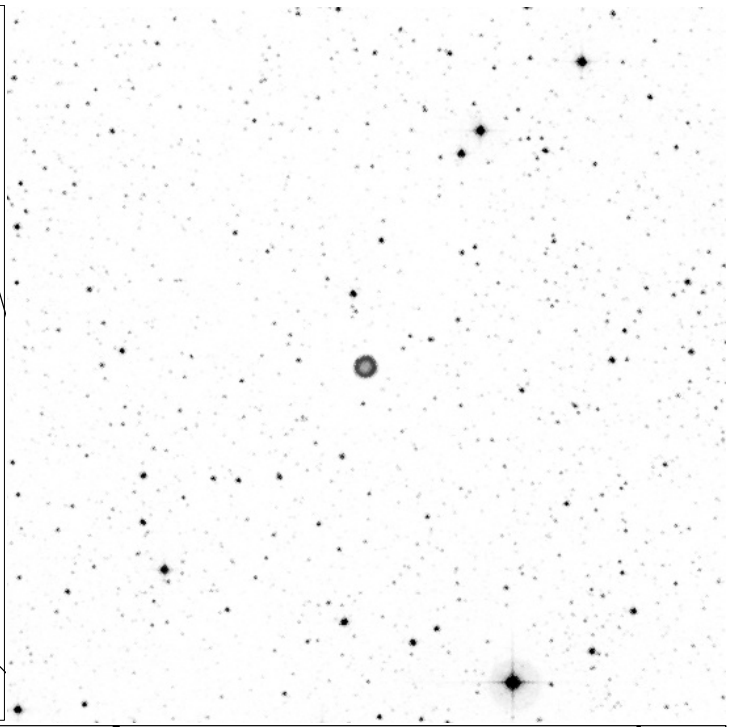


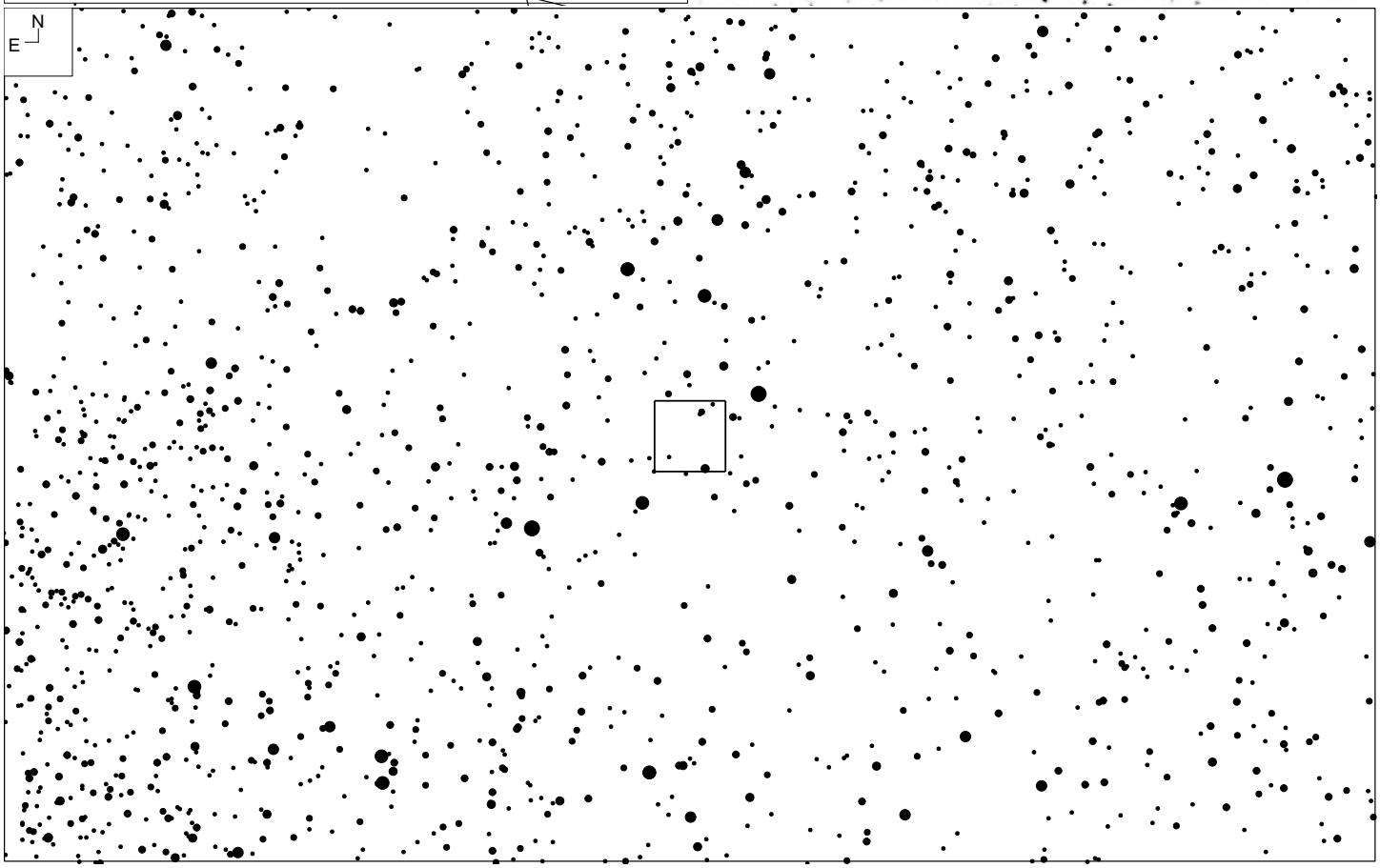



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| NGC 6742 | 2c | 18 59 29 | +48 27 57 | 15.0p | 20.0 | 36” | 33 | 18 |

# Abell 53 (Aquila)

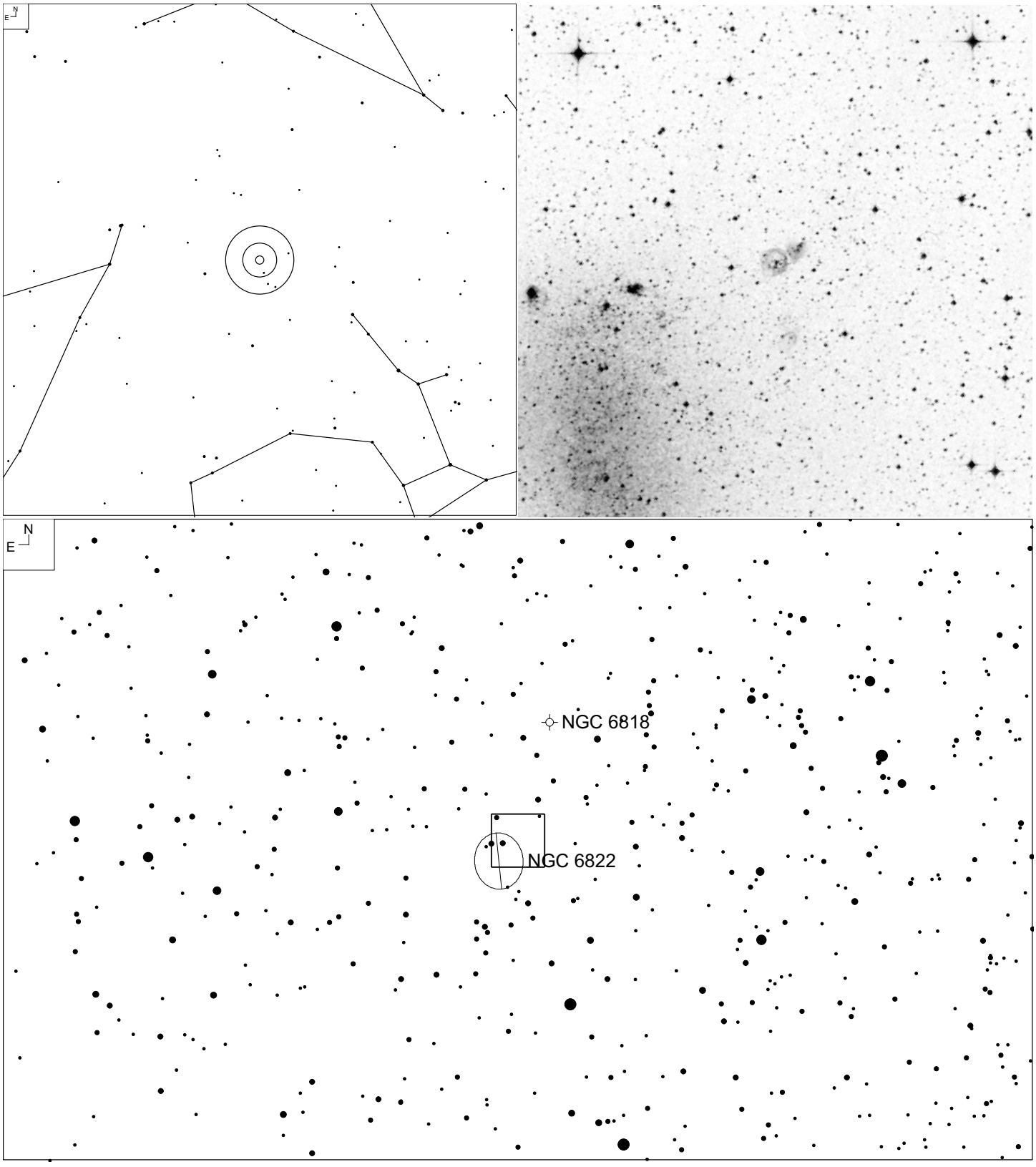






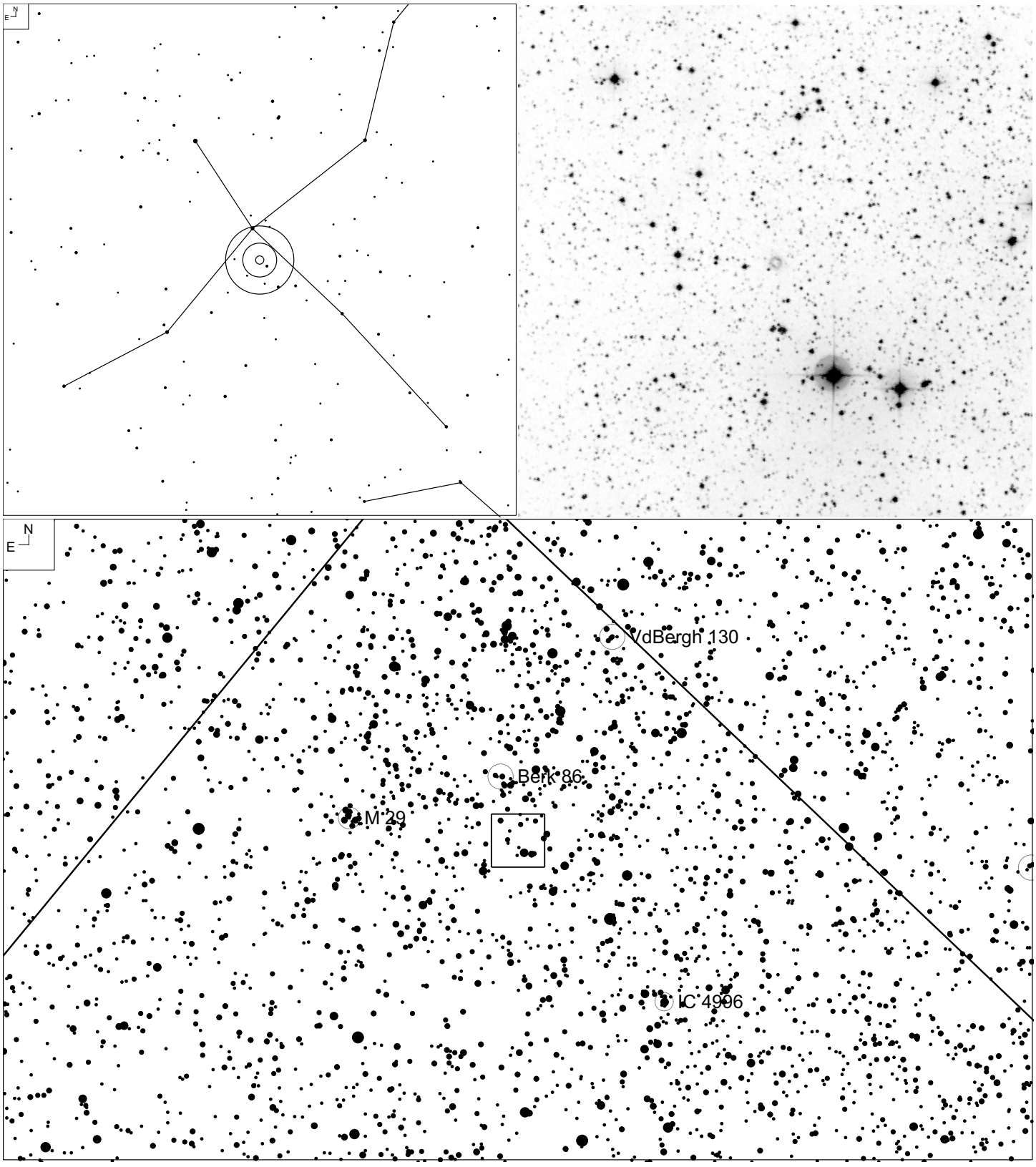

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 40-0.1 | 4 | 19 06 46 | +06 23 53 | 16.9p | 20.9 | 31” | 85 | 54 |

# MCG-2-50-3 (Sagittarius)



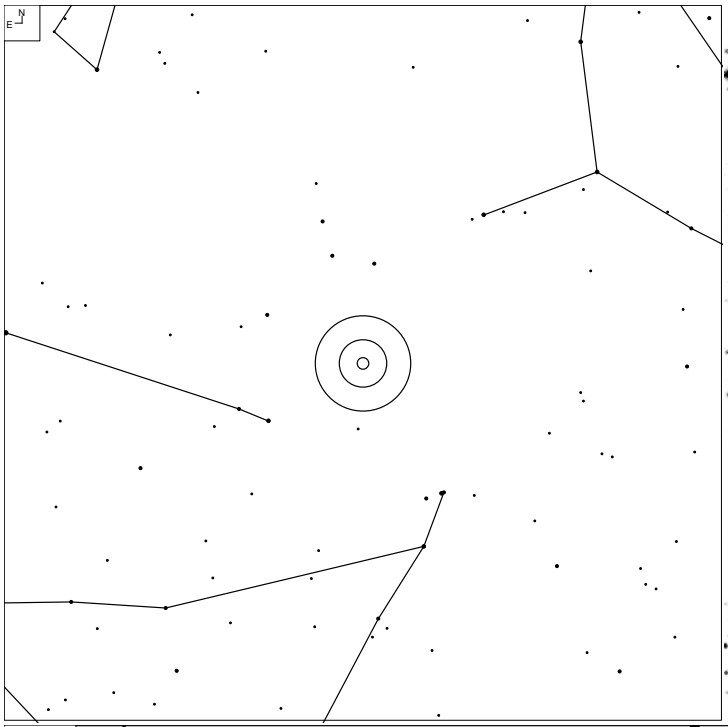

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Hubble III | | 19 44 34 | -14 42 21 | 14.2 | - | 1.1x1.0’ | 125 | 66 |

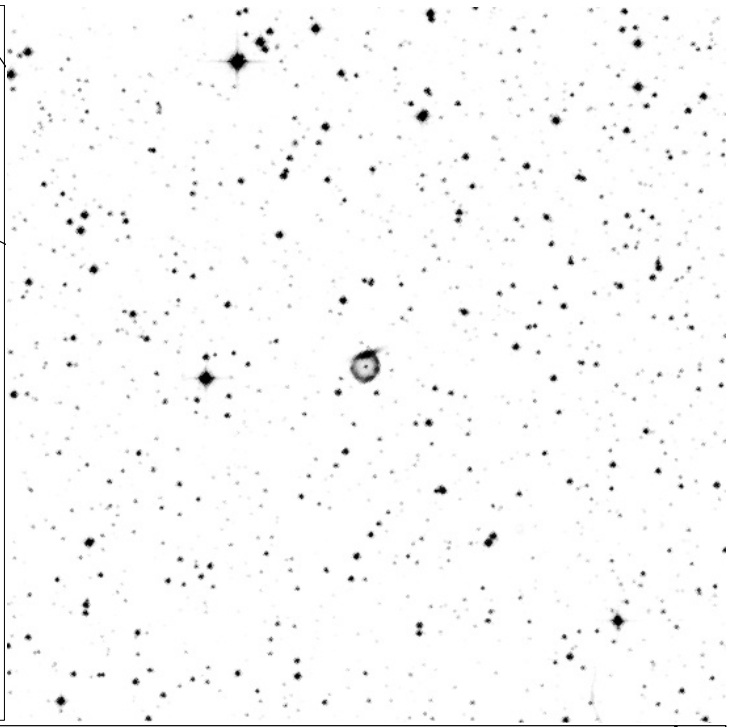
# Abell 69 (Cygnus)

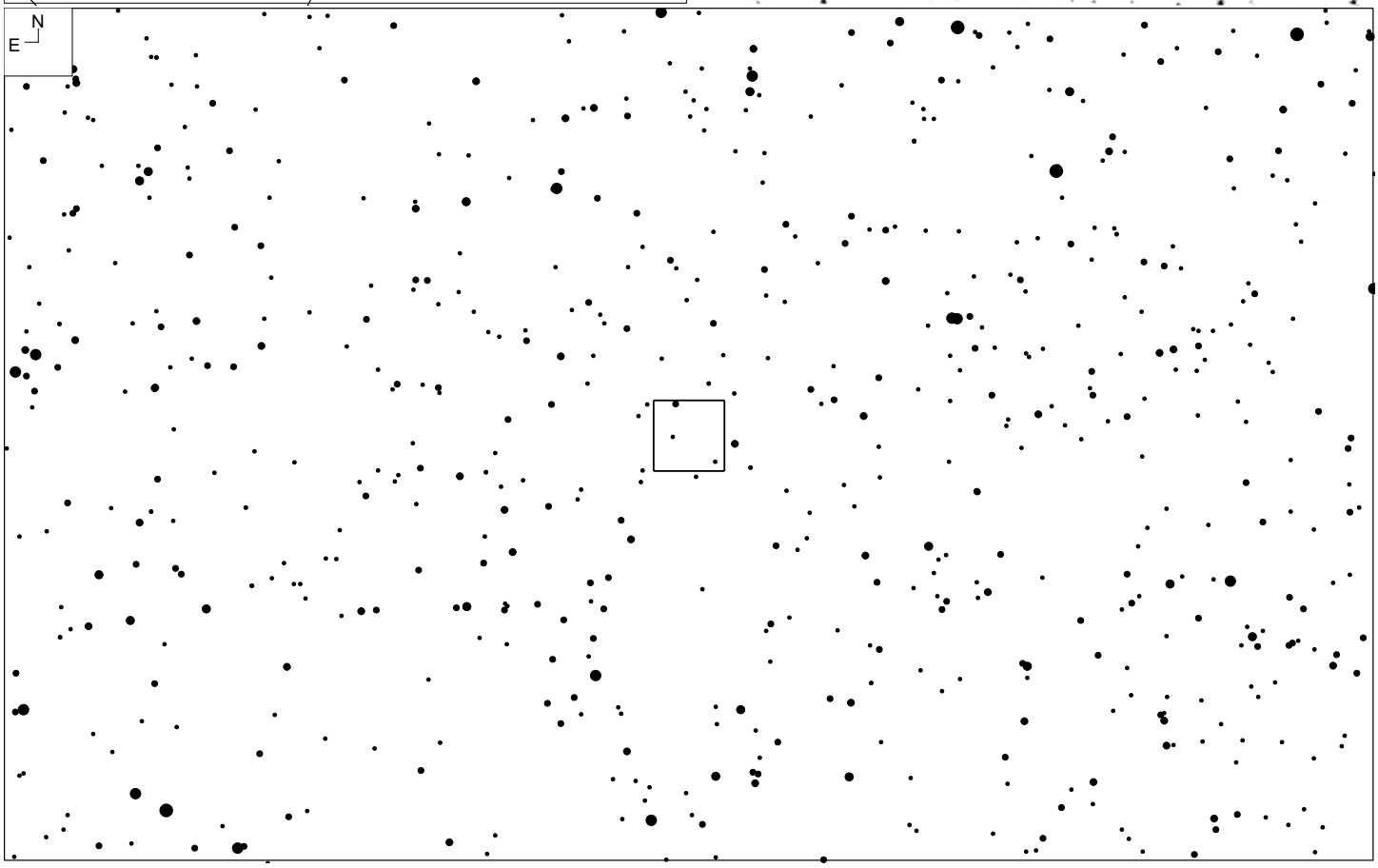



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 76+1.1 | | 20 19 57 | +38 24 06 | 20.1p? | 21.0 | 42” | 48 | 17 |

# Abell 70 (Aquila)

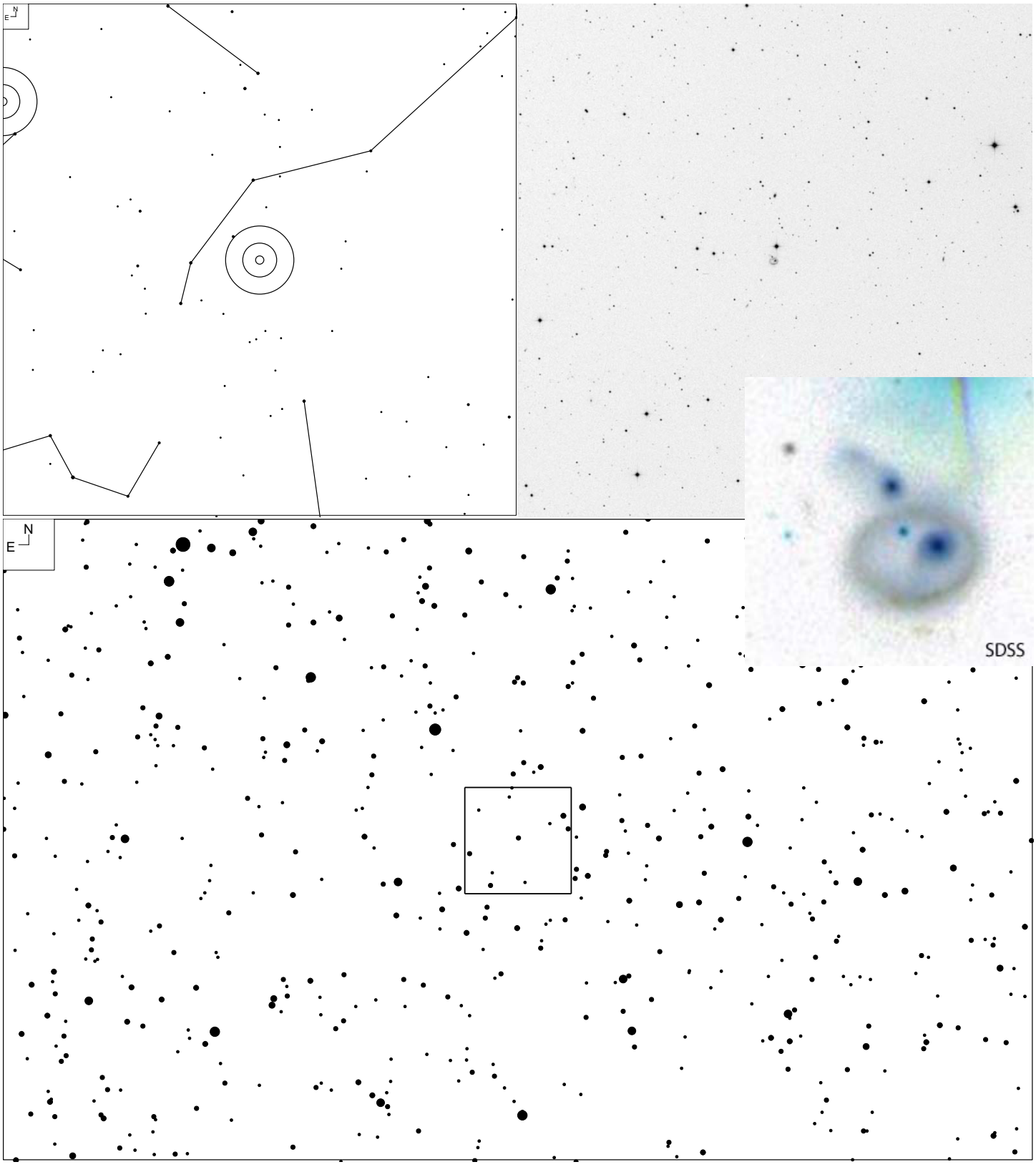






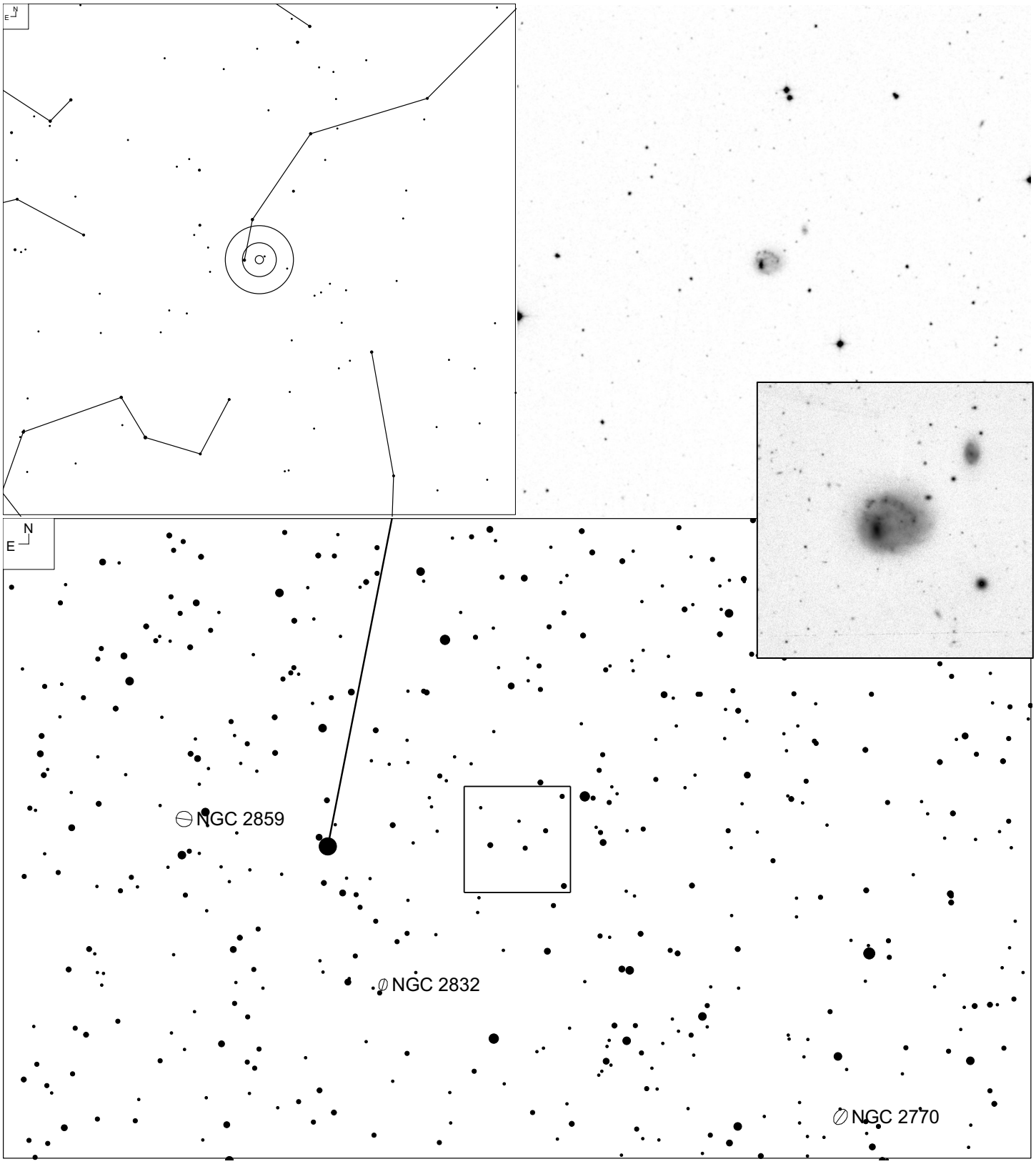

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 38-25.1 | 4 | 20 31 33 | -07 05 16 | 14.3p | 18.4 | 43” | 124 | 53 |

# II Hz 4 (Lynx)



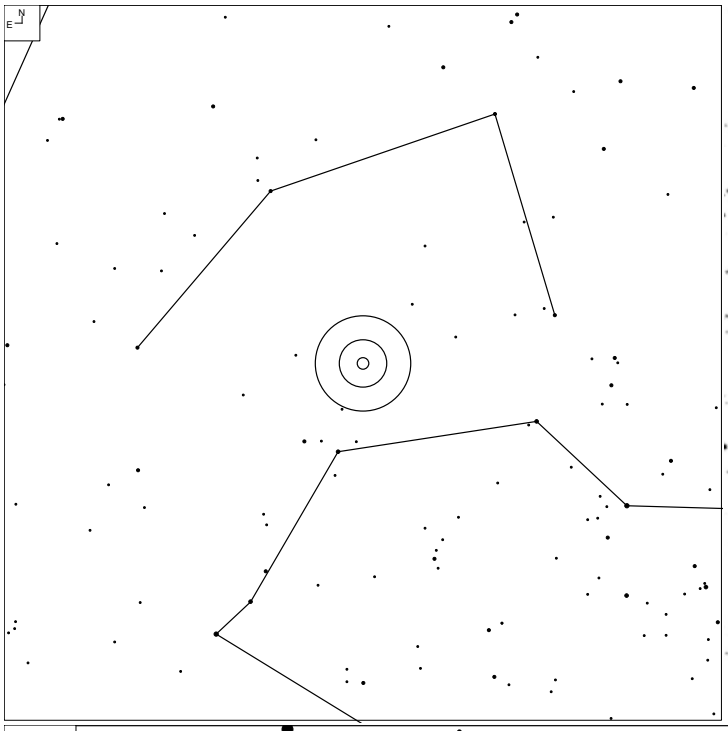

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| PGC 25211<br>CGCG 180-23 | | 08 58 33 | +37 05 11 | 15.8 | 0.6 x 0.5’ | 57 | 35 |

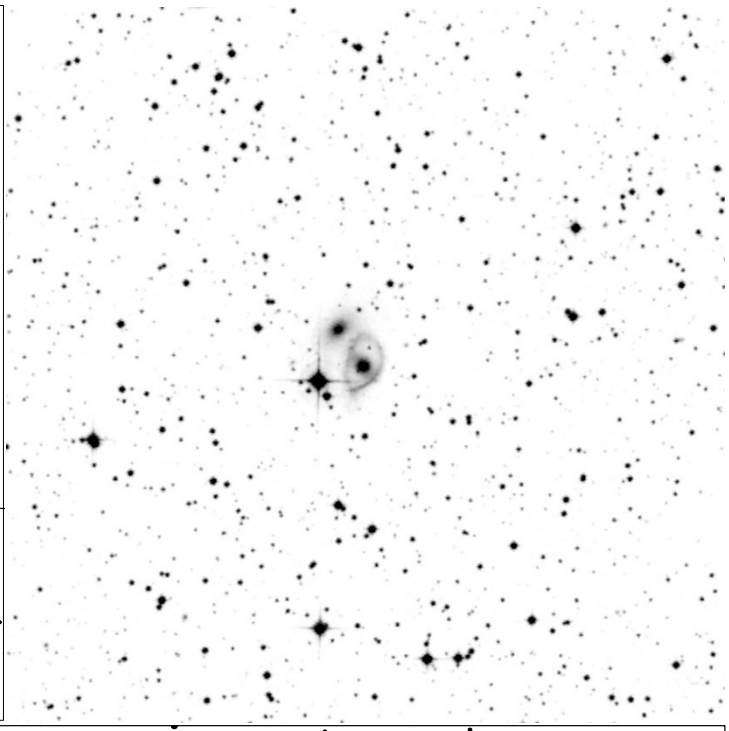
# NGC 2793 (Lynx)

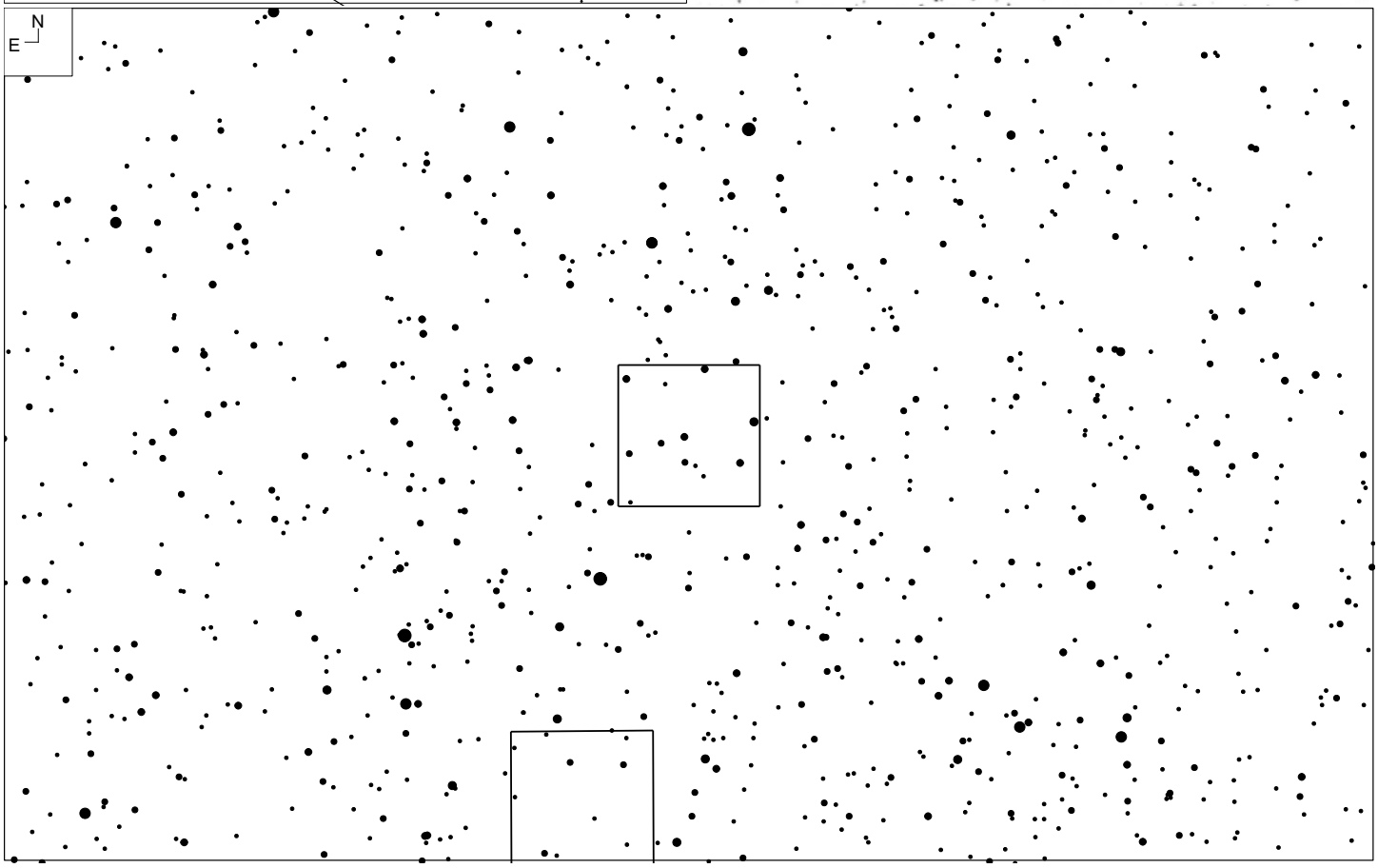



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| UGC 4894 | | 09 16 46 | +34 25 54 | 13.2 | 1.1 x 0.9’ | 561 | 35 |

# Vela Ring (Antlia)

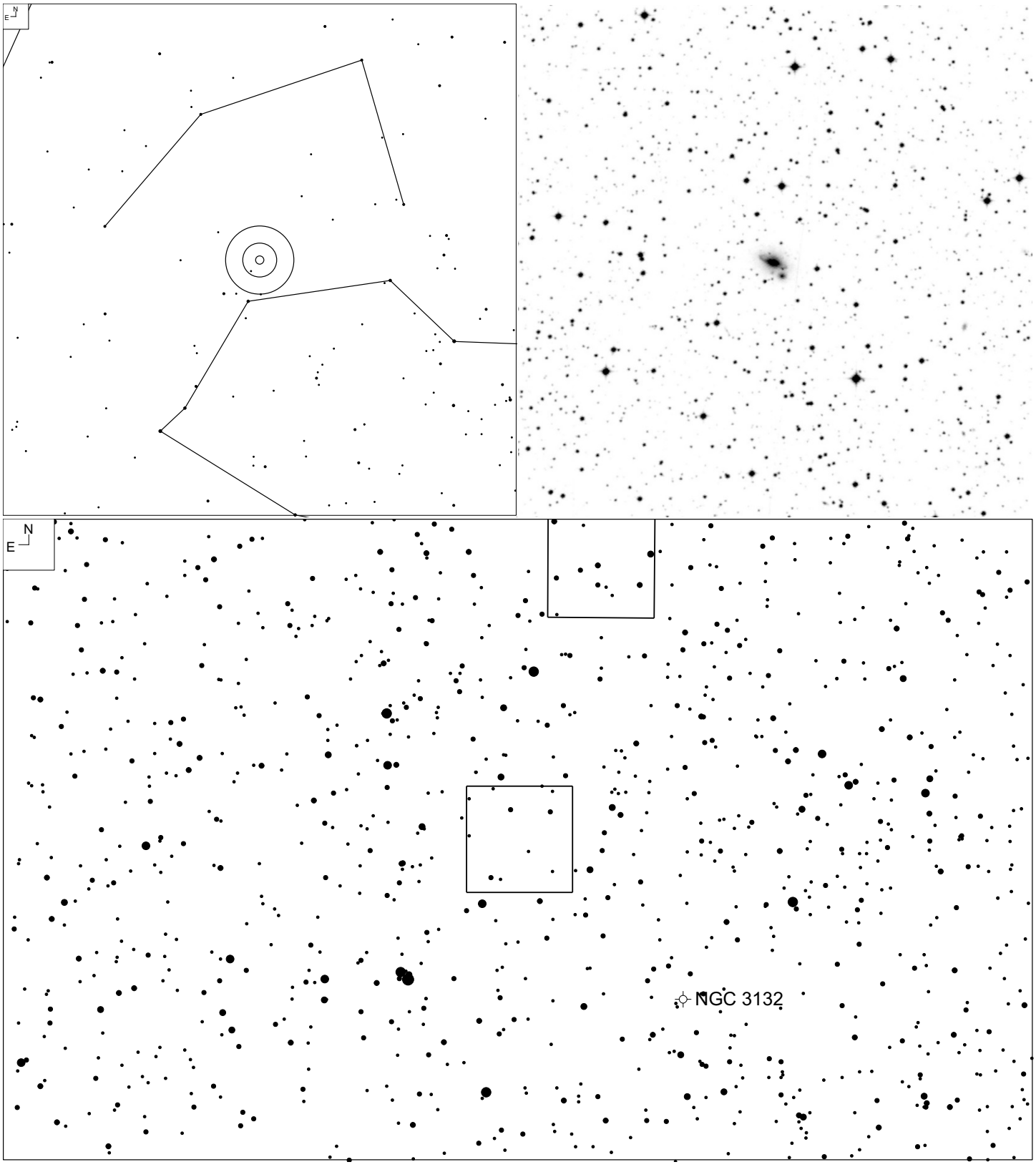






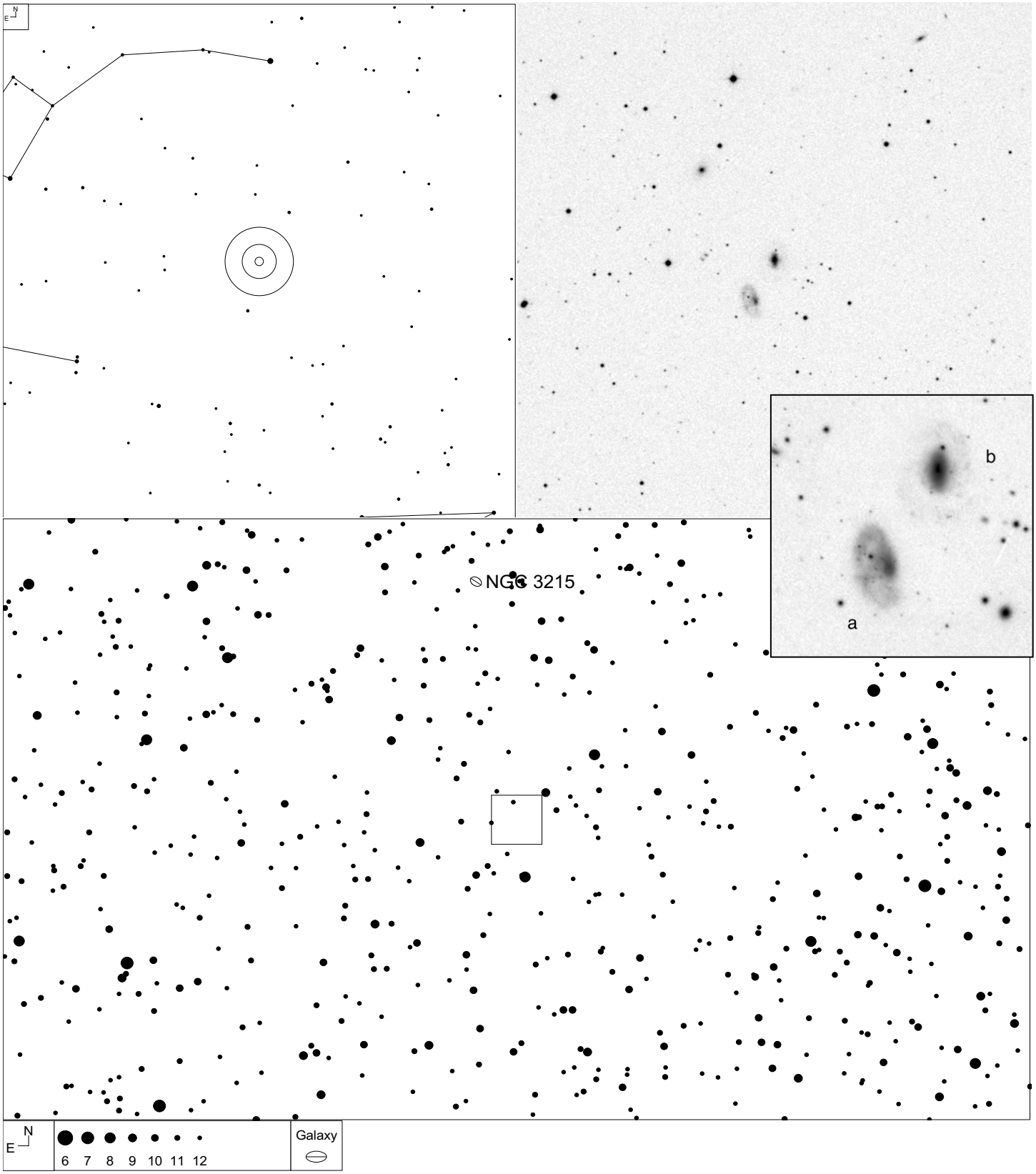

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| MCG-6-23-2<br>ESO 316-22 | | 10 09 05 | -38 24 34 | 13.4p | 1.7 x 1.0’ | 169 | 94 |

# MCG-6-23-8 (Antlia)



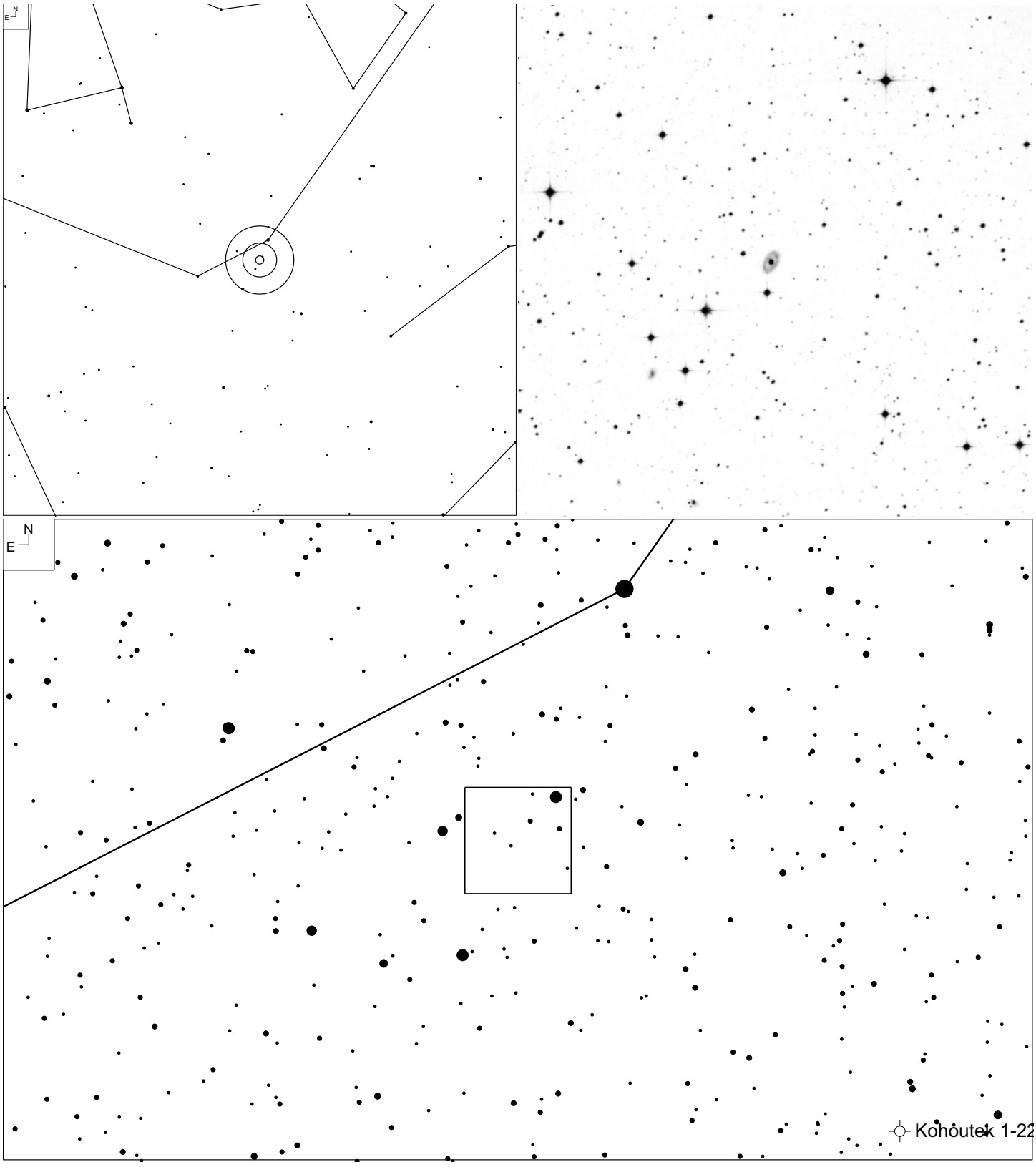

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| ESO 316-44 | | 10 11 02 | -39 41 39 | 14.1 | 1.5 x 1.0’ | 169 | 94 |

# VV 330a (Draco)



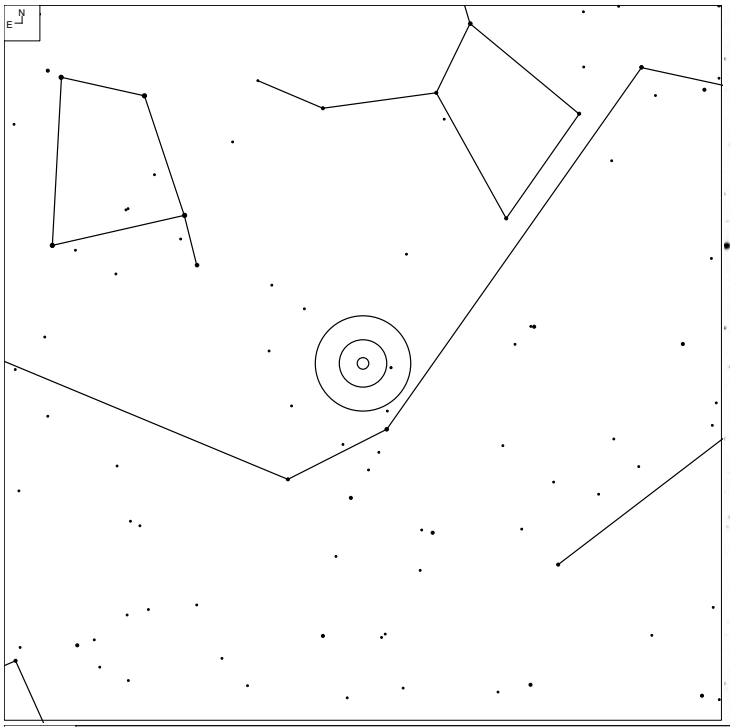

| VV | ID | RA | Dec | NED Type | Mag | Size (') | Int. Type | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|---|
| 330 | VII Zw 323 | 10 24 16.4 | +78 37 08 | GPair | | | PD | 5 | 5 |
| 330a | UGC 5609 | 10 24 22.3 | +78 36 33 | G | 14.9g | 1.3 x 0.8 | | | |
| 330b | UGC 5600 | 10 24 09.9 | +78 37 44 | G | 14.6g | 1.4 x 1.0 | | | |

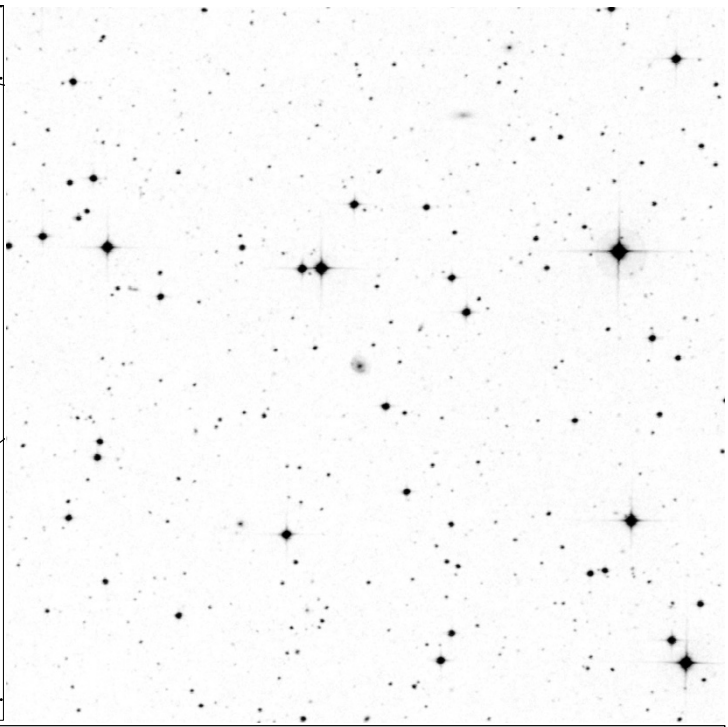
# MAC 1135-3302 (Hydra)

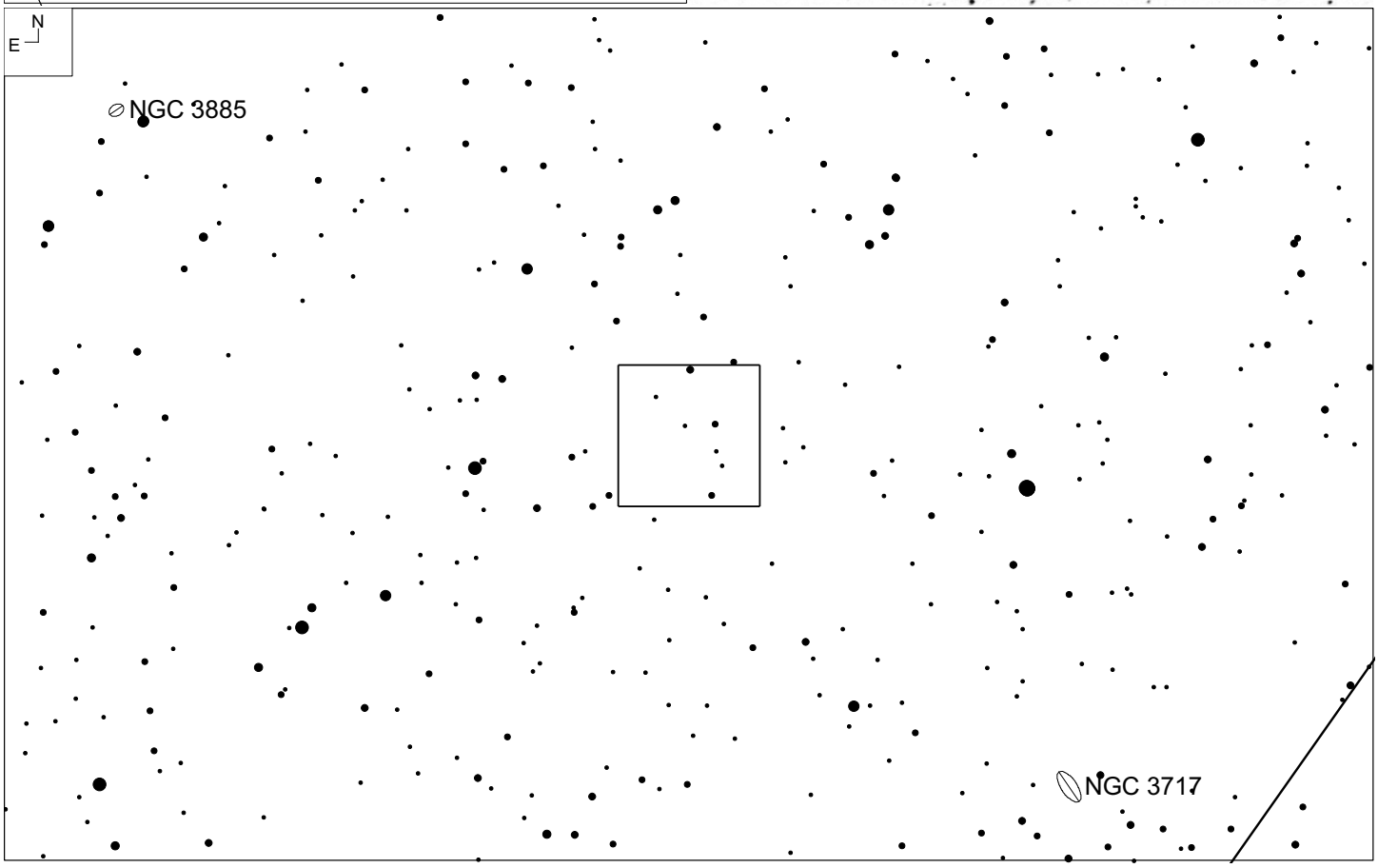



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| AM 1132-324 | | 11 35 20 | -33 02 03 | 15 | 52 x 52” | 168 | 82 |

# AM 1135-284 (Hydra)

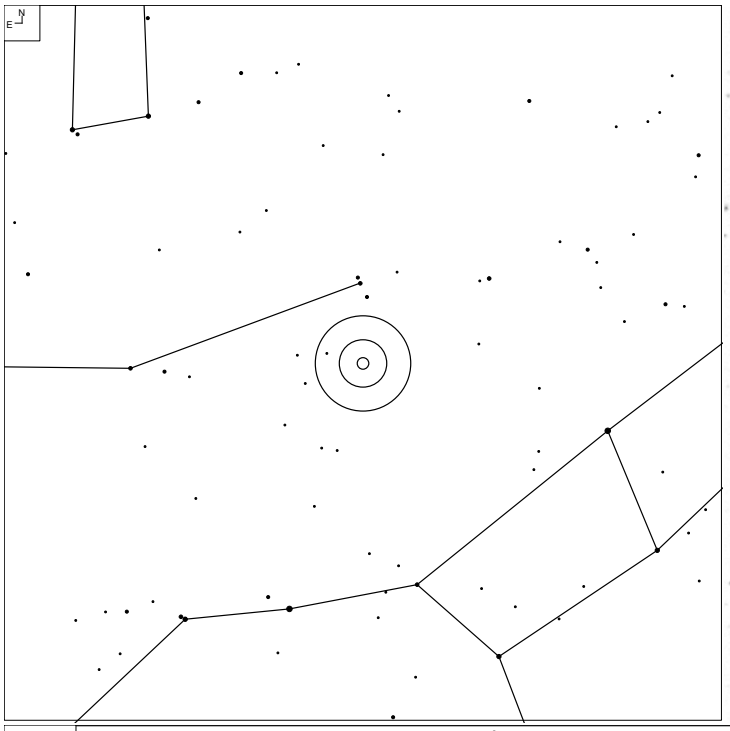


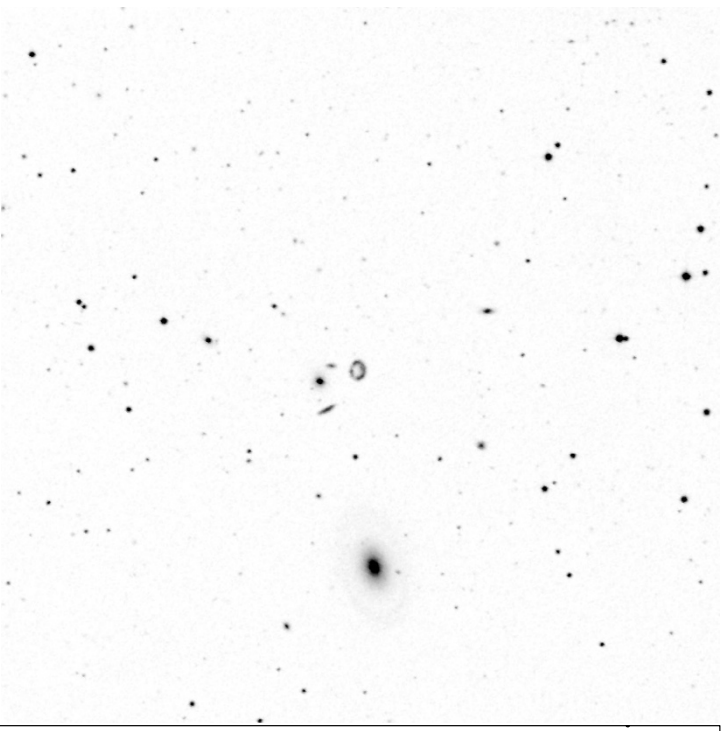


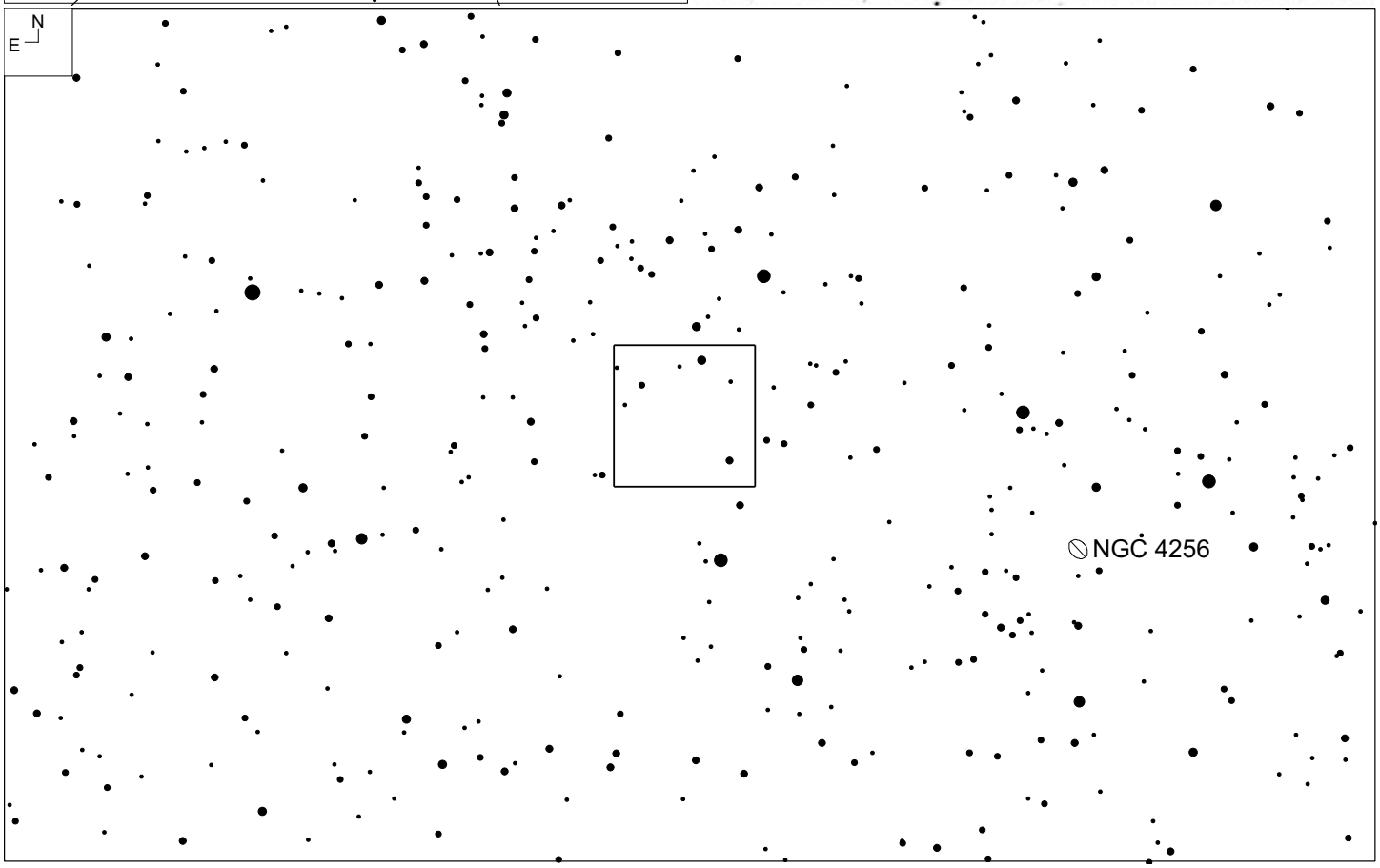



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | | 11 37 42 | -29 05 00 | 16.4b | 0.5’ | 150 | 82 |

# VII Zw 466 (Draco)

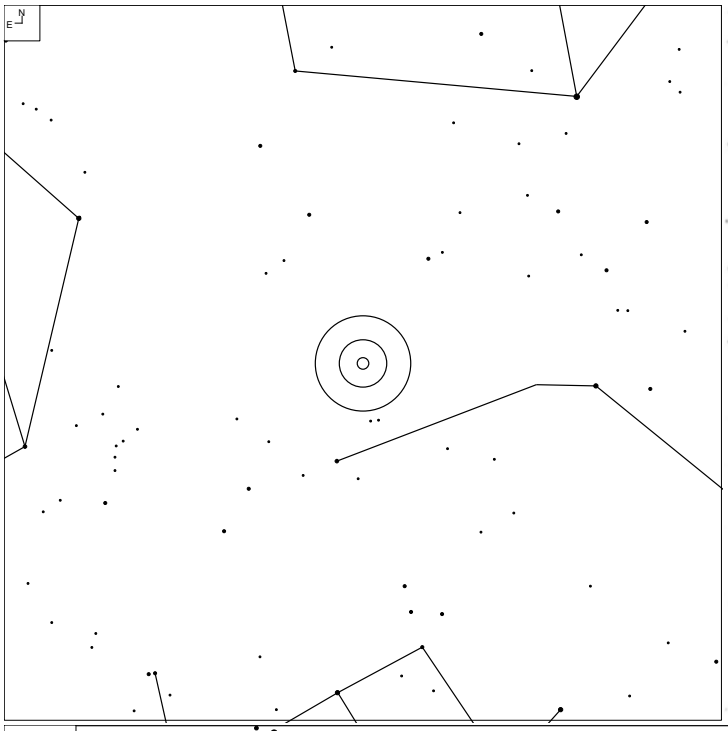


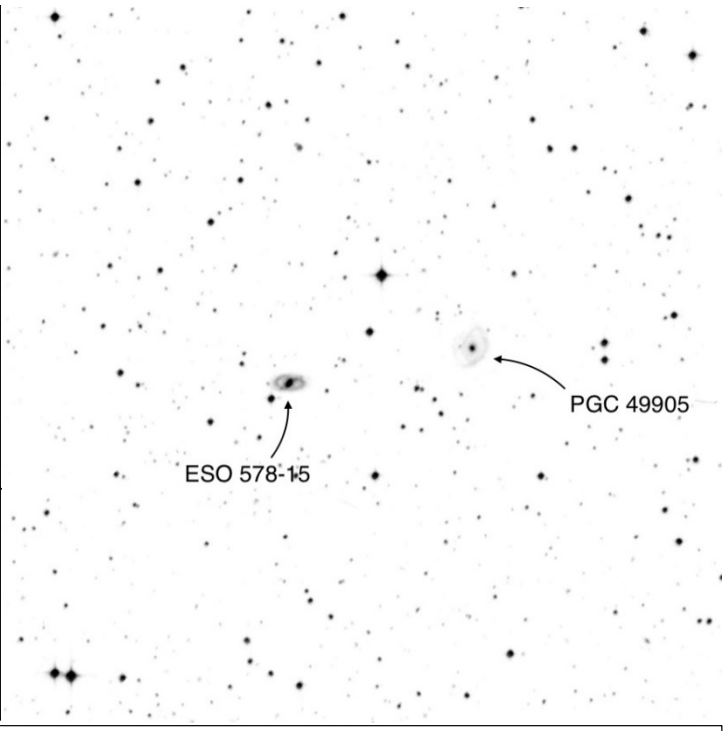


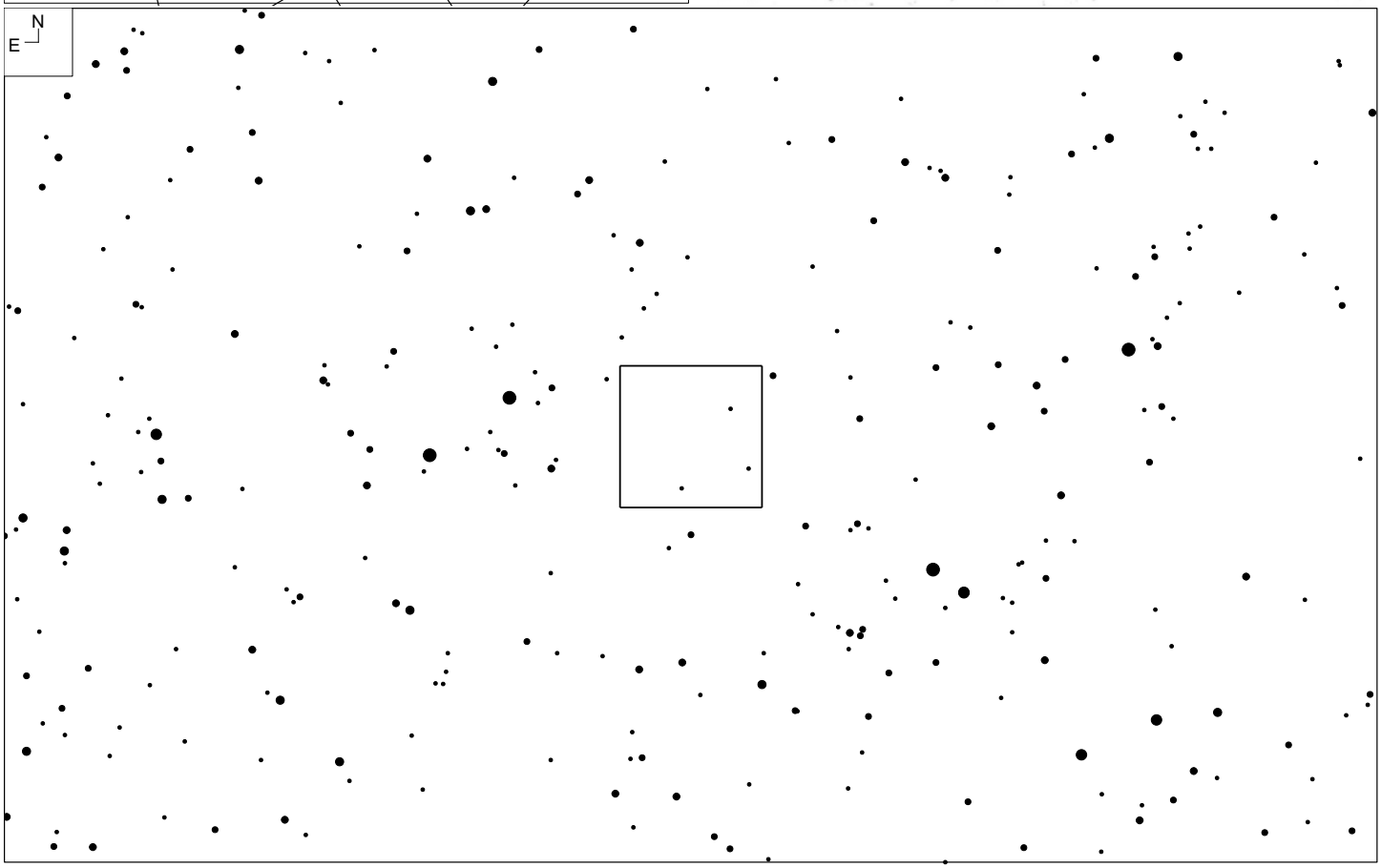



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| CGCG 315-43, VV 788 | | 12 32 05 | +66 24 12 | 15.8 | 0.5’ | 131 | 11 |

# PGC 49905 and ESO 578-15 (Virgo)

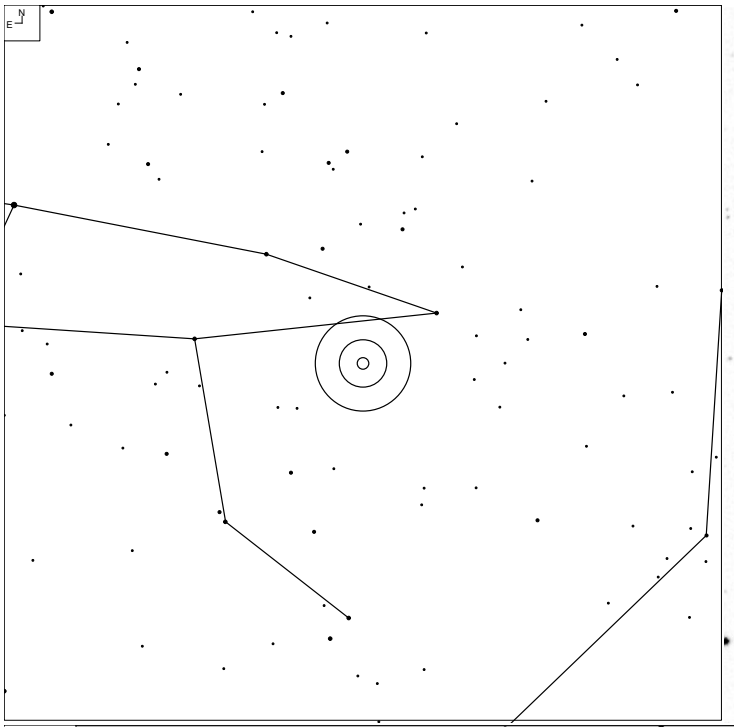


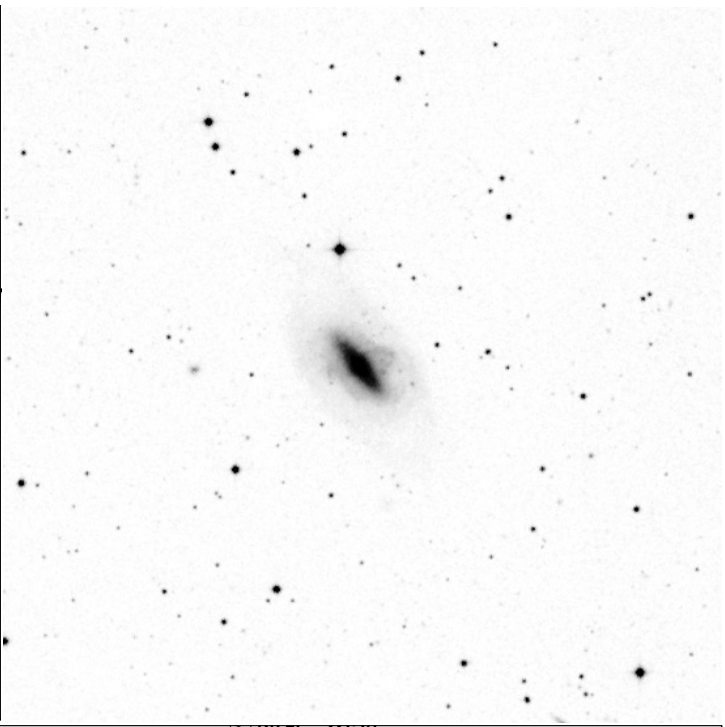


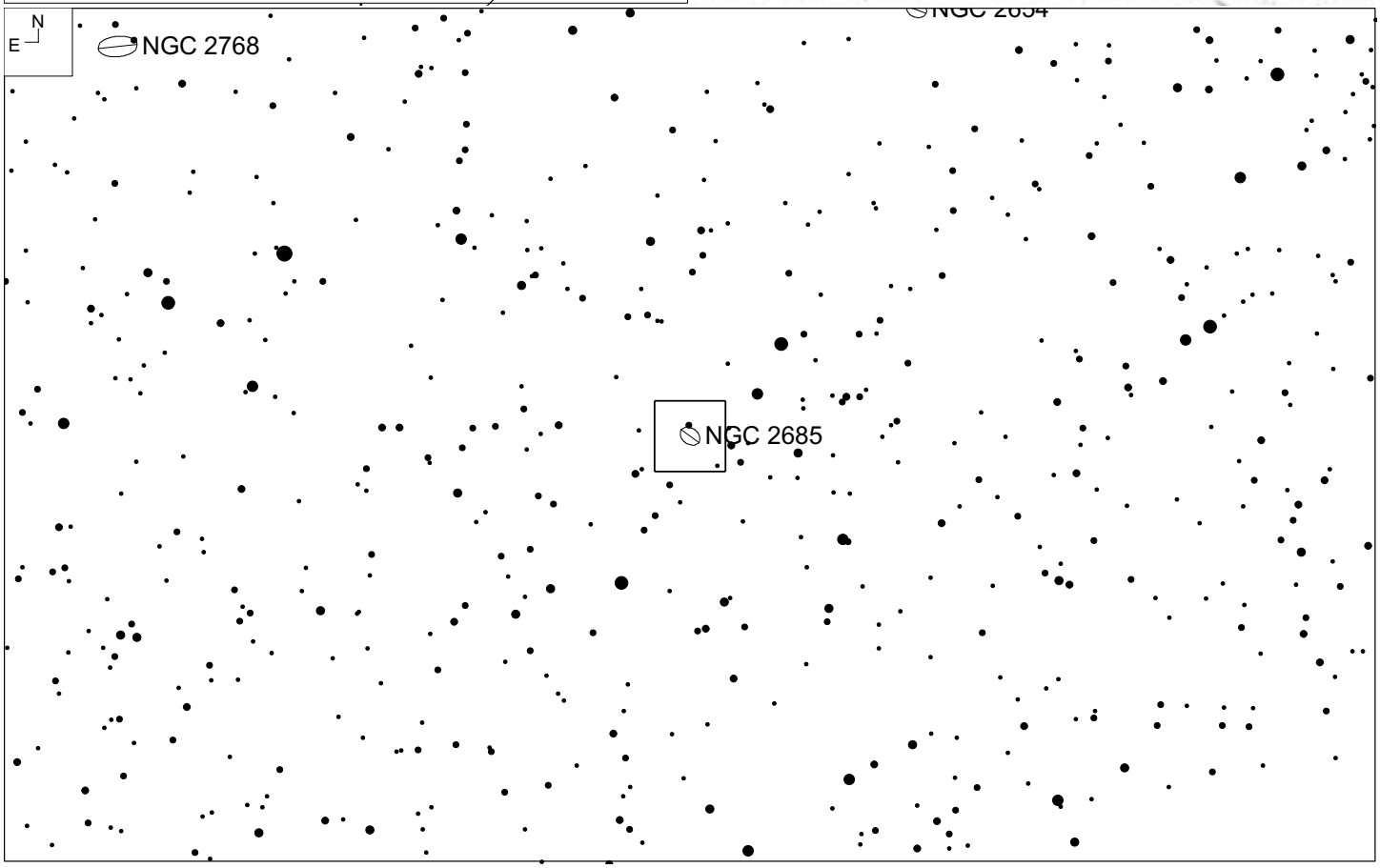




| ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| PGC 49005 | | 14 01 08 | -22 33 34 | 15.8 | 1.1 x 0.8’ | 149 | 68 |
| ESO 578-15 | | 14 01 26 | -22 34 20 | 15.2p | 0.9 x 0.5’ | | |

# NGC 2685 – Helix Galaxy (Ursa Major)

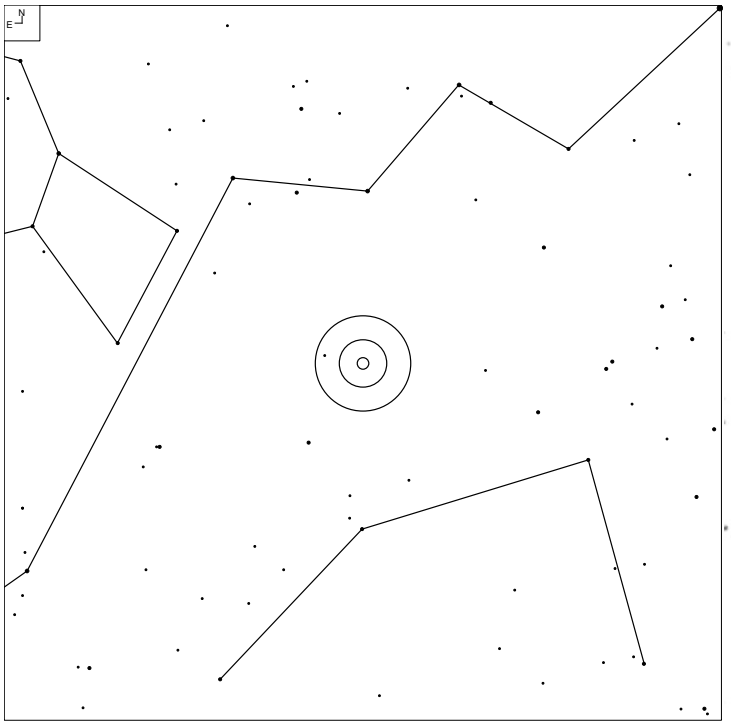


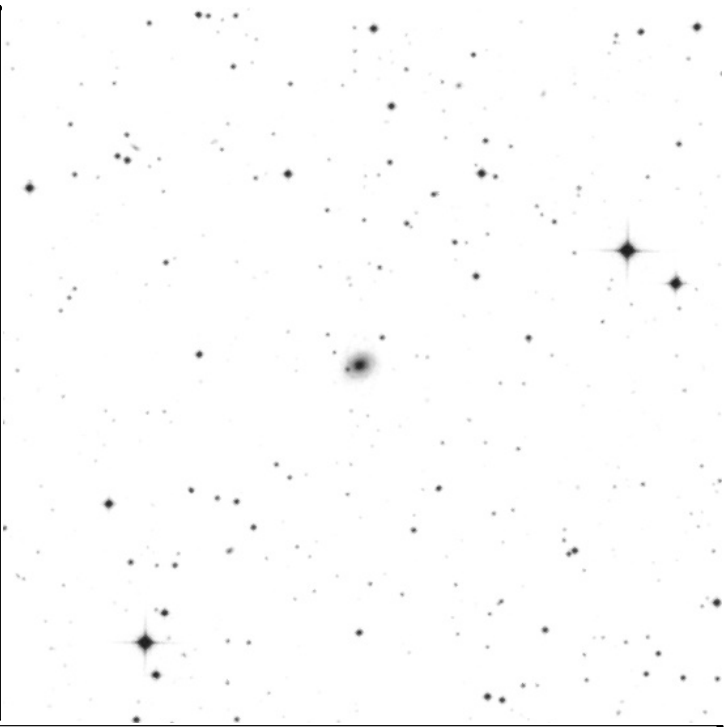


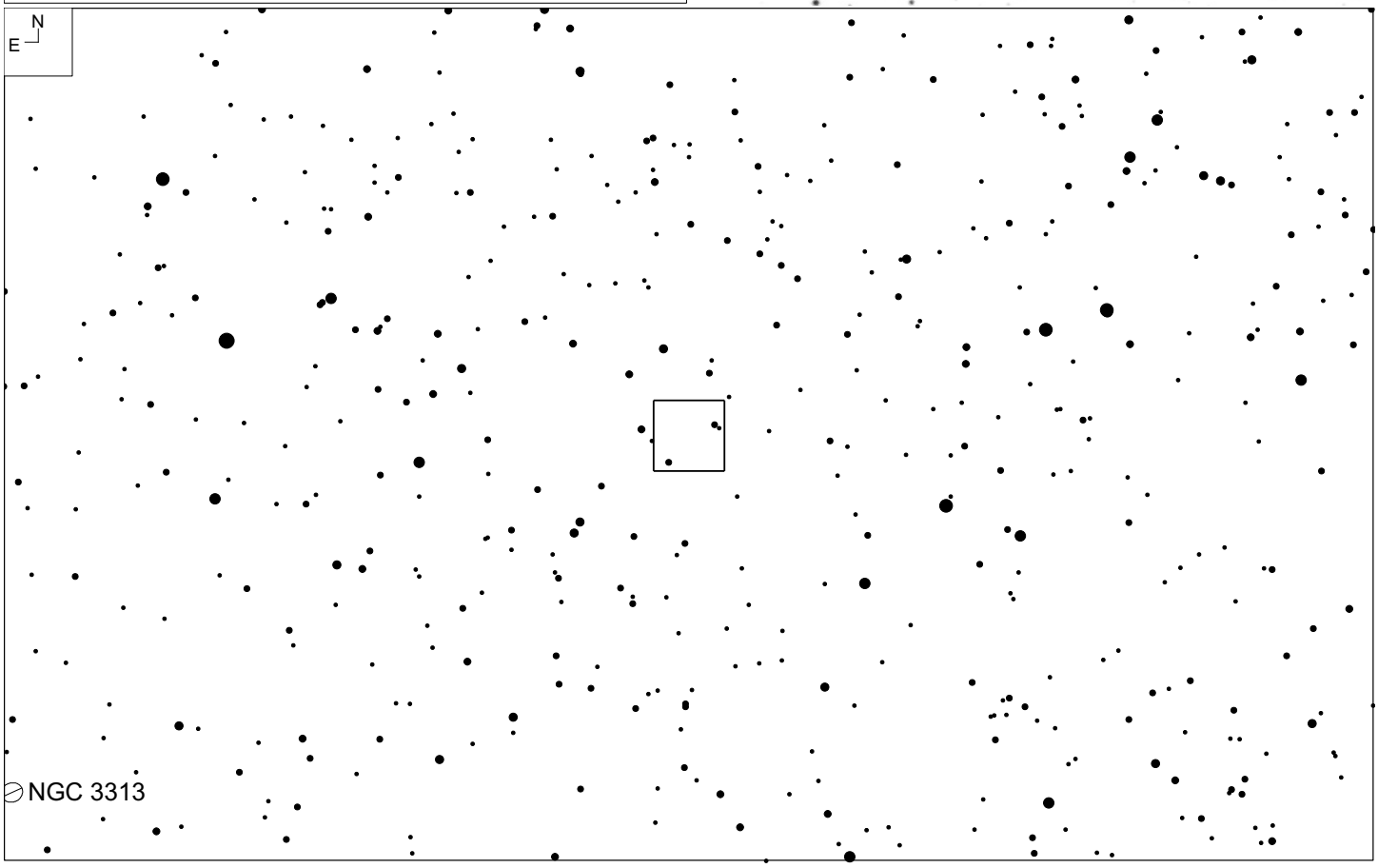



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | Pec | 08 55 35 | +58 44 02 | 11.4v | 4.5 x 2.4’ | 26 | 12 |

# ESO 500-41 (Hydra)

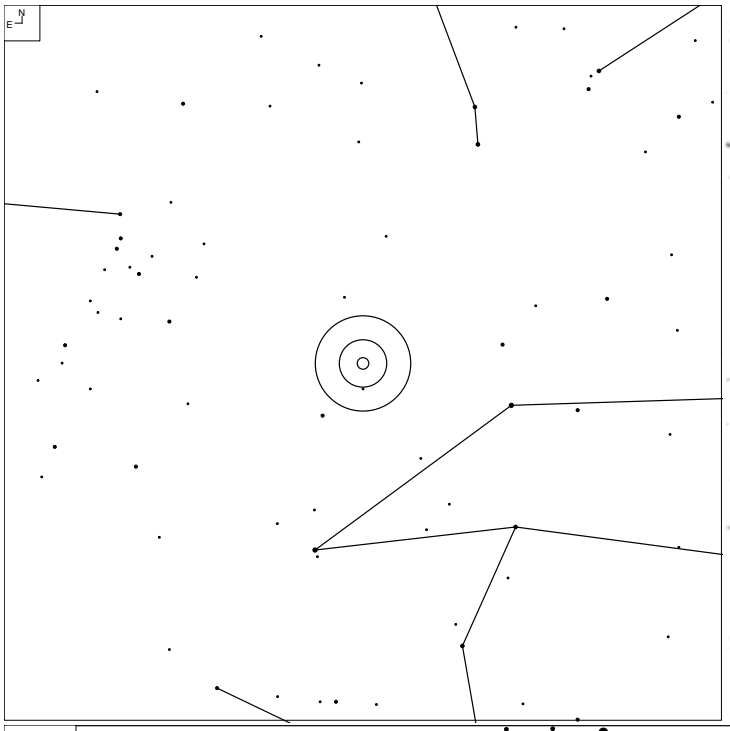


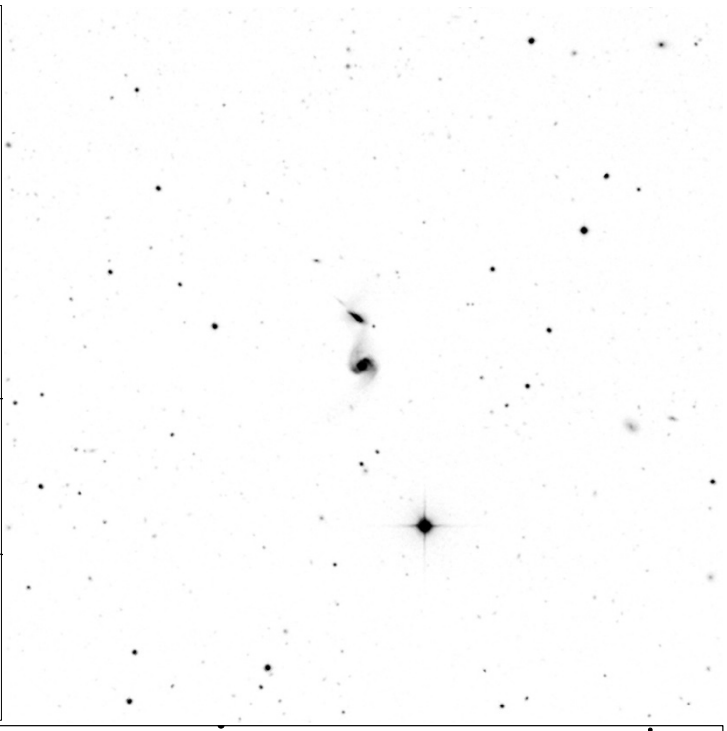


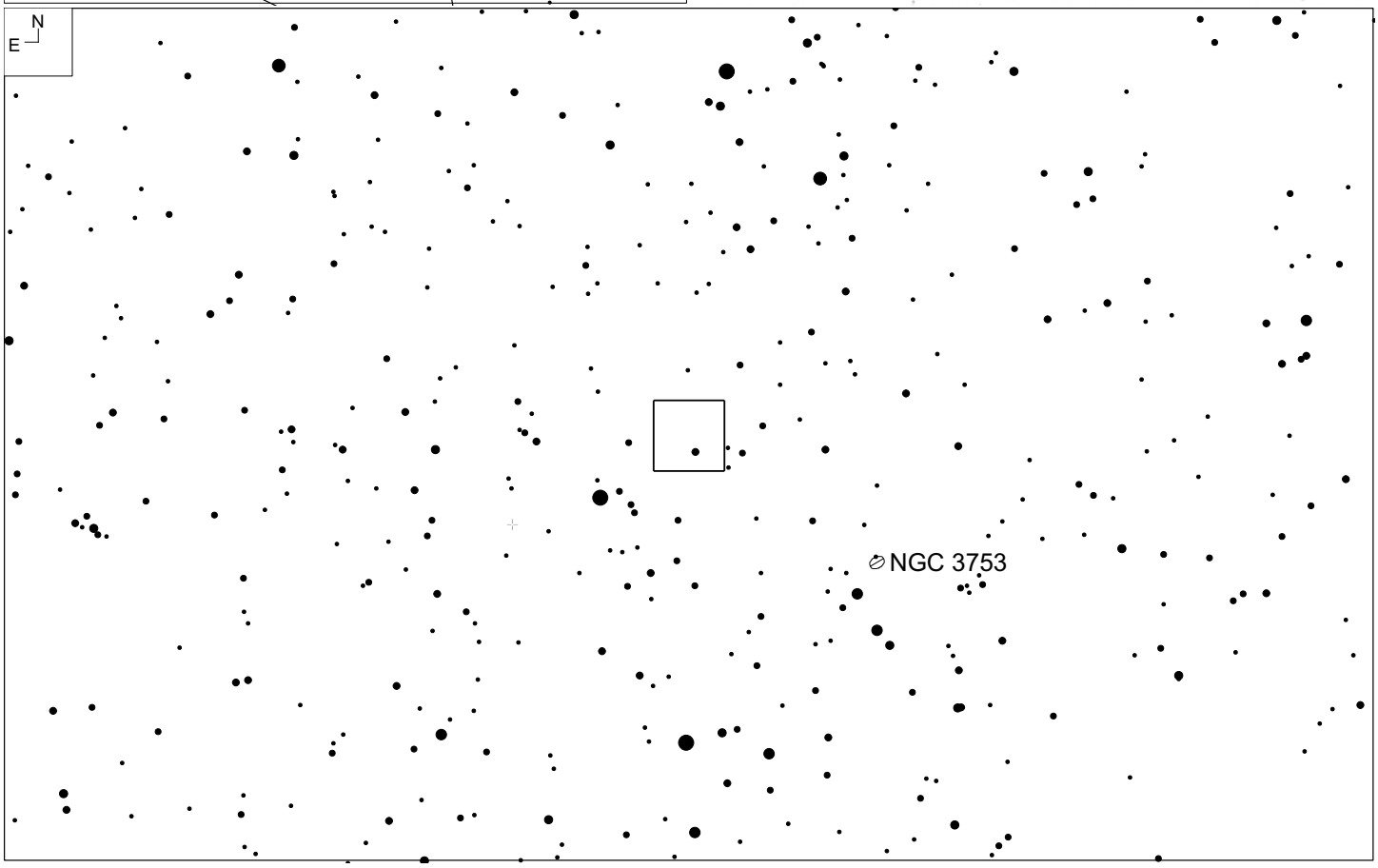



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | RSAR | 10 26 56 | -24 05 20 | 14.3p | - | 151 | 82 |

# NGC 3808 (Leo)

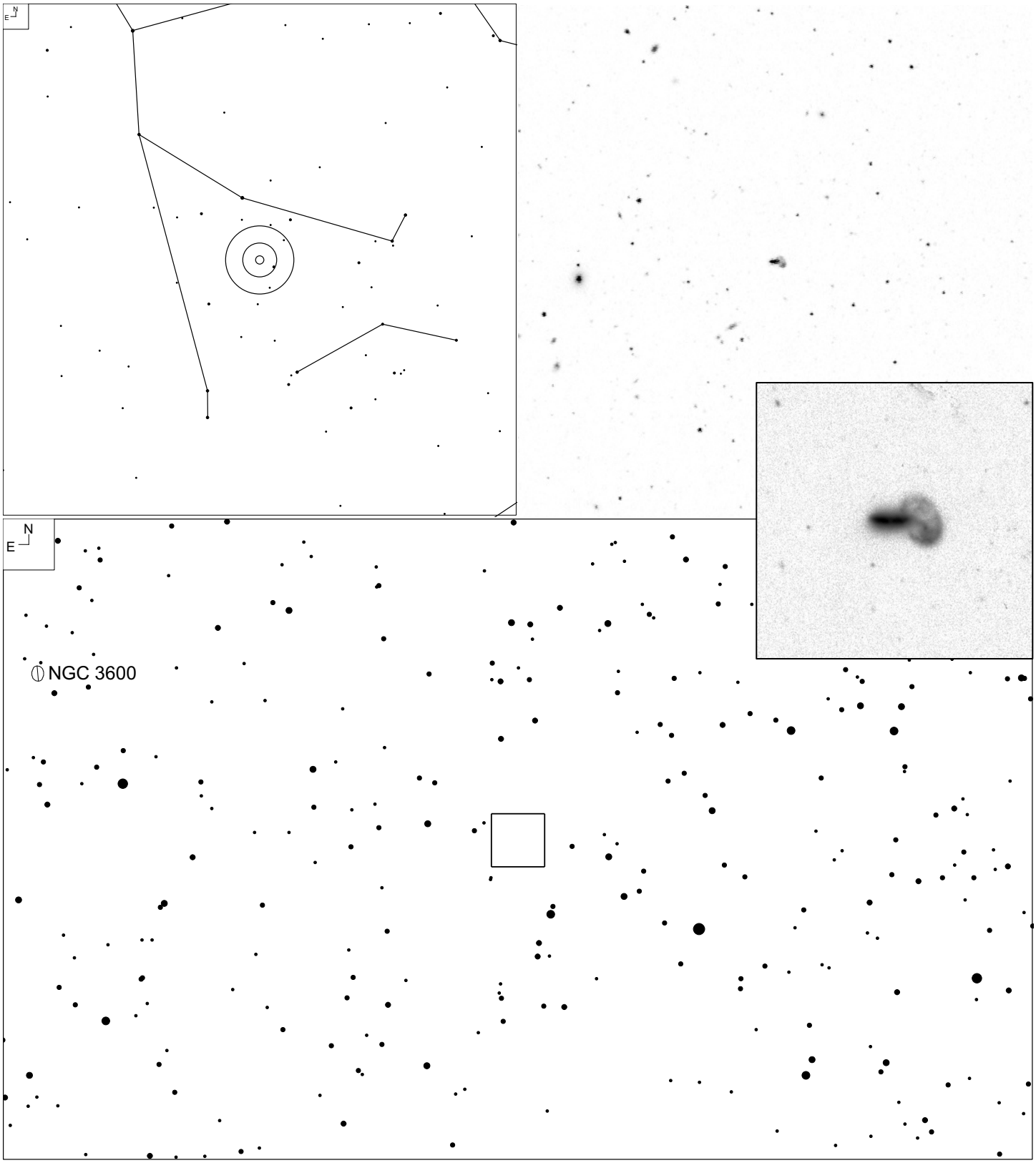






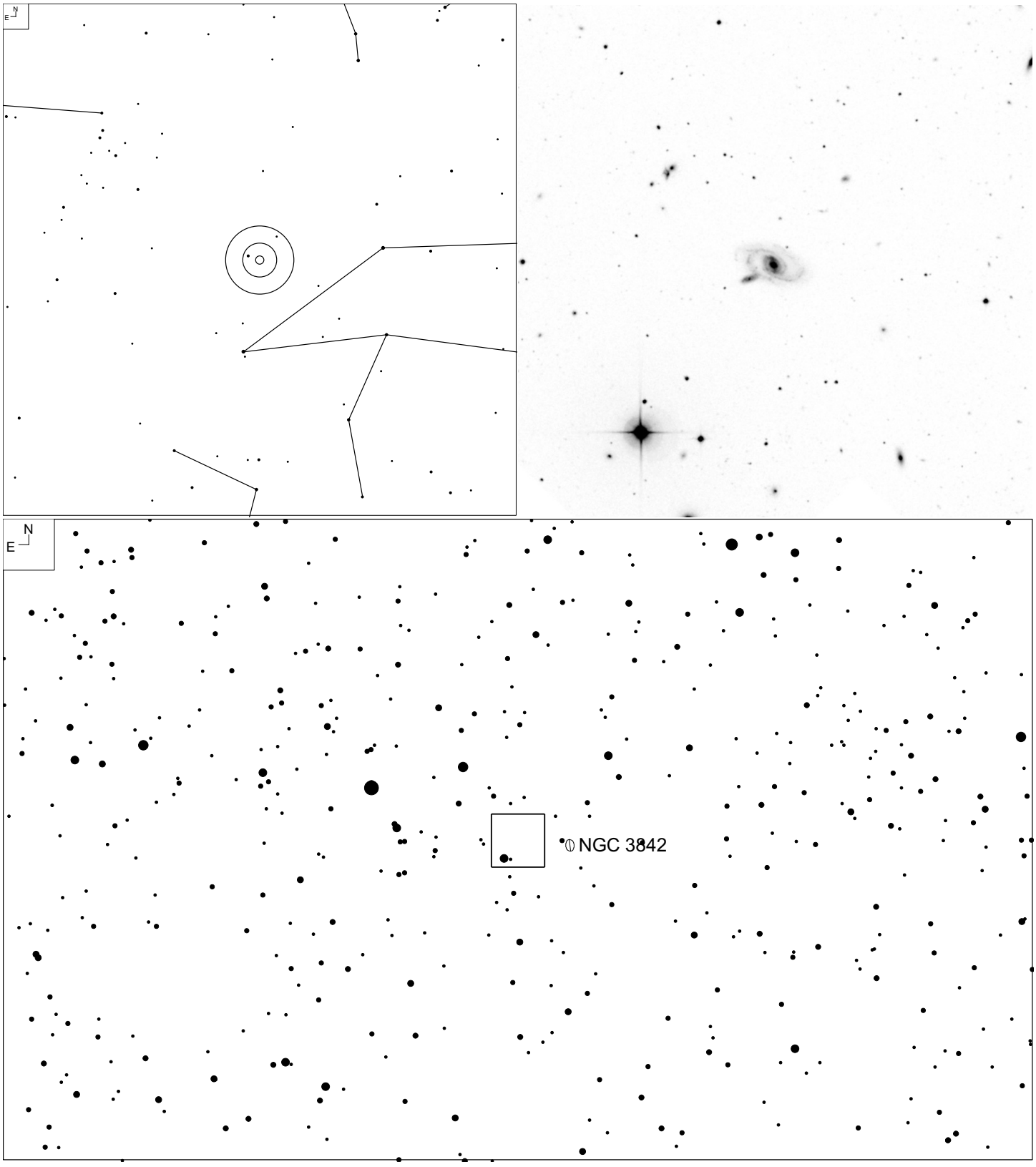

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| Arp 87 | Dbl | 10 40 45 | +22 26 48 | 12.5 | 0.9 x 0.6’ | 72 | 34 |

# Arp 148 (Ursa Major)



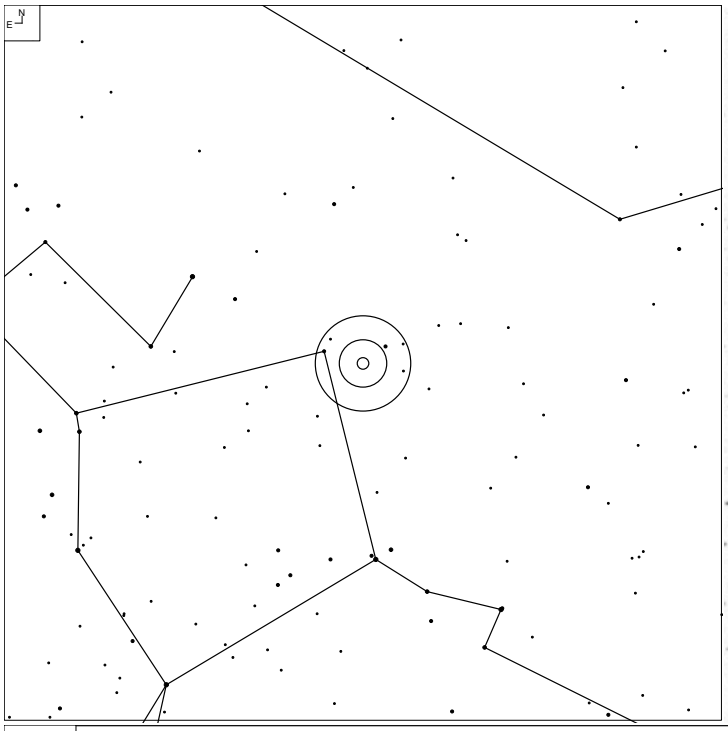

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| Mayall's Object | Ring | 11 03 54 | +40 51 00 | 15.4p | 0.8 x 0.4' | 55 | 22 |

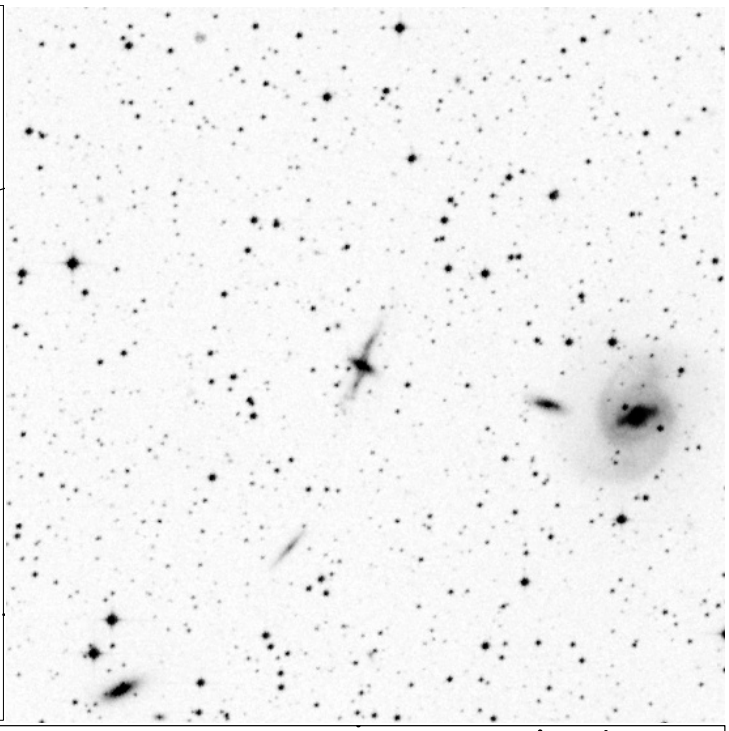
# NGC 3861 (Leo)

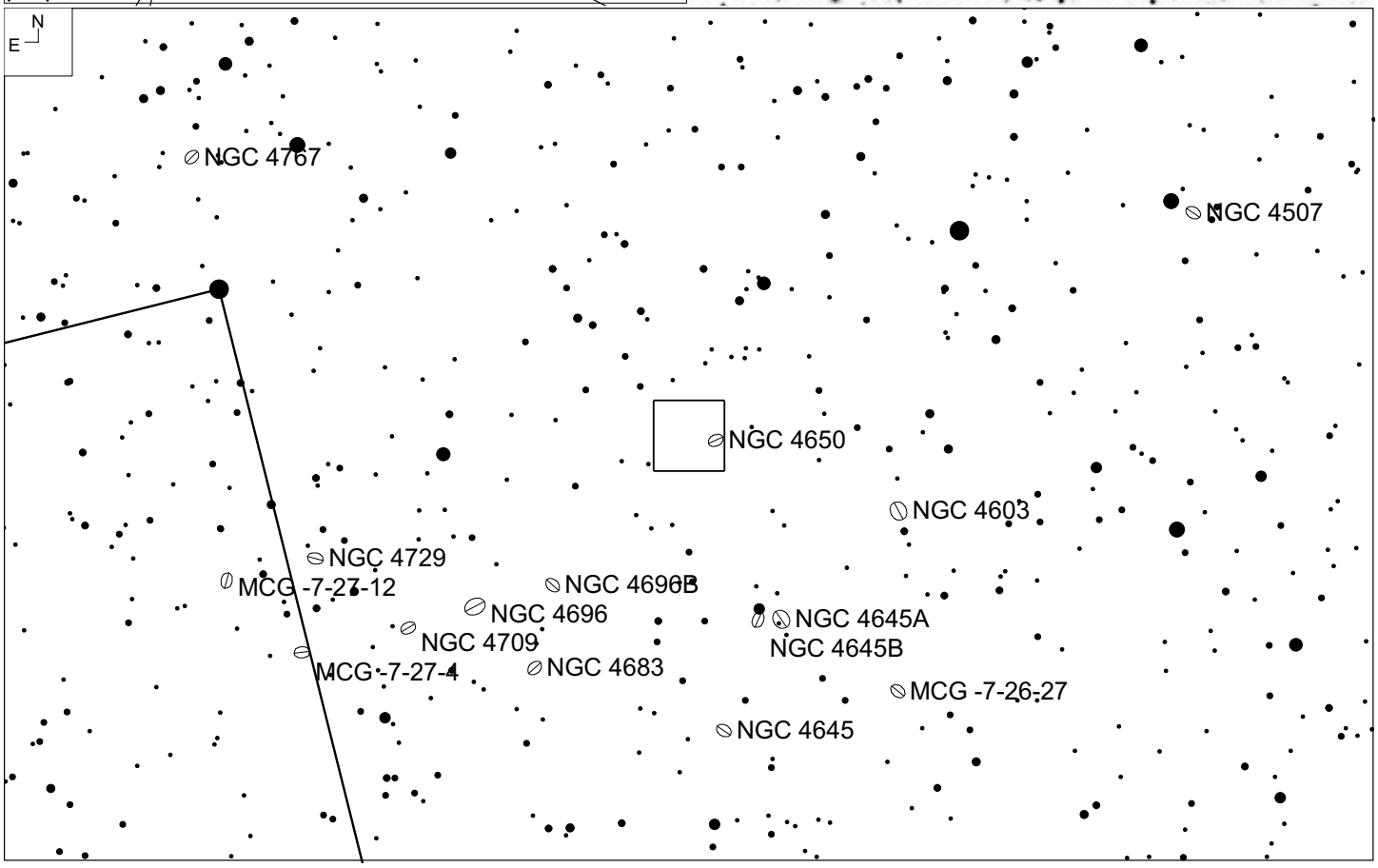



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| UGC 6724 | | 11 45 04 | +19 58 20 | 13.6 | 2.4 x 1.2’ | 72 | 46 |

# NGC 4650A (Centaurus)

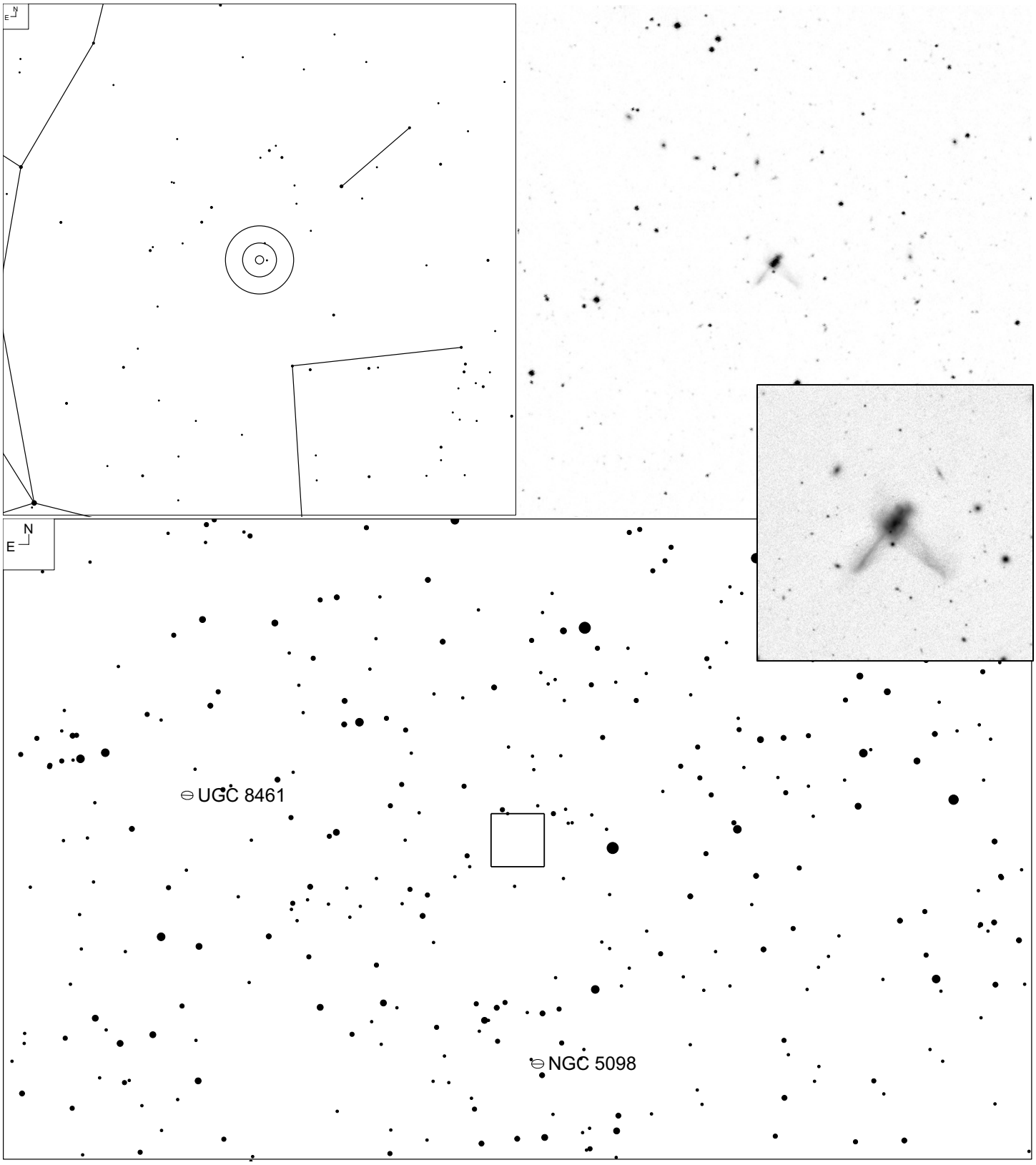






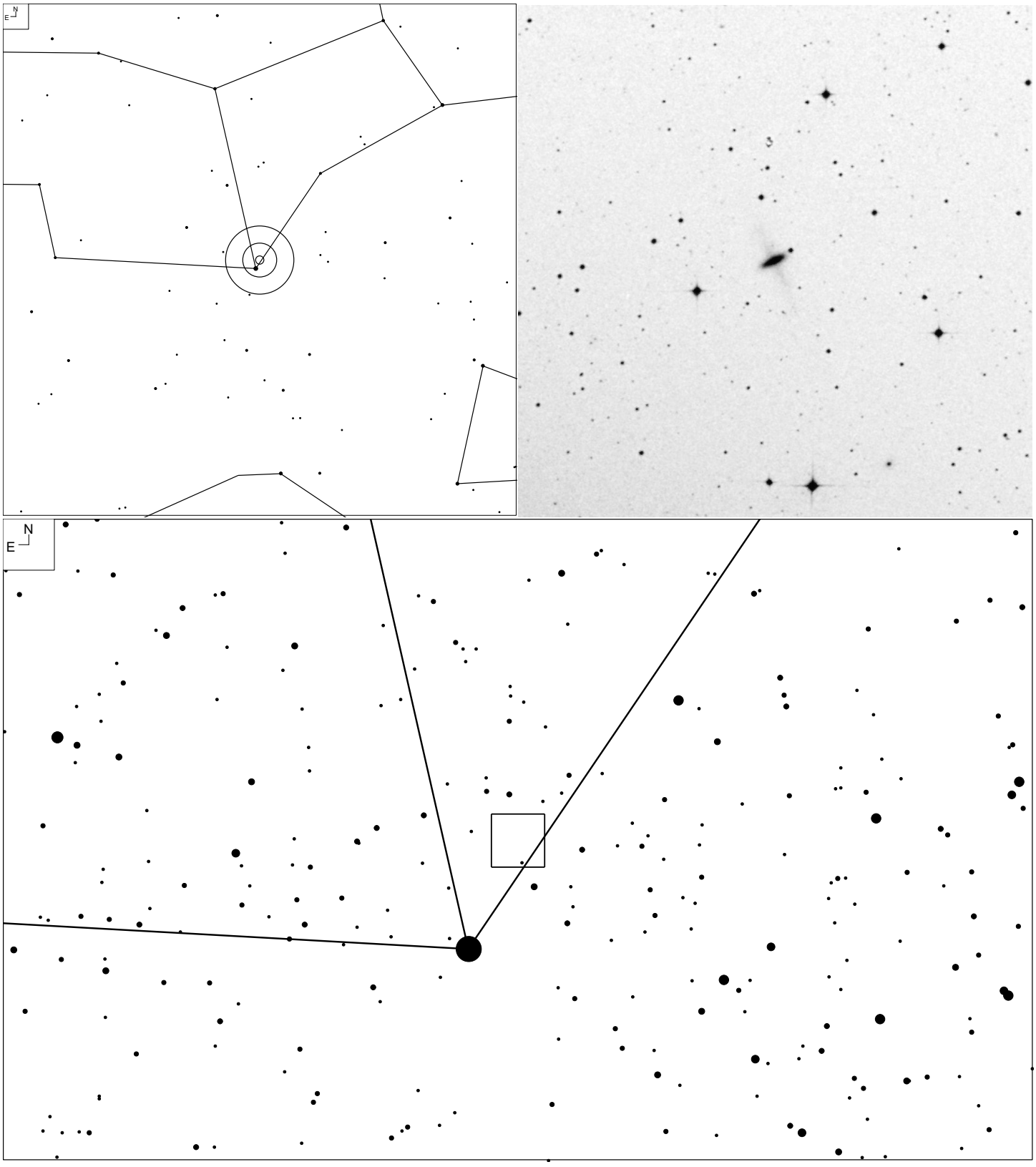

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | S.OP | 12 44 49 | -40 42 52 | 13.9b | 2.0 x 0.7’ | 167, A23 | 93 |

# Arp 193 (Canes Venatici)



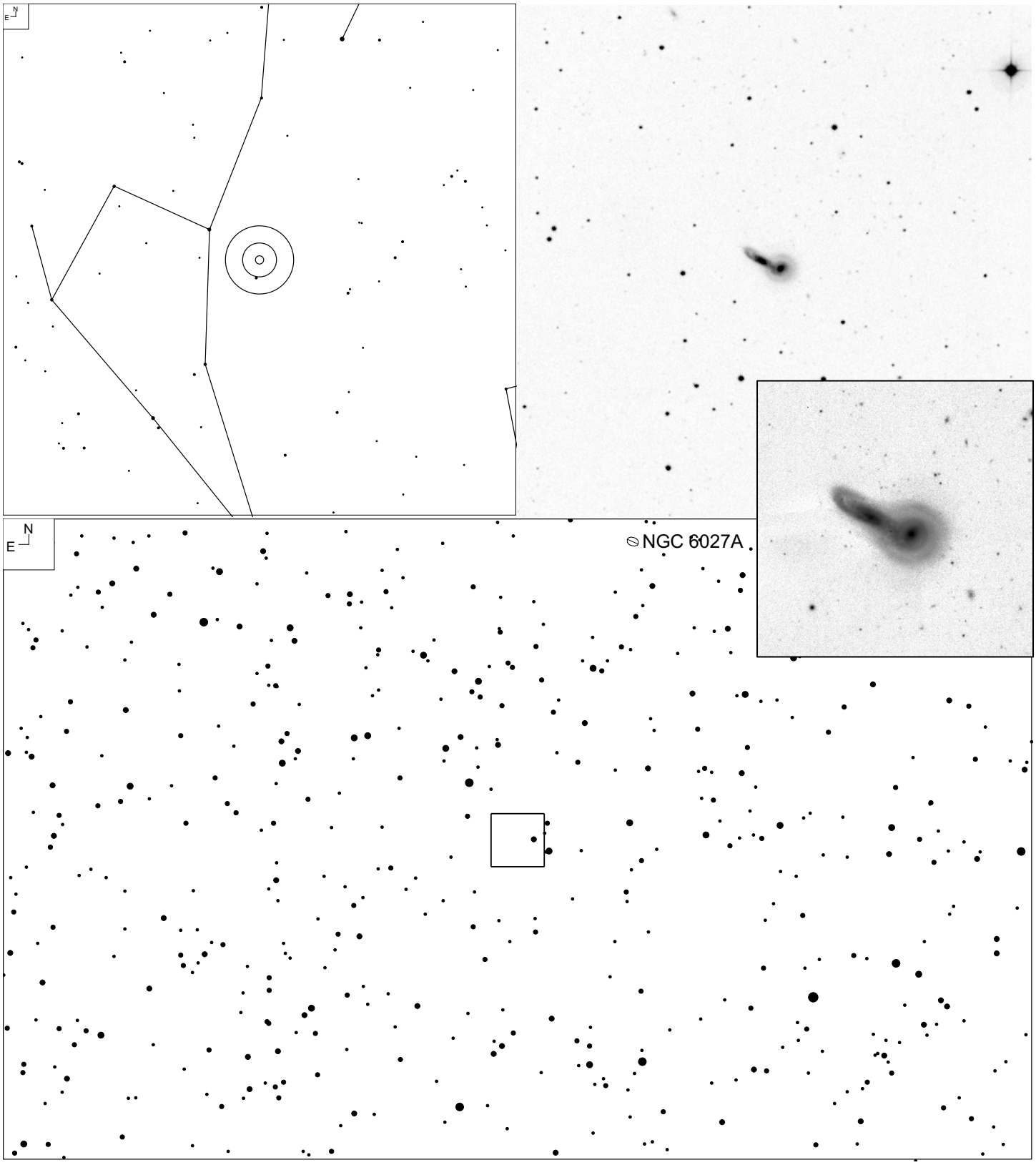

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| IC 883 | Pec | 13 20 36 | +34 08 10 | 14.4p | 1.6 x 1.6’ | 53 | 33 |

# NGC 5122 (Virgo)



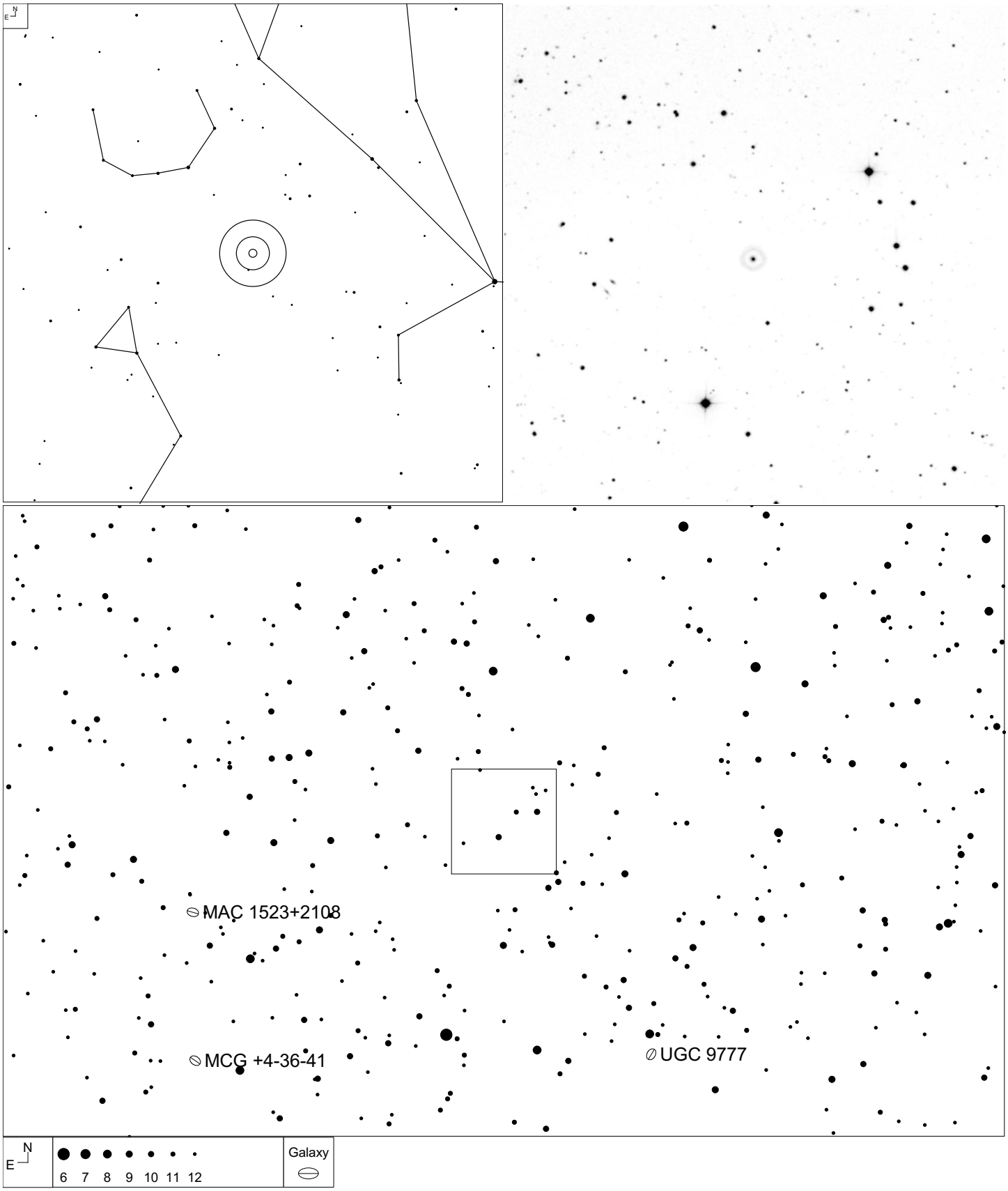

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | S | 13 24 15 | -10 39 15 | 14.6 | 2.4 x 0.8’ | 130 | 69 |

# NGC 5544/5545 (Boötes)



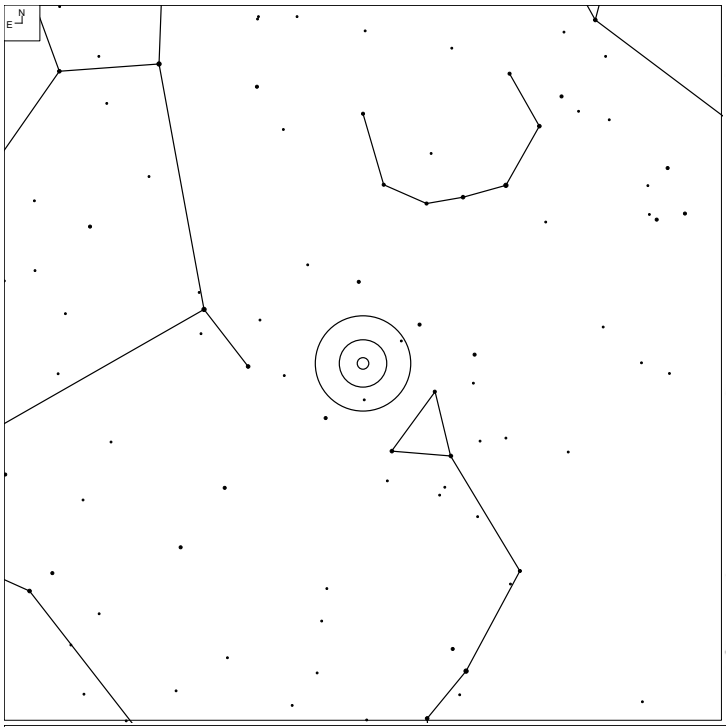

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| Arp 199 | Sa/Sbc | 14 17 03 | +36 34 17 | 14.2 | 1.0 x 1.0’ | 52 | 32 |

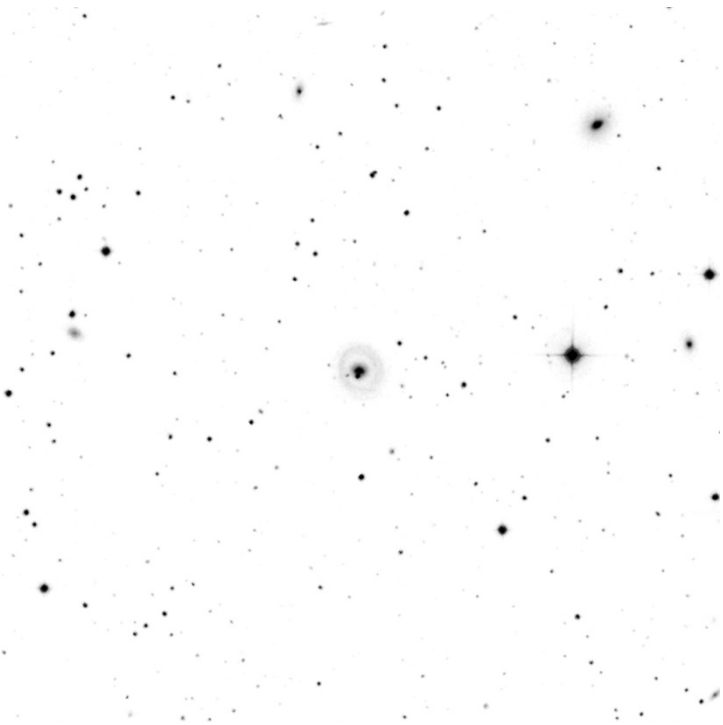
# PGC 54559 (Serpens)

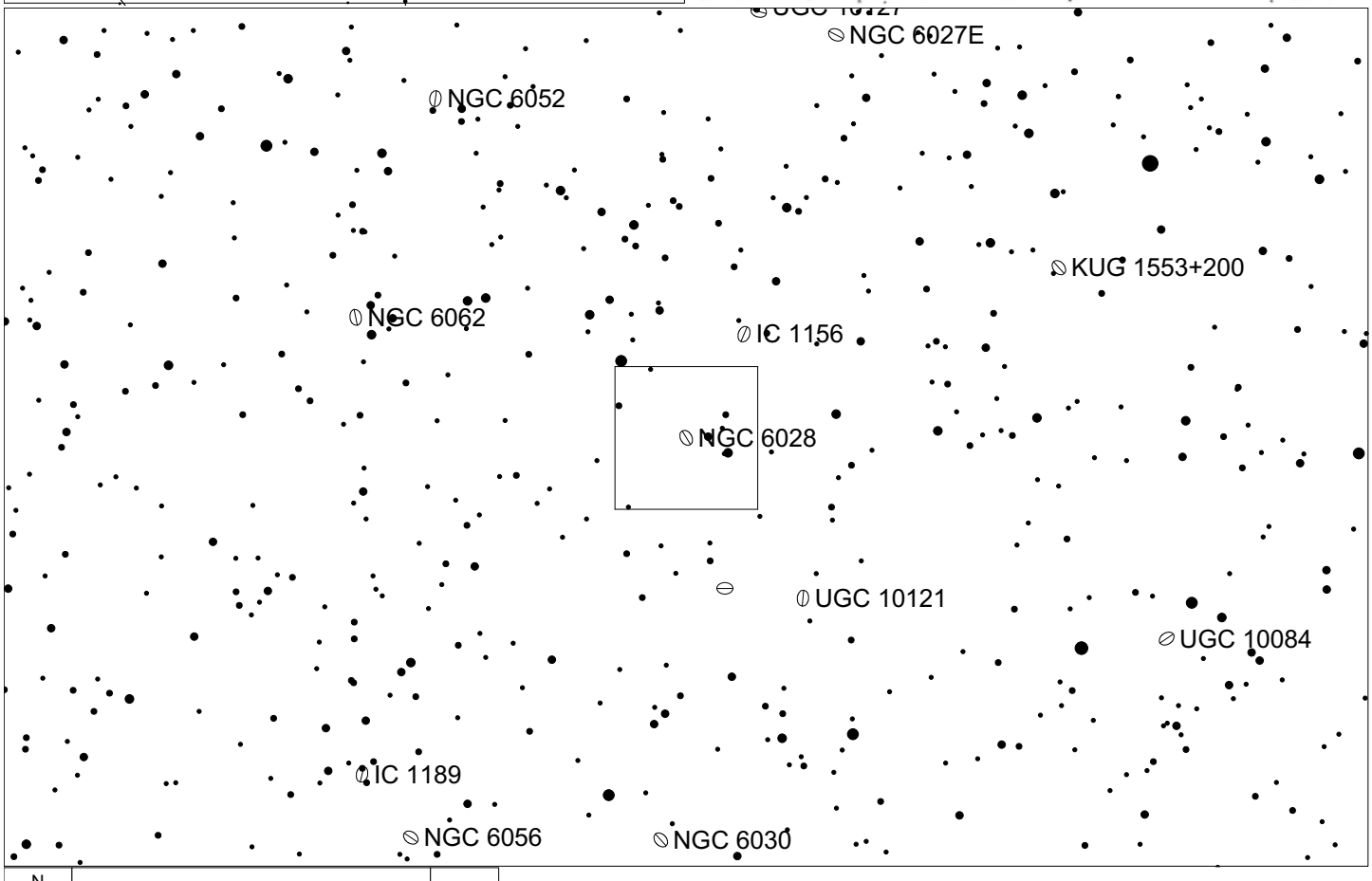


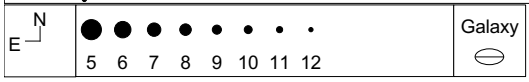

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| Hoag's Object | | 15 17 14 | +21 35 08 | 16.1 | 1.0 x 0.9' | 70 | 44 |

# NGC 6028 (Hercules)








| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| UGC 10135 | | 16 01 29 | +19 21 36 | 14.4 | 1.4 x 1.2’ | 69 | 43 |

# 2001: Explosions Over TSP

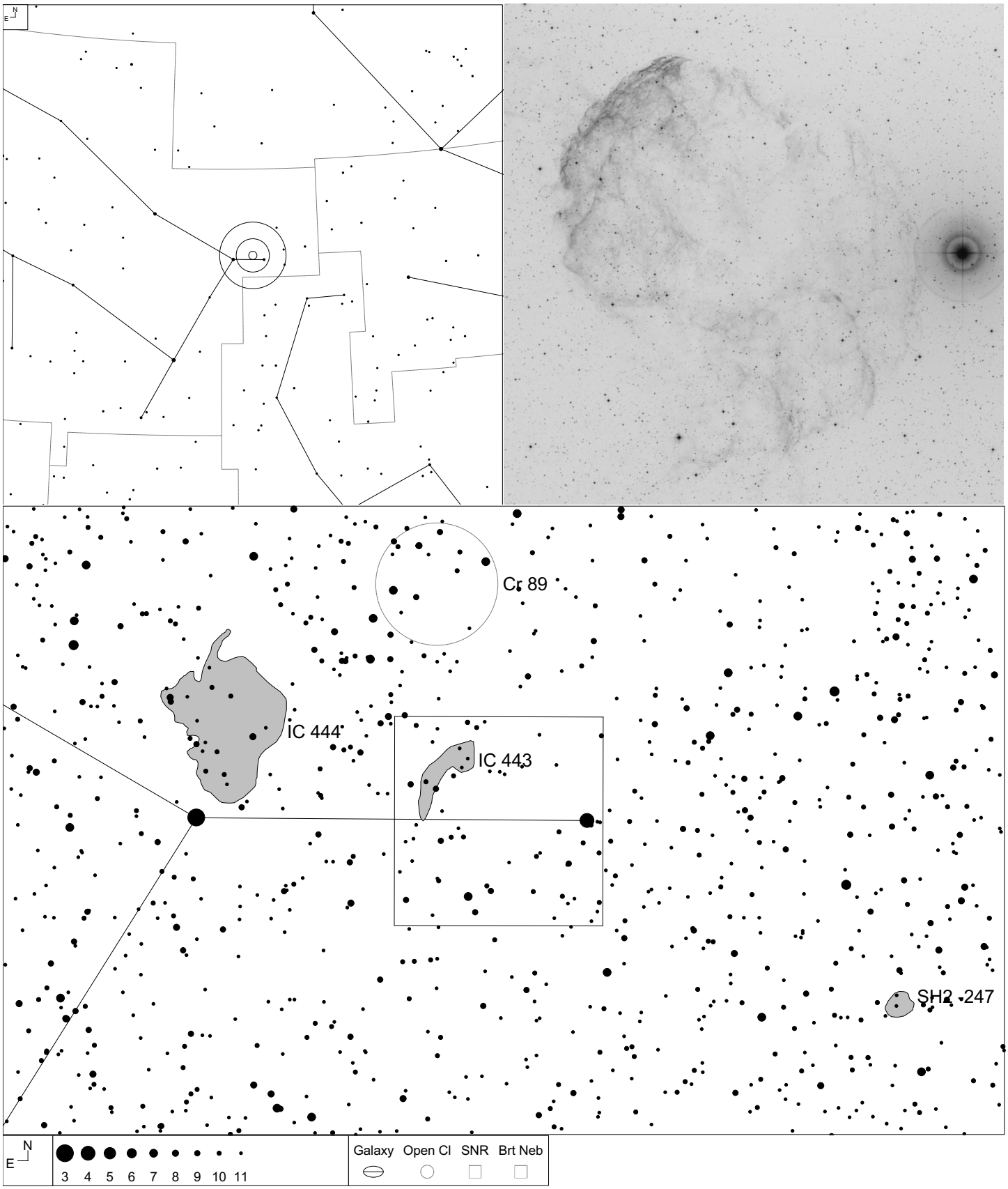
## ADVANCED OBSERVING – EXPLOSIONS OVER T.S.P. 2001

| | Coordinates (2000) | Const. | Mag. | Size | Type | R.V / z | Dist. Ly. | Uran. |
|---|---|---|---|---|---|---|---|---|
| **EXPLOSIVE NEBULA:** | | | | | | | | |
| IC443 – Supernova Remnant | 06 17 52.0 + 22 46 00 | Cyg | | 27 x 7" | S.N. | | | 137 |
| Campbell's Star - BD+30° 3639 | 19 34 45.2 + 30 30 59 | Cyg | 10.4(v) | 7.5" | P.N. | -30.4 | | 118 |
| M1-67 – Wolf Rayet Nebula | 19 11 30.9 + 16 51 38 | Sge | 8.2 | 1.8" | W.R | | | 206 |
| Crescent Nebula (NGC6888) | 20 12 01.0 + 38 23 00 | Cyg | | 18 x 8" | W.R. | | | 119 |
| Cygnus Egg – Proto Planetary | 21 02 18.8 + 36 41 38 | Cyg | 13.5 | 1.0 x 0.5' | P.P. | | | 121 |
| **AGN's / STARBURST GALAXIES:** | | | | | | | | |
| Mrk 220 – Interacting AGN | 12 43 47.7 + 54 53 45 | UMa | 14.5 | 1.3 x 0.3' | Pec. | +4875 | 227.0 | 48 |
| Mrk 273 – Starburst Galaxy | 13 44 41.9 + 55 52 57 | UMa | 15.1 | 1.3 x 0.3' | Pec | +11274 | 525.5 | 49 |
| Barnard's Star – Runaway star | 17 57 47.8 + 04 41 49 | Oph | 9.5 | Stellar | Star | | 6.0 ly | 249 |
| **SEYFERT 2 GALAXIES:** | | | | | | | | |
| NGC4941 – Seyfert 2 Galaxy | 13 04 13.1 – 05 33 05 | Vir | 11.9(b) | 3.6 x 1.9' | RS | +846 | 39.4 | 284 |
| Mrk 1376 (NGC5506) | 14 13 14.9 – 03 12 27 | Vir | 12.8(b) | 2.8 x 0.8' | S | +1829 | 85.2 | 242 |
| Arp 220 (IC4553) – Seyfert 2 | 15 34 57.2 + 23 30 10 | Ser | 13.9(b) | 1.5 x 1.2' | Pec | +5469 | 254.7 | 154 |
| NGC6251 – Seyfert 2 Galaxy | 16 32 33.6 + 82 32 17 | Uma | 13.6(p) | 1.8 x 1.4' | E | +6900 | 321.3 | 11 |
| **SEYFERT 1 GALAXIES:** | | | | | | | | |
| NGC4151 – Seyfert I Galaxy | 12 10 16.6 + 39 18 17 | CVn | 11.5(b) | 6.5 x 5.0' | Sa/SBc | +956 | 44.5 | 74 |
| Mrk 231 - QSO 1254+571) | 12 56 14.2 + 56 52 25 | UMa | 14.4(b) | 1.3 x 0.9' | S | +12300 | 572.8 | 48 |
| IC4329A – Seyfert 1 Galaxy | 13 49 19.4 – 30 18 35 | Cen | 13.0(v) | 2.6 x 0.7' | LA | +4793 | 223.2 | 371 |
| Mrk 279 – Seyfert I Galaxy | 13 53 03.5 + 69 18 29 | Dra | 14.6)p) | 0.8 x 0.4' | SO | +9176 | 427.3 | 27 |
| **RADIO GALAXIES:** | | | | | | | | |
| 3C 236 – Largest Galaxy | 10 06 01.7 + 34 54 10 | LMi | 16.5 | 0.4 x 0.2' | E | +29674 | 1,382 (B) | 104 |
| 3C 264 - NGC3862 | 11 45 05.0 + 19 36 22 | Com | 13.7(b) | 1.4 x 1.4' | E | +6469 | 301.3 | 147 |
| 3C 270 - NGC4261 | 12 19 23.3 + 05 49 33 | Vir | 10.4(v) | 4.3 x 3.5 | E | +2210 | 102.9 | 193 |
| Cygnus A – Radio Galaxy | 19 59 27.0 + 40 44 02 | Cyg | 15.5(v) | 0.6 x 0.4' | S | +16837 | 784.1 | 84 |
| 3C 449 – Radio Galaxy | 22 31 20.6 + 39 21 30 | Lac | 14.5(b) | 0.6 x 0.7' | E.SO | +5122 | 238.5 | 123 |
| **QUASARS:** | | | | | | | | |
| BR1202 – 0725 | 12 05 20.8 – 07 41 46 | Vir | 17.5 | Stellar | QSO | z=4.69 | 12,000 (B) | 283 |
| Mrk 205 – Quasar & NGC4319 | 12 21 44.0 + 75 18 38 | Dra | 15.5 | Stellar | QSO | +21173 | 986.1 | 9 |
| 3C 273 – Quasar | 12 29 06.4 + 02 03 09 | Vir | 13.0 | Stellar | QSO | z=0.158 | 2,206 (B) | 238 |
| HS 1946 + 7658 | 19 44 55.0 + 77 05 52 | Dra | 15.8(v) | Stellar | QSO | z=3.02 | 11,500 (B) | 13 |
| **QUASARS – GRAVITATIONAL LENS:** | | | | | | | | |
| APM 08270 + 5255 A | 08 31 41.6 + 52 45 18 | Lyn | 15. | Stellar | QSO | z=3.91 | 11,750(B) | 44 |
| Double Quasar – Grav. Lens | 10 01 21.1 + 55 53 57 | UMa | 16.7(v) | Stellar–2 | QSO | z=1.154 | 8,000 (B) | 45 |
| QSO 1115+0802 – Grav. Lens | 11 18 17.0 + 07 45 59 | Leo | 17.0(v) | Stellar | QSO | z=1.414 | 8,900 (B) | 191 |
| Einstein's Cross – Grav. Lens | 22 40 30.2 + 03 21 30 | Aqr | 16.8 | Stellar–4 | QSO | z=1.70 | 9,500 (B) | 257 |
| **BL LACERTA OBJECTS:** | | | | | | | | |
| Mrk 421 – Bl Lac Object | 11 04 27.0 + 38 12 29 | UMa | 13.8var | 0.7 x 0.7' | | +9000 | 419.1 | 106 |
| Mrk 501 – Bl Lac Object | 16 53 52.3 + 39 45 32 | Her | 14.4(b) | 1.2 x 0.9' | | +10092 | 470.0 | 114 |
| Bl Lacerta – 2200 + 420 | 22 02 43.3 + 42 16 40 | Lac | 15.1 var. | | | z=.069 | 963.4 | 87 |

***Distance:*** $H_o = 70\ Km.s^{-1}\ Mpc^{-1}$ ***(B) = Billion Light Years***

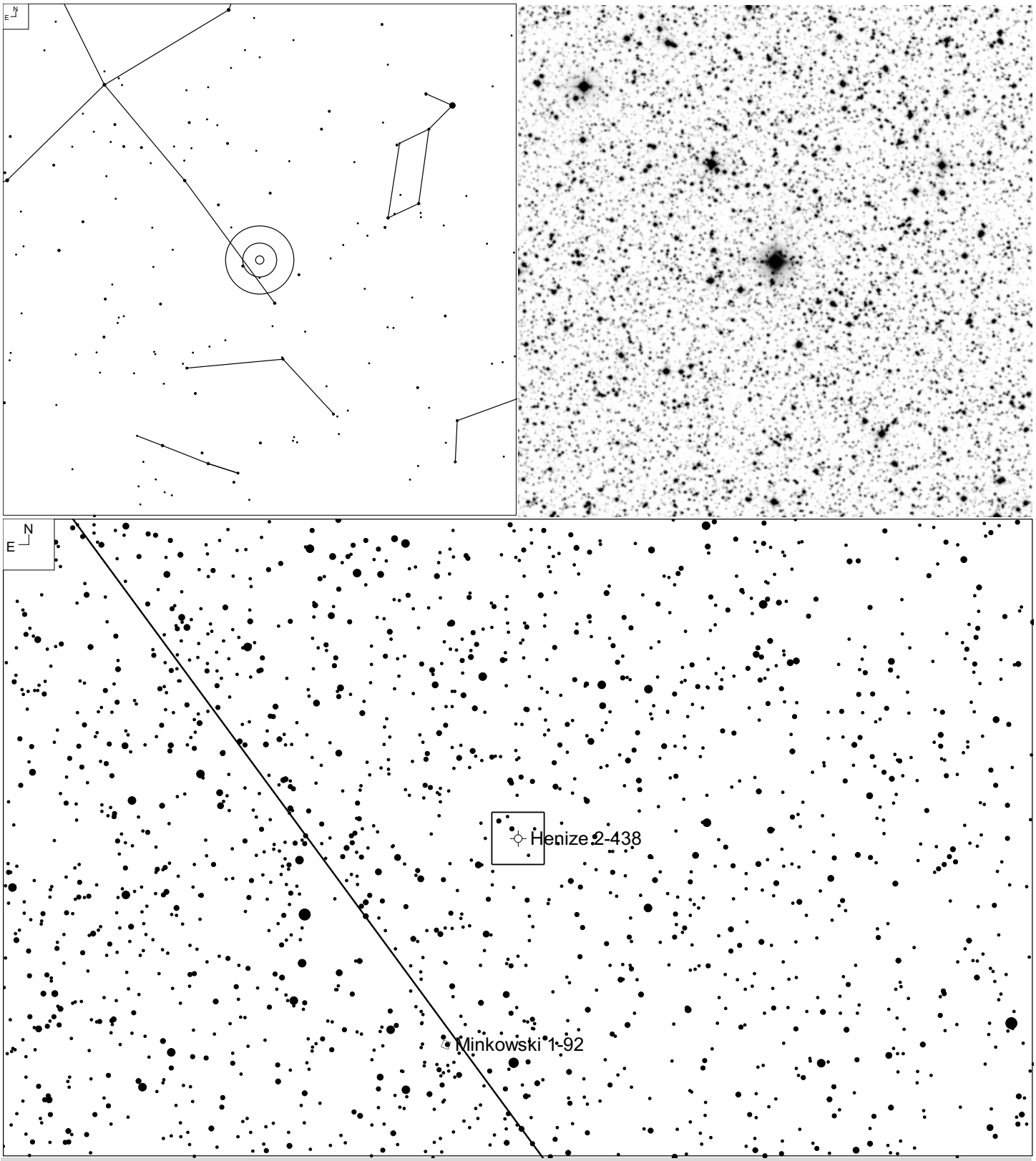
**GOOD LUCK!!!!** Å☼☺♀♂▲ώÆŒØ®©§ **LARRY MITCHELL - H.A.S., F.B.A.C., H.N.A.C.**

# IC 443 (Gemini)



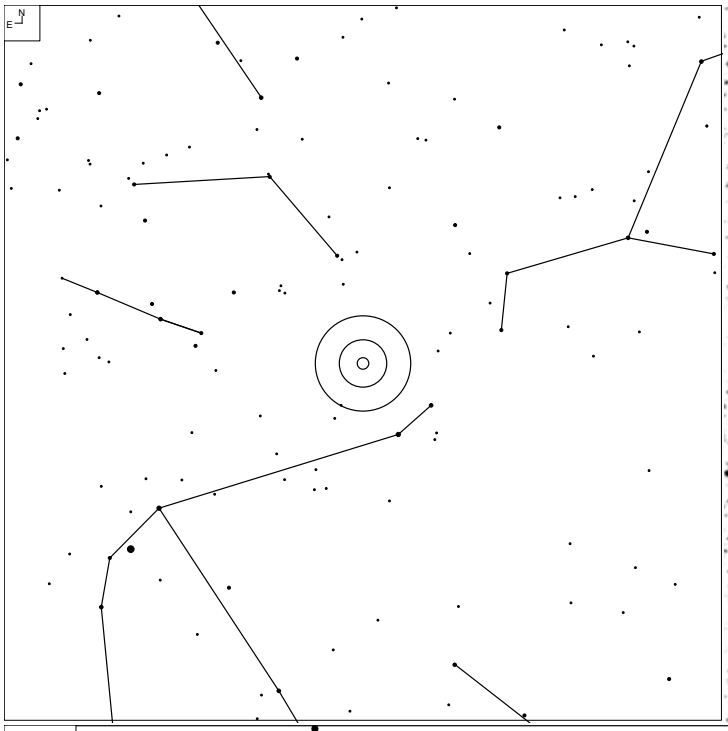

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| LBN 844 | SNR | 06 17 52.0 | +22 46 00 | - | - | 27 x 7’ | 76 | 36 |

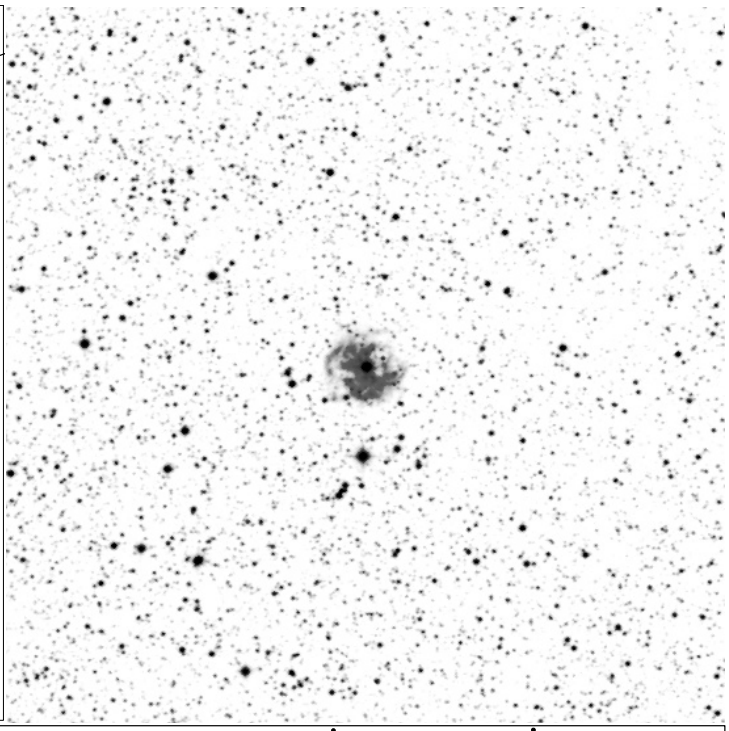
# Campbell's Star (Cygnus)

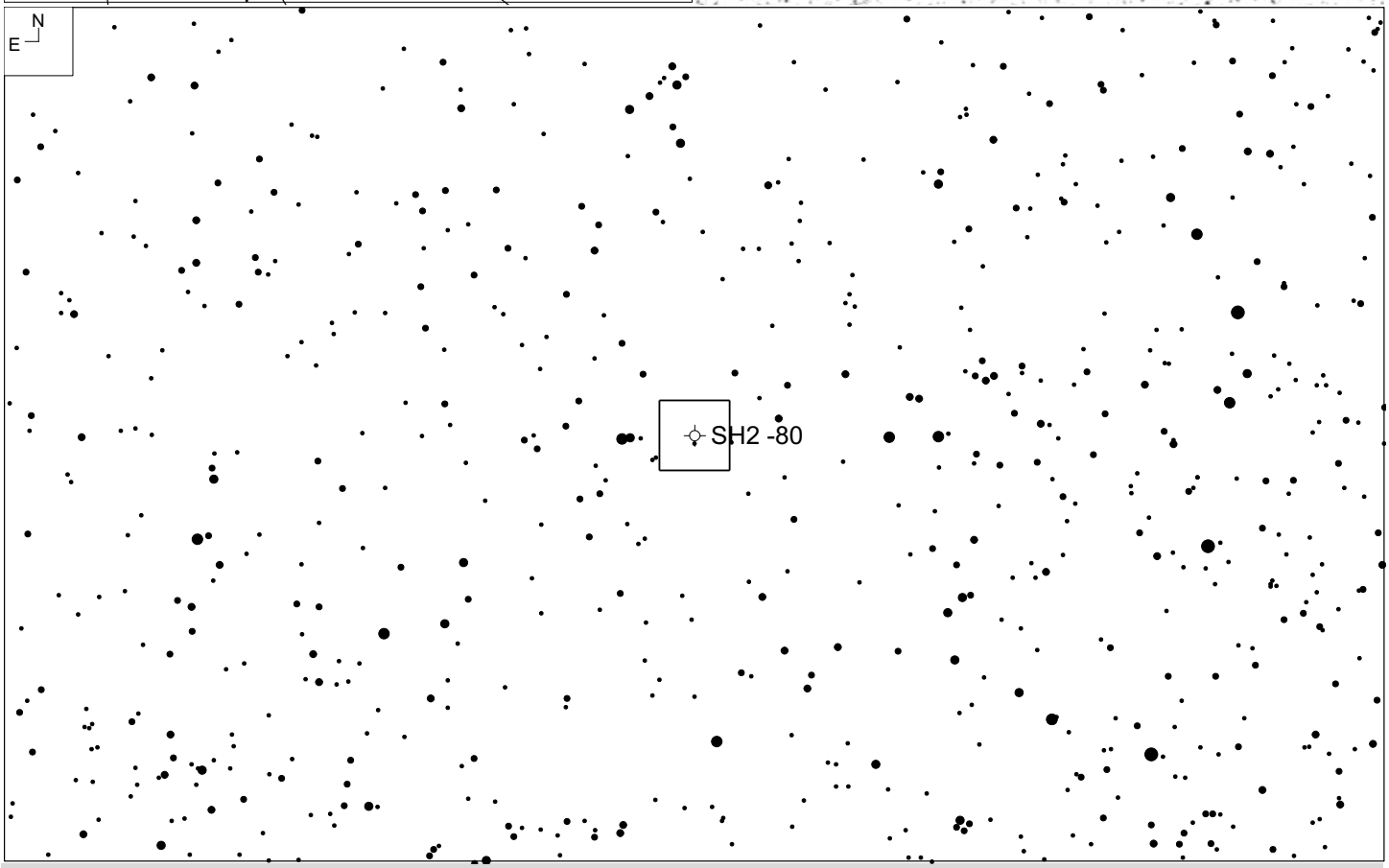



| Other ID | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| BD+30 3639 | 19 34 45.2 | +30 30 59 | 10.4v | | 7.5" | 48 | 30 |

# Minkowski 1-67 (Sagitta)

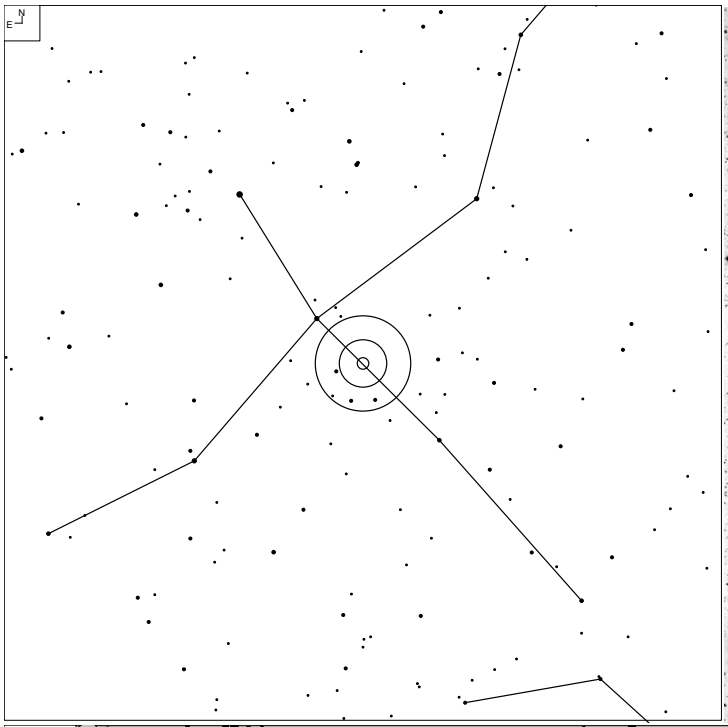


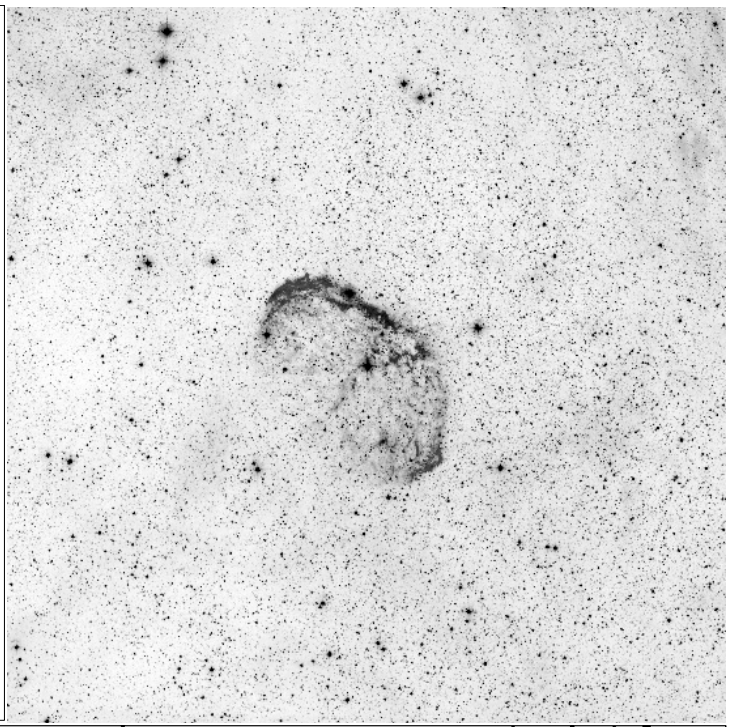



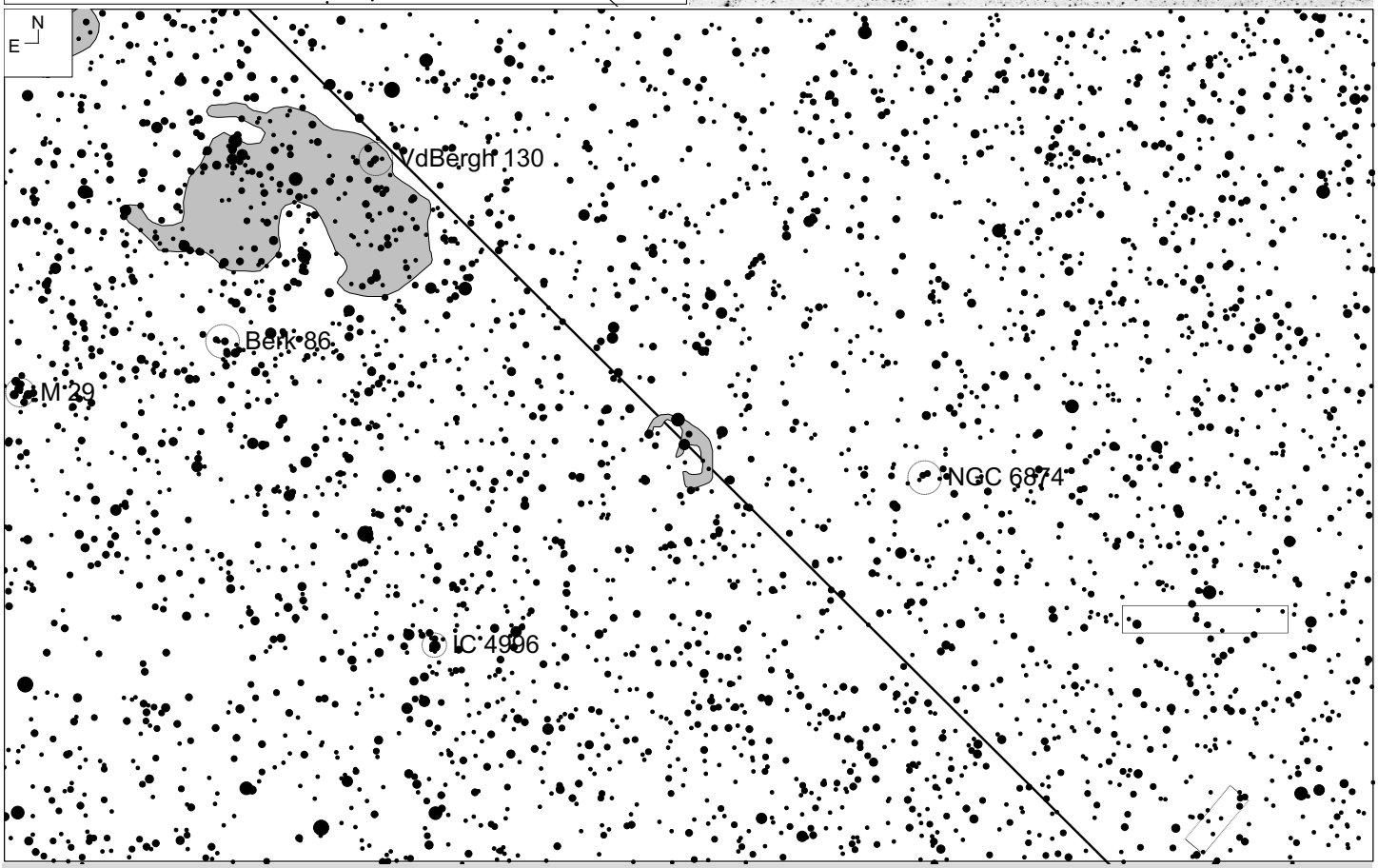



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | | 19 11 30.9 | +16 51 38 | 8.2 | | 1.8” | 85 | 42 |

# NGC 6888 (Cygnus)

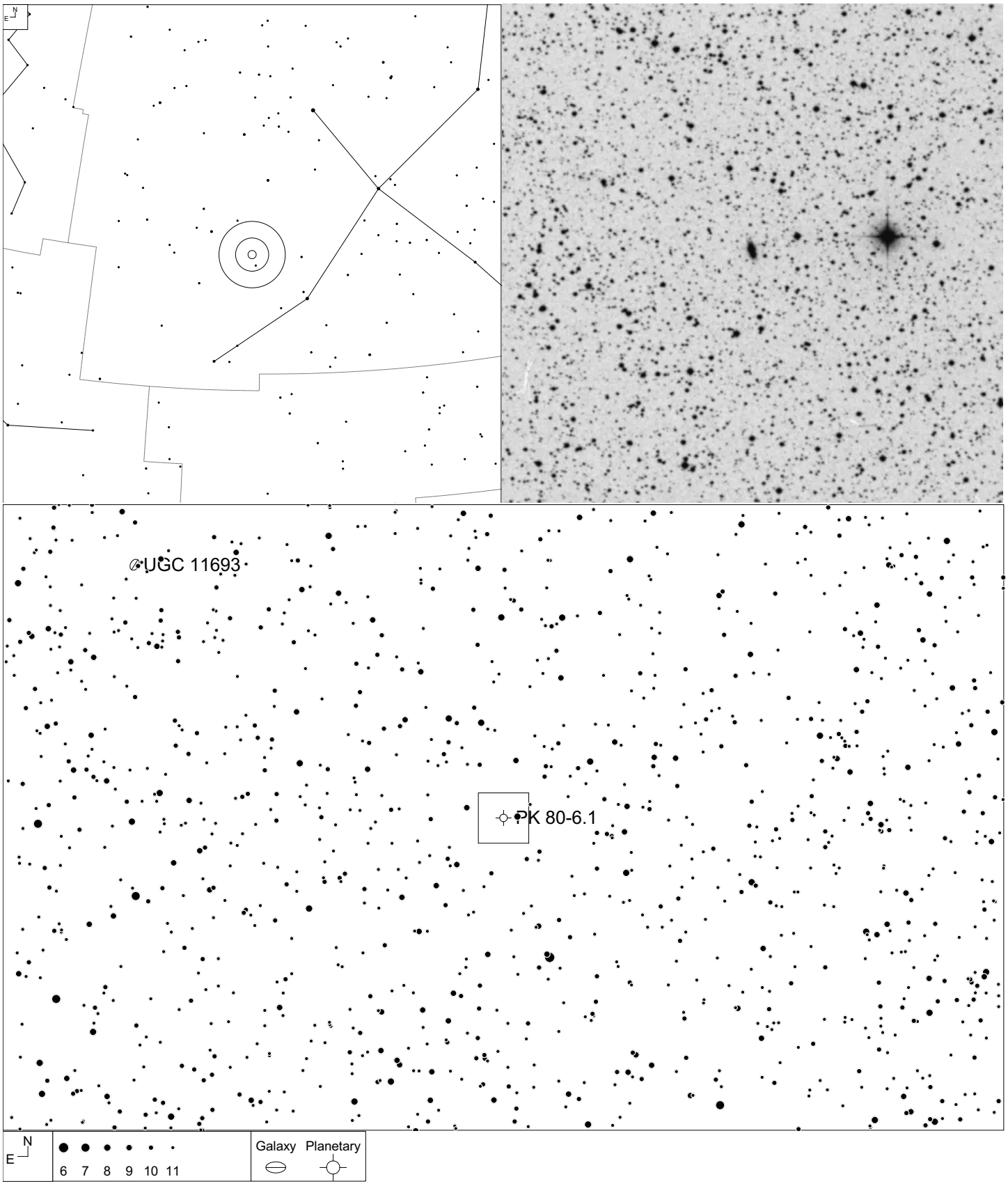






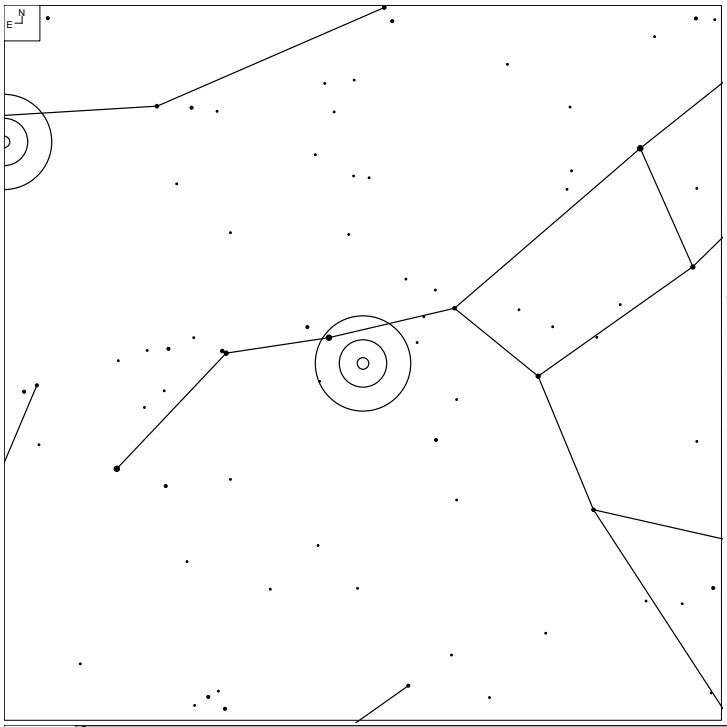

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Crescent Nubula | WR | 20 12 01.0 | +38 23 00 | - | - | 18 x 8’ | 48 | 17 |

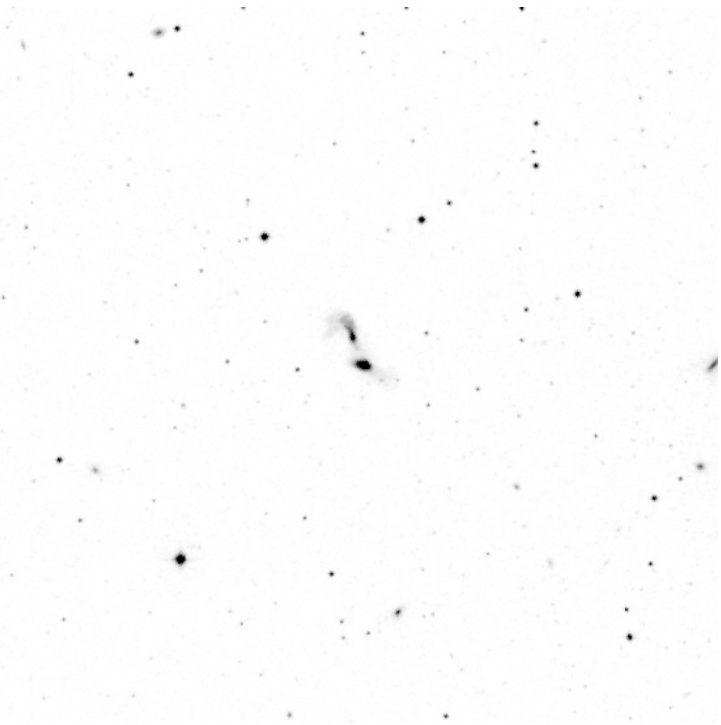
# PK 80-6.1 - Egg Nebula (Cygnus)

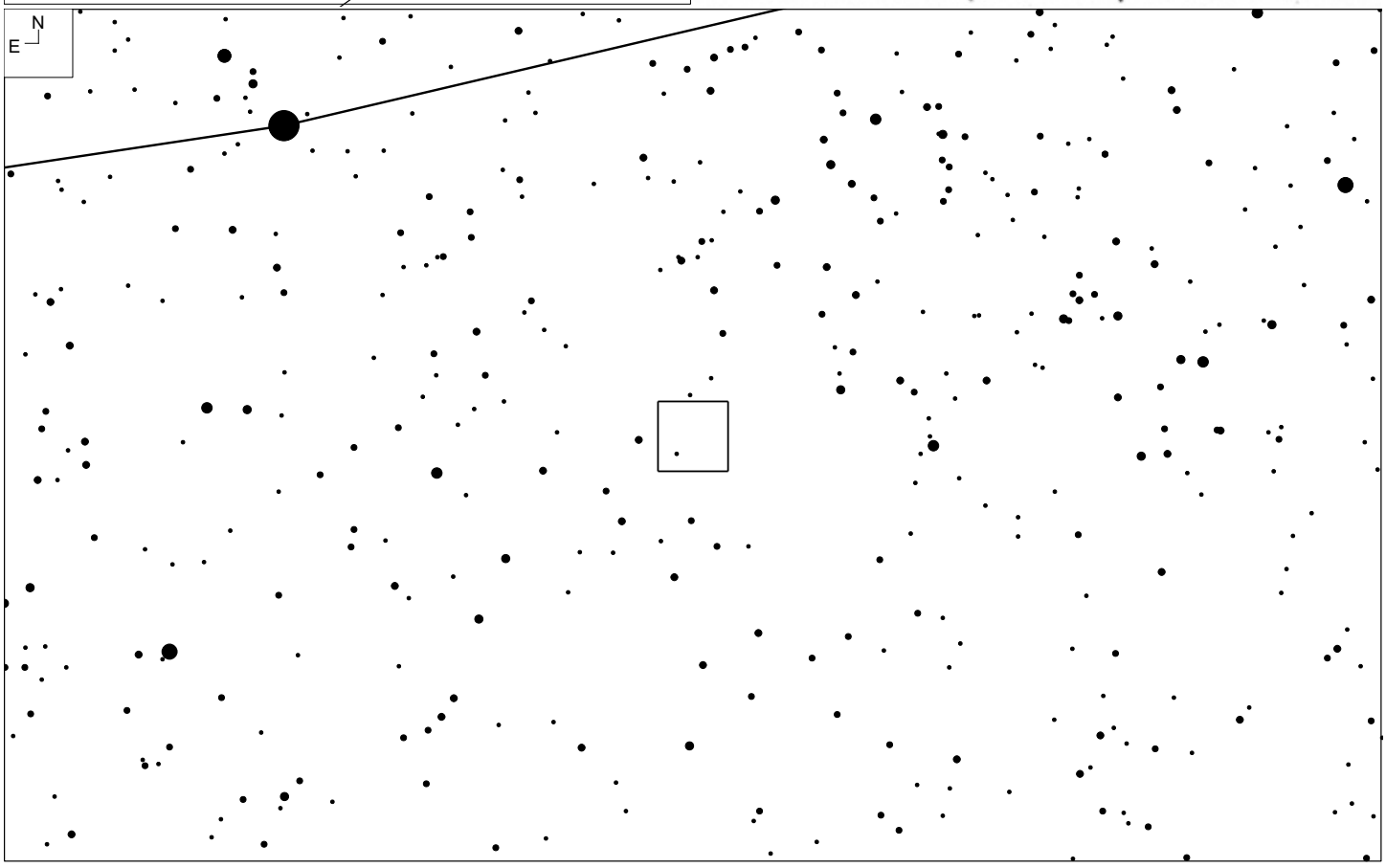



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| CRL 2688 | Proto | 21 02 18.7 | +36 41 40 | 13.5p | - | 1.0 x 0.5’ | 47 | 29 |

# Markarian 220 (Ursa Major)

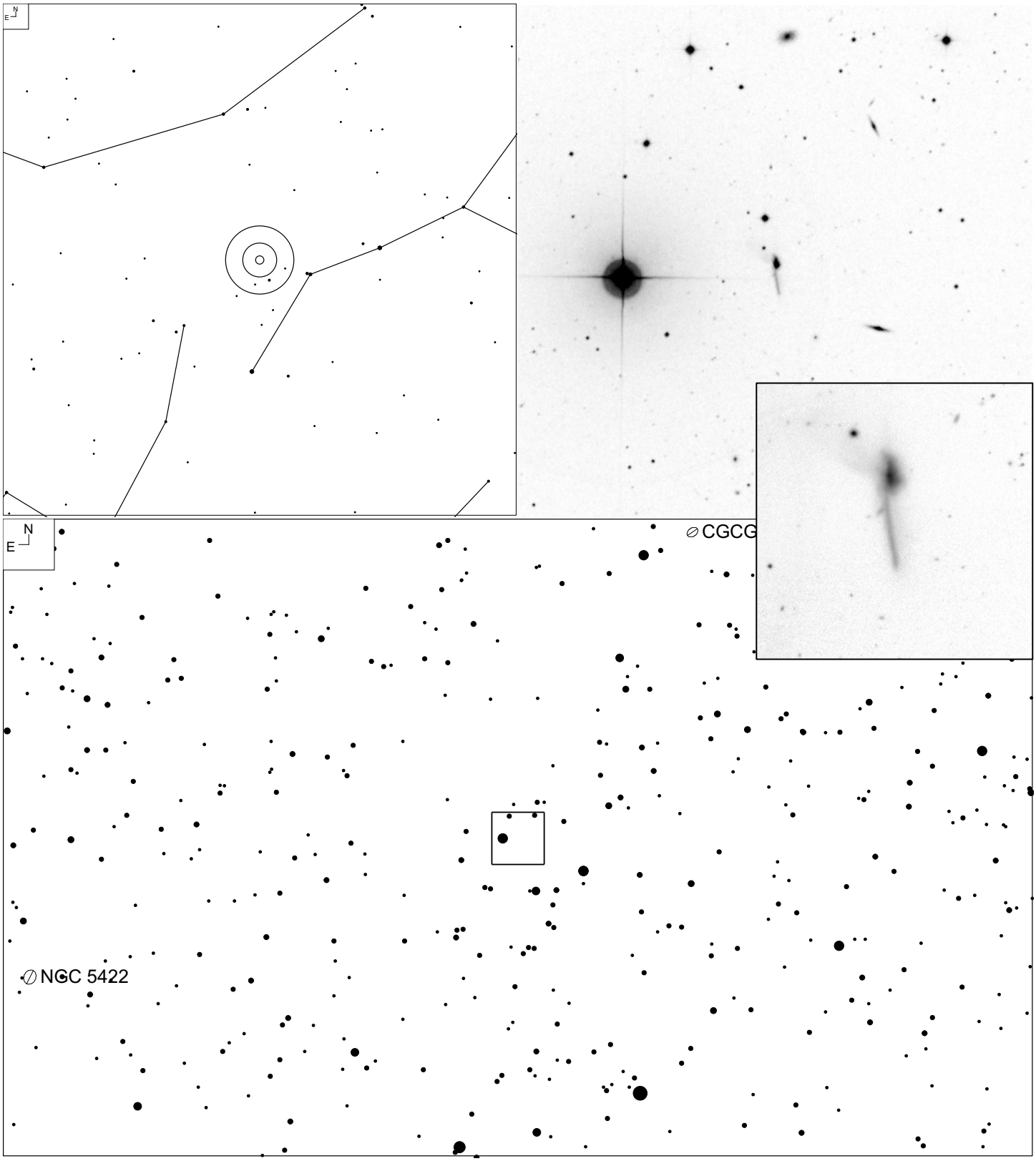






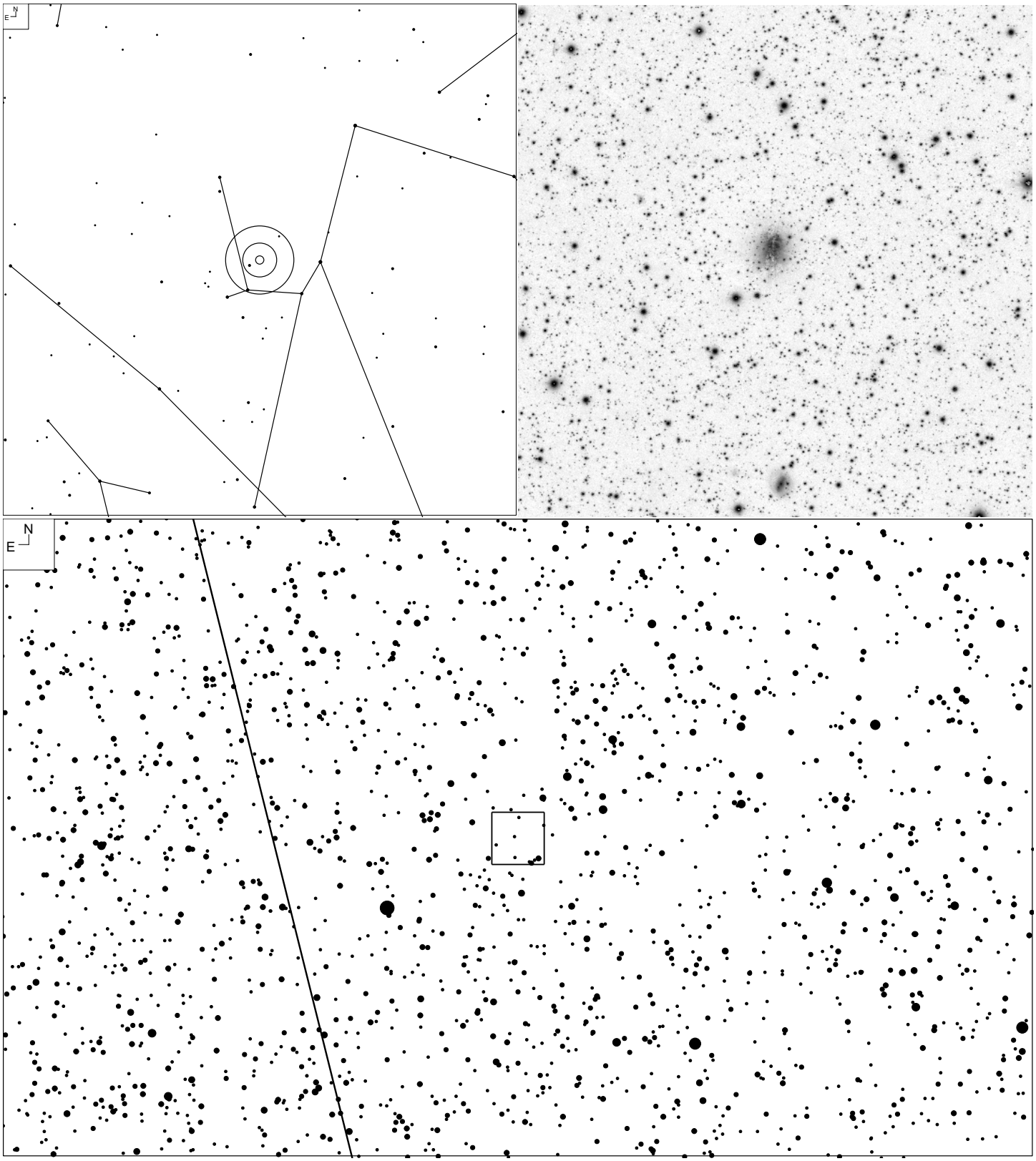

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | | 12 43 47.7 | +54 53 45 | 14.5 | 1.3 x 0.3’ | 24 | 11 |

# Markarian 273 (Ursa Major)




| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | | 13 44 41.9 | +55 52 57 | 15.1 | 1.3 x 0.3’ | 23 | 11 |

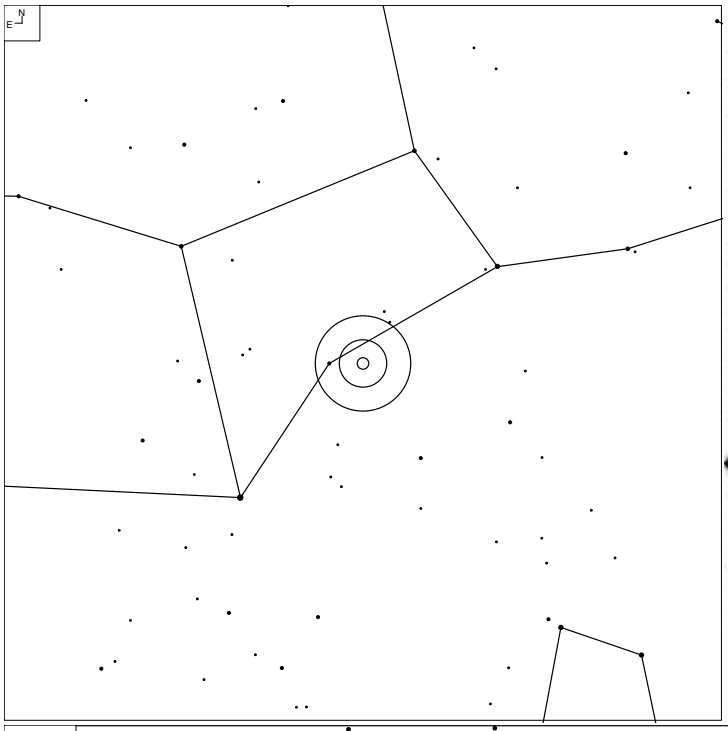
# Barnard's Star (Ophiuchus)

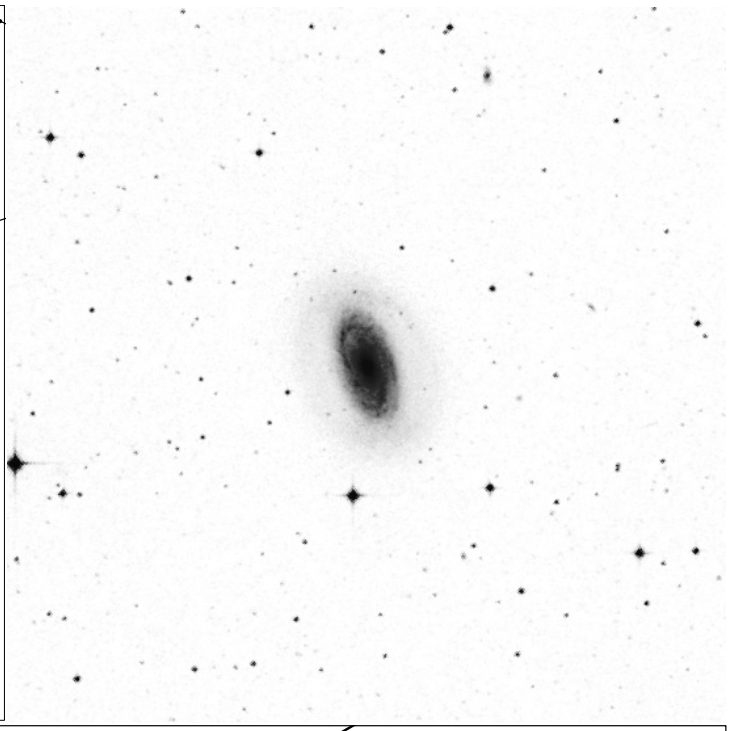


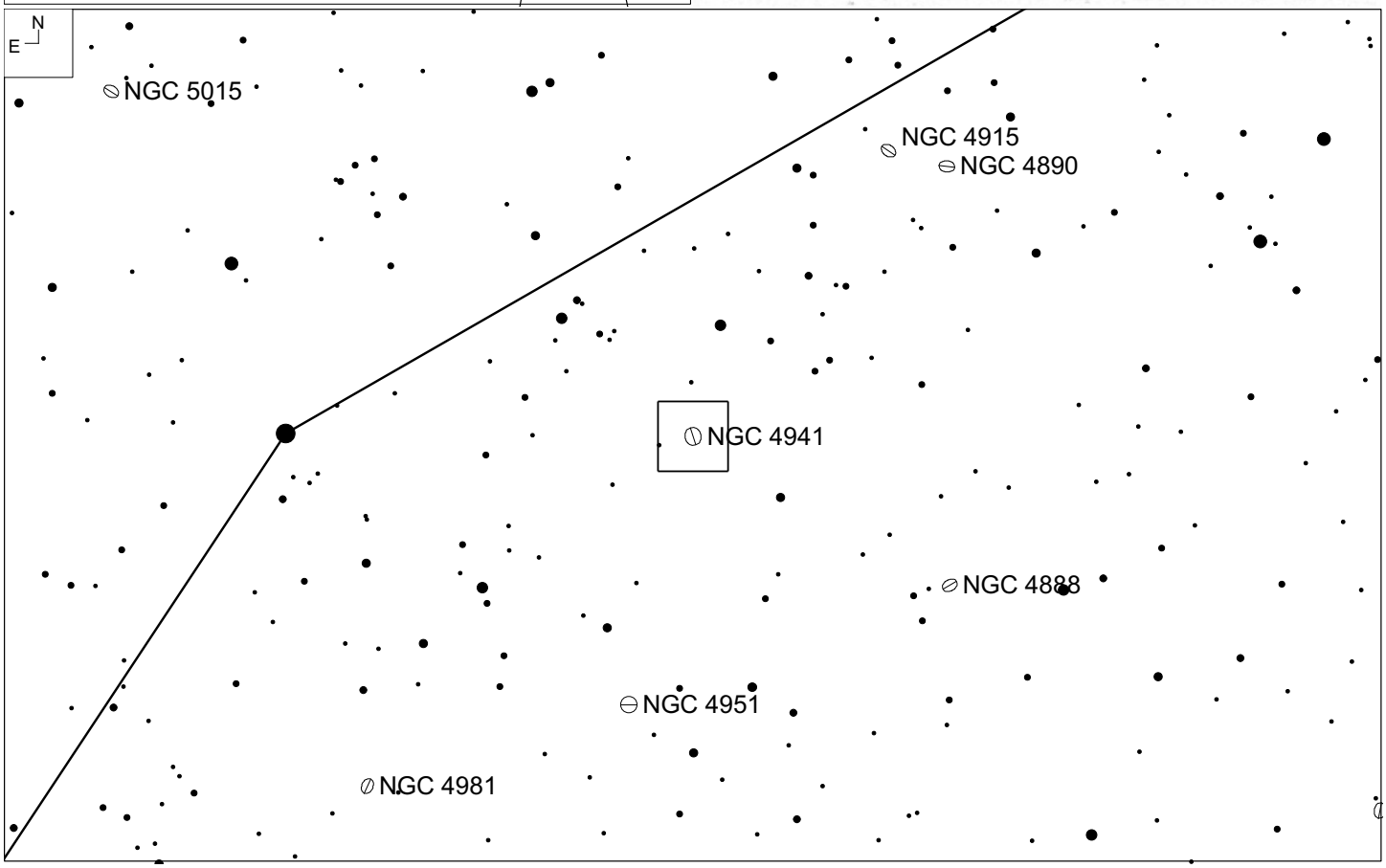

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| Star | | 17 57 48 | +04 41 49 | 9.5 | Stellar | 106 | 55 |

https://skyandtelescope.org/sky-and-telescope-magazine/finder-chart-for-barnards-star-in-the-may-2024-issue-of-st/

# NGC 4941 (Virgo)

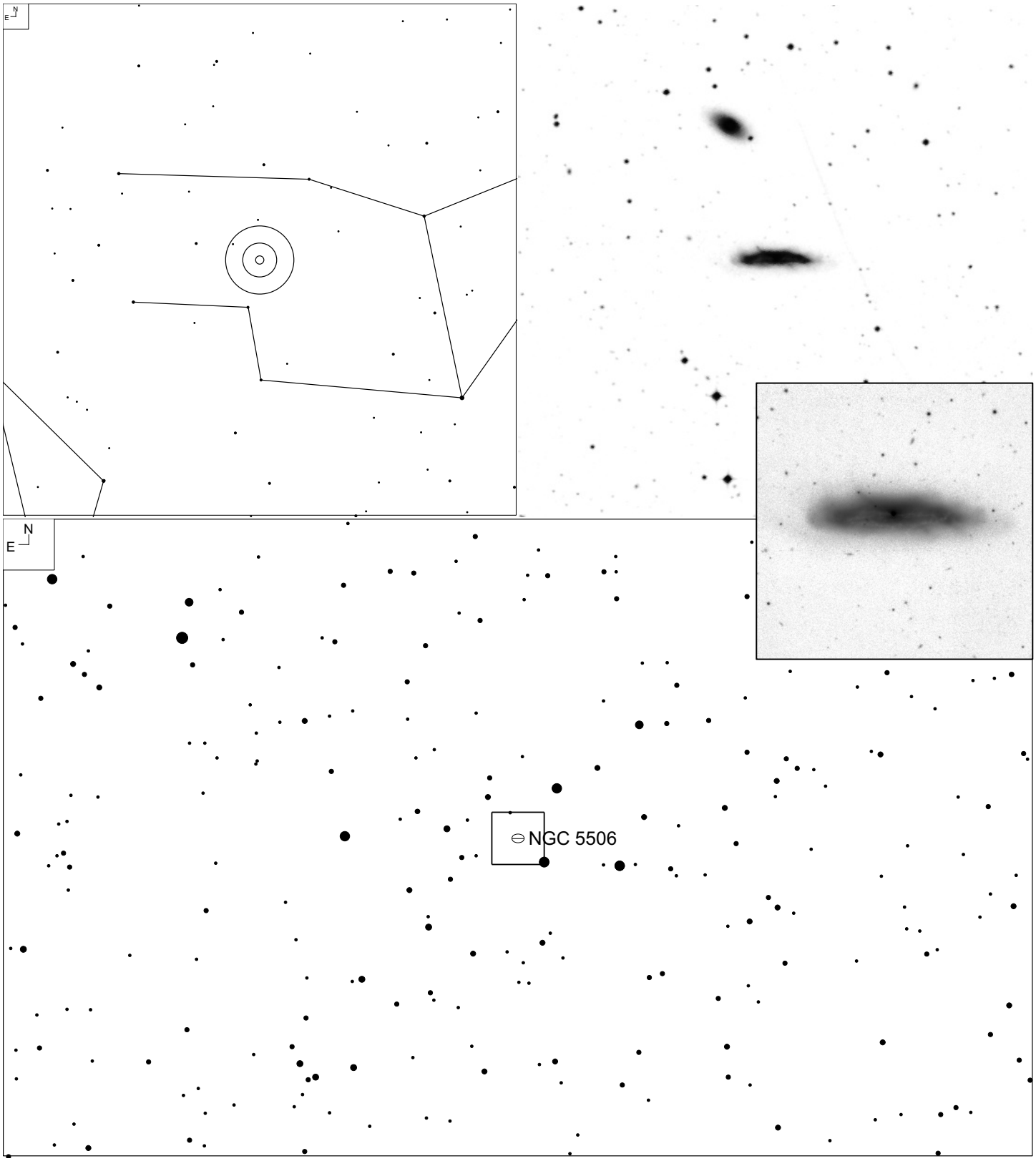






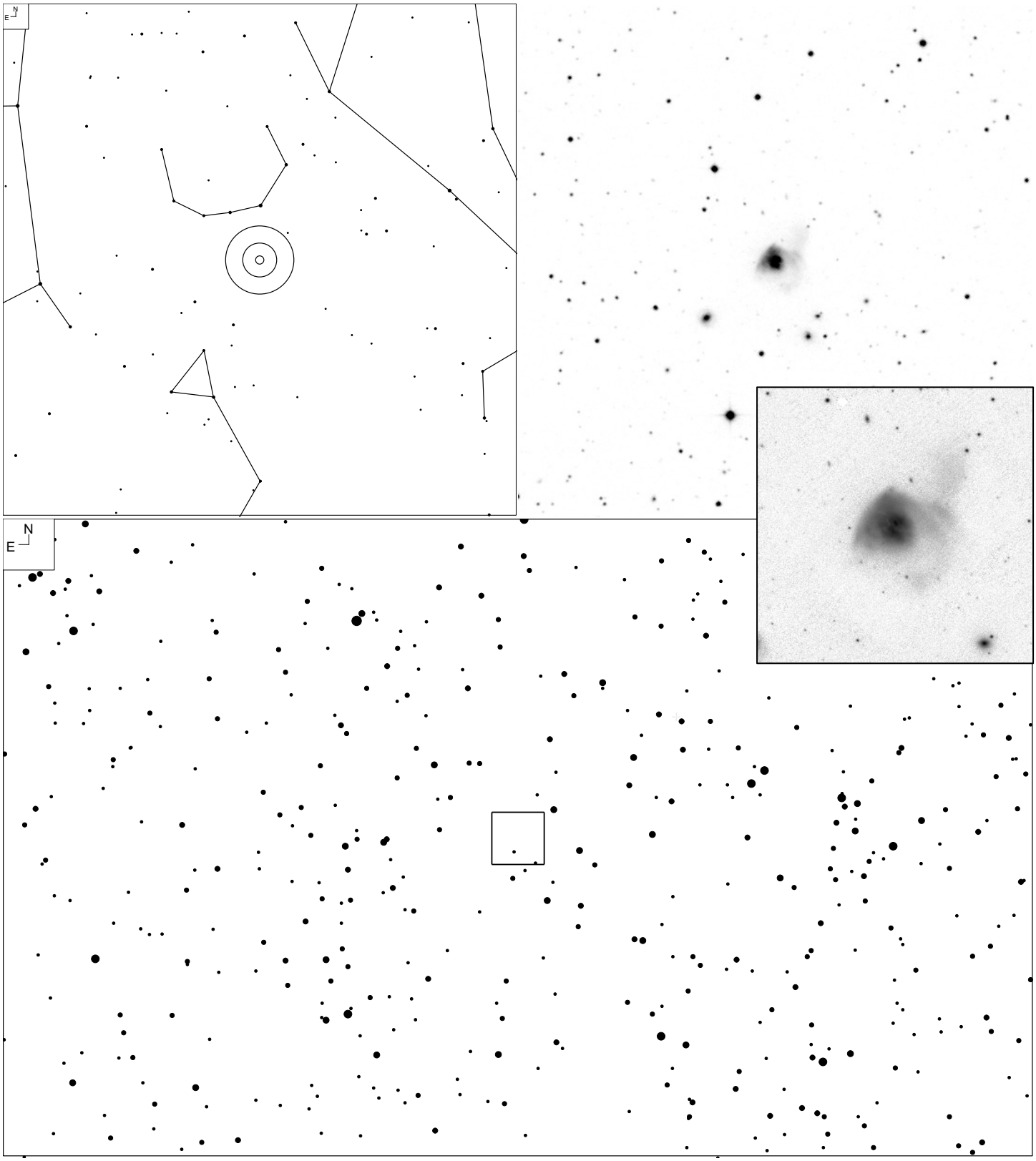

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | | 13 04 13.1 | -05 33 05 | 11.9b | 3.6 x 1.9’ | 110 | 57 |

# Markarian 1376 (Virgo)



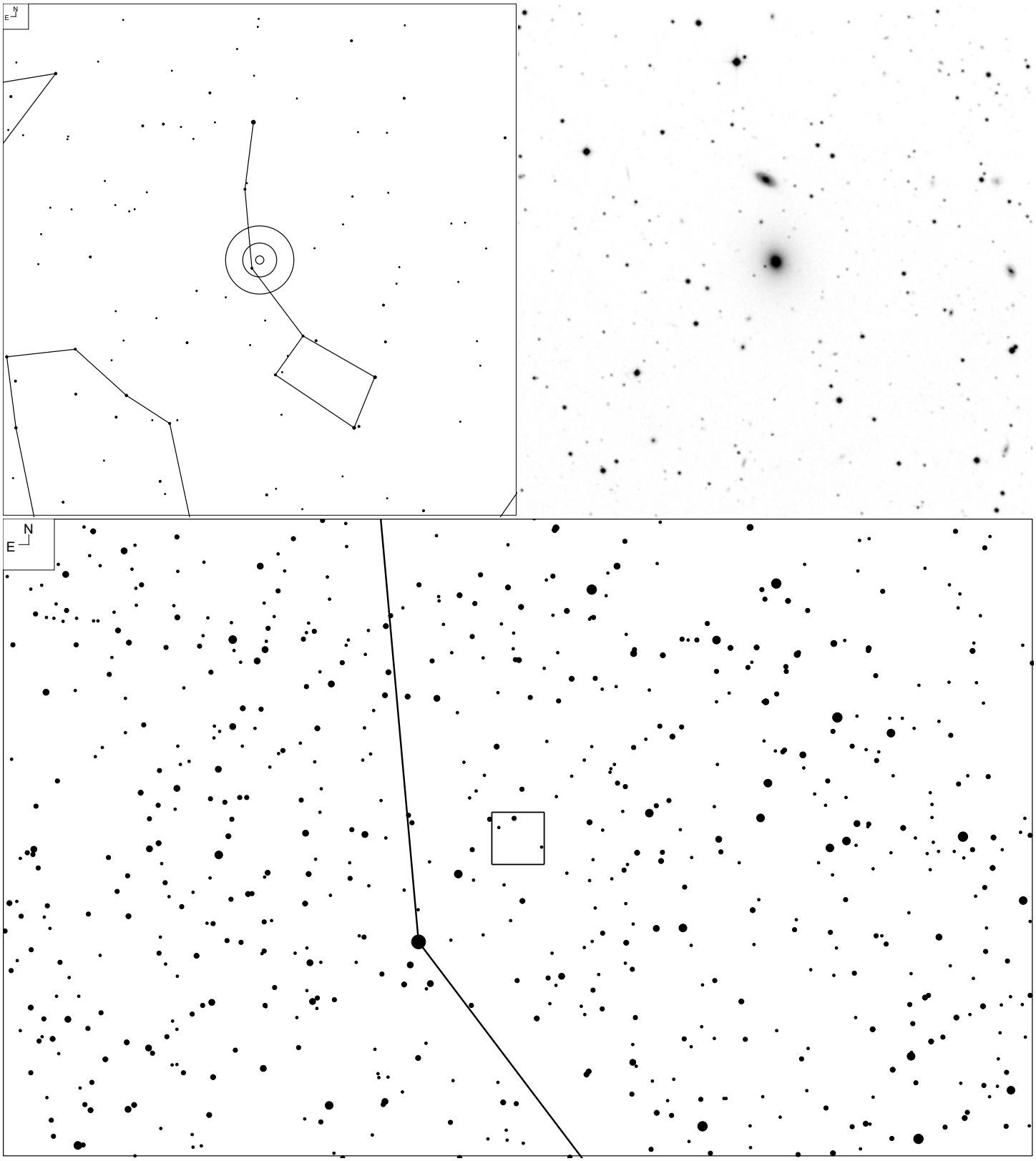

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| NGC 5506 | | 14 13 14.9 | -03 12 27 | 12.8b | 2.8 x 0.8’ | 109 | 56 |

# Arp 220 (Serpens)



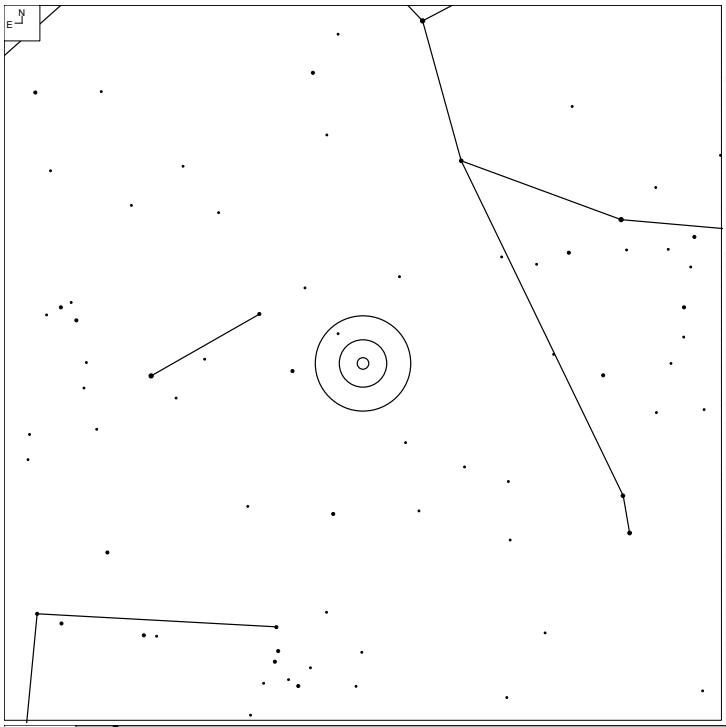

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| IC 4553 | Pec | 15 34 57.2 | +23 30 10 | 13.9b | 1.5 x 1.2’ | 69 | 32 |

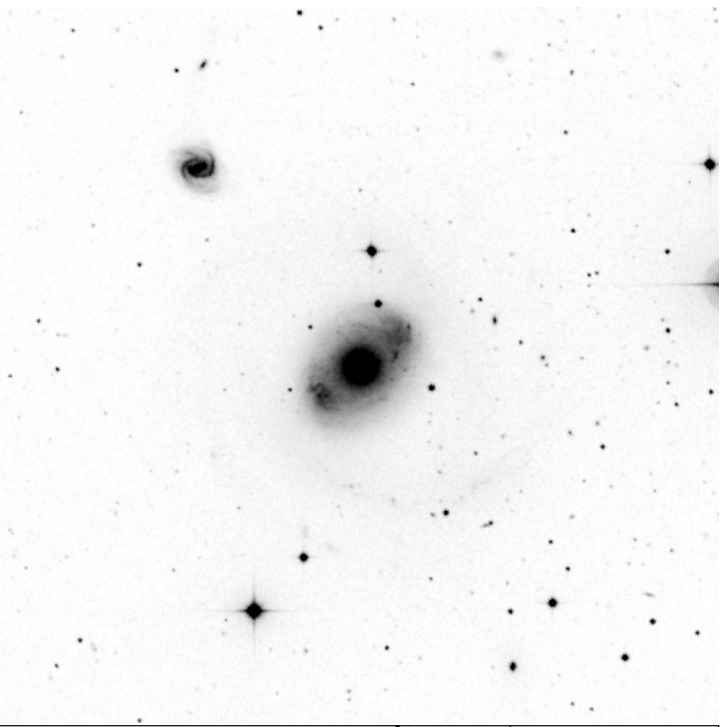
# NGC 6251 (Ursa Major)

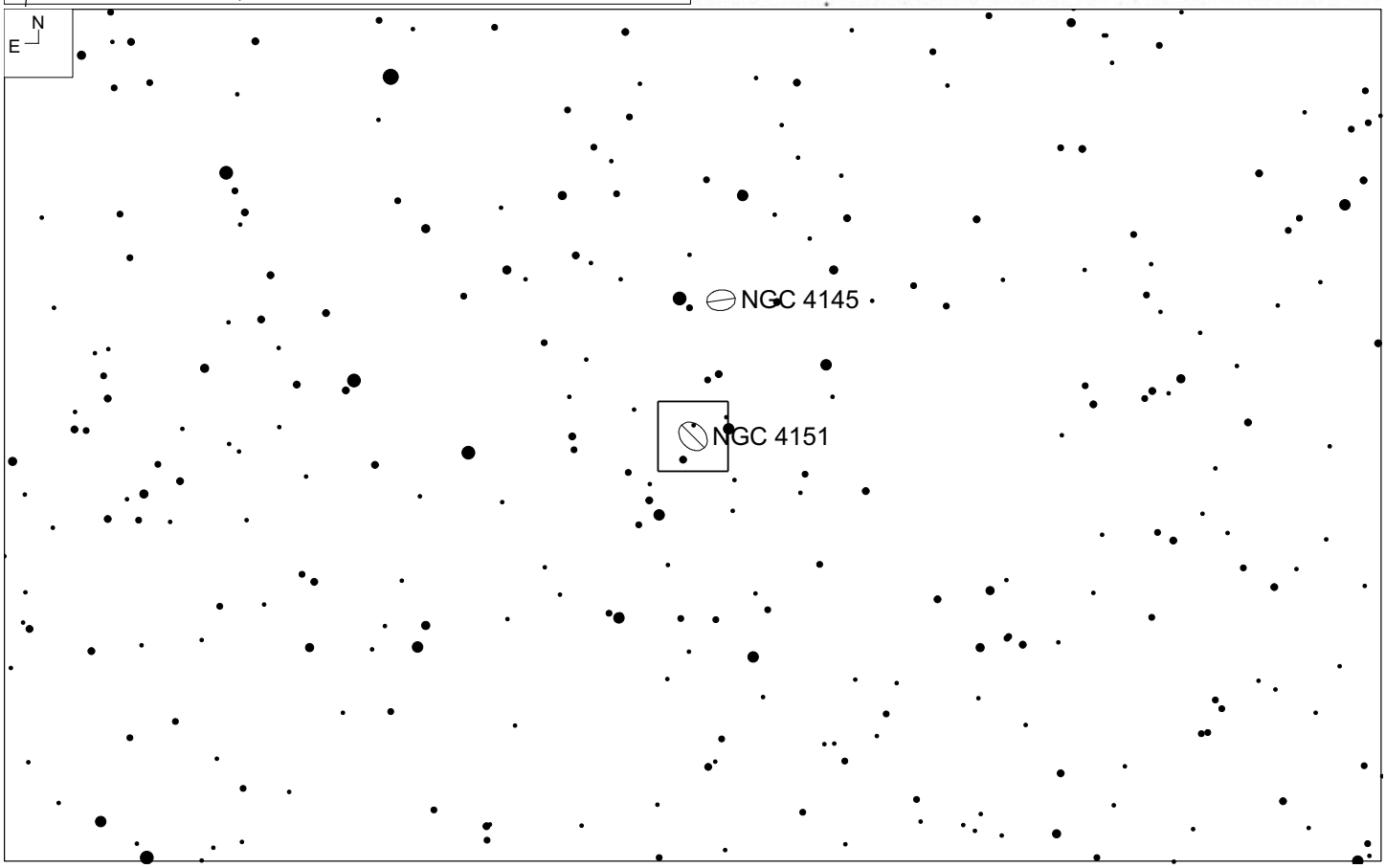



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | E | 16 32 33.6 | +82 32 17 | 13.6p | 1.8 x 1.4’ | 4 | 1 |

# NGC 4151 (Canes Venatici)

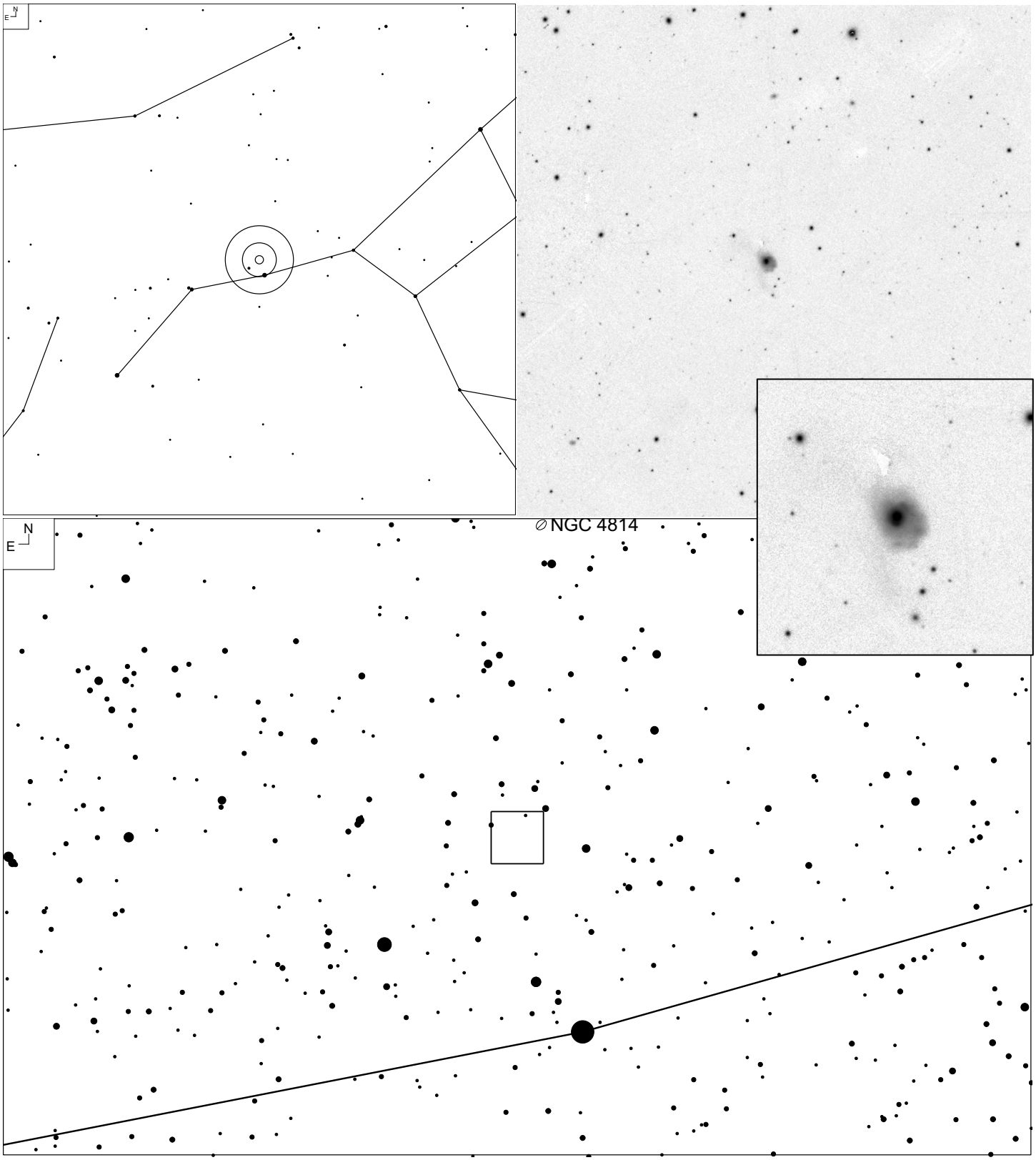






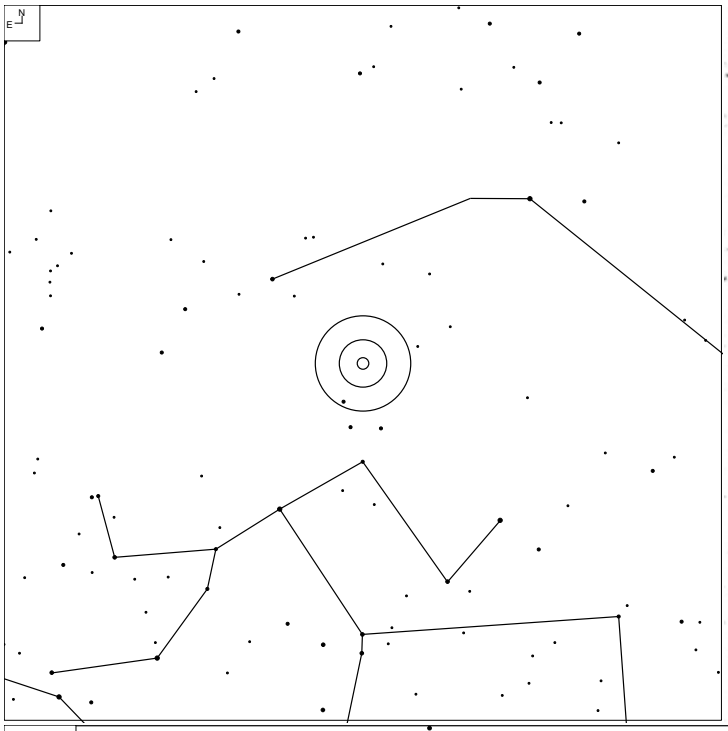

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | Sa/SBc | 12 10 16.6 | +39 18 17 | 11.5b | 6.5 x 5.0’ | 37 | 21 |

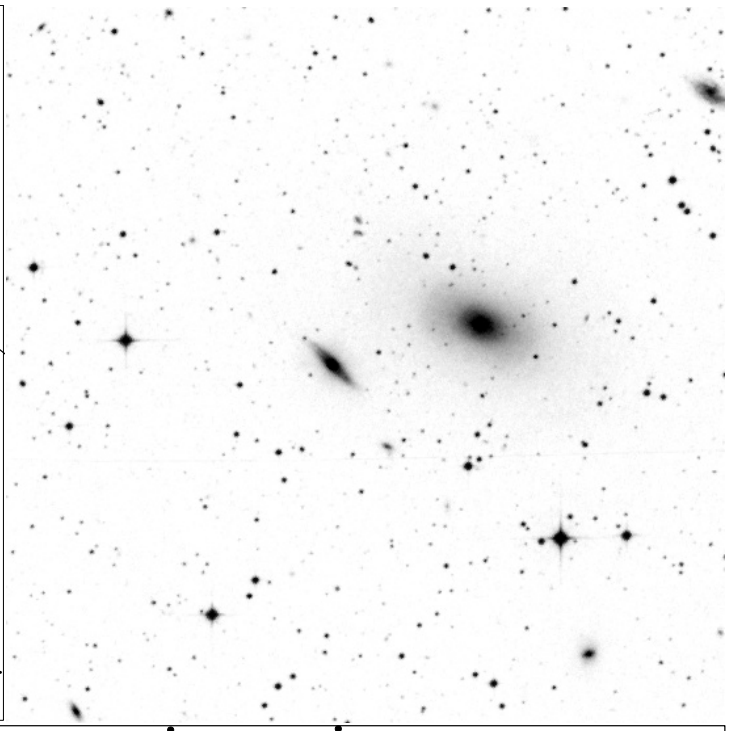
# Markarian 231 (Ursa Major)

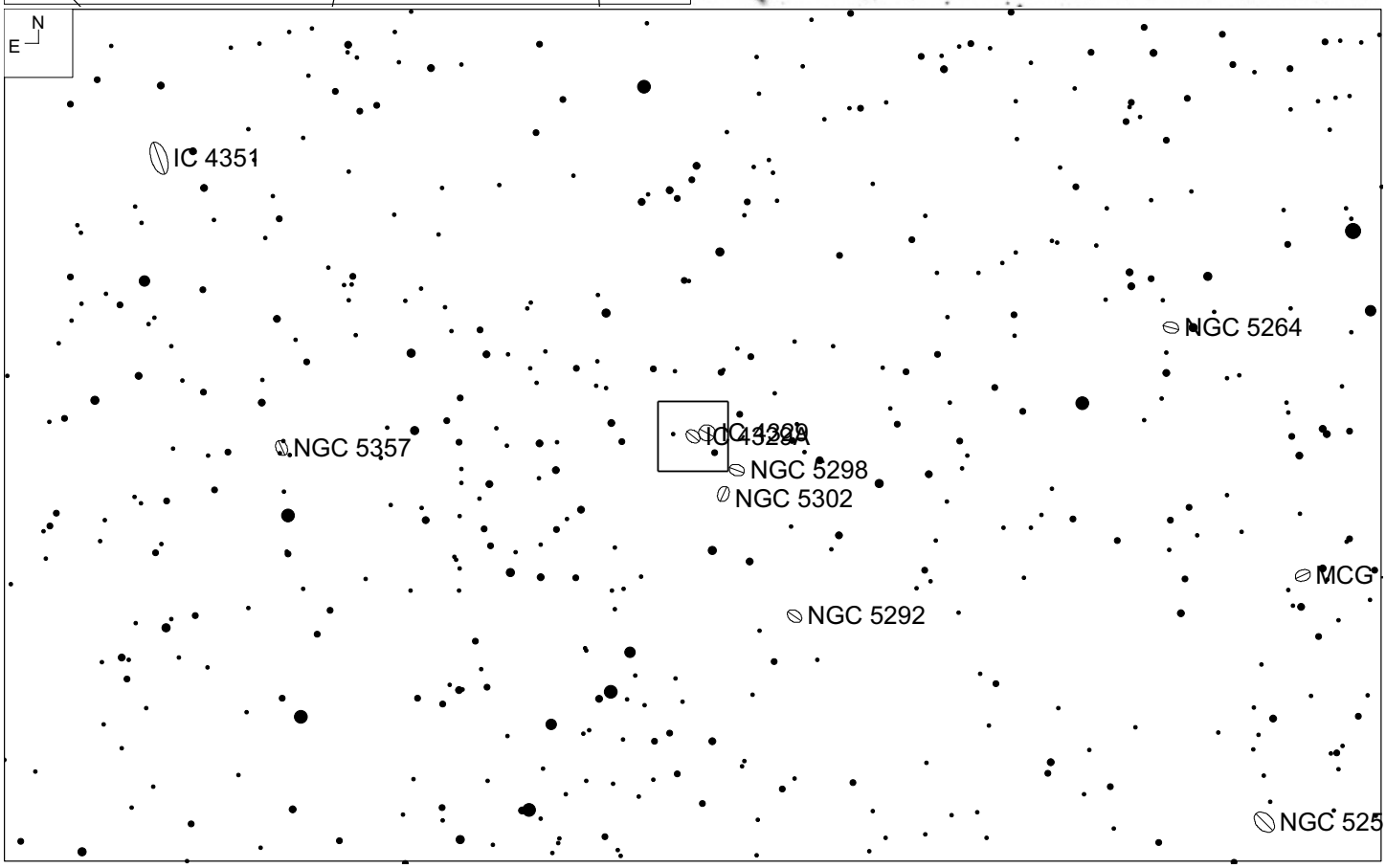



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| QSO 1254+571 | S | 12 56 14.2 | +56 52 25 | 14.4b | 1.3 x 0.9’ | 24 | 11 |

# IC 4329A (Centaurus)

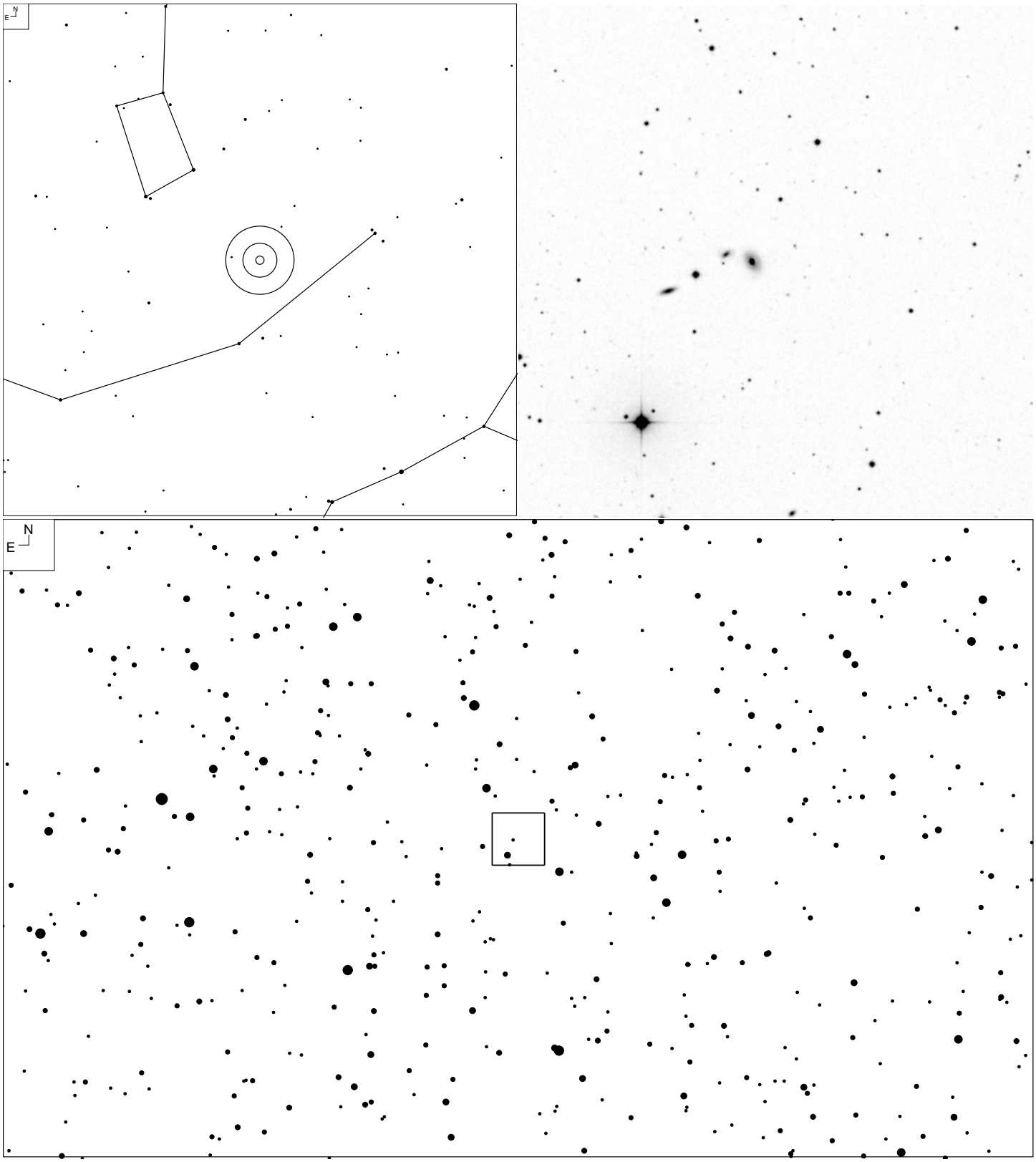






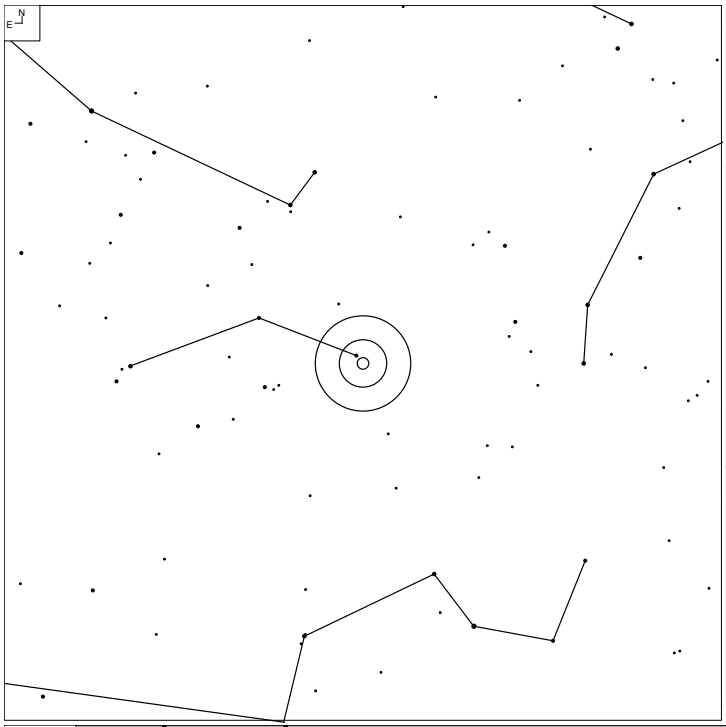

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | LA | 13 49 19.4 | -30 18 35 | 13.0v | 2.6 x 0.7’ | 167 | 81 |

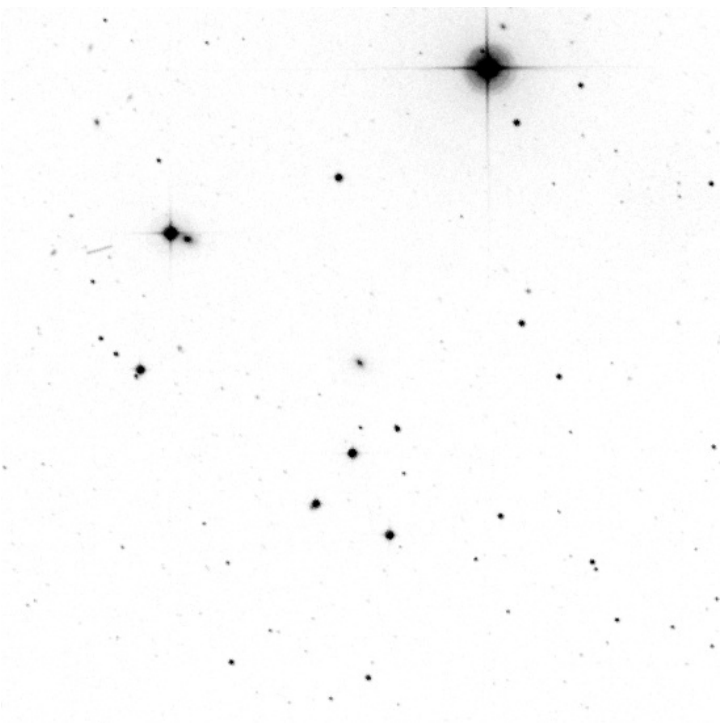
# Markarian 279 (Draco)

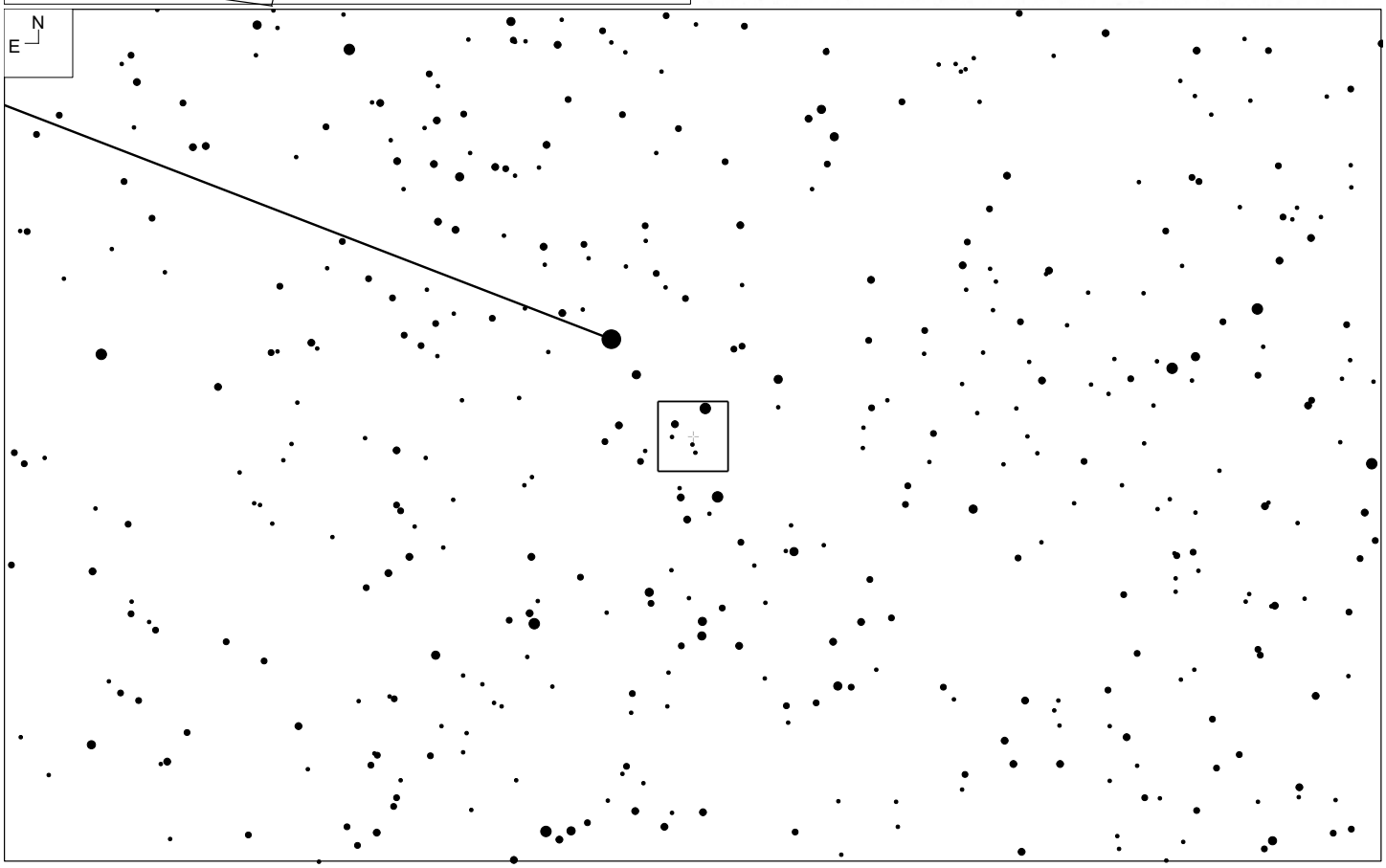



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | S0 | 13 53 02.5 | +69 18 29 | 14.6p | 0.8 x 0.4’ | 12 | 4 |

# 3C 236 (Leo Minor)

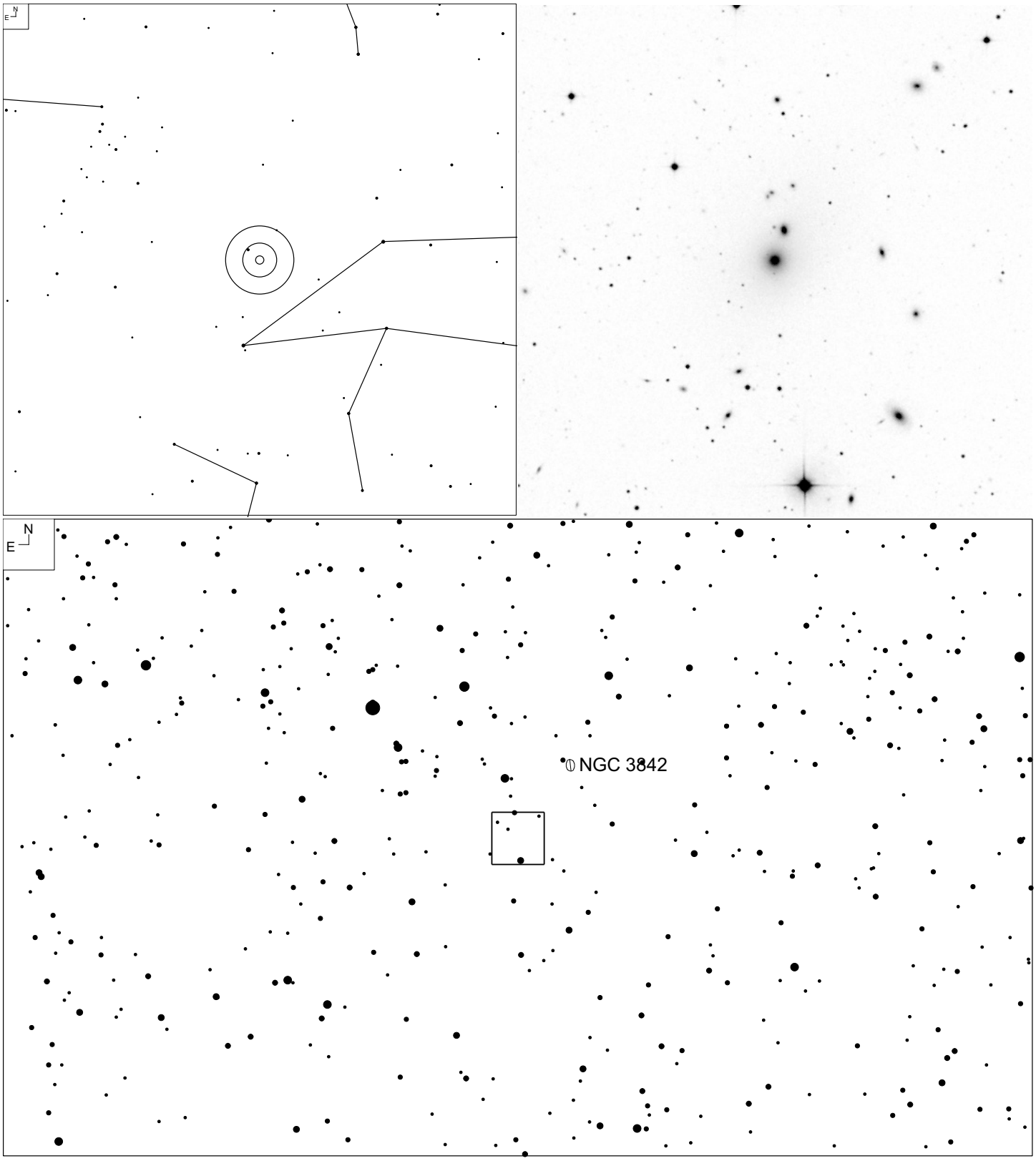






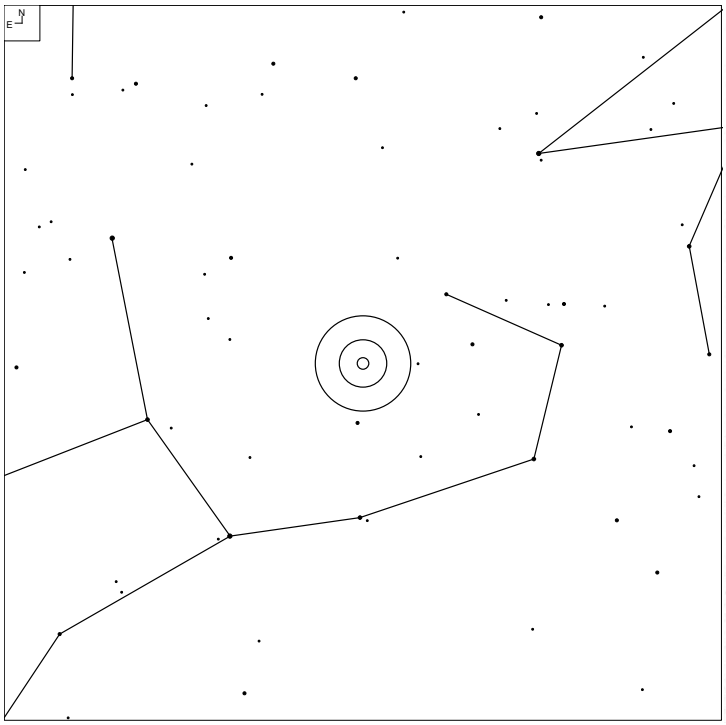

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | E | 10 06 01.7 | +34 54 10 | 16.5 | 0.4 x 0.2’ | 55 | 34 |

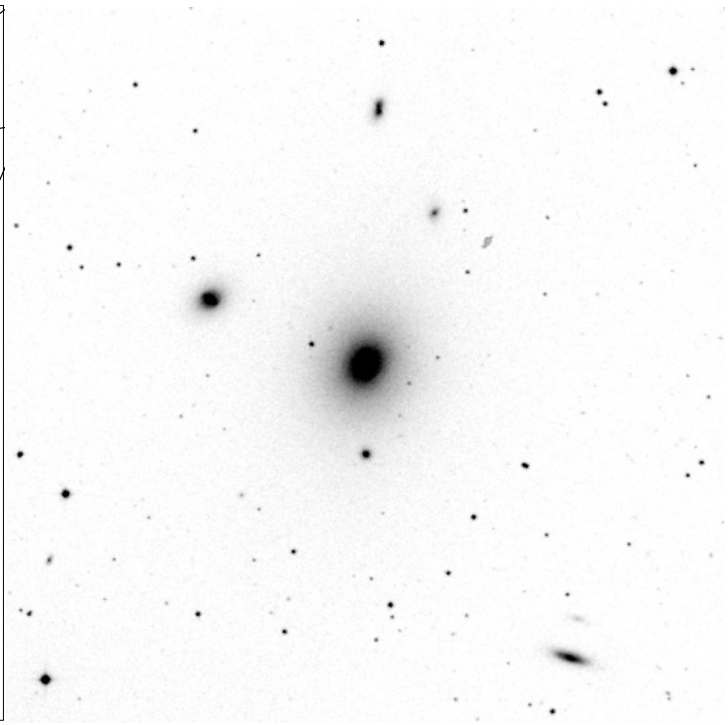
# 3C 264 (Coma Berenices)

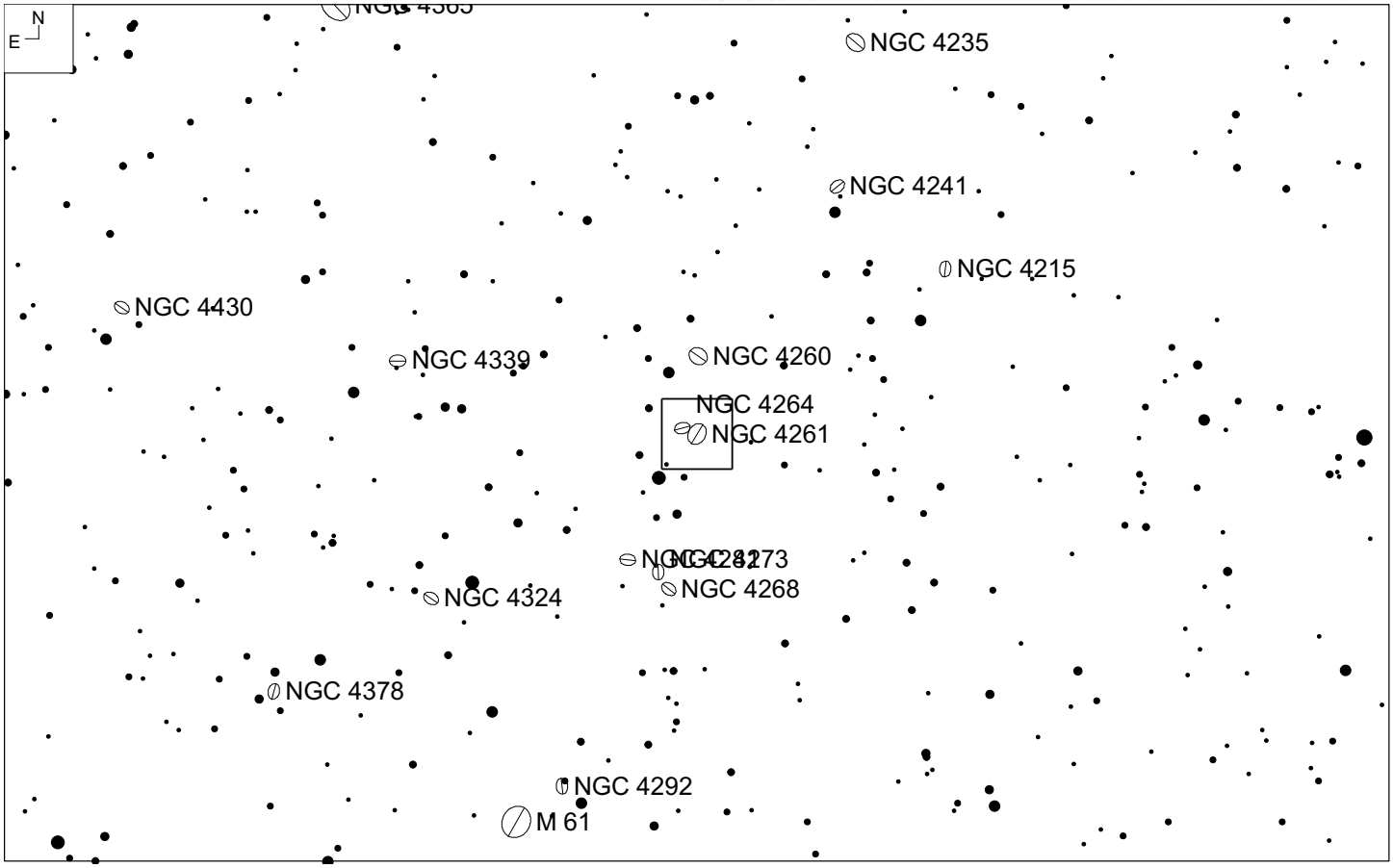



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| NGC 3862 | E | 11 45 05.0 | +19 36 22 | 13.7b | 1.4 x 1.4’ | 72 | 46 |

# 3C 270 (Virgo)

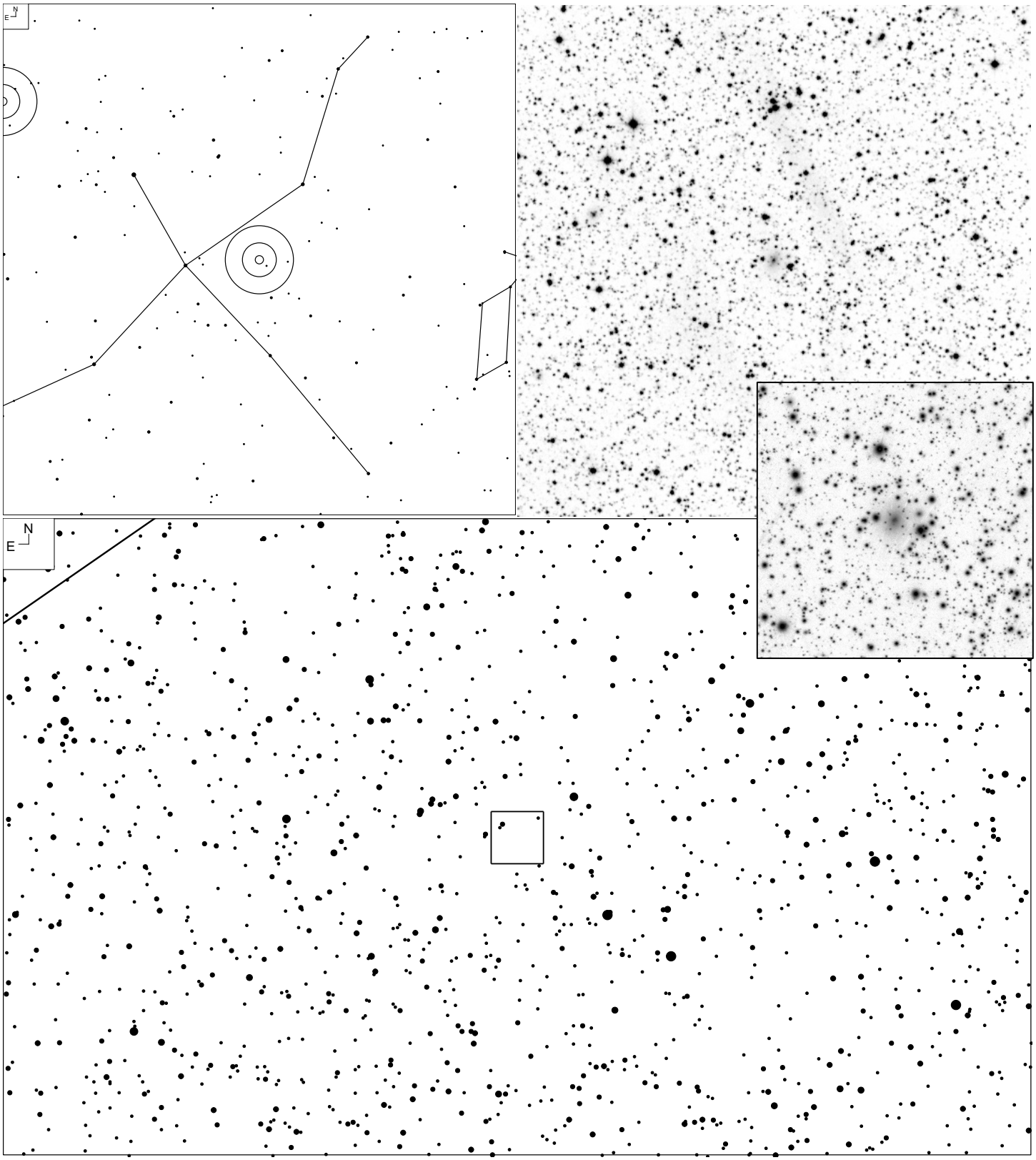






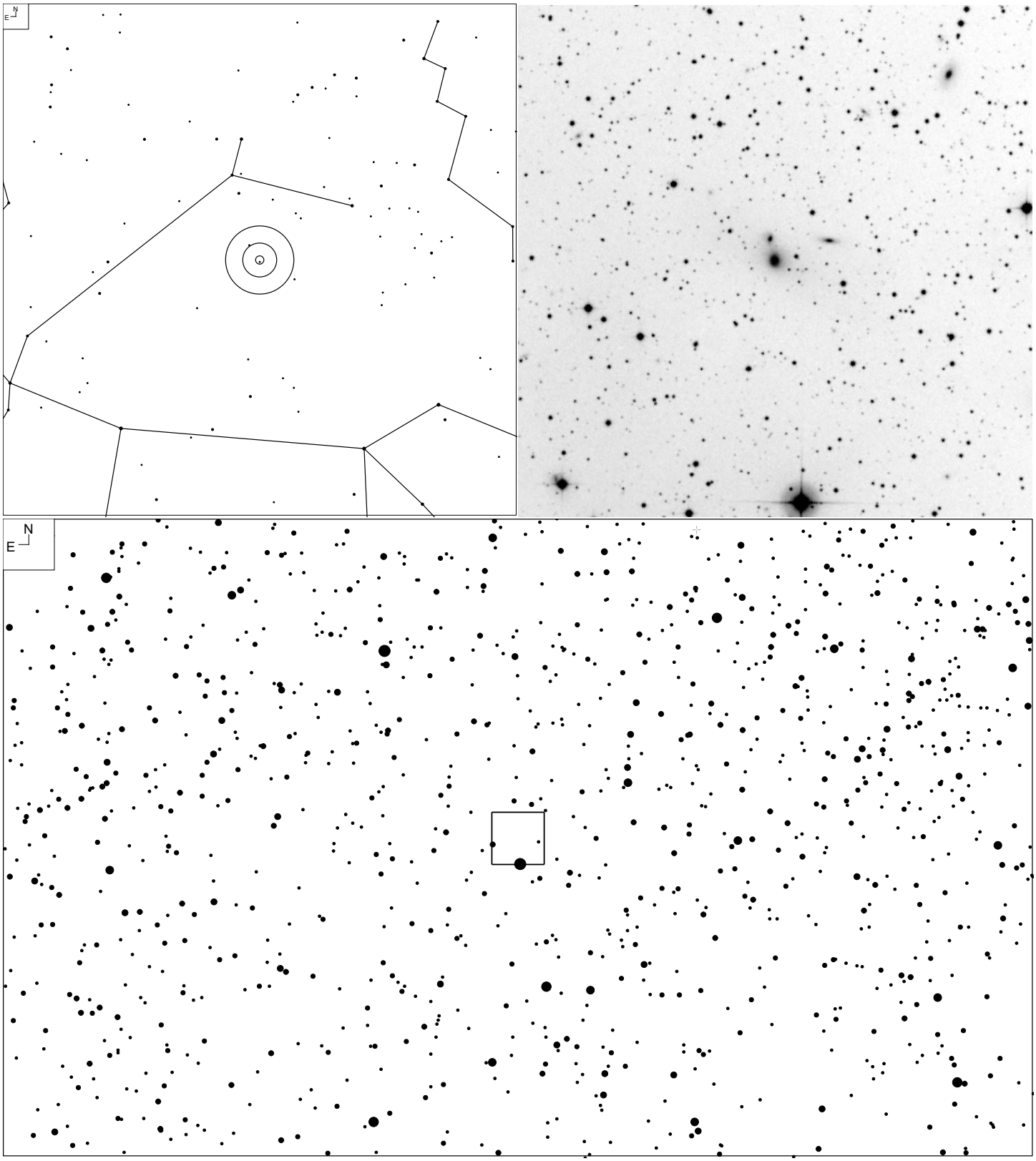

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| NGC 4261 | E | 12 19 23.3 | +05 49 33 | 10.4v | 4.3 x 3.5’ | 111 | 57 |

# Cygnus A (Cygnus)



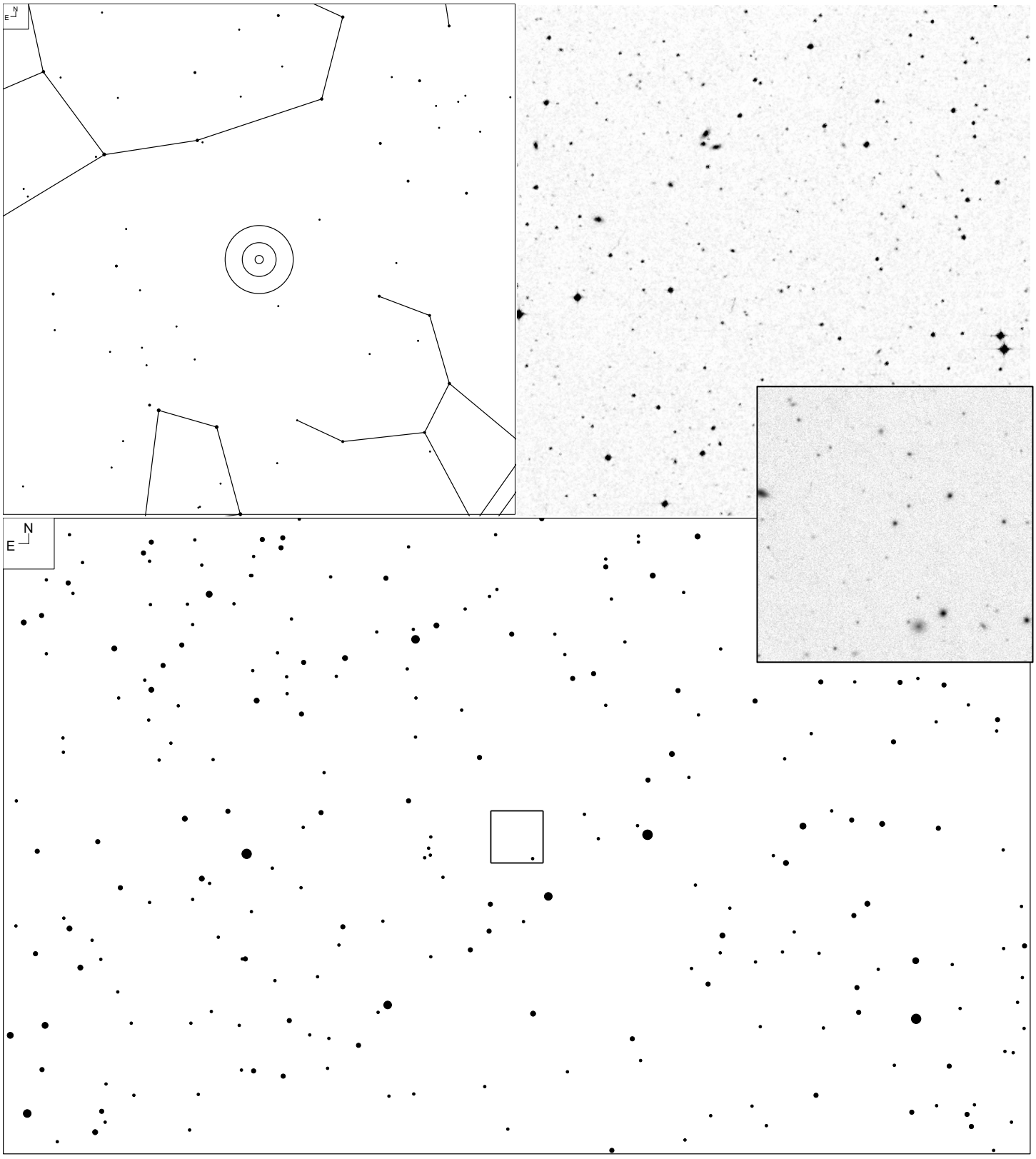

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | S | 19 59 27.0 | +40 44 02 | 15.5v | 0.6 x 0.4’ | 48 | 18 |

# 3C 449 (Lacerta)



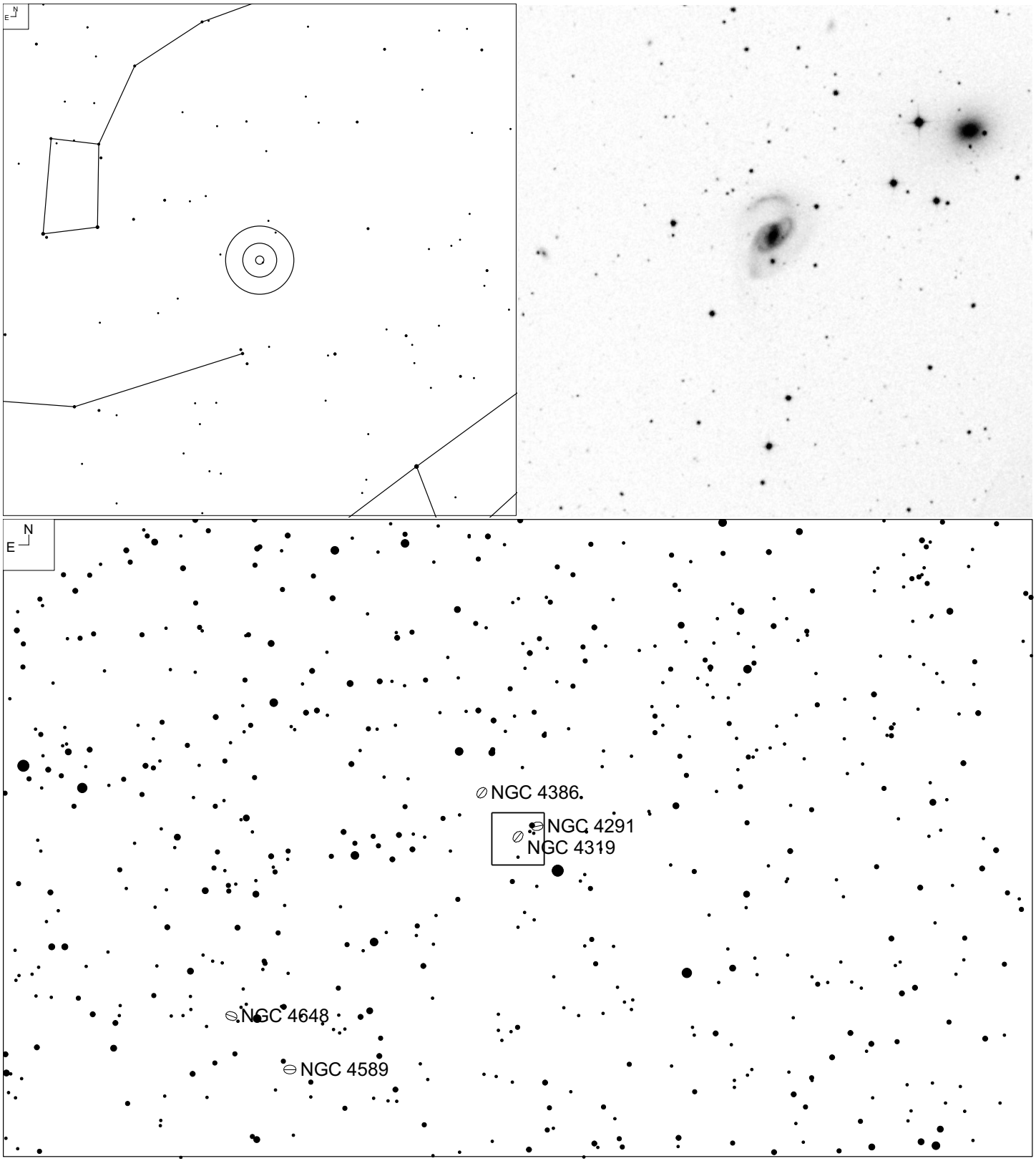

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | E.S0 | 23 31 20.6 | +39 21 30 | 14.5b | 0.6 x 0.7’ | 45 | 16 |

# BR 1202-0725 (Virgo)



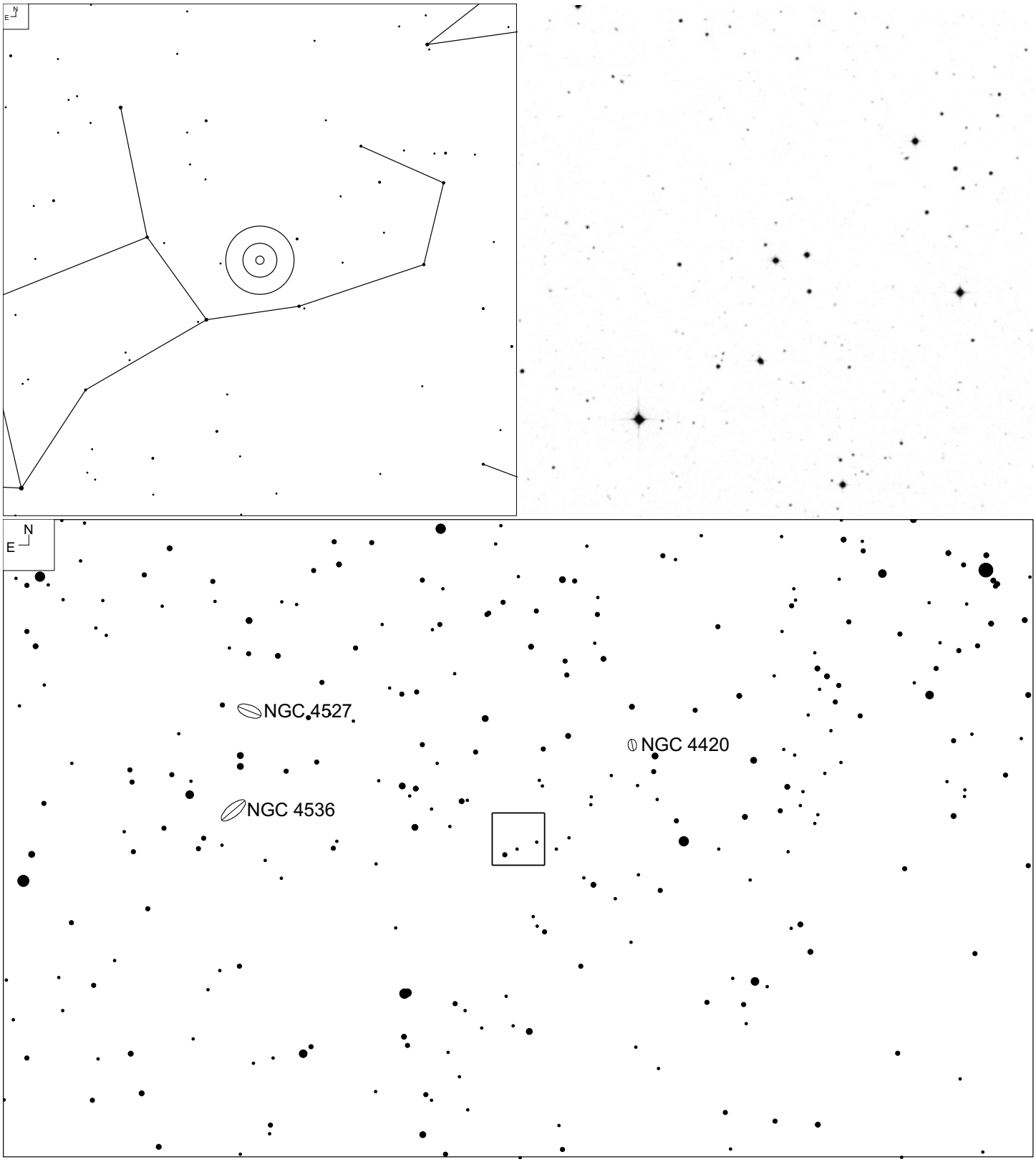

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| v | QSO | 12 05 20.8 | -07 41 46 | 17.5 | stellar | 131 | 57 |

# Markarian 205 (Draco)



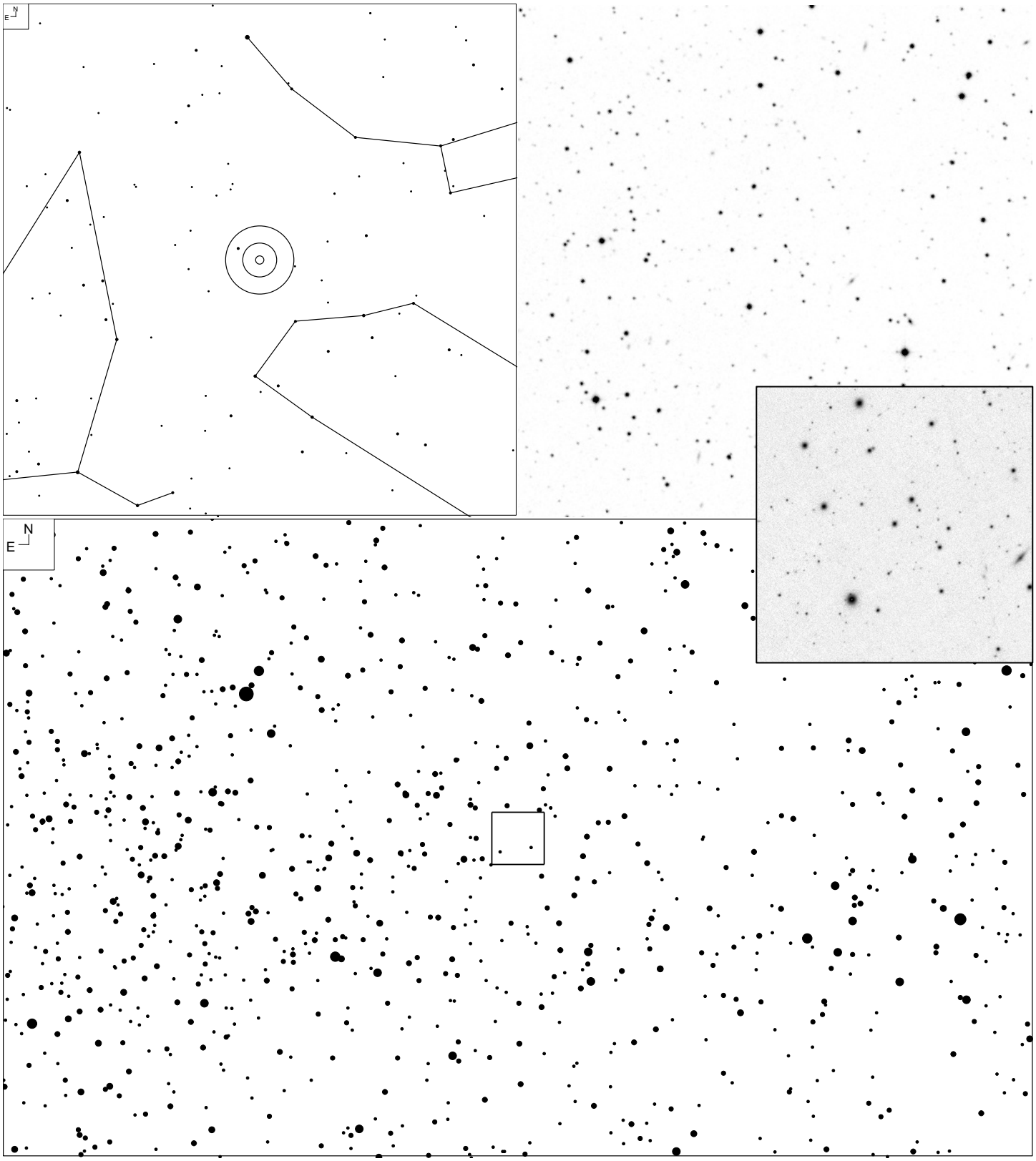

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| NGC 4319 | QSO | 12 21 44.0 | +75 18 38 | 15.5 | stellar | 5 | 4 |

# 3C 273 (Virgo)



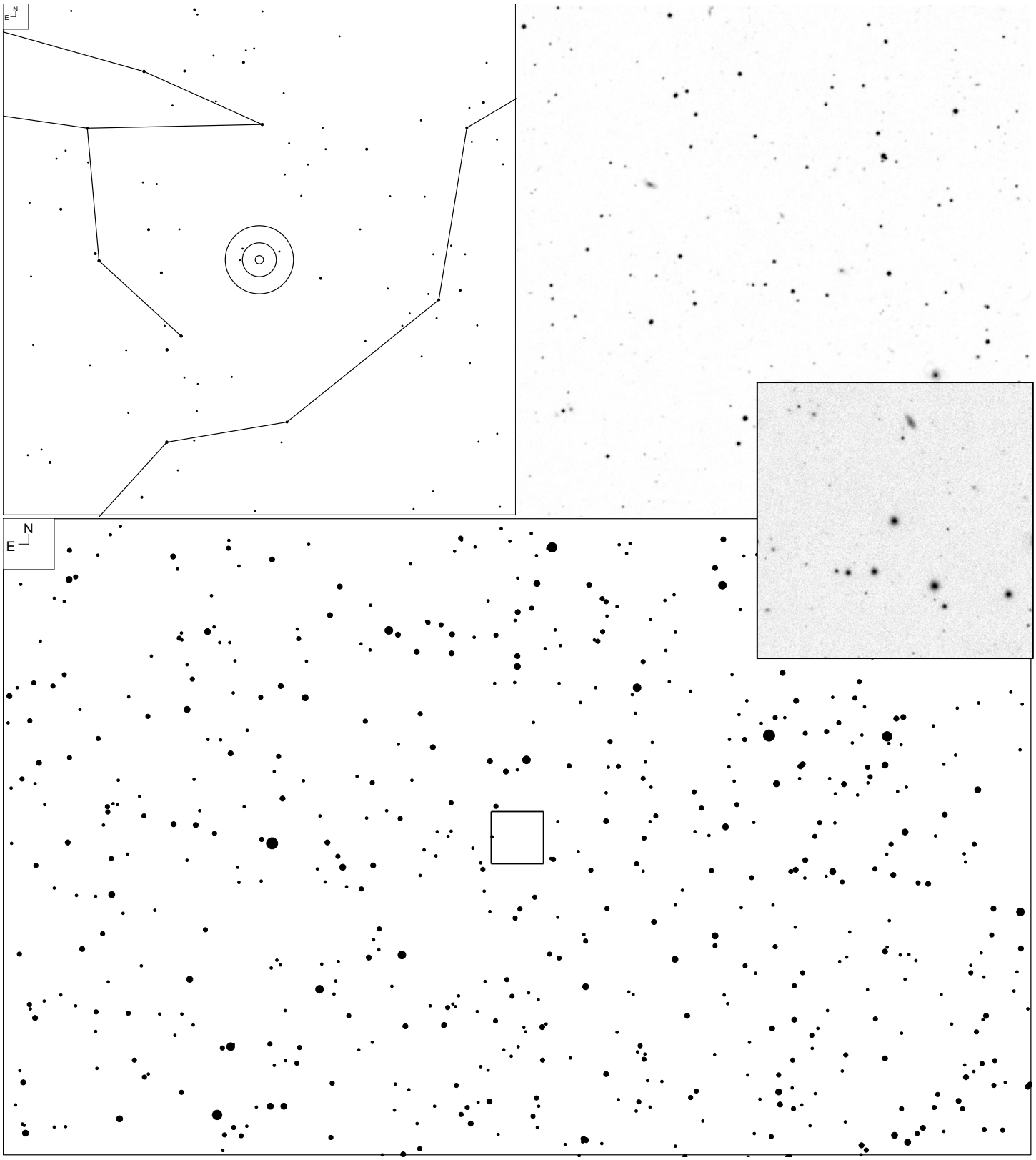

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | QSO | 12 29 06.4 | +02 03 09 | 13.0 | stellar | 111 | 57 |

# HS 1946+7658 (Draco)



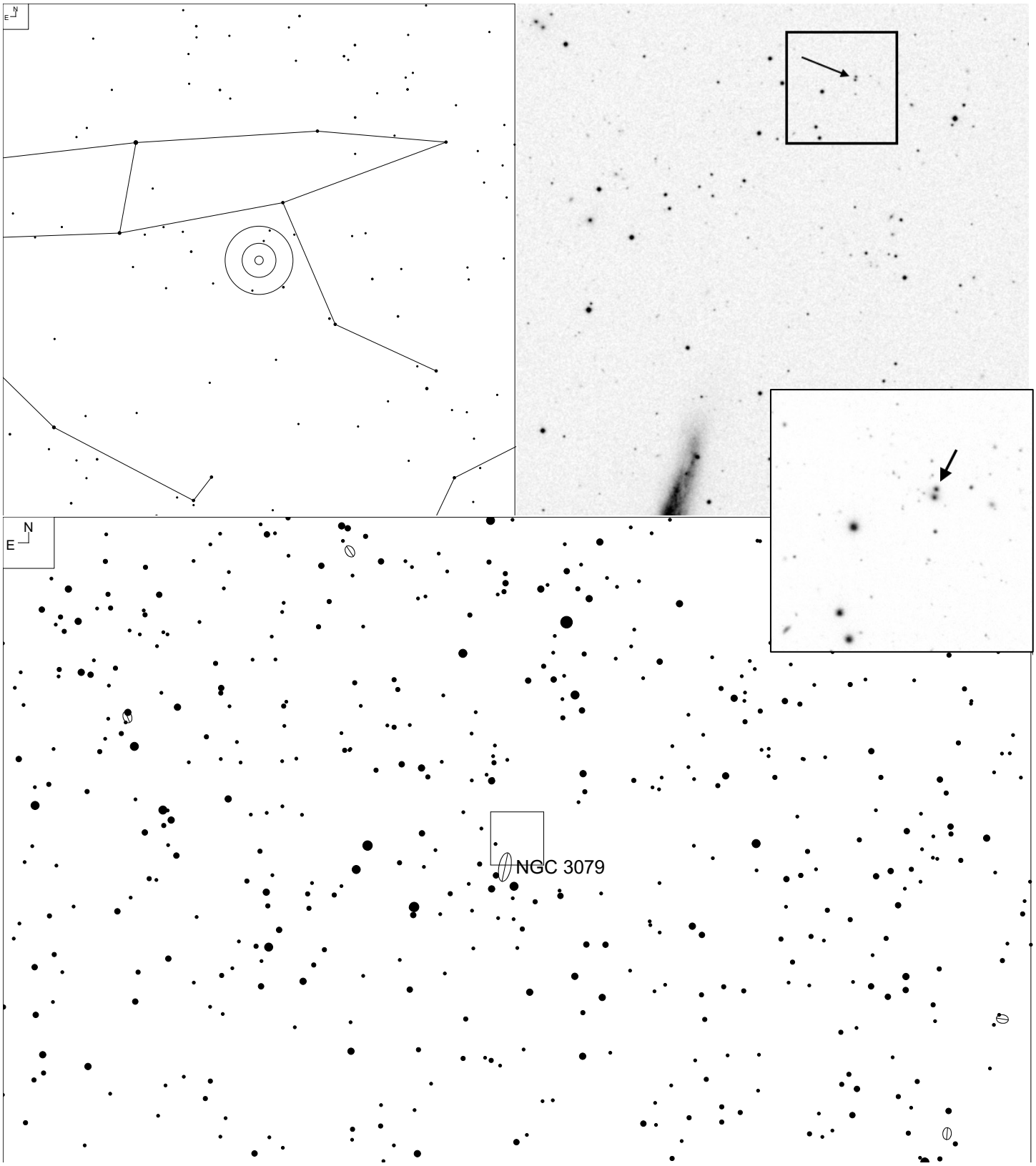

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | QSO | 19 44 55.0 | +77 05 52 | 15.8v | stellar | 3 | 3 |

# APM 08270+5255A (Lynx)



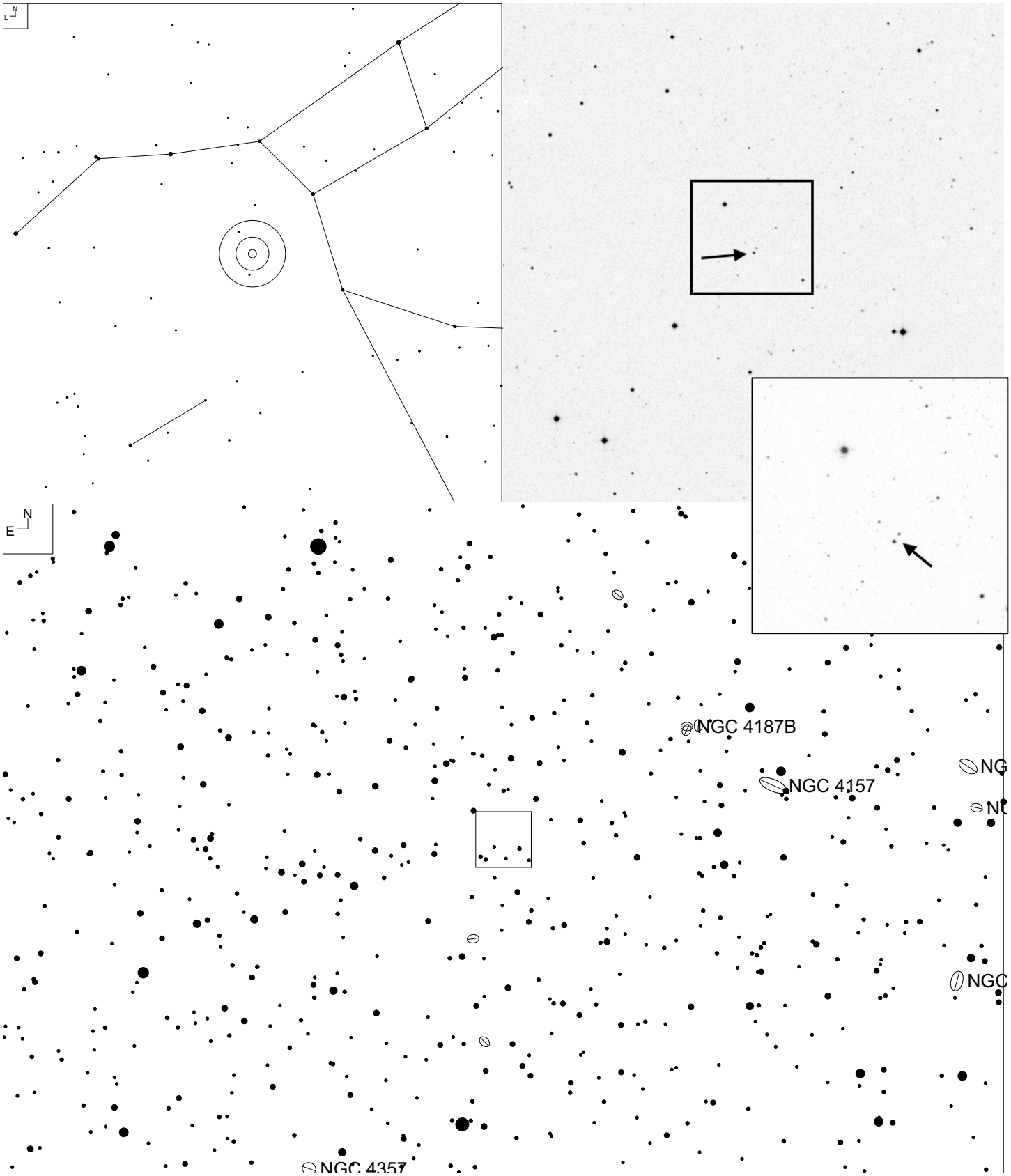

| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | QSO | 08 31 41.6 | +52 45 18 | 15 | | 26 | 13 |

# Double Quasar (Ursa Major)



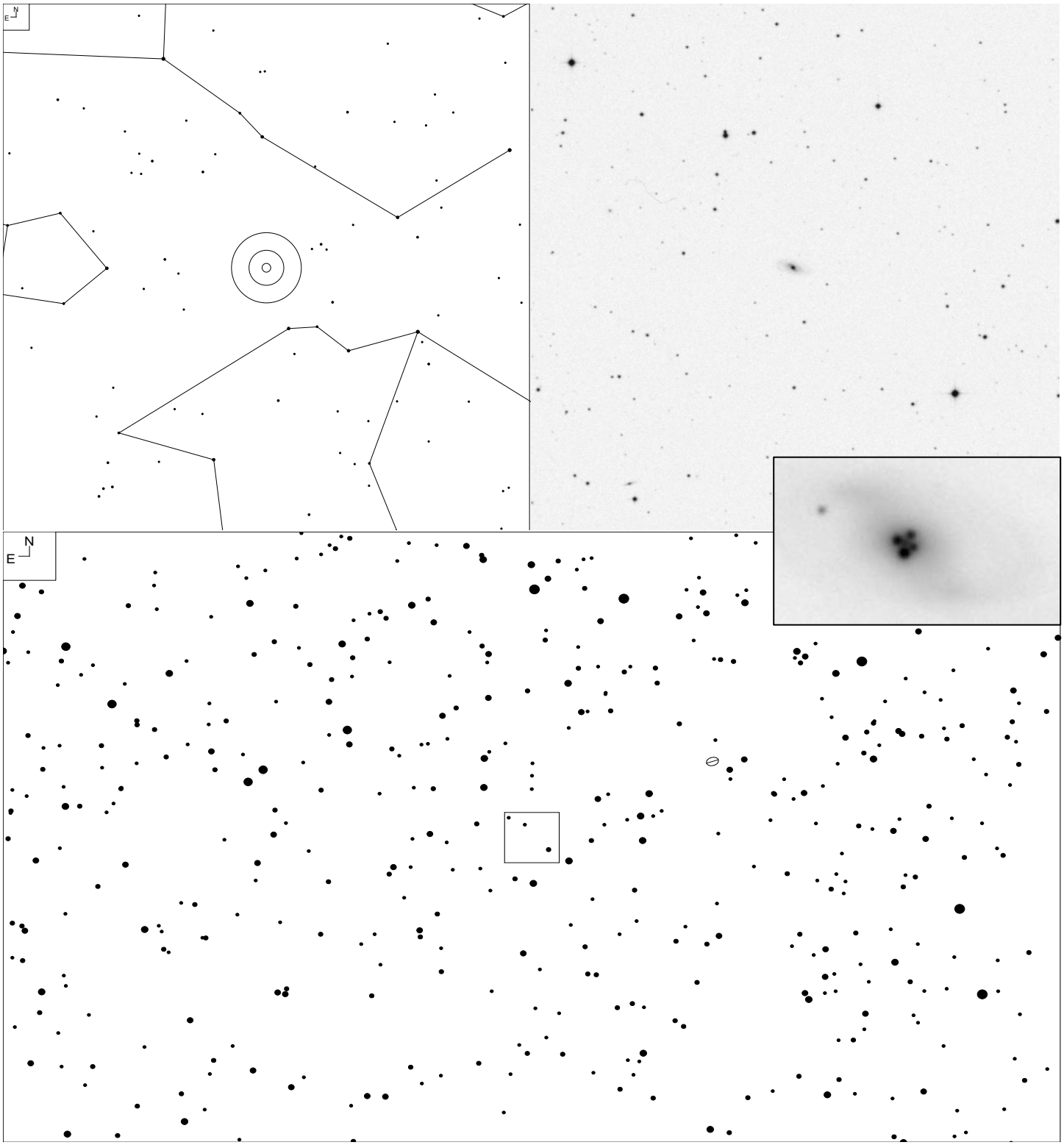

| Object | RA | Dec | Mag | Separation | Urano 2 | iDSA |
|---|---|---|---|---|---|---|
| Q 0957+561A/B | 10 01 21.1 | +55 53 52 | 17.3, 17.4 | 6.2” apart | 25 | 12 |

# Twin Quasar (Canes Venatici)



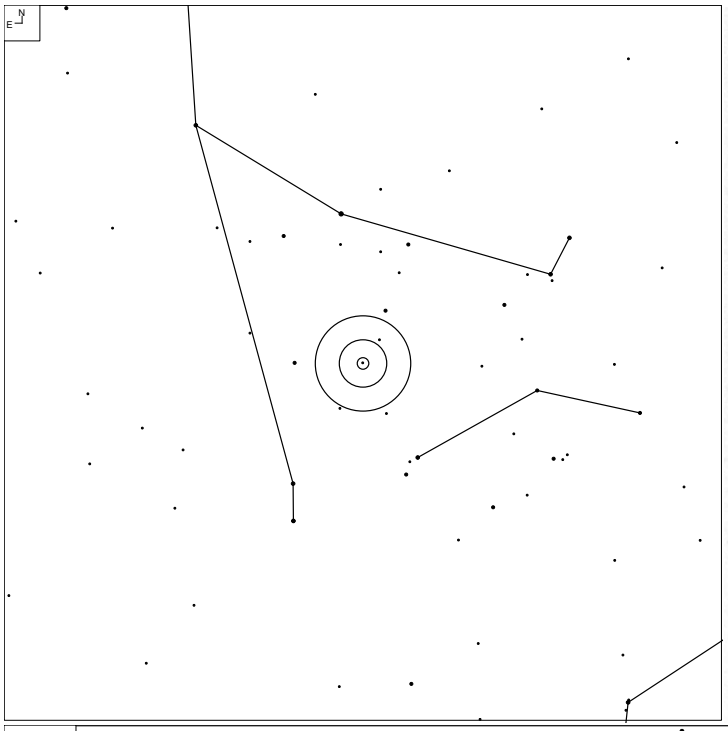

| Object | RA | Dec | Mag | Separation | Urano 2 | iDSA |
|---|---|---|---|---|---|---|
| HE 1216+5032A/B | 12 18 41.1 | +50 15 34 | 17.2v, 19.0v | 9.1” | 37 | 21 |

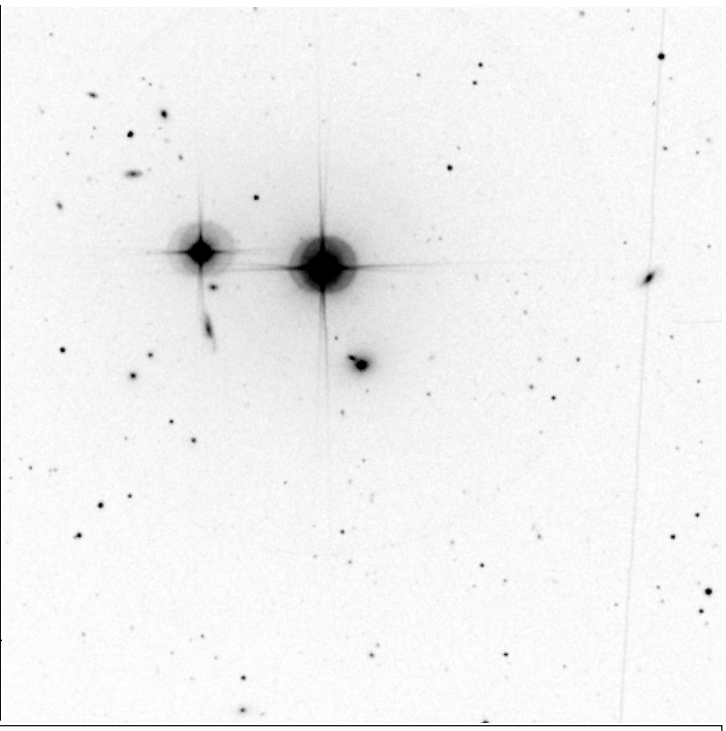
# Einstein's Cross, CGCG 378-15 (Pegasus)

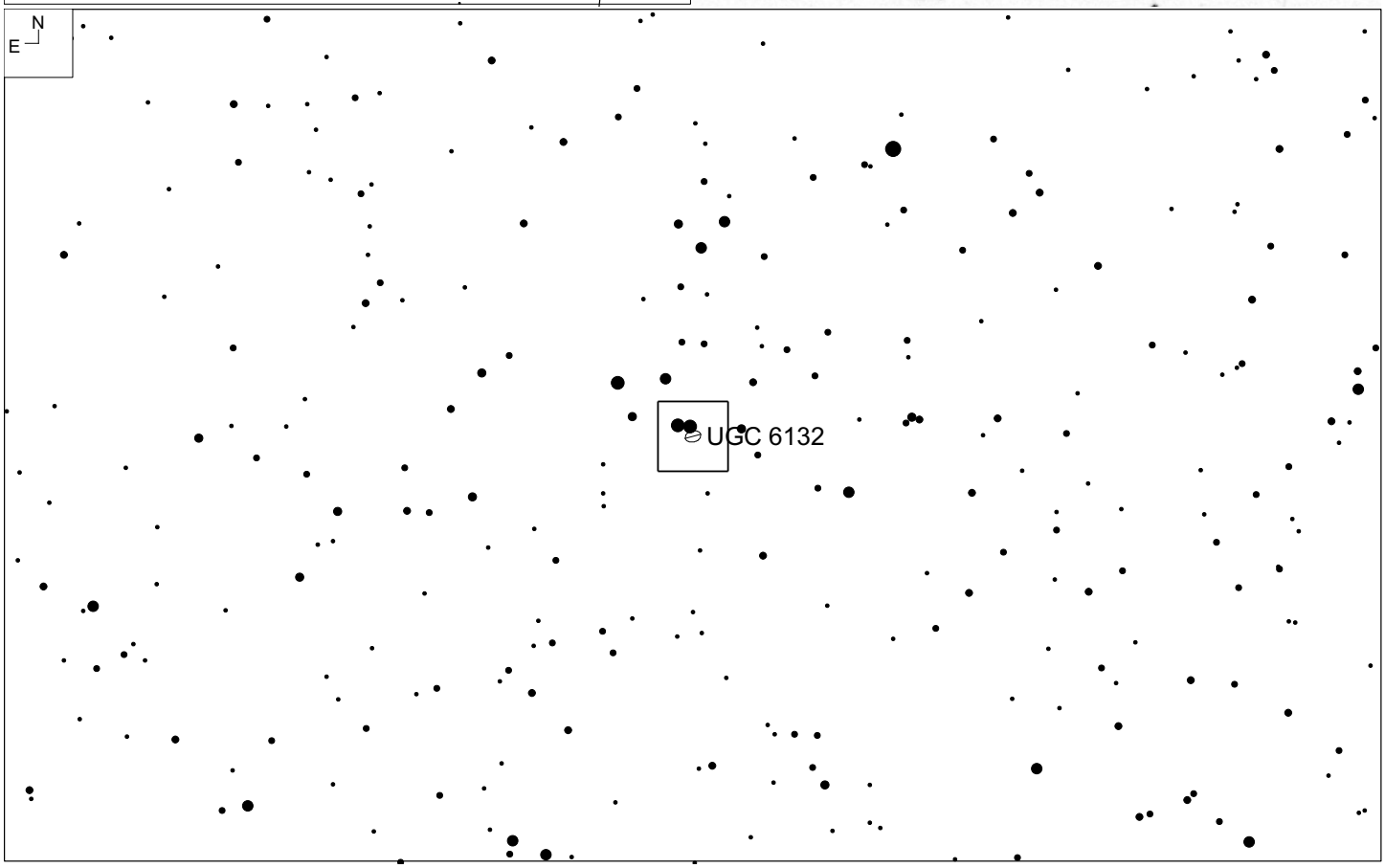



| Object | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|
| CGCG 378-15 | 22 40 30.2 | +03 21 30 | 15.1p | 1.1 x 0.5' | 102 | 40 |
| QSO 2237+0305 | | | 17.36, 17.39, 18.43, 18.72 | Average of 1" separation between points and core | | |

# Markarian 421 (Ursa Major)

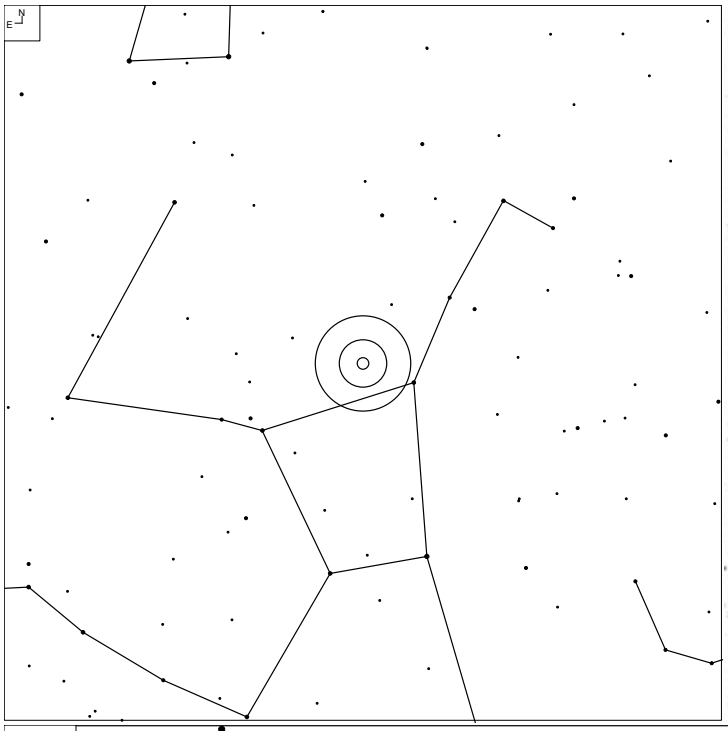


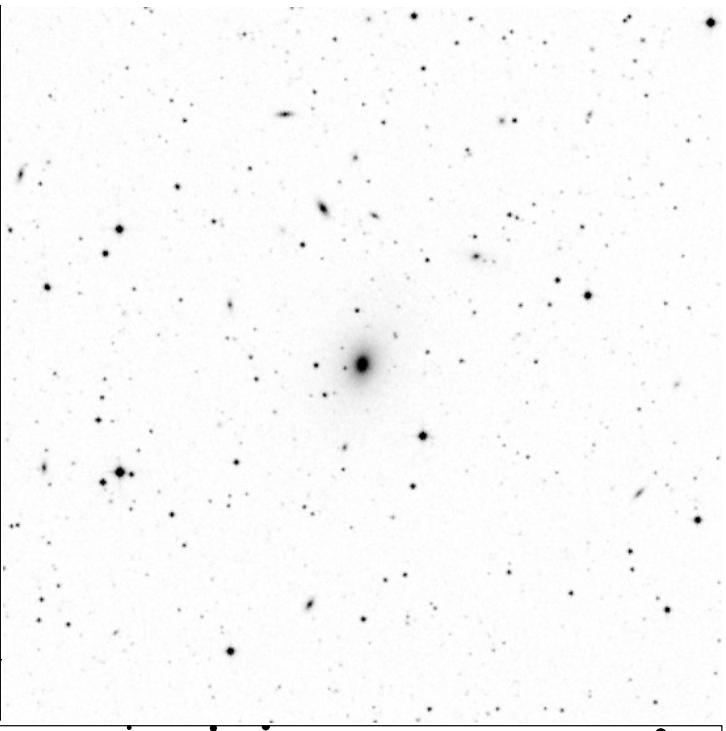


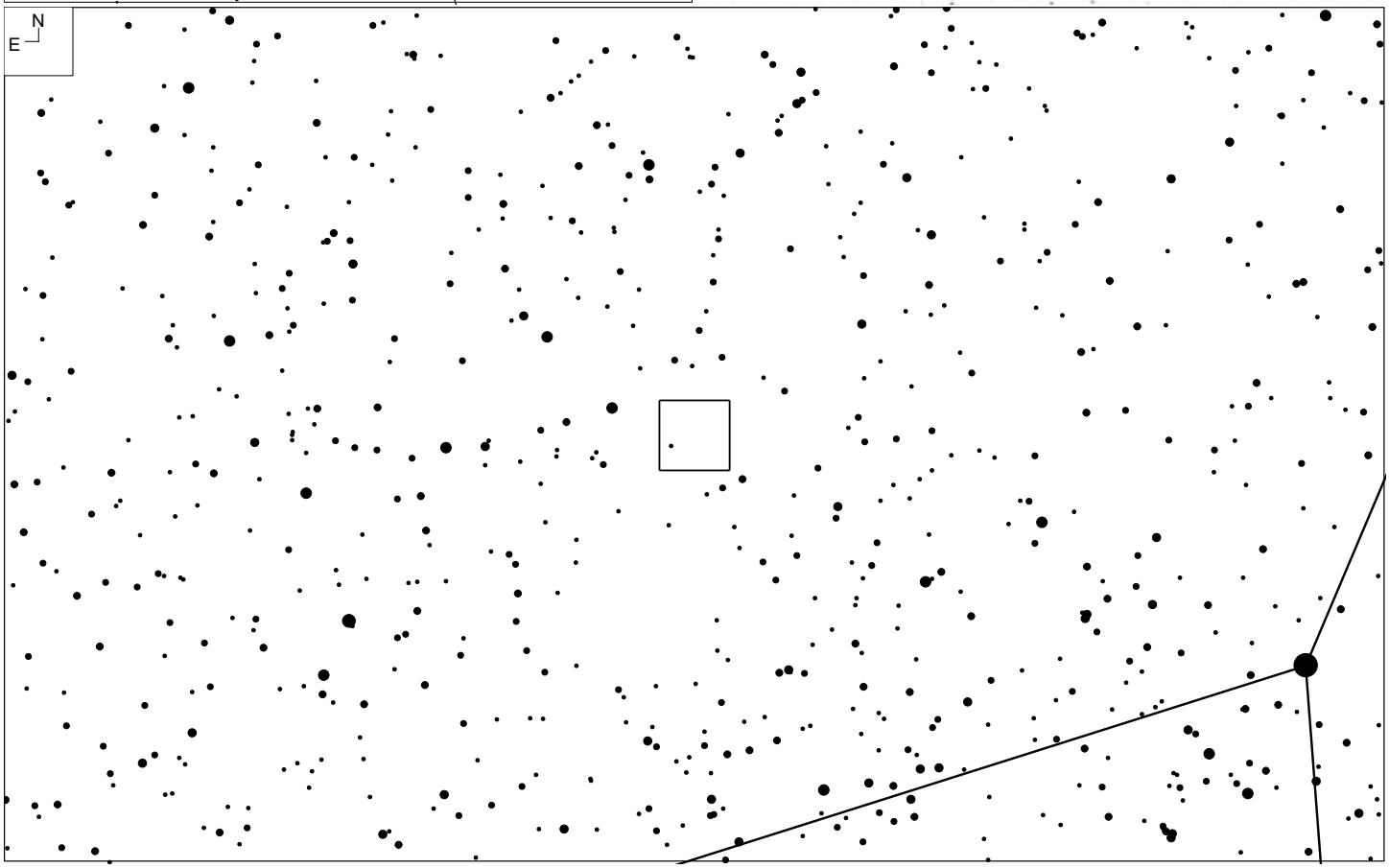



| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | BL | 11 04 27.0 | +38 12 29 | 13.8var | 0.7 x 0.7’ | 55 | 22 |

# Markarian 501 (Hercules)

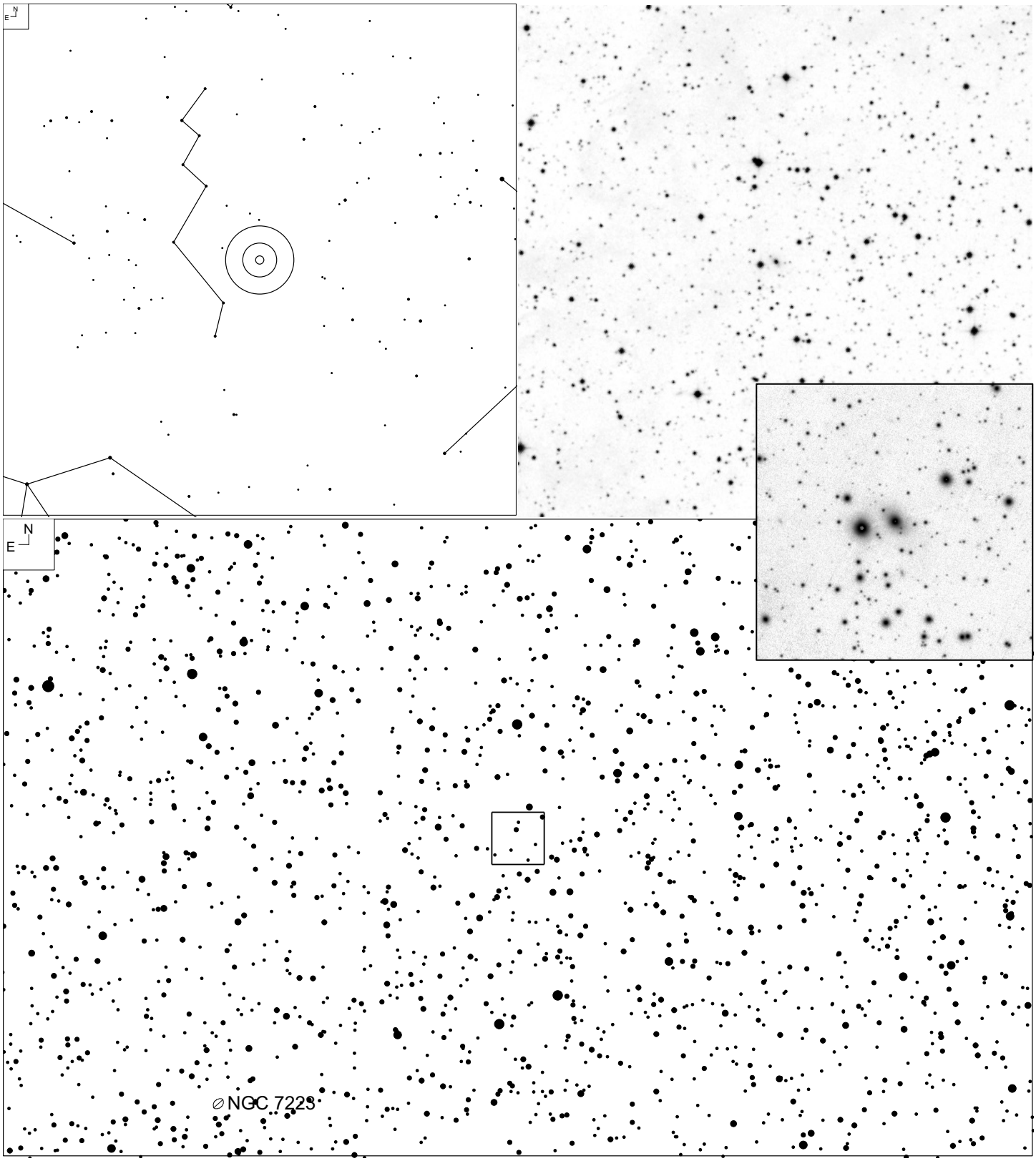







| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| | BL | 16 53 52.3 | +39 45 32 | 14.4b | 1.2 x 0.9’ | 50 | 19 |

# BL Lacerta (Lacerta)




| Other ID | Type | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|
| 2200+420 | BL | 22 02 43.3 | +42 16 40 | 15.1 | | 31 | 16 |

# 2002: Interactions

## ADVANCED OBSERVING - "INTERACTIONS" - T.S.P. 2002

### <> Observe any 25 Objects <>

| OBJECT | COOR (2000) | CONS | TYPE | SIZE | MAG. | R.V. | DIST. $H_0$=70 | URANO 1 / 2 | |
|---|---|---|---|---|---|---|---|---|---|
| **ARP 243, NGC2623** | 08 38 24 + 25 45 15 | Cnc | Trpl | 2.4 X 0.7' | 13.4v | +5472 | 254.8 | 141 | 75 |
| **ARP 321, HICKSON 40A** | 09 38 53 – 04 50 55 | Hya | E8 | 0.9 X 0.7' | 12.8v | +6622 | 308.4 | 233 | 1 |
| HICKSON 40B | | | SOP | 0.8 X 0.5' | 14.0v | +6821 | 317.7 | | |
| HICKSON 40C | | | Sbc | 1.1 X 0.3' | 14.9v | +6853 | 319.2 | | |
| HICKSON 40D | | | Sba | 0.7 X 0.3' | 14.1v | +6466 | 301.1 | | |
| HICKSON 40E | | | Sc | 0.6 X 0.3' | 17.3 | +6625 | 308.5 | | |
| **SHAKHBAZIAN 1 CLUSTER** | 10 55 06 + 40 27 29 | UMa | Clstr | 1.4 X 1.0' | 16.5 | +34,910 | 1625.8 | 73 | 55 |
| **ARP 105, "Ambartsumian's Knot"** | | | | | | | | | |
| NGC 3561 | 11 11 13 + 28 41 46 | UMa | Dbl | 0.7 X 0.7' | 13.8v | +8549 | 398.3 | 106 | 73 |
| NGC3561A | | | P | 0.8 X 0.8' | 13.3v | +8811 | 410.3 | | |
| PGC 33994 – The Knot | | | | 0.1 X 0.1' | | +8870 | 413.1 | | |
| MAC 111+2845A | | | | 0.5 X 0.5' | 17.5 | | | | |
| **ARP 322, HICKSON 56A** | 11 32 40 + 52 57 00 | UMa | Sc | 1.3 X 0.2' | 16.2b | +7929 | 369.3 | 47 | 24 |
| HICKSON 56B | | | SBO | 0.7 X 0.3' | 16.2b | +7929 | 369.3 | | |
| HICKSON 56C | | | SOP | 0.7 X 0.4' | 15.8b | +8110 | 377.7 | | |
| HICKSON 56D | | | SO | 0.4 X 0.3' | 16.8 | +8346 | 388.7 | | |
| HICKSON56E | | | SOP | 0.5 X 0.3' | 16.4b | +7884 | 367.2 | | |
| **VV172, ARP 329, HICK 55A** | 11 32 07 + 70 48 56 | Dra | EO | 0.2 X 0.2' | 15.9b | +15,649 | 728.8 | 25 | 13 |
| HICKSON 55B | | | SO | 0.3 X 0.2' | 16.4 | +15,480 | 720.9 | | |
| HICKSON 55C | | | E3 | 0.2 X 0.2' | 16.9 | +15,571 | 725.2 | | |
| HICKSON 55D | | | E2 | 0.2 X 0.1' | 17.1 | +15,891 | 740.1 | | |
| HICKSON 55E | | | Sc | 0.2 X 0.1' | 17.4 | +36,880 | 1717.6 | | |
| **"COPELAND'S" SEPTET** | | | | | | | | | |
| HICKSON 57A, NGC3753 | 11 37 54 + 21 58 51 | Leo | Sb | 1. 9 X 0.5' | 13.6v | +8717 | 406.0 | 147 | 72 |
| HICKSON 57B, NGC3746 | | | SBb | 1.1 X 0.5' | 14.2v | +9074 | 422.6 | | |
| HICKSON 57C, NGC3750 | | | E3 | 0. 9 X 0.5' | 13.9v | +9064 | 422.1 | | |
| HICKSON 57D, NGC3454 | | | SBc | 0.6 X 0.4' | 14.3v | +9012 | 419.7 | | |
| HICKSON 57E, NGC3748 | | | SOa | 0. 8 X 0.3' | 14.8v | +8989 | 418.6 | | |
| HICKSON 57F, NGC3751 | | | E4 | 0. 9 X 0.4' | 13.9v | +9592 | 446.7 | | |
| HICKSON 57G, NGC3745 | | | SBO | 0.4 X 0.41' | 15.2v | +9413 | 438.4 | | |
| HICKSON 57H | | | SBb | 0.3 X 0.2' | 16.0v | | | | |
| **"WILDS TRIPLET", ARP 248** | | | | | | | | | |
| MCG-1-30-33 | 11 46 45 – 03 50 50 | Vir | SBP1 | 3.1 X 0. 7' | 13.4v | +5008 | 233.2 | 237 | 111 |
| MCG-1-30-32 | | | P | 1. 8 X 0.8' | 13.8v | +5108 | 237.9 | | |
| MCG-1-30-34 | | | SBP | 1.3 X 0.5' | 15.3v | +5396 | 251.3 | | |
| **VV 523, NGC 3991** | 11 57 30 + 32 20 04 | UMa | I pec | 1.9 X 0.6' | 13.1v | +3204 | 149.2 | 107 | 54 |
| ARAKELIAN 337, NGC3994 | | | Sa pec | 1.5 X 1.0' | 12.7v | +3096 | 144.2 | | |
| ARP 313, NGC3995 | | | Sa pec | 3.1 X 1.2' | 12.4v | +3339 | 155.5 | | |
| **ARP 97, MCG+5-29-11** | 12 05 45 + 31 03 17 | UMa | P | 1.4 X 0.5' | 14.1v | +6886 | 320.7 | 107 | 54 |
| MCG+5-29-10 | | | P | 1.6 X 0.5' | 15.7 | +6949 | 323.6 | | |
| MCG+5-29-12 | | | S | 0.4 X 0.2' | 16.4V | | | | |
| **"BOX", HICK 61A, NGC4169** | 12 12 19 + 29 10 47 | Com | SOa | 2.3 x 1.2' | 12.2V | +3783 | 176.2 | 107 | 72 |
| HICKSON 61B, NGC4170-73 | | | SM | 5.0 x 0.7' | 13.0V | +1121 | 52.2 | | |
| HICKSON 61C, NGC4175 | | | Sbc | 1.8 x 0.4' | 13.3v | +4007 | 186.6 | | |
| HICKSON 61D, NGC4174 | | | SO | 1.1 x 0.5' | 13.4v | +3980 | 185.4 | | |
| MAC 59722 | | | -- | 0.2 x 0.1' | 17.5p | | | | |
| **"MITCHELL'S" OBJECT** | 12 17 48 + 46 34 59 | CVn | Dbl | 0.75 x 0.5' | 16.0p | | | 74 | 37 |
| **NGC4298** | 12 21 33 + 14 36 11 | Com | Sc | 3.0 x 1.8' | 11.3v | +1122 | 52.3 | 193 | 91 |
| NGC4302 | | | Sc | 5.8 x 0.7' | 11.6v | +1111 | 51.7 | | |
| MAC 1221+1437 | | | -- | 0.4 x 0.2' | 17.0p | | | | |

**Adv anced Observing T.S.P. 2002 - "Interactions", Cont.**

| OBJECT | COORD. (2000) | CONS | TYPE | SIZE | MAG. | R.V. | DIST. $H_0$= 70 | URANO 1/2 | |
|---|---|---|---|---|---|---|---|---|---|
| **"SIAMESE TWINS", NGC4567** | 12 36 33 + 11 15 31 | Vir | Sc | 3.3 x 2.0′ | 13.1v | +2213 | 103.1 | 194 | 91 |
| NGC4568 | | | Sc | 4.8 x 2.0 | 10.8v | +2260 | 105.3 | | |
| **"MICE" ARP 242, NGC4676A** | 12 46 11 + 30 44 39 | Com | Dbl | 2.6 X 0.5′ | 13.1v | +6649 | 309.7 | 108 | 53 |
| NGC4676B | | | Dbl | 2.3 X 1.2′ | 13.8v | +6549 | 305.0 | | |
| **AM 1316-241, ESO 508-45/A** | 13 19 32 – 24 29 04 | Hya | Dbl | 0.8 X 0.8′ | 15.7 | +9653 | 449.6 | 330 | 149 |
| ESO 508-45A | | | Dbl | 0.8 X 0.4′ | 15.8 | | | | |
| **"KEENEN'S" SYSTEM, ARP 104** | | | | | | | | | |
| NGC5216 | 13 32 06 + 62 42 01 | UMa | EOP | 2.4 X 1.8′ | 12.6v | +2949 | 137.3 | 26 | 12 |
| NGC5218 | | | S | 2.9 X 1.6′ | 12.3v | +2807 | 130.7 | | |
| **ARP 239, NGC5278** | 13 41 39 + 55 40 12 | UMa | Dbl | 0.8 X 0.6′ | 13.5v | +7541 | 351.2 | 49 | 23 |
| NGC5279 | | | Dbl | 0.7 X 0.4′ | 14.7v | +7580 | 353.0 | | |
| **"SEASHELL", MCG-5-33-5** | 13 47 23 – 30 25 00 | Cen | S | 0.8 X 0.5′ | 15.1v | +3730 | 173.7 | 371 | 167 |
| NGC5291 | | | EP | 1.3 X 0.9′ | 14.1v | +4340 | 202.1 | | |
| **HICKSON 68A, NGC5353** | 13 53 27 + 40 18 09 | CVn | SO | 3.3 X 1.8′ | 10.9v | +2107 | 98.1 | 76 | 53 |
| HICKSON 68B, NGC5354 | | | E2 | 2.8 X 2.2′ | 11.3v | +2459 | 114.5 | | |
| HICKSON 68C, NGC5350 | | | SBbc | 3.3 X 2.4′ | 11.3v | +2308 | 107.4 | | |
| HICKSON 68D, NGC5355 | | | E3 | 1.2 X 0.7′ | 13.1v | +2414 | 112.4 | | |
| HICKSON 68E, NGC5358 | | | SO | 1.7 X 0.7′ | 13.6v | +2432 | 113.3 | | |
| MAC 1353+40158C | | | -- | 0.4 X 0.3′ | 16.0p | | | | |
| **AM 1352-263, MCG-4-33-13** | 13 55 04 – 26 46 48 | Hya | SP | 1.0 X 1.2′ | 13.4p | +3559 | 165.7 | 331 | 149 |
| **ARP 271, NGC5426** | 14 03 25 – 06 04 10 | Vir | SaP | 3.0 X 1.6′ | 12.1v | +2371 | 110.4 | 286 | 129 |
| NGC5427 | | | Sb | 3.2 X 2.3′ | 11.4v | +2645 | 123.2 | | |
| **ARP 274, NGC5679A** | 14 35 06 + 05 21 18 | Vir | S | 1.3 X 0.6′ | 13.7v | +7483 | 348.5 | 242 | 109 |
| NGC5679B | | | Dbl | 1.1 X 0.7′ | 13.6v | +8654 | 403.0 | | |
| MCG+1-37-36 | | | -- | 0.4 X 0.2′ | 17.2 | +7618 | 354.8 | | |
| **ARP 173, MCG+2-38-19** | 14 51 27 + 09 18 53 | Boo | S | 1.5 X 0.3′ | 14.6 | +8745 | 407.3 | 198 | 89 |
| MCG+2-38-20 | | | S | 0.6 X 0.4′ | 14.7v | +8780 | 408.9 | | |
| **ARP 302, UGC 9618** | 14 57 00 + 24 36 24 | Boo | Dbl | 0.7 X 0.7′ | 14.9 | +9872 | 459.8 | 153 | 70 |
| MCG +4-35-19 | | | S | 0.9 X 0.2′ | 15.8 | +10,059 | 468.5 | | |
| **"SANCHO'S" OBJECT** | 15 10 17 + 58 10 39 | Dra | Dbl | 0.5 X 0.4′ | 16.0v | +9563 | 445.4 | 50 | 22 |
| **ABELL 2065** | 15 22 42 + 27 43 00 | CrB | Clstr | 22.4 X 22.4′ | 15.6 | +21,605 | 1.01Bil | 154 | 69 |
| **"SEYFERT'S SEXTET"** | | | | | | | | | |
| NGC3027 | 15 59 11 + 20 45 17 | Ser | SOp | 0.5 X 0.3′ | 14.3v | +4413 | 205.2 | 155 | 69 |
| HICKSON 79A, NGC6027A | | | EO | 0.9 X 0.6′ | 13.9v | +4197 | 195.5 | | |
| HICKSON 79B, NGC6027B | | | SO | 0.5 X 0.3′ | 14.3v | +4017 | 187.1 | | |
| HICKSON 79C, NGC6027C | | | SO | 0.7 X 0.2′ | 15.9v | +4482 | 208.7 | | |
| HICKSON 79D, NGC6027D | | | Sdm | 0.3 X 0.3′ | 15.6v | +19,813 | 922.7 | | |
| HICKSON 79E, NGC6027E | | | Scd | 0.9 X 0.4′ | 13.5v | +4095 | 190.7 | | |
| **ARP 101, UGC10169** | 16 04 34 + 14 49 44 | Ser | Dbl | 2.3 X 0.5′ | 13.7v | +4708 | 219.3 | 200 | 88 |
| **VV489, UGC10273** | 16 12 45 + 28 17 09 | CrB | Dbl | 1.7 X 0.4′ | 14.3v | +7381 | 343.7 | 113 | 69 |
| MAC 16030 | | | -- | 0.4 X 0.1′ | 16.5p | -- | | | |
| **ARP 102, UGC 10814** | 17 19 20 + 49 03 15 | Her | S | 3.7 X 0.5′ | 14.1v | +7177 | 334.2 | 81 | 34 |

***Source "Megastar"*** ***Distance: $10^6$ light year*** ***$H_o$ = 70 Km. $s^{-1}$. $Mpc^{-1}$***

**GOOD LUCK**

**LARRY MITCHELL - Houston, TX.**

| Guide | Page | TSP AO Object |
|---|---|---|
| APG | 219 | ARP 243, NGC2623 |
| APG | 303 | ARP 321, HICKSON 40A |
| Shk | 58 | SHAKHBAZIAN 1 CLUSTER |
| APG | 258 | ARP 105, “Ambartsumian’s Knot” |
| APG | 246 | ARP 322, HICKSON 56A |
| APG | 228 | VV172, ARP 329, HICK 55A |
| HCG | 156 | “COPELAND’S” SEPTET |
| APG | 292 | “WILDS TRIPLET”, ARP 248 |
| VV-2 | 230 | VV 523, NGC 3991 |
| APG | 257 | ARP 97, MCG+5-29-11 |
| HCG | 164 | “BOX”, HICK 61A, NGC4169 |
| TSP2007 | - | “MITCHELL’S” OBJECT |
| See below | - | NGC 4298 |
| VV-1 | 116 | “SIAMESE TWINS”, NGC4567, VV219 |
| APG | 338 | “MICE” ARP 242, NGC4676A |
| See below | - | AM 1316-241, ESO 508-45/A |
| APG | 315 | “KEENEN’S” SYSTEM, ARP 104 NGC5216 |
| APG | 318 | ARP 239, NGC5278 |
| See below | - | “SEASHELL”, MCG-5-33-5 |
| HCG | 178 | HICKSON 68A, NGC5353 |
| See below | - | AM 1352-263, MCG-4-33-13 |
| APG | 356 | ARP 271, NGC5426 |
| APG | 357 | ARP 274, NGC5679A |
| APG | 396 | ARP 173, MCG+2-38-19 |
| APG | 399 | ARP 302, UGC 9618 |
| TSP2007 | - | “SANCHO’S” OBJECT |
| AGC | 332 | ABELL 2065 |
| HCG | 200 | “SEYFERT’S SEXTET” |
| APG | 417 | ARP 101, UGC10169 |
| VV-2 | 379 | VV489, UGC10273 |
| APG | 404 | ARP 102, UGC 10814 |

**APG** = Observing the Arp Peculiar Galaxies: https://www.faintfuzzies.com/ArpGuide2.html

**Shk** = Shakhbazian Compact Galaxy Clusters: https://www.faintfuzzies.com/Files/ShkGroups%20v3.pdf

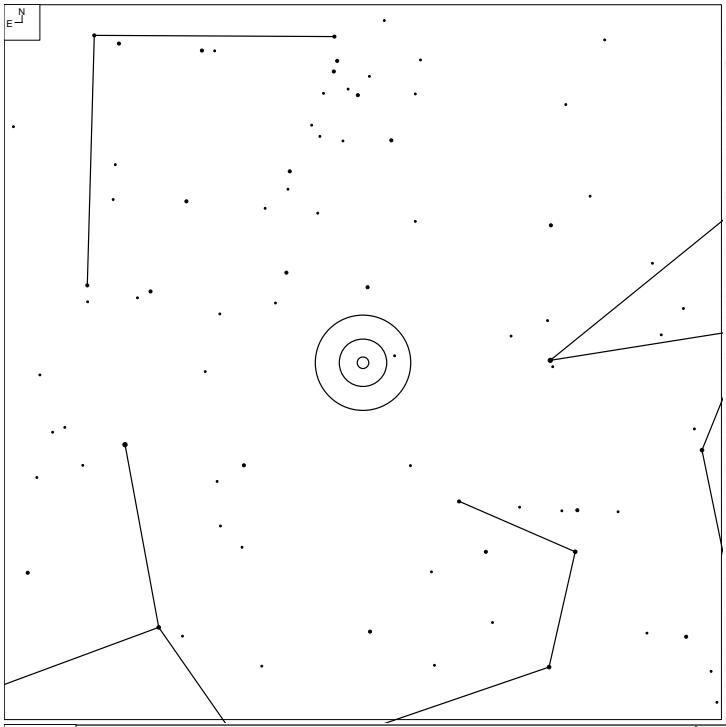
**HCG** = Hickson Compact Galaxy Groups: https://www.faintfuzzies.com/HicksonGuide2.html

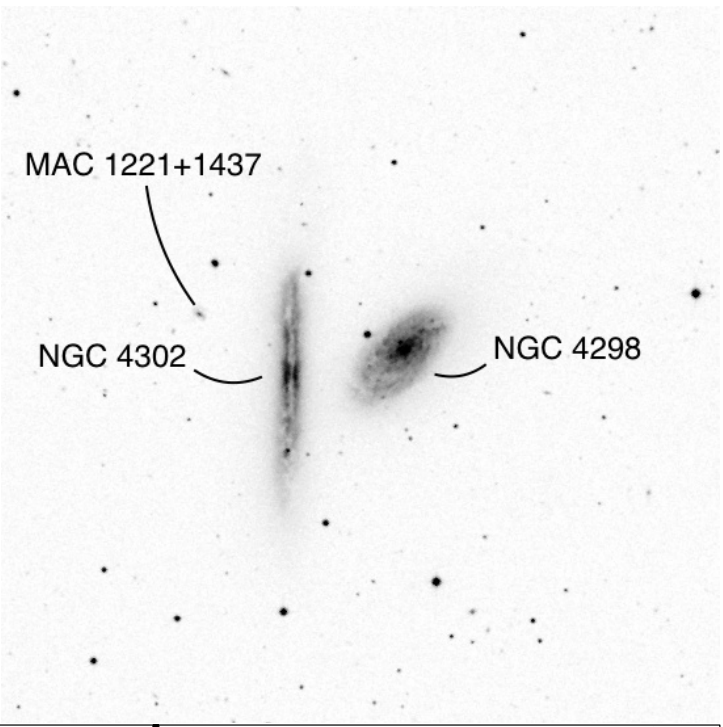
**VV-1, -2** = Vorontsov-Velyaminov Catalogue of Interacting Galaxies (Part 1 and 2):
https://www.faintfuzzies.com/Files/VVCatalogue-Part1-v4.pdf
https://www.faintfuzzies.com/Files/VVCatalogue-Part2-v4.pdf

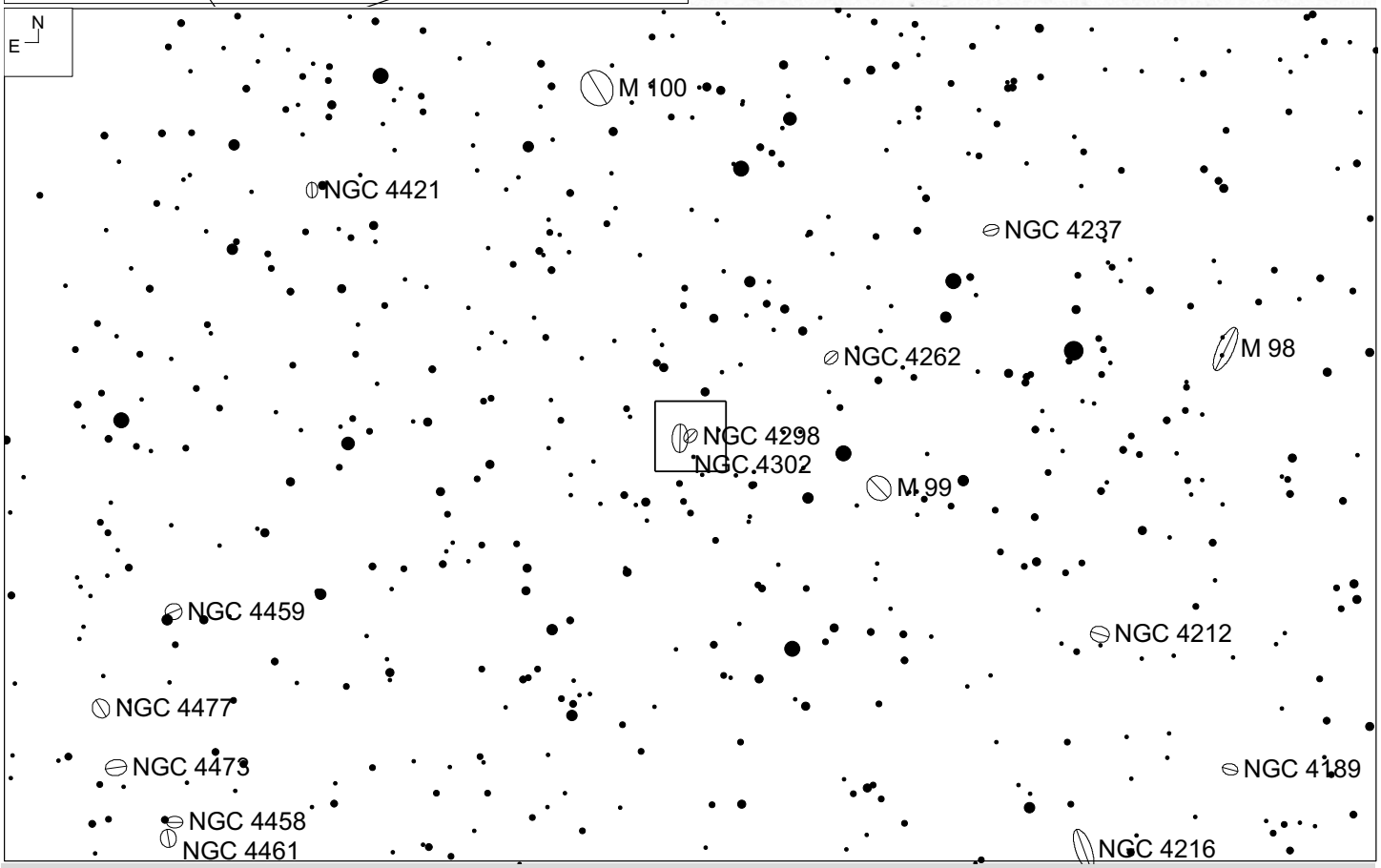
**AGC** = Abell Galaxy Clusters: https://www.faintfuzzies.com/Files/AbellGalaxyClusters%20v2.pdf

**TSP2007** = TSP Advanced Observing Program for year 2007, see corresponding PDF.

# NGC 4298 (Coma Berenices)

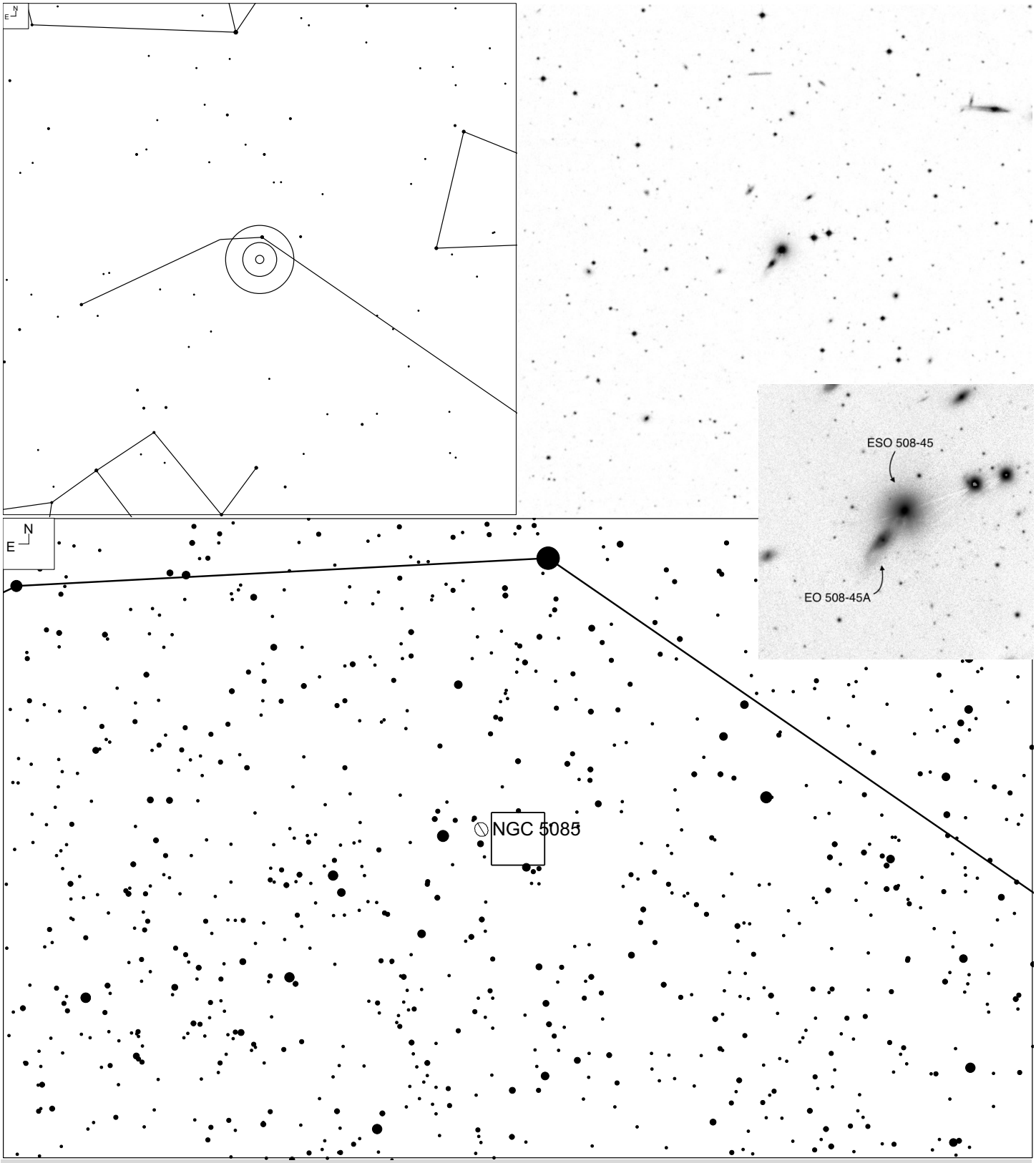




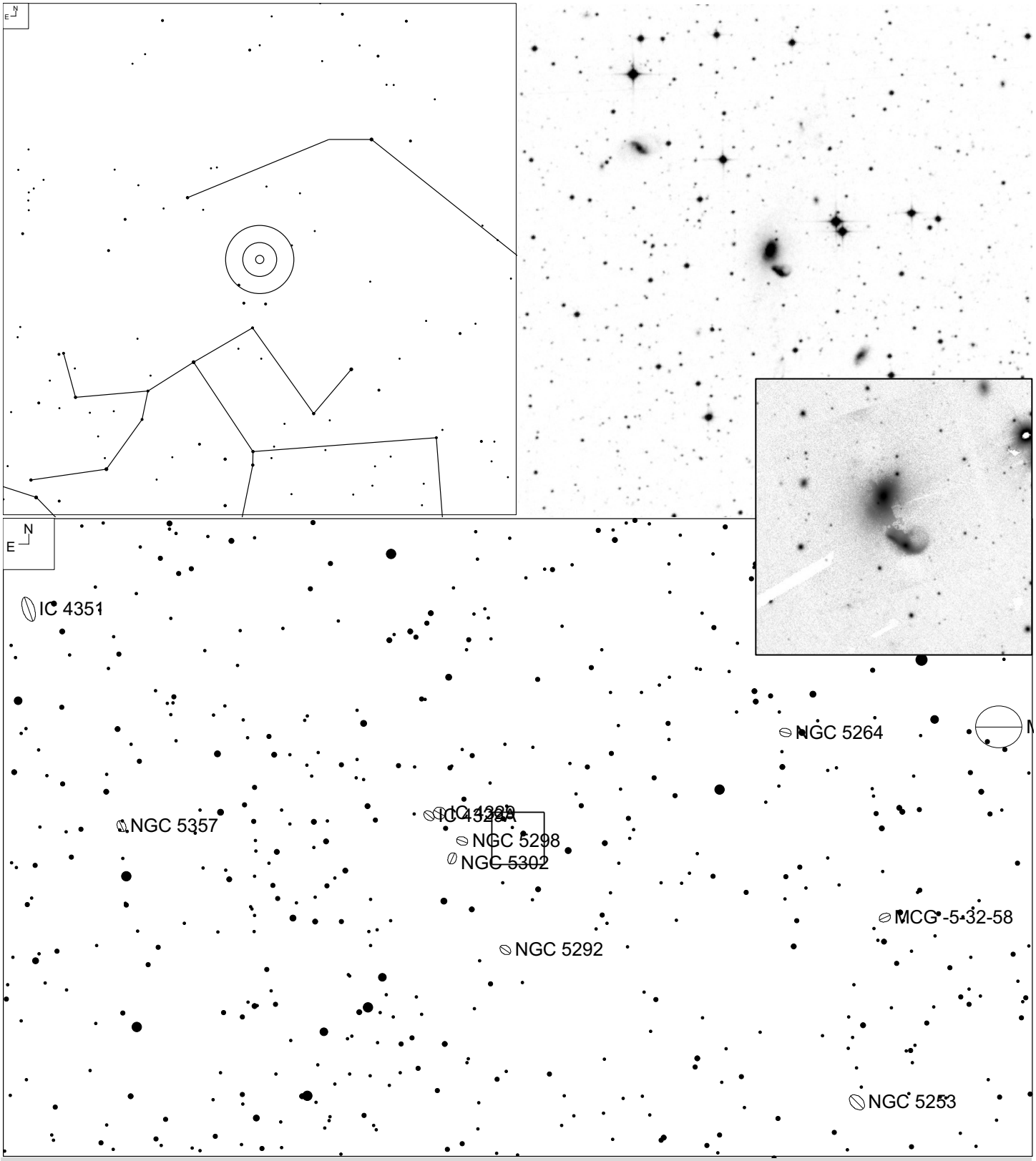

| ID | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|
| NGC 4298 | 12 31 32.8 | +14 36 22 | 11.3v | 3.3 x 1.2’ | 91 | 45 |
| NGC 4302 | | | 22.6v | 5.8 x 0.7’ | | |
| MAC 1221+1437 | | | | 0.4 x 0.2’ | | |

# AM 1316-241 (Hydra)



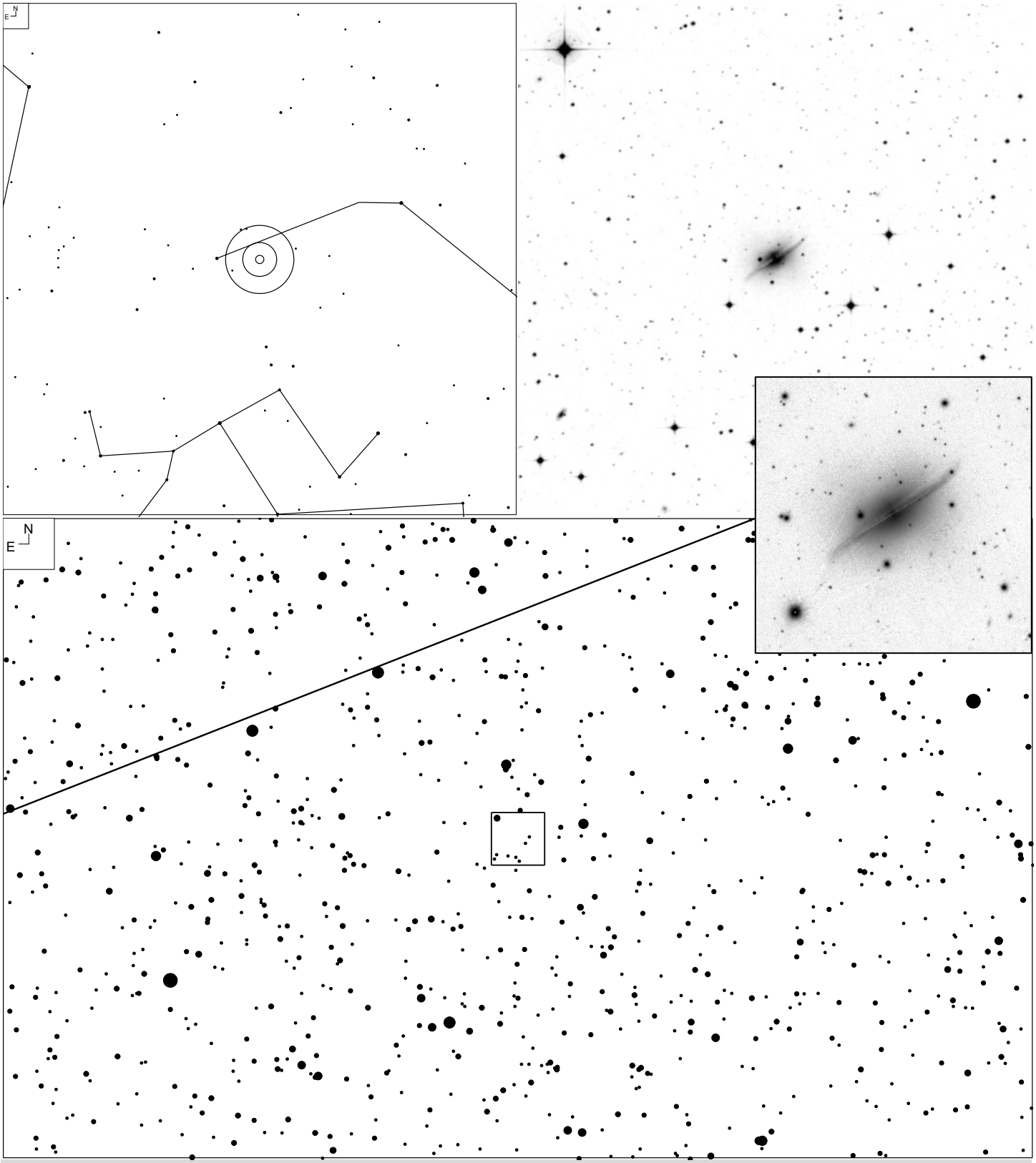

| Other ID | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|
| ESO 508-45 | 13 19 32.9 | -24 29 20 | 15.7b | 0.8 x 0.8’ | 149 | 81 |
| ESO 508-45A | | | 15.8 | 0.8 x 0.4’ | | |

# MCG-5-33-5 (Centaurus)




| ID | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|
| Seashell, MCG-5-33-5 | 13 47 23 | -30 25 00 | 15.1v | 0.8 x 0.5’ | 167 | 81 |
| NGC 5291 | | | 14.1v | 1.3 x 0.9’ | | |

# AM 1352-263 (Hydra)




| Other ID | RA | Dec | Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|
| MCG-4-33-13 | 13 55 04.4 | -26 46 50 | 13.4b | 1.0 x 1.2’ | 149 | 81 |

# 2003: "G.D." Planetary Nebulae

## ADVANCED OBSERVING - T.S.P. 2003: "G.D." PLANETARY NEBULA

### (Observe at Least 20 of the 40 Objects – Your Choice)

| Name | Position (2000) | Const. | Mag. | Size | Mag. © | Class | Uran 1 | Uran 2 |
|---|---|---|---|---|---|---|---|---|
| NGC2371 / NGC2372 | 07 25 34.8 + 29 29 22 | Gem | 13.0 (P) | 55.0" | 14.8 | 3a + 2 | 100 | 75 |
| Abell 21, The "Medusa" | 07 29 04.5 + 13 14 55 | Gem | 11.3 (P) | 11.7' | 15.9 | ? | 184 | 95 |
| Frosty Leo, IRAS09371+1212 | 09 39 53.6 + 11 58 54 | Leo | 10.97(V) | | | | 188 | 93 |
| Kohoutek 1 - 22 | 11 26 43.7 - 34 22 18 | Hya | 12.6(P) | 3.0' | 17.4 | ? | 367 | 168 |
| IC972, Abell 37 | 14 04 25.9 – 17 13 40 | Vir | 14.9(P) | 54.0" | 17.9 | 2c | 286 | 129 |
| IC4406, Sanduleak 2-105 | 14 22 26.5 - 44 09 05 | Lup | 10.6(P) | 106x38" | 17.4 | 4 + 3 | 404 | 183 |
| Sand 2-120, Wray16-176 | 15 22 19.4 - 23 37 33 | Lib | 11.5(P) | 16.0" | 18.8 | 2 | 334 | 147 |
| Longmore 13 | 16 09 45.8 – 30 55 06 | Sco | ? | 71.0" | ? | ? | 374 | 165 |
| IC4593 | 16 11 44.5 + 12 04 17 | Her | 10.9(P) | 30.0" | 11.2 | 2 + 2 | 200 | 87 |
| Abell 39 | 16 27 33.8 + 27 54 33 | Her | 13.7(P) | 2.9' | 15.6 | 2c | 156 | 69 |
| Minkowski 2 - 9, "Butterfly" | 17 05 37.9 – 10 08 32 | Oph | 13.2(IR) | 50 x 20" | 15.6 | ?+6 | 292 | 127 |
| Nassau 1, Sanduleak 2 - 179 | 17 12 51.9 - 03 16 00 | Oph | 13.4(P) | 5.0" | 16.6 | ? | 247 | 107 |
| NGC6309, The "Box" | 17 14 04.5 - 12 54 41 | Oph | 10.8(P) | 16.0" | 16.5 | 3b+6 | 292 | 127 |
| ■Cotton Candy Nebula | 17 18 20.1 – 32 27 23 | Sco | | | | Proto | 376 | 164 |
| Mink 2-11, Sand 2-186 | 17 20 33.3 - 29 00 39 | Oph | 14.4 | 15.0" | ? | 1 | 376 | 146 |
| Mink 3-9, Sand 2-196 | 17 25 43.4 - 26 11 56 | Oph | 15.0(V) | 17.0" | 18.8 | 3 | 338 | 146 |
| Sanduleak 2 – 237 | 17 44 42.1 – 15 45 12 | Ser | ? | ? | 15.6 | ? | 293 | 126 |
| Hubble 5, Wray 16-310 | 17 47 56.2 – 29 59 40 | Sgr | 13.6(P) | 15.0" | 18.6 | 2 + 6 | 377 | 146 |
| Haro 1-36, Sanduleak 2-249 | 17 49 48.2 – 37 01 28 | Sco | 12.0(P) | 10.0" | 16.8 | ? | 377 | 164 |
| Abell 43 | 17 53 32.2 + 10 37 25 | Oph | 14.7(P) | 78 x 72" | 14.7 | 2c | 204 | 86 |
| Minkowski 3 - 23 | 18 07 06.1 - 30 34 17 | Sgr | 13.8(P) | 11.0" | ? | 2 | 377 | 163 |
| ■Gomez's Hamburger | 18 09 13.3 - 32 10 48 | Sgr | | | | Proto | 377 | 163 |
| Minkowski 4 – 9 | 18 14 18.3 – 04 59 22 | Ser | 16.0(P) | 54.0" | 20.3 | 4 | 249 | 106 |
| Kohoutek 3 – 4 | 18 31 00.3 + 02 25 23 | Ser | 15.7(P) | 20.0" | ? | 3b+2 | 250 | 106 |
| Minkowski 1 – 54 | 18 36 08.3 – 16 59 57 | Sgr | 12.5(P) | 13.0" | ? | 3 | 295 | 126 |
| GJJC1, IRAS18333-2357 | 18 36 24.2 – 23 54 12.2 | Sgr | 15.0(P) | 10 x 7" | 14.3 | | 340 | 145 |
| Henize 2 – 418 | 18 44 14.6 – 30 19 36 | Sgr | 15.1 | 13.0" | 15.6 | ? | 378 | 163 |
| Sanduleak 2-364, PC-21 | 18 45 35.2 – 20 34 59 | Sgr | 13.9(P) | 13.0" | 18.4 | 6+3 | 340 | 145 |
| Minkowski 1 - 64 | 18 50 02.3 + 35 14 33 | Lyr | 12.8(P) | 24.0" | ? | 4 | 117 | 49 |
| Minkowski 4 - 11 | 18 54 17.7 – 10 05 10 | Sct | 14.9(P) | •21.0" | 18.7 | 2 | 295 | 125 |
| Sharpless 2 – 71 | 19 02 00.0 + 02 09 23 | Aql | 12.2(P) | 2.6 x 1.5' | 13.7 | 3b+3 | 251 | 105 |
| Kohoutek 3 – 27 | 19 14 30.2 + 28 40 43 | Lyr | 14.9(P) | 16.0" | 17.2 | ? | 118 | 67 |
| Nassau 2 | 19 18 19.7 – 11 06 17 | Aql | 13.3(P) | 16.0" | 14.0 | ? | 296 | 125 |
| ■Minkowski Footprint, M-92 | 19 36 18.0 + 29 33 00 | Cyn | | .2 x 0.1' | | Proto | 118 | 48 |
| PC - 22 | 19 42 03.6 + 13 50 35 | Aql | 14.4(P) | 24x18" | 18.1 | ? | 207 | 85 |
| Kohoutek 3-73 | 20 04 00.2 + 49 19 04 | Cyg | 15.2(P) | 16.0" | 20.8 | ? | 84 | 32 |
| Henize 1-6 | 20 17 21.5 + 25 21 44 | Vul | 14.9(P) | 24.0" | ? | 3+2 | 163 | 66 |
| NGC7008 & Kohoutek 4 - 44 | 21 00 33.1 + 54 32 32 | Cyg | 13.3(P) | 86.0" | 13.2 | 3 | 56 | 19 |
| ■Egg Nebula, CRL 2688 | 21 02 18.7 + 36 41 40 | Cyn | 13.5 | 1.0x0.5' | | Proto | 121 | 47 |
| NGC7026 | 21 06 18.5 + 47 51 08 | Cyg | 12.79p 0 | 40.0" | 14.2 | 3a | 85 | 32 |

■ = *Proto – Planetary Nebula*

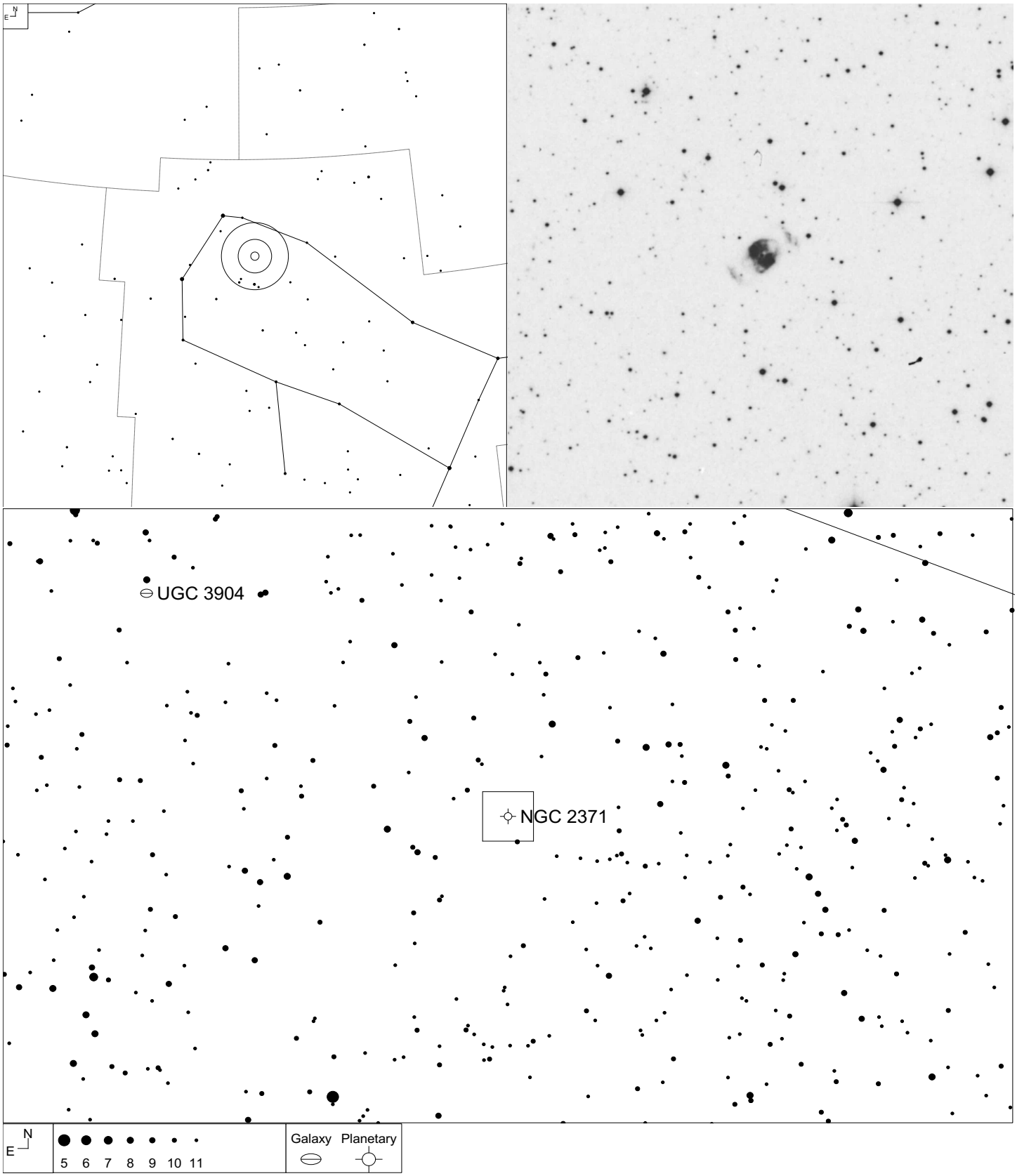
***Thank You - Jayne Lambert!!!!***

***Larry Mitchell - Houston, TX***

*Classification – Vorontsov-Velyaminov (1934)*

1. Stellar
2. Smooth Disk
   a. Brighter towards the center
   b. Uniform brightness
   c. Traces of ring structure
3. Irregular Disk
   a. Very irregular brightness distribution
   b. Traces of ring structure
4. Ring Structure
5. Irregular Form

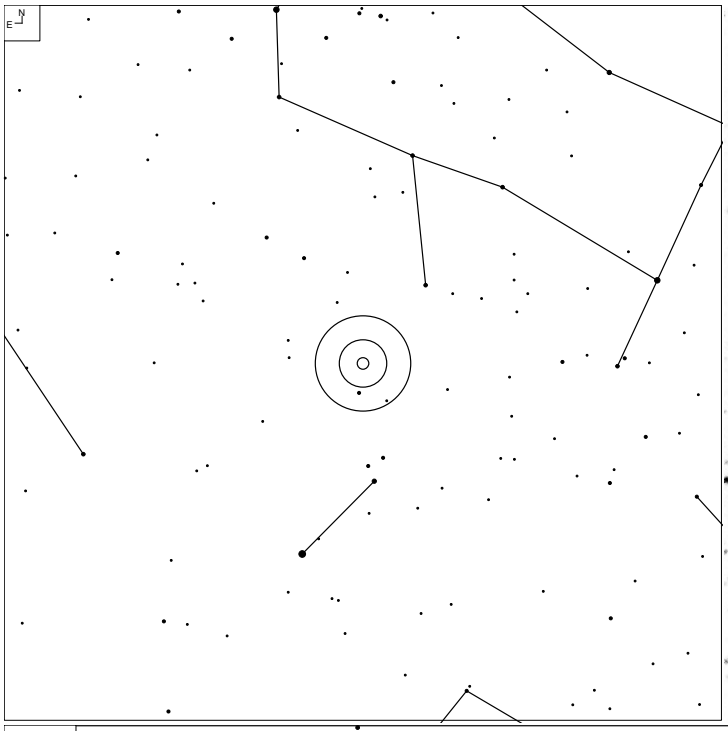
# NGC 2371/2 – Double Bubble (Gemini)

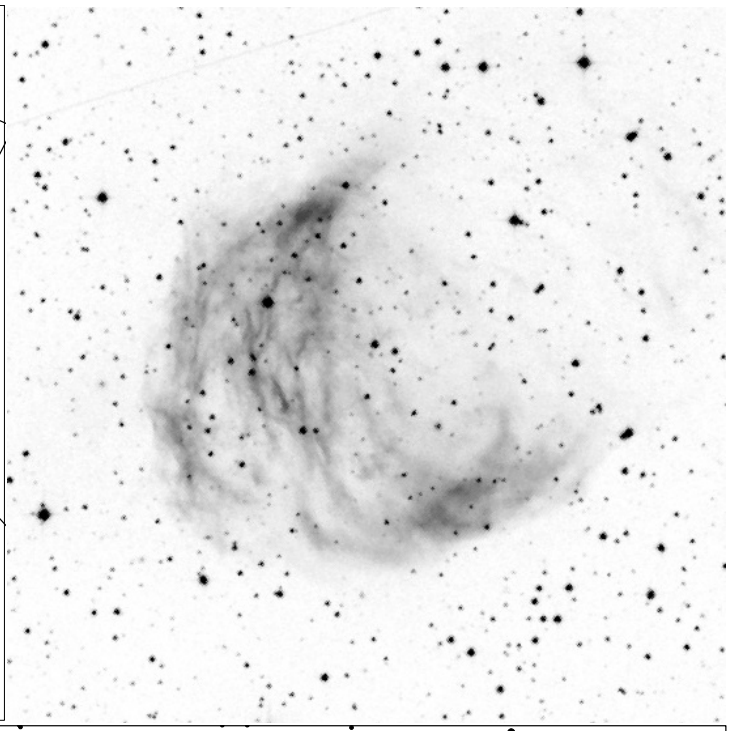


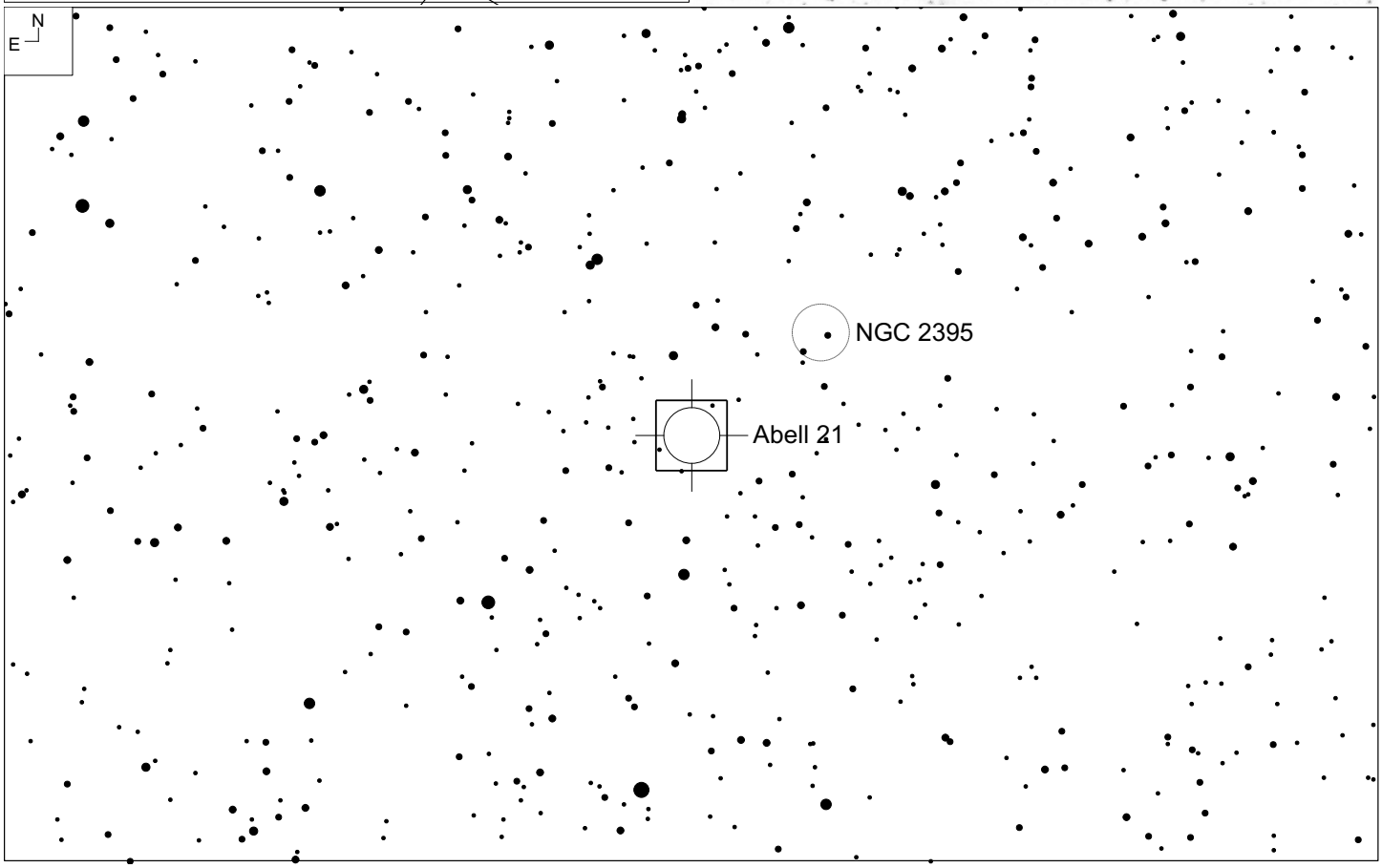

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 189+19.1 | 3a+2 | 07 25 34.8 | +29 29 22 | 11.2v | 14.8 | 55” | 75 | 36 |

Extensions - Broken arcs, difficult to discern, are SE and NW of poles.

# Abell 21 (Gemini)

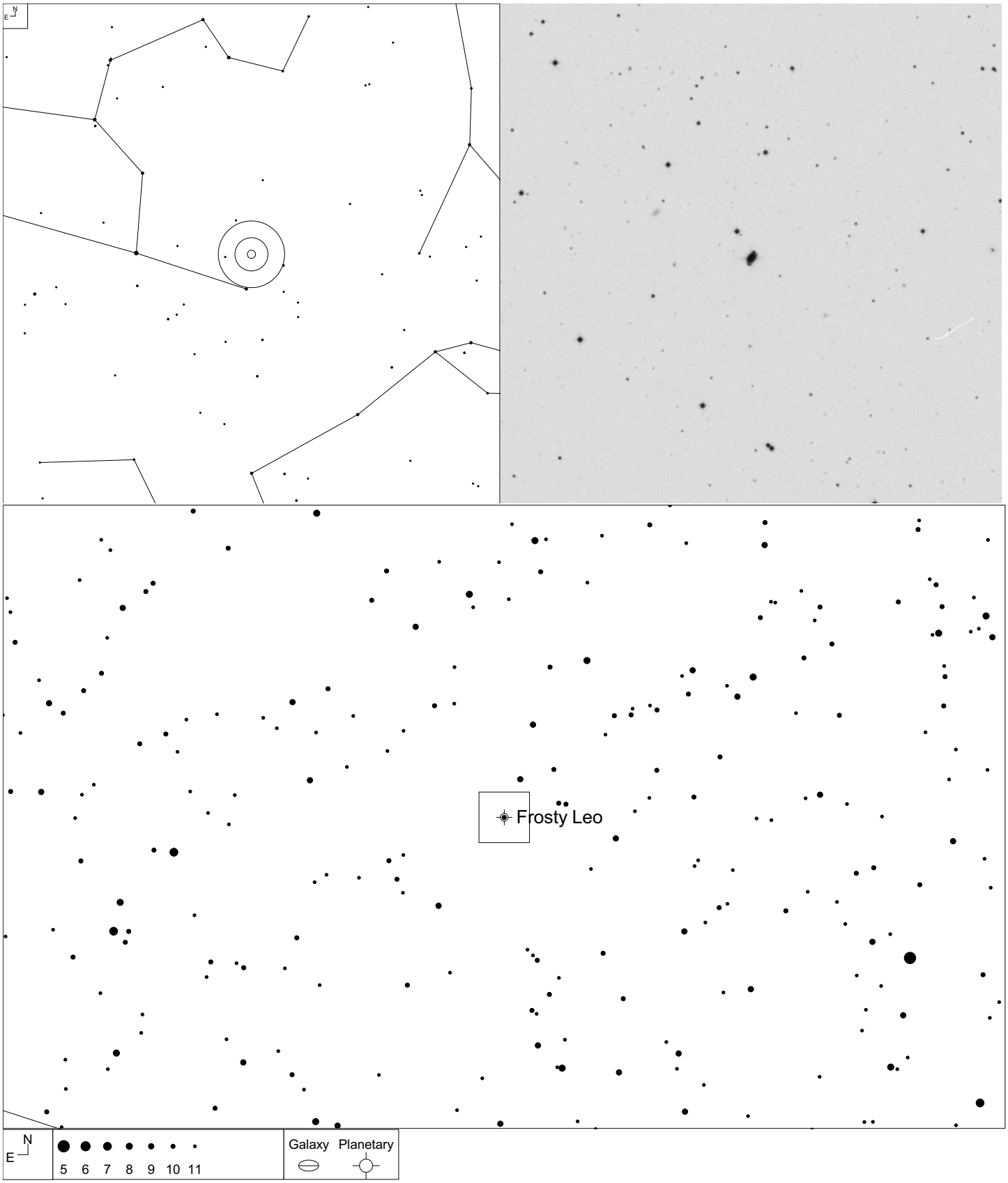






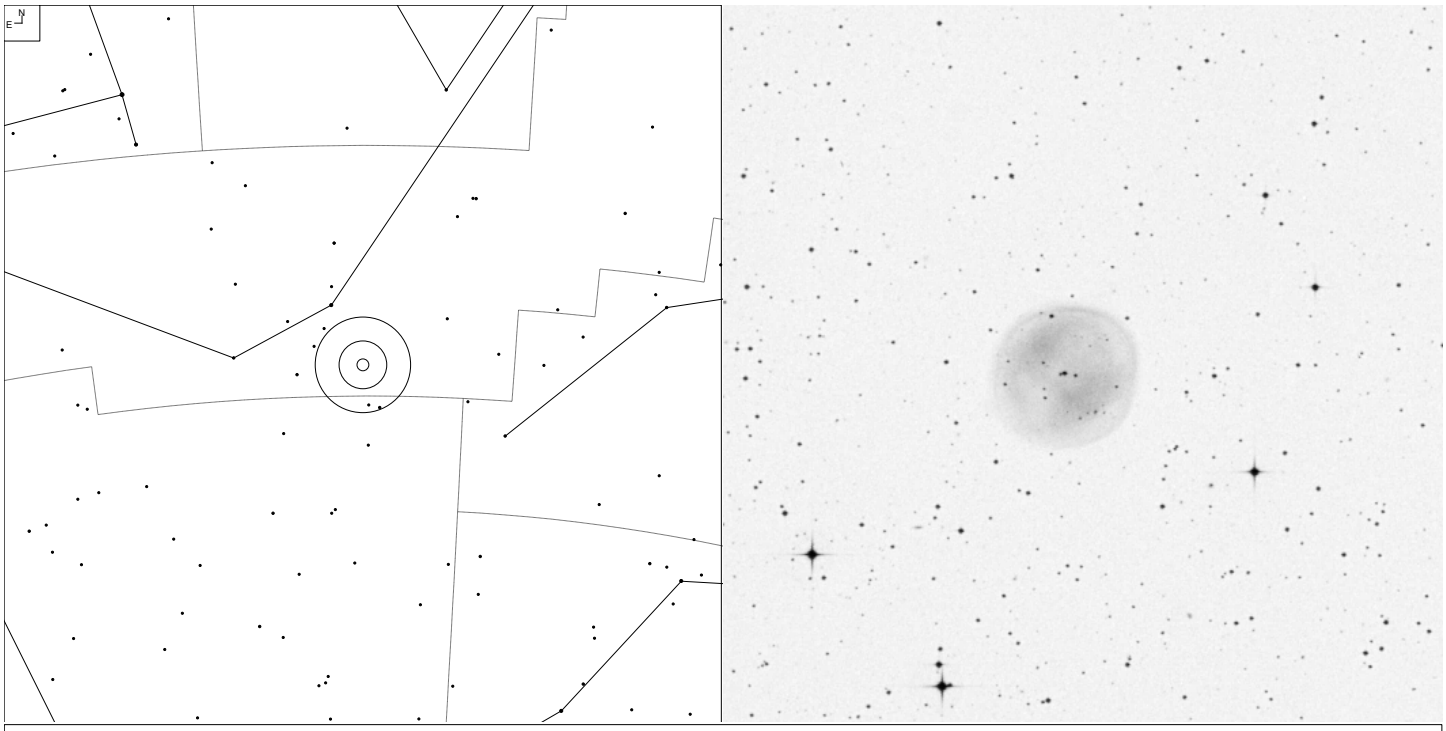

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| The Medusa | | 07 29 04.5 | +13 14 55 | 11.3p | 15.9 | 11.7’ | 95 | 48 |

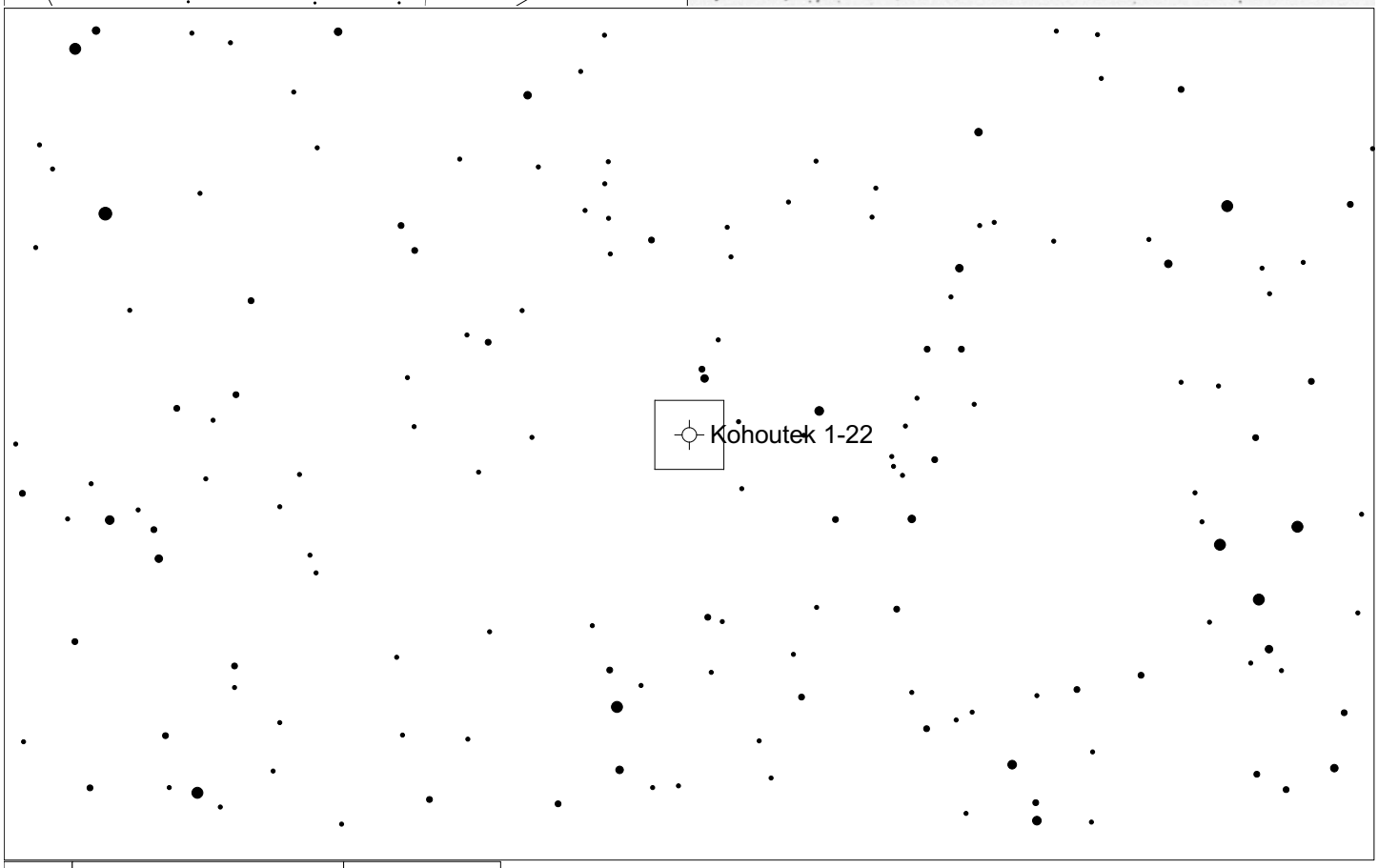
# IRAS 09371+1212 (Leo)

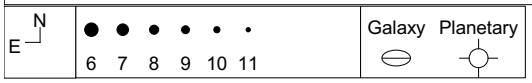



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Frosty Leo | Proto | 09 39 54 | +11 59 00 | 10.5 | 11 | 12” | 93 | 47 |

# Kohoutek 1-22 (Hydra)

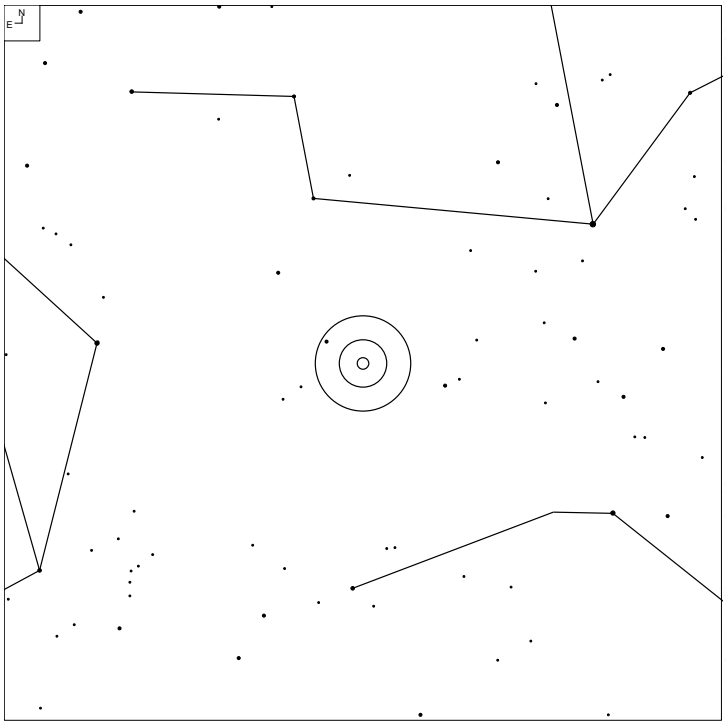


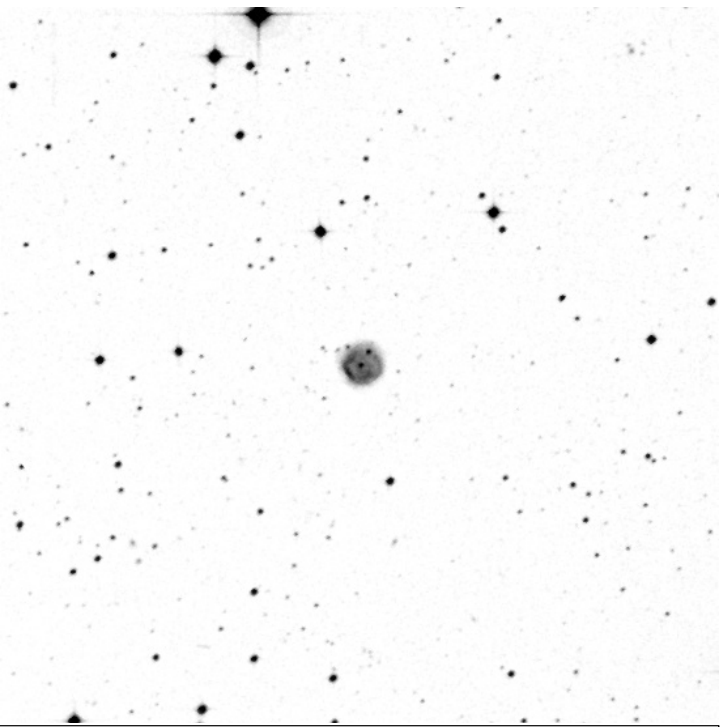


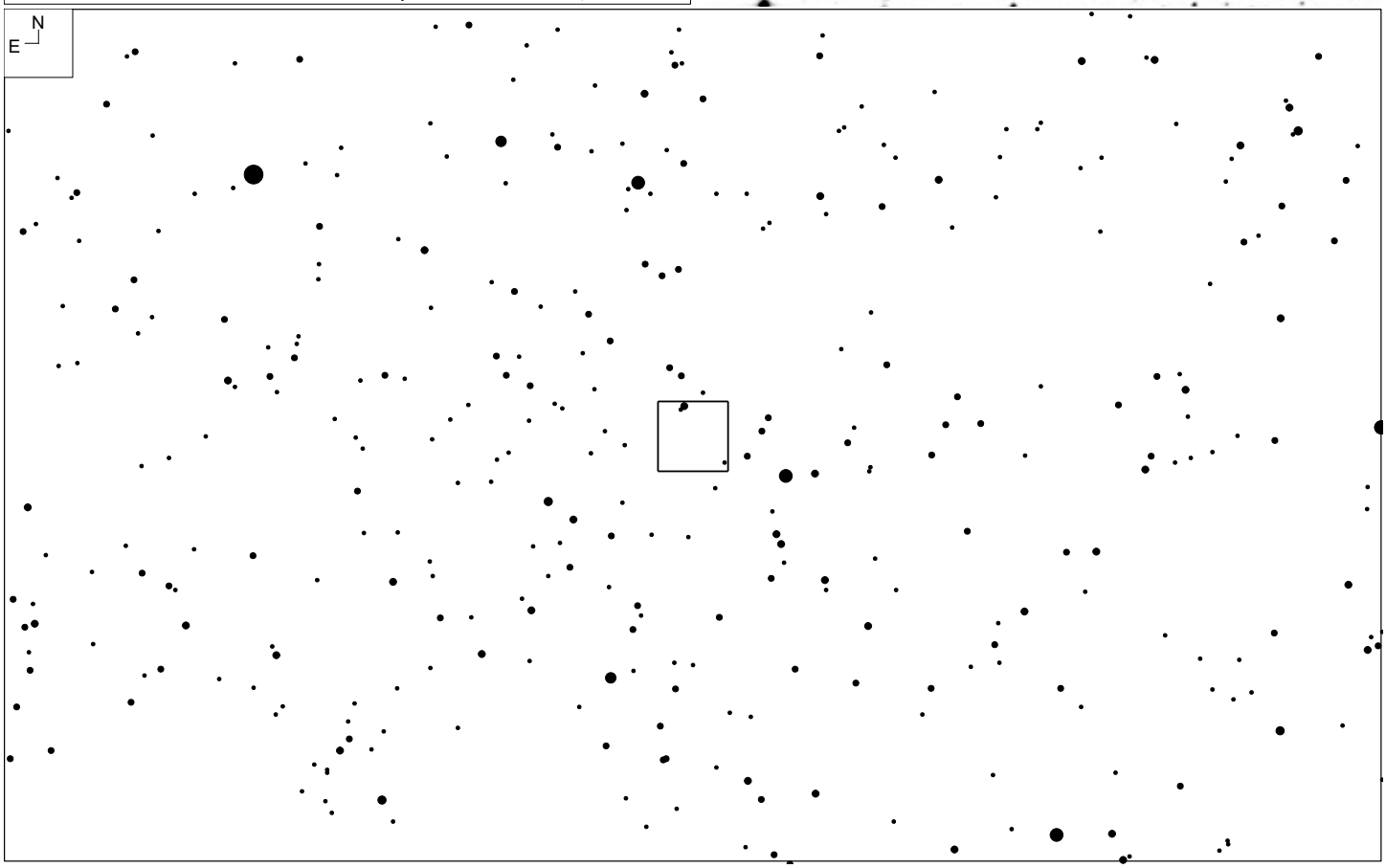




| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 283+25.1 | - | 11 26 43.7 | -34 22 18 | 12.1v | 17.4 | 3.0’ | 168 | 82 |

# IC 972 (Virgo)

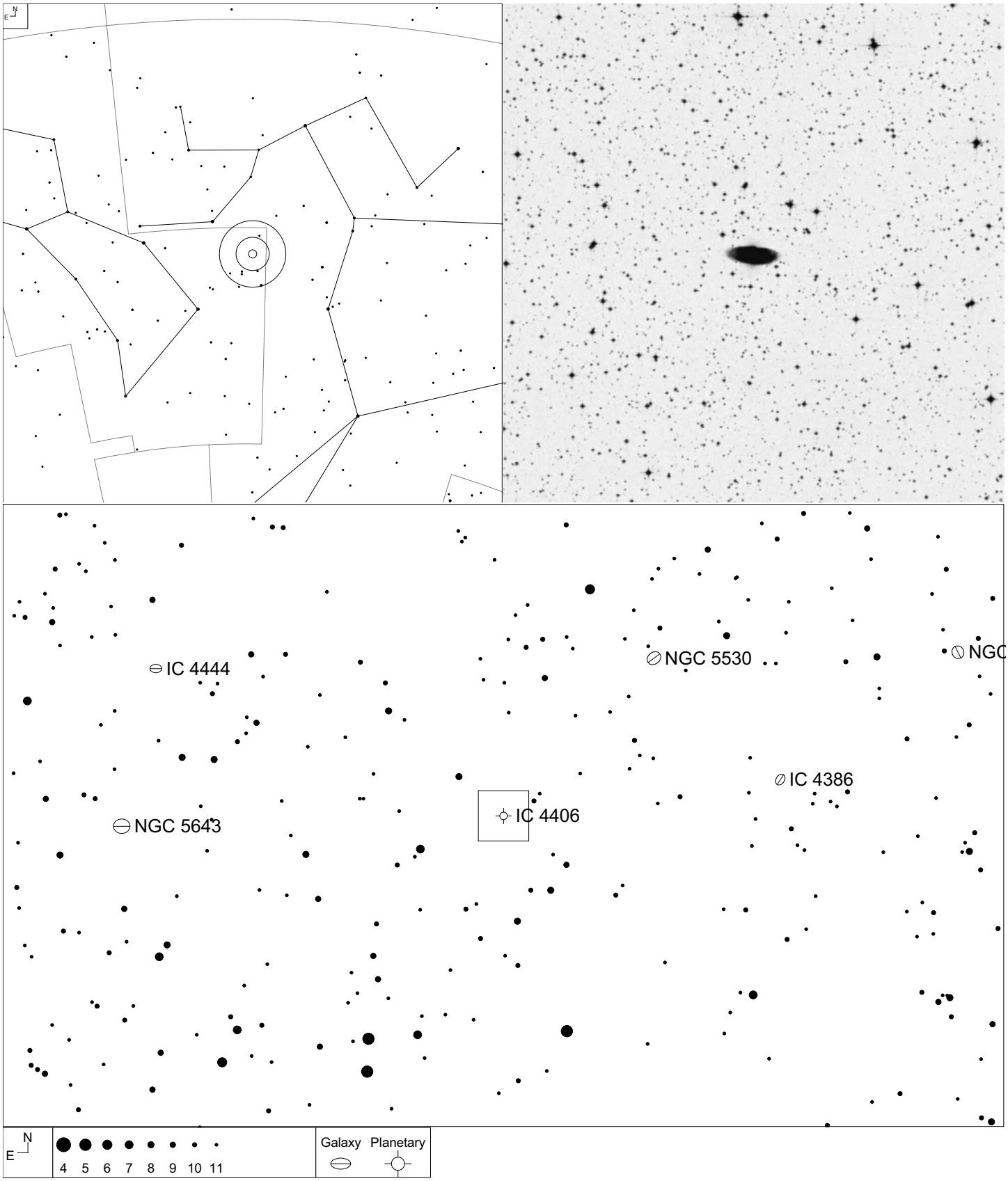






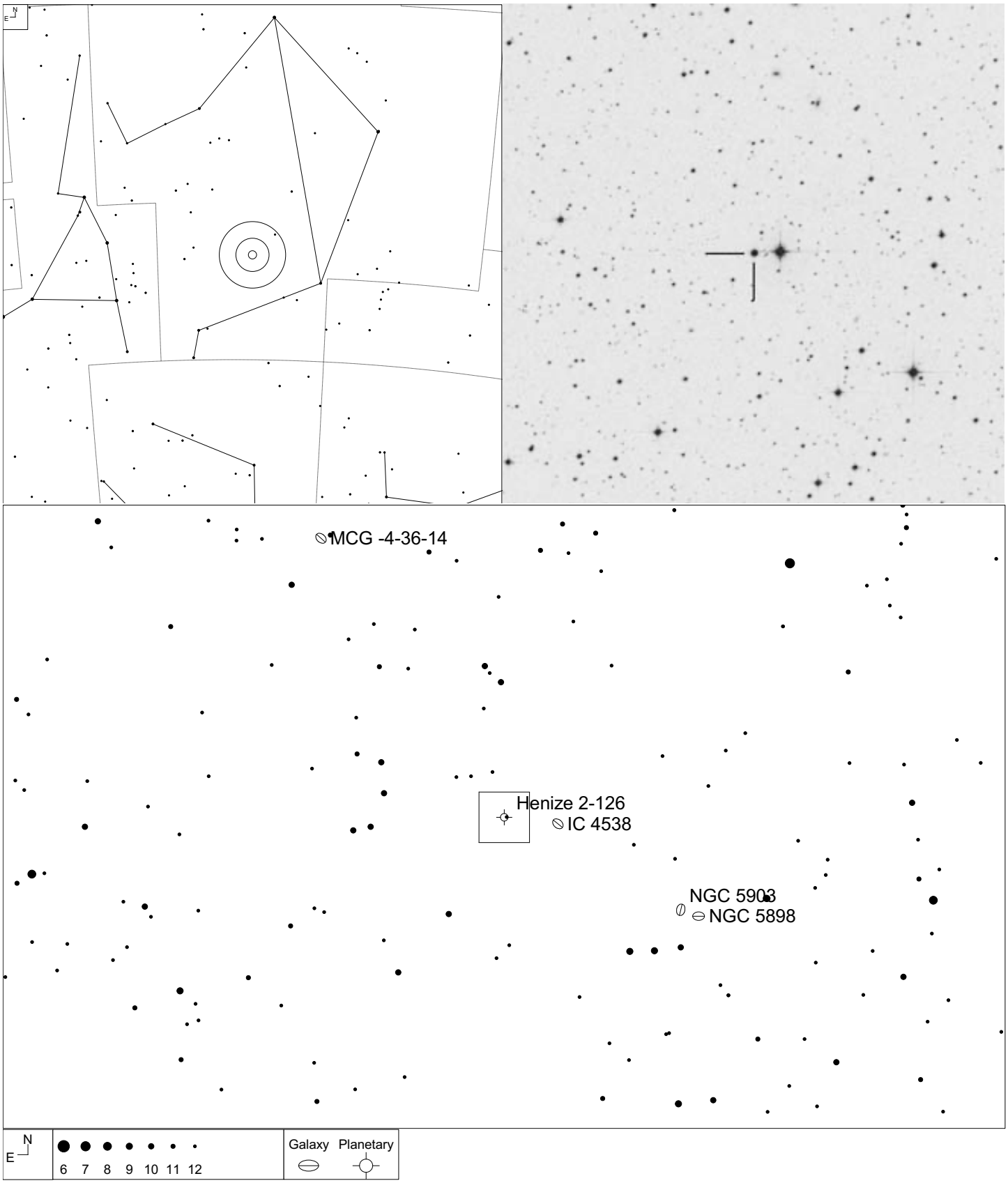

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Abell 37 | 2c | 14 04 25.9 | -17 13 40 | 14.9p | 17.9 | 54” | 129 | 68 |

# IC 4406 (Lupus)



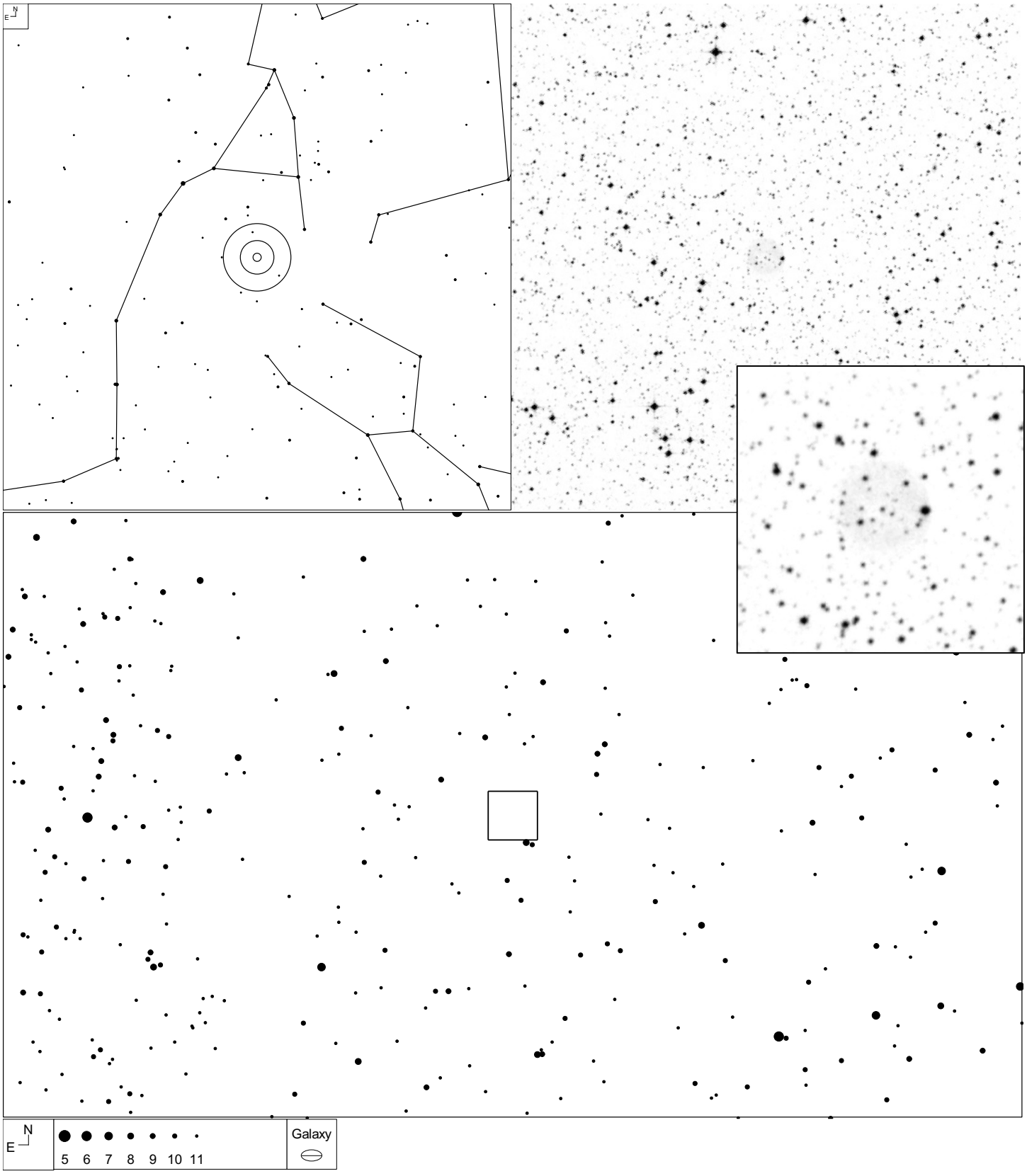

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 319+15.1 | 4+3 | 14 22 26.5 | -44 09 05 | 10.2v | 17.4 | 100x37” | 183 | 92 |

# Henize 2-126 (Libra)



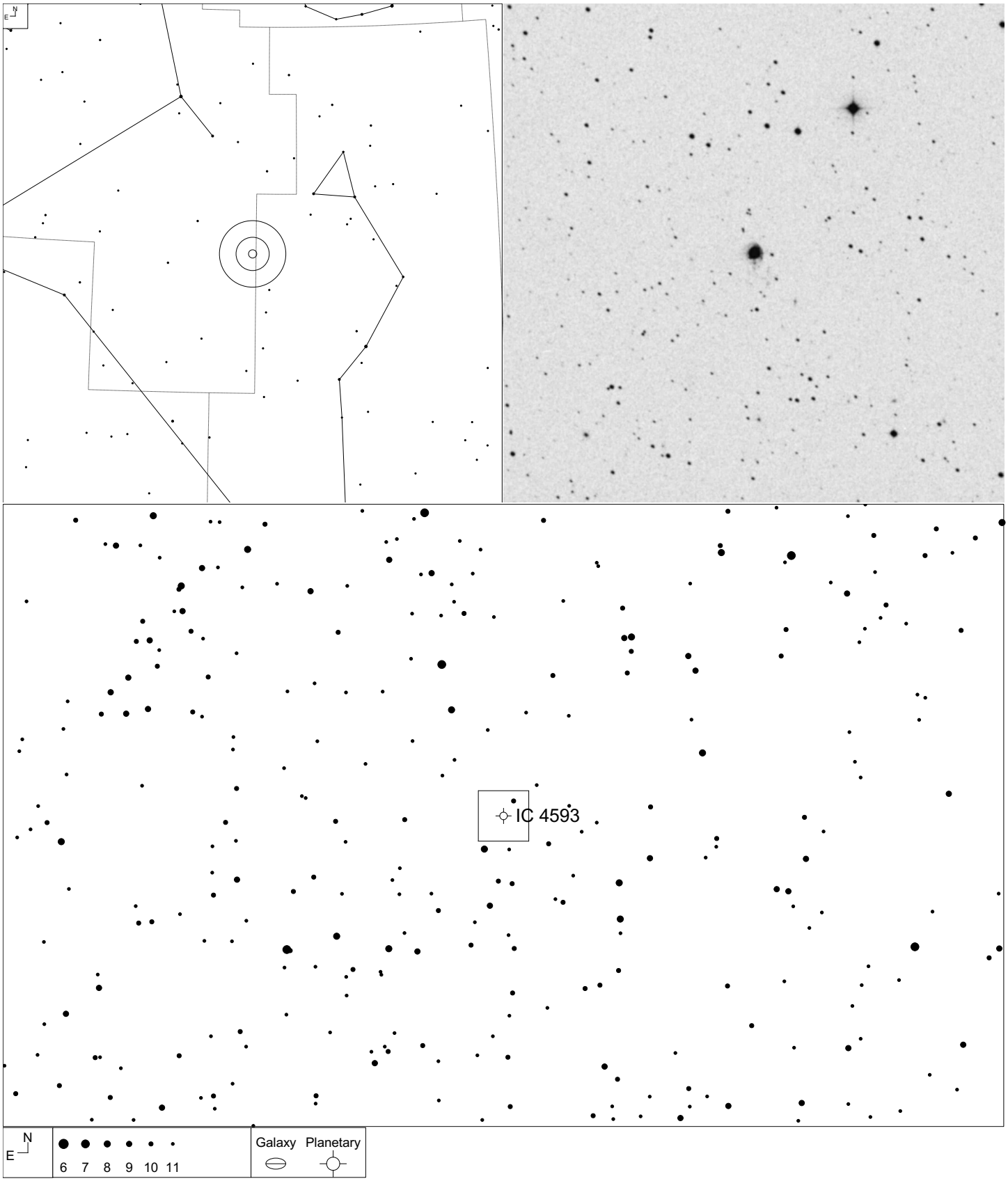

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Sanduleak 2-120 | 2 | 15 22 19.4 | -23 37 33 | 11.6v | 18.8 | 16” | 147 | 80 |

# Longmore 13 (Scorpius)



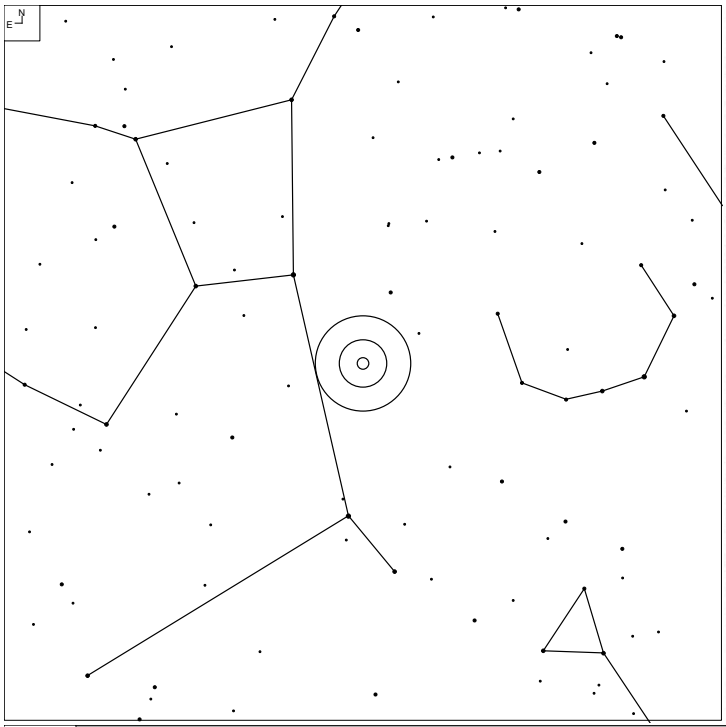

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | | 16 09 45.9 | -30 55 08 | 11.7v | | 98 x 72” | 165 | 79 |

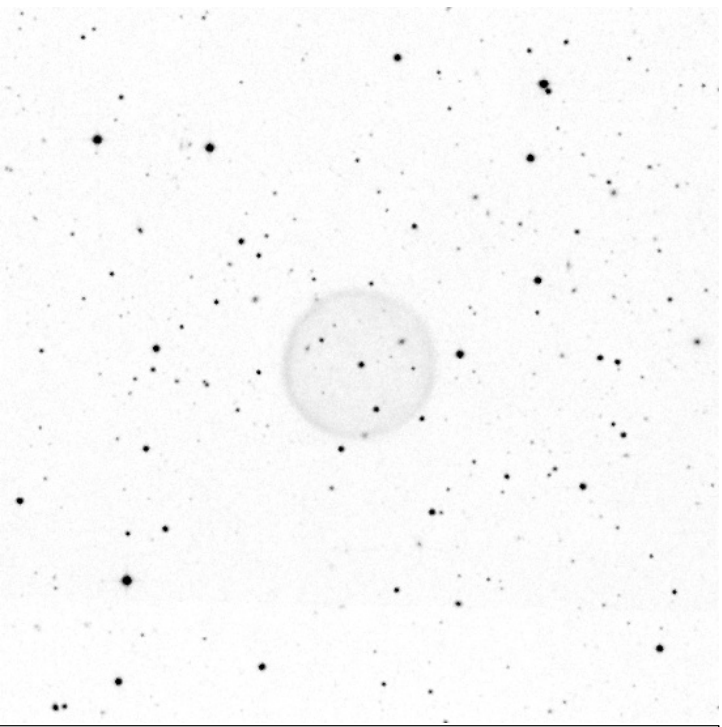
# IC 4593 (Hercules)

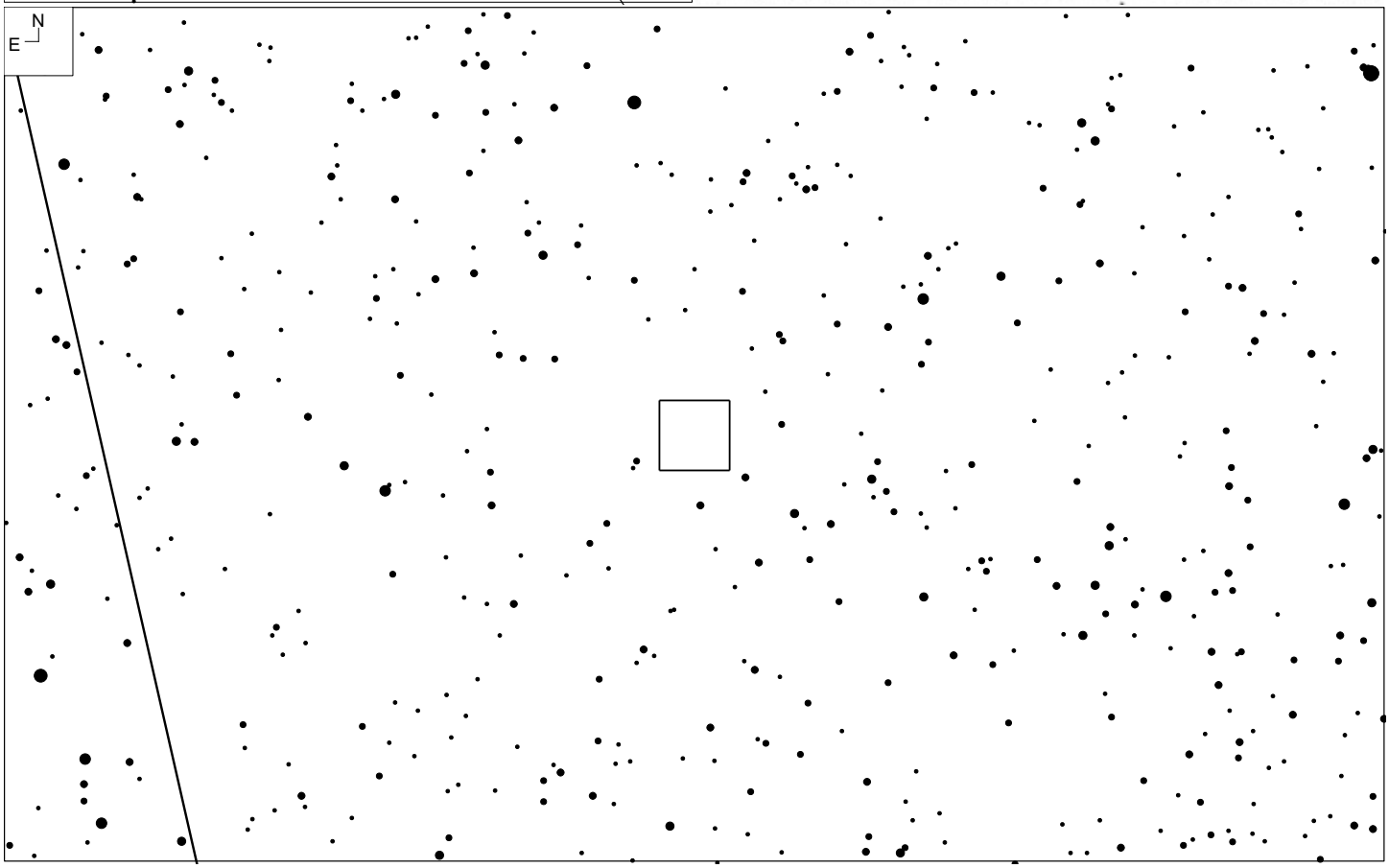



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 25+40.1 | 2+2 | 16 11 44.5 | +12 04 17 | 10.7v | 11.2 | 30” | 87 | 43 |

# Abell 39 (Hercules)

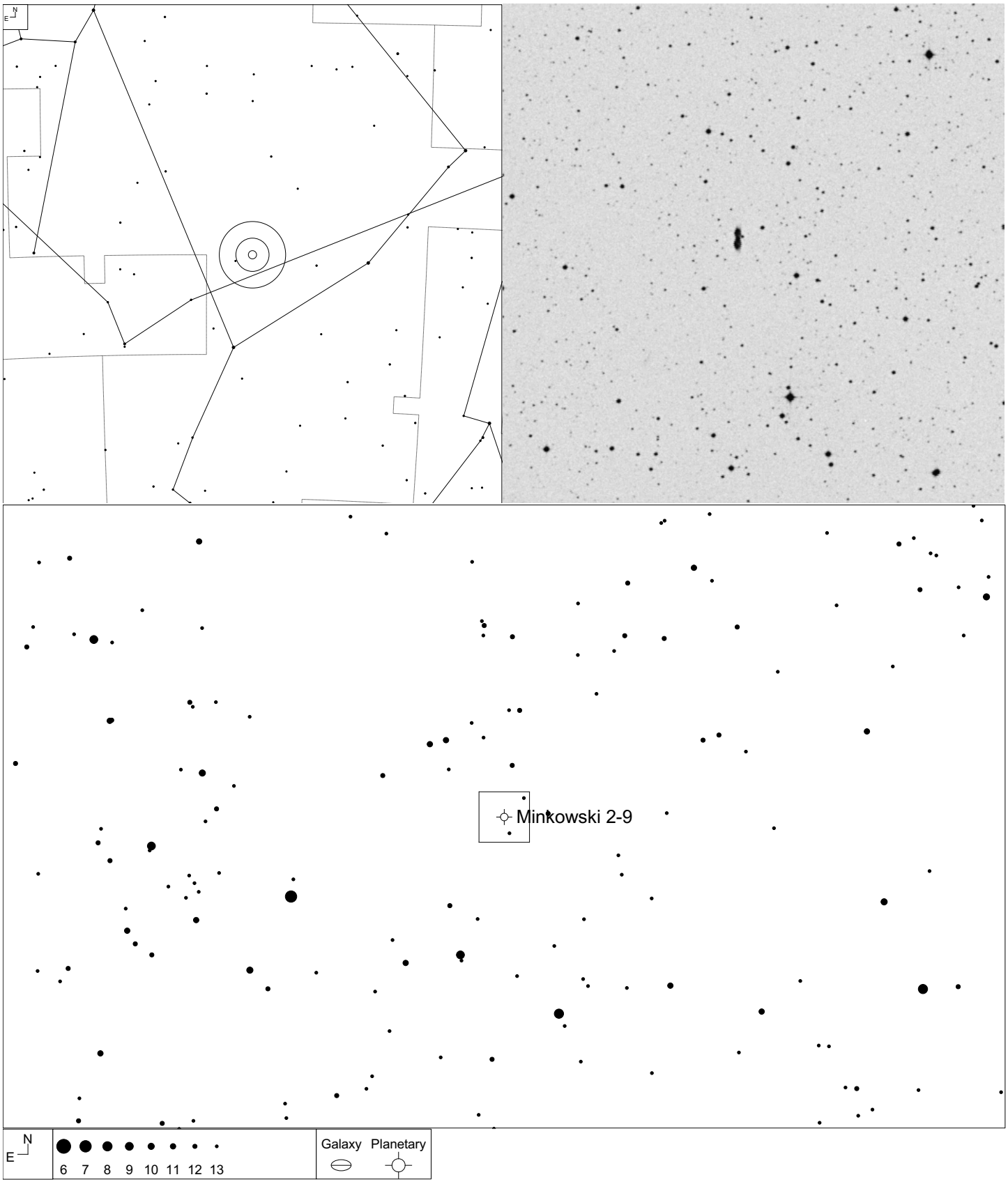






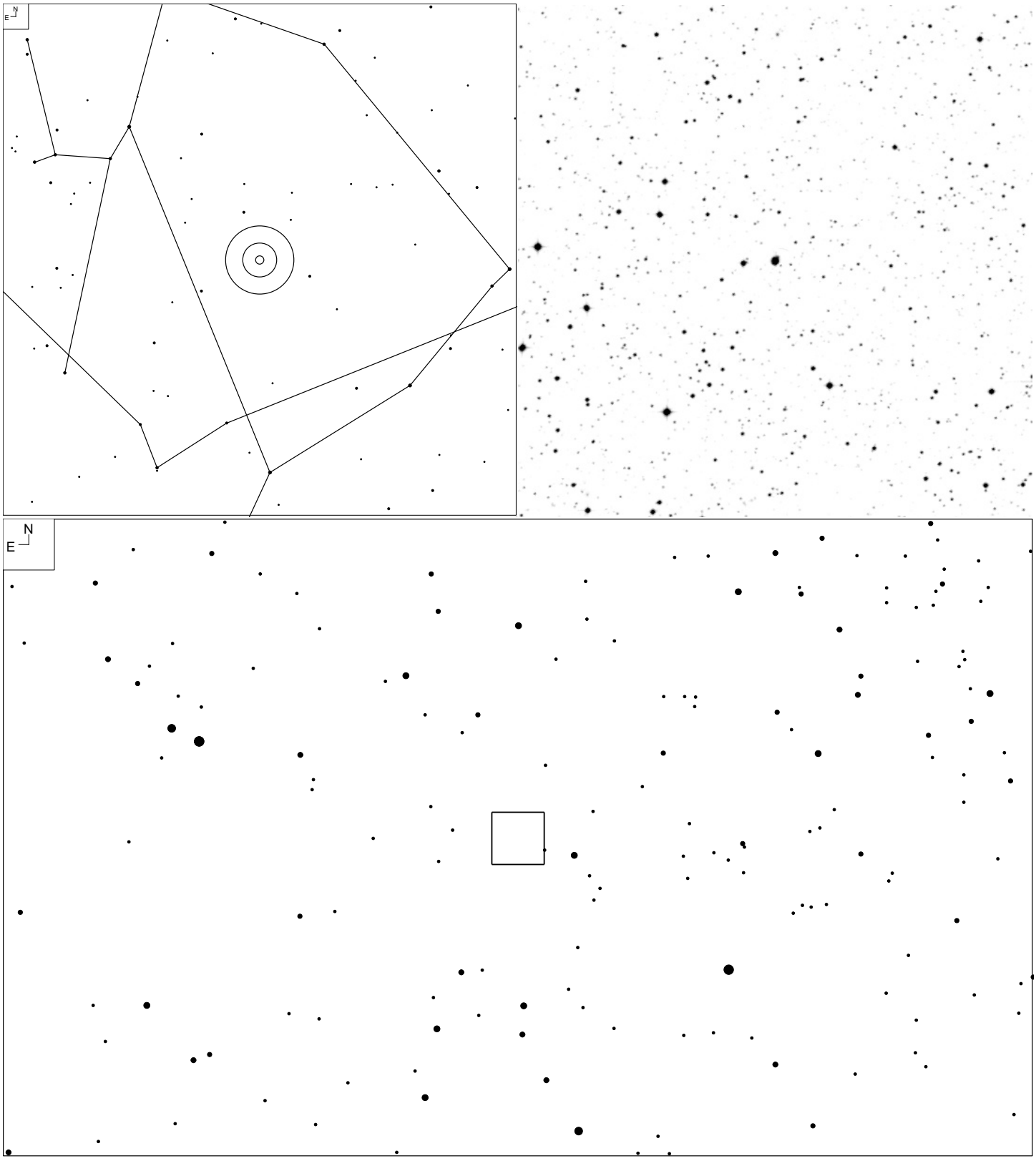

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | 2c | 16 27 33.8 | +27 54 33 | 13.7p | 15.6 | 2.9’ | 69 | 31 |

# Minkowski 2-9 – Minkowski's Butterfly (Ophiuchus)



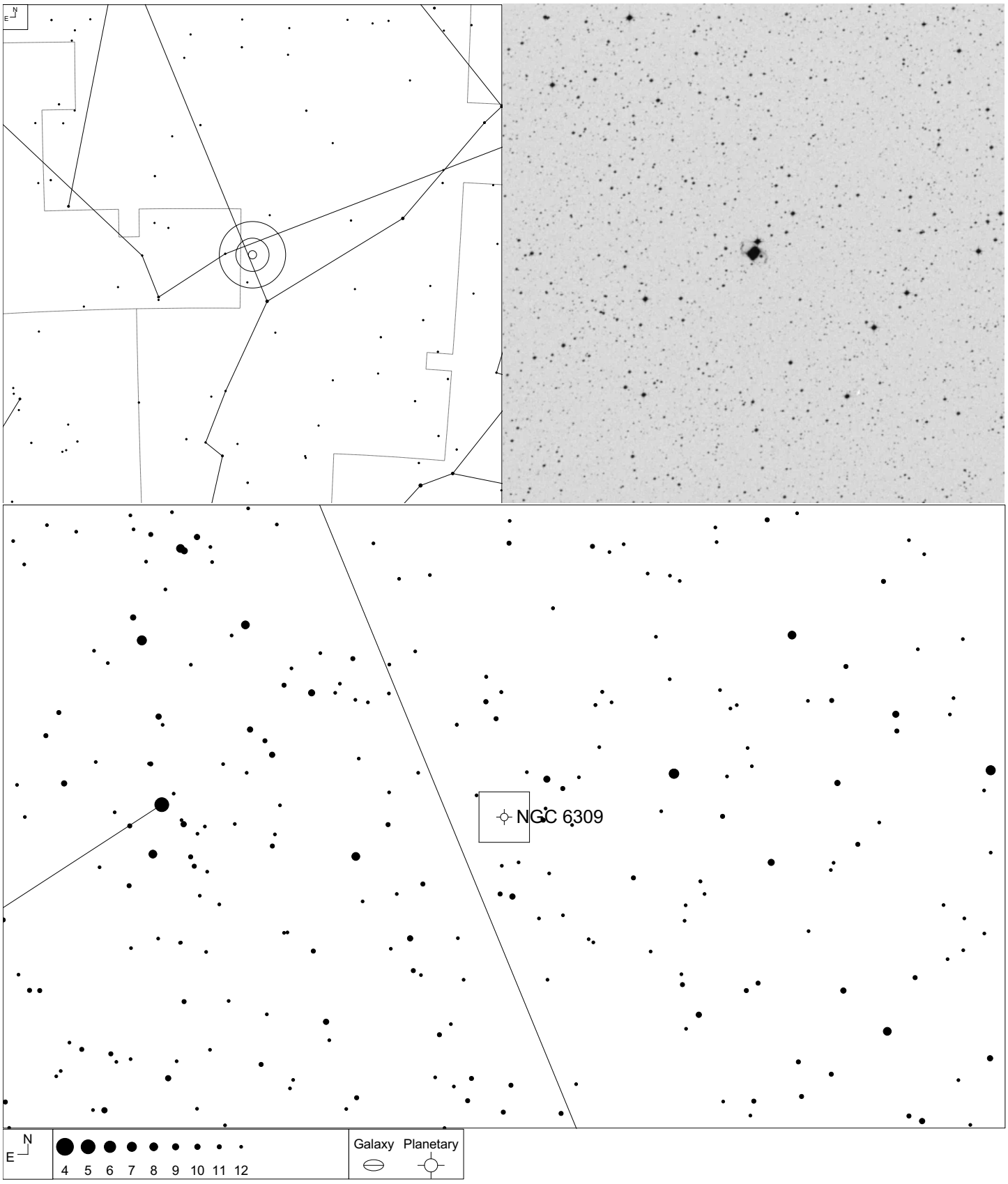

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 10+18.2 | ?+6 | 17 05 37.9 | -10 08 32 | 14.6v | 15.6 | 50 x 20" | 127 | 67 |

# Nassau 1 (Ophiuchus)



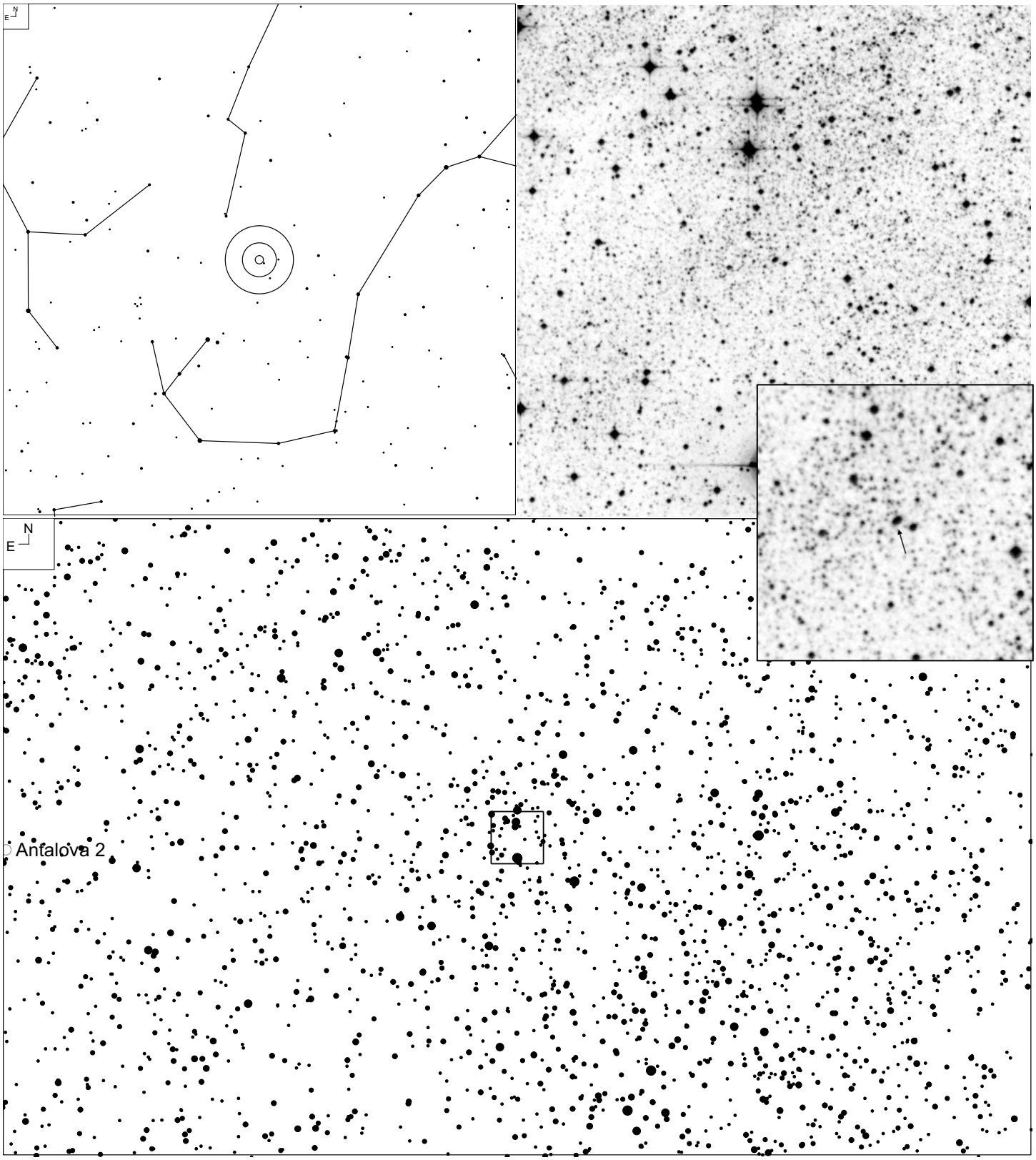

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Sanduleek 2-179 | ? | 17 12 51.9 | -03 16 00 | 13.4p | 16.6 | 5” | 107 | 55 |

# NGC 6309 (Ophiuchus)



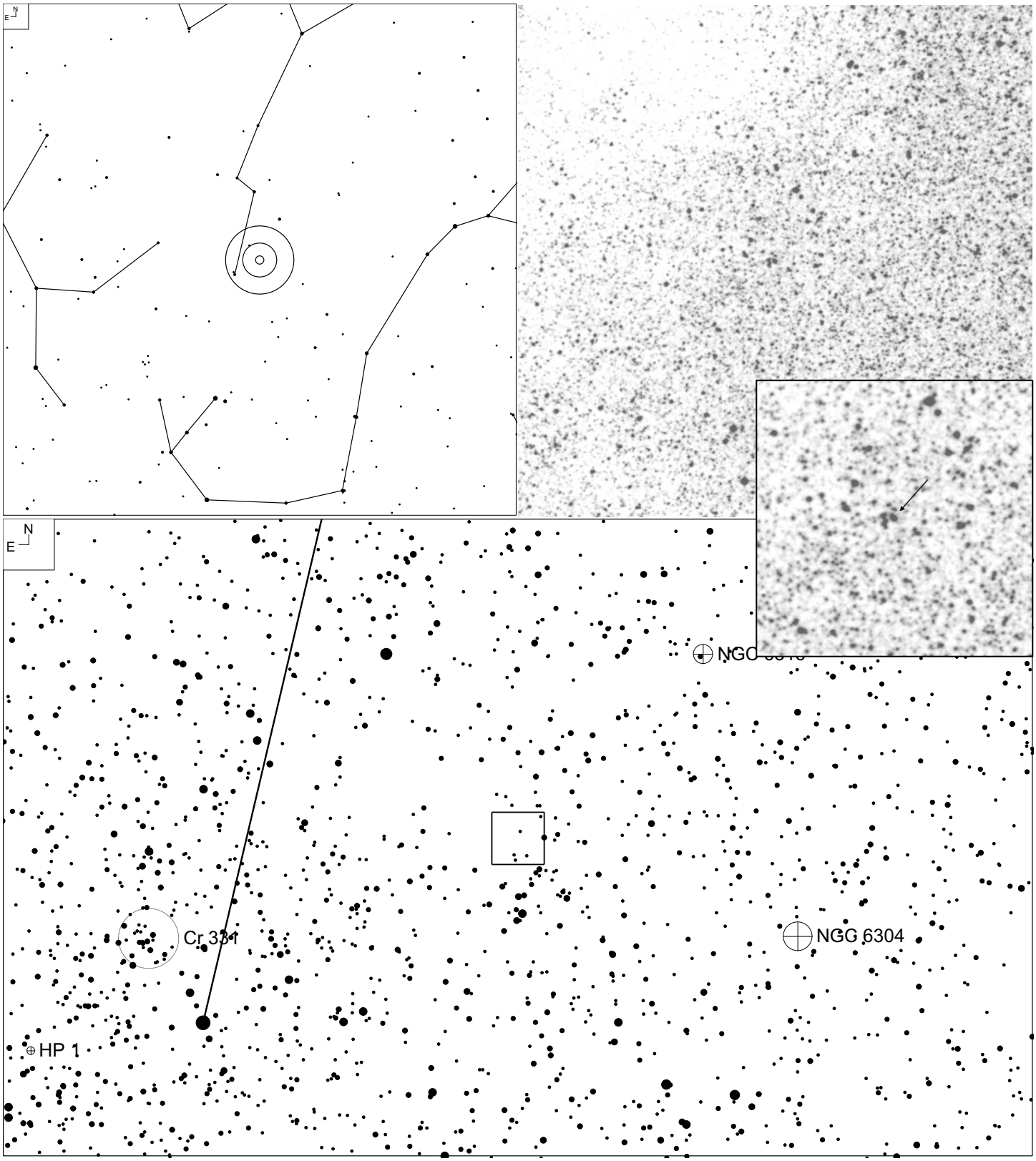

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 9+14.1 | 3b+6 | 17 14 04.5 | -12 54 41 | 11.5v | 16.5 | 21x12” | 127 | 67 |

# Cotton Candy Nebula (Scorpius)



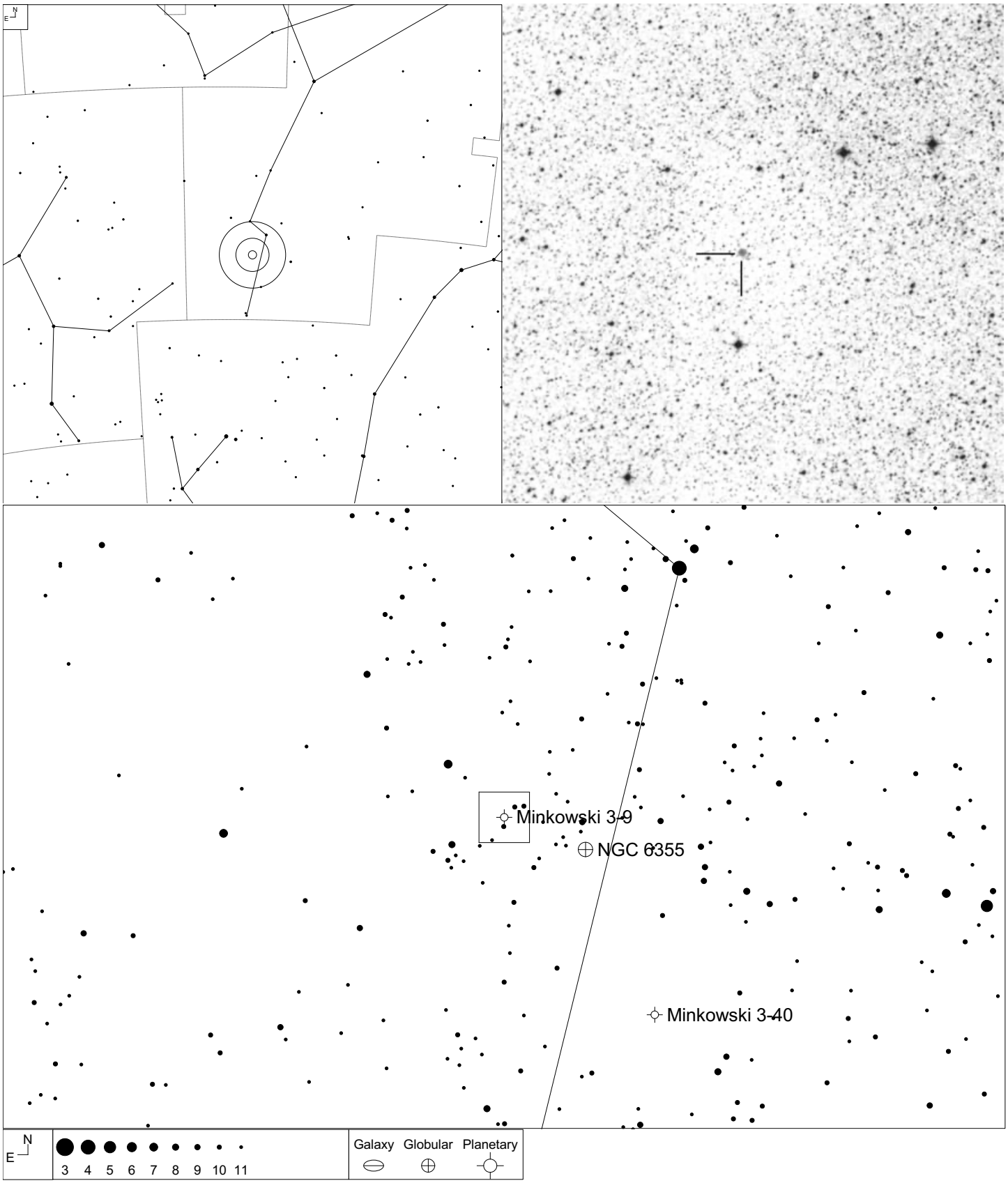

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | Proto | 17 18 20.1 | -32 27 23 | - | - | - | 164 | 79 |

# Minkowski 2-11 (Ophiuchus)



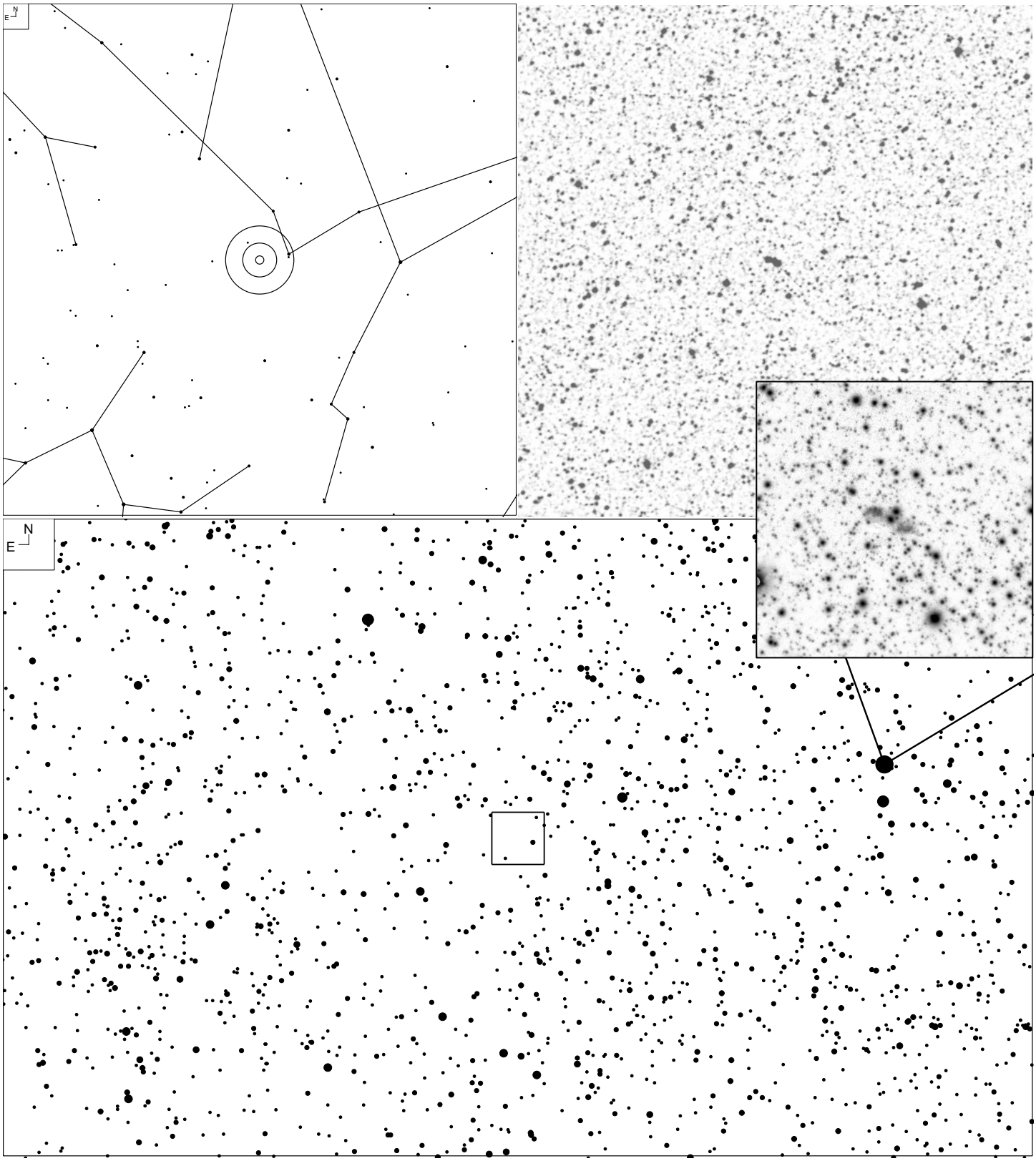

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | 1 | 17 20 33.3 | -29 00 39 | 14.4 | ? | 15” | 146 | 79 |

# Minkowski 3-9 (Ophiuchus)



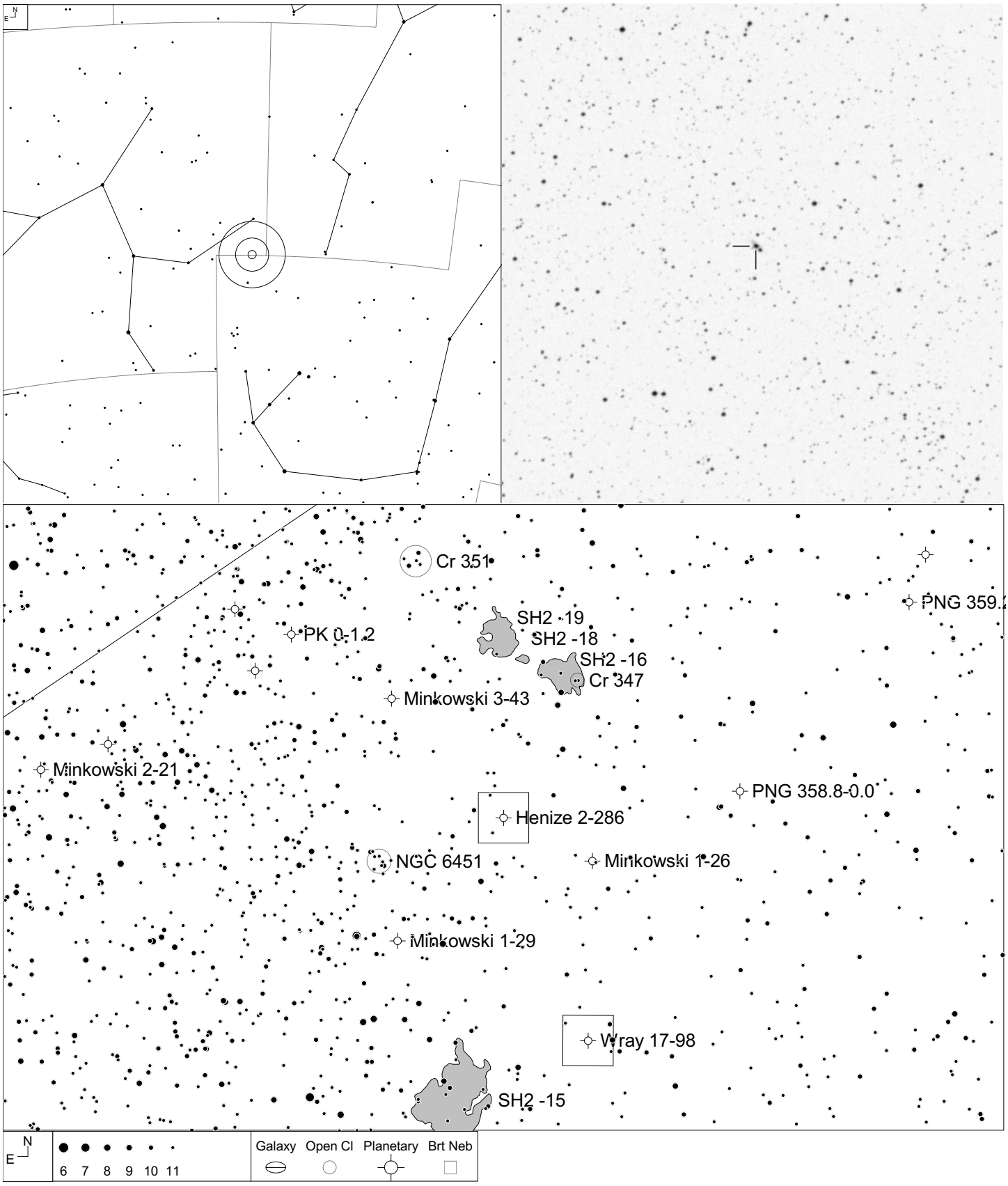

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 359+5.2 | 3 | 17 25 43.4 | -26 11 56 | 15.0v | 18.8 | 17” | 146 | 79 |

# Sanduleak 2-237 (Ophiuchus)



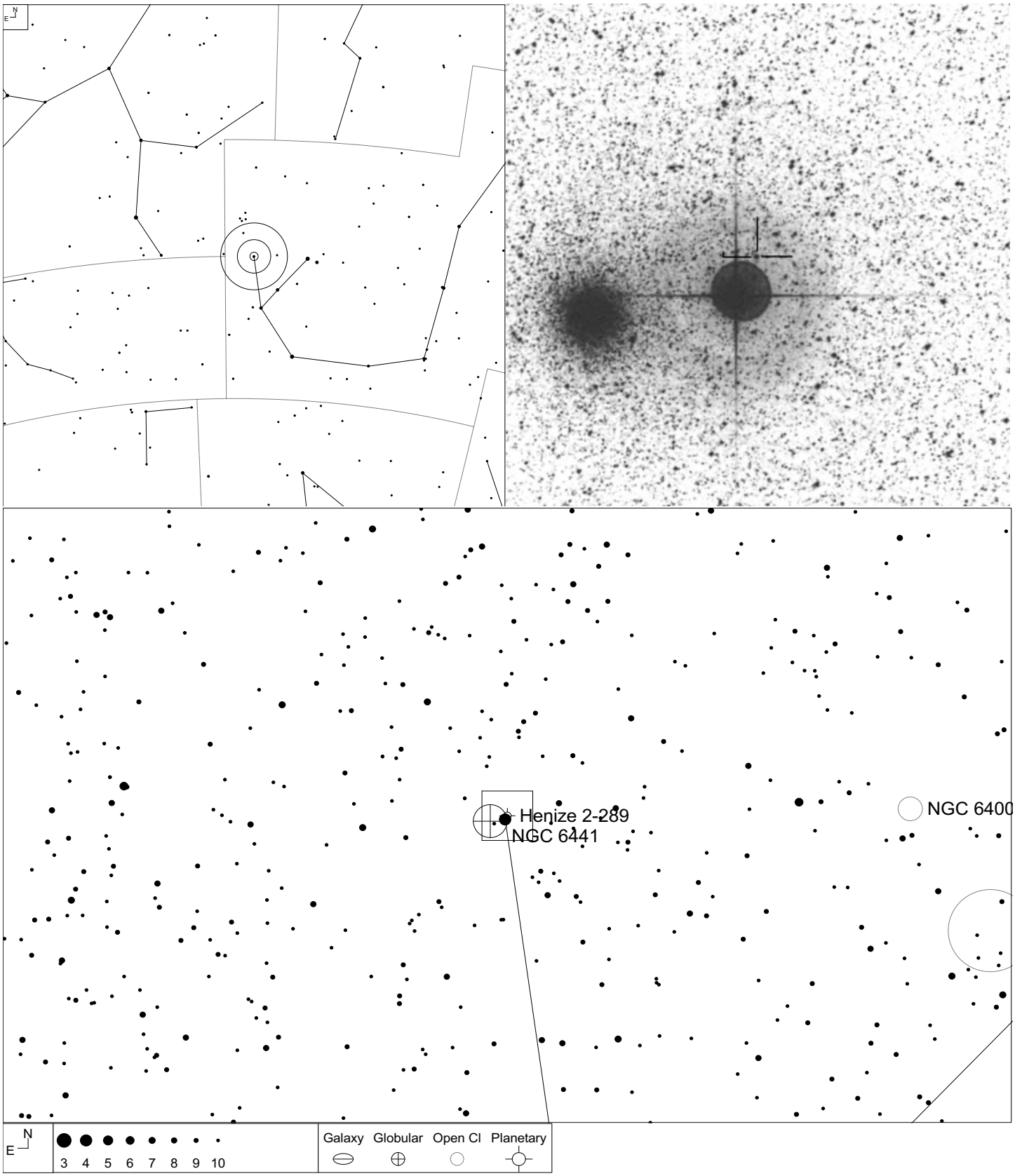

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | ? | 17 44 42.1 | -15 45 12 | - | 15.6 | - | 126 | 67 |

# Henize 2-286 (Sagittarius)



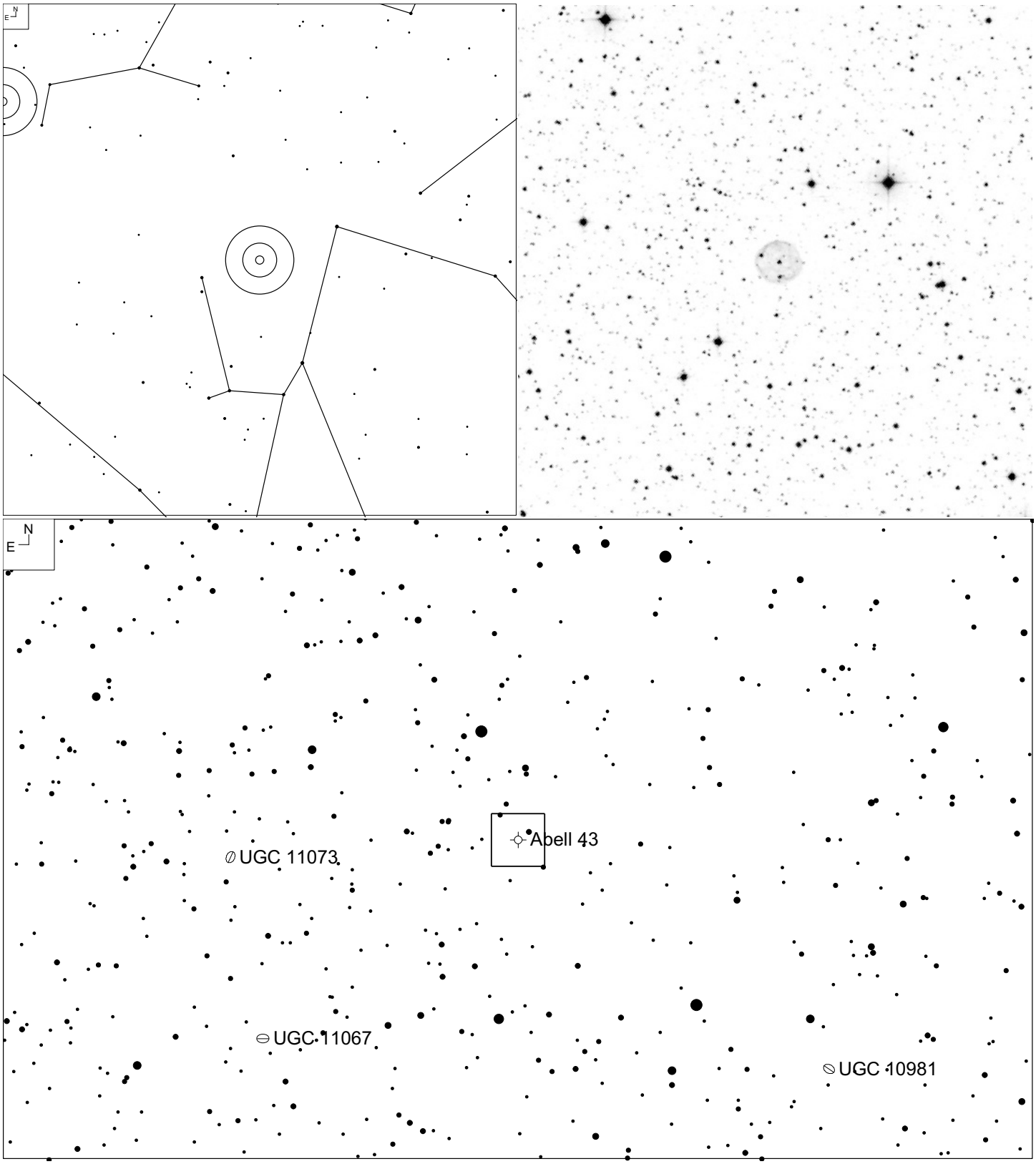

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Hubble 5 | 2+6 | 17 47 56.2 | -29 59 40 | 11.8v | 18.6 | 3” | 146 | 79 |

# Haro 1-36 (Scorpius)



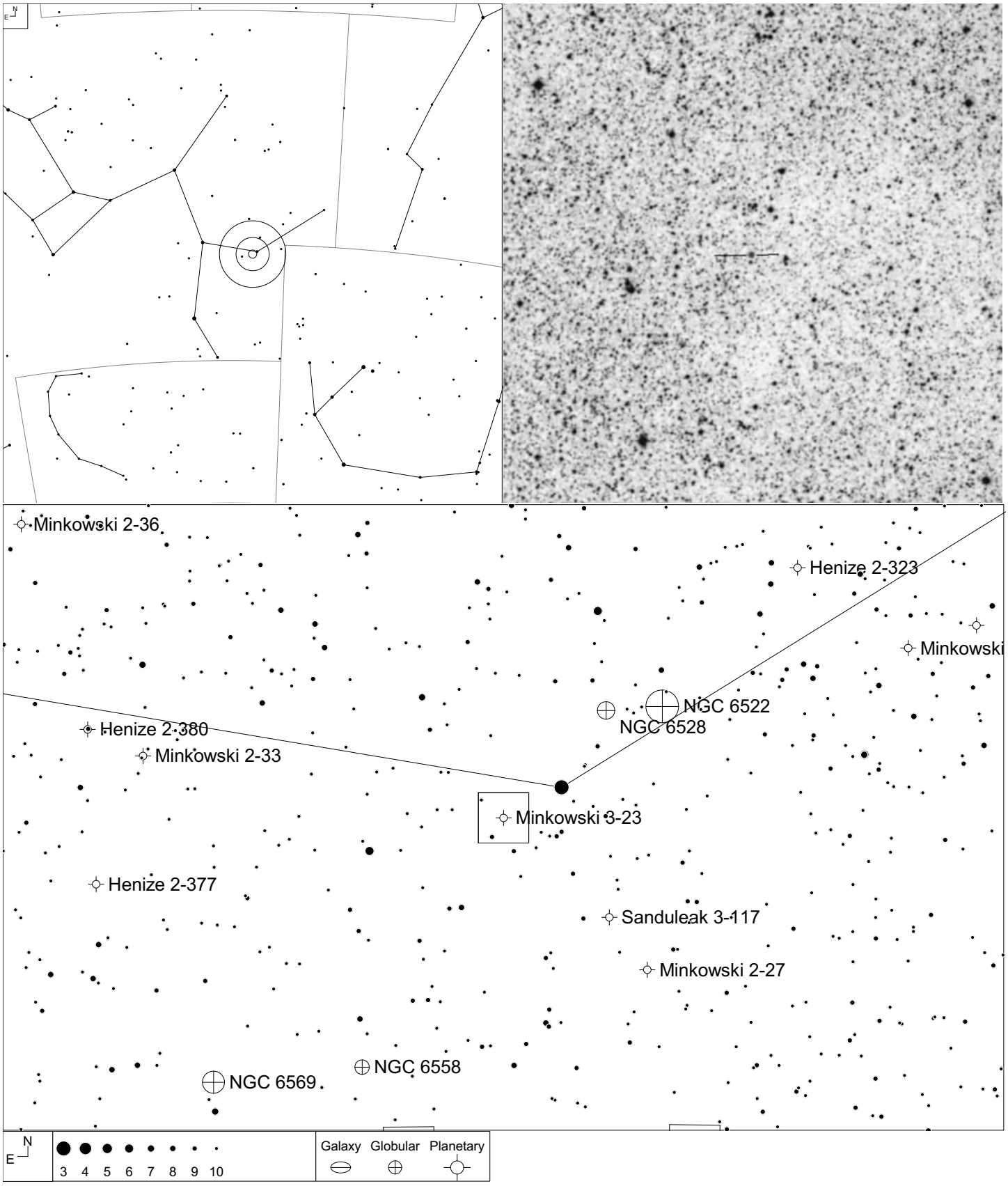

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Sand 2-249<br>PK 353.5-4.9 | - | 17 49 48.2 | -37 01 28 | 12.0p | 16.8 | 10” | 164 | 79 |

# Abell 43 (Ophiuchus)



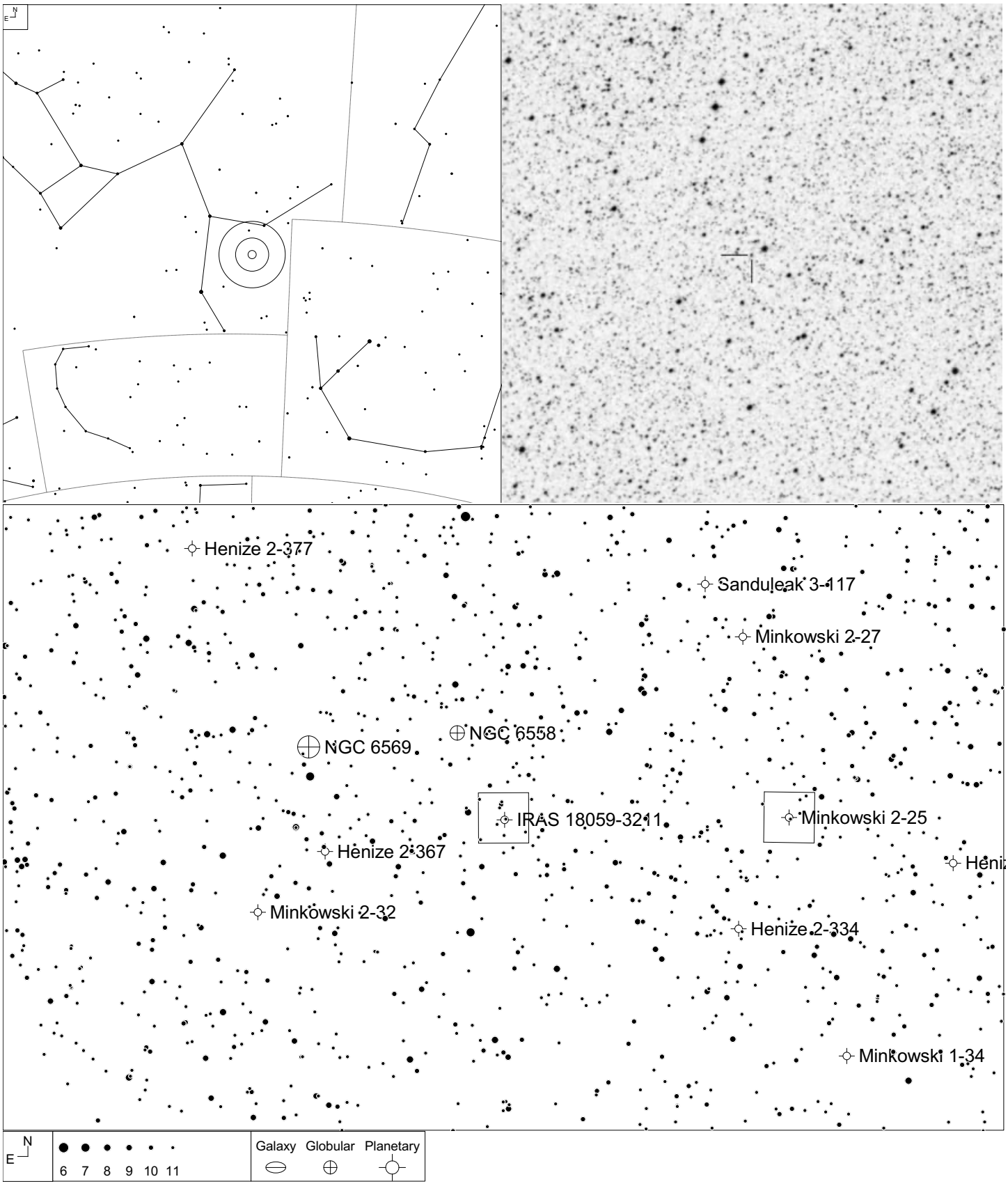

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | 2c | 17 53 32.3 | +10 37 25 | 14.7p | 14.7 | 78 x 72” | 146 | 79 |

# Minkowski 3-23 (Sagittarius)



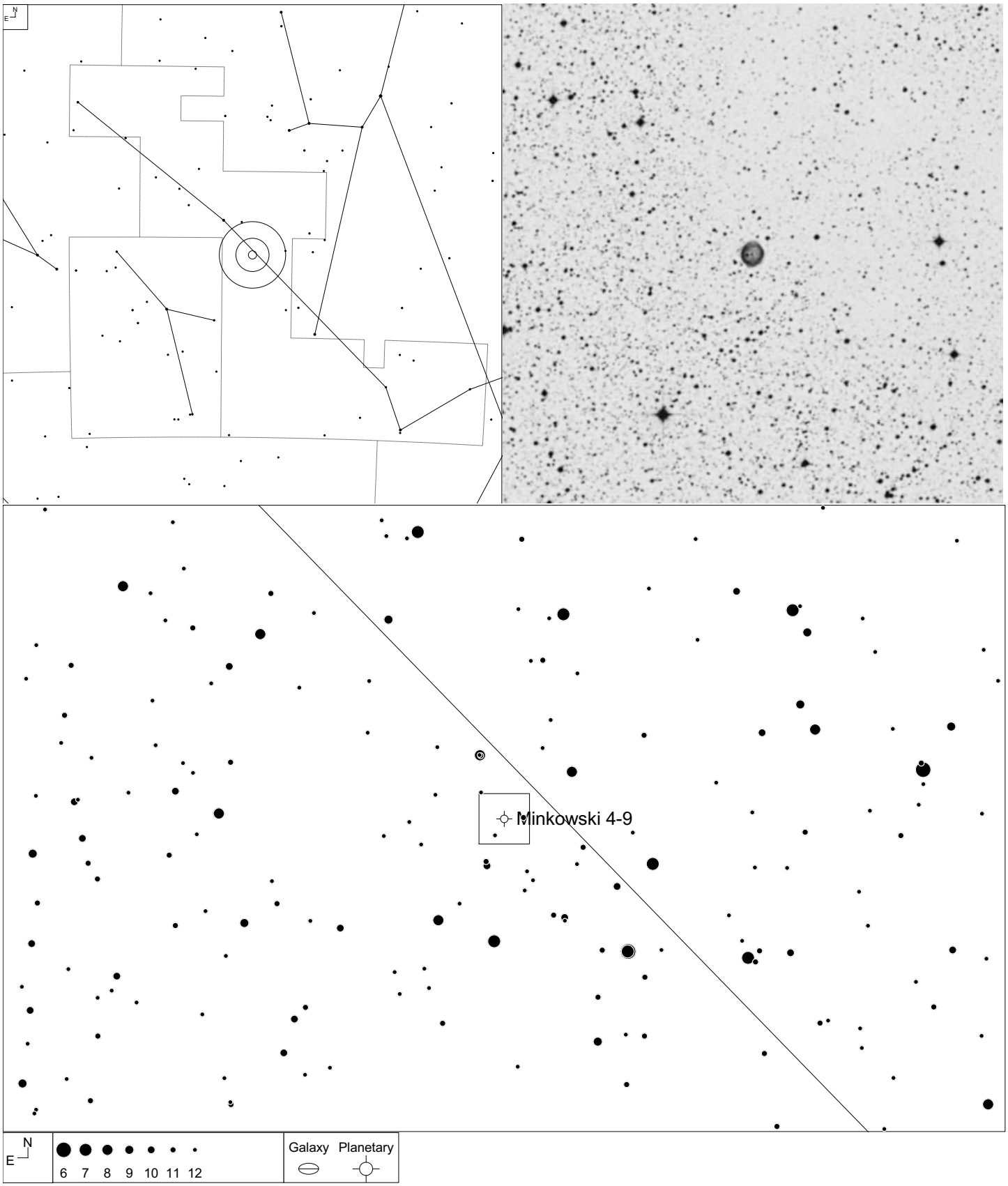

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 0-4.2 | 2 | 18 07 06.1 | -30 34 17 | 13.8p | - | 11” | 163 | 78 |

# IRAS 18059-3211 – Gomez's Hamburger (Sagittarius)



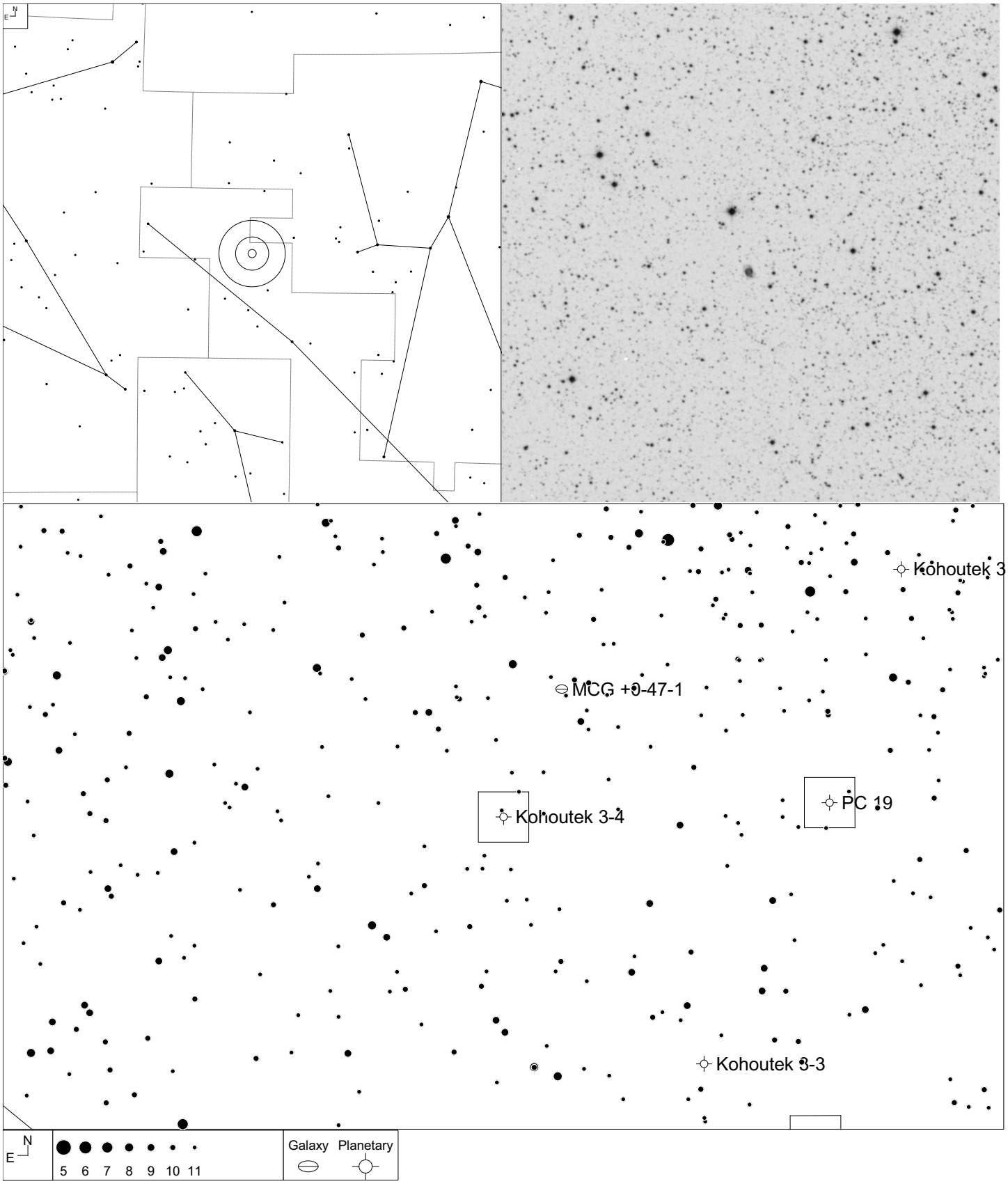

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| - | - | 18 09 13.3 | -32 10 48 | 14.0v | - | 6x4" | 163 | 78 |

# Minkowski 4-9 (Serpens)



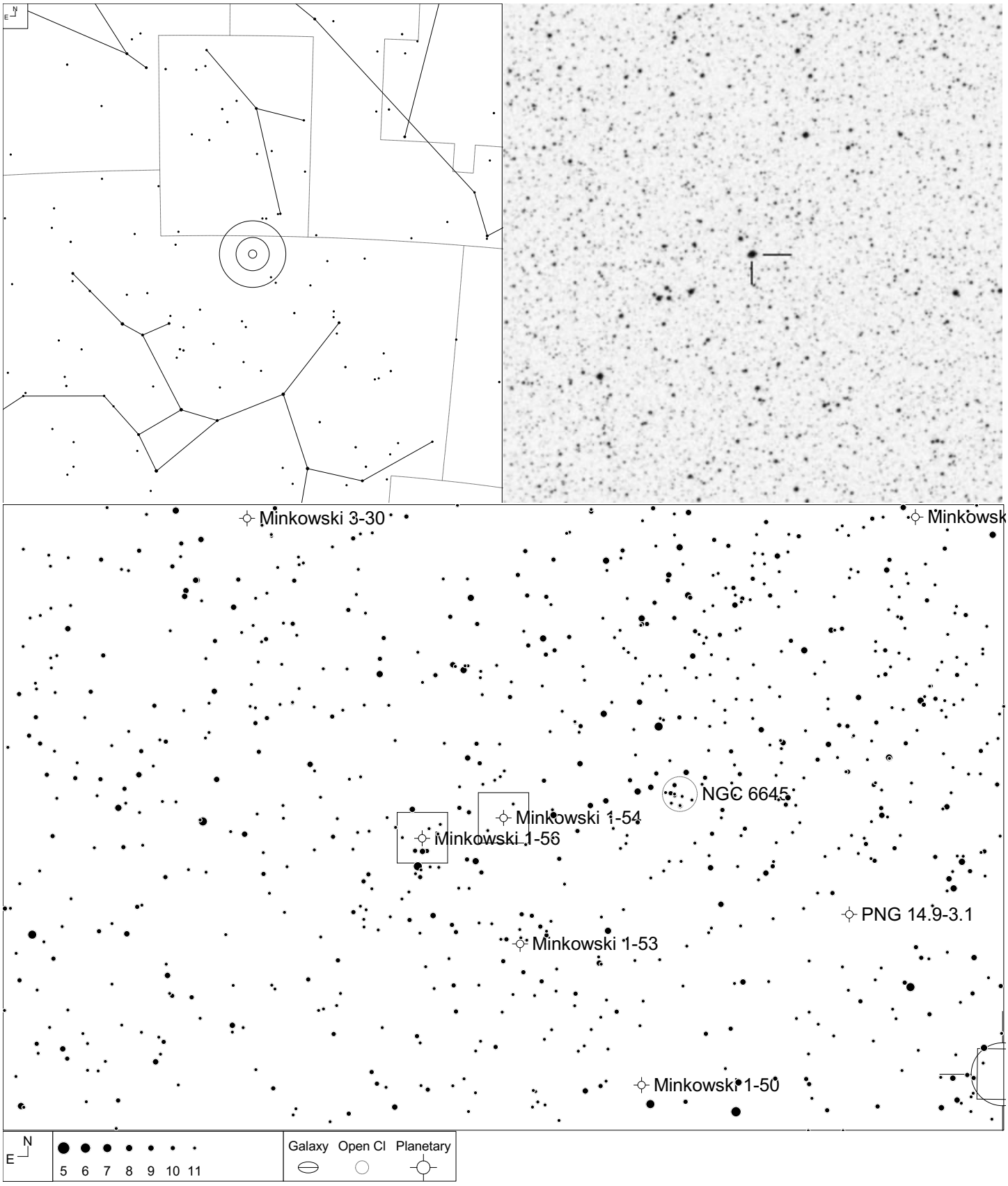

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Sanduleak 3-125 | 4 | 18 14 18.3 | -04 59 22 | 16.0p | 20.3 | 54” | 106 | 54 |

# Kohoutek 3-4 (Serpens)



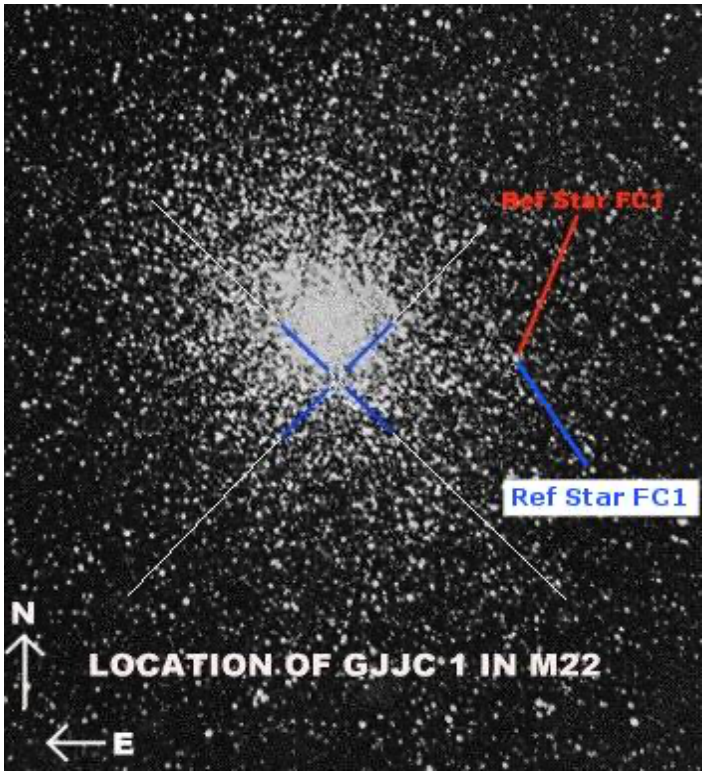

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 32+5.1 | 3b+2 | 18 31 00.3 | +02 25 23 | 14.6v | - | 20” | 106 | 54 |

# Minkowski 1-54 (Sagittarius)

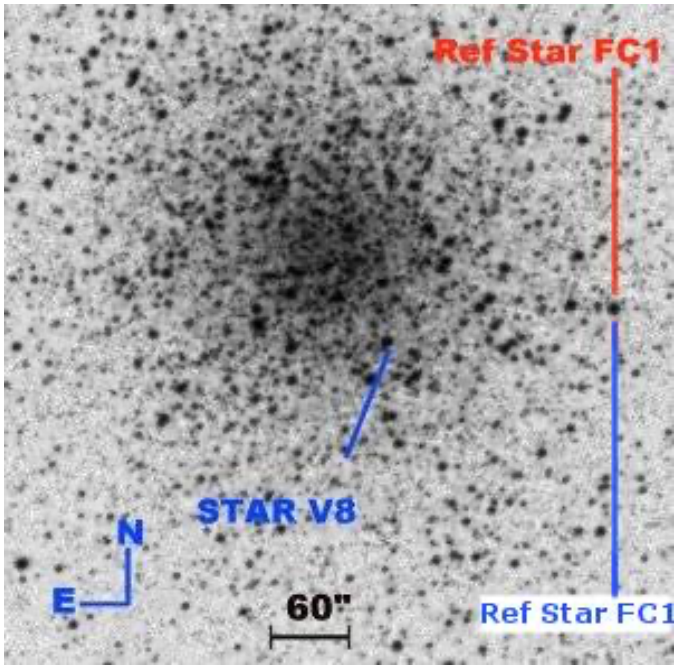



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 16-4.1 | 3 | 18 36 08.3 | -16 59 57 | 12.5p | - | 13” | 126 | 66 |

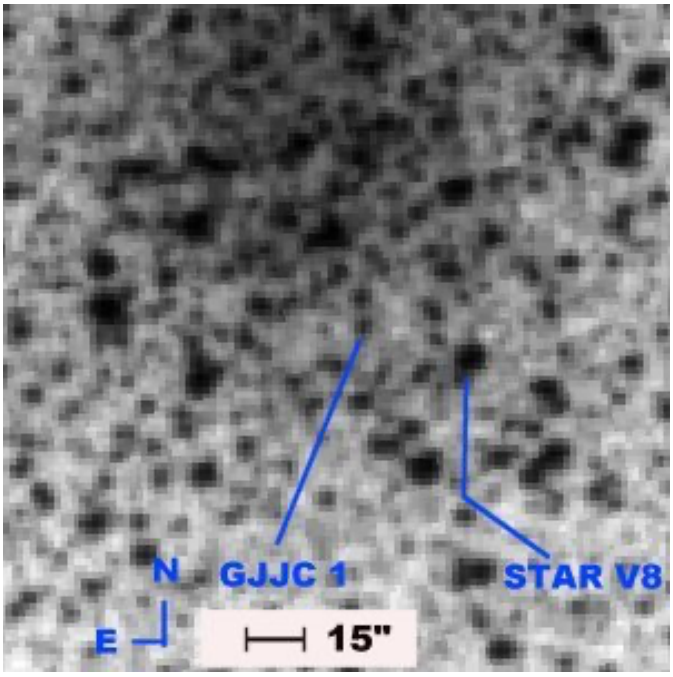
# GJJC1 in M22 (Sagittarius)

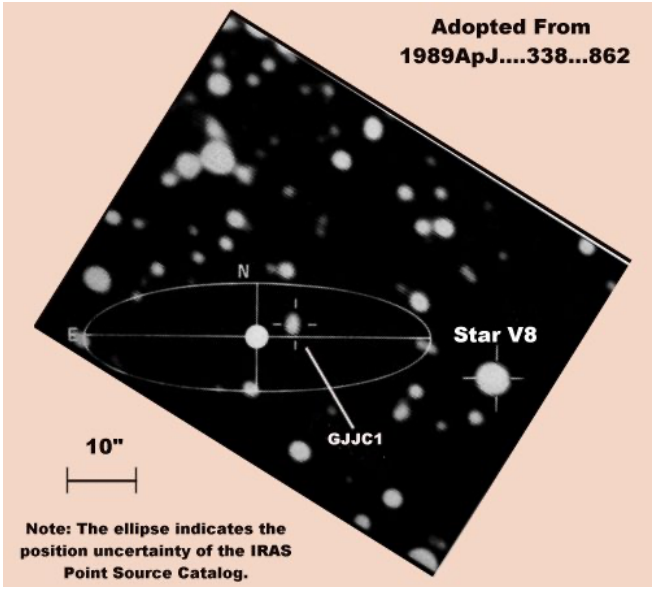



**This image shows the overall view of M22 and in general the location of GJJC1. The Reference Star FC1 (arbitrarily chosen) can be a starting point for star hopping to the area of the PNe, but it is also used as a reference on the next image so that we don't lose our bearings. All of the images have North at the top and East to the left.**




The reference star V8 on Image2 (right) is a check point for Image3 (bottom left), and a rough position is also shown for GJJC1. Now proceed to Image4 (bottom right) for the final location. Also confirm with the Hubble image found on the next page.

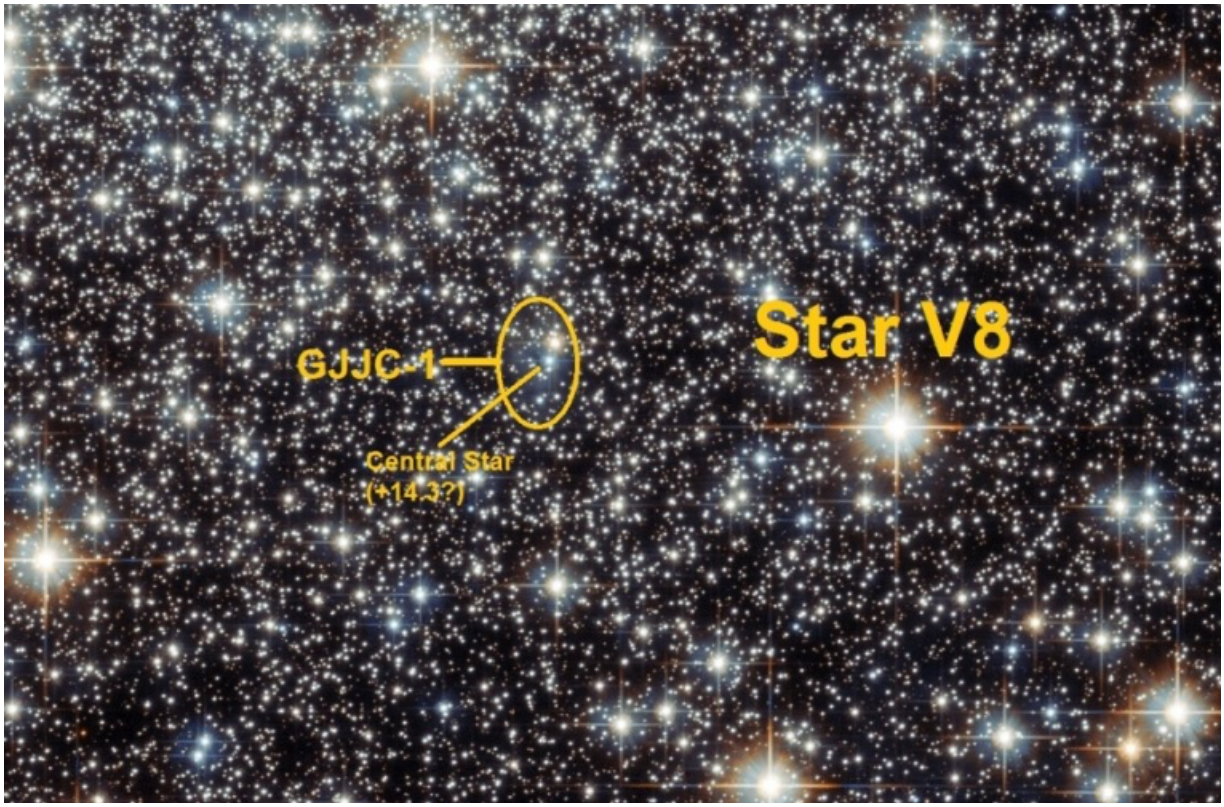


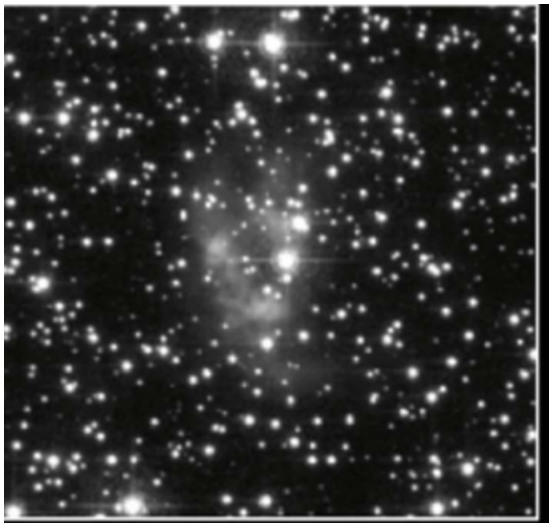

Finder charts and directions reproduced with permission from Doug Snyder www.blackskies.org

# GJJC1 in M22 (Sagittarius)

Upon closer look by Scott Harrington, he found the object in the Hubble image.




Annotated Hubble image by Scott Harrington

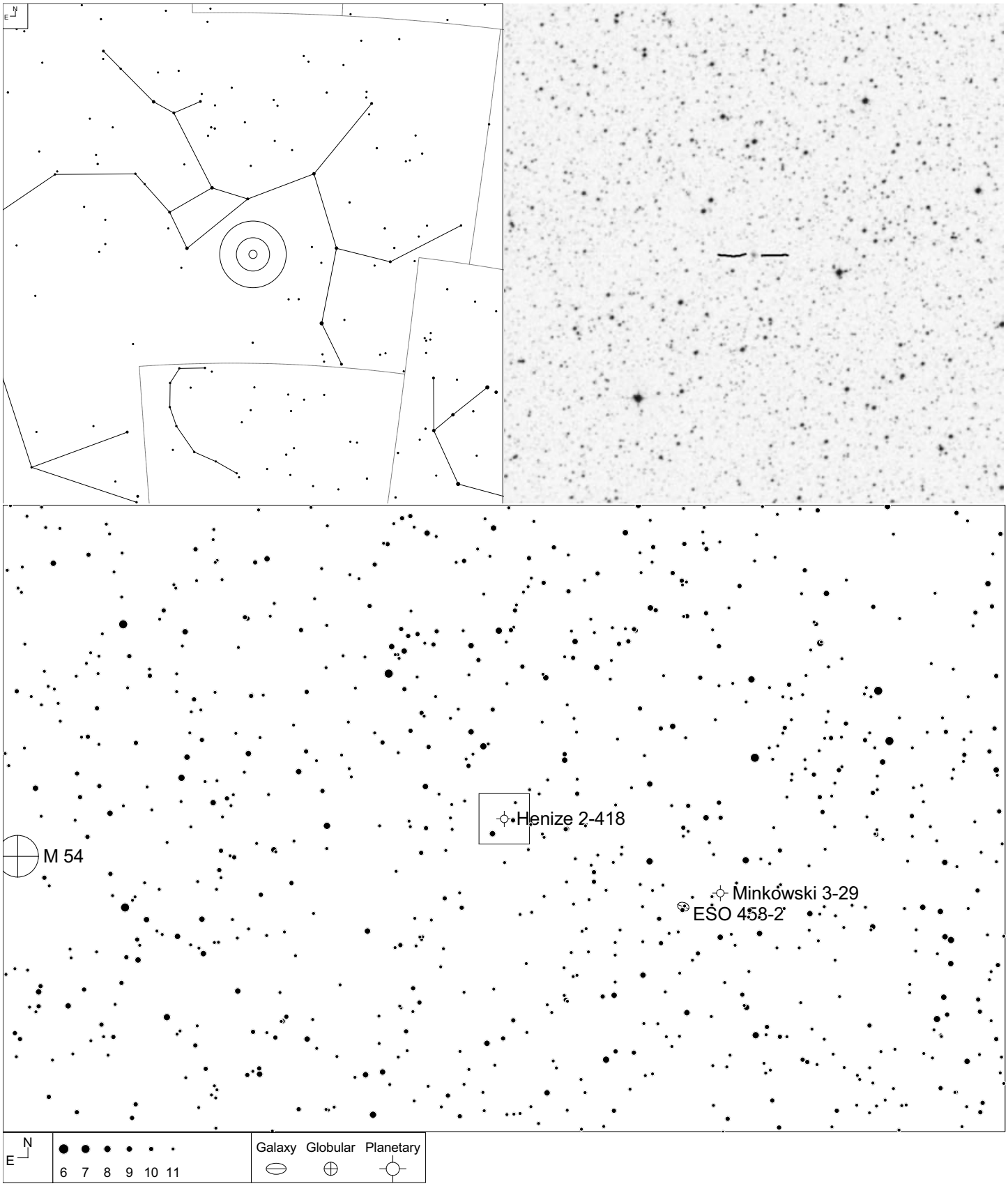


This photo was taken by the Hubble Space Telescope.

The finder charts and images copied from our *Observing the Milky Way Globular Clusters*, page 155-156

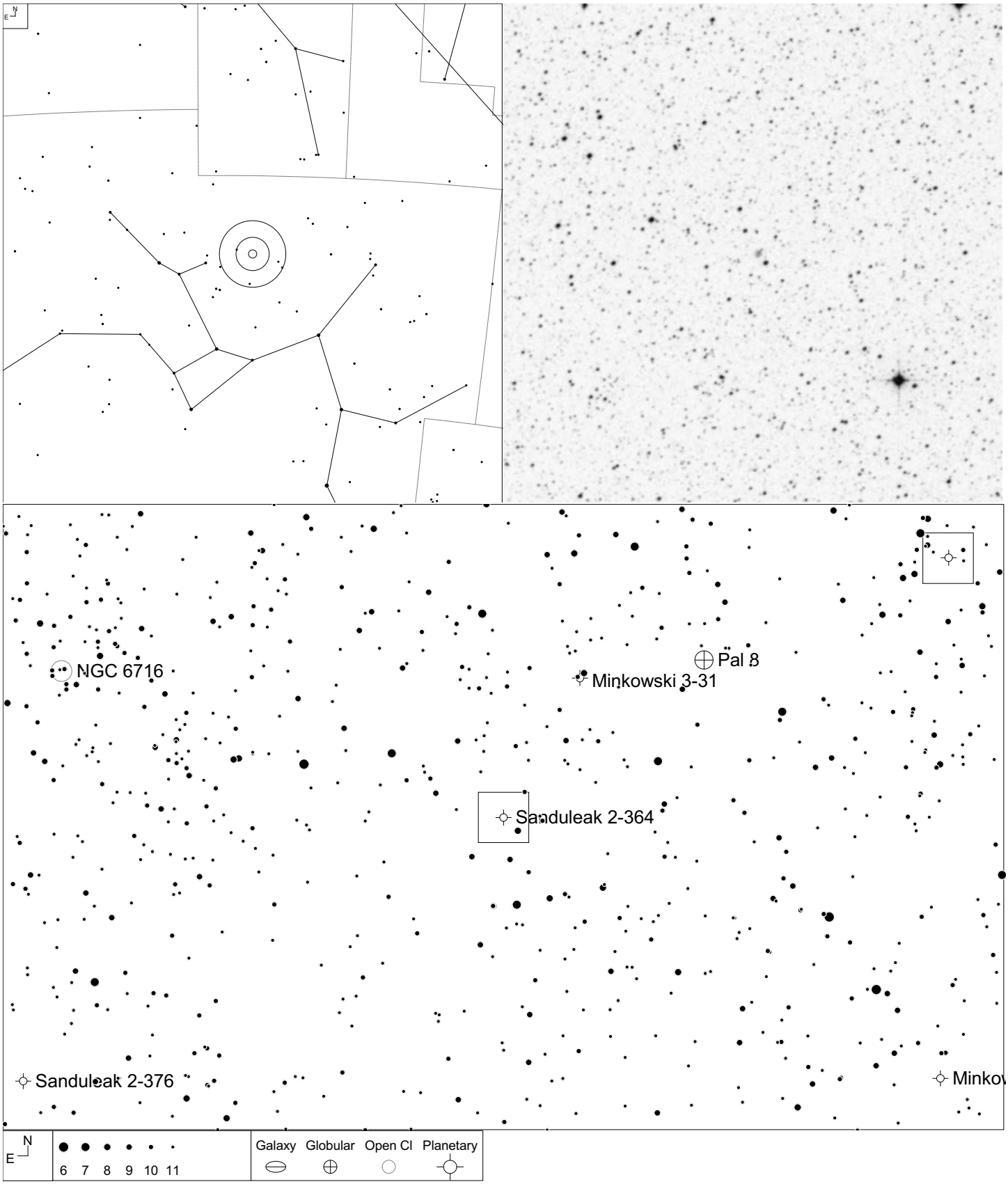
| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | | 18 36 24.2 | -23 54 12.2 | 15.0p | 14.3 | 10 x 7” | 145 | |

# Henize 2-418 (Sagittarius)



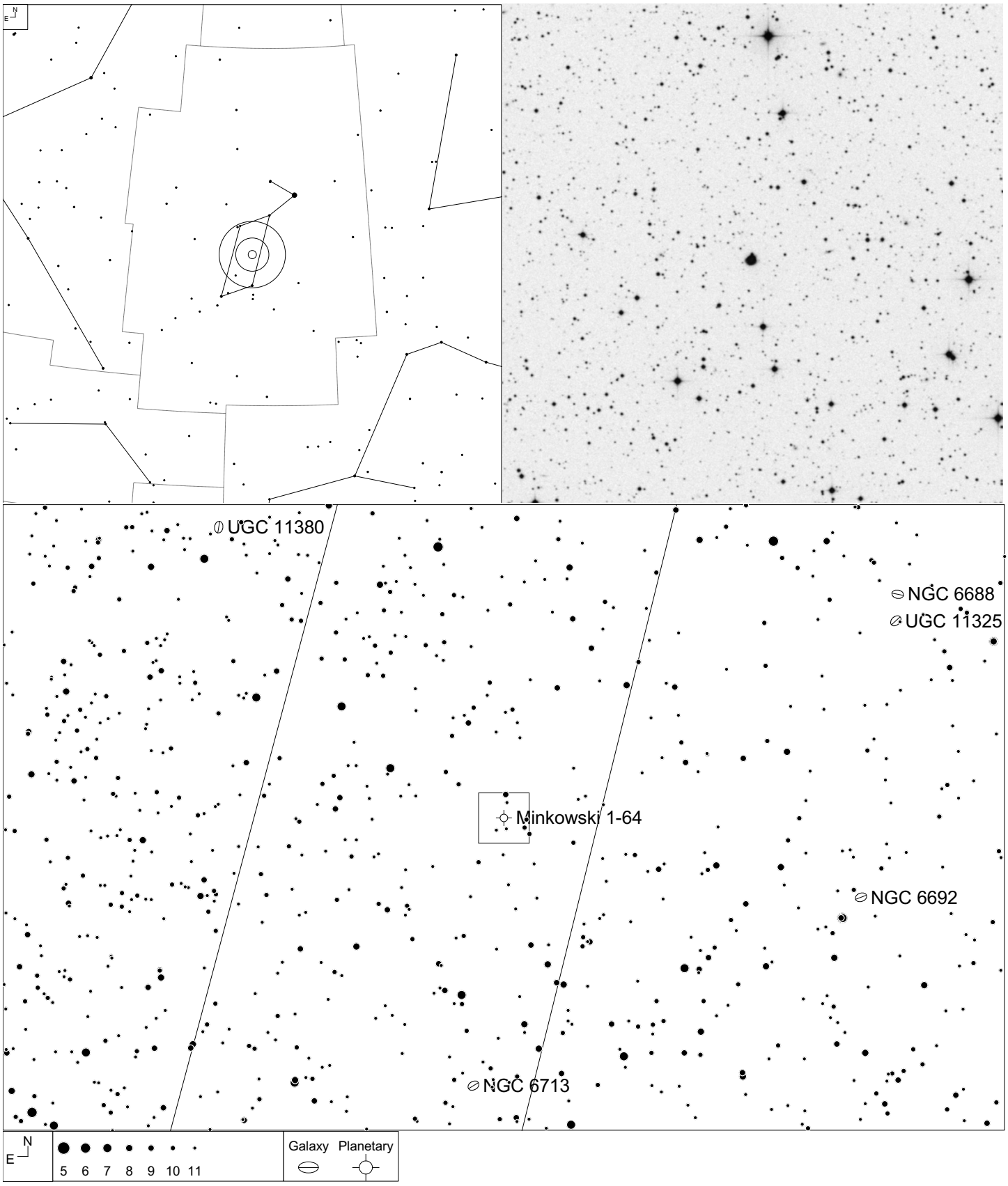

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 4-11.2 | - | 18 44 14.6 | -30 19 36 | 15.1 | 15.6 | 13” | 163 | 78 |

# Sanduleak 2-364 (Sagittarius)



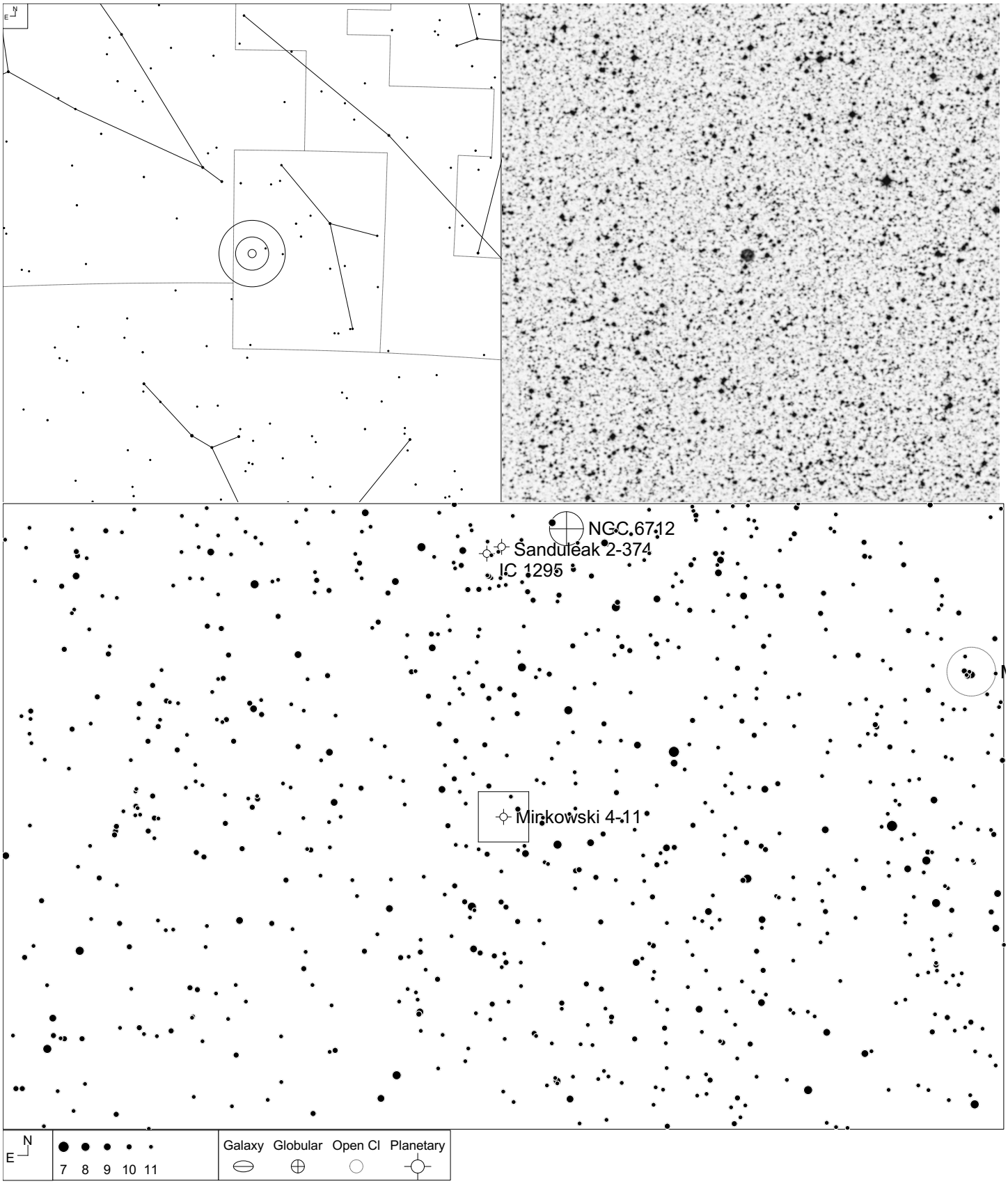

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 13-7.1 | ?+3 | 18 45 35.2 | -20 34 59 | 13.9p | 18.4 | 13” | 145 | 66 |

# Minkowski 1-64 (Lyra)



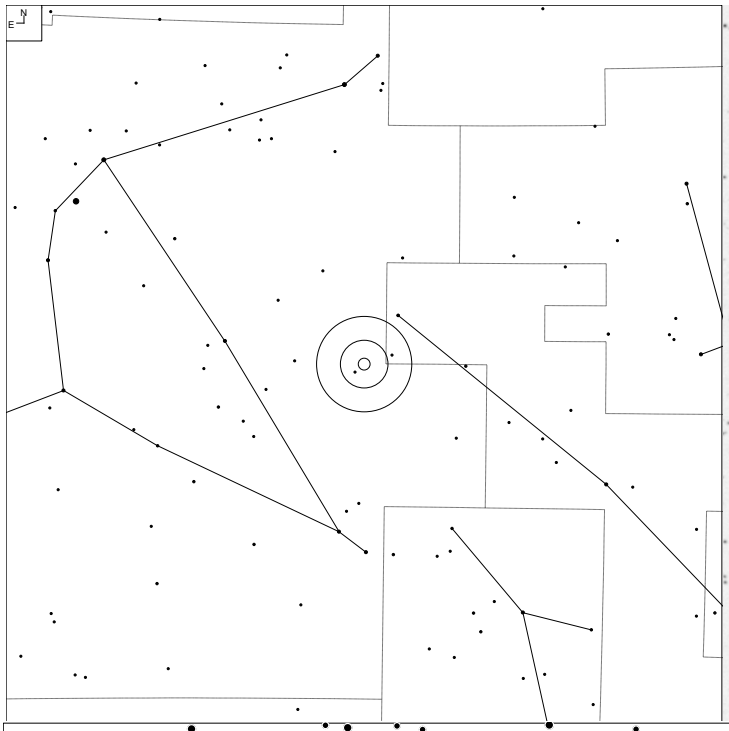

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 64+15.1 | 4 | 18 50 02.3 | +35 14 33 | 13.3v | - | 24” | 49 | 30 |

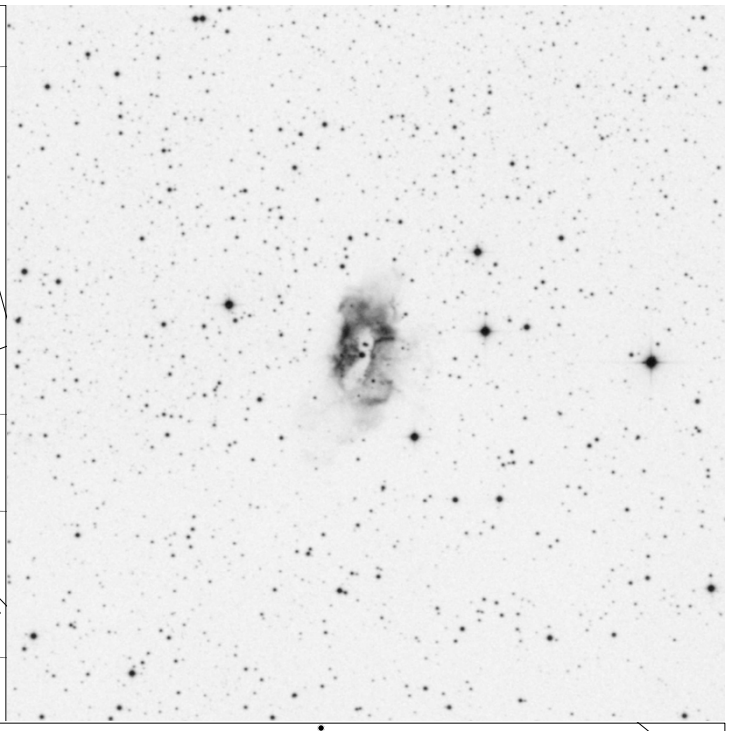
# Minkowski 4-11 (Scutum)

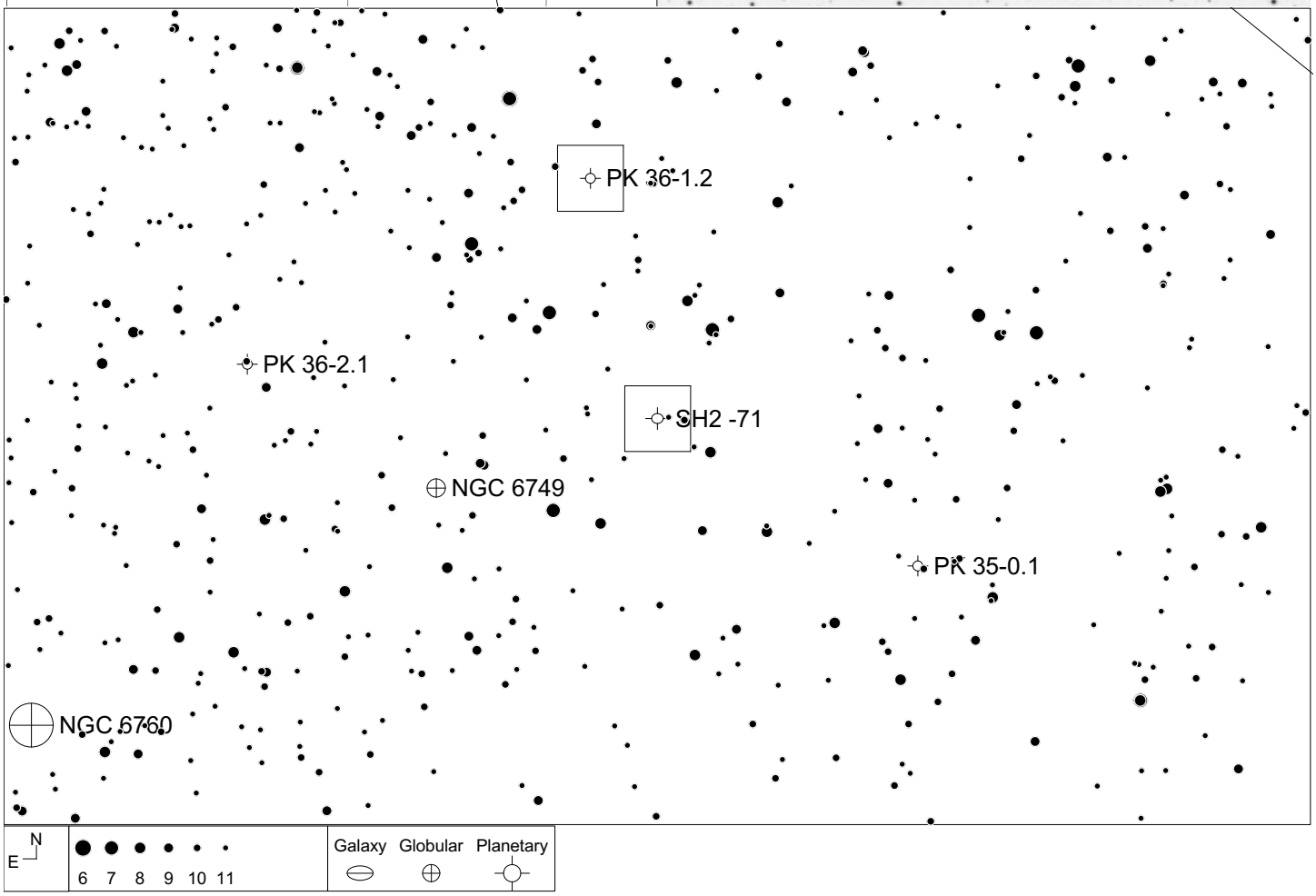



| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 24-5.1 | 2 | 18 54 17.7 | -10 05 10 | 13.8v | 18.0 | 21” | 125 | 66 |

# Sharpless 2-71 (Aquila)

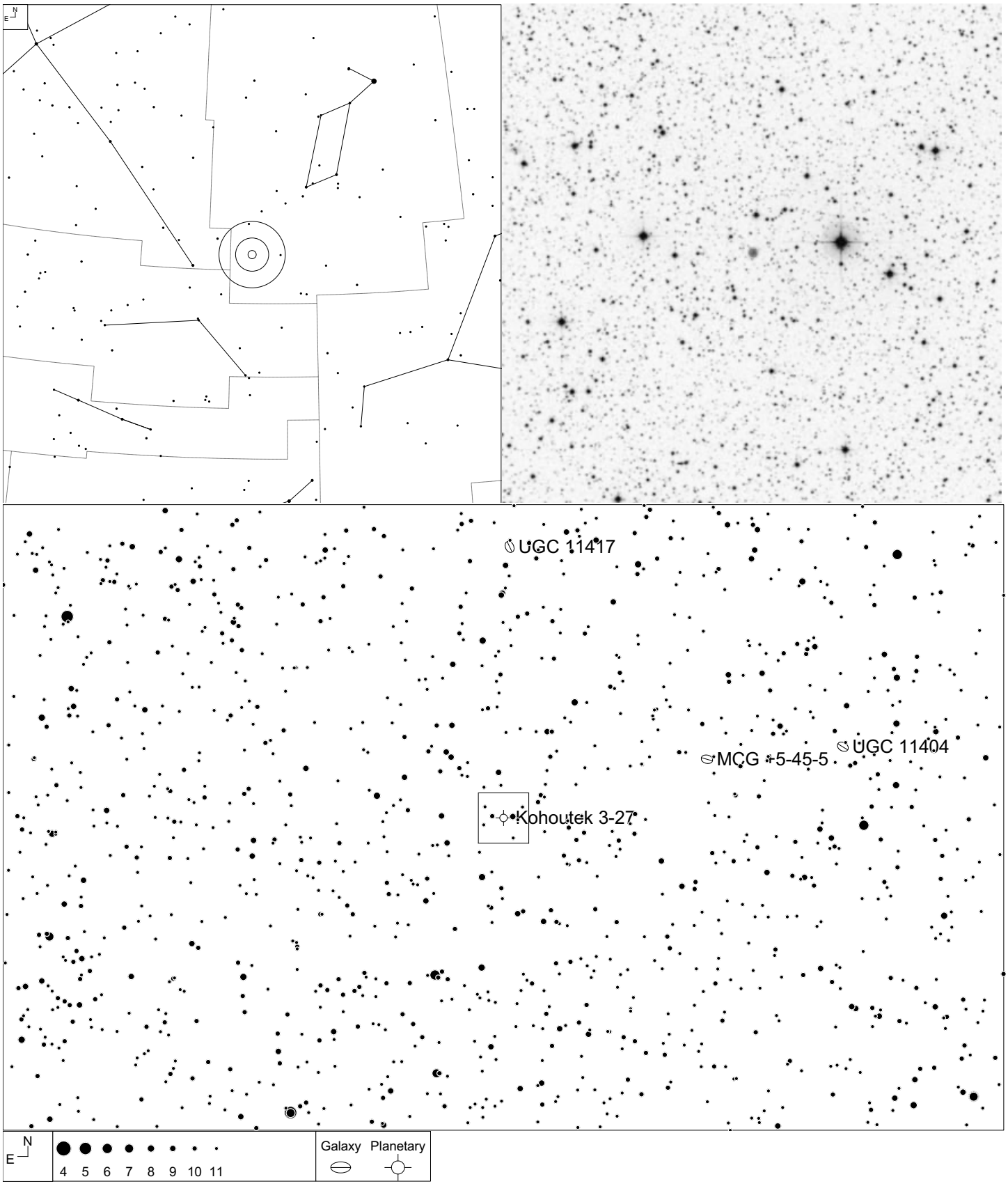






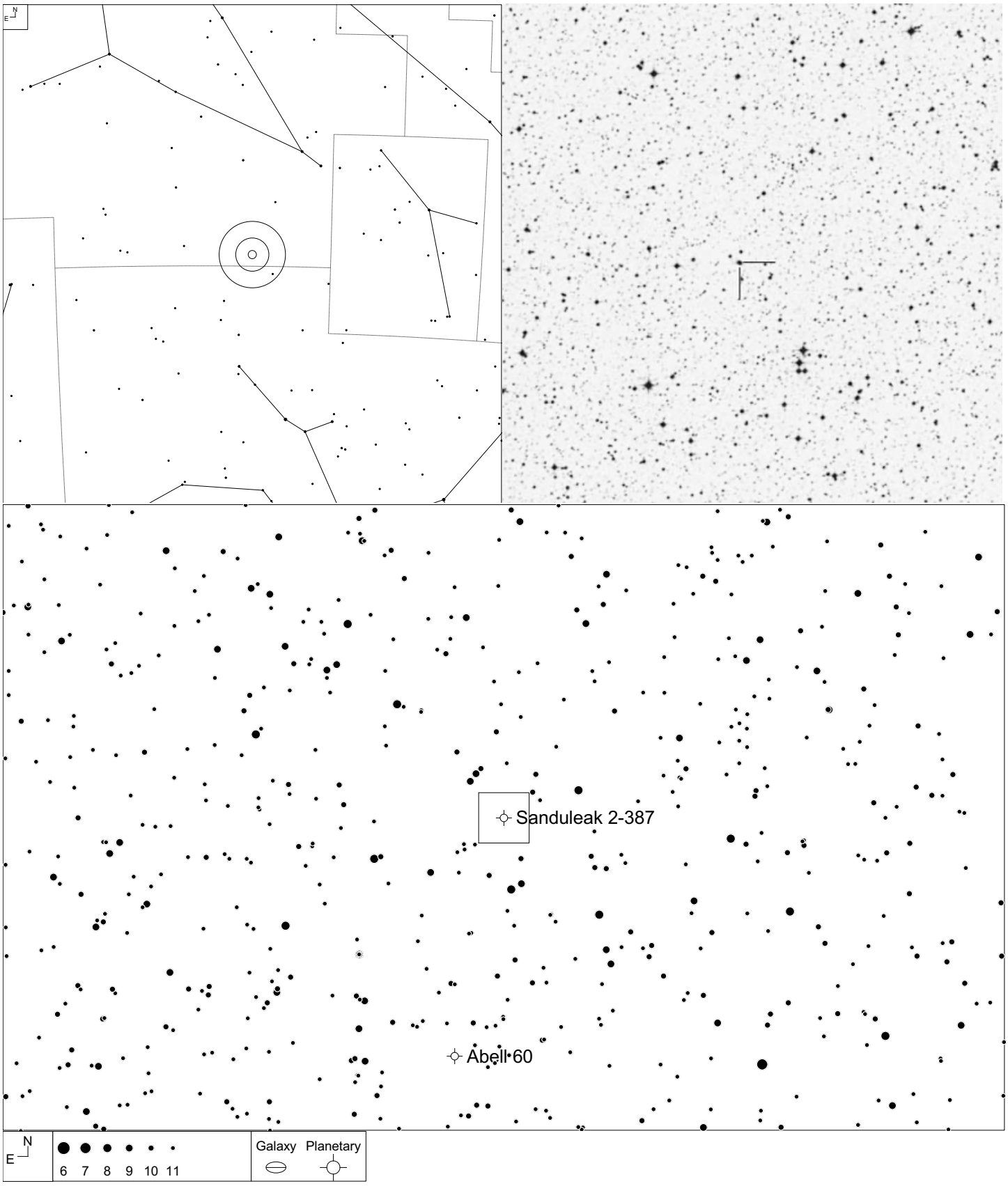

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 36-1.1 | 3b+3 | 19 02 00.0 | +02 09 23 | 13.2v | 13.8 | 2.6 x 1.5’ | 105 | 54 |

# Kohoutek 3-27 (Lyra)



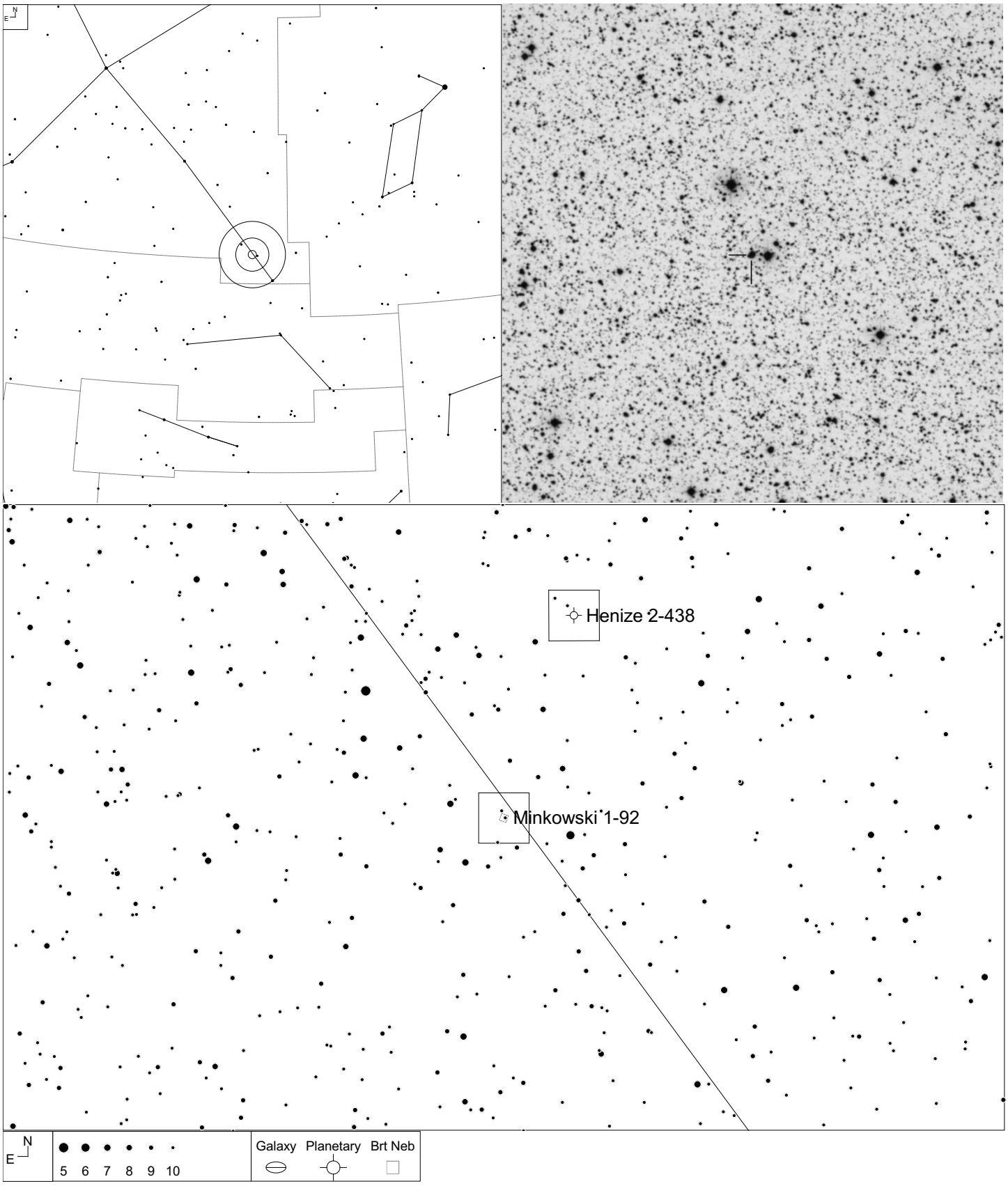

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 61+8.1 | - | 19 14 30.2 | +28 40 43 | 14.9p | 17.2 | 16” | 67 | 30 |

# Nassau 2 (Aquila)



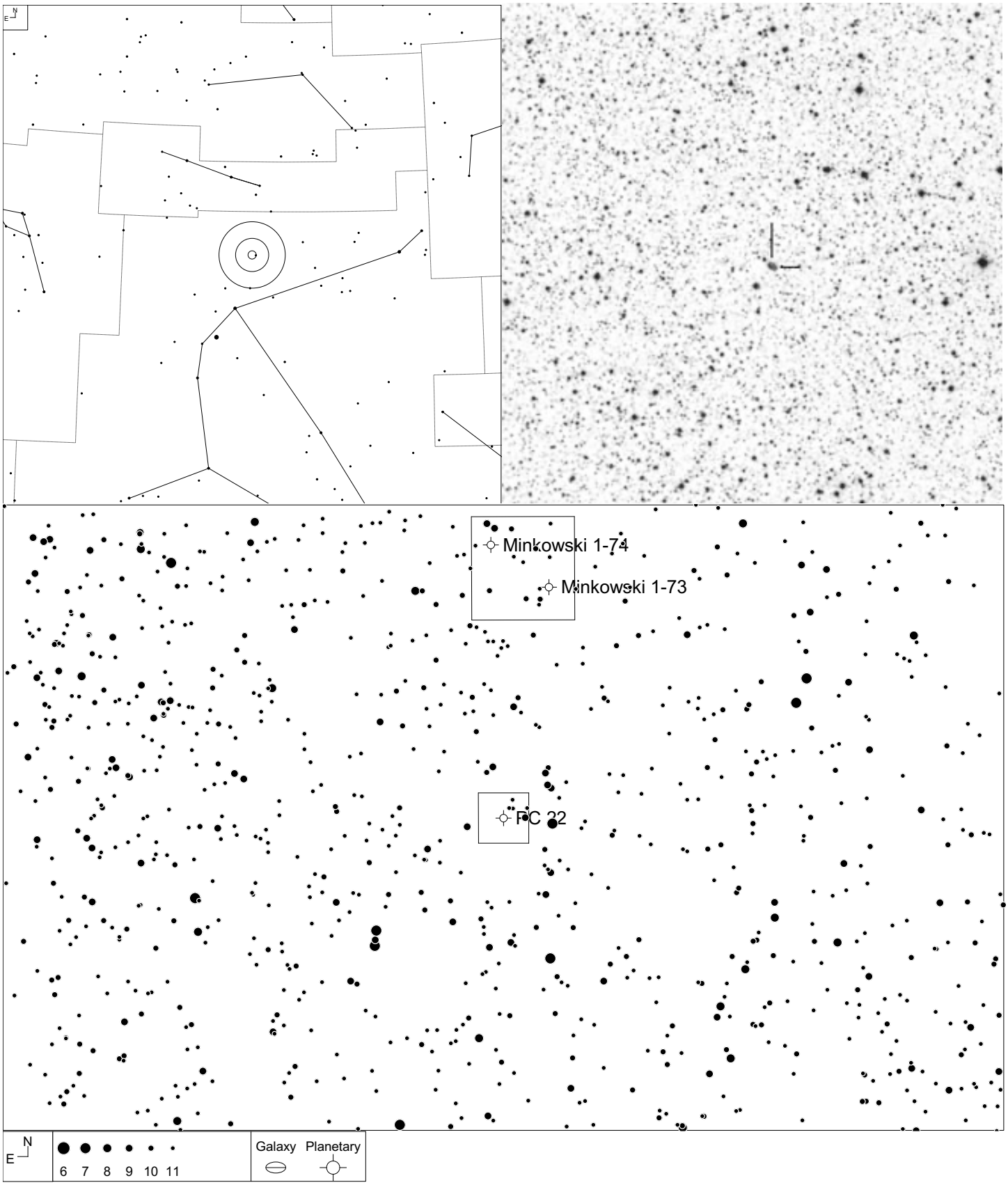

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Sanduleak 2-387 | - | 19 18 19.7 | -11 06 17 | 13.3p | 14.0 | 16” | 125 | 66 |

# Minkowski 1-92 – Minkowski's Footprint (Cygnus)



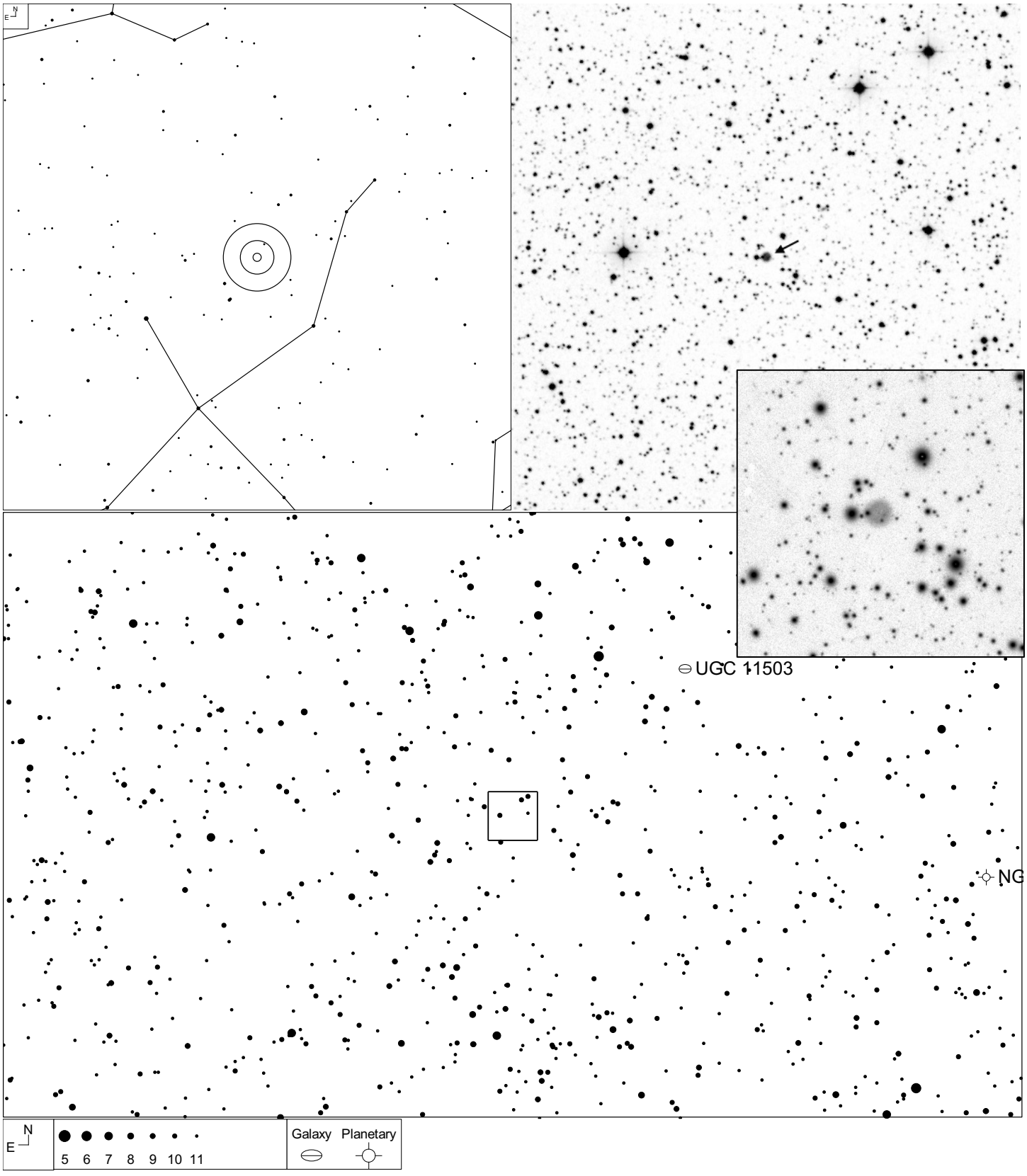

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| - | - | 19 36 18.9 | +29 32 51 | 11.7v | - | 20 x 4" | 48 | 30 |

# PC 22 (Aquila)



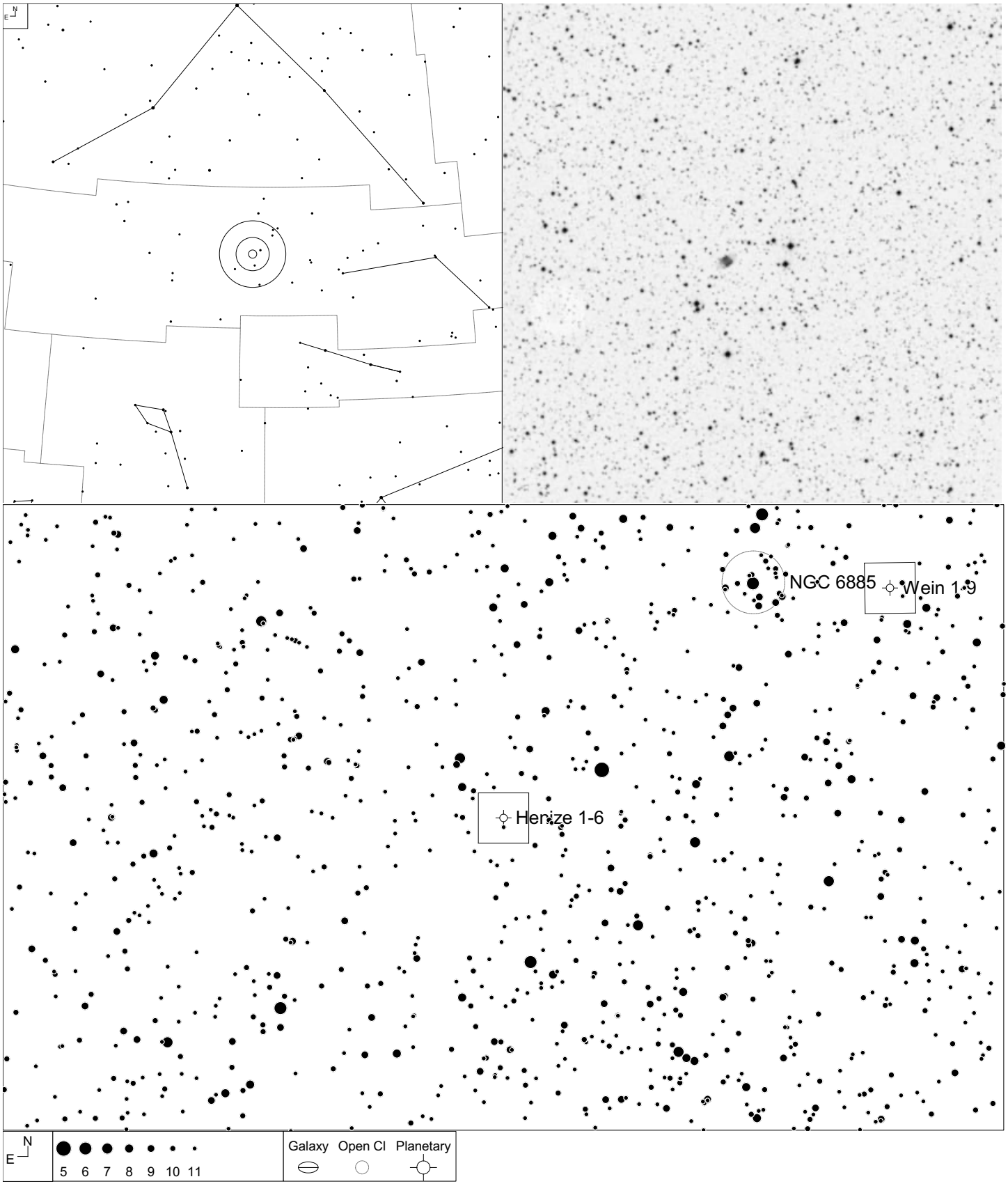

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 51-4.1 | - | 19 42 03.6 | +13 50 35 | 14.4p | 18.1 | 24 x 18” | 85 | 42 |

# Kohoutek 3-73 (Cygnus)



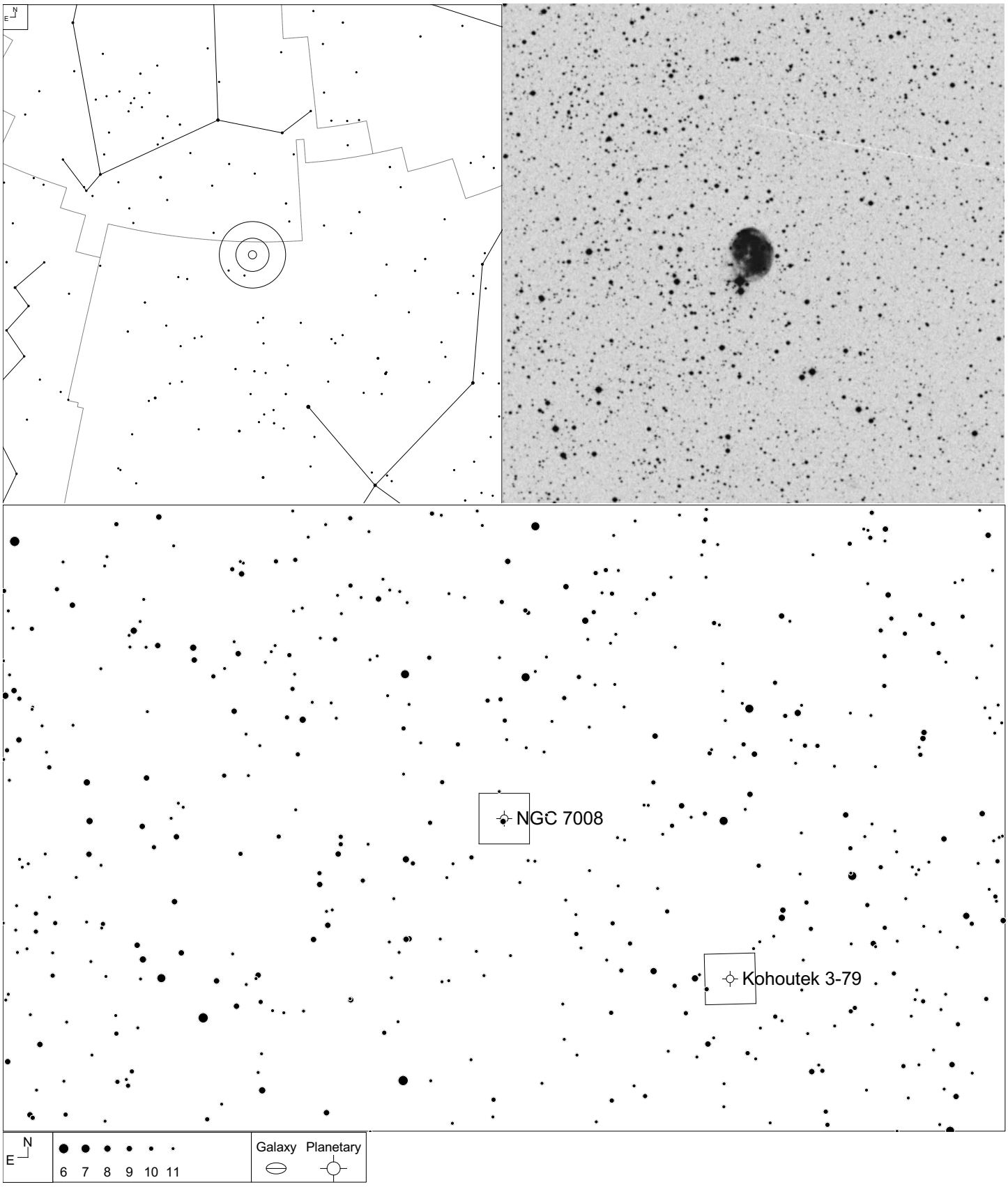

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| | | 20 04 00.0 | +49 19 06 | 15.7 | | 17 x 15” | 32 | 17 |

# Henize 1-6 (Vulpecula)



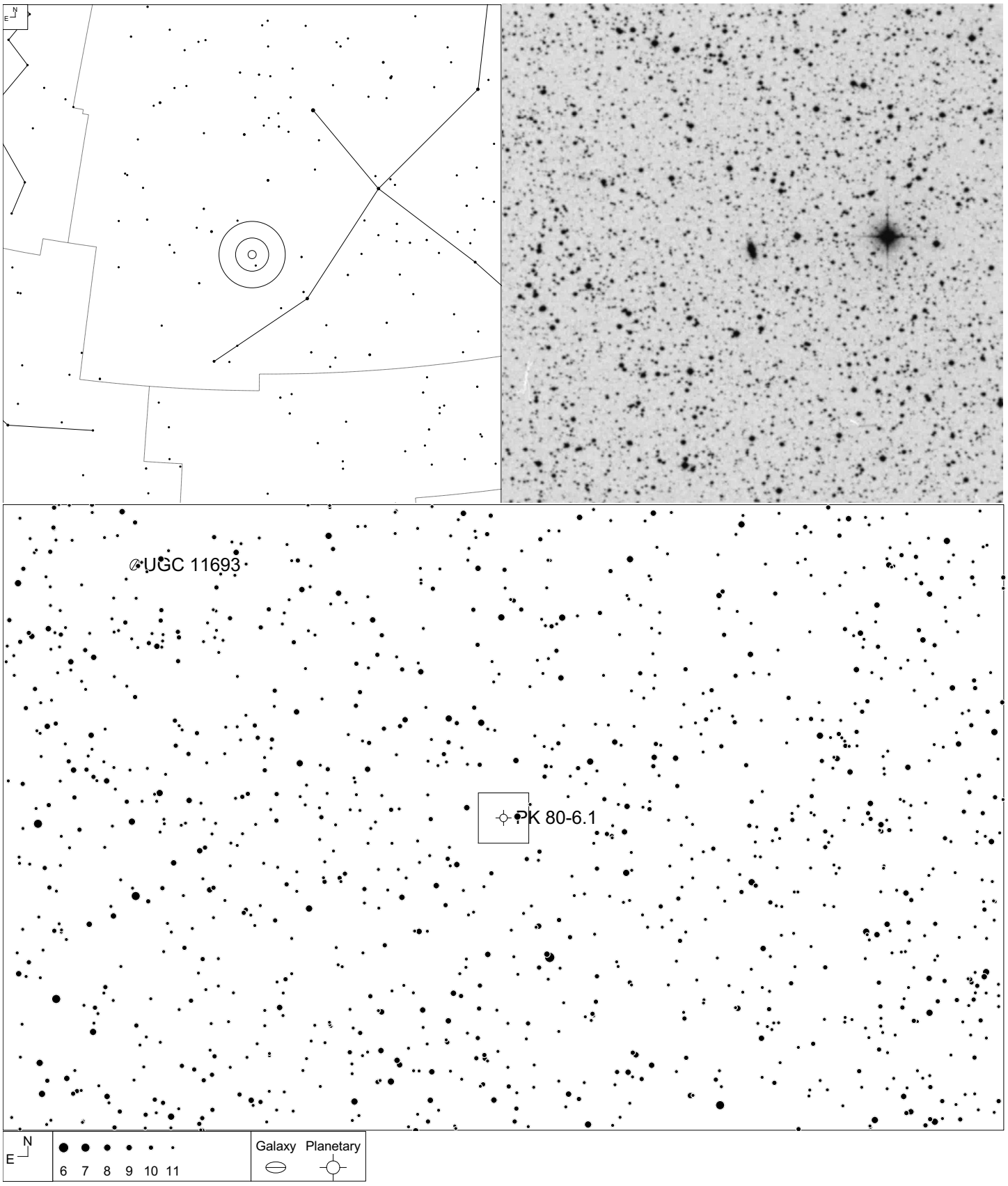

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| Henize 2-462 | 3+2 | 20 17 21.5 | +25 21 44 | 14.9p | - | 24” | 66 | 29 |

# NGC 7008 – Fetus Nebula (Cygnus)



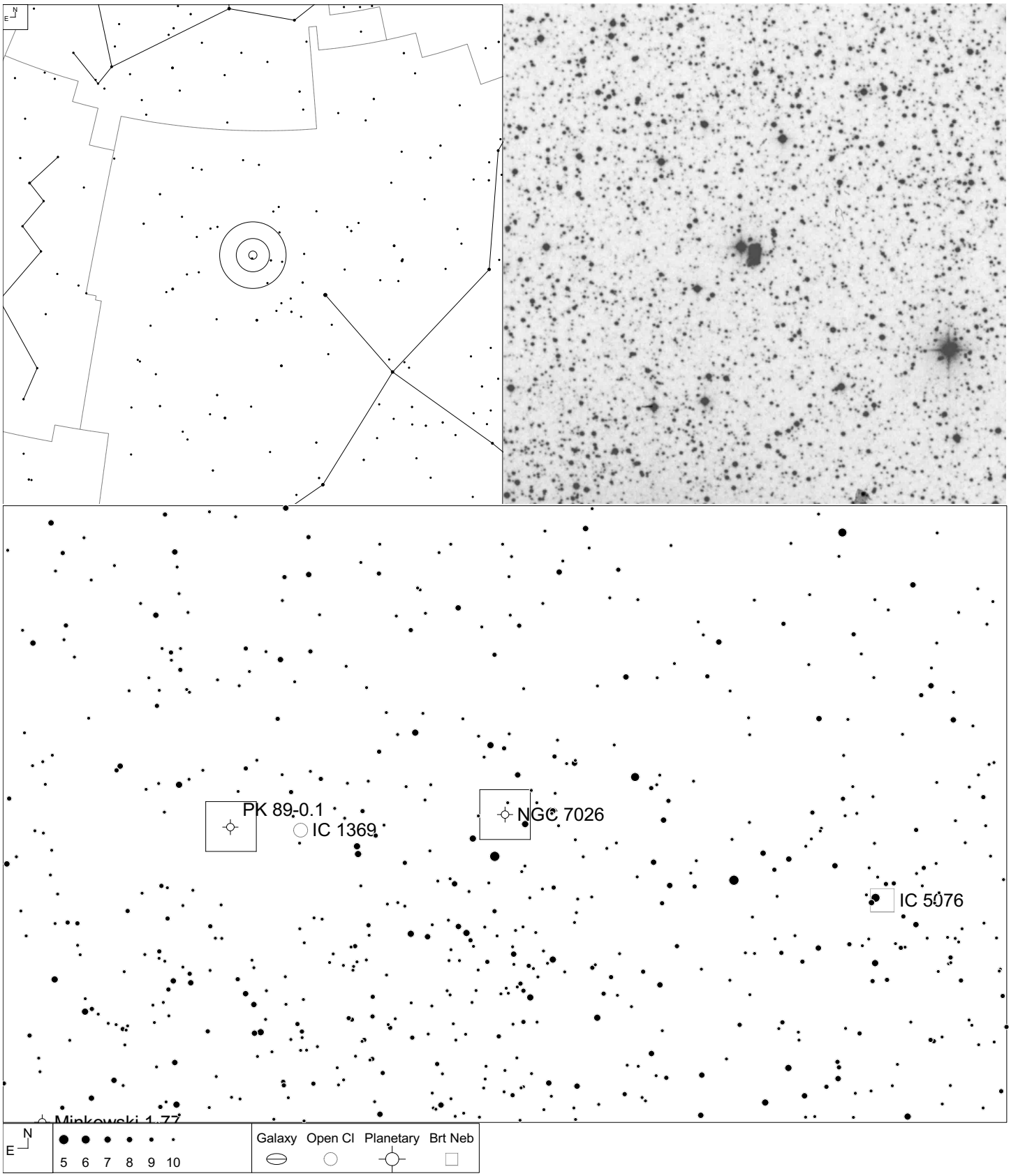

| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 93+5.2 | 3 | 21 00 33.1 | +54 32 32 | 10.7v | 13.2 | 86” | 19 | 8 |

# PK 80-6.1 - Egg Nebula (Cygnus)




| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| CRL 2688 | Proto | 21 02 18.7 | +36 41 40 | 13.5p | - | 1.0 x 0.5’ | 47 | 17 |

# NGC 7026 – Cheeseburger Nebula (Cygnus)




| Other ID | Type | RA | Dec | Mag | * Mag | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|---|---|---|
| PK 89+0.1 | 3a | 21 06 18.5 | +47 51 08 | 10.9v | 14.2 | 40” | 32 | 17 |

Bi-polar halo with lobes extending NW and SE. Visible without O-II filter.

# GLOBULAR CLUSTERS

## *The Texas Star Party - 2004*

| NAME | 2000 | Const | Mag. | V-tip | D-Sun | V HB | Urano-1 | Urano-2 |
|---|---|---|---|---|---|---|---|---|
| Palomar 3 | 10 05 31.4 +00 04 17 | Sex | 13.9 | 18.0 | 302,202 | 20.51 | 234 | 113 |
| Ruprecht 106 | 12 38 40.2 -51 09 01 | Cen | 10.9 | 14.8 | 69,112 | 17.8 | 429 | 184 |
| NGC5466 | 14 05 27.3 +28 32 04 | Boo | 9.2 | 13.8 | 51,834 | 16.6 | 110 | 70 |
| Palomar 5 | 15 16 05.3 -00 06 41 | Ser | 11.8 | 15.5 | 75,632 | 17.51 | 244 | 108 |
| vdB-Ha 176, BH 176 | 15 39 07.3 -50 03 02 | Nor | 14.0 | -- | 50,856 | 19.00 | 432 | 182 |
| Terzan 3 | 16 28 40.1 -35 21 13 | Sco | 12.0 | 15.0 | 24,450 | 17.30 | 375 | 165 |
| 1636-283, ESO452-CSII | 16 39 25.5 -28 23 52 | Sco | 12.0 | -- | 25,428 | 16.55 | 375 | 147 |
| NGC6235 | 16 53 25.4 -22 10 38 | Oph | 8.9 | 14.0 | 37,164 | 16.7 | 337 | 146 |
| NGC6325 | 17 17 59.2 -23 45 57 | Oph | 10.2 | 14.7 | 26,080 | 17.3 | 337 | 146 |
| NGC6355 | 17 23 58.6 -26 21 13 | Oph | 8.6 | -- | 30,970 | 17.2 | 338 | 146 |
| IC1257 | 17 27 08.5 -07 05 35 | Oph | 13.1 | 17.5 | 81,500 | 19.80 | 293 | 126 |
| NGC6366 | 17 27 44.3 -05 04 36 | Oph | 9.5 | 13.6 | 11,736 | 15.7 | 293 | 106 |
| Haute Province (HP) 1 | 17 31 05.2 -29 58 54 | Oph | 12.5 | 16.0 | 45,966 | 18.60 | 376 | 164 |
| NGC6380 | 17 34 28.0 -39 04 09 | Sco | 11.5 | 17.0 | 34,884 | 19.5 | 408 | 164 |
| Terzan 1, Haute Province 2 | 17 35 47.2 -30 28 54 | Sco | 15.9 | 18.5 | 18,256 | 21.40 | 376 | 164 |
| Tonantzintlia (Ton) 2, Pismis 26 | 17 36 10.5 -38 33 12 | Sco | 12.2 | -- | 26,406 | 19.10 | 376 | 164 |
| NGC6397 | 17 40 41.3 -53 40 25 | Ara | 5.3 | 10.0 | 7,498 | 12.87 | 434 | 195 |
| Palomar 6 | 17 43 42.2 -26 13 21 | Oph | 11.6 | -- | 19,234 | 19.0 | 338 | 146 |
| NGC6426 | 17 44 54.7 +03 10 13 | Oph | 10.9 | 15.2 | 67,482 | 18.1 | 248 | 106 |
| Djorgovski 1 | 17 47 28.3 -33 03 56 | Sco | 13.6 | -- | 39,120 | 20.36 | 377 | 164 |
| Terzan 5, Terzan 11 | 17 48 04.9 -24 46 45 | Sgr | 13.9 | 20.5 | 33.578 | 22.52 | 338 | 146 |
| NGC6453 | 17 50 51.8 -34 35 55 | Sco | 10.2 | 14.3 | 31,296 | 17.5 | 377 | 164 |
| Terzan 9 | 18 01 38.8 -26 50 23 | Sgr | 16.0 | 17.2 | 21,190 | 20.35 | 339 | 145 |
| Djorgovski 2, ESO456-SC38 | 18 01 49.1 -27 49 33 | Sgr | 9.9 | -- | 21,842 | 17.60 | 339 | 145 |
| NGC6539 | 18 04 49.8 -07 35 09 | Ser | 8.9 | 15.9 | 27,384 | 18.3 | 294 | 126 |
| Djorgovski 3, NGC6540 | 18 06 08.6 -27 45 55 | Sgr | 14.6 | -- | 12,062 | 15.3 | 339 | 145 |
| Palomar 7, IC1276 | 18 10 44.2 -07 12 27 | Ser | 10.3 | 15.7 | 17,604 | 17.70 | 294 | 126 |
| Palomar 8 | 18 41 29.9 -19 49 33 | Sgr | 10.9 | 15.4 | 42,054 | 17.27 | 340 | 145 |
| Palomar 9, NGC6717 | 18 55 06.1 -22 42 06 | Sgr | 8.4 | -- | 23,146 | 15.55 | 340 | 145 |
| NGC6749 | 19 05 15.3 +01 54 03 | Aql | 12.4 | 16.5 | 25,754 | 19.7 | 251 | 105 |
| Terzan 7 | 19 17 43.7 -34 39 27 | Sgr | 12.0 | 15.0 | 75,632 | 17.76 | 379 | 163 |
| Arp GC2 | 19 28 44.1 -30 21 14 | Sgr | 13.0 | 15.5 | 93,236 | 18.13 | 379 | 162 |
| Terzan 8 | 19 41 45.0 -34 00 01 | Sgr | 12.4 | 15.0 | 84,760 | 17.95 | 380 | 162 |
| Palomar 11 | 19 45 14.4 -08 00 26 | Aql | 9.8 | -- | 42,380 | 17.40 | 297 | 125 |
| G1 (Inside M31) | 00 32 46.3 +39 34 41 | And | 13.7 | | | | 60 | 45 |
| G78, Vitesnik 42 (Inside M31) | 00 41 01.1 +41 13 41 | And | 14.2V | | | | 60 | 30 |

***V-tip*** = ***Magnitude of the Vtip - Brightest Stars*** - **Megastar**
***D-Sun*** = ***Distance from Sun, Light Years (1 ly = 3.26 Kpc)*** - **Wm. Harris**
***V HB*** = ***V Magnitude Level of the Horizontal Branch (or RR Lyraes)*** - **Wm. Harris**

**Larry Mitchell - The Houston Astronomical Society**

| Page | Name | Const | TSP 2004 |
|---|---|---|---|
| 111 | Palomar 3 | Sex | 1 |
| 35 | Rup 106 | Cen | 2 |
| 30 | NGC 5466 | Boo | 3 |
| 50 | Palomar 5 | Oph | 4 |
| 46 | BH 176 | Nor | 5 |
| 126 | Terzan 3 | Sco | 6 |
| 144 | 1636-283 (ESO 452-SCII) | Sco | 7 |
| 53 | NGC 6235 | Oph | 8 |
| 54 | NGC 6325 | Oph | 9 |
| 63 | NGC 6355 | Oph | 10 |
| 56 | IC 1257 | Oph | 11 |
| 56 | NGC 6366 | Oph | 12 |
| 57 | Haute Provence 1 | Oph | 13 |
| 76 | NGC 6380, Ton 1 | Sco | 14 |
| 124 | Terzan 1 | Sco | 15 |
| 76 | Tonantzintlia 2 (Pismis 26) | Sco | 16 |
| 80 | NGC 6397 | Ara | 17 |
| 113 | Palomar 6 | Oph | 18 |
| 58 | NGC 6426 | Oph | 19 |
| 146 | Djorgovski 1 | Sco | 20 |
| 113 | Terzan 5 | Sgr | 21 |
| 77 | NGC 6453 | Sco | 22 |
| 130 | Terzan 9 | Sgr | 23 |
| 86 | ESO 456-SC38, Djorg 2 | Sgr | 24 |
| 59 | NGC 6539 | Oph | 25 |
| 86 | NGC 6540 | Sgr | 26 |
| 59 | Palomar 7 | Oph | 27 |
| 115 | Palomar 8 | Sgr | 28 |
| 116 | Palomar 9 (NGC 6717) | Sgr | 29 |
| 99 | NGC 6749 | Aql | 30 |
| 128 | Terzan 7 | Sgr | 31 |
| 93 | Arp GC2 | Sgr | 32 |
| 118 | Palomar 11 | Aql | 34 |

Page number of our observing guide: https://www.faintfuzzies.com/Files/GlobularClustersv8.pdf

For M31 Globular Clusters, see the Local Group Guide: https://www.faintfuzzies.com/Files/LocalGroup-v5.pdf

# 2005: Arp Peculiar Galaxies

*T.S.P. - Advanced Observing – 2005*

## ARP PECULIAR GALAXIES

*By Larry Mitchell*

## Spiral Galaxies-

| *Object* | *Loc 2000* | *Const.* | *Mag.* | *Size* | *Class.* | *R.V.* | *Urano 1* | *Urano 2* |
|---|---|---|---|---|---|---|---|---|
| | ***– Low Surface Brightness (1 – 6):*** | | | | | | | |
| □**Arp 1**, NGC2857 | 09 24 38.0 + 49 21 20 | UMa | 12.9 (B) | 2.2 x 2.2' | SA (s)c | +4864 | 71 | 39 |
| □**Arp 5**, NGC3664, VV251 | 11 24 25.3 + 03 19 36 | Leo | 13.2 (B) | 1.8 x 1.8' | SB(s)m pec | +1362 | 236 | 111 |
| | ***– Split Arms (7 – 12):*** | | | | | | | |
| □**Arp 9,** NGC2523 | 08 15 00.2 + 73 34 44 | Cam | 12.6 (B) | 2.9 x 1.7' | SB(r)bc | +3415 | 7 | 6 |
| □**Arp 12**, NGC2608 | 08 35 17.3 + 28 28 26 | Cnc | 13.0 (B) | 2.2 x 1.3' | SB(s)b | +2120 | 102 | 75 |
| | ***– Detached Segments (13 – 18):*** | | | | | | | |
| □**Arp 15**, NGC7393, VV68 | 22 51 38.3 – 05 33 27 | Aqr | 13.4 | 2.0 x 0.8' | SB(rs)c pec | +3706 | 258 | 124 |
| □**Arp 18**, NGC4088 | 12 05 34.1 + 50 32 23 | UMa | 11.2 (B) | 5.3 x 2.1' | SAB(rs)bc | +723 | 47 | 37 |
| | ***–Three Armed (19 – 21):*** | | | | | | | |
| □**Arp 21**, **CGCG155-56** | 11 04 58.5 + 30 01 37 | LMi | 14.7 | 1.1 x 0.7' | SBbc | ---- | 106 | 55 |
| | ***– One Arm (22 – 24):*** | | | | | | | |
| □**Arp 22**, NGC4027 | 11 59 30.5 – 19 15 43 | Crv | 11.7 (B) | 2.8 x 2.5' | SB(s) dm | +1639 | 327 | 50 |
| □**Arp 24**, NGC3445 | 10 54 35.1 + 56 59 16 | UMa | 12.9 (B) | 1.6 x 1.4' | SAB(s)m | +1990 | 46 | 24 |
| | ***– One Heavy Arm (25 – 30):*** | | | | | | | |
| □**Arp 27**, NGC3631, VV363 | 11 21 02.9 + 53 10 10 | UMa | 11.0 (B) | 5.0 x 4.7' | SA(s)c | +1143 | 46 | 24 |
| □**Arp 30**, NGC6365B | 17 22 43.1 + 62 10 36 | Dra | 14.8 | 1.1 x 0.3' | Sdm | +8212 | 29 | 21 |
| NGC6365A | 17 22 43.8 + 62 09 56 | Dra | 14.6 | 1.5 x 1.0' | SBcd | +7904 | 29 | 21 |
| | ***– Integral Sign (31 – 36):*** | | | | | | | |
| □**Arp 32**, **UGC 10770, VV89** | 17 13 07.1 + 59 19 18 | Dra | 14.4 | 1.5 x 0.5' | Im pec | +1108 | 52 | 21 |
| **PGC59864** | 17 13 10.2 + 59 19 56 | Dra | 16.2 | 0.8 x 0.3' | SBm P | ---- | 52 | 21 |
| □**Arp 34**, NGC4615 | 12 41 37.4 + 26 04 22 | Com | 13.8 (P) | 1.5 x 1.2' | Scd | +4755 | 149 | 71 |
| | ***– Companions on Arms – Low Surface Brightness Companions (37 – 48):*** | | | | | | | |
| □**Arp 38**, NGC6412, VV444 | 17 29 37.1 + 72 42 18 | Dra | 12.3 (B) | 2.5 x 2.1' | SA(s)c | +1475 | 12 | 4 |
| □**Arp 44, IC609, VV354** | 10 25 35.5 – 02 12 55 | Sex | 14.1 (P) | 1.5 x 0.7' | SAB(rs)bc | +12,608 | 235 | 112 |
| | ***– Companions on Arms – Small High Surface Brightness Companions (49 – 78):*** | | | | | | | |
| □**Arp 49**, NGC5665, VV412 | 14 32 25.7 + 08 04 45 | Boo | 12.7 (P) | 2.5 x 1.6' | SAB(rs)cpec | +2271 | 197 | 89 |
| □**Arp 62**, **UGC6865, VV286** | 11 53 39.7 + 43 27 29 | UMa | 14.7 (P) | 1.2 x 0.4' | S | +5809 | 74 | 38 |
| □**Arp 72**, NGC5996 / 94 | 15 46 58.8 + 17 53 05 | Ser | 13.2 (B) | 3.2 x 2.6' | S | +3297 | 155 | 69 |
| NGC5994, UGC 10033 | 15 46 53.3 + 17 52 22 | Ser | 15.0 | 0.6 x 0.4' | SB | +3259 | 155 | 69 |
| | ***– Companions on Arms – Large High Surface Brightness Companions (79 – 91):*** | | | | | | | |
| □**Arp 81**, NGC6621 / 22 | 18 12 55.8 + 68 21 49 | Dra | 13.6 | 2.0 x 0.7' | Sb pec | +6210 | 30 | 10 |
| NGC6622 | 18 12 59.9 + 68 21 15 | Dra | 16.3 | 0.5 x 0.4' | S | +6456 | 30 | 10 |
| □**Arp 83**, NGC3800 / 3799 | 11 40 13.4 + 15 20 32 | Leo | 13.5 (P) | 2.0 x 0.7' | SAB(rs)bpec | +3457 | 192 | 91 |
| NGC3799, UGC 6630 | 11 40 09.4 + 15 19 38 | Leo | 14.7 | 0.9 x 0.8' | SBpec | +3449 | 192 | 91 |
| □**Arp 84**, NGC5395 / 94 | 13 58 37.6 + 37 25 31 | CVn | 12.1 (B) | 3.1 x 1.6' | SA(s)b pec | +3505 | 110 | 53 |
| NGC5394, UGC 8898 | 13 58 33.7 + 37 27 12 | CVn | 13.7 (B) | 1.8 x 0.9' | SB(s)b pec | +3427 | 110 | 53 |
| □**Arp 90**, NGC5930 / 29 | 15 26 07.9 + 41 40 39 | Boo | 13.0 | 2.2 x 0.8' | Sa | +2672 | 78 | 35 |
| NGC5929, UGC 9851 | 15 26 05.6 + 41 40 17 | Boo | 14.4 | 0.9 x 0.8' | Sab pec | +2514 | 78 | 35 |
| □**Arp 91**, NGC5953 / 54 | 15 34 32.4 + 15 11 41 | Ser | 12.9 | 1.6 x 1.3' | SAa pec | +2099 | 199 | 88 |
| NGC5954, UGC 9904 | 15 34 35.0 + 15 12 12 | Ser | 12.9 | 1.2 x 0.5' | SAB(rs)cd | +2067 | 199 | 88 |
| | ***– Companions on Arms –Elliptical Galaxy Companions (92 – 101):*** | | | | | | | |
| □**Arp 94**, NGC3227 / 26 | 10 23 30.6 + 19 51 55 | Leo | 10.3 (V) | 5.2 x 4.0' | SAB(s)a pec | +1145 | 144 | 73 |
| NGC3226, UGC 5617 | 10 23 27.0 + 19 53 53 | Leo | 11.4 (V) | 3.3 x 2.5' | E2 Pec | +1322 | 144 | 73 |
| □**Arp 95, IC4461** | 14 35 01.9 +26 32 39 | Boo | 15.2 | 1.3 x 0.7' | Dbl | ---- | 152 | 70 |
| **MCG +5-34-76** | 14 35 00.3 + 26 31 57 | Boo | 15.8 | 0.4 x 0.2' | S | ---- | 152 | 70 |

# Elliptical and Elliptical-like Galaxies-

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***- Connected to Spirals (102 – 108):*** | | | | | | | |
| □**Arp 103**, **Zwickys Triplet** | 16 49 28.1 + 45 27 43 | Her | ---- | 0.9 x 0.8' | Sa | +9405 | 80 | 34 |
| **PGC 59062** | 16 49 26.0 + 45 27 31 | Her | 15.4 | 0.3 x 0.2' | SO pec | +9408 | 80 | 34 |
| **MCG +8-31-3A** | 16 49 33.1 + 45 29 52 | Her | 16.0 | 0.6 x 0.5' | SAB(rs)O | +9449 | 80 | 34 |
| □**Arp 106**, NGC4211 / 4211A | 12 15 35.9 + 28 10 38 | Com | 14.4 | 0.9 x 0.7' | SO/a pec | +6744 | 107 | 72 |
| NGC4211A | 12 51 37.4 + 28 09 59 | Com | 15.5 | 1.4 x 0.3' | SO/a pec | +6670 | 107 | 72 |
| | ***- Repelling Spiral Arms (109 – 112):*** | | | | | | | |
| □**Arp 109**, **UGC 10053** | 15 47 50.8 + 69 28 11 | Dra | 15.0 (P) | 1.1 x 0.7' | S | +11,298 | 28 | 11 |
| □**Arp 111**, NGC5421 | 14 01 41.3 + 33 49 33 | CVn | 14.2 | 1.6 x 1.0' | SB? | +7889 | 110 | 52 |
| | ***- Close to and Perturbing Spirals (113 – 132):*** | | | | | | | |
| □**Arp 117**, IC983 / 982 | 14 10 04.4 + 17 44 01 | Boo | 12.5 (B) | 5.3 x 4.6' | SB(r)bc | +5452 | 152 | 70 |
| IC 982, UGC 9059 | 14 09 59.1 + 17 41 46 | Boo | 14.0 (P) | 1.3 x 1.3' | SAO+ | +5053 | 152 | 70 |
| □**Arp 124**, NGC6361 | 17 18 41.0 + 60 36 31 | Dra | 13.9 (P) | 2.2 x 0.6' | SAb sp | +3812 | 52 | 21 |
| □**Arp 125**, UGC 10491 | 16 38 13.6 + 41 56 22 | Her | 15.0 (B) | 1.2 x 0.5' | Dbl sys | +8118 | 80 | 35 |
| PGC 58674 | 16 38 13.8 + 41 55 51 | Her | -- | 0.4 x 0.3' | RingA | +8572 | 80 | 35 |
| | ***- With Nearby Filaments (133 - 136):*** | | | | | | | |
| □**Arp 136**, NGC5820 | 14 58 40.1 + 53 53 10 | Boo | 13.4 (B) | 1.6 x 1.0' | SO sp | +3252 | 50 | 22 |
| | **- Material Emanating from Elliptical Galaxies (137 – 145):** | | | | | | | |
| □**Arp 138**, NGC4015 | 11 58 42.6 + 25 02 11 | Com | 14.2 (P) | 2.0 x 1.5' | Dbl sys | -- | 147 | 72 |
| MCG +4-28-110 | 11 58 43.2 + 25 02 35 | Com | 15.6 | 0.9 x 0.2' | S | +4347 | 147 | 72 |
| □**Arp 142**,NGC2936 / 37 | 09 37 43.3 + 02 45 24 | Hya | 13.9 (B) | 1.5 x 0.8' | I? | +6989 | 233 | 113 |
| NGC2937, UGC 5131 | 09 37 45.0 + 02 44 51 | Hya | 14.6 (B) | 0.9 x 0.6' | E | +6839 | 233 | 113 |

# Galaxies-

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***- With Associated Rings (146 – 148):*** | | | | | | | |
| □**Arp 148**, **Mayall's Object** | 11 03 53.9 + 40 51 00 | UMa | 15.4 | 0.5 x 0.3' | Ring | +10,357 | 73 | 38 |
| MAC 1103+4050 | 11 03 52.5 + 40 50 55 | UMa | 16.5 | 0.4 x 0.3' | Ring | | 73 | 38 |
| | ***– With Jets (149 - 152):*** | | | | | | | |
| □**Arp**, 149, IC803 | 12 39 37.6 + 16 35 18 | Com | 15.9 | 0.5 x 0.2' | S | +7924 | 194 | 90 |
| | ***– Disturbed With Interior Absorption (153 – 160):*** | | | | | | | |
| □**Arp 155**, NGC3656 | 11 23 38.5 + 53 50 31 | UMa | 13.3 (P) | 1.6 x 1.5' | (R)IO pec | +2905 | 46 | 24 |
| MGC +9-19-64 | 11 23 39.3 + 53 49 51 | UMa | -- | 0.5 x 0.2' | -- | +2878 | 46 | 24 |
| □**Arp 160**, NGC4194, VV261 | 12 14 09.6 + 54 31 35 | UMa | 12.5 (V) | 2.8 x 2.1' | IBm pec | +2511 | 47 | 24 |
| | ***– With Diffuse Filaments (161 – 166):*** | | | | | | | |
| □**Arp 161, UGC 6665** | 11 42 12.6 + 00 20 03 | Vir | 14.7(P) | 1.2 x 0.5' | Pec | +5448 | 237 | 111 |
| □**Arp 163**, NGC4670 | 12 45 17.0 + 27 07 33 | Com | 13.1 (B) | 1.7 x 1.2' | SB(s)O/a pec | +1112 | 149 | 71 |
| | ***– With Diffuse Counter Tails (162 – 172):*** | | | | | | | |
| □**Arp 171**, NGC5718/IC1042 | 14 40 42.9 + 03 27 57 | Vir | 13.9 (P) | 1.5 x 1.0' | SO | +8277 | 243 | 109 |
| IC1042 | 14 40 39.0 + 03 28 11 | Vir | 14.3 (P) | 1.0 x 1.0' | SO | +7929 | 243 | 109 |
| □**Arp 176**, NGC4933 A / B | 13 03 56.8 – 11 29 52 | Vir | 12.7 (P) | 1.8 x 1.1' | SO/a pec | +3173 | 284 | 131 |
| NGC4933B | 13 03 54.3 – 11 30 21 | Vir | 13.4 | 1.4 x 0.7' | E pec | +3291 | 284 | 131 |
| | ***– With Narrow Counter Tails (173 – 178):*** | | | | | | | |
| □**Arp 178**, NGC5614/5615 | 14 24 07.5 + 34 51 31 | Boo | 11.6 (V) | 2.4 x 2.2' | SA(r)ab pec | +3872 | 111 | 52 |
| NGC5615 | 14 24 04.6 + 34 52 18 | Boo | 15.5 | 1.4 x 0.4' | -- | +3883 | 111 | 52 |
| | ***– With Narrow Filaments (179 – 193):*** | | | | | | | |
| □**Arp 181**, NGC3212 / 3215 | 10 28 16.1 + 79 49 23 | Dra | 14.1 (P) | 1.8 x 0.8' | SB ? | +9769 | 8 | 5 |
| NGC3215, UGC 5659 | 10 28 38.5 + 79 48 49 | Dra | 14.0 (P) | 1.1 x 0.8' | S ? | +9468 | 8 | 5 |
| □**Arp 188, The "Tadpole"** | 16 06 04.1 + 55 25 29 | Dra | 14.4 (P) | 3.8 x 0.9' | SB(s)c pec | ---- | 51 | 22 |
| □**Arp 192**, NGC3303, VV71 | 10 37 02.3 + 18 07 56 | Leo | 14.3 | 3.0x 2.1' | Pec | +6165 | 145 | 73 |
| | ***– With Material Ejected from Nuclei (194 – 208):*** | | | | | | | |
| □**Arp 194, U 6945, VV126** | 11 57 55.2 + 36 23 32 | UMa | 14.9 | 1.2 x 0.7' | S ? | +10,436 | 107 | 54 |
| **MAC1157+3622** | 11 57 56.6 + 36 22 59 | UMa | 15.5 | 0.5 x 0.4' | -- | ---- | 107 | 54 |
| □**Arp 199,** NGC5544 / 45 | 14 17 02.5 + 36 34 17 | Boo | 14.2 | 1.0 x 1.0' | (R)SB(rs)O/a | +3121 | 110 | 52 |
| NGC5545, UGC 9143 | 14 17 05.5 + 36 34 34 | Boo | 16.0 | 1.3 x 0.5' | SA(s)bc | +3161 | 110 | 52 |
| □**Arp 206**, NGC3432, VV11 | 10 52 31.0 + 36 37 12 | LMi | 11.7 (B) | 6.8 x 1.4' | SB(s)m sp | +619 | 105 | 55 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***– With Irregularities, Absorption & Resolution (209 – 214):*** | | | | | | | |
| □**Arp 209**, NGC6052, 6064 | 16 05 13.3 + 20 32 31 | Her | 13.4 (B) | 0.9 x 0.4' | Sc | +4701 | 155 | 69 |
| □**Arp 214**, NGC3718 | 11 32 35.0 + 53 04 05 | UMa | 10.7 (V) | 9.2 x 4.4' | SB(s)a pec | +1031 | 47 | 24 |
| | ***– With Adjacent Loops (215 - 280):*** | | | | | | | |
| □**Arp 217**, N3310, VV356 | 10 38 44.8 + 53 30 16 | UMa | 11.2 (B) | 3.3 x 3.0' | SAB(r)bc pec | +1018 | 46 | 25 |
| □**Arp 218**, **CGCG 107-52** | 15 53 36.9 + 18 36 38 | Ser | 15.4 (P) | 0.8 x 0.4' | SAB(s)bc | ---- | 155 | 69 |
| | ***– With Amorphous Spiral Arms (221 – 226):*** | | | | | | | |
| □**Arp 221, MCG-2-25-6** | 09 36 28.3 – 11 19 49 | Hya | 13.6 | 1.3 x 1.1' | S | ---- | 278 | 134 |
| **MAC0936-1120** | 09 36 26.8 – 11 20 51 | Hya | 16.0 | 0.4 x 0.3' | | | 278 | 134 |
| □**Arp 224**, NGC3921, VV31 | 11 51 06.5 + 55 04 24 | UMa | 13.1 (B) | 2.1 x 1.2' | SA(s)O/a p | +5942 | 47 | 24 |
| | ***-With Concentric Rings (227 – 231):*** | | | | | | | |
| None Selected | | | | | | | | |
| | ***– With Appearance of Fission (233 – 256):*** | | | | | | | |
| □**Arp 240**, NGC5257 / 58 | 13 39 52.9 + 00 50 24 | Vir | 12.9 (V) | 2.0 x 1.4' | SAB(s)b pec | +6823 | 241 | 110 |
| NGC5258, UGC8645 | 13 39 57.9 + 00 49 55 | Vir | 12.9 (V) | 2.4 x 1.8' | SA(s)b pec | +6718 | 241 | 110 |
| □**Arp 241**, U9425, VV264 | 14 37 50.9 + 30 28 50 | Boo | 15.0 (P) | 0.8 x 0.4' | S? | +10,394 | 111 | 52 |
| | ***– With Irregular Clumps (257 – 268):*** | | | | | | | |
| □**Arp 263**, NGC3239, VV95 | 10 25 05.6 + 17 09 02 | Leo | 11.7 (B) | 5.0 x 3.6' | IB(s)m pec | +830 | 145 | 92 |
| □**Arp 266**, NGC4861, Mkn59 | 12 59 02.4 + 34 51 46 | CVn | 12.9 (B) | 4.2 x 1.5' | SB(s)m | +809 | 108 | 53 |

# Double Galaxies-

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ***– With Connected Arms (269 – 274):*** | | | | | | | |
| □**Arp 269**, NGC4490 / 85 | 12 30 36.1 + 41 38 33 | CVn | 10.2 (B) | 6.3 x 2.7' | SB(s)d pec | +594 | 75 | 37 |
| NGC4485, UGC7648 | 12 30 31.4 + 41 42 00 | CVn | 12.3 (B) | 2.6 x 1.9' | IB(s)m pec | +617 | 75 | 37 |
| □**Arp 270**, NGC3395 / 96 | 10 49 50.1 + 32 58 58 | LMi | 12.0 (V) | 1.8 x 1.6' | SAB(rs)cd | +1634 | 105 | 55 |
| NGC3396 | 10 49 55.2 + 32 59 26 | LMi | 12.6 (P) | 4.2 x 1.4' | IBm pec | +1667 | 105 | 55 |
| | ***– Interacting (275 – 280):*** | | | | | | | |
| □**Arp 277**, NGC4809 / 10 | 12 54 51.0 + 02 39 12 | Vir | 14.4 (P) | 1.6 x 0.7' | Im pec | +956 | 239 | 110 |
| NGC4810, CGCG 43-61 | 12 54 51.2 + 02 38 24 | Vir | 14.9 (P) | 0.8 x 0.5' | Im pec | +876 | 239 | 110 |
| □**Arp 280**, NGC3769 / 3769A | 11 37 43.5 + 47 53 40 | UMa | 12.6 (B) | 3.3 x 0.9' | SBrb | +722 | 74 | 38 |
| NGC3769A | 11 37 50.5 + 47 52 55 | UMa | 14.7 (P) | 1.0 x 0.4' | SBm pec | +761 | 74 | 38 |
| | ***– Infall and Attraction (281 – 286):*** | | | | | | | |
| □**Arp 286**, NGC5566 / 60 / 69 | 14 20 20.0 + 03 56 01 | Vir | 11.5 (B) | 6.7 x 2.1' | SB(r)ab | +1457 | 242 | 109 |
| NGC5560 | 14 20 04.4 + 03 59 33 | Vir | 12.4 (V) | 4.3 x 1.2' | SB(s)b pec | +1731 | 242 | 109 |
| NGC5569 | 14 20 32.1 + 03 58 57 | Vir | 13.9 (P) | 2.5 x 1.3' | SAB(rs)cd | +1773 | 242 | 109 |
| | ***– Wind Effects (287 – 293):*** | | | | | | | |
| □**Arp 291**, **UGC5832, VV112** | 10 42 48.7 + 13 27 34 | Leo | 13.7 (P) | 1.4 x 1.0' | SB ? | +1178 | 190 | 92 |
| □**Arp 292, IC575** | 09 54 32.9 – 06 51 26 | Sex | 13.2 | 1.6 x 1.1' | Sa pec sp | -- | 279 | 134 |
| □**Arp 293**, NGC6286 | 16 58 31.9 + 58 56 16 | Dra | 14.1 (P) | 1.5 x 1.4' | Sb pec | +5595 | 52 | 21 |
| NGC6285, CGCG299-37 | 16 58 24.0 + 58 57 21 | Dra | 14.5 (P) | 1.3 x 0.6' | SO pec | ---- | 52 | 21 |
| | ***– Long Filaments 294 – 297):*** | | | | | | | |
| □**Arp 294**, NGC3786 / 88 | 11 39 42.4 + 31 54 35 | UMa | 13.2 (P) | 2.2 x 1.2' | SAB(rs)a pec | +2722 | 106 | 54 |
| NGC3788, UGC 6623 | 11 39 44.7 + 31 55 51 | UMa | 13.5 (P) | 1.7 x 0.6' | SAB(rs) ab | +2486 | 106 | 54 |
| □**Arp 299**, NGC3690 / IC694 | 11 28 33.2 + 58 33 56 | UMa | 12.0 (P) | 1.5 x 1.0' | Ibm pec | +3033 | 46 | 24 |
| IC694, UGC 6471 | 11 28 30.6 + 58 33 29 | UMa | 12.1 | 1.1 x 0.9' | SBmpec | +3132 | 46 | 24 |
| □**Arp 301**, UGC6204 | 11 09 51.7 + 24 15 40 | Leo | 14.8 (P) | 1.2 x 0.6' | Sb? pec | +6009 | 146 | 73 |
| | ***- Groups of Galaxies (311 – 321):*** | | | | | | | |
| □**Arp 311**, **IC1258 / IC1259** | 17 27 17.5 + 58 29 07 | Dra | 14.4 (P) | 1.0 x 0.8' | Sab ? | +7928 | 52 | 21 |
| □**Arp 316**, NGC3193/90 /87 | 10 18 24.7 + 21 53 34 | Leo | 11.8 (B) | 2.0 x 2.0' | E2 | +1379 | 144 | 73 |
| | ***- Chains of Galaxies (322 – 332):*** | | | | | | | |
| □**Arp 324**, **UGC 10143** | 16 02 17.5 + 15 58 32 | Her | 14.2 (P) | 1.7 x 1.0' | E+ | +10,412 | 200 | 88 |
| □**Arp 328**, Hickson 72E | 14 47 55.3 + 19 03 04 | Boo | 18.0 | 0.3 x 0.2' | Mlt S | ---- | 153 | 70 |

# Miscellaneous:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| □**Arp 334, UGC 8498** | 13 30 26.1 + 31 37 11 | CVn | 13.6 (P) | 2.7 x 0.9' | Sb | +7289 | 109 | 53 |
| □**Arp 335**, NGC3509,VV75 | 11 04 23.6 + 04 49 43 | Leo | 13.5 (P) | 2.3 x 1.1' | SA(s)bc pec | +7636 | 236 | 112 |

**Observe a Total of 25 Objects – Only One Object Accepted per Group..**

***Note: Omitted Arp Peculiar Galaxies are either not visible from TSP, Considered too difficult, or have been included in previous Advanced Listings***

***Arp 148 & Arp 199 were Previously Listed under "Rings"***

**◄Good Luck►**

**Larry Mitchell**
**Houston, Texas**
**The Texas Star Party - 2005**

For finder charts, see Observing the Arp Peculiar Galaxies Observing Guide:

https://www.faintfuzzies.com/ArpGuide2.html

# 2006: Nebulae

## *Advanced Observing - The Texas Star Party - 2006*

## NEBULAE

### Observe Any 20 Objects – At Least 5 in each Group

| Emission Nebulae: | | Location 2000 | Const. | Size | Urano 1 | Urano 2 |
|---|---|---|---|---|---|---|
| ☐ Sh 2-237, NGC1931 | also Reflecting | 05 31 26.0 _ 34 14 42 | Aur | 7.0' | U-97 | 59L |
| ☐ IC 443 | SN Remnant | 06 17 52.0 + 22 46 00 | Gem | 27.0 x 7.0' | U-137 | 76R |
| ☐ NGC2736, RCW37 | SN Remnant | 09 00 11.8 – 45 58 15 | Vel | 20.0 x 3.0' | U-397 | 186R |
| ☐ NGC4449 | Galaxy | 12 28 11.4 + 44 05 40 | CVn | 6.1 x 4.3' | U-75 | 37R |
| ☐ "Boomerang" Nebula | | 12 44 46.1 - 54 31 10 | Cen | 1.4 x 0.6' | U-429 | 198L |
| ☐ NGC5068 | Galaxy | 13 18 54.7 – 21 02 21 | Vir | 7.3 x 6.5' | U-330 | 149R |
| ☐ M101 (Galaxy) | | 14 03 12.5 + 54 20 55 | UMa | 28.9 x 26.9' | U-49 | 23L |
| NGC5447 | Galaxy Knot | | | 1.0 x 0.5' | | |
| NGC5461 | Galaxy Knot | | | 0.8 x 0.4' | | |
| NGC5462 | Galaxy Knot | | | 1.7 x 0.8' | | |
| ☐ NGC 6357, Sh 2-11 | | 17 24 56.0 – 34 11 25 | Sco | 31.0 x 30.0' | U-376 | 164L |
| ☐ NGC 6559 | | 18 09 53.0 – 24 04 30 | Sgr | 8.3 x 4.2' | U-339 | 145R |
| ☐ Sh2-82, LBN 129 | also Reflecting | 19 30 23.3 + 18 17 02 | Sge | 9.0' | U-162 | 66R |
| ☐ Sh 2-84, Sm Calif. Neb | | 19 49 01.6 +18 23 22 | Sge | 6.7 x 2.9' | U-162 | 66R |
| ☐ Sh 2-90, LBN 144 | | 19 49 12.4 + 26 50 49 | Vul | 5.0 x 3.0' | U-162 | 66R |
| ☐ NGC6888, "Crescent" | Wolf Rayet | 20 12 01.0 + 38 23 00 | Cyg | 18.0 x 8.0' | U-119 | 48L |
| ☐ Sh 2-106 | | 20 27 25.5 + 37 22 32 | Cyg | 3.0' | U-120 | 48L |
| ☐ Sh 2-112 | | 20 34 03.0 + 45 38 42 | Cyg | 15.0' | U-85 | 32R |
| ☐ HH 555, the "Pelican" | Herbig Haro Obj. | 20 51 19.5 + 44 25 36 | Cyg | 4.0 x 1.0' | U-85 | 32L |
| ☐ IC 5146, "Cocoon" | | 21 53 29.0 + 47 15 41 | Cyg | 11.0 x 10.0' | U-86 | 31R |
| **Reflection Nebulae:** | | | | | | |
| ☐ IC 4601, CED 129 | | 16 20 14.0 – 20 04 00 | Sco | 19.6 x 11.6' | U-336 | 147L |
| ☐ IC4604, Rho Oph | | 16 25 35.2 – 23 26 50 | Oph | 80.0 x 70.0' | U-336 | 147L |
| ☐ IC 4605, LBN 1110 | | 16 30 15.0 – 25 04 00 | Sco | 23.0 x 22.0' | U-336 | 147L |
| ☐ NGC 6590, LBN 43 | | 18 17 32.0 – 19 41 00 | Sgr | 5.6 x 3.3' | U-339 | 145R |
| ☐ Serpen's Object | | 18 29 56.6 + 01 14 51 | Ser | 2.1 x 0.5' | U-250 | 106L |
| ☐ NGC 6726 (NGC6727) | | 19 01 42.0 – 36 53 00 | CrA | 5.0' | U-379 | 163L |
| ☐ Mi 1-92, "Footprint" | Cometary Nebula | 19 36 18.9 + 29 32 51 | Cyg | 20.0 x 4.0" | U-118 | 48R |
| ☐ IC 4954 (4955) | | 20 04 54.0 + 29 11 00 | Vul | 3.0' | U-119 | 66L |
| ☐ Gyulbudaghian's Nebula | Variable | 20 45 58.0 + 67 58 30 | Cep | 1.6 x 0.7' | U-32 | 9R |
| ☐ NGC7023 | | 21 01 36.0 + 68 10 00 | Cep | 14.0' | U-33 | 9R |
| ☐ Van den Bergh 142 | Cometary Globule | 21 36 21.6 + 57 31 01 | Cep | 28.1 x 10.3' | U-57 | 19R |
| ☐ Zodiacal Light | Sun's Nebula | -- -- | -- | -- | -- | |

## Cont. – T.S.P. Advanced Observing - Nebulae:

| Dark Nebulae : | | Location 2000 | Const. | Size | Urano 1 | Urano 2 |
|---|---|---|---|---|---|---|
| ☐ CB 68 | Bok Globule | 16 57 16 – 16 09 18 | Oph | 4.8 x 3.9' | U-292 | 128R |
| ☐ B 68, LDN 57 | Kidney Globule | 17 22 38.0 – 23 50 12 | Oph | 4.0' | U-338 | 146L |
| ☐ B 86 & NGC6520 | Irregular Globule | 18 02 58.6 – 27 52 00 | Sgr | 5.0' | U-339 | 145R |
| ☐ Bok Globule – M8 | Bok Globule | 18 04 47.7 – 24 29 50 | Sgr | 1.5 x 1.0' | U-339 | 145R |
| ☐ B 92, LDN 323 | | 18 15 27.9 – 18 13 19 | Sgr | 15.0 x 9.0' | U-339 | 145R |
| ☐ B 93, LDN 327 | Cometary Globule | 18 16 53.7 – 18 03 58 | Sgr | 8.0 x 3.0' | U-339 | 145R |
| ☐ Pillars of Creation, M16 | | 18 18 51.5 – 13 49 00 | Ser | 3.2' x 44" | U-294 | 127R |
| ☐ B 98, LDN 239 | Bok Globule | 18 33 18.5 – 26 01 36 | Sgr | 3.0' | U-340 | 145R |
| ☐ B 104, LDN 532 | | 18 47 18.6 – 04 33 53 | Sct | 2.6 x 2.1' | U-250 | 105R |
| ☐ B 117, LDN 509 | | 18 53 40.2 – 07 25 30 | Sct | 2.2 x 1.1' | U-295 | 127L |
| ☐ B118 | Bok Globule | 18 53 56.6 – 07 26 03 | Sct | 1.5 | U-295 | 127L |
| ☐ B 129, LDN 549 | Irregular | 19 02 06.9 – 05 18 28 | Aql | 5.0' | U-251 | 105R |
| ☐ B 335, LDN 663 | Bok Globule | 19 36 59.4 + 07 34 44 | Aql | 5.6 x 4.5' | U-207 | 86L |
| ☐ B 143, LDN 694 | "E" Nebula | 19 41 06.2 + 10 56 35 | Aql | 22.6 x 5.5' | U-207 | 86L |

**PLEASE - No Computers or "Go-To" Systems**

***B*** *Barnard, E.E., "Catalog of 349 Dark Objects in the Sky", 1927*
***CB*** *Clemens, D.P., Barraines, R., "A Catalog of small optically selected molecular clouds" , ApJS, 1988*
***CED*** *Cederblad, S., "Catalog of Bright Diffuse Galactic Nebulae", 1946*
***LBN*** *Lynds, Beverly T., "Catalog of Bright Nebulae", ApJ, 1965*
***LDN*** *Lynds, Beverly T., "Catalog of Dark Nebulae", ApJ, 1962*
***Mi*** *Minkowsk, R., "New Emission Nebulae", 1946*
***Sh 2*** *Sharpless, Stewart, "A Catalog of HII Regions", ApJS, 1959*
***vdB*** *van den Bergh, S., "A Study of Reflection Nebulae", 1966*

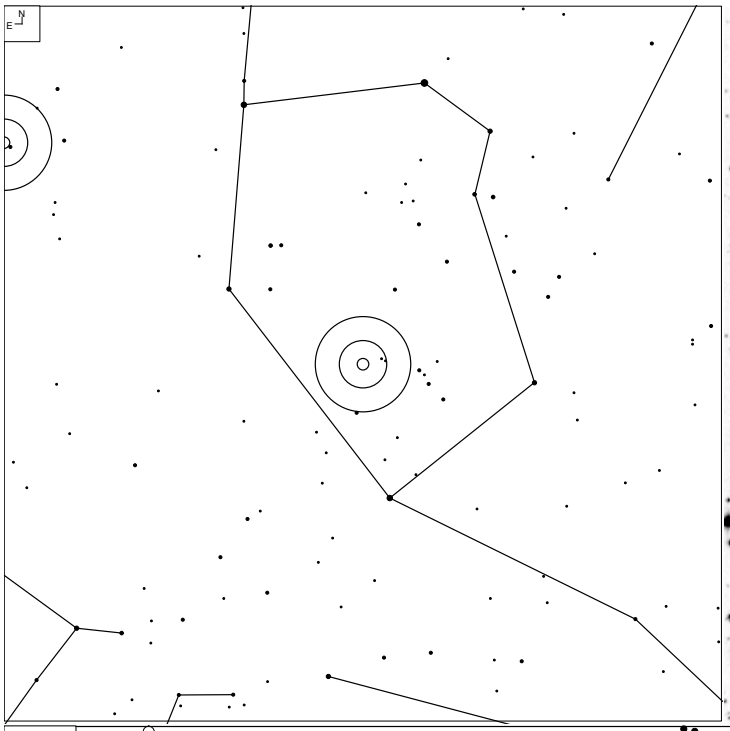
***Data Source:*** **Mega*Star 5***

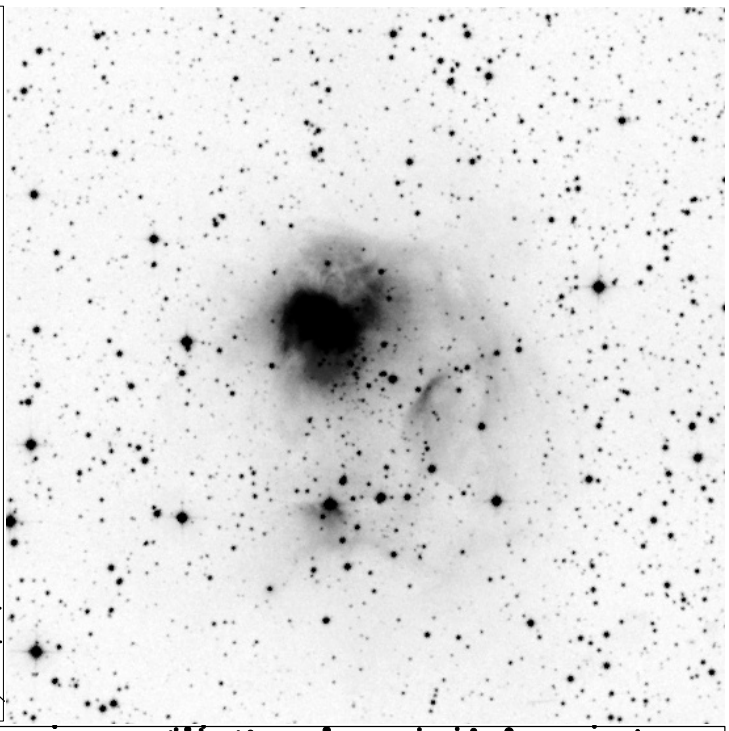
***Good Hunting & Good Luck,***

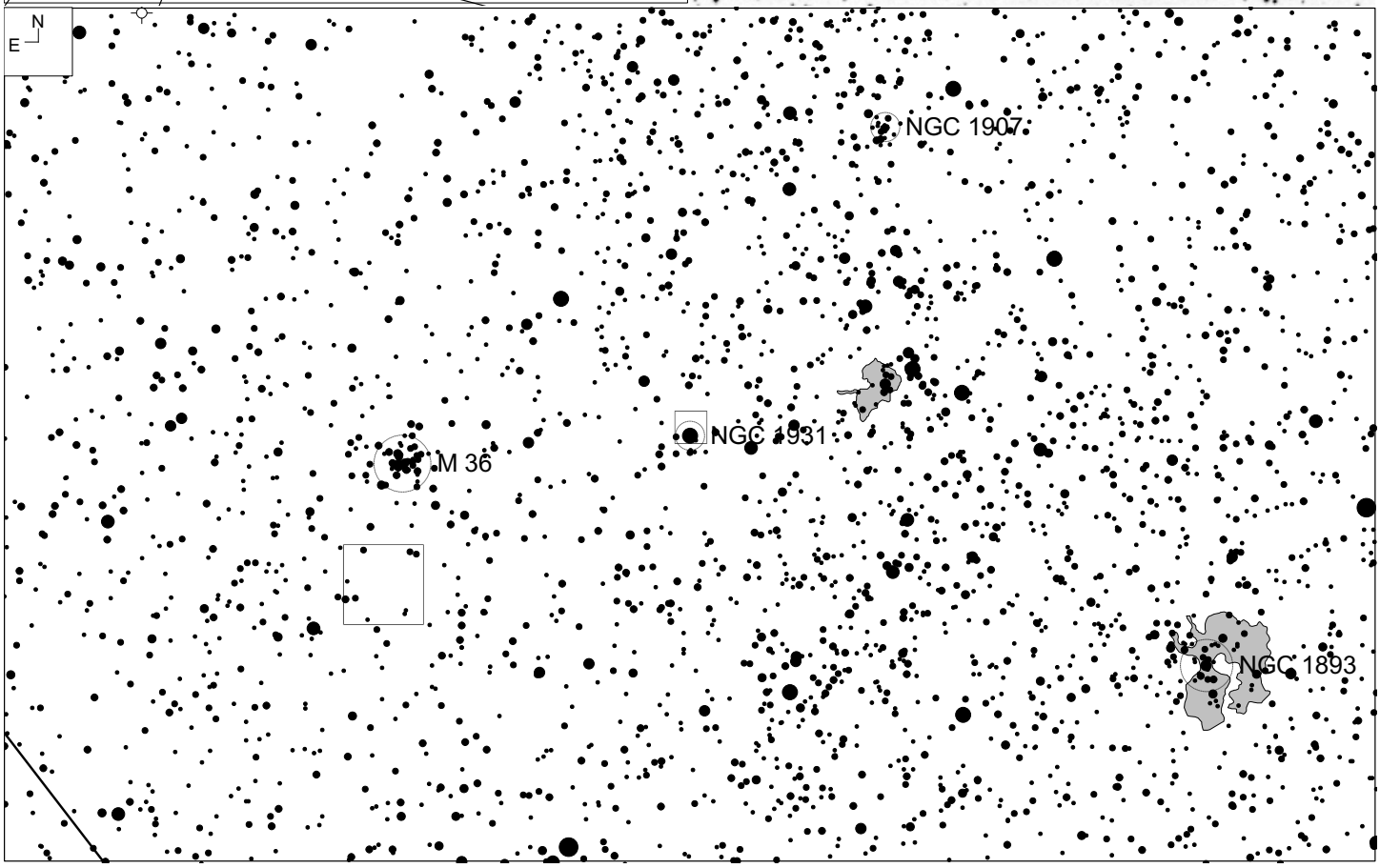
***Larry Mitchell***

***Houston Astronomical Society***

# Sharpless 2-237 (Auriga)

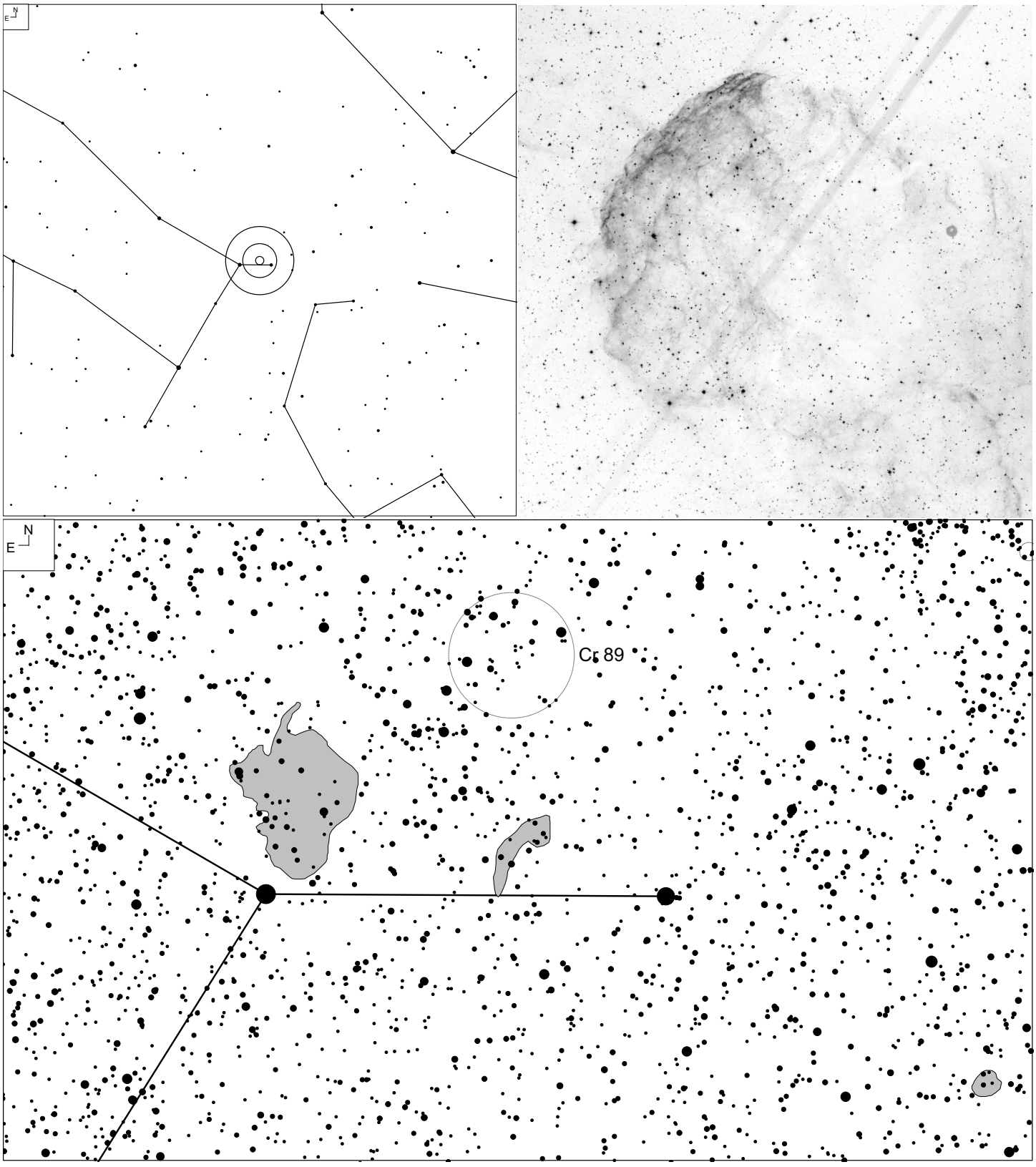






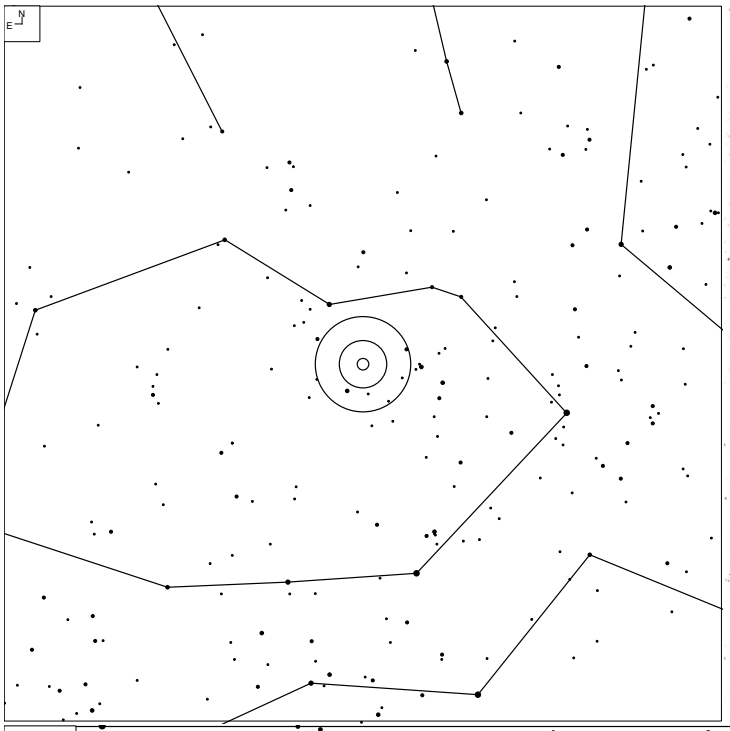

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| NGC 1931 | 05 31 26.0 | +34 14 42 | 7.0 | 59L | 37 |

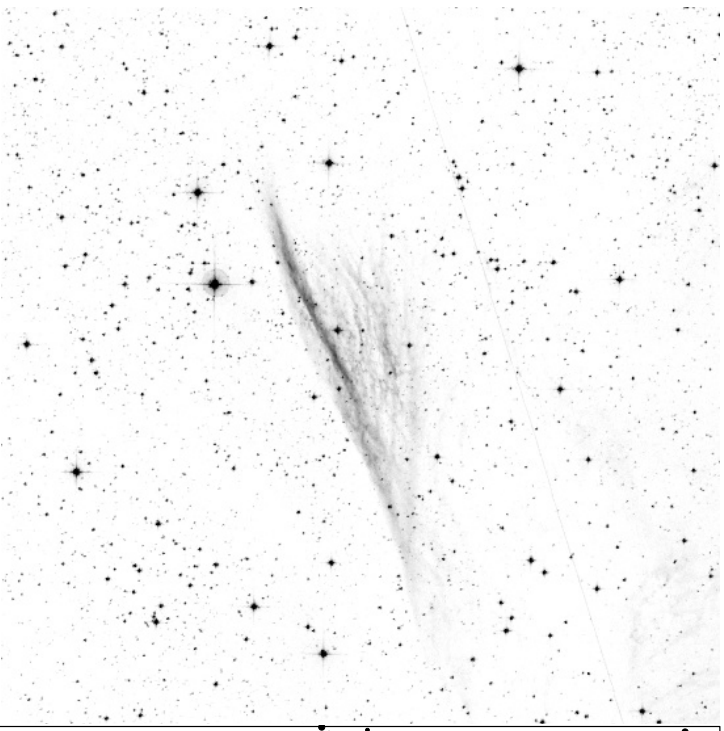
# IC 443 (Gemini)

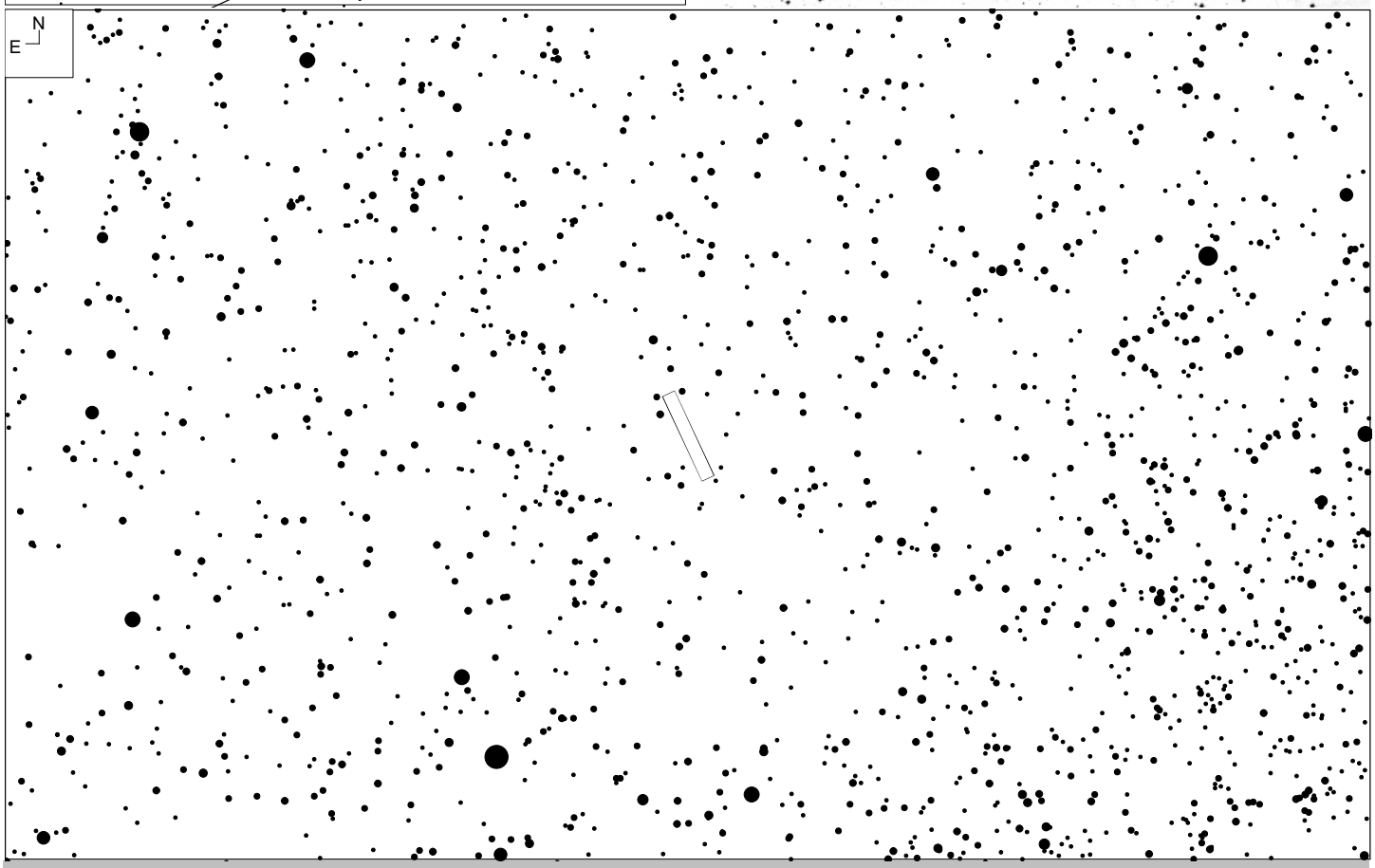



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Sh 2-248 | 06 17 52.0 | +22 46 00 | 27.0 x 7.0’ | 76R | 36 |

# NGC 2736 (Vela)

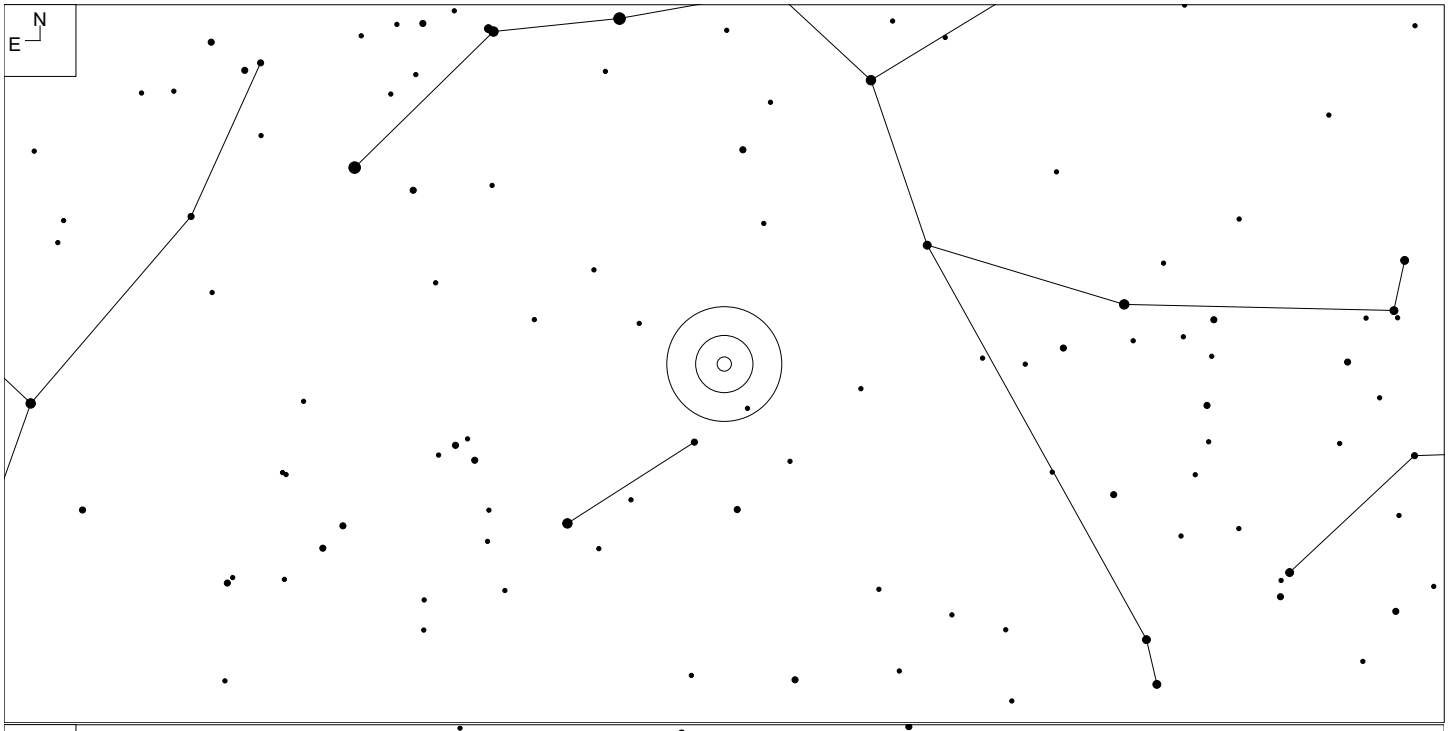


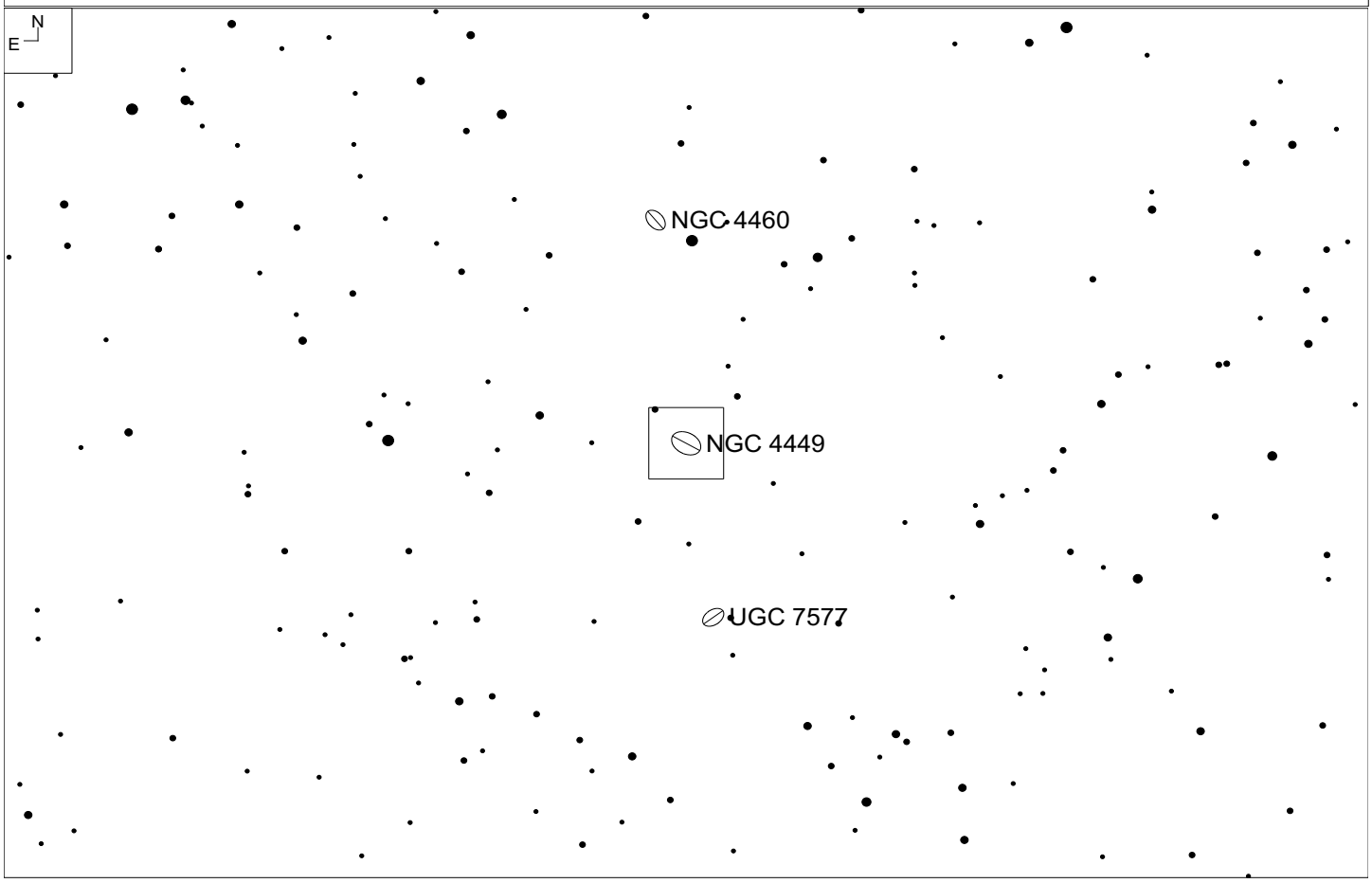






| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| RCW 37 | 09 00 11.8 | -45 58 15 | 20.0 x 3.0’ | 186R | 95 |

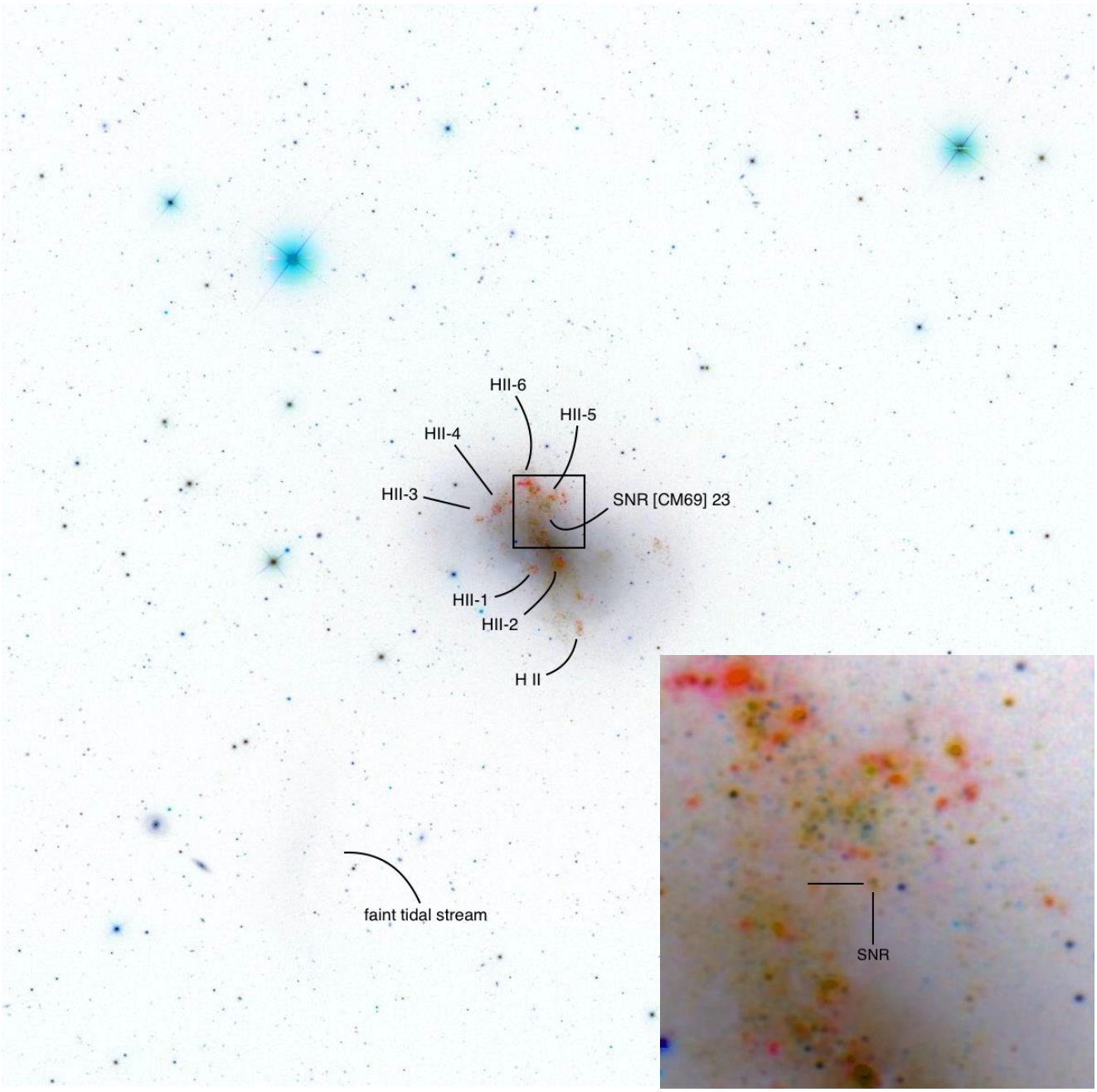
# NGC 4449 (Canes Venatici)




| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 12 28 11.4 | +44 05 40 | 6.1 x 4.3’ | 37R | 21 |

# NGC 4449 (Canes Venatici)




NGC 4449 is a type IBm irregular dwarf galaxy sitting 12 mly away and about 22 kly across. This small galaxy has very active star formation and giant H II regions.

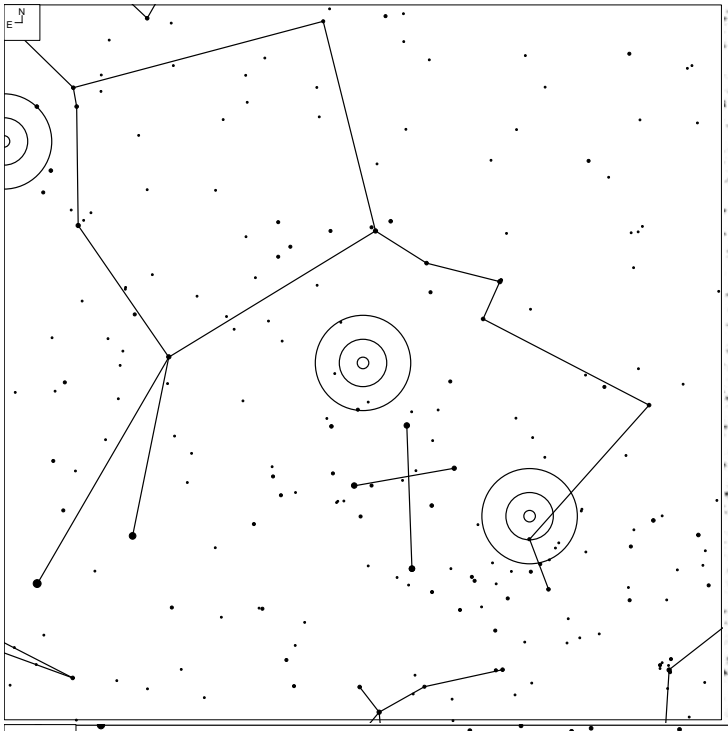
F. Annibali , M. Tosi, et al, "PNe and H II Regions in the Starburst Irregular Galaxy NGC 4449 from LBT MODS Data," *Astrophysical Journal*, Volume 843, Issue 1 (July 2017)

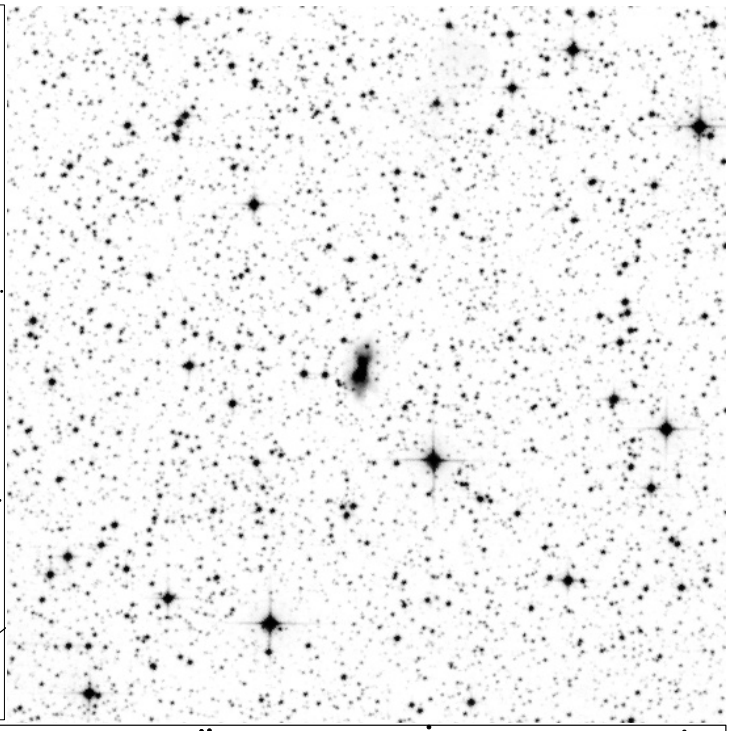
A supernova remnant was initially investigated by E.R. Seaquist and may be observable with a very large amateur telescope. See inset and Seaquist, E. R.; R. C.Bignell, "Radio emission from a possible supernova remnant in the galaxy NGC 4449," *Astrophysical Journal*, Volume 226, (Nov 1978): L5-L6. Also see Robert P. Kirshner and William P. Blair, "The extraordinary extragalactic supernova remnant in NGC 4449," *Astrophysical Journal*, Part 1, Volume 236 (Feb 1980): 135-142. There are more articles but these two give you a good base.

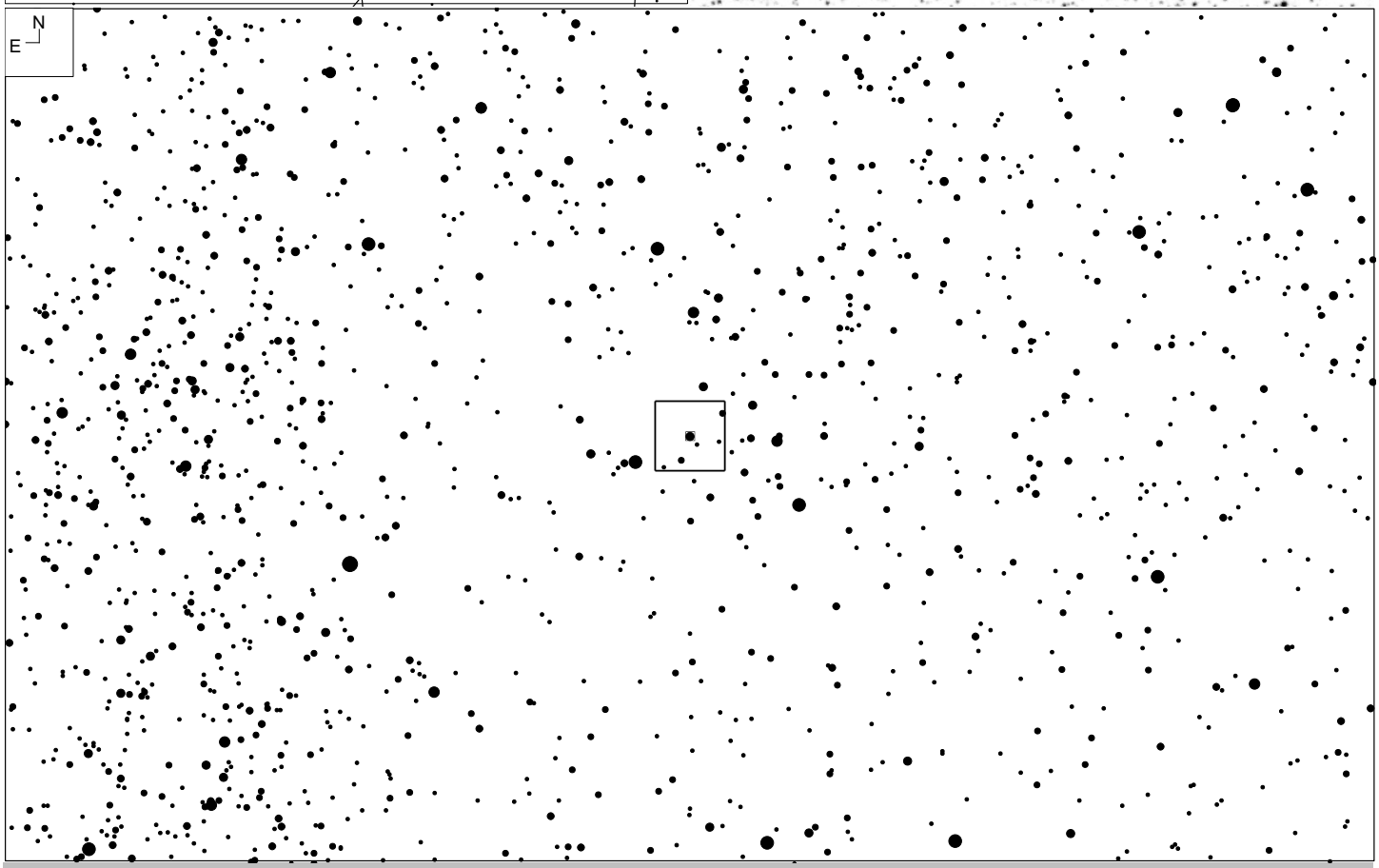
Numerous star clusters in the galaxy, see Andrea E. Gelatt, et al, "The Star Clusters in the Irregular Galaxy NGC 4449," *The Publications of the Astronomical Society of the Pacific*, Volume 113, Issue 780 (Feb 2001): 142-153

A faint tidal steam to the southwest of NGC 4449, see David Martínez-Delgado, et al, "Dwarfs Gobbling Dwarfs: A Stellar Tidal Stream around NGC 4449 and Hierarchical Galaxy Formation on Small Scales," *The Astrophysical Journal Letters*, Volume 748, Issue 2, Article ID L24 (Apr 2012)

# Boomerang Nebula (Centaurus)

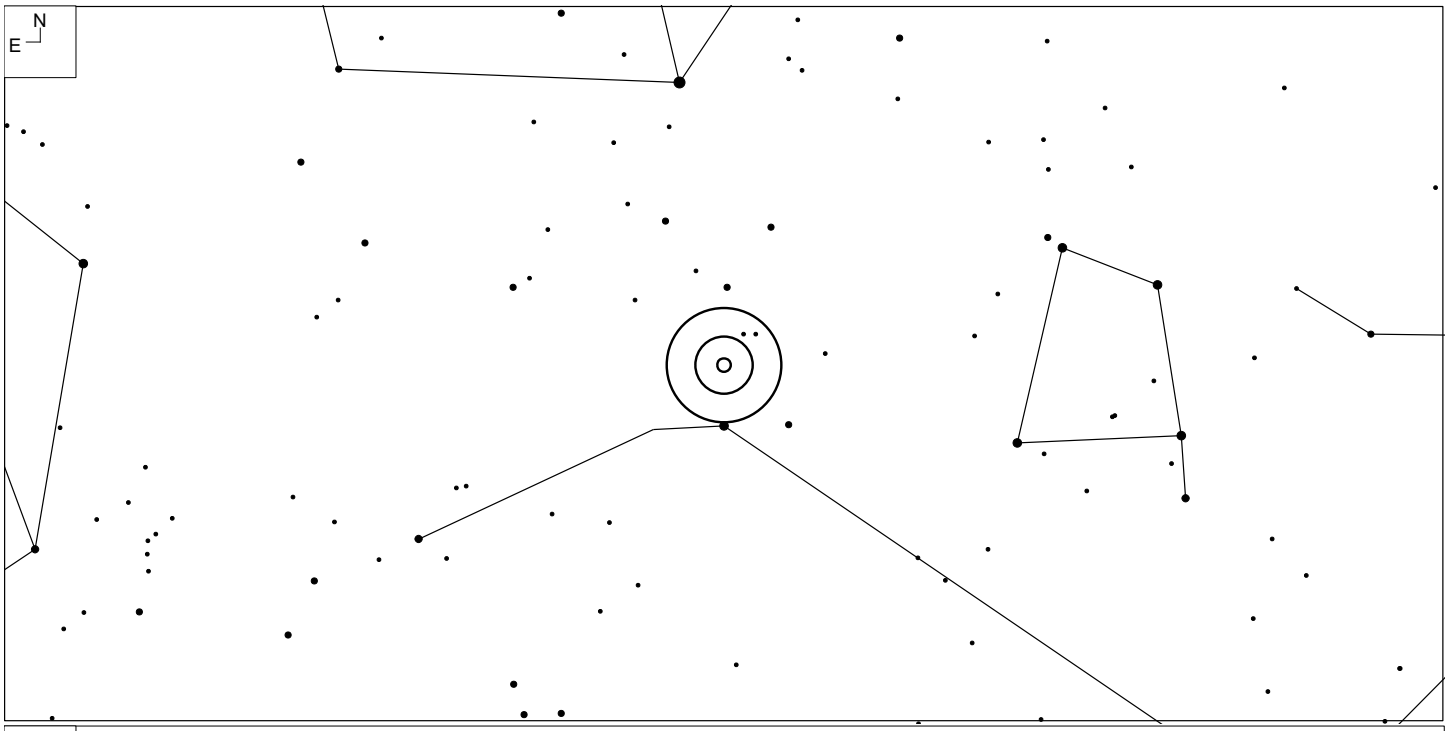


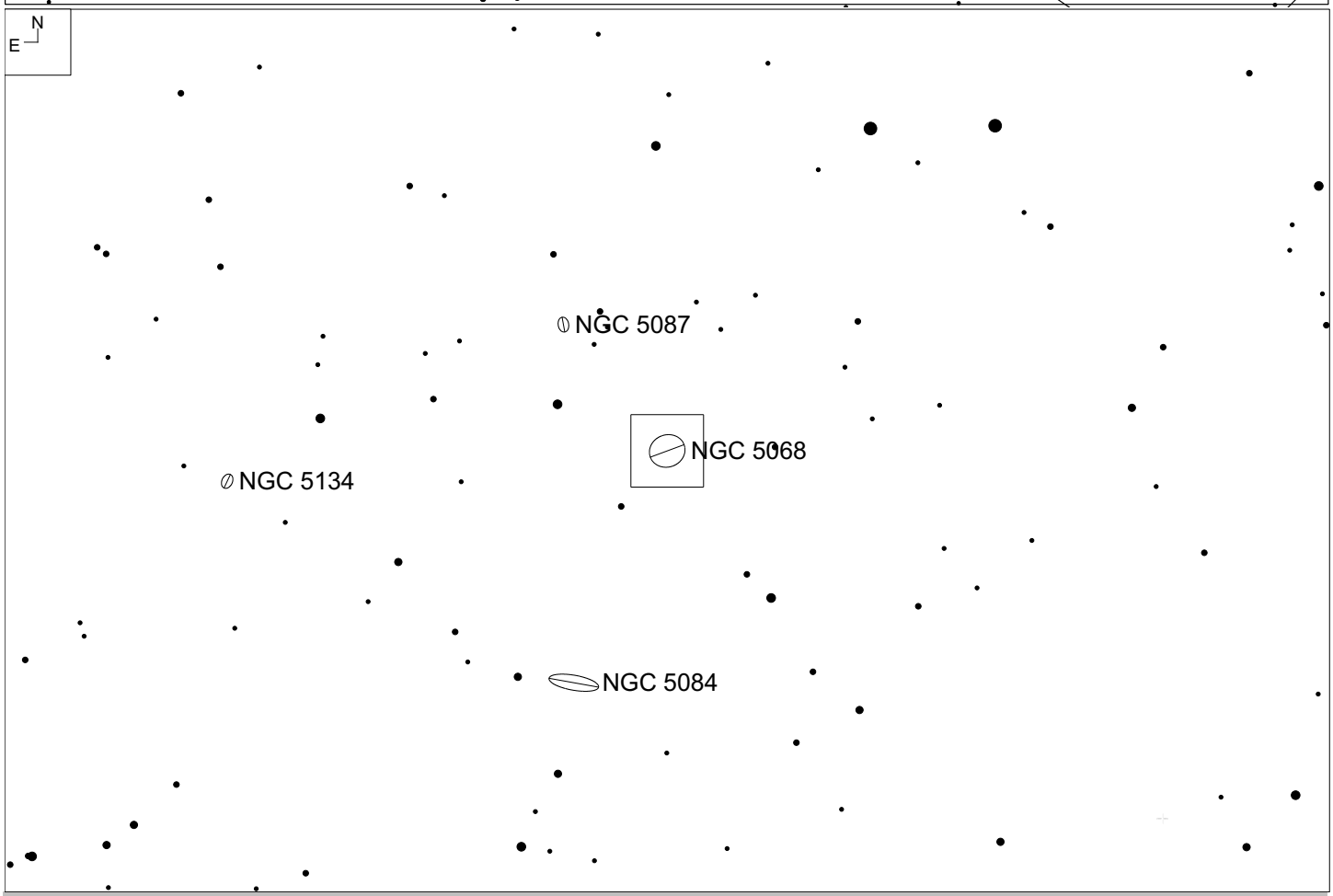





| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 12 44 46.1 | -54 31 10 | 1.4 x 0.6’ | 198L | 103 |

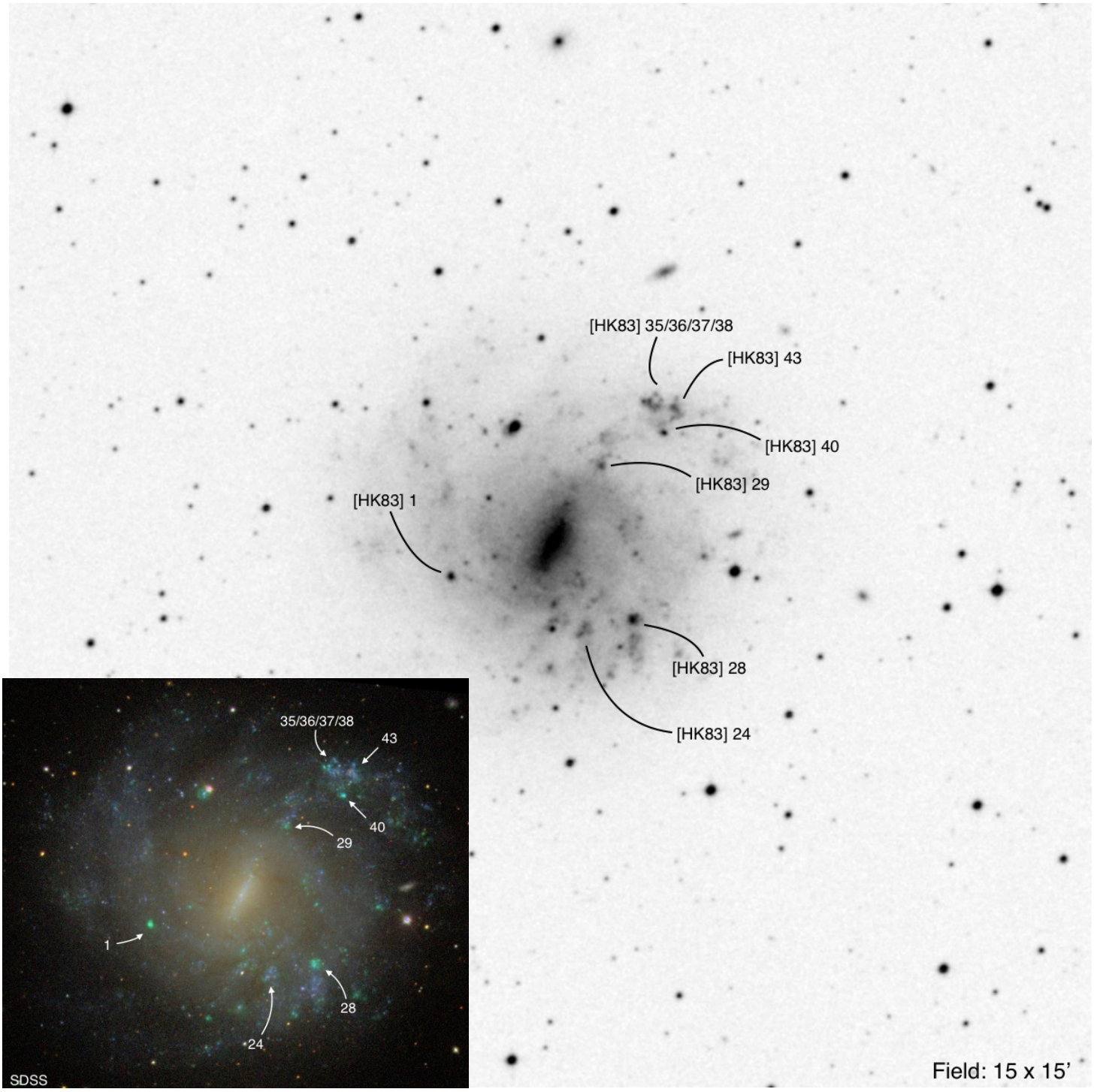
# NGC 5068 (Virgo)



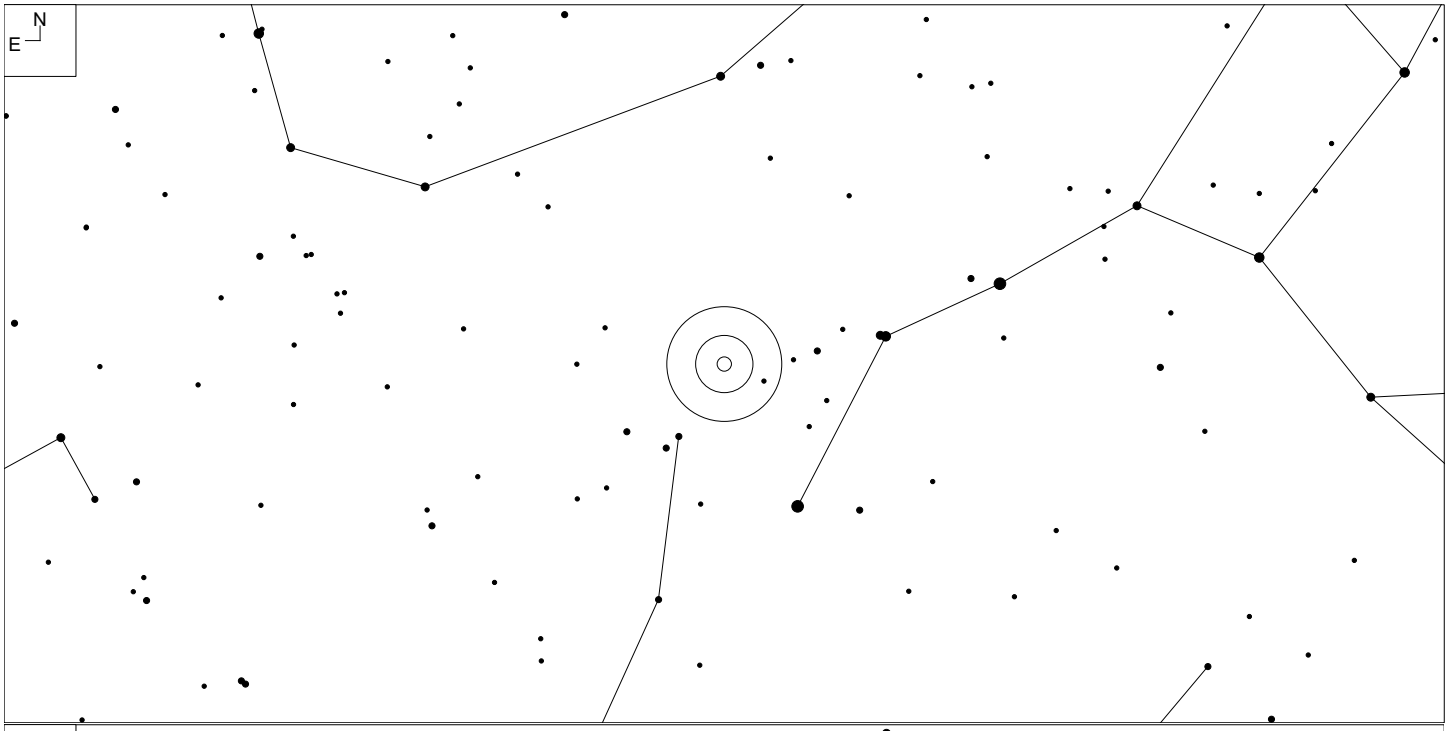

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 13 18 54.7 | -21 02 21 | 7.3 x 6.5’ | 149R | 69 |

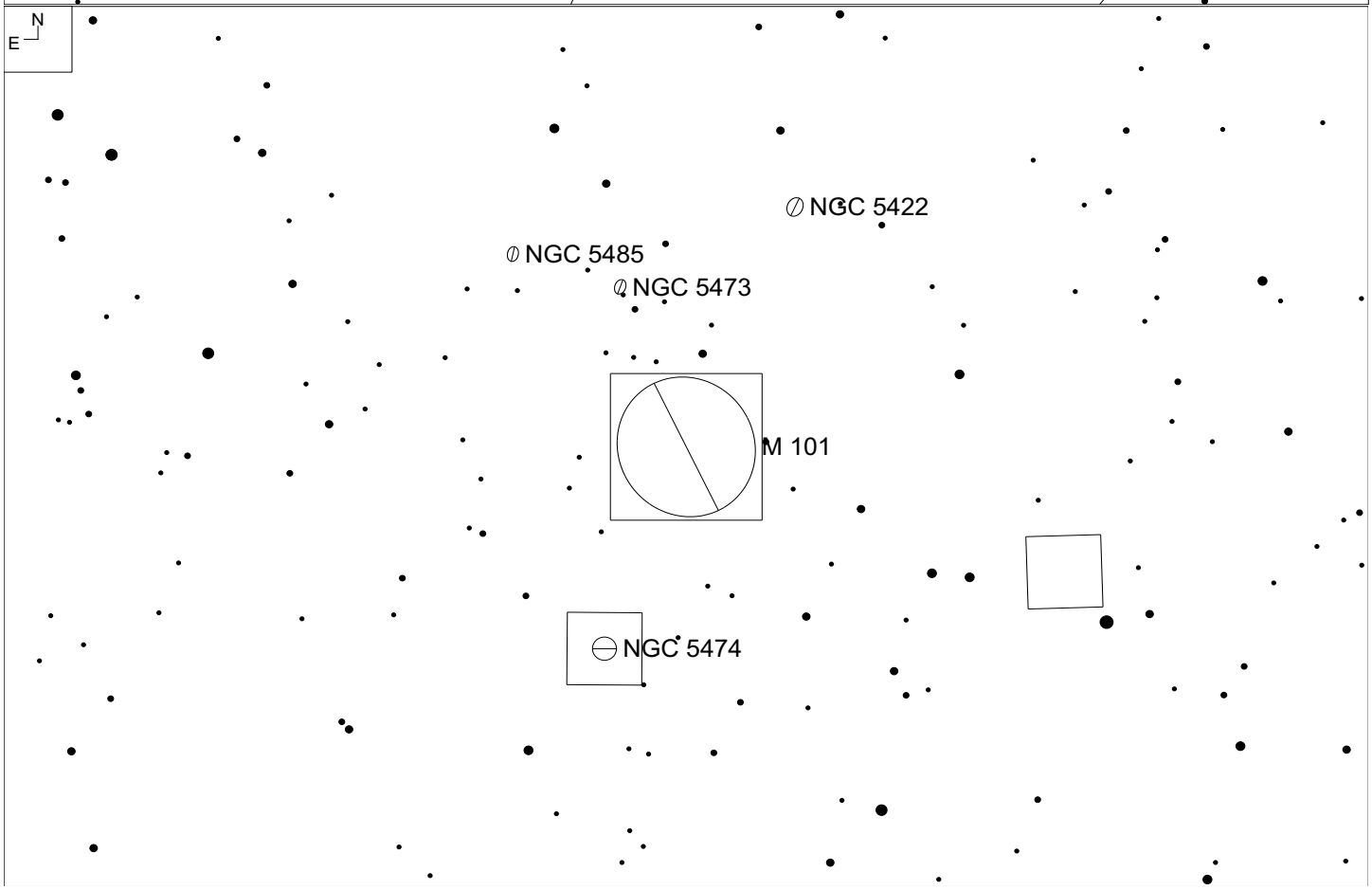
# NGC 5068 (Virgo)




NGC 5068 is a type SB(s)d galaxy that sits 20 mly away and 45 kly across. It appears a majority of the H II regions are on one side of the galaxy.

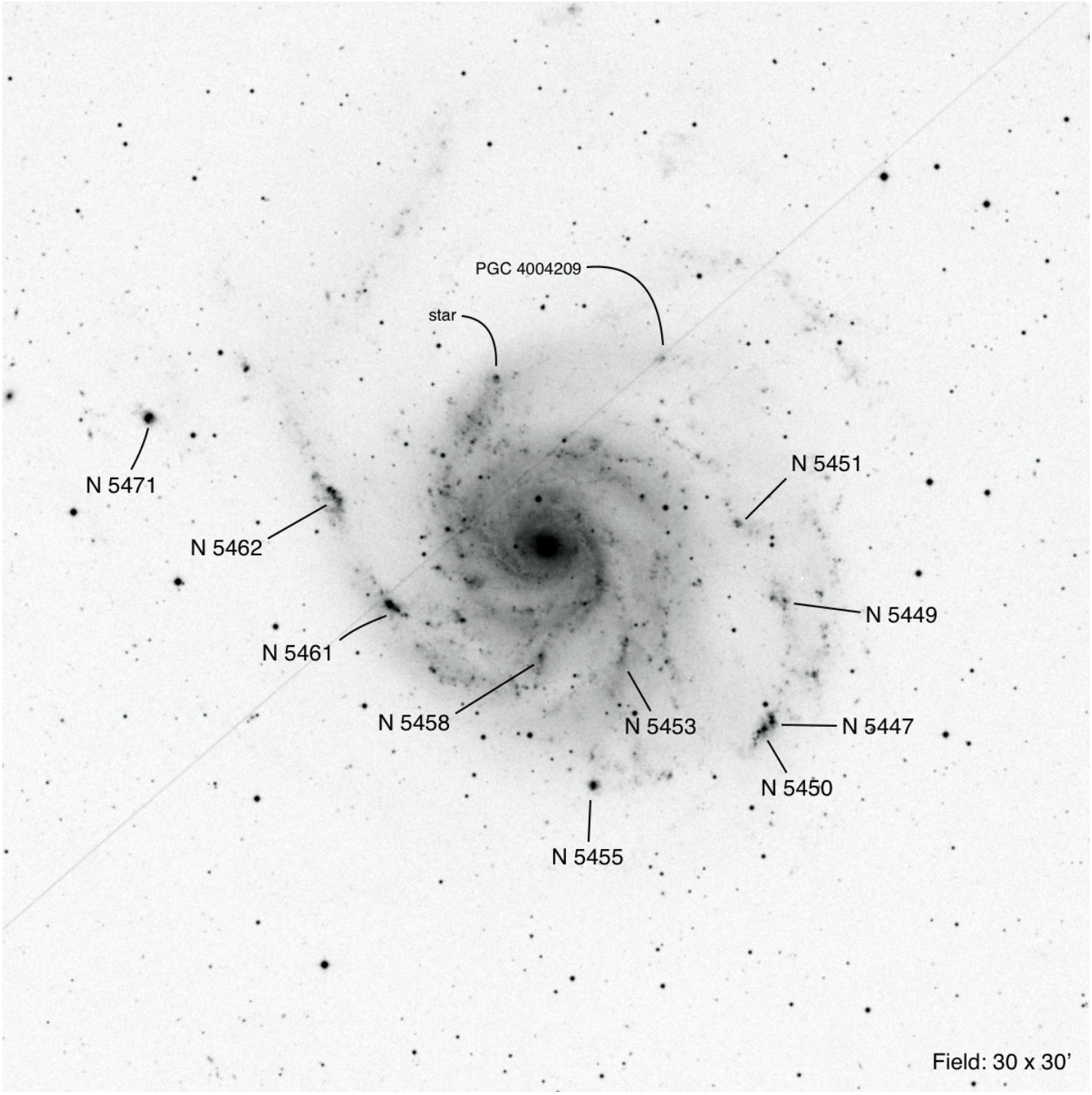
# NGC 5457, M 101 (Ursa Major)



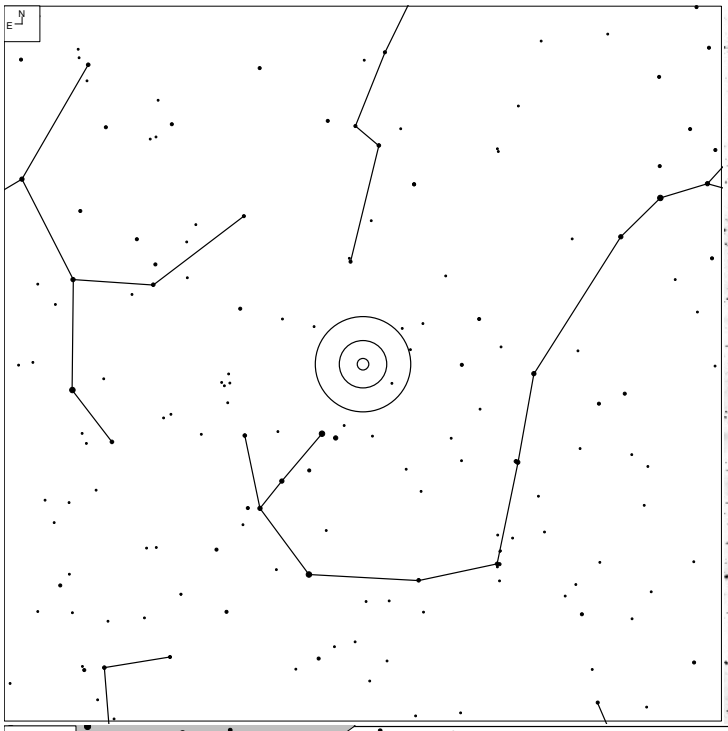



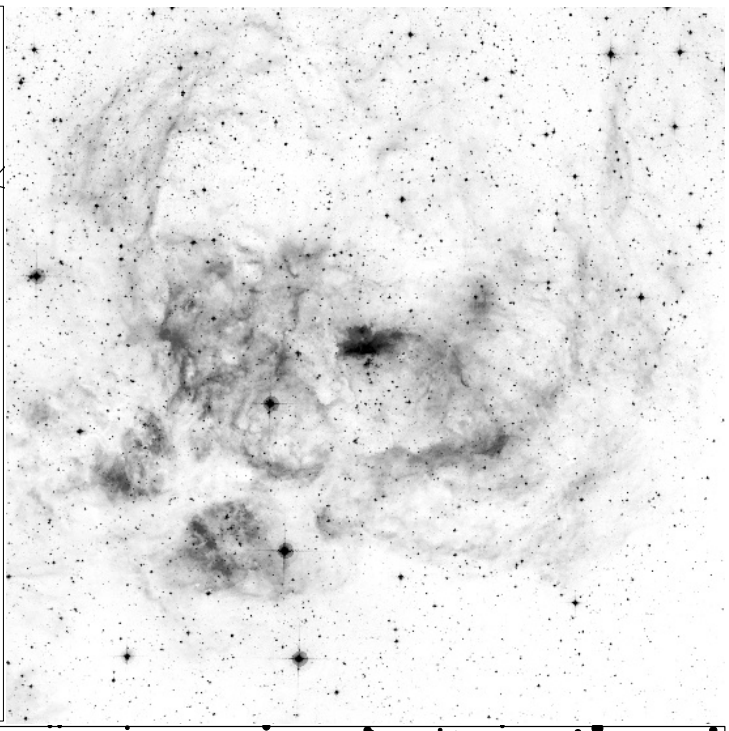

| Object | RA | Dec | Mag | Size | iSDA |
|---|---|---|---|---|---|
| NGC 5457 (M 101) | 14 03 12.6 | +54 20 56 | 7.9v | 28.9 x 26.9' | 11 |

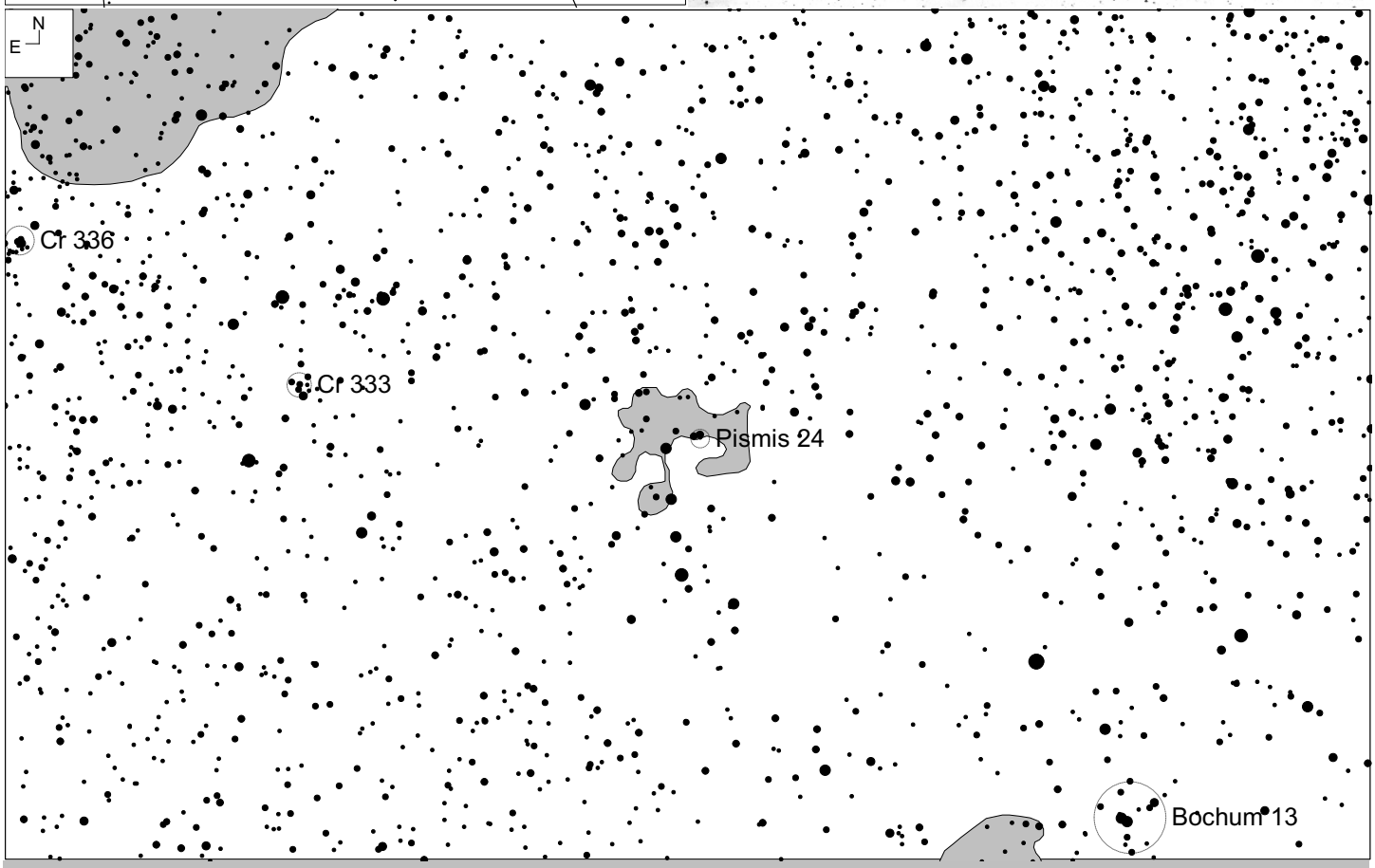
# NGC 5457, M 101 (Ursa Major)



# NGC 6357 (Scorpius)

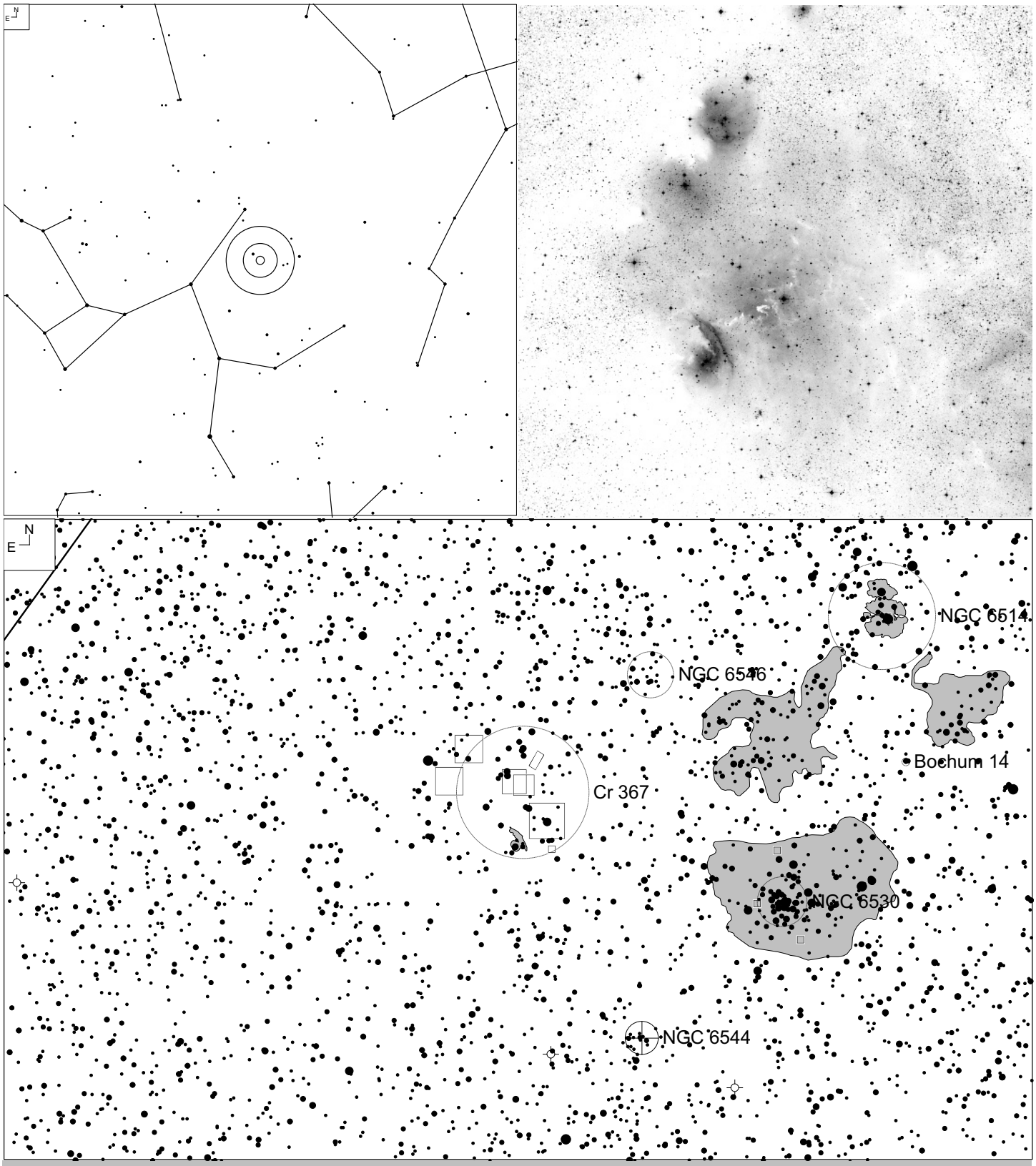






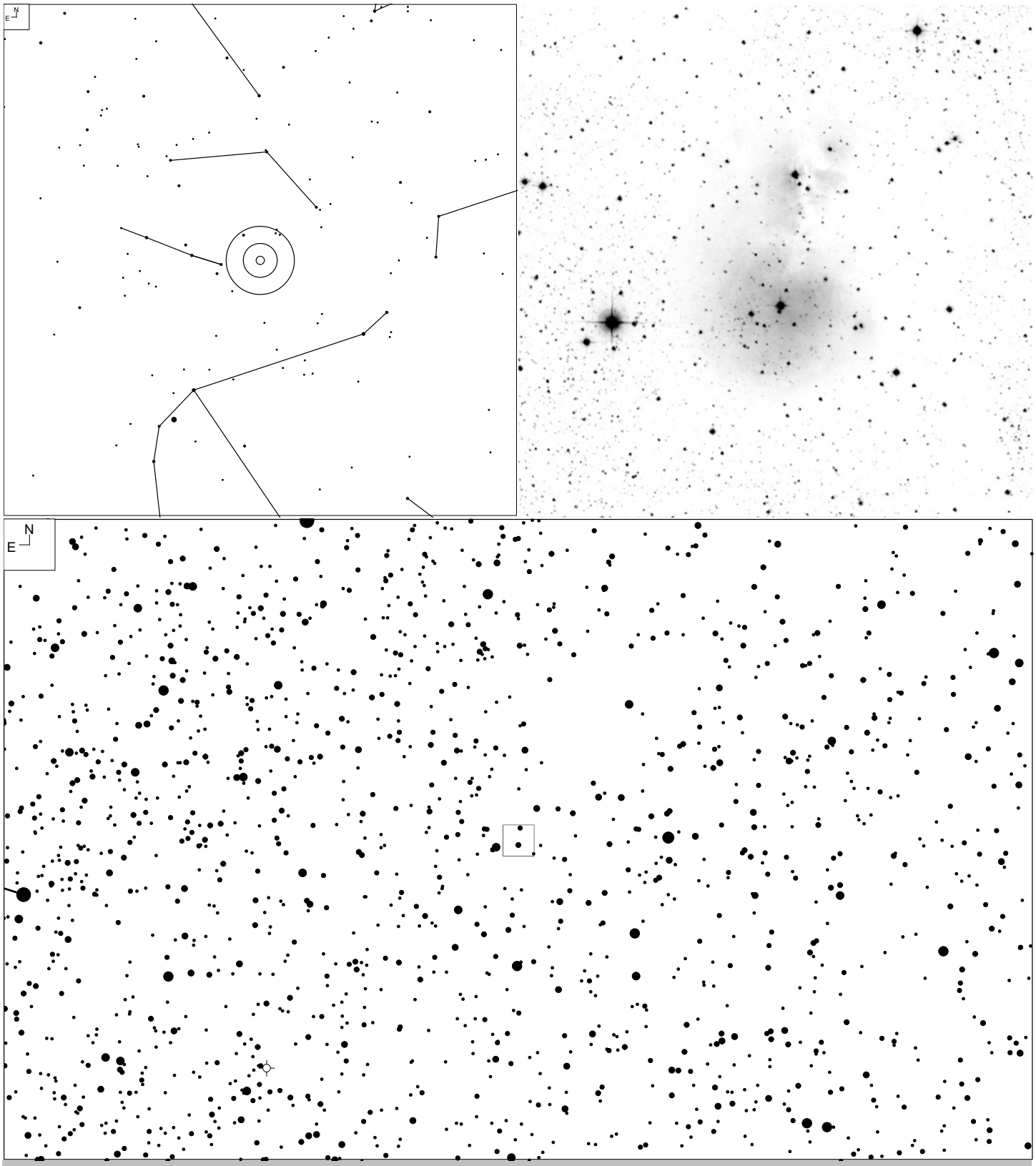

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Sh 2-5 | 17 24 56.0 | -34 11 25 | 31.0 x 30.0’ | 164L | 79 |

# NGC 6559 (Sagitarius)



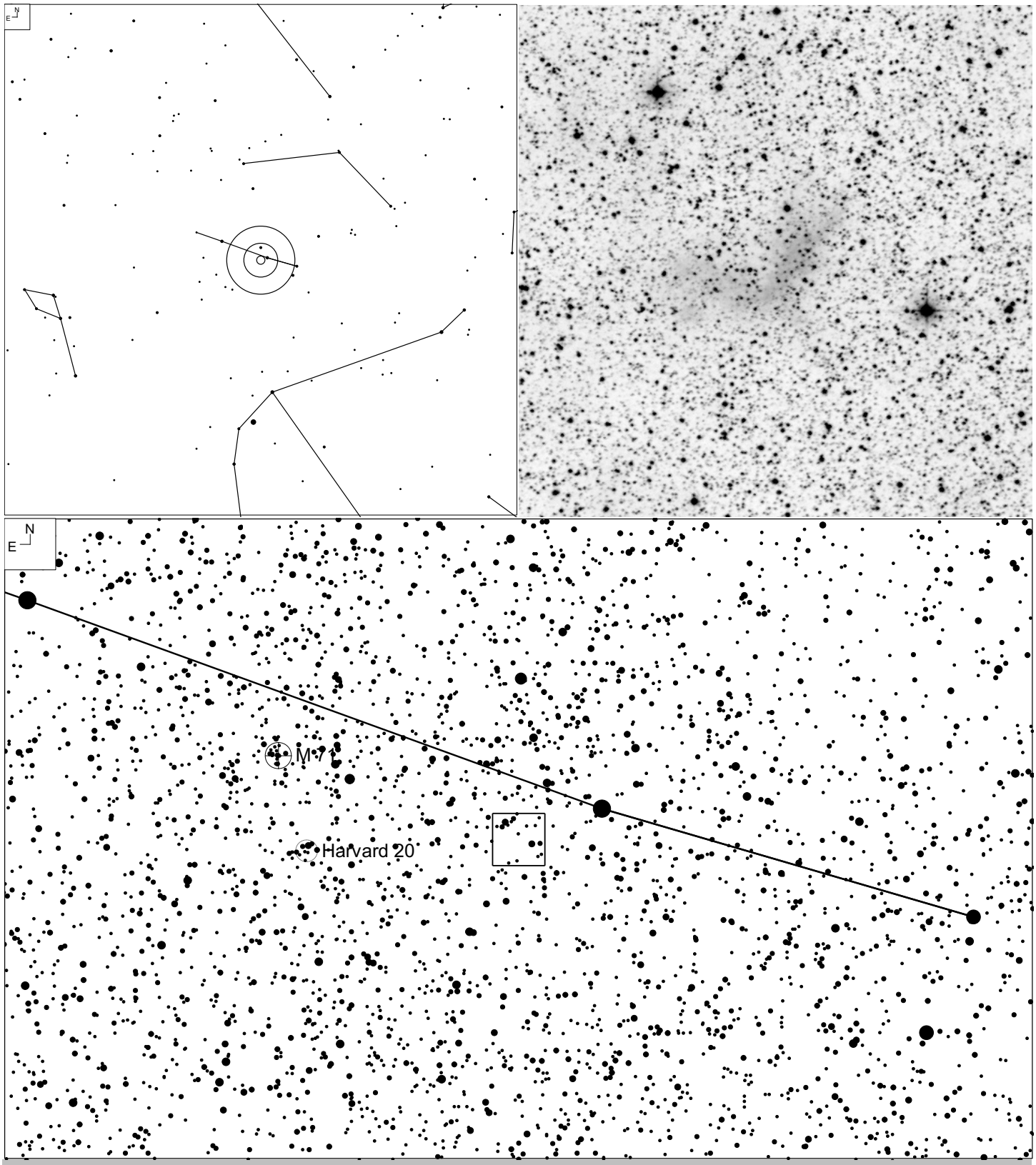

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 18 09 53.0 | -24 04 30 | 8.3 x 4.2’ | 145R | 78 |

# Sharpless 2-82 (Sagitta)



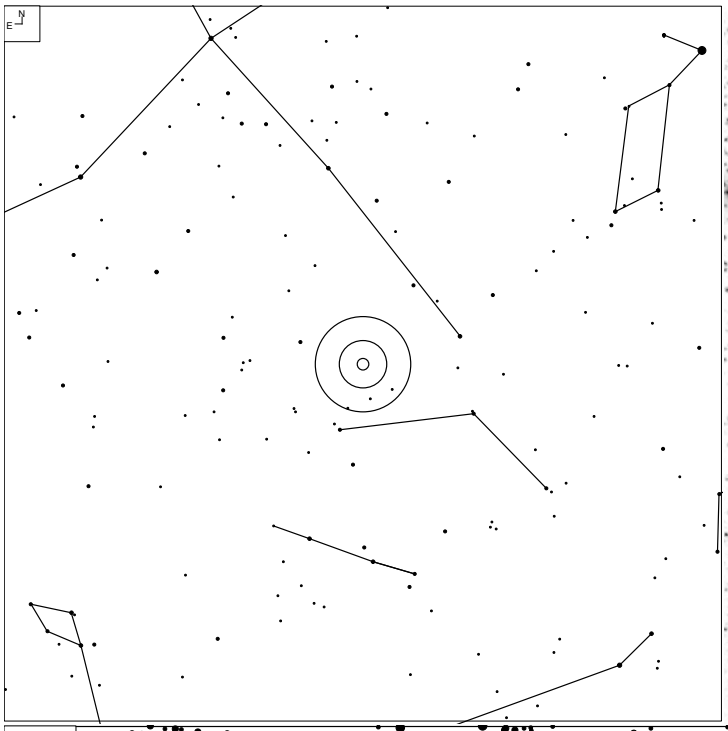

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LBN 129 | 19 30 23.3 | +18 17 02 | 9.0’ | 66R | 42 |

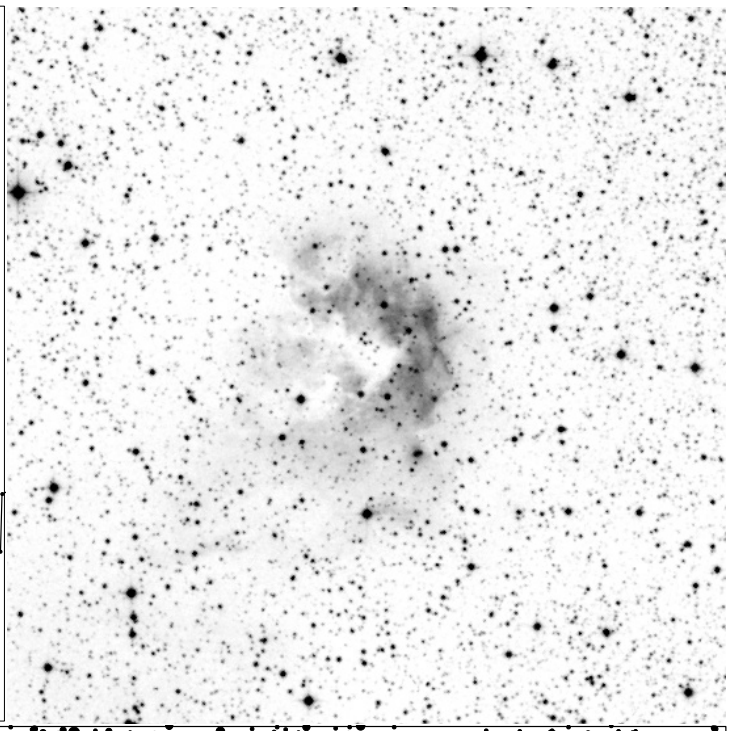
# Sharpless 2-84 (Sagitta)

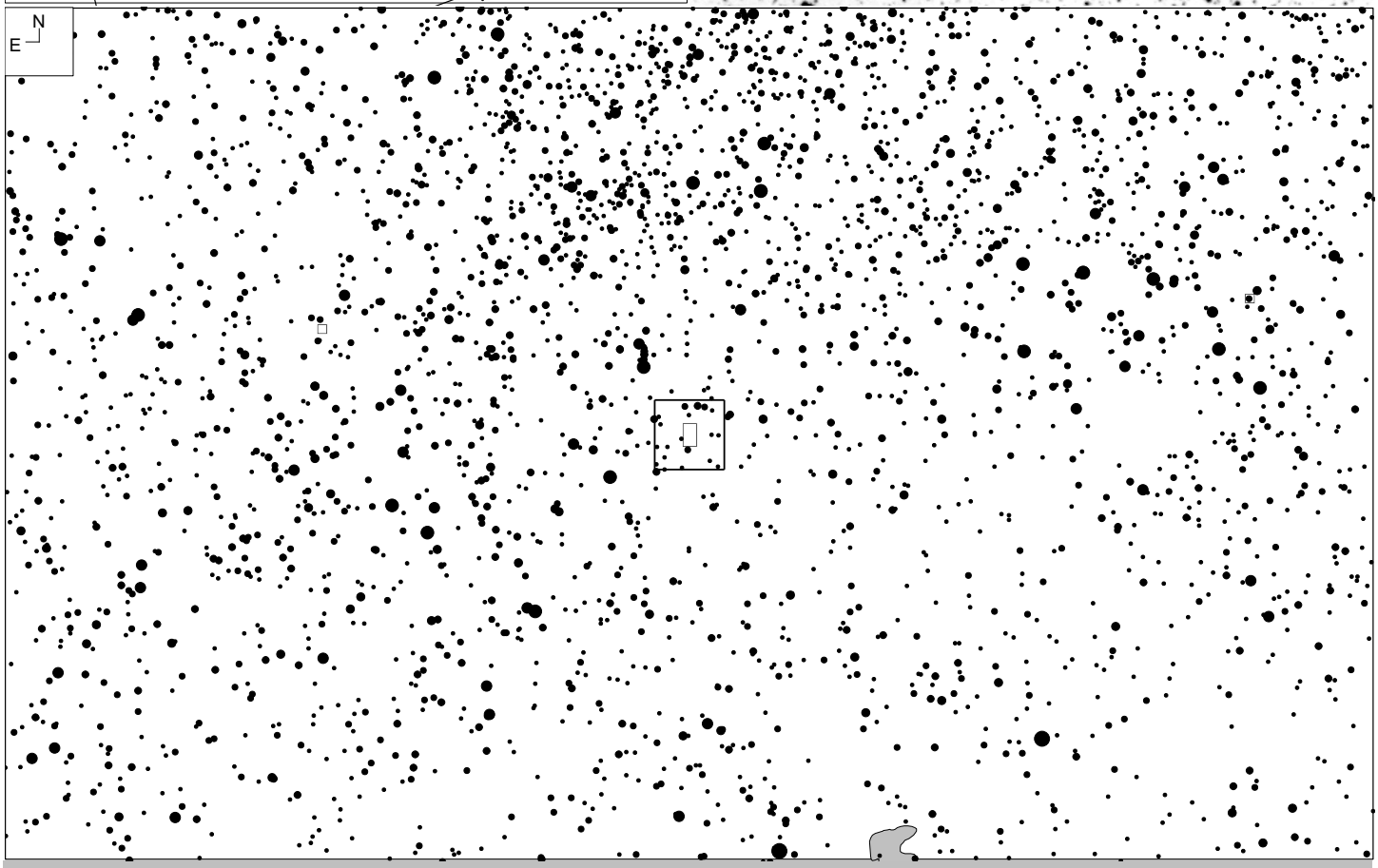



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Small California Nebula | 19 49 01.6 | +18 23 22 | 6.7 x 2.9’ | 66R | 42 |

# Sharpless 2-90 (Vulpecula)

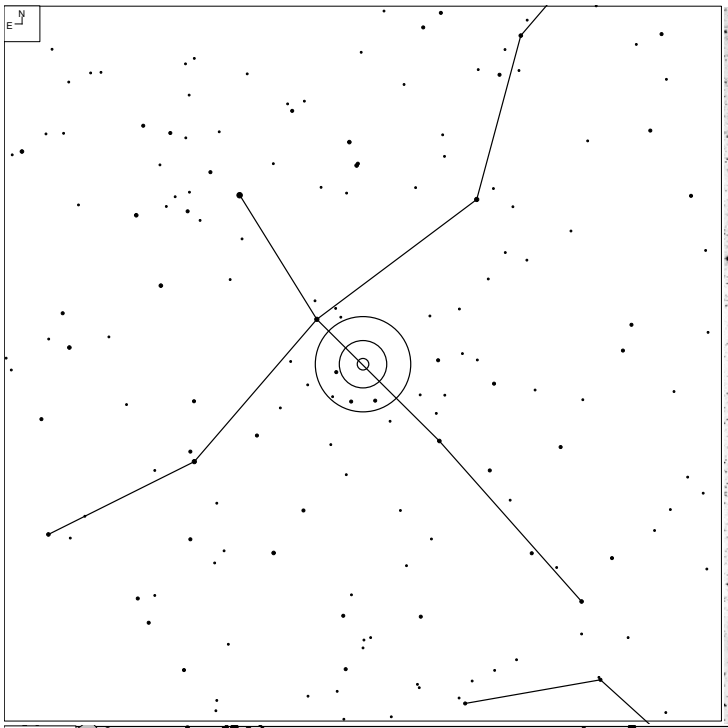


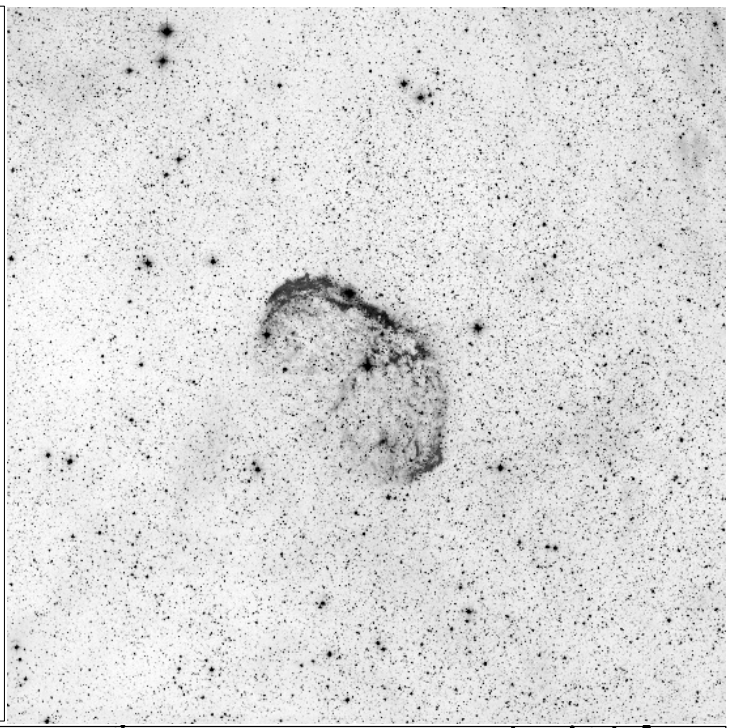


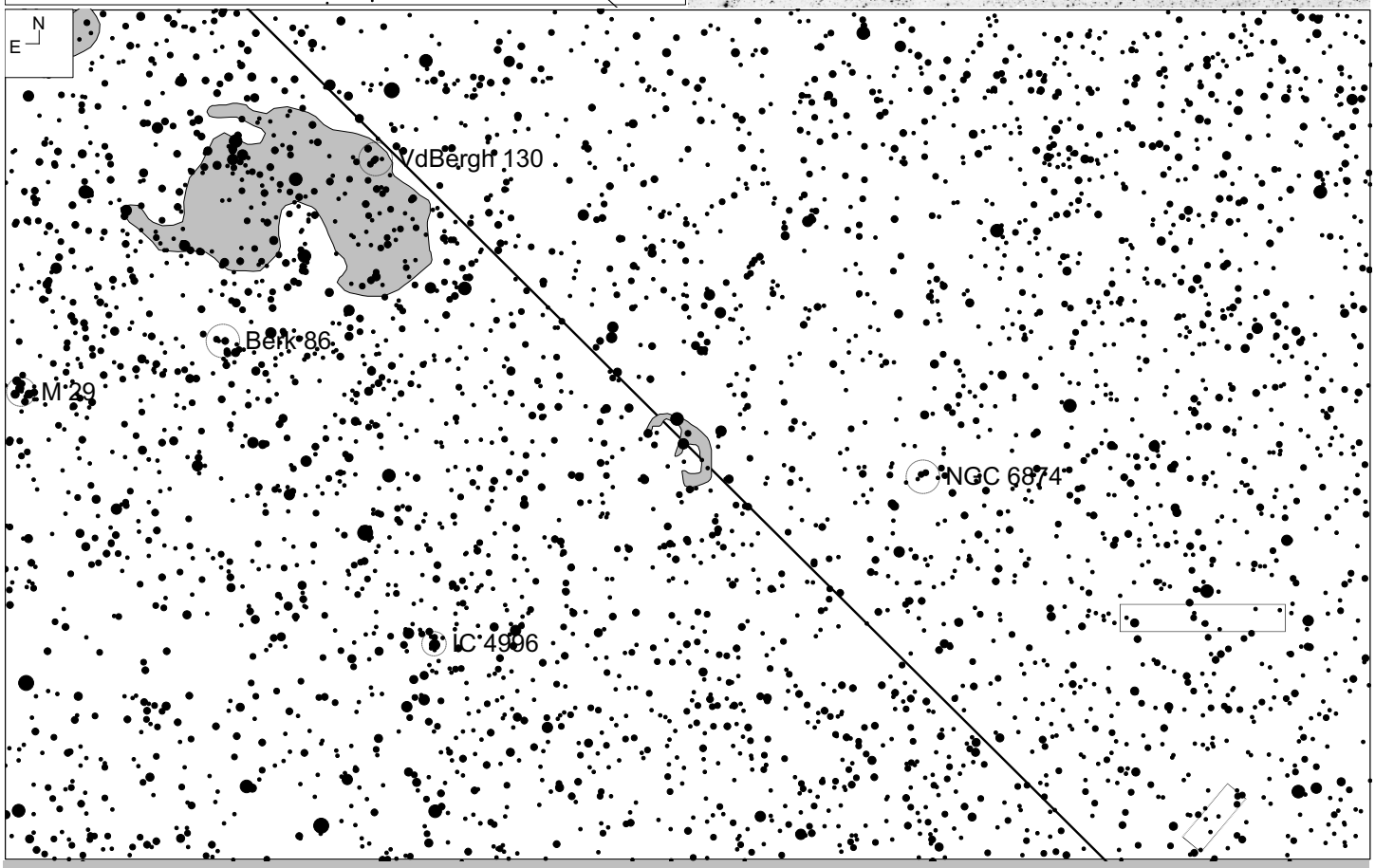



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LBN 144 | 19 49 12.4 | +26 50 49 | 5.0 x 3.0’ | 66R | 30 |

# NGC 6888 (Cygnus)

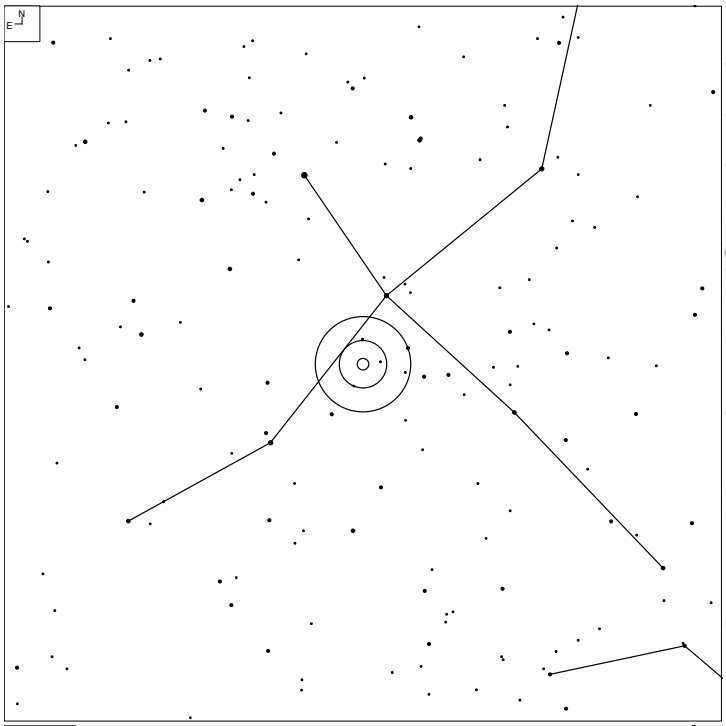


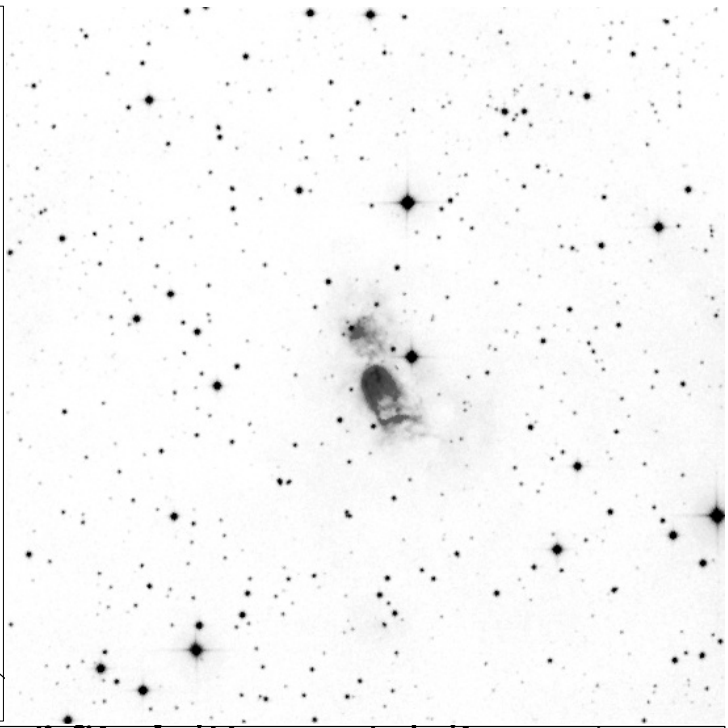


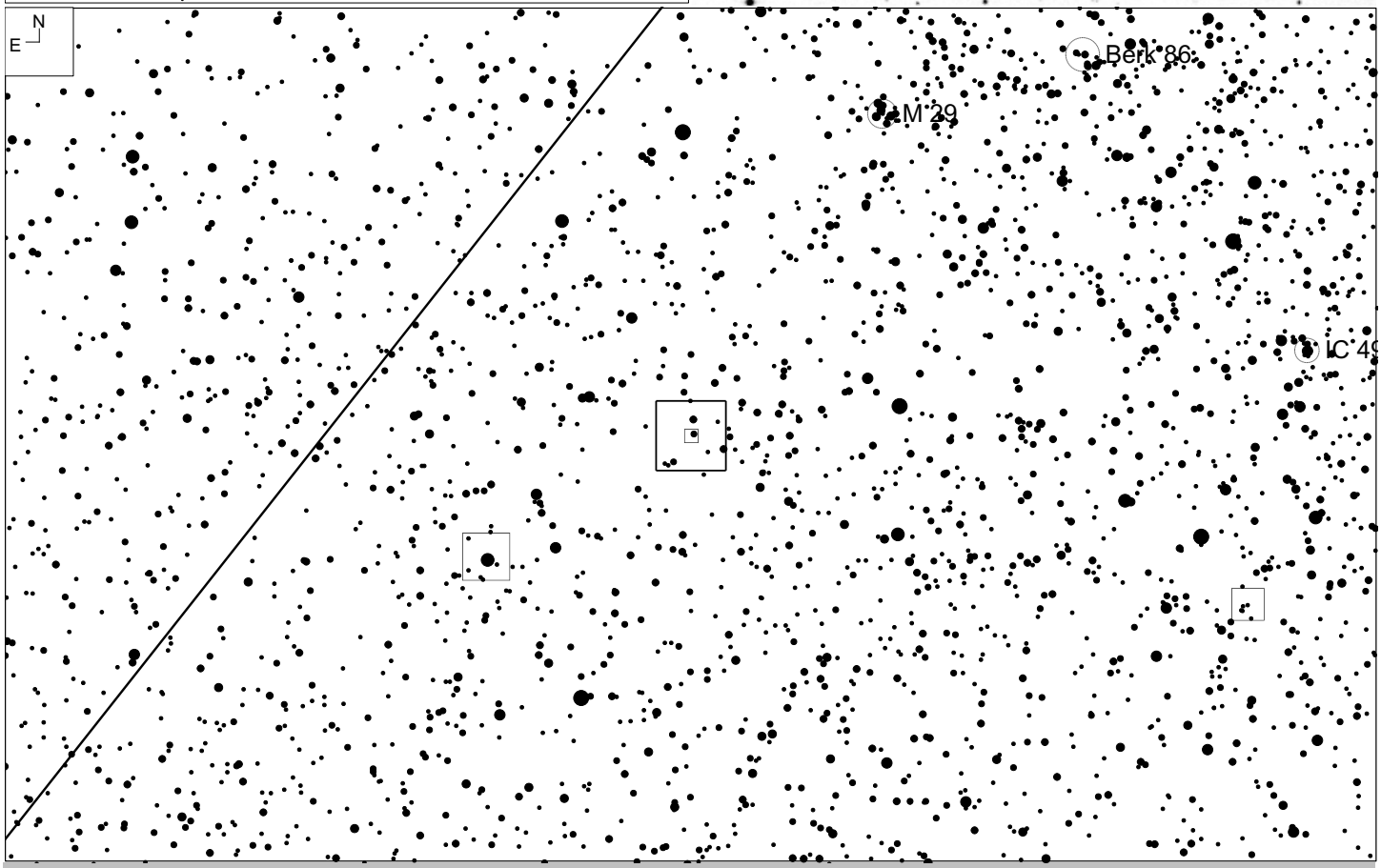



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Crescent Nebula | 20 12 01.0 | + 38 23 00 | 18.0 x 8.0’ | 48L | 17 |

# Sharpless 2-106 (Cygnus)

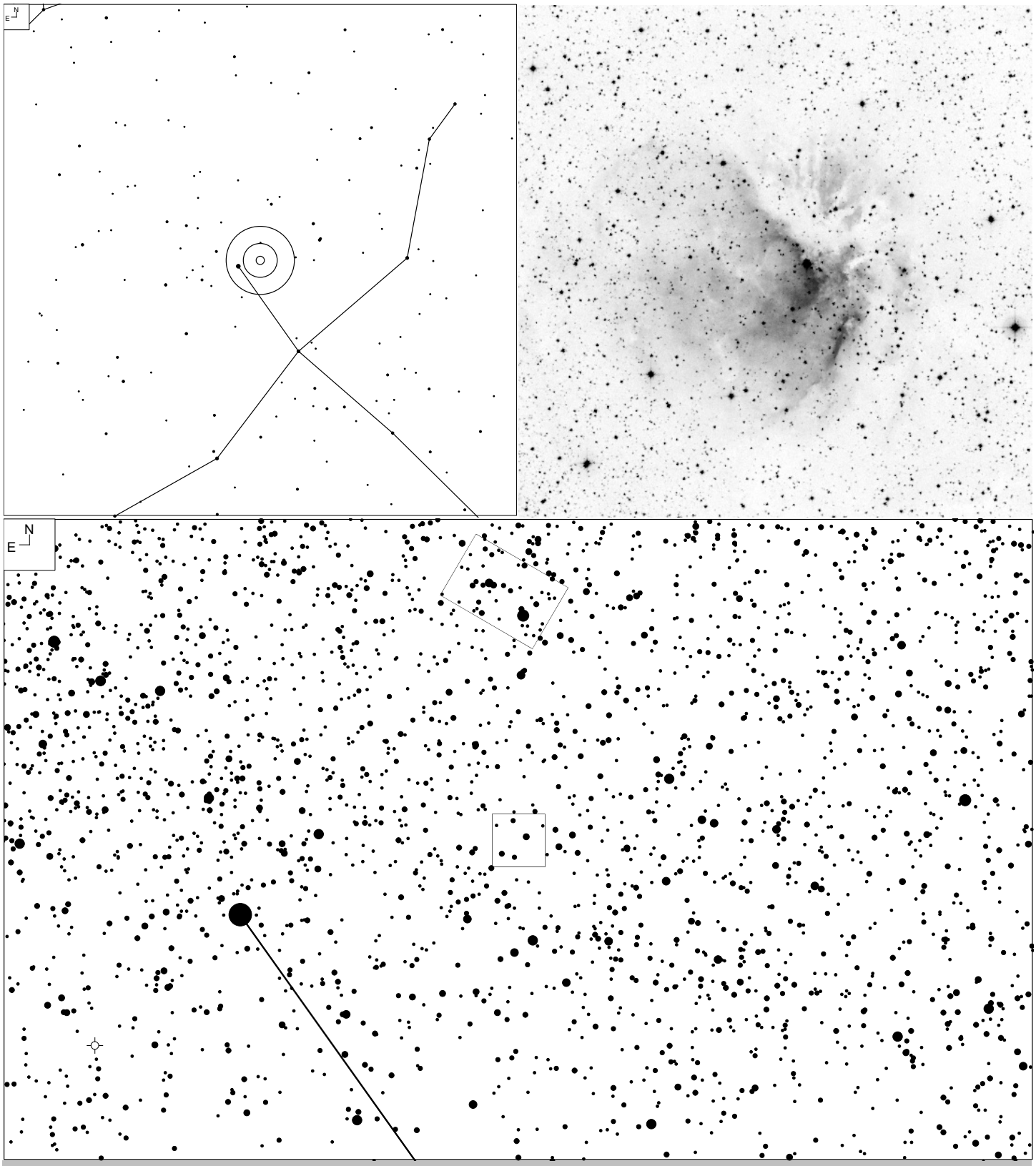






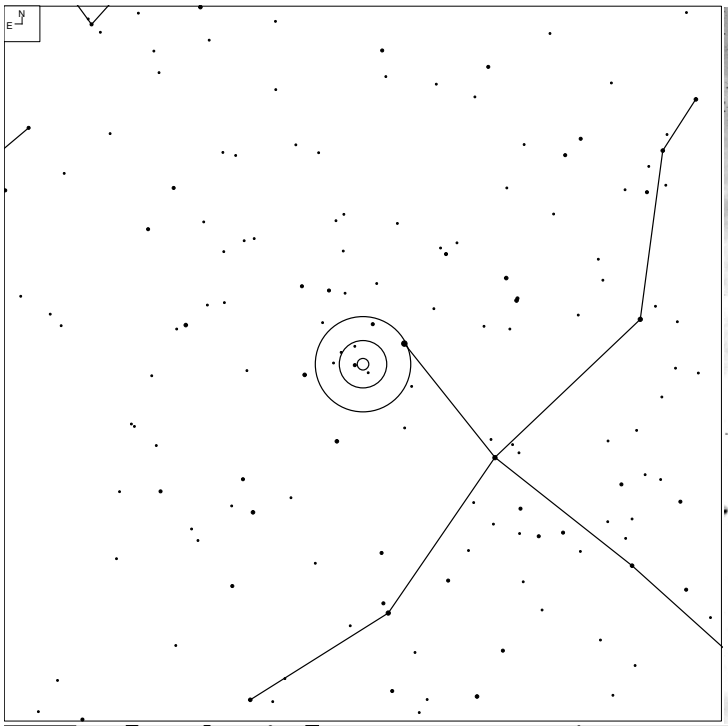

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 20 27 25.5 | + 37 22 32 | 3.0’ | 48L | 29 |

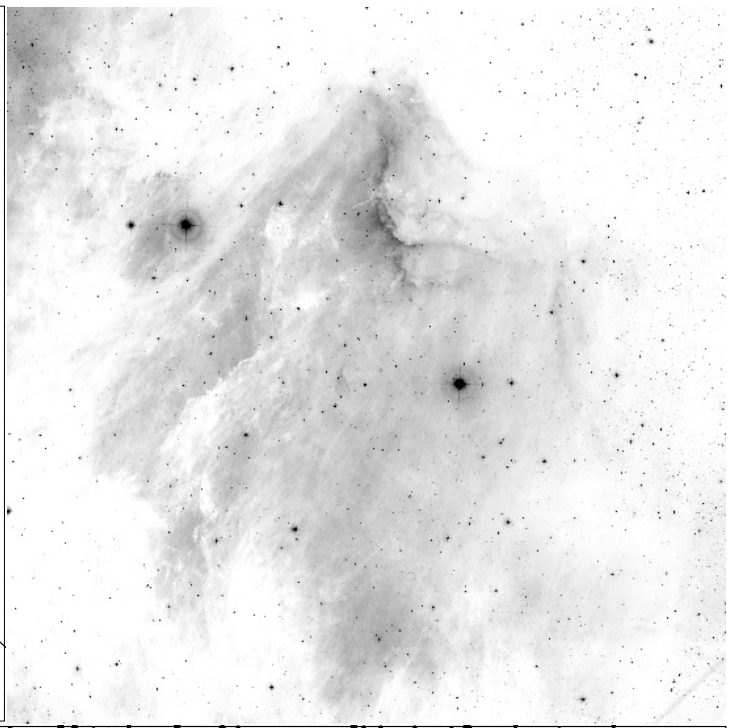
# Sharpless 2-112 (Cygnus)

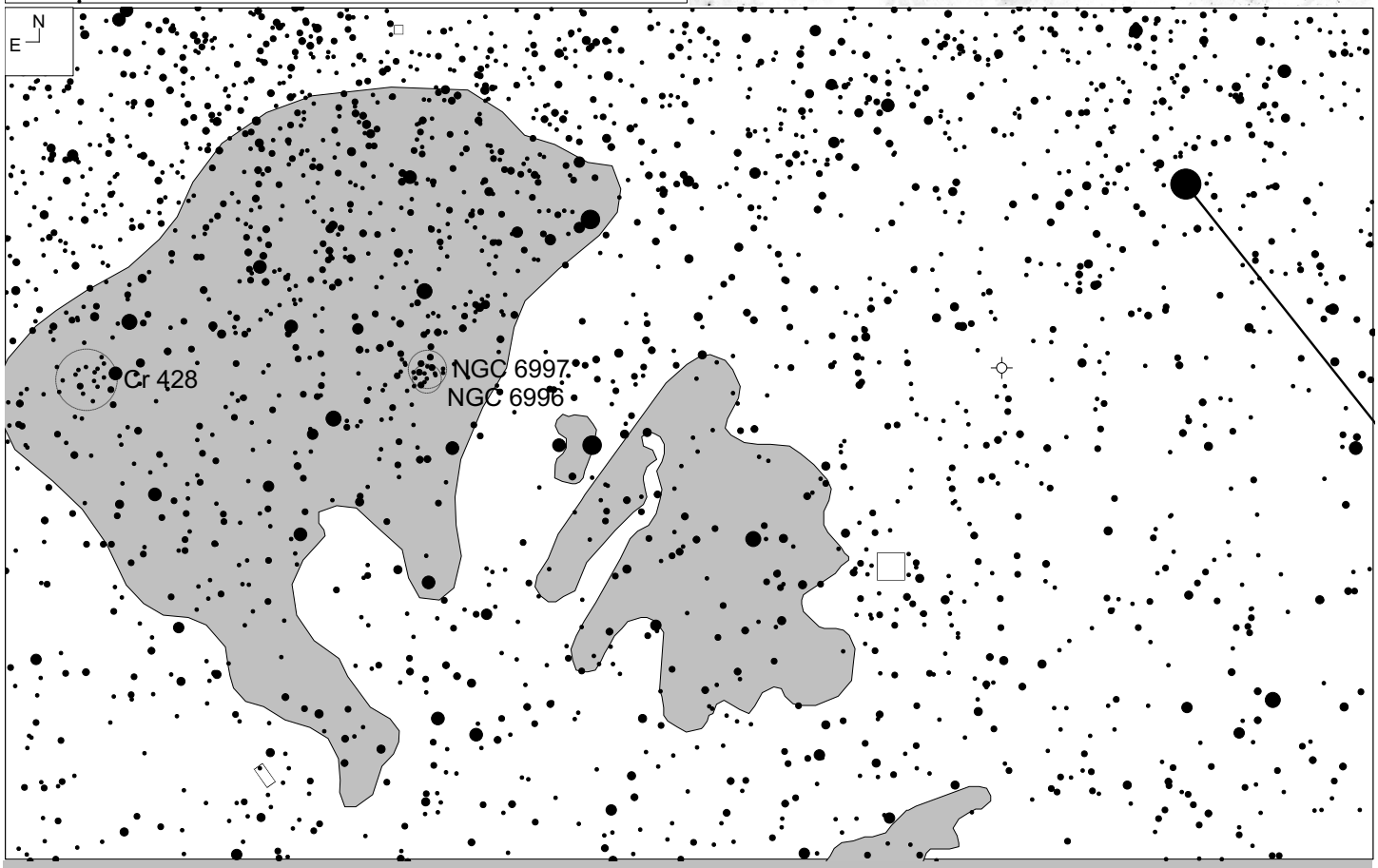



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 20 34 03.0 | +45 38 42 | 15.0’ | 32R | 17 |

# Herbig Haro 555 (Cygnus)

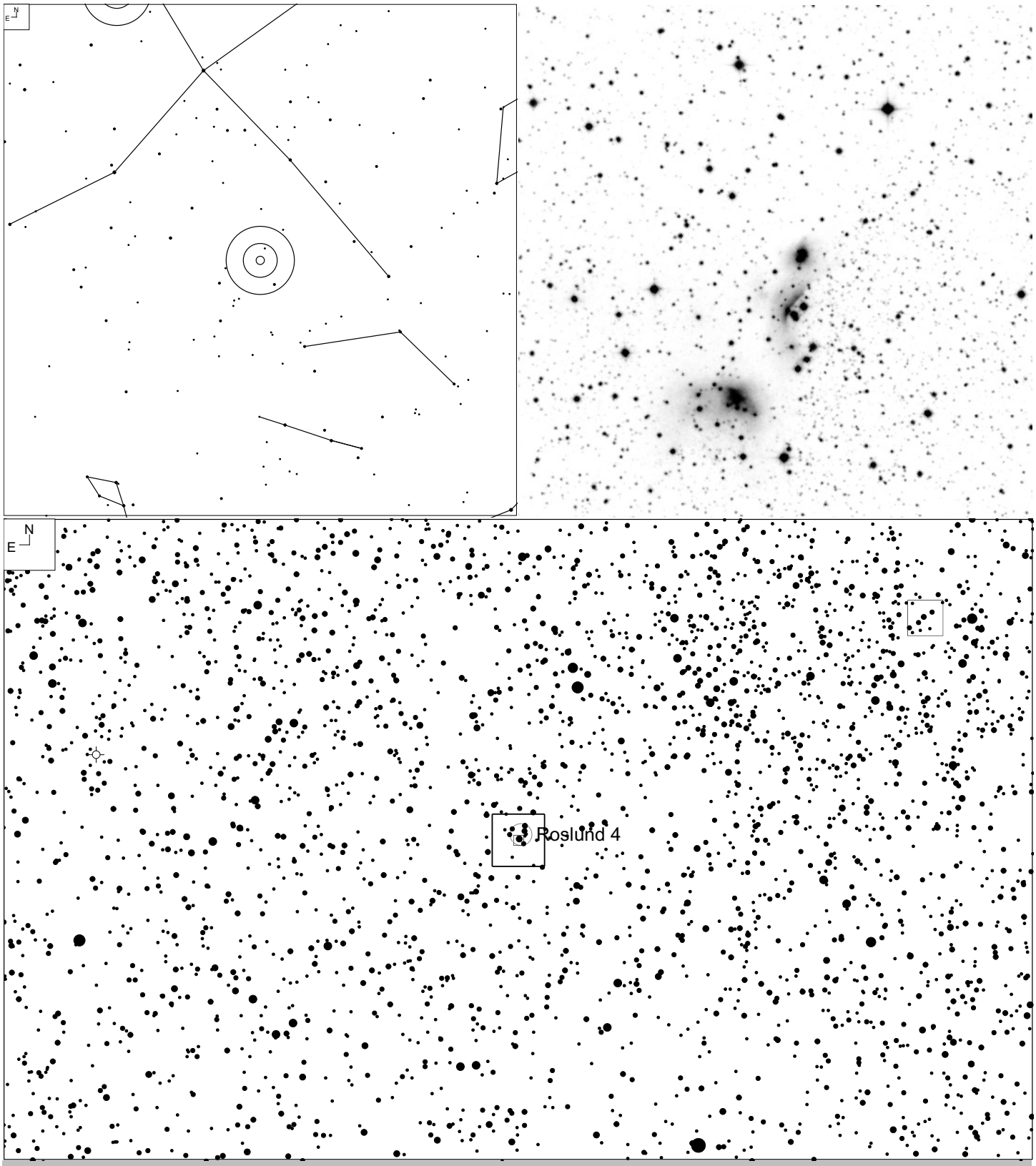






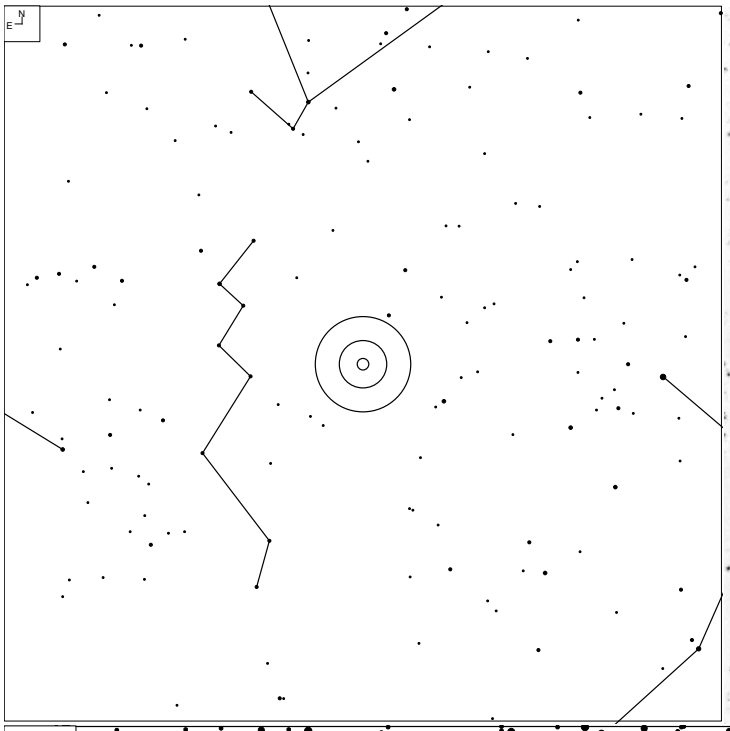

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| In the Pelican Nebula | 20 51 19.5 | +44 25 36 | 4.0 x 1.0’ | 32L | 17 |

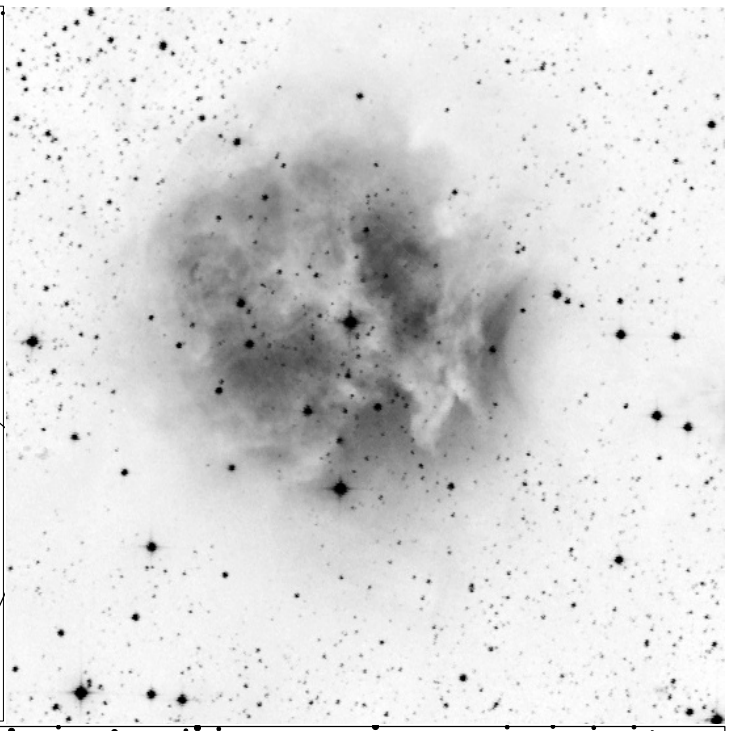
# IC 4954 (Vulpecula)

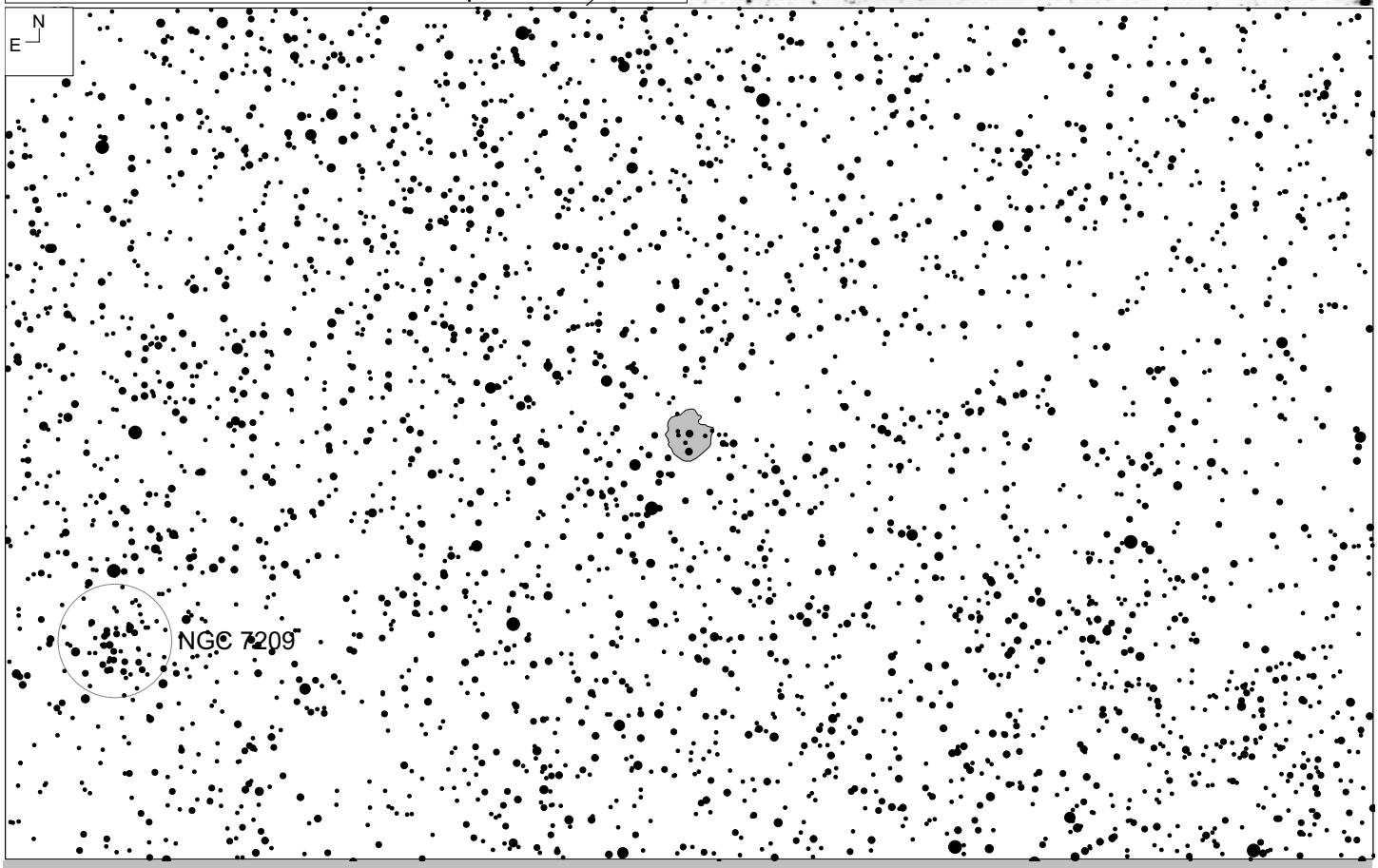



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LBN 153 | 20 04 54.0 | +29 11 00 | 3’ | | 29 |

# IC 5146 (Cygnus)

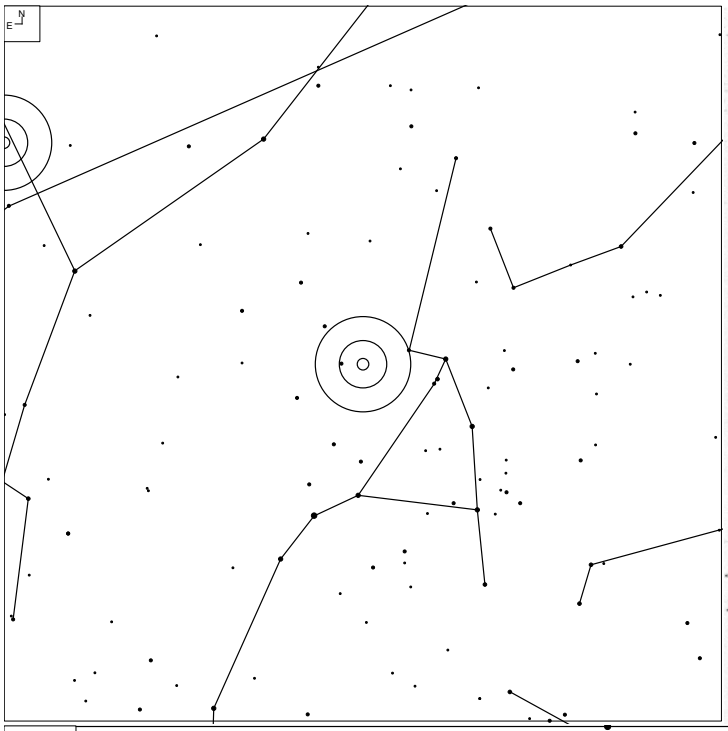


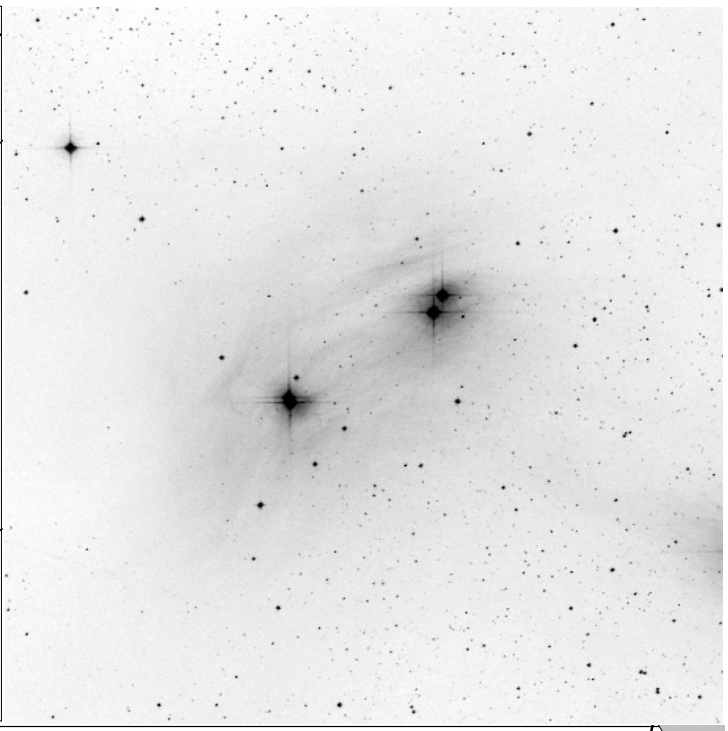


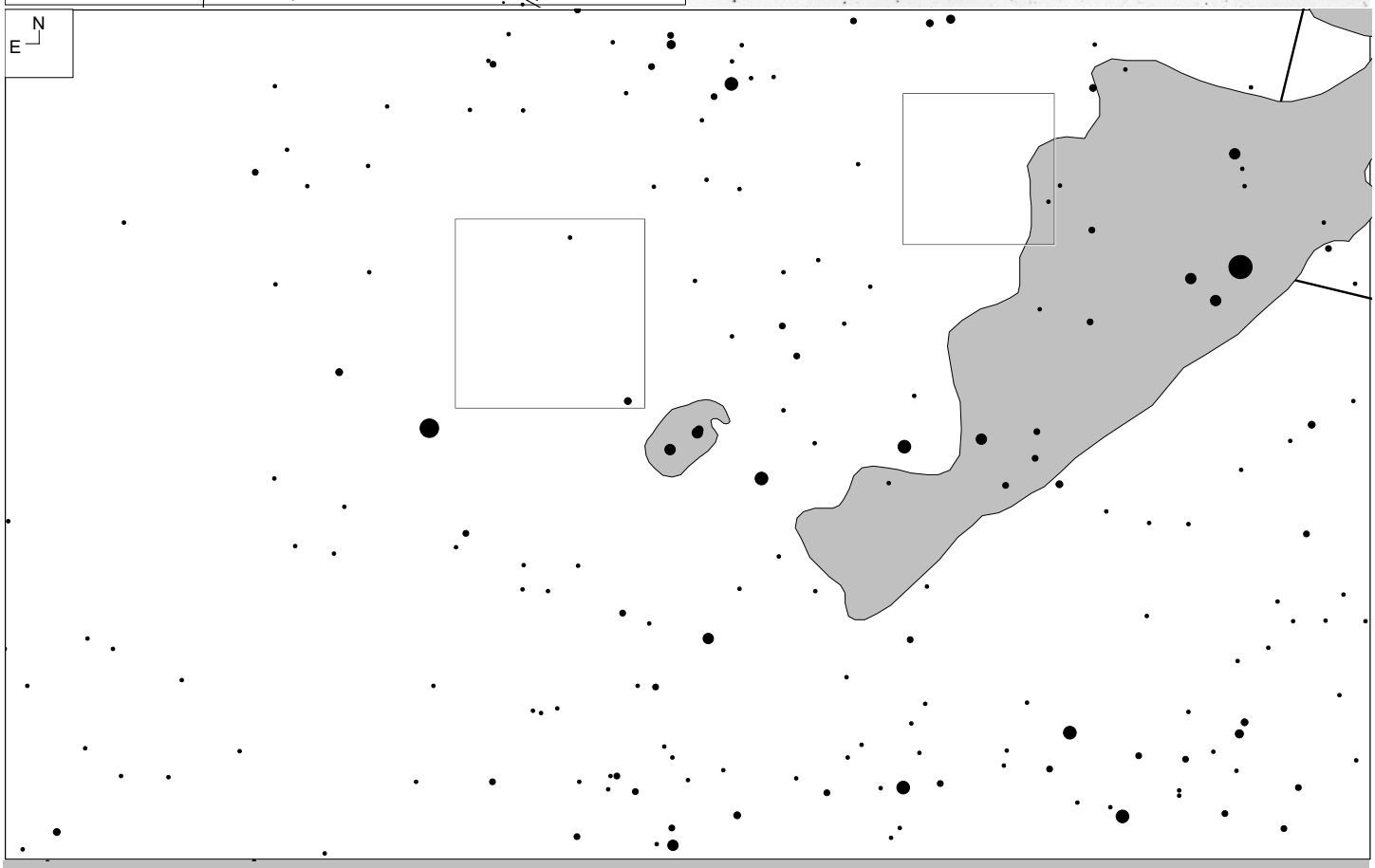



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Cocoon Nebula | 21 53 29.0 | +47 15 41 | 11.0 x 10.0’ | 31R | 17 |

# IC 4601 (Scorpius)

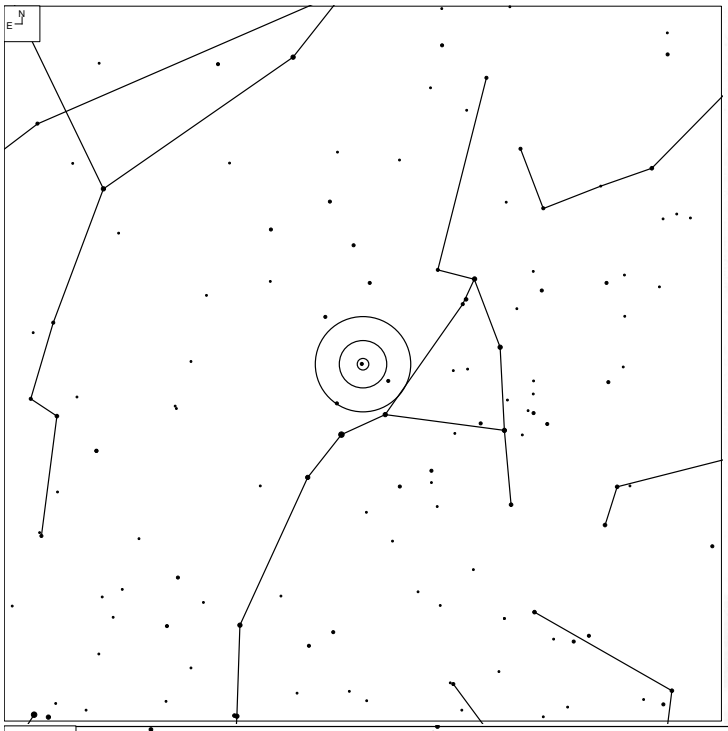


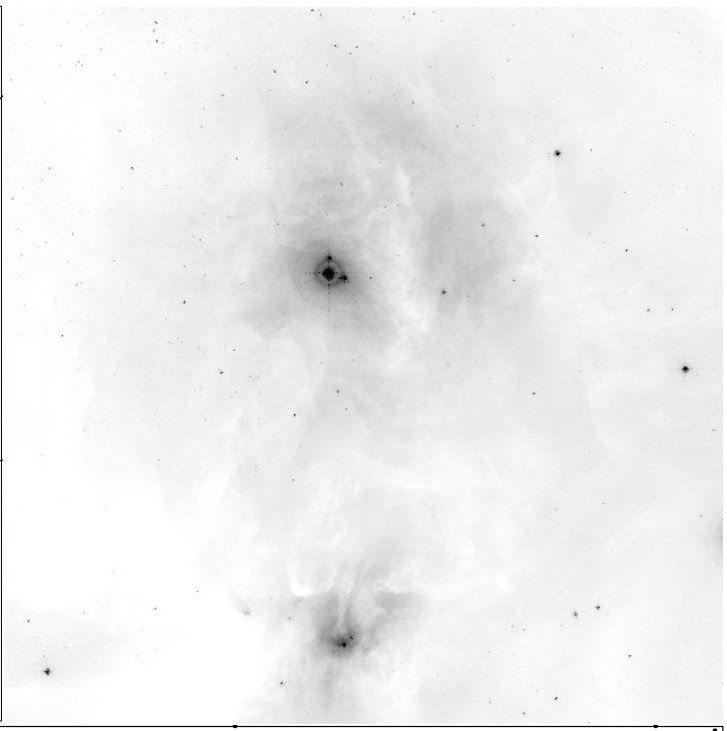


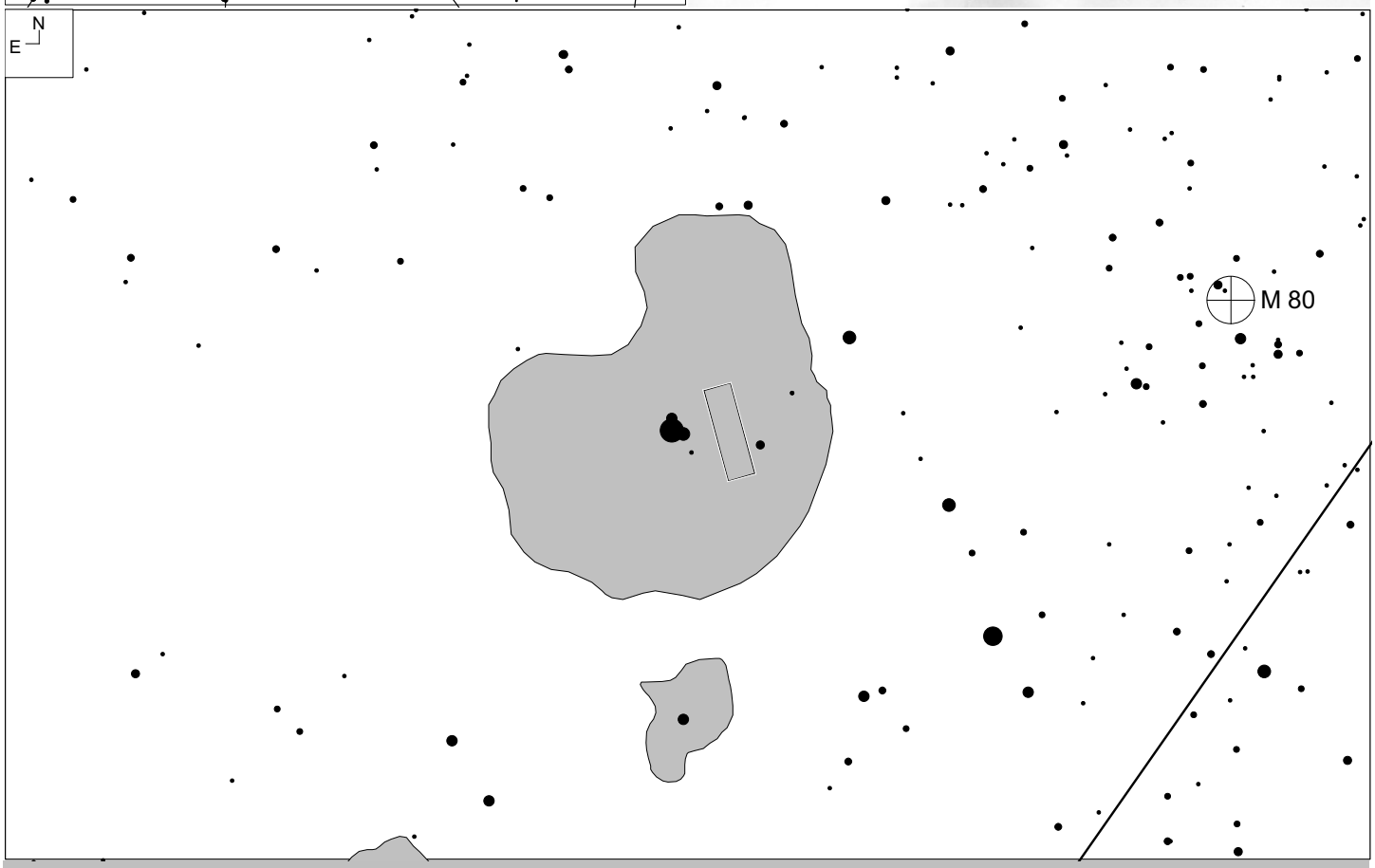



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| CED 129 | 16 20 14.0 | – 20 04 00 | | | 67 |

# IC 4604 (Ophiuchus)

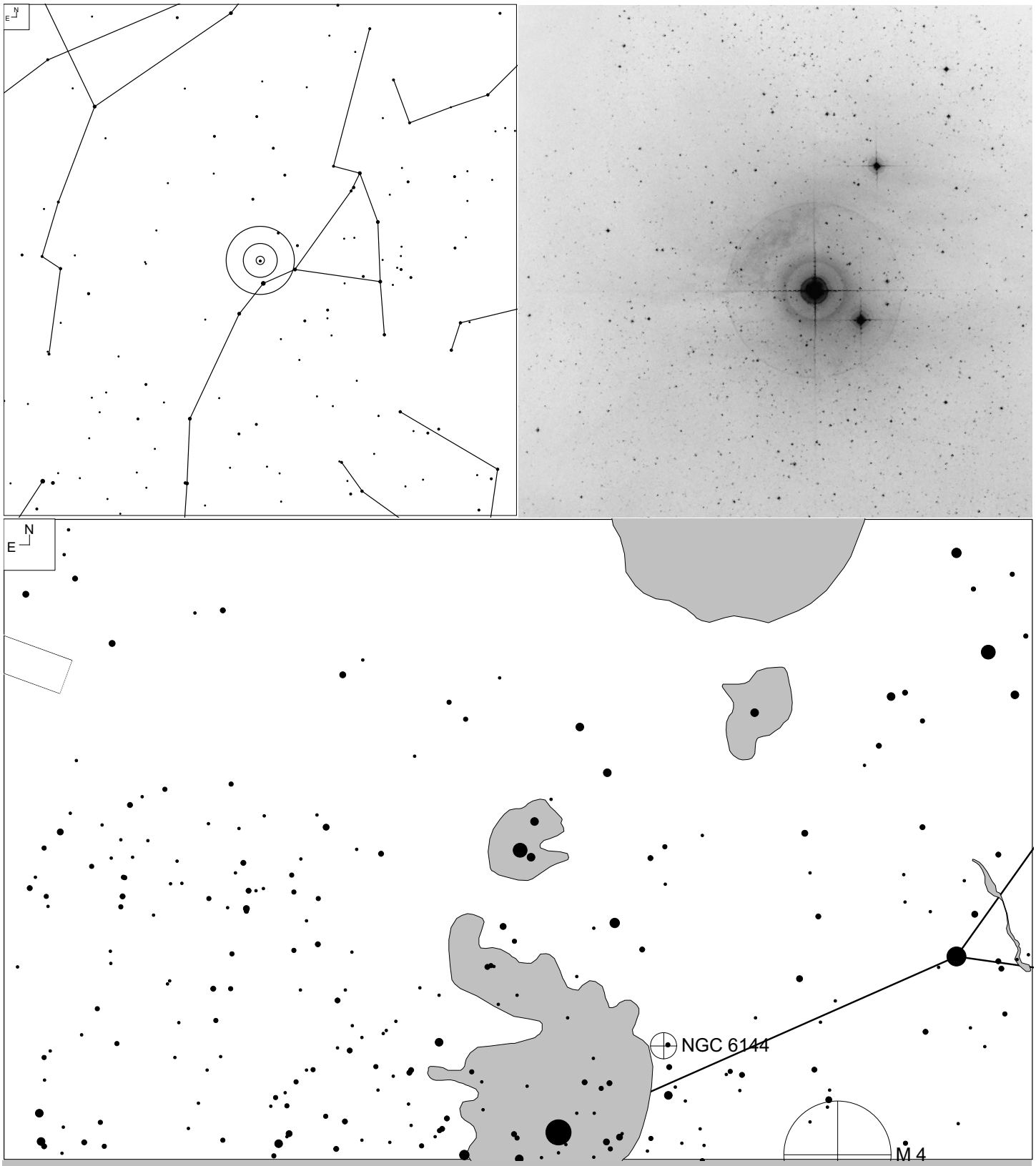




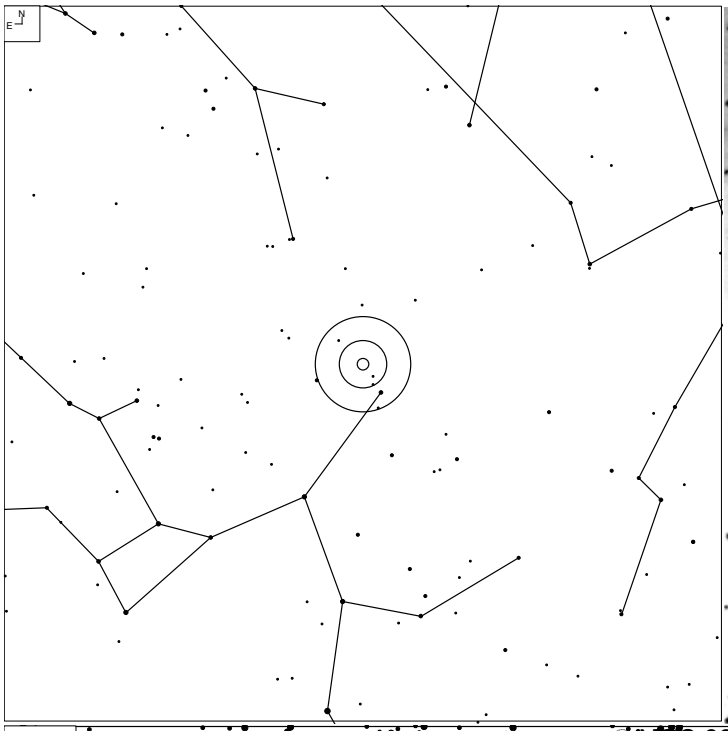

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Rho Oph | 16 25 35.2 | – 23 26 50 | 80.0 x 70.0’ | 147L | 79 |

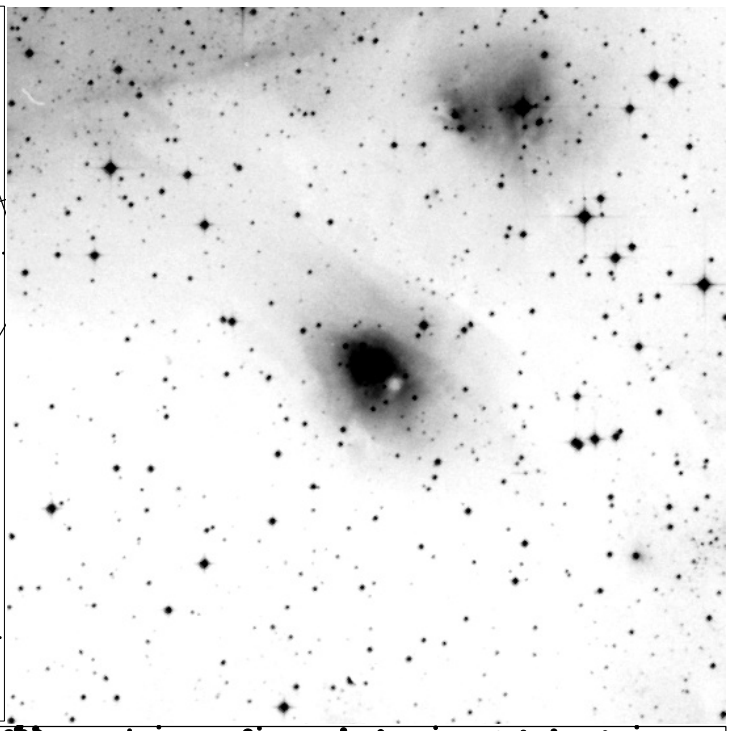
# IC 4605 (Scorpius)

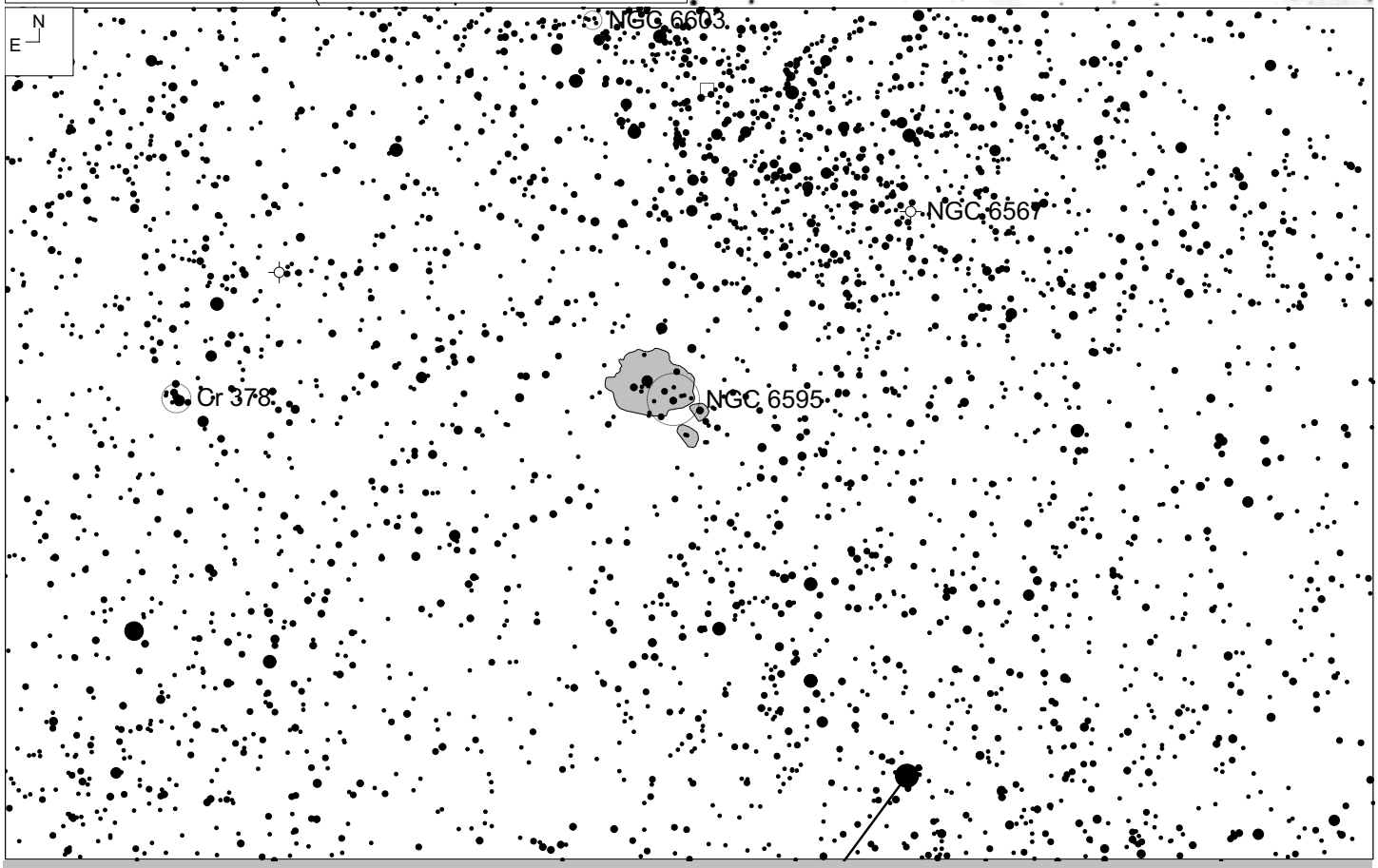



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LBN 1110 | 16 30 15.0 | -25 04 00 | 23.0 x 22.0’ | 147L | 79 |

# NGC 6590 (Sagittarius)

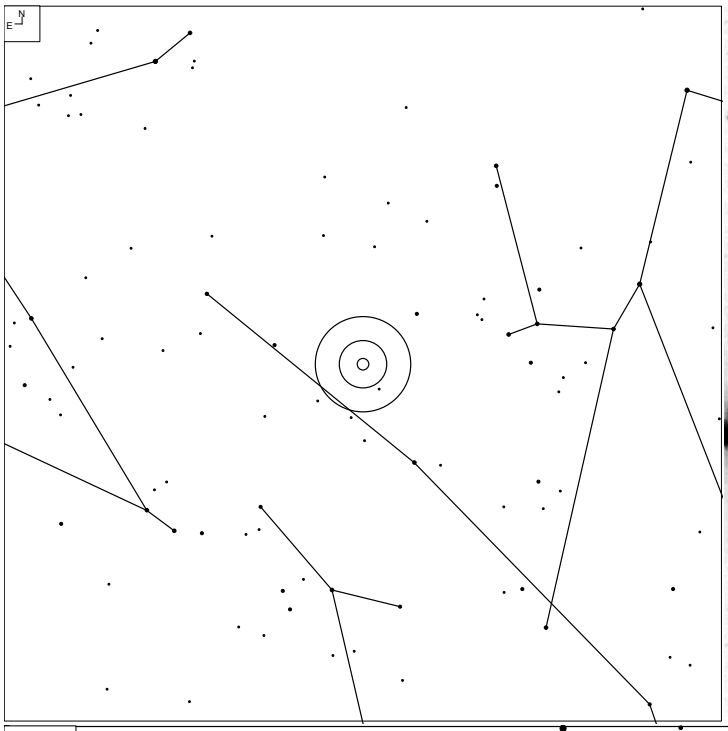


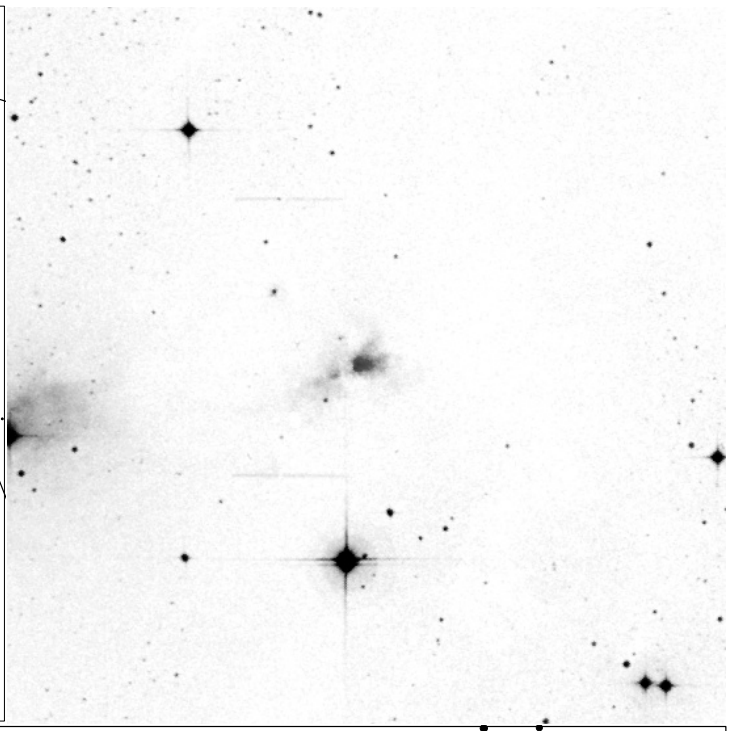


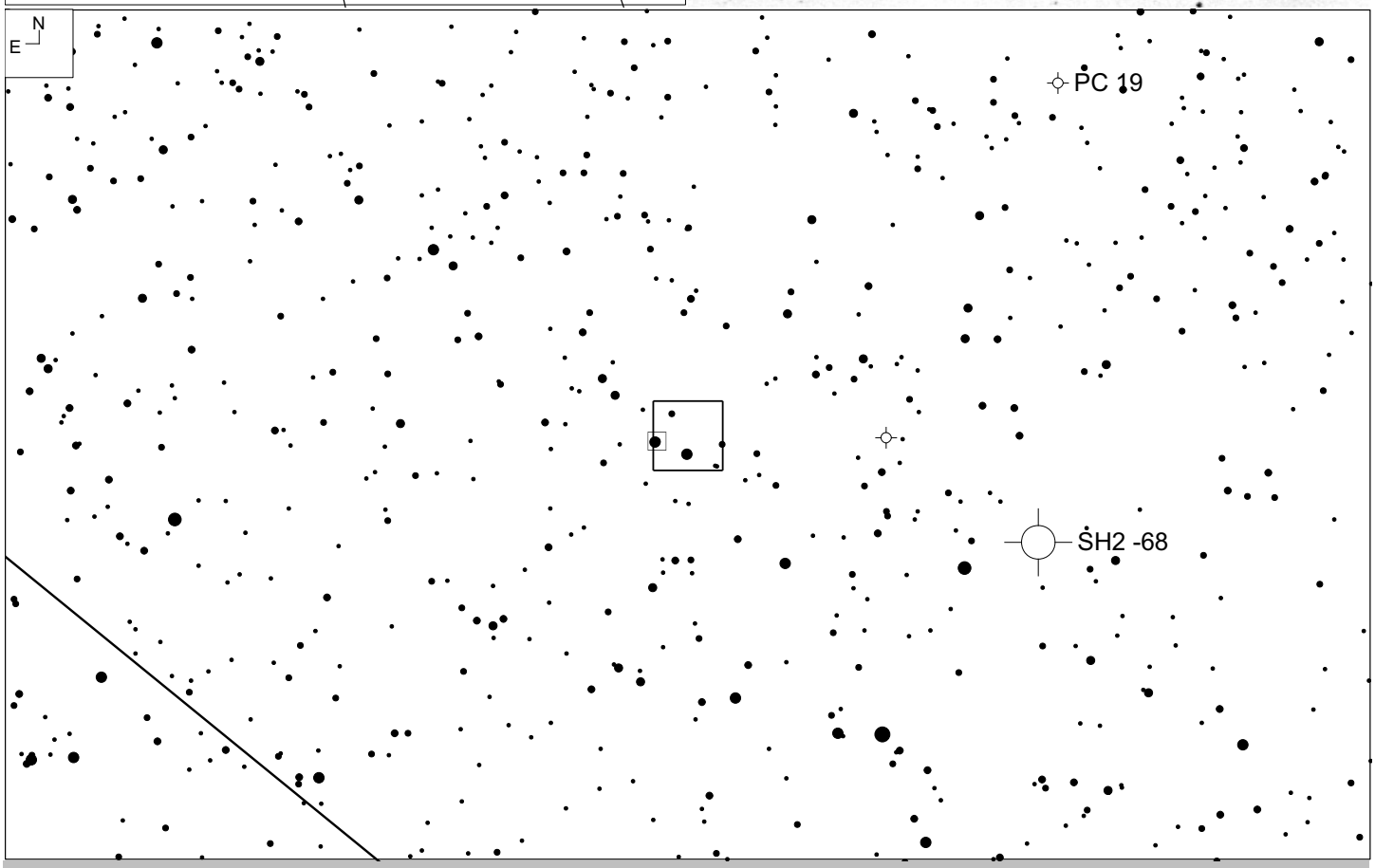



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LBN 43 | 18 17 32.0 | -19 41 00 | 5.6 x 3.3’ | 145R | 66 |

# Serpen's Object (Serpens)

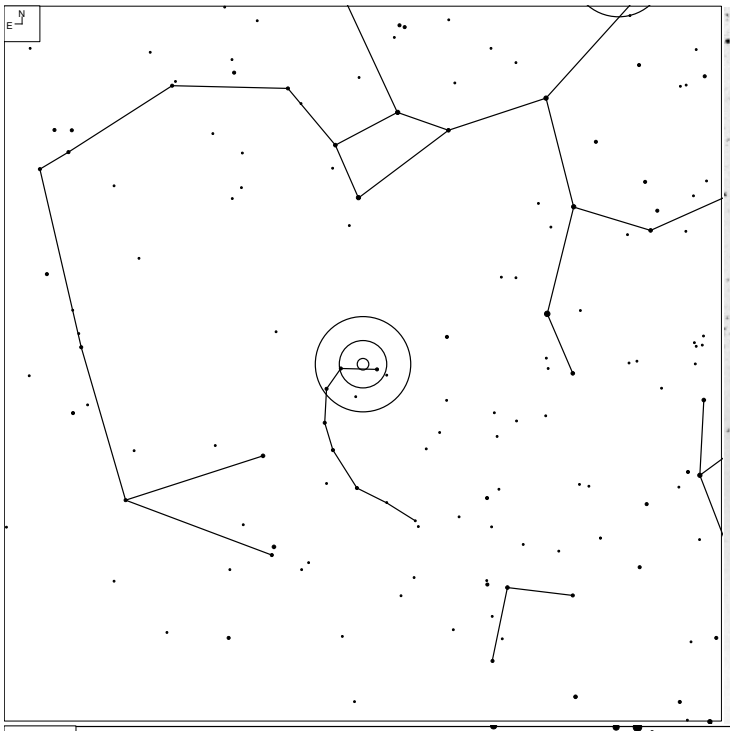


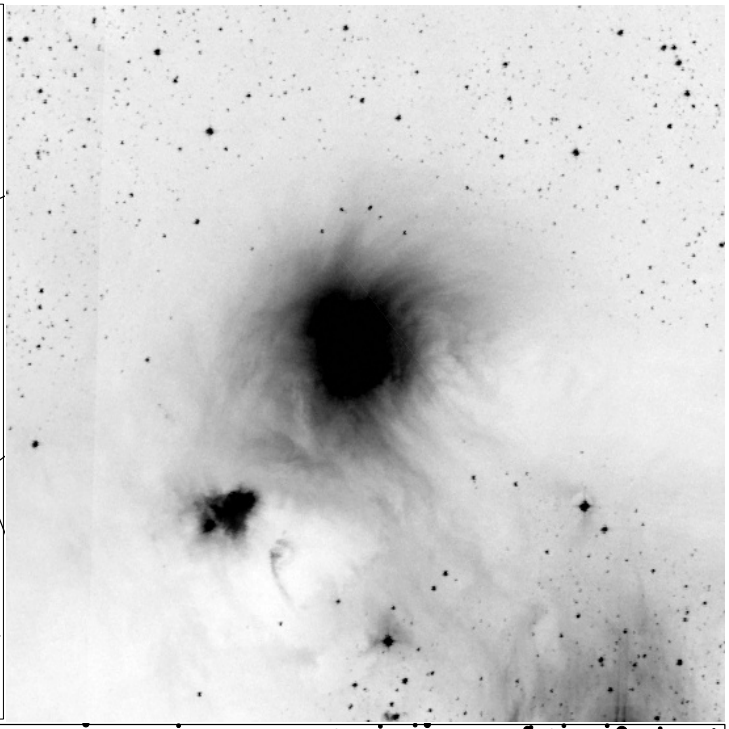


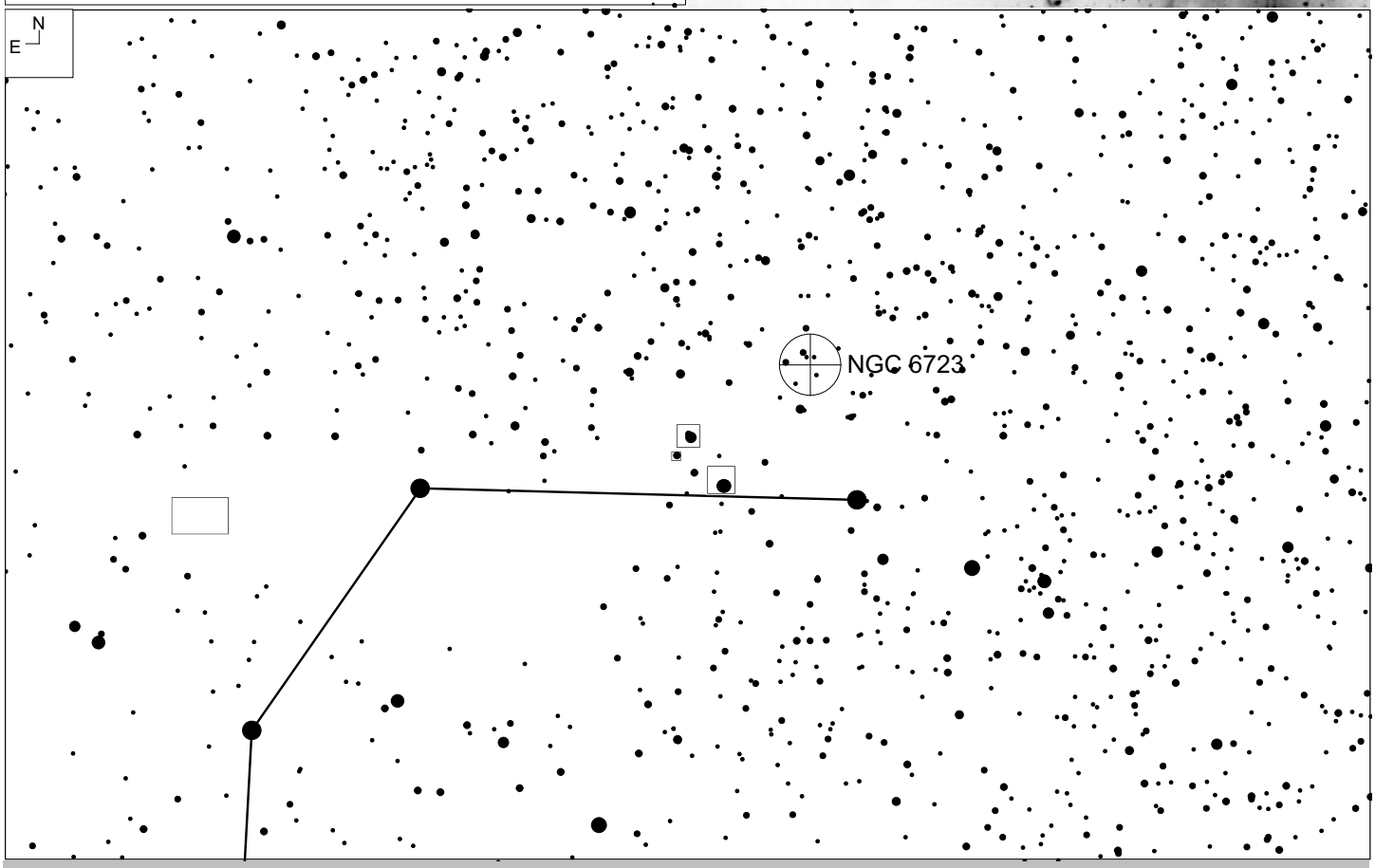



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 18 29 56.6 | +01 14 51 | 2.1 x 0.5' | 106L | 54 |

# NGC 6726 (Corona Australis)

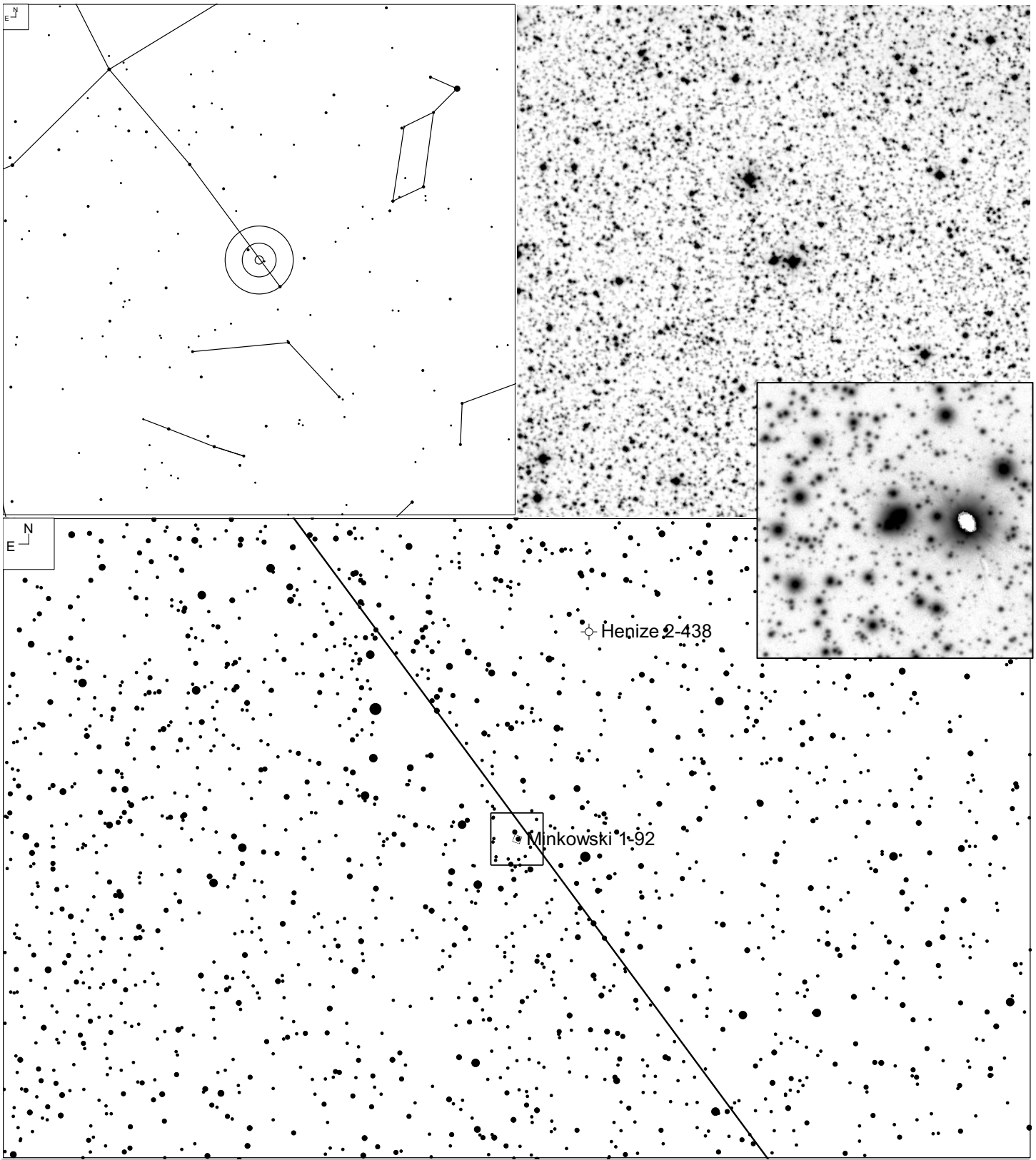






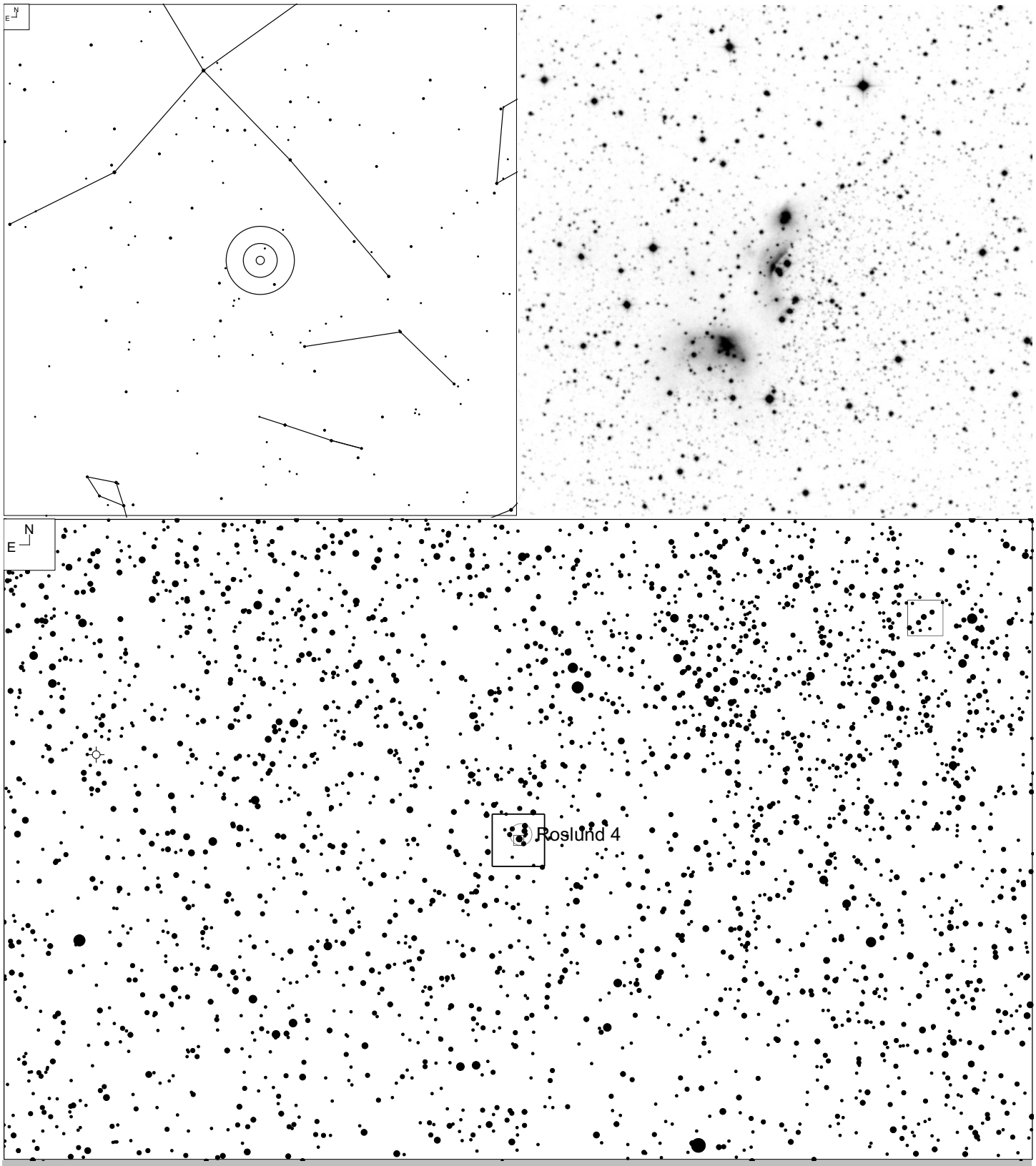

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| NGC 6727 | 19 01 42.0 | -36 53 00 | 5.0’ | 163L | 78 |

# Minkowski 1-92 (Cygnus)



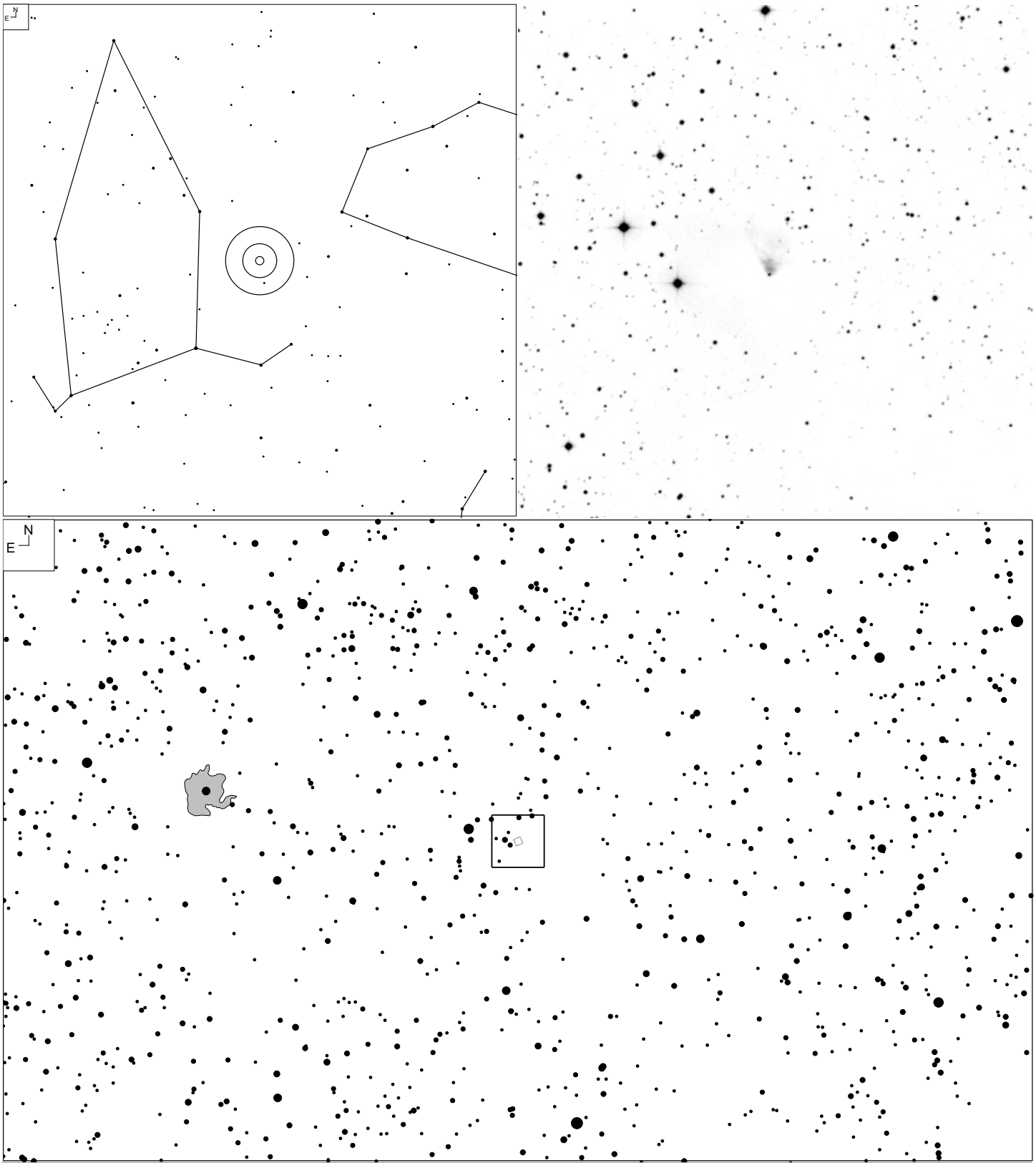

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Minkowski's Footprint | 19 36 18.9 | +29 32 51 | 20.0 x 4.0" | 48R | 30 |

# IC 4954 (Vulpecula)



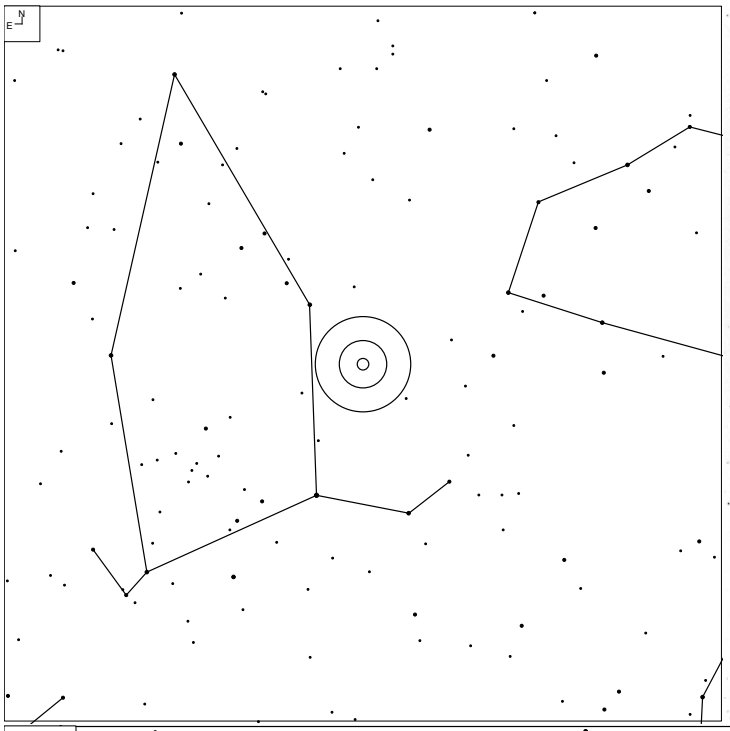

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 20 04 54.0 | +29 11 00 | 3.0’ | 66L | 30 |

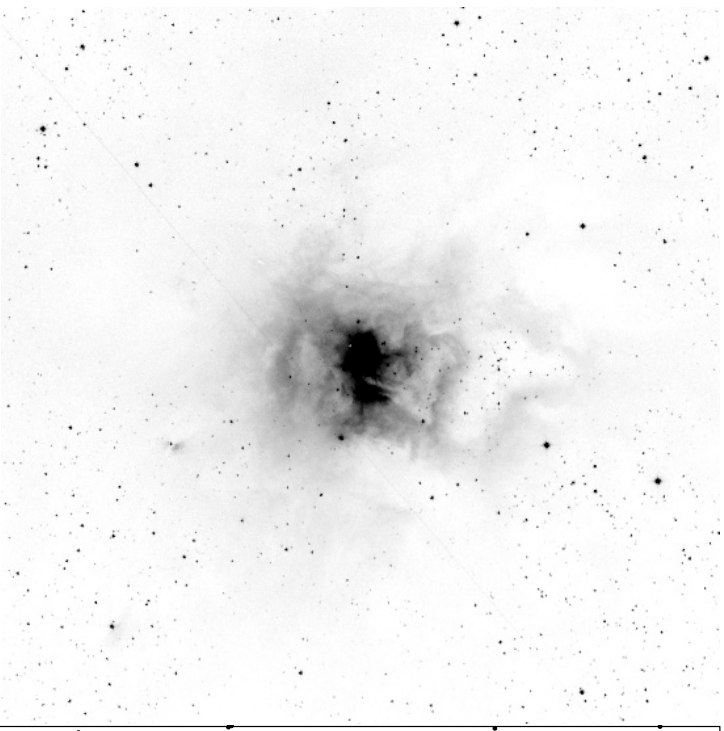
# Gyulbudaghian's Nebula (Cepheus)

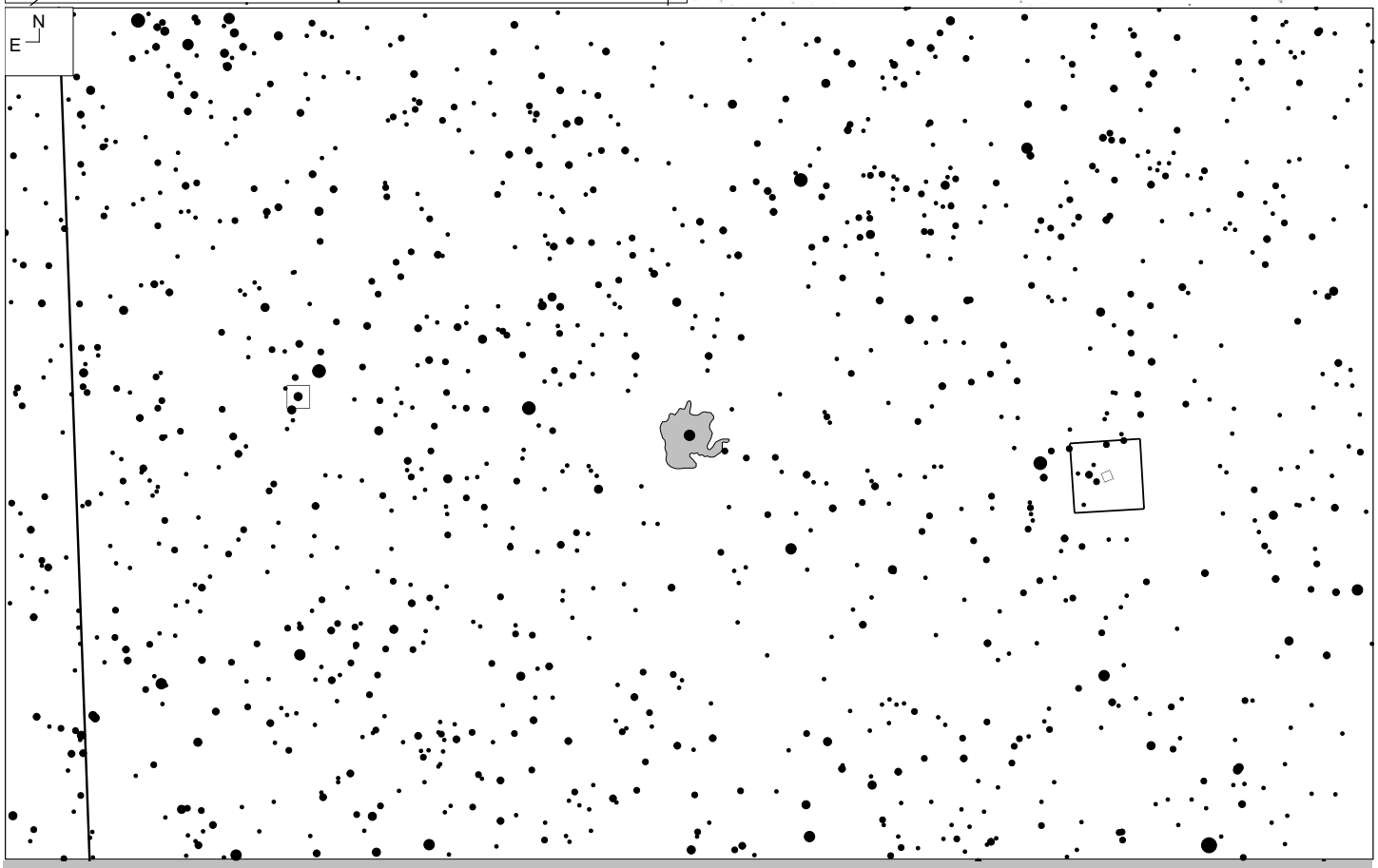



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 20 45 58.0 | + 67 58 30 | 1.6 x 0.7' | 9R | 8 |

# NGC 7023 (Cepheus)

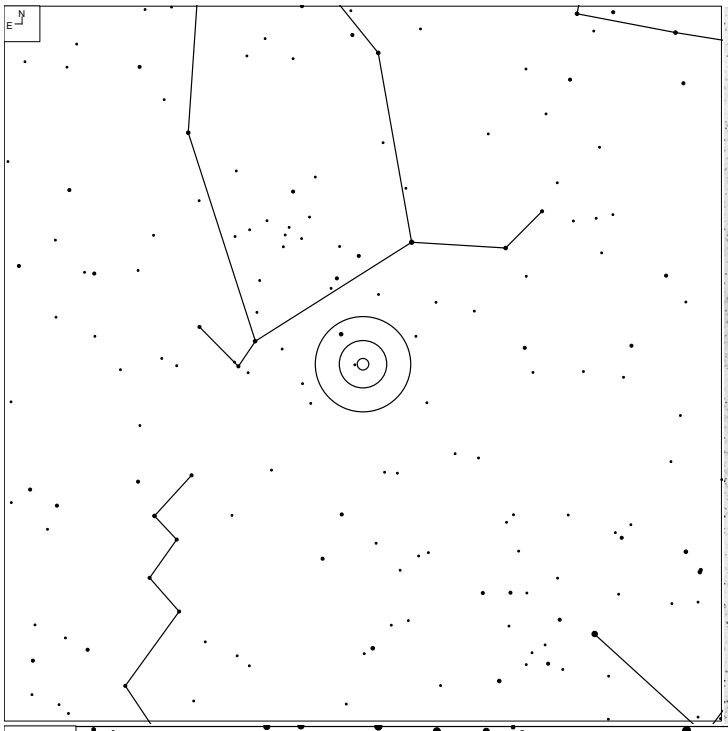


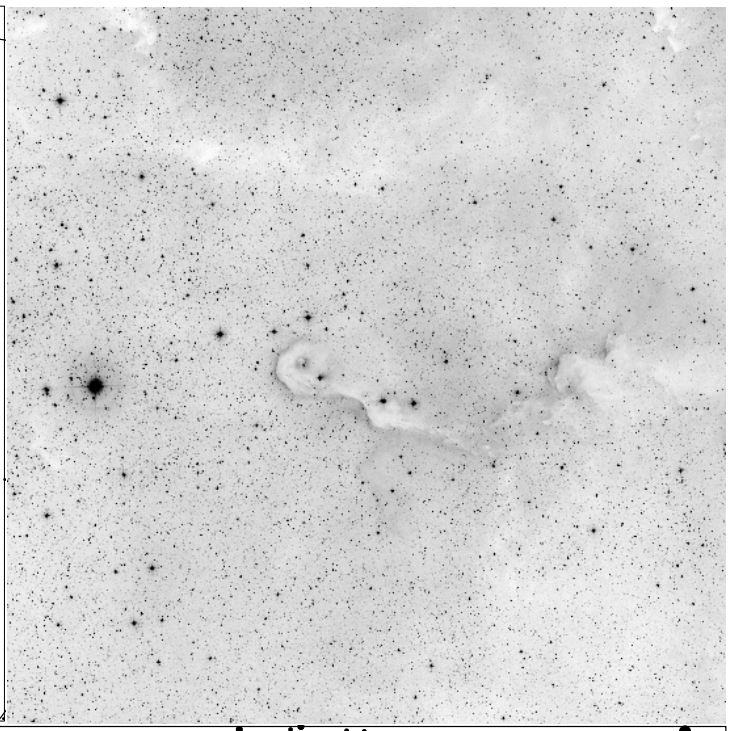


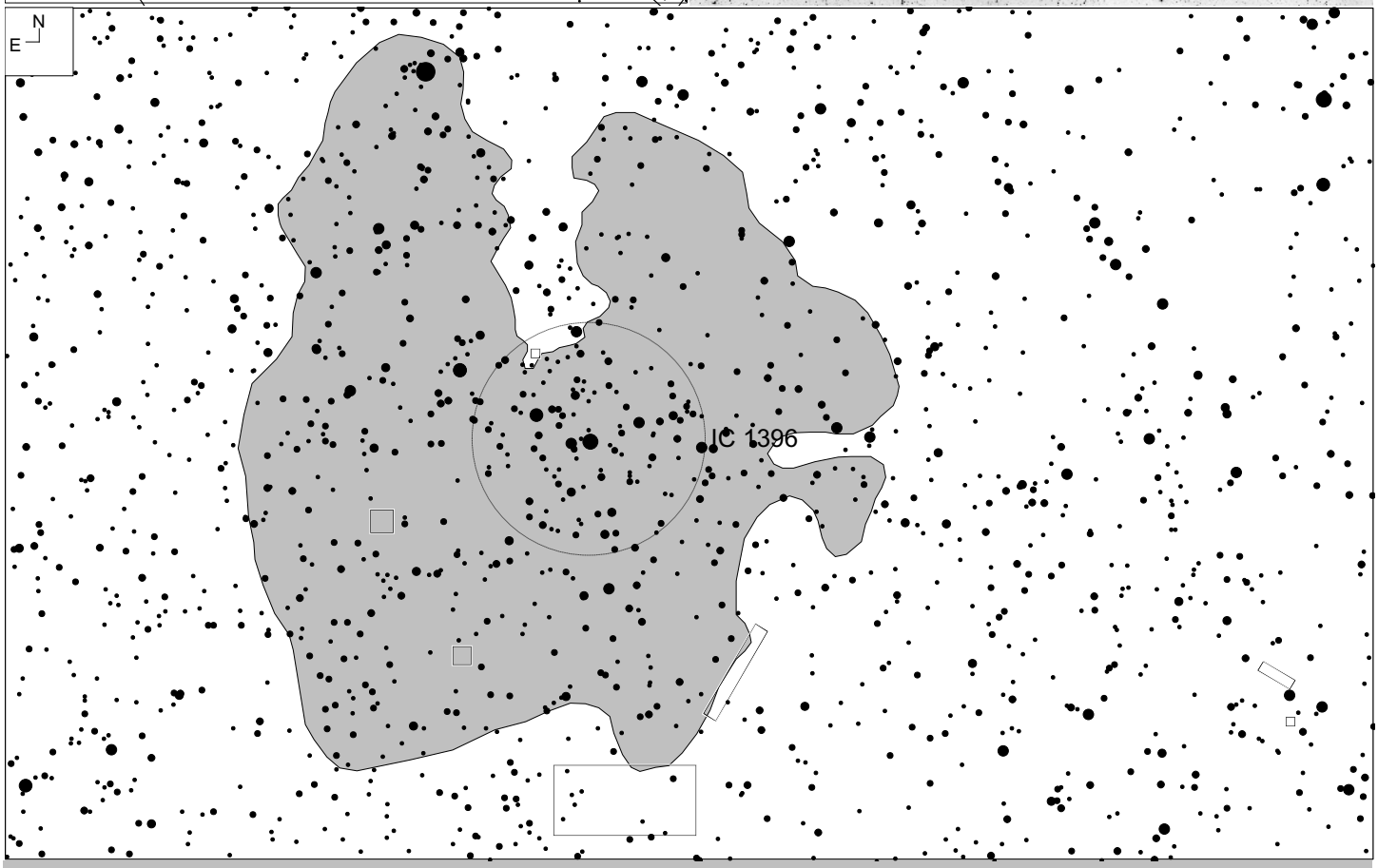



| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 21 01 36.0 | +68 10 00 | 14.0’ | 9R | 8 |

# Van den Bergh 142 (Cepheus)

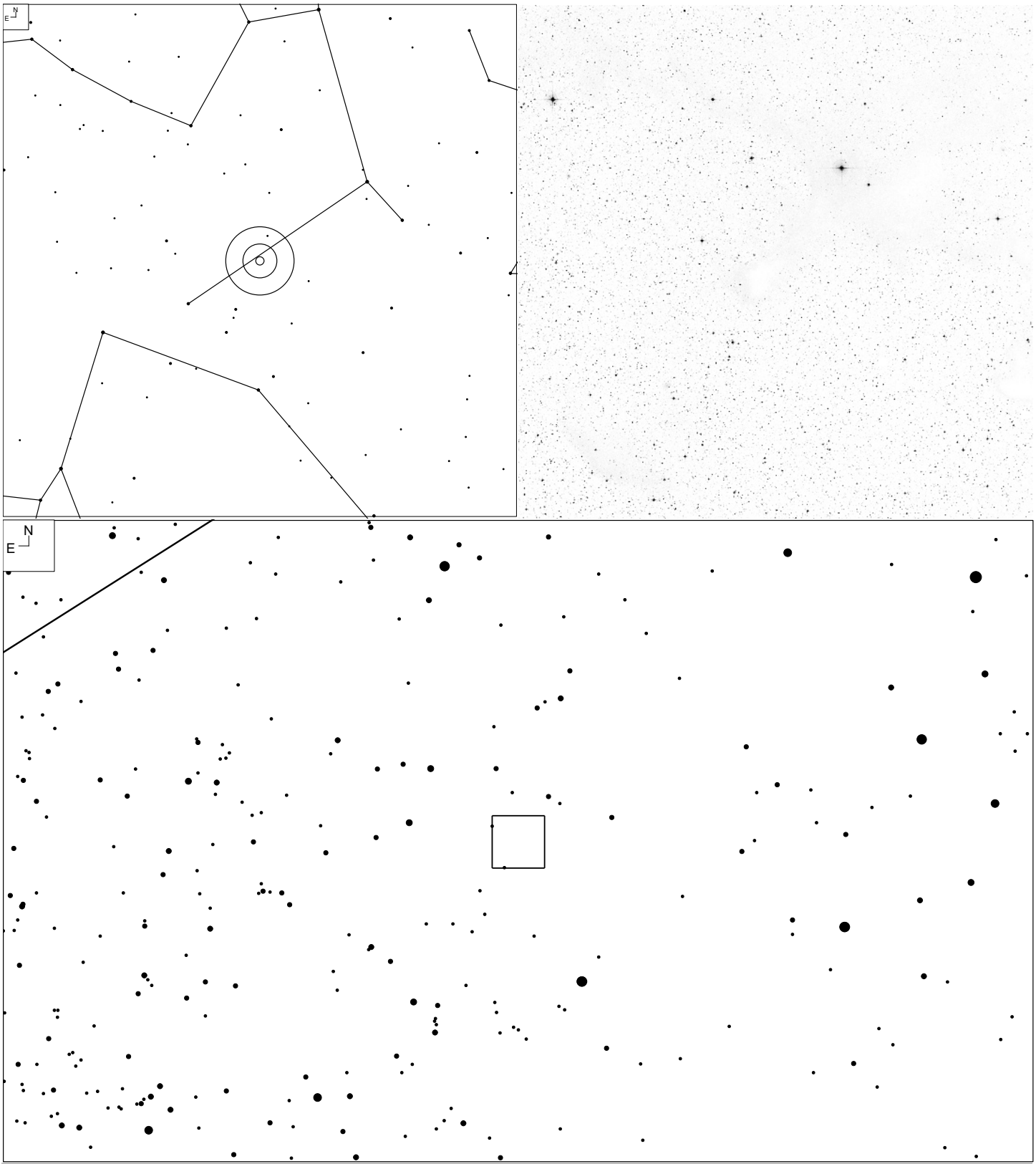






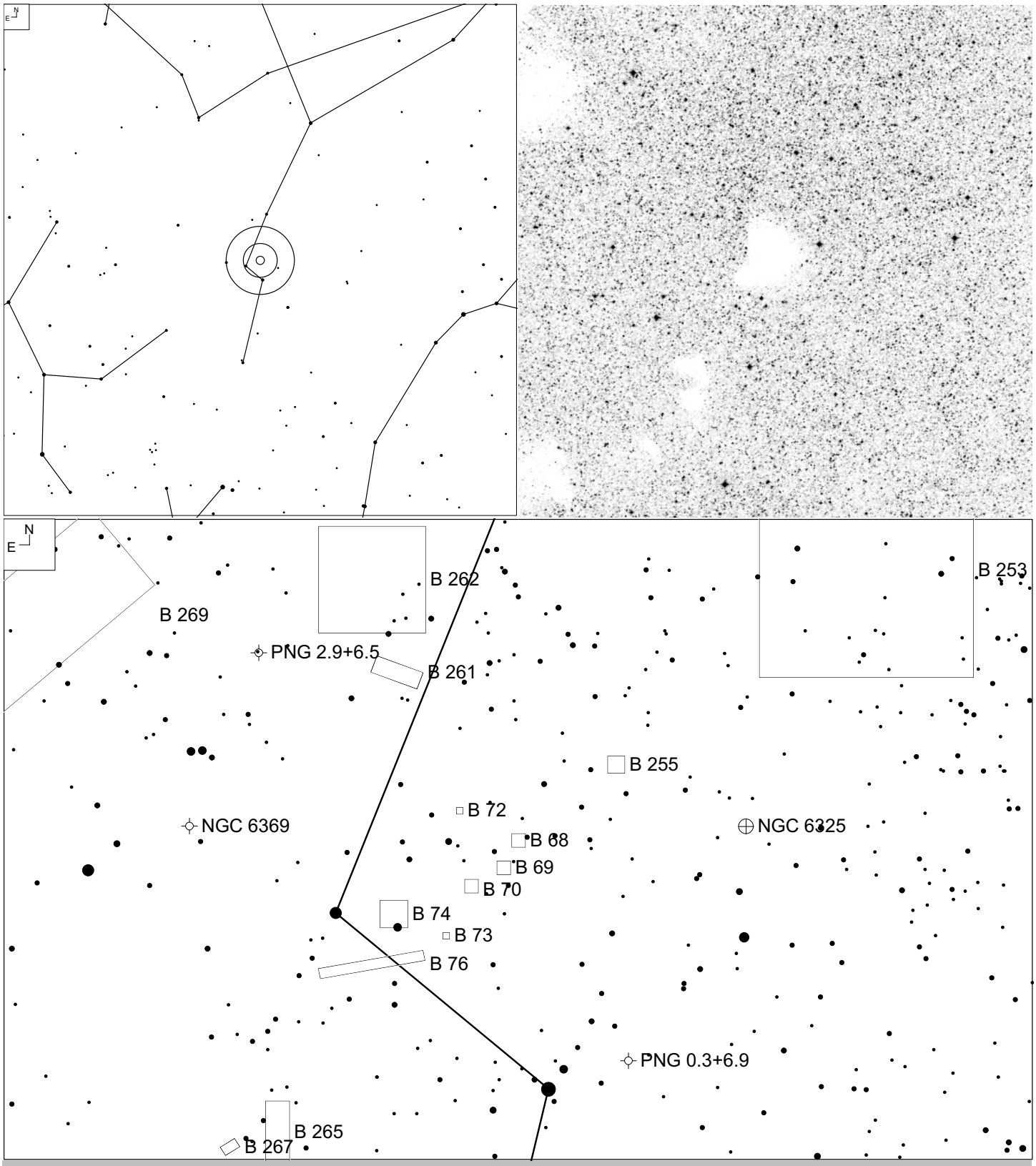

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 21 36 21.6 | +57 31 01 | 28.1 x 10.3’ | 19R | 8 |

# CD 68 (Ophiuchus)



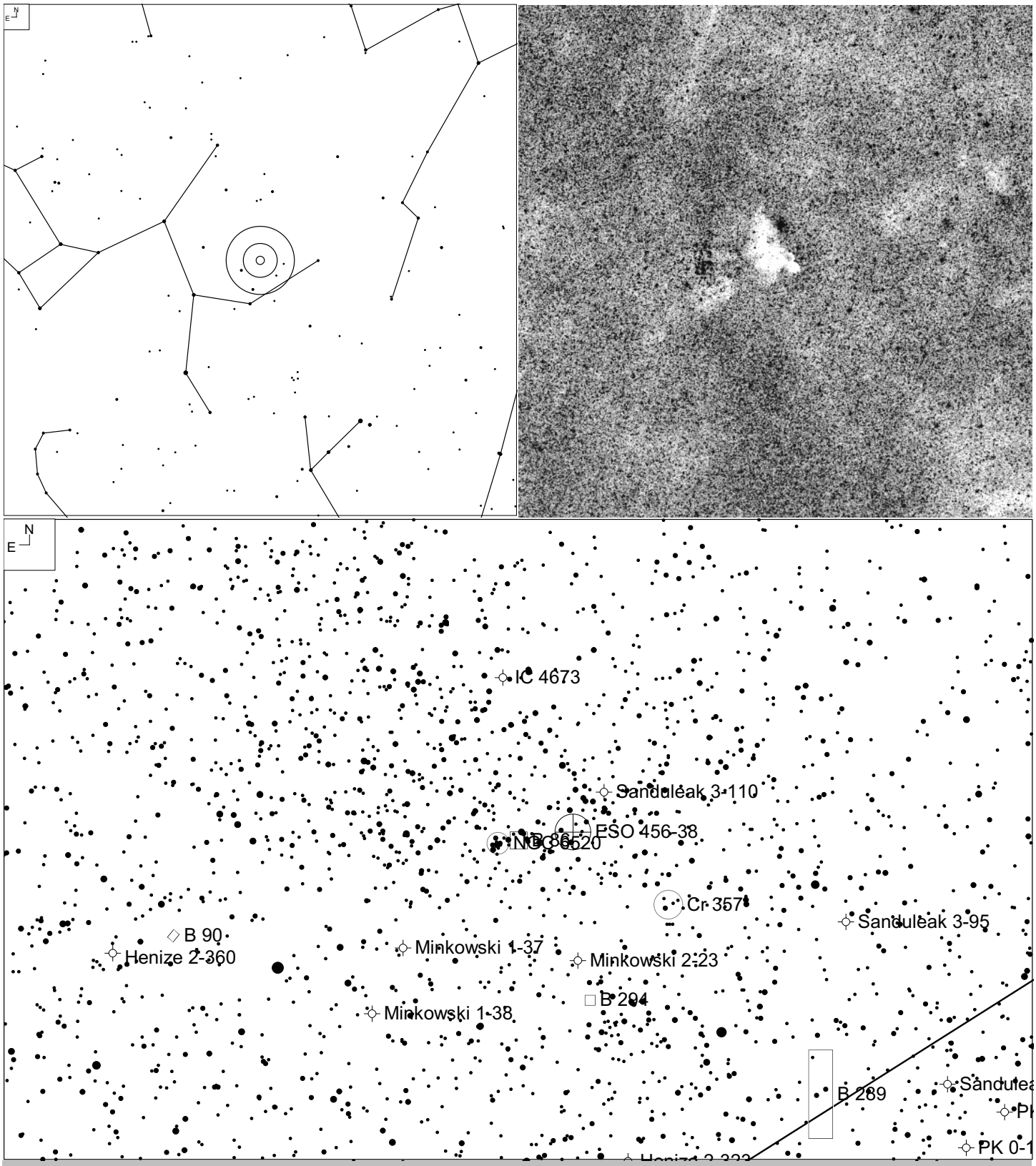

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Bok globule | 16 57 16 | -16 09 18 | 4.8 x 3.9’ | 128R | 67 |

# Barnard 68 (Ophiuchus)



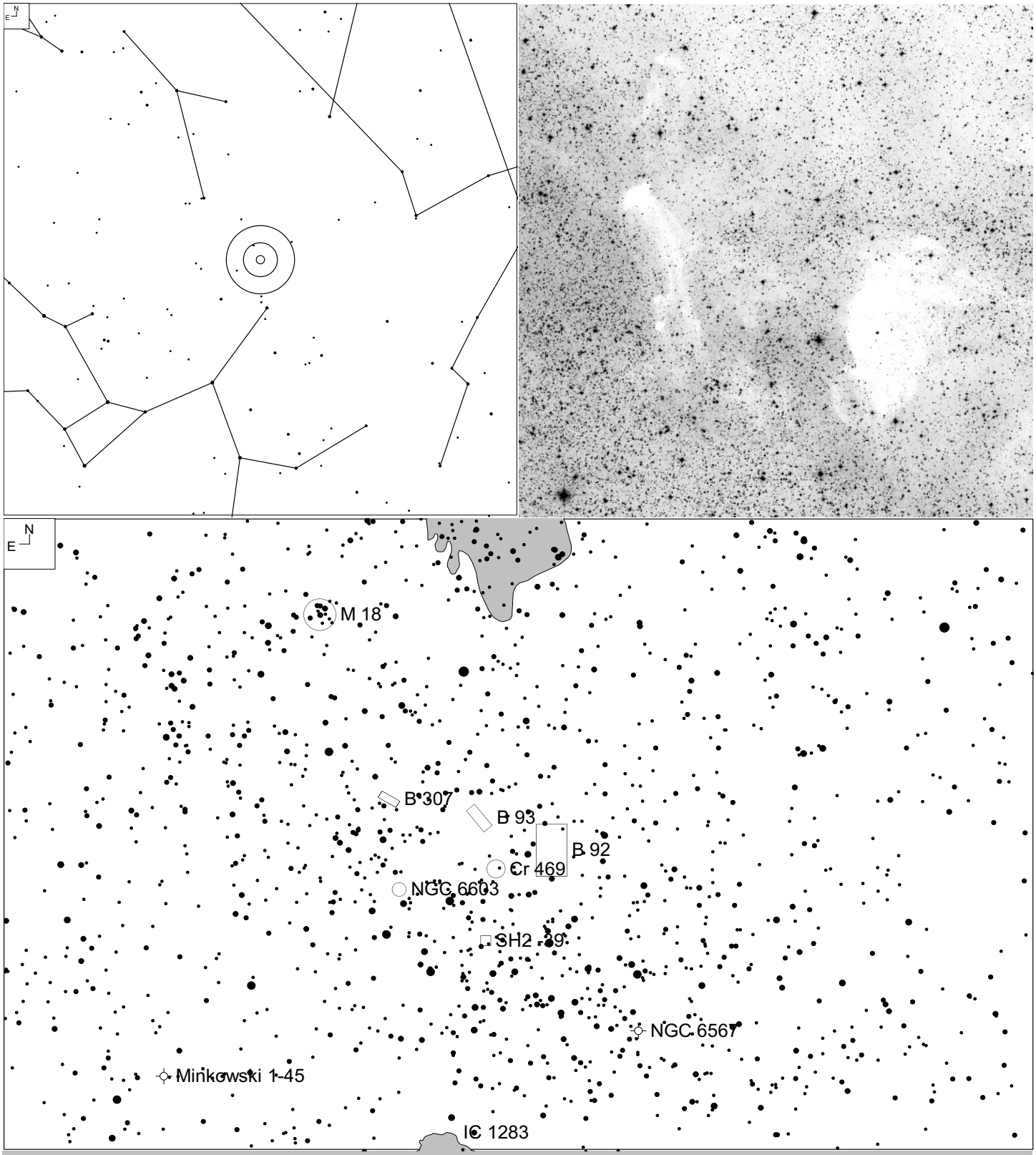

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LDN 57<br>Kidney Globule | 17 22 38.0 | -23 50 12 | 4.0’ | 146L | 79 |

# Barnard 86 & NGC 6520 (Sagittarius)




| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Irregular Globule | 18 02 58.6 | -27 52 00 | 5.0’ | 145R | 78 |

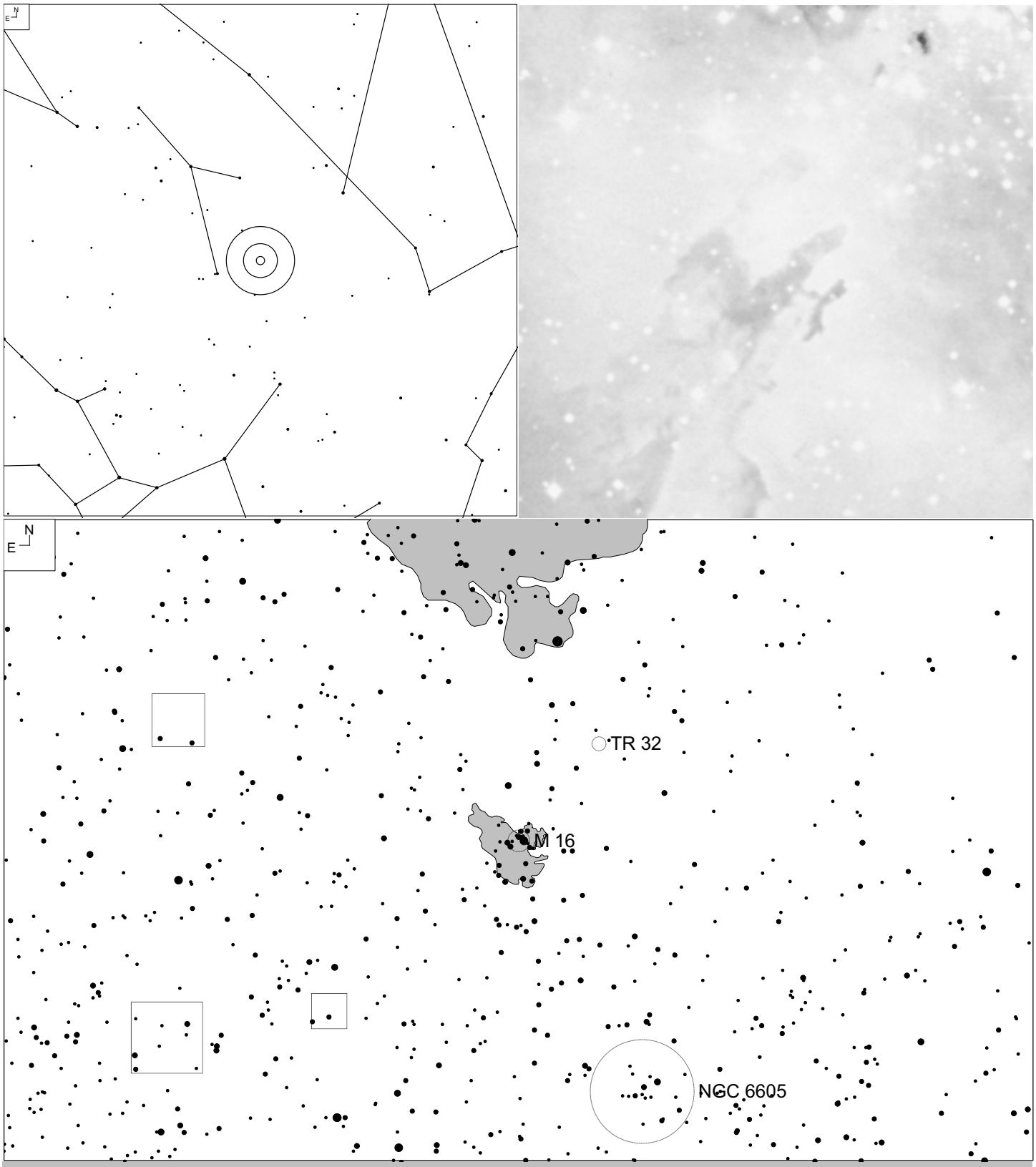
# Barnard 92 and 93 (Sagittarius)




| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LDN 323 | 18 15 27.9 | -18 13 19 | 15.0 x 9.0’ | | |
| LDN 327 | 18 16 53.7 | -18 03 58 | 8.0 x 3.0’ | 145R | 66 |

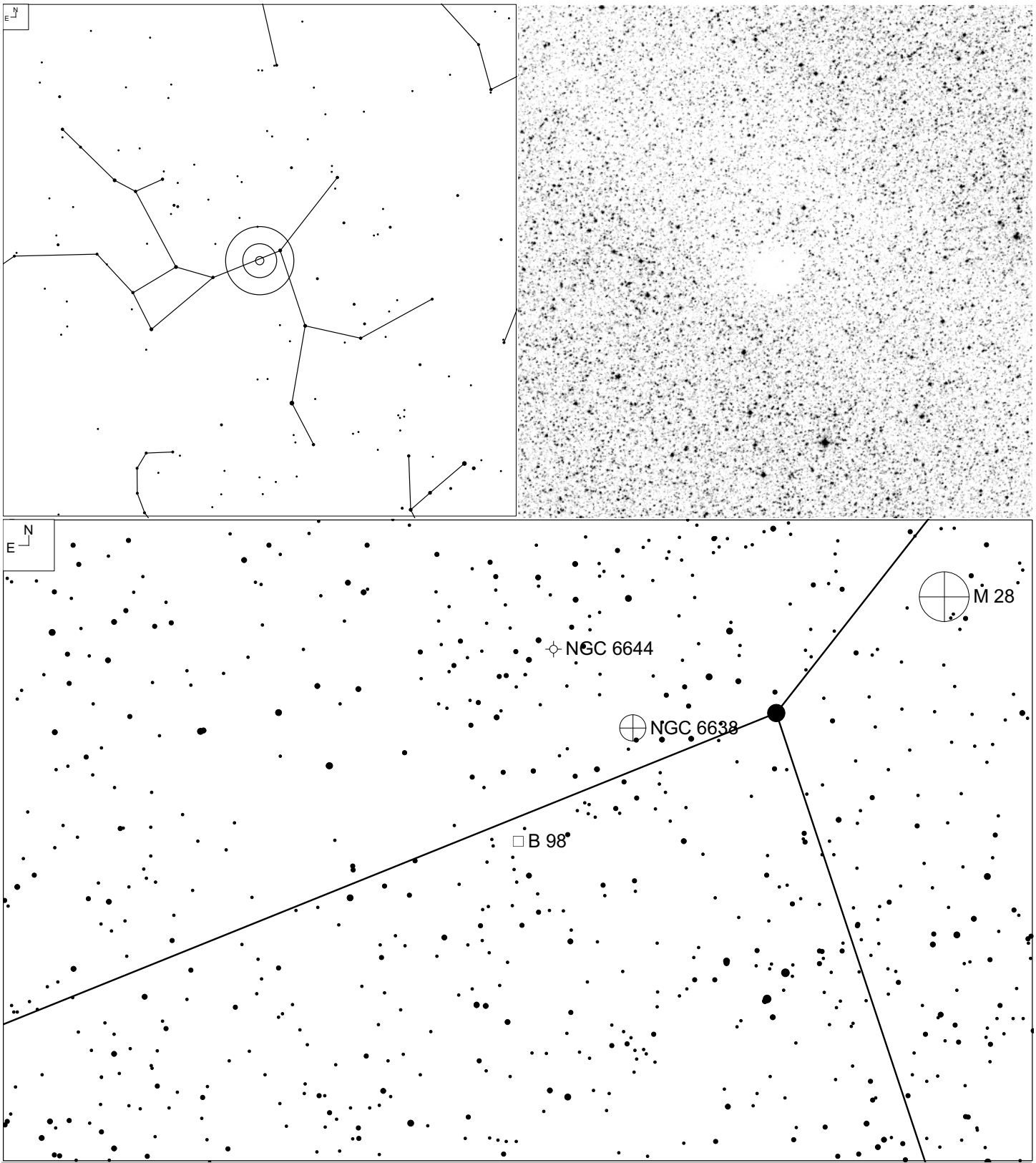
Cometary Globule

# Pillars of Creation in M16 (Serpens)



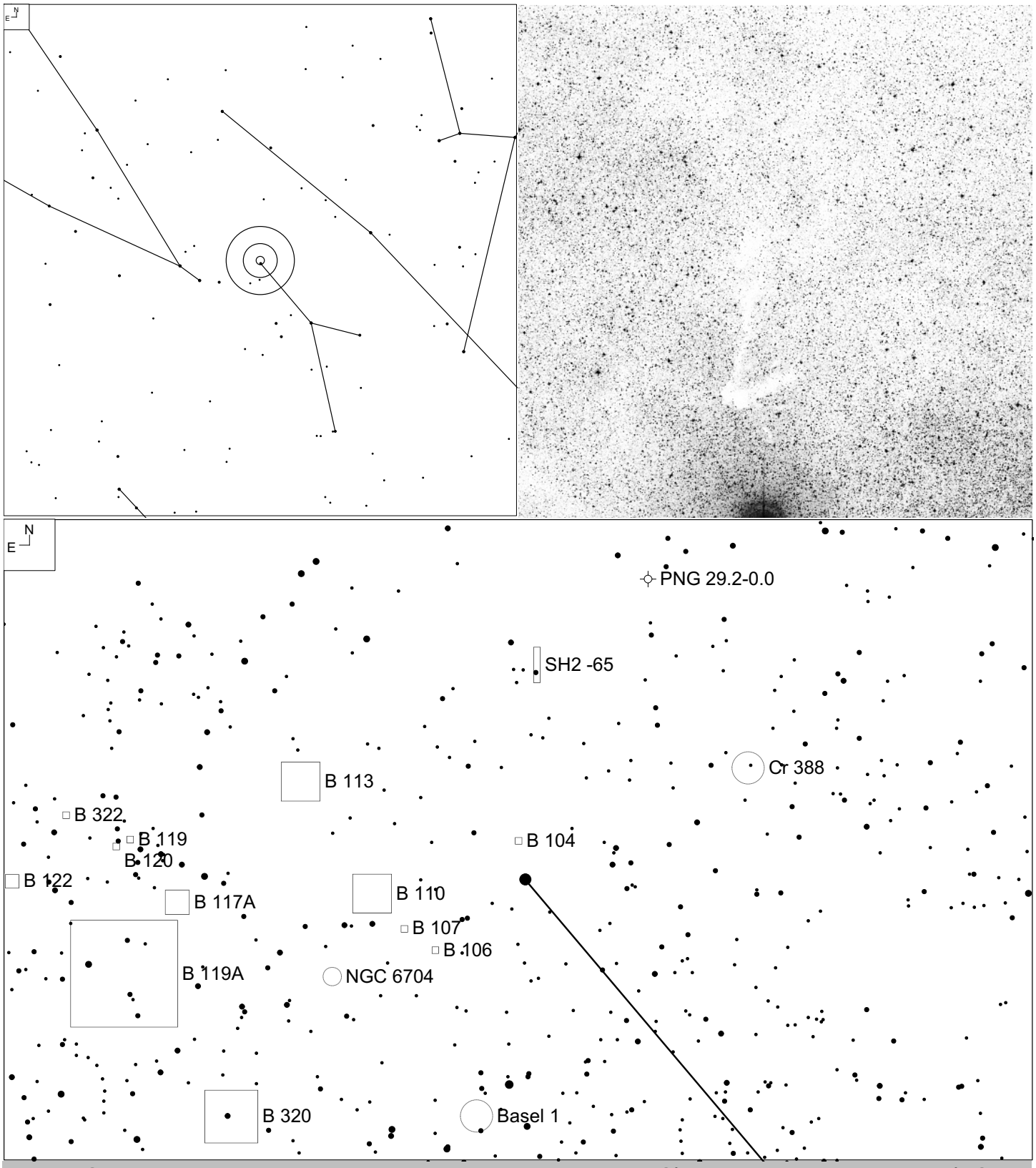

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| | 18 18 51.5 | -13 49 00 | 3.2’ x 44” | 127R | 66 |

# Barnard 98 (Sagittarius)



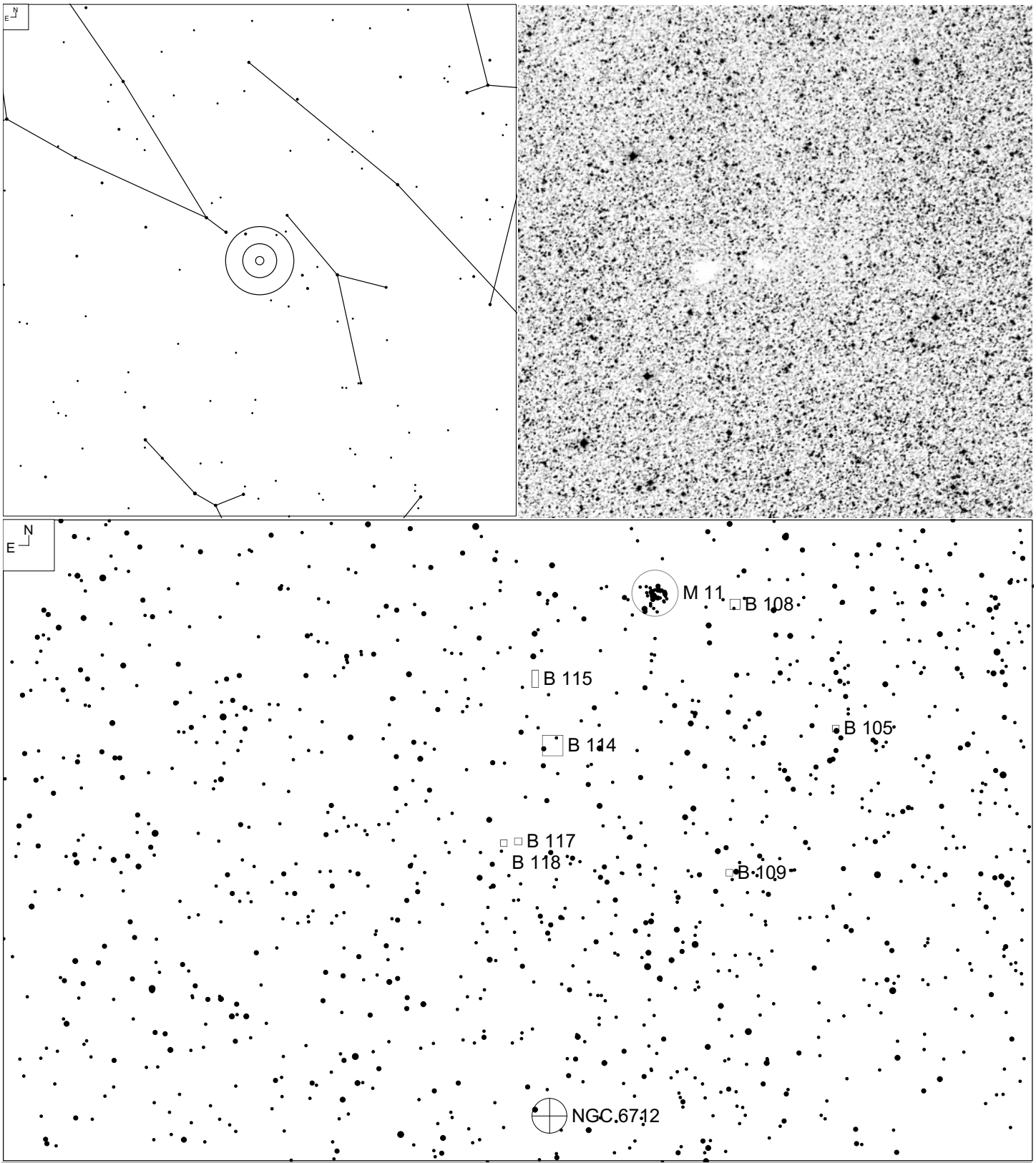

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LDN 239<br>Bok Globule | 18 33 18.5 | -26 01 36 | 3.0’ | 145R | 78 |

# Barnard 104 (Scutum)



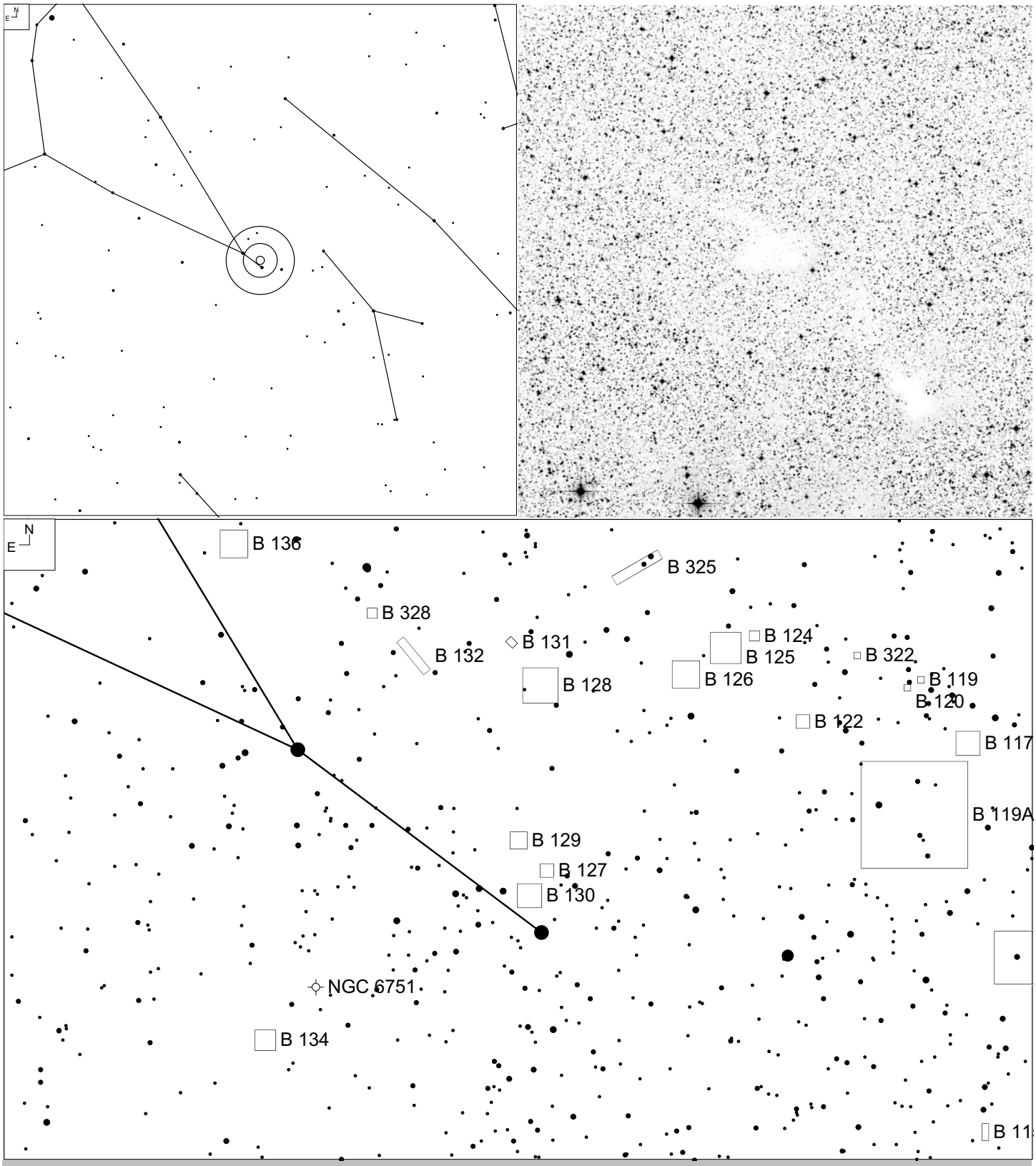

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LDN 532 | 18 47 18.6 | -04 33 53 | 2.6 x 2.1’ | 105R | 54 |

# Barnard 117 and 118 (Scutum)



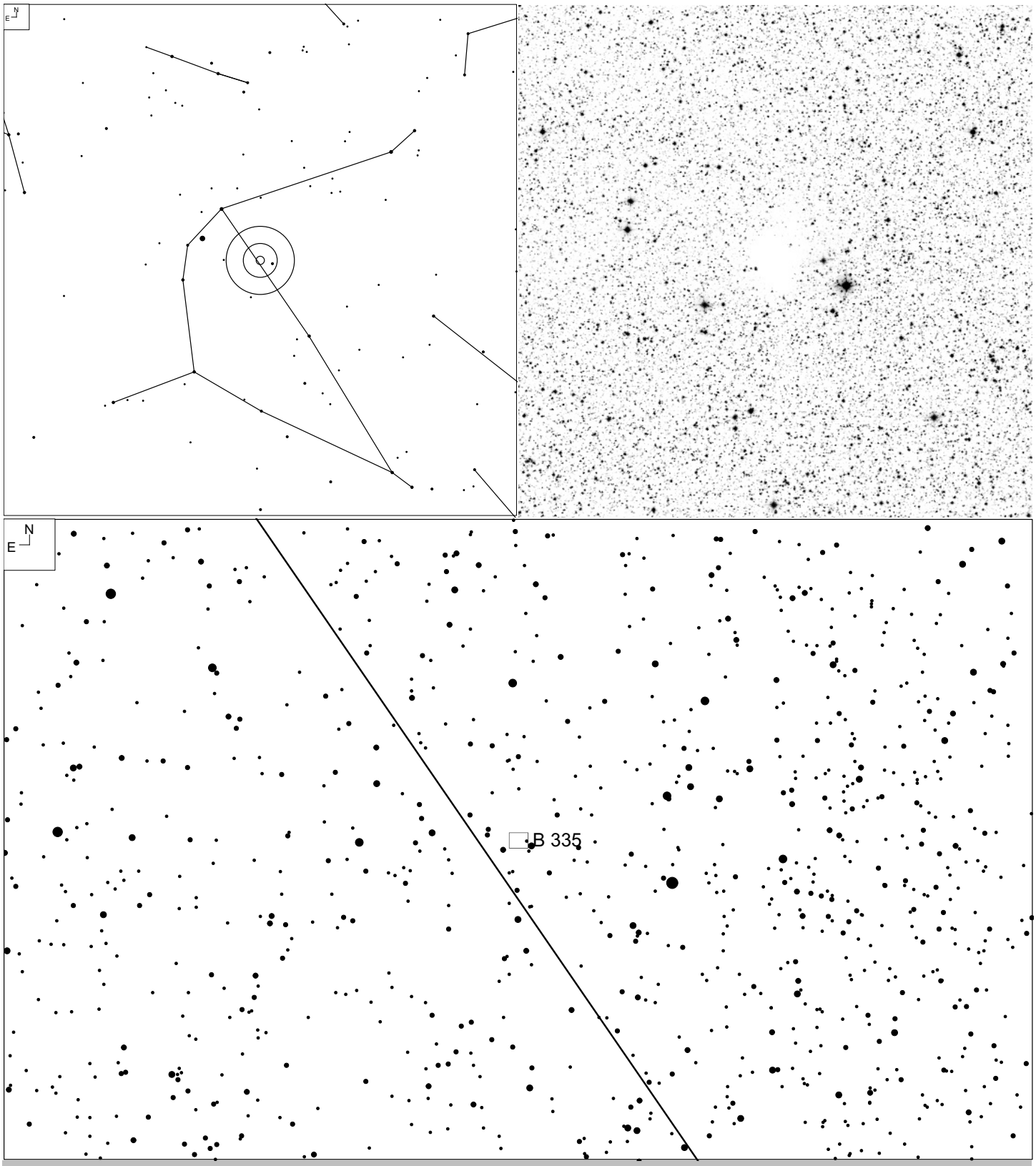

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LDN 509 | 18 53 40.2 | -07 25 30 | 2.2 x 1.1’ | 127L | 54 |
| Bok Globule | 18 53 56.6 | -07 26 03 | 1.5 | | |

# Barnard 129 (Aquila)



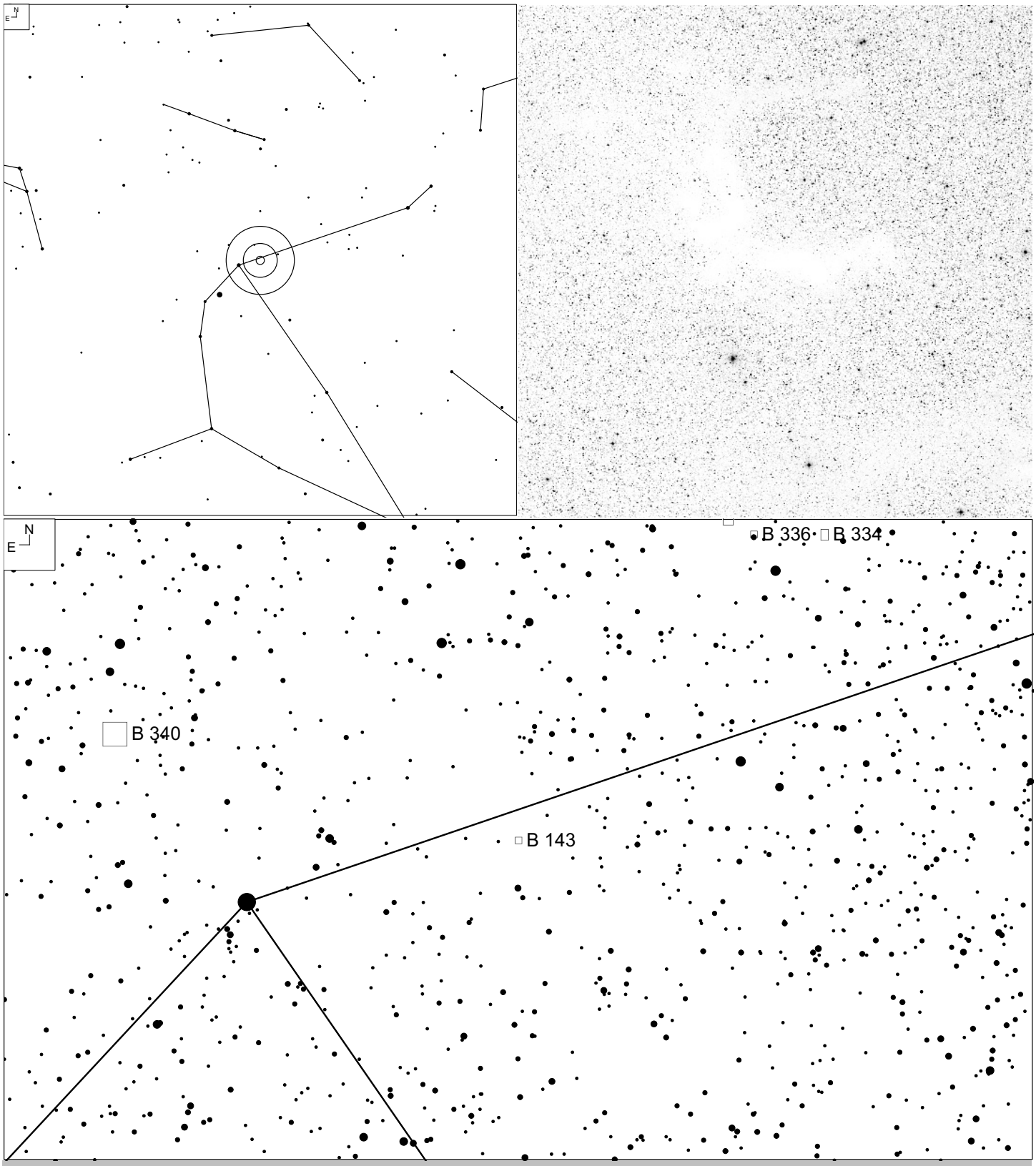

| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| LDN 549 | 19 02 06.9 | -05 18 28 | 5.0’ | 105R | 54 |

# Barnard 335 (Aquila)




| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| Bok Globule | 19 36 59.4 | +07 34 44 | 5.6 x 4.5’ | 86L | 54 |

# Barnard 143 (Aquila)




| Other ID | RA | Dec | Size | Urano 2 | iDSA |
|---|---|---|---|---|---|
| “E” Nebula | 19 41 06.2 | +10 56 35 | 22.6 x 5.5’ | 86L | 42 |