Texas Star Party
Advanced Observing Program

Years 2013 to 2018

List created by Larry Mitchell

Star charts compiled by Alvin Huey

Table of Contents

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.

2013: Illusions

Galaxy - "ILLUSIONS"

TSP Advanced Observing Program – May 2013

Observe ANY 20 Pair - and see BOTH Objects

Object	2000	Const.	Dim.	Mag.	z	Distance	U - 1
☐ NGC 2672	08 49 21.9 + 19 04 30	Cnc	2.9 x 2.7	12.7B	0.014487	195M	U-142
NGC 2673				14.3	0.012535	169M	
☐ NGC 2872	09 25 42.6 + 11 25 56	Leo	1.6 x 1.4	12.8	0.010661	144M	U-188
NGC 2874			2.8 x 0.8	13.4	0.012619	170M	
☐ PGC30467	10 23 47.1 + 53 06 28	Uma	0.7 x 0.6	13.8	0.031385	419M	U-45
PGC 30466			0.7 x 0.4	13.5	0.033451	446M	
☐ UGC 5770	10 37 04.9 + 20 26 27	Leo	0.9 x 0.9	15.4	0.042156	568M	U-145
UGC 5769			1.0 x 0.9	15.3	0.043251	582M	
☐ NGC 3314A	10 37 12.8 – 27 41 02	Hya	1.6 x 0.7	14.4	0.009510	128M	U 325
NGC 3314B			1.3 x 0.6	13.8	0.015481	208M	
☐ UGC 5818	10 41 15.7 + 06 21 41	Leo	1.1 x 0.7	14.6	0.020864	280M	U-190
CGCG 37-114			.8 x 0.7	14.8	0.019264	259M	
☐ MCG +7-22-57	10 45 24.9 + 39 09 50	LMi	0.8 x 0.2	14.9	0.025554	342M	U-72
MCG +7-22-58			0.8 x 0.8	15.3	0.026498	355M	
☐ UGC 5904	10 48 37.9 + 66 21 43	Uma	2.0 x 0.3	13.9	0.021985	295M	U-24
MCG +11-13-38B			0.5 x 0.3	16.0	0.024041	322M	
☐ Markarian 421	11 04 27.3 + 38 12 32	Uma	Stellar	13.3Var	0.030021	401M	U-106
PGC 33453	11 04 28.3 + 38 12 40		0.8 x 0.7	17.0	0.031288	418M	
☐ NGC 3607	11 16 54.7 + 18 03 06	Leo	5.5 x 5.1	10.8	0.003202	43M	U-146
NGC 3605			1.6 x 1.2	13.1 (V)	0.002365	32M	
☐ MCG +4-28-43	11 44 16.5 + 20 13 01	Leo	0.6 x 0.4	16.2	0.02247	301M	U-147
MCG +4-28-44			0.9 x 0.5	14.3	0.02124	285M	
☐ NGC 3861	11 45 03.9 + 19 58 25	Leo	2.1 x 1.2	13.7	0.016982	228M	U-147
MCG +3-30-94			0.6 x 0.3	15.5	0.025171	337M	
☐ NGC 3873	11 45 46.1 + 19 46 26	Leo	1.0 x 1.0	13.9B	0.018126	244M	U-147
NGC 3875			1.4 x 0.4	14.9	0.023209	311M	
☐ NGC 4073	12 04 27.0 + 01 53 45	Vir	3.4 x 2.3	12.9	0.019584	263M	U-238
PGC 38205			0.2 x 0.2	15.3	0.021361	287M	
☐ NGC 4089	12 05 37.4 + 20 33 21	Com	0.8 x 0.8	14.6 (P)	0.024240	325M	U-148
NGC 4091			1.2 x 0.3	15.2	0.025638	343M	
☐ NGC 4169, H61A	12 12 18.8 + 29 10 46	Com	2.3 x 1.2	13.2 (B)	0.012622	170M	U-107
NGC 4173, H61B			5.0 x 0.7	15.2 (B)	0.003759	51M	
☐ NGC 4496A	12 31 39.2 + 03 56 22	Vir	4.0 x 3.1	11.9B	0.005771	78M	U-238
NGC 4496B			1.0 x 0.9	14.0	0.015085	203M	
☐ NGC 4540	12 34 50.9 + 15 33 06	Com	1.9 x 1.4	12.4 (B)	0.004290	58M	U-194
IC 3528			0.4 x 0.4	15.2 (B)	0.046120	610M	

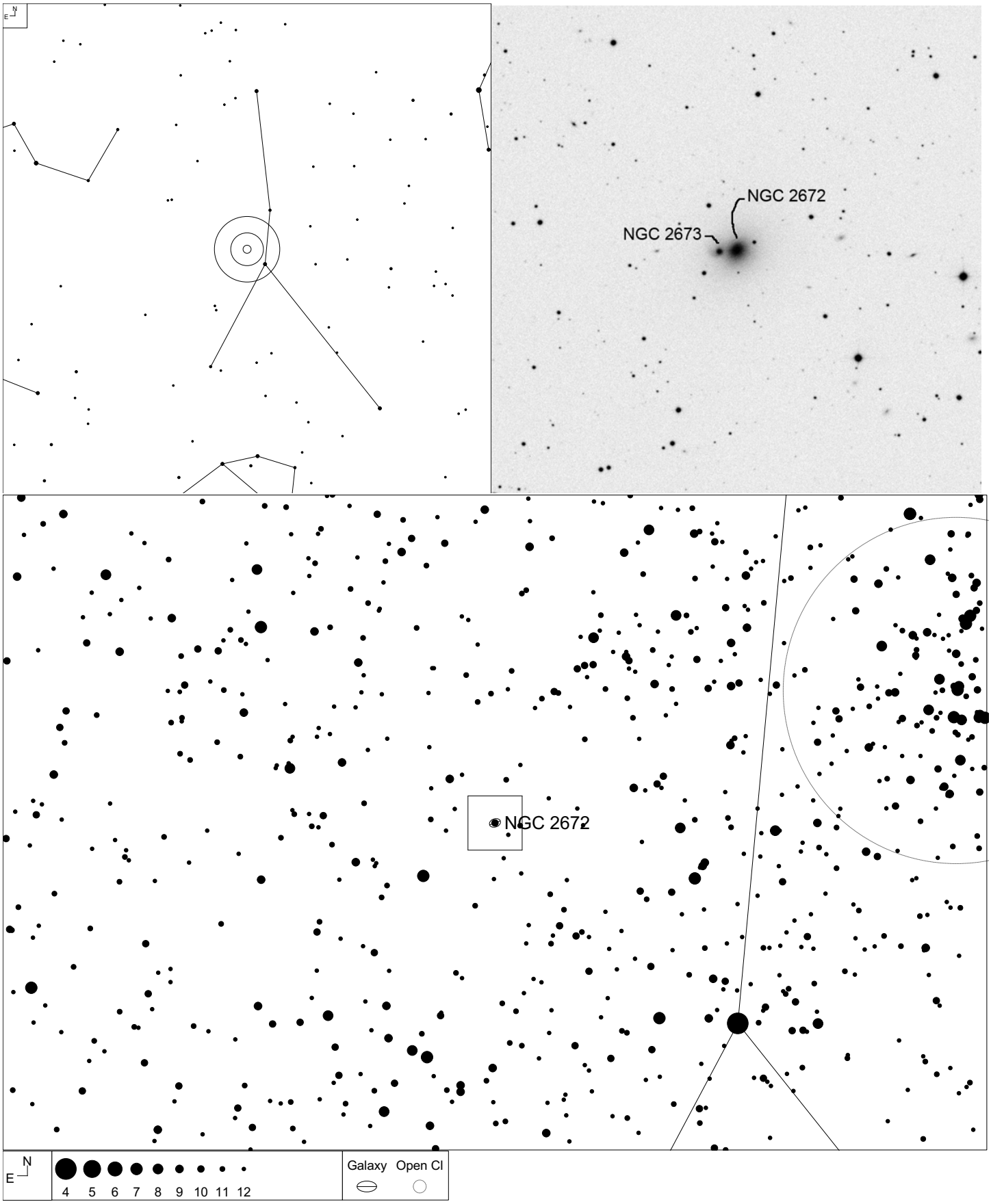
Object	2000	Const.	Dim.	Mag.	z	Distance	U - 1
☐ PGC 44984, H 63A	13 02 17.4 – 32 45 44	Cen	1.3 x 0.4	14.9 (B)	0.016361	220M	U-370
PGC 44979, H 63C			0.7 x 0.5	15.5 (B)	0.032102	428M	
☐ NGC 5353, H 68A	13 53 26.7 + 40 16 59	CVn	3.3 x 1.8	12.0 (V)	0.007755	105M	U-76
NGC 5354, H 68B			2.8 x 2.2	12.3 (V)	0.008603	116M	
☐ UGC 8960	14 02 43.1 + 39 10 06	CVn	2.0 x 0.4	14.4	0.018937	254M	U-77
UGC 8962			1.1 X 1.1	14.8	0.019992	268M	
PGC 50020			0.4 x 0.3	16.1	0.068000	889M	
☐IC 4371, H70A	14 04 10.1 + 33 20 15	CVn	1.4 x 0.3	14.7	0.027479	367M	U-110
IC 4370, H 70D	14 04 09.8 + 33 20 45		0.5 x 0.3	15.7	0.062863	825M	
☐ NGC 5526	14 13 51.8 + 57 46 13	Uma	1.9 x 0.2	14.3	0.006685	90M	U-49
MCG +10-20-84			0.8 x 0.5	15.2	0.039988	531M	
☐ NGC 5532	14 16 52.9 + 10 48 27	Boo	1.6 x 1.6	14.1	0.024704	331M	U-197
UGC 9137	14 16 53.4 + 10 47 54		0.7 x 0.5	15.0	0.0230	308M	
☐NGC 5679B, Arp274	14 35 08.8 + 05 21 23	Vir	1.1 x 0.7	13.8	0.028900	386M	U-197
NGC 5679A			1.3 x 0.6	14.5	0.025604	343M	
☐ UGC 9401	14 36 09.2 + 21 47 37	Boo	1.5 x 0.6	14.3 (P)	0.018773	252M	U-152
MAC 1436+2148	14 36 06.3 + 21 48 01		0.5 x 0.2	17.7	0.087047	1.127B	
☐ NGC 5707	14 37 30.8 + 51 33 42	Boo	2.5 x 0.4	13.1	0.007378	100M	U-50
PGC 52269			1.0 x 1.0	15.6	0.043717	579M	
☐ UGC 9602	14 55 55.3 + 11 51 42	Boo	0.8 x 0.58	14.6	0.032196	429M	U-198
CGCG 76-100			0.7 x 0.78	14.5	0.029574	395M	
☐ NGC 5829, H 73A	15 02 42.0 + 23 20 01	Boo	1.5 x 1.0	14.1	0.018797	253M	U-153
IC 4526, H73B	15 02 38.2 + 23 21 04		0.5 x 0.4	15.7	0.045648	604M	
☐ CGCG 135-51	15 21 40.6 + 25 50 33	CrB	0.4 x 0.4	15.2	0.033946	452M	U-154
CGCG 135-51-02	15 21 39.6 + 25 50 46			16.8	0.0745	971M	
☐ UGC 10052	15 49 59.4 + 20 48 20	Ser	0.5 x 0.4	14.4	0.035923	478M	U-155
UGC 10052-01	15 49 57.3 + 20 48 19		0.8 x 0.7	14.7	0.035149	468M	
☐ CGCG 224-13	16 23 27.7 + 41 42 23	Her	0.7 x 0.5	14.6 (P)	0.028039	375M	U-79
J162326.33+414231-7				17.5	0.134002	1.69B	
☐ MCG +7-34-64	16 28 44.4 + 39 28 26	Her	0.8 x 0.8	14.1	0.027225	364M	U-80
MCG +7-34-69			0.7 x 0.3	15.7	0.025898	347M	
☐ NGC 6365A	17 22 43.8 + 62 09 58	DrA	1.5 x 1.0	14.7	0.028341	379M	U-29
NGC 6365B			1.1 x 0.3	16.5	0.026801	**359M**	
☐ NGC 6962	20 47 19.0 + 00 19 15	Aqr	3.3 x 2.2	13.3	0.014046	189M	U-254
NGC 6964			1.7 x 4.2	13.8	0.012689	171M	

Good Luck – Good Hunting

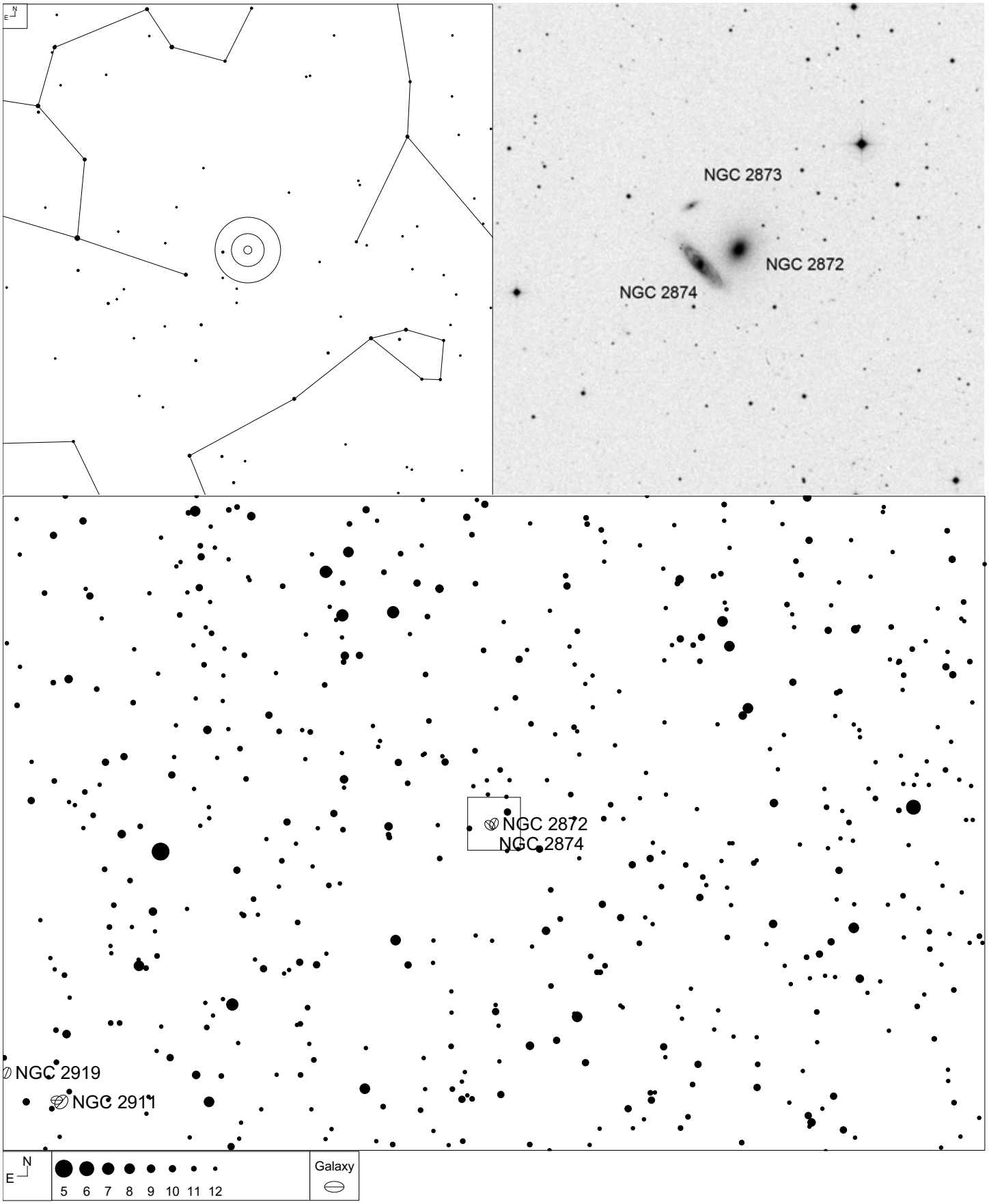
Larry Mitchell -- Jim Chandler

H_o = 72 km s^{-1} Mpc^{-1}
Open Universe

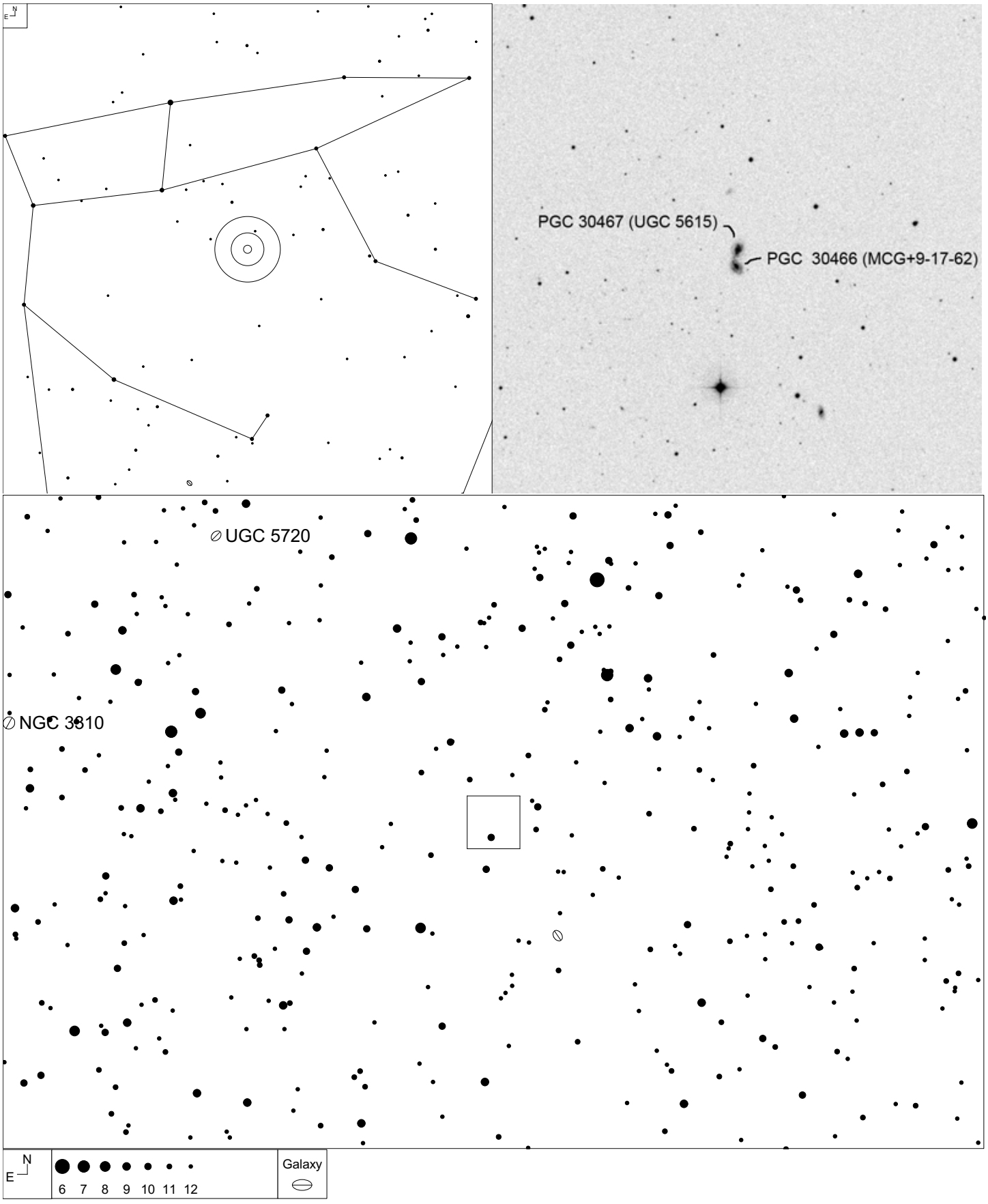
NGC 2672 and NGC 2673 (Cancer)



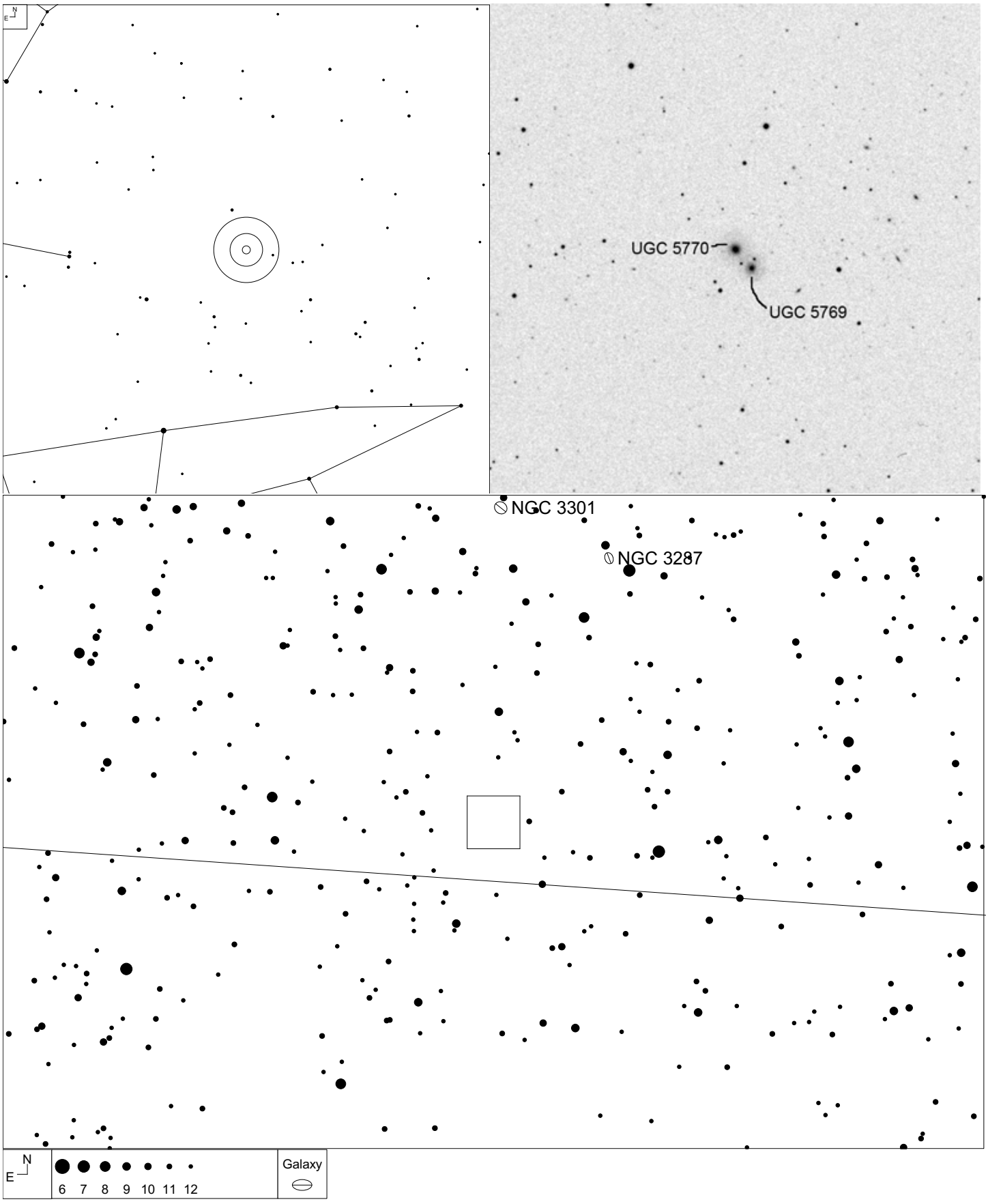
NGC 2872 and NGC 2874 (Leo)



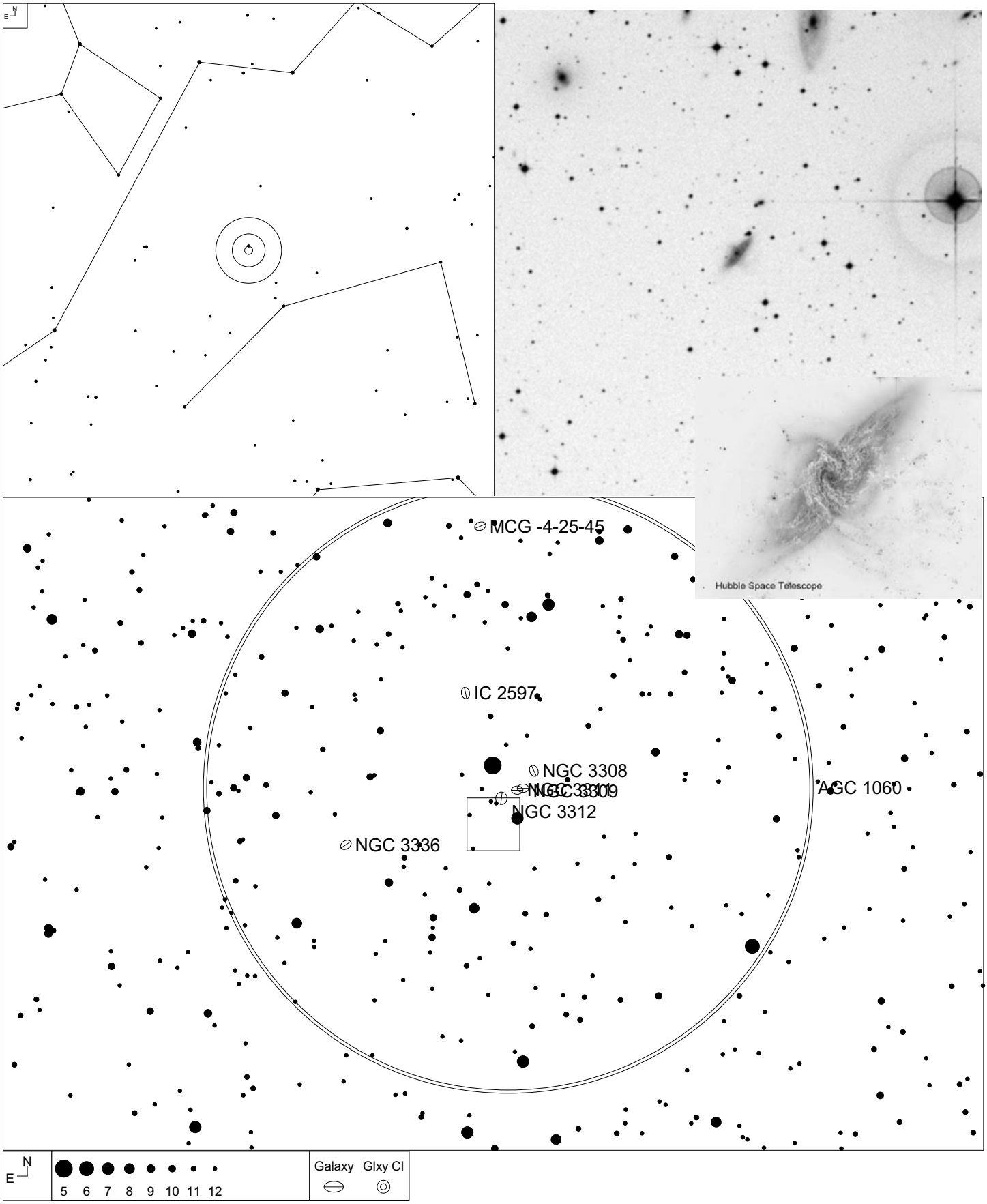
PGC 30467 and PGC 30466 (Ursa Major)



UGC 5770 and UGC 5769 (Leo)

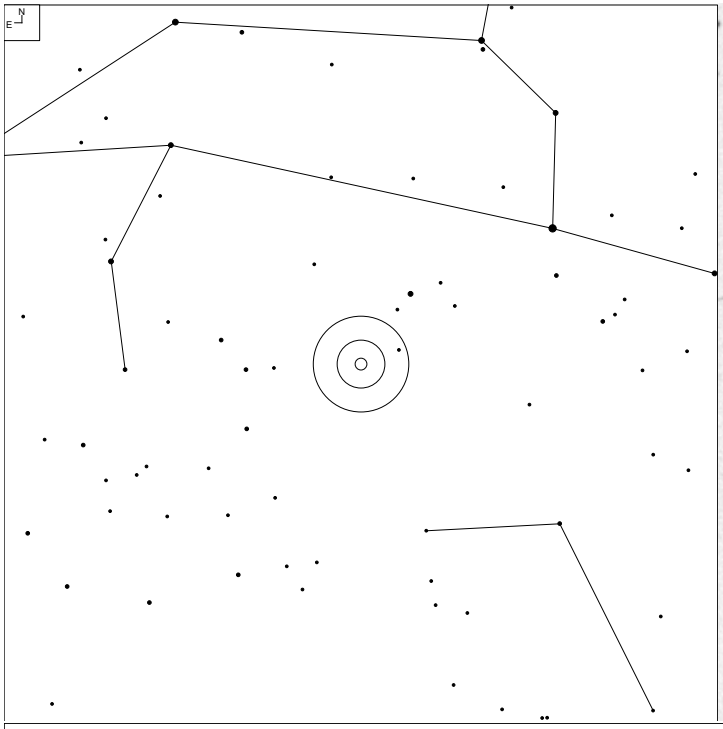


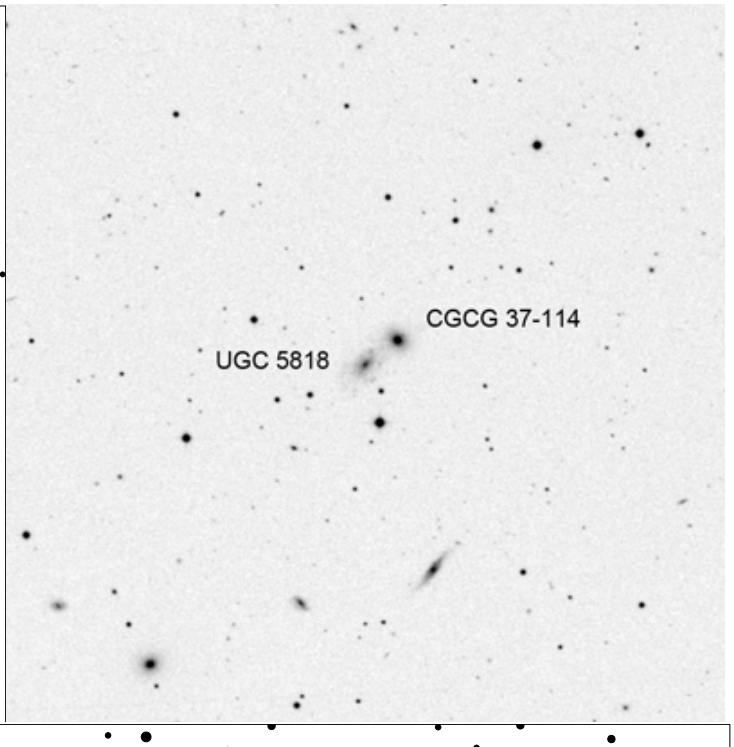
NGC 3314A and NGC 3314B (Hydra)

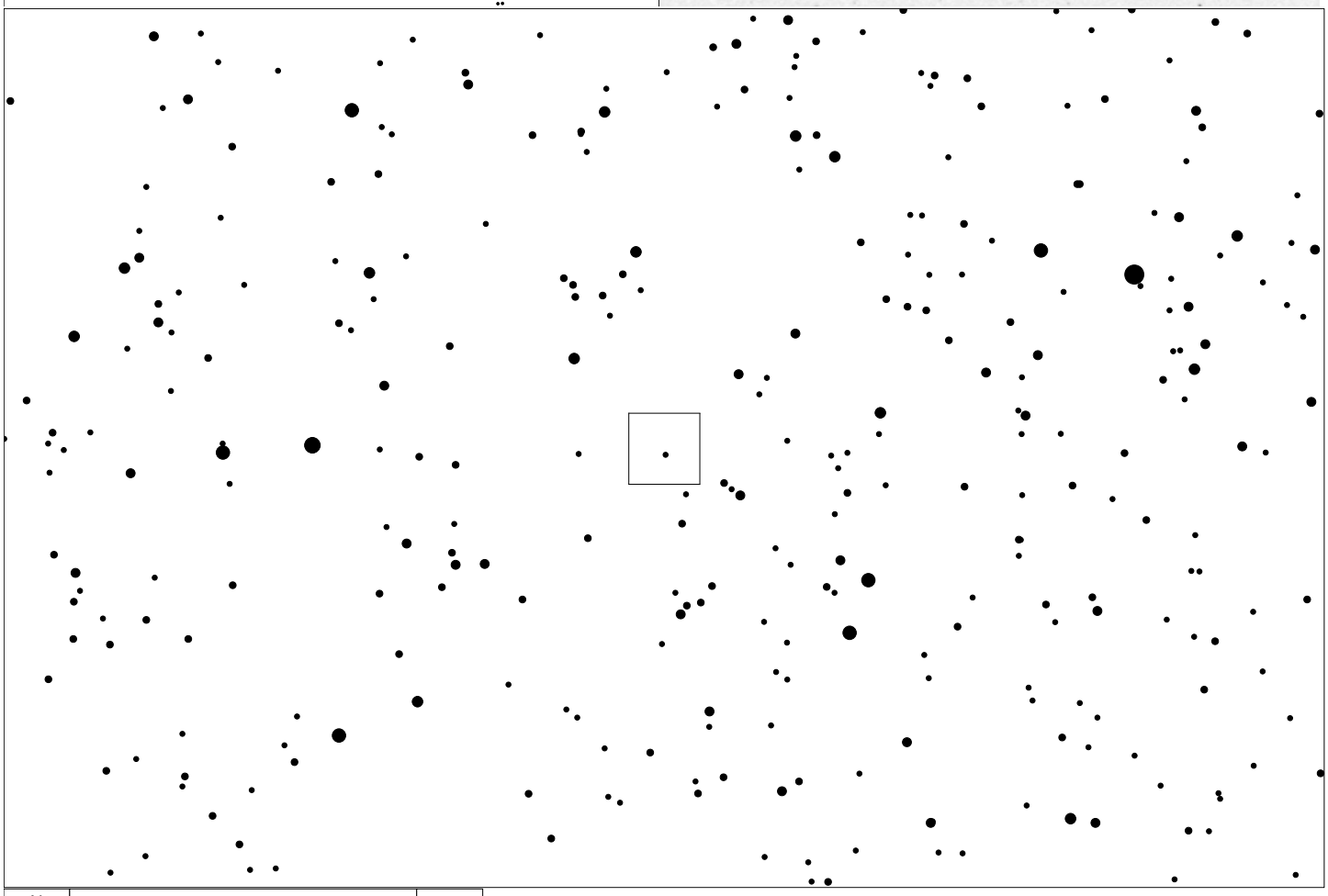


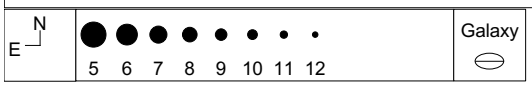
Superimposed on top of each other.

UGC 5818 and CGCG 37-114 (Leo)

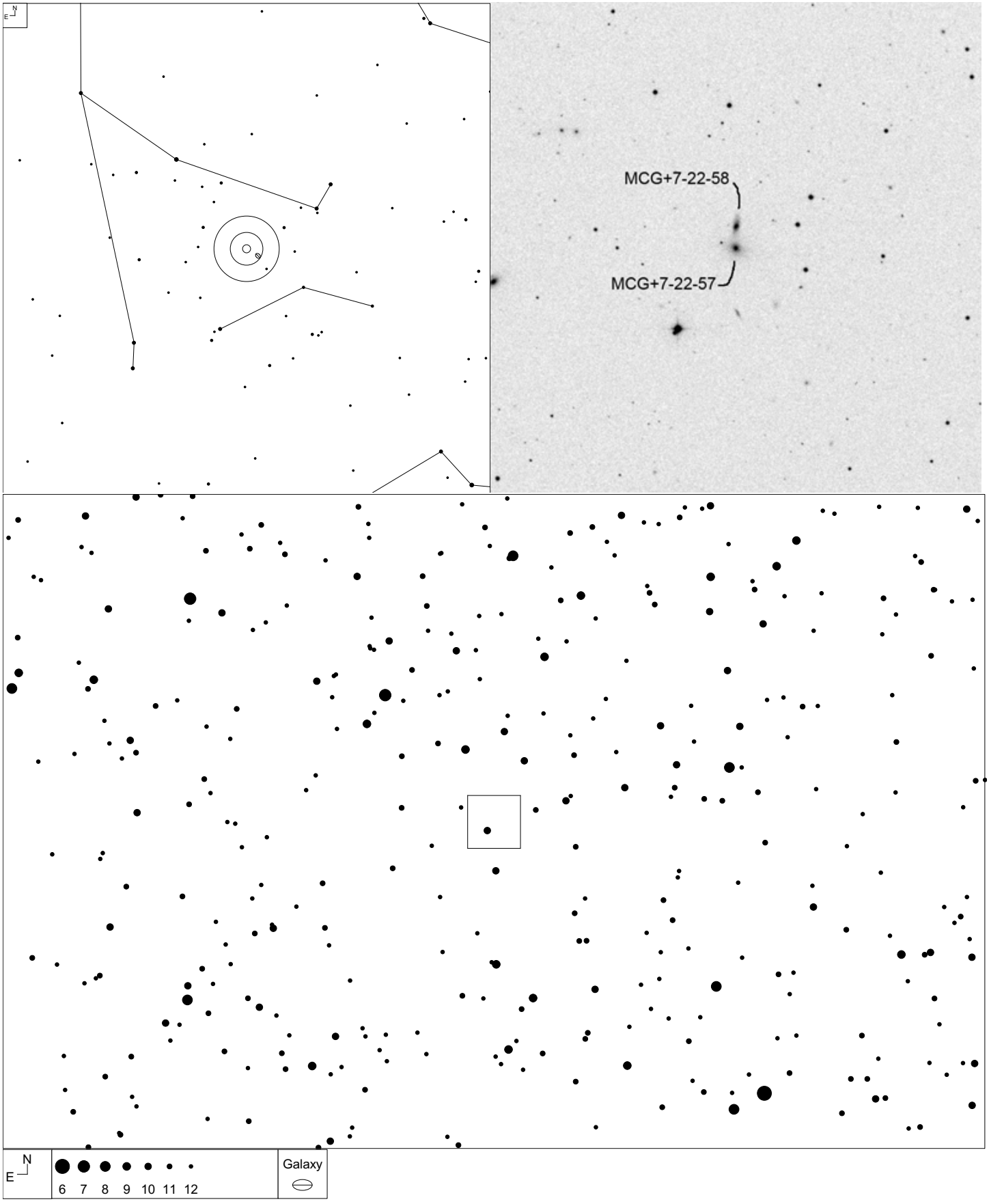




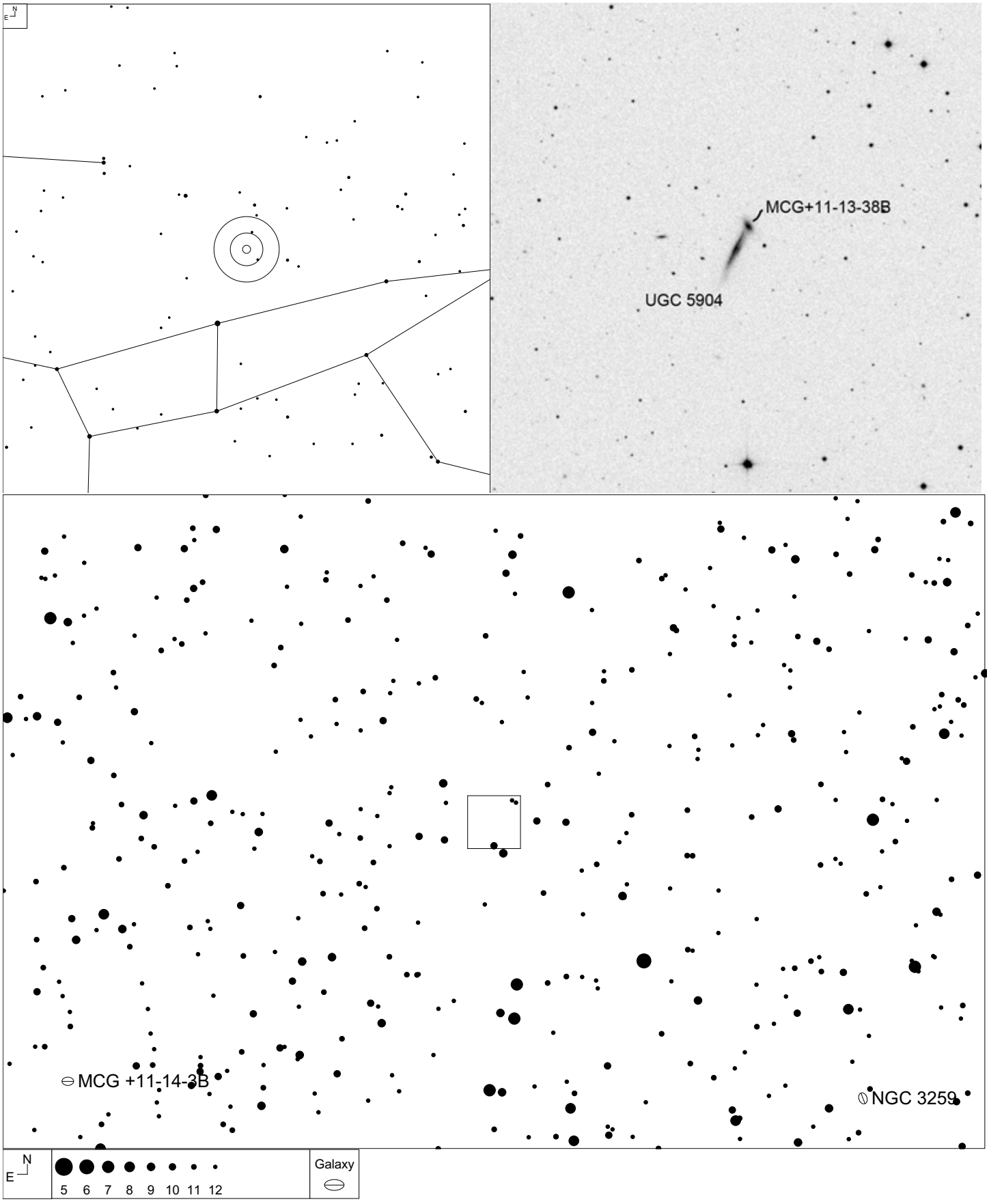




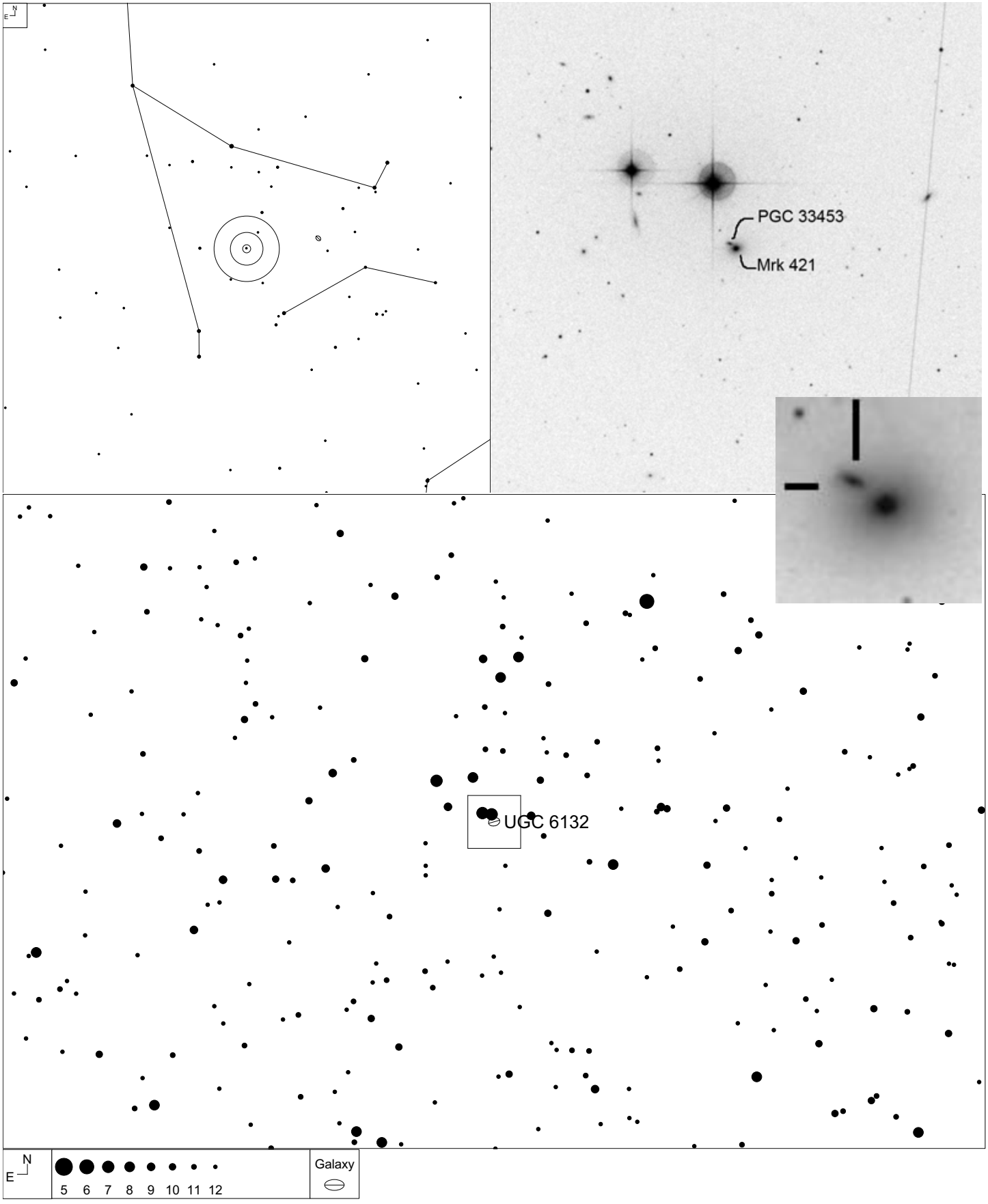
MCG+7-22-57 and MCG +7-22-58 (Leo)



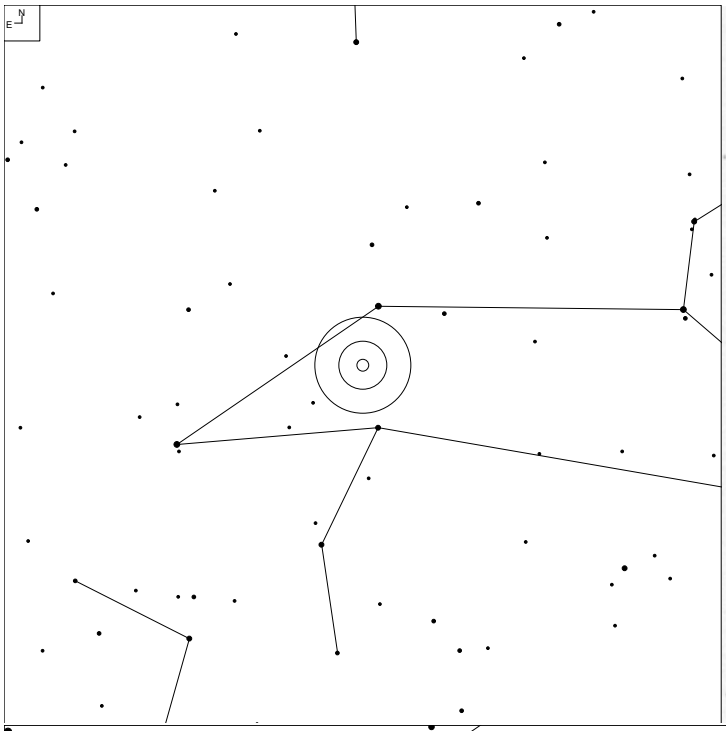
UGC 5904 and MCG+11-13-38B (Ursa Major)

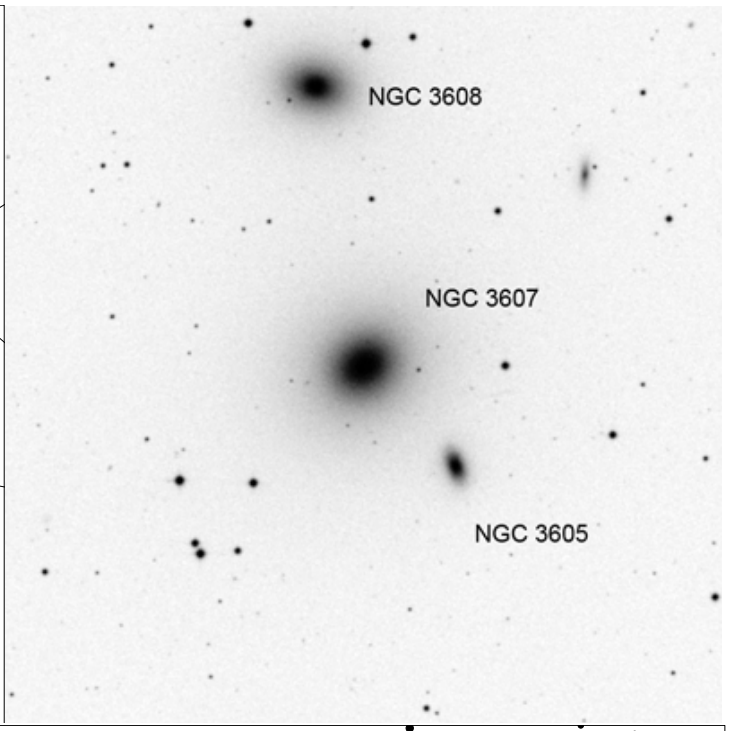


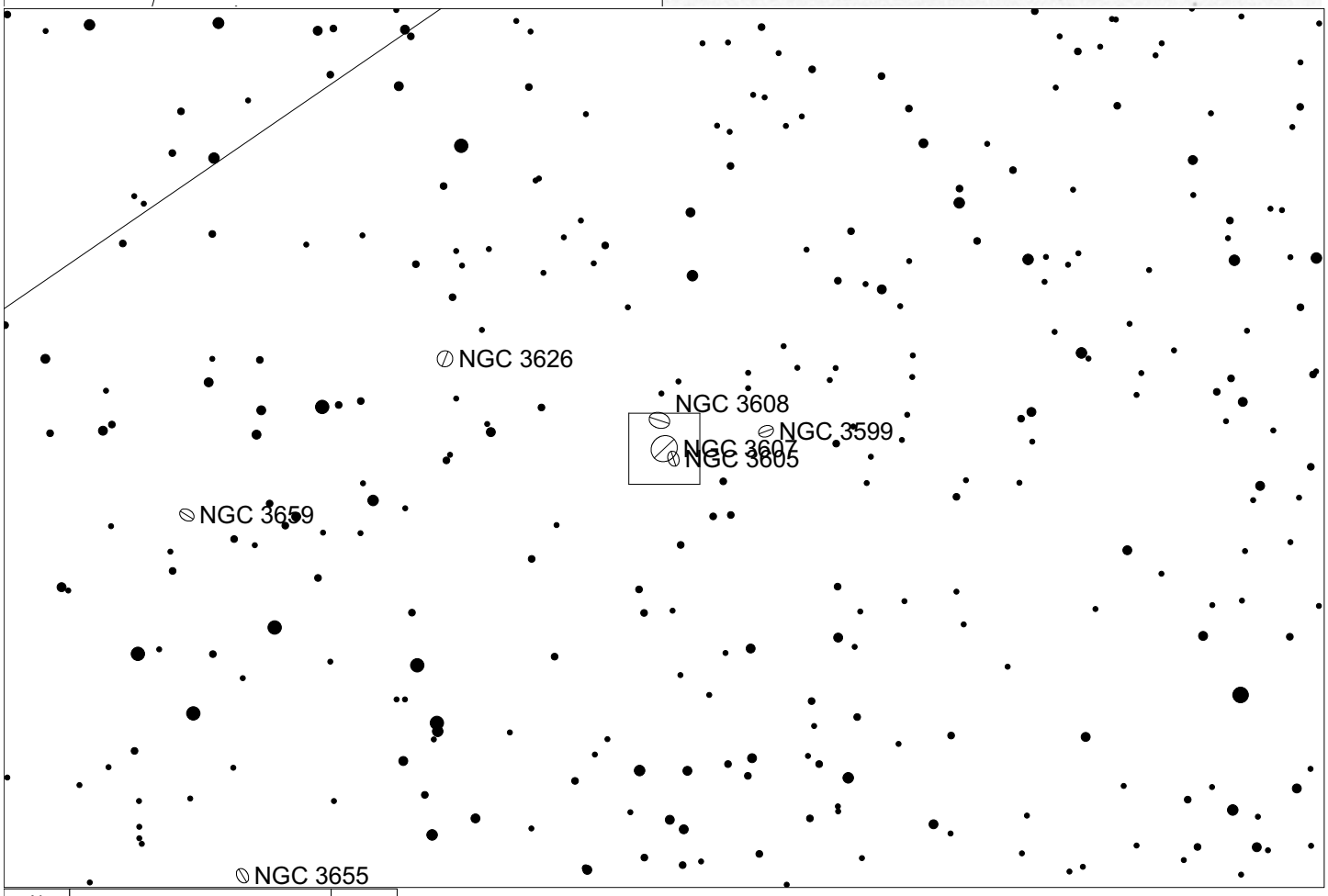
Markarian 421 and PGC 33453 (Ursa Major)

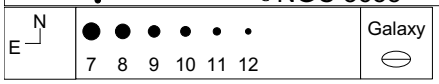


NGC 3607 and NGC 3605 (Leo)

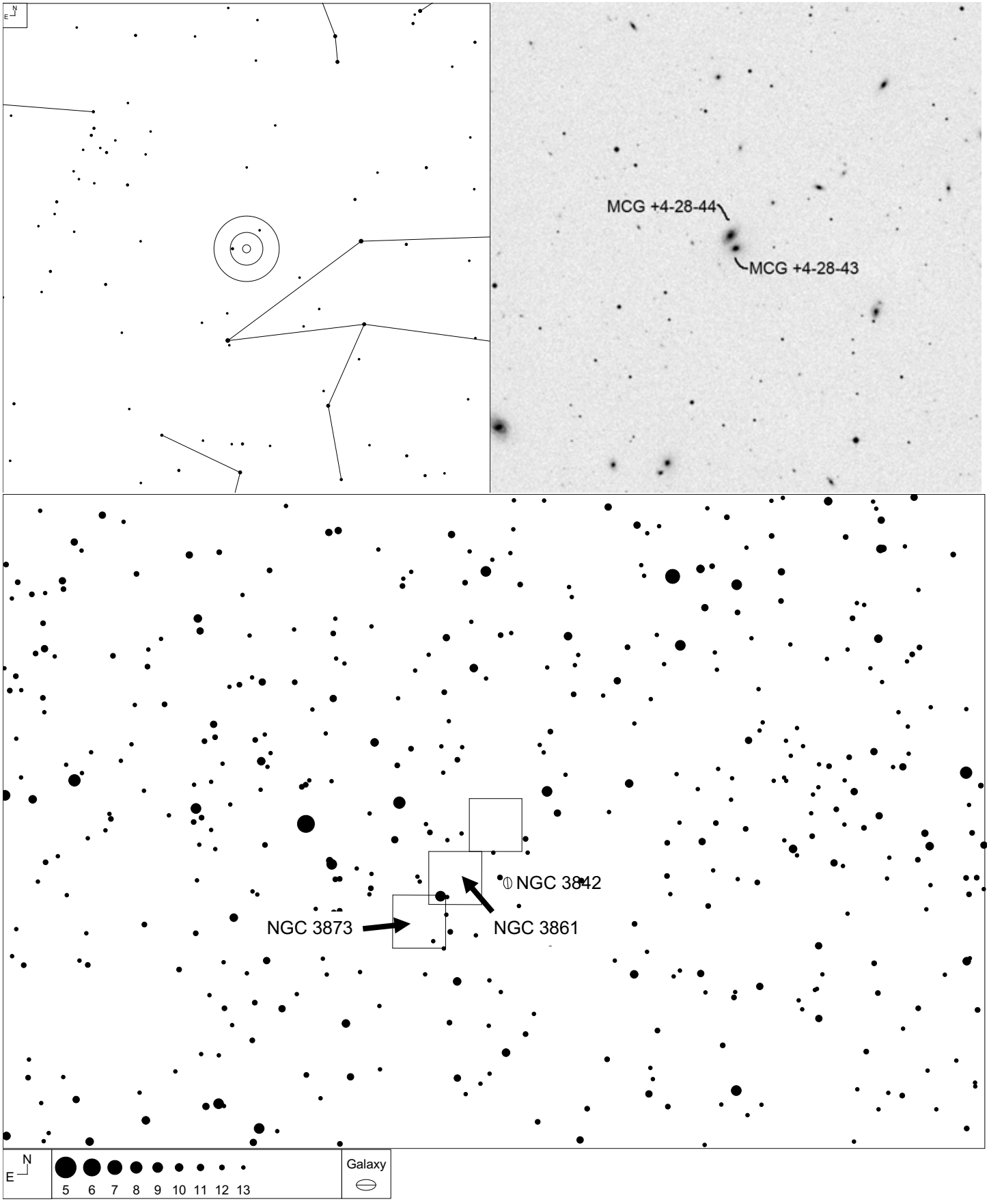




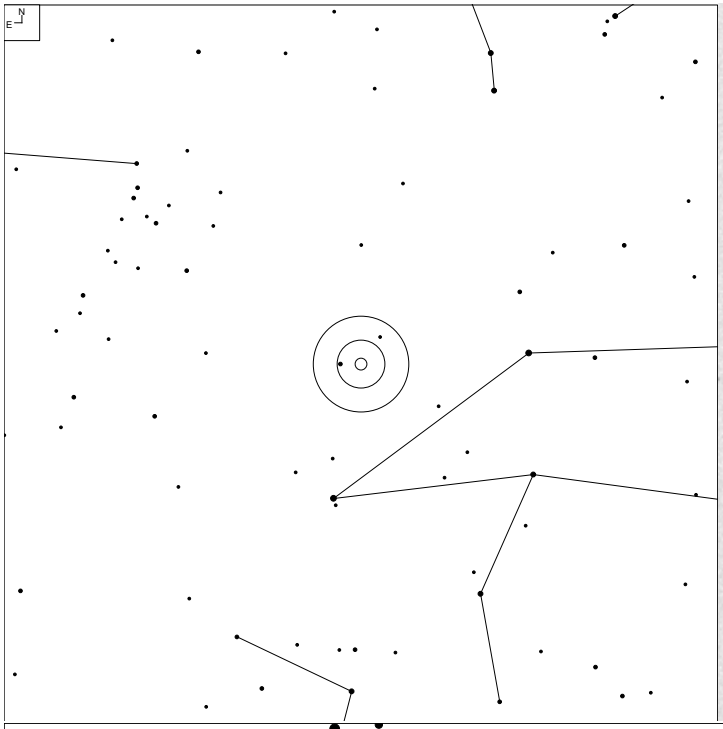


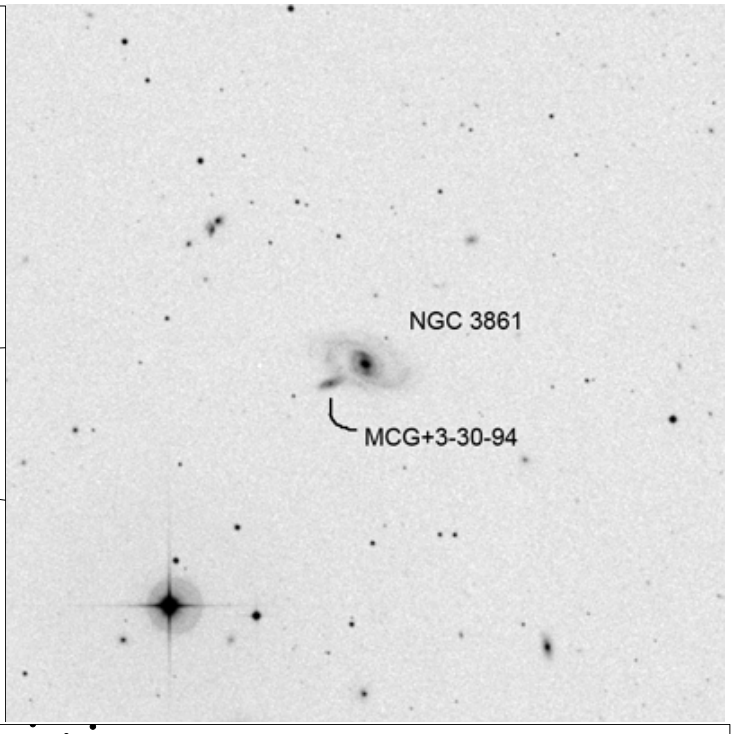


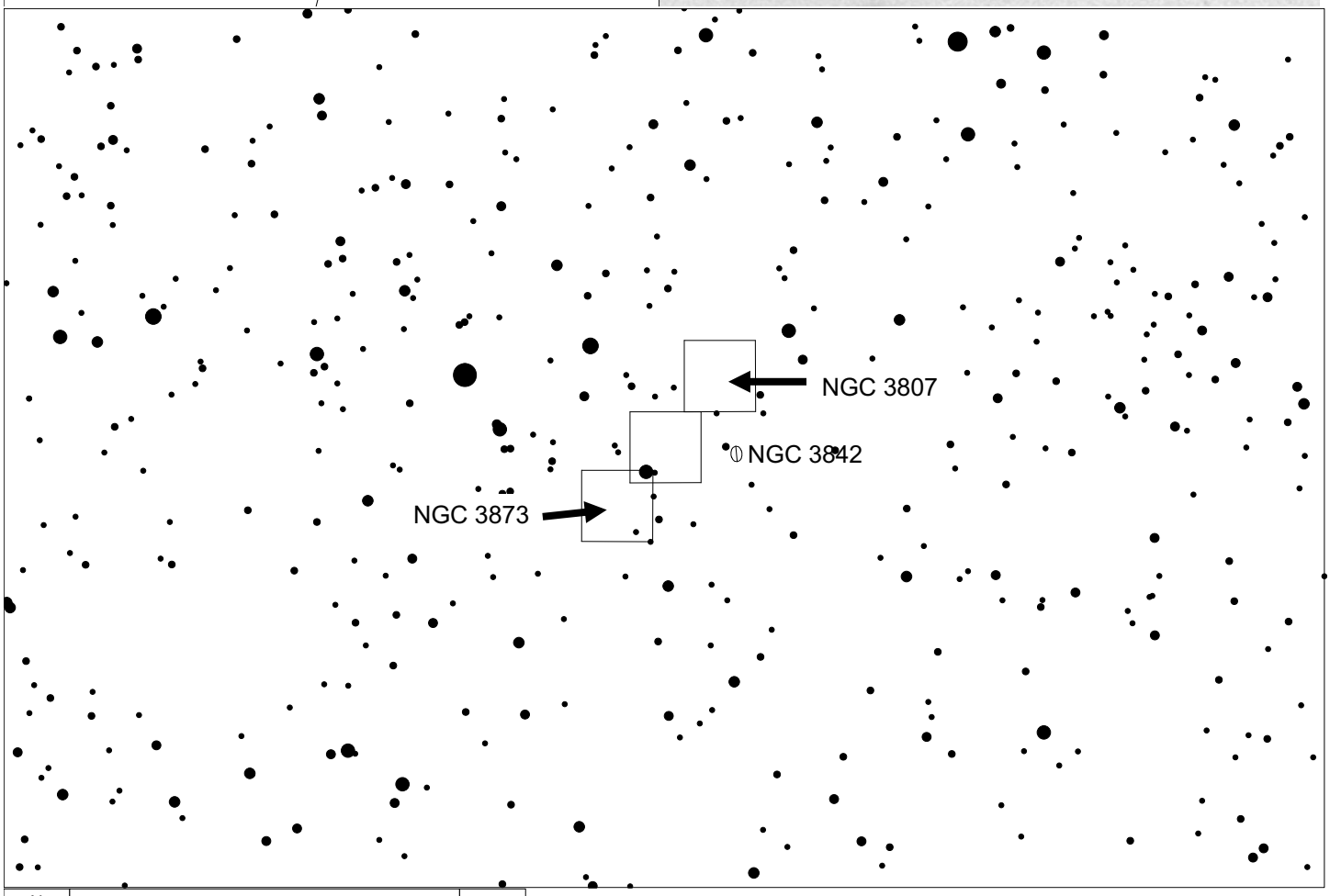
MCG +4-28-43 and MCG +4-28-44 (Leo)

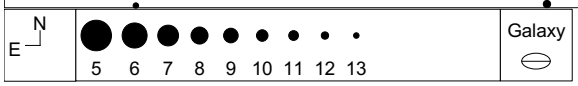


NGC 3861 and MCG +3-30-94 (Leo)

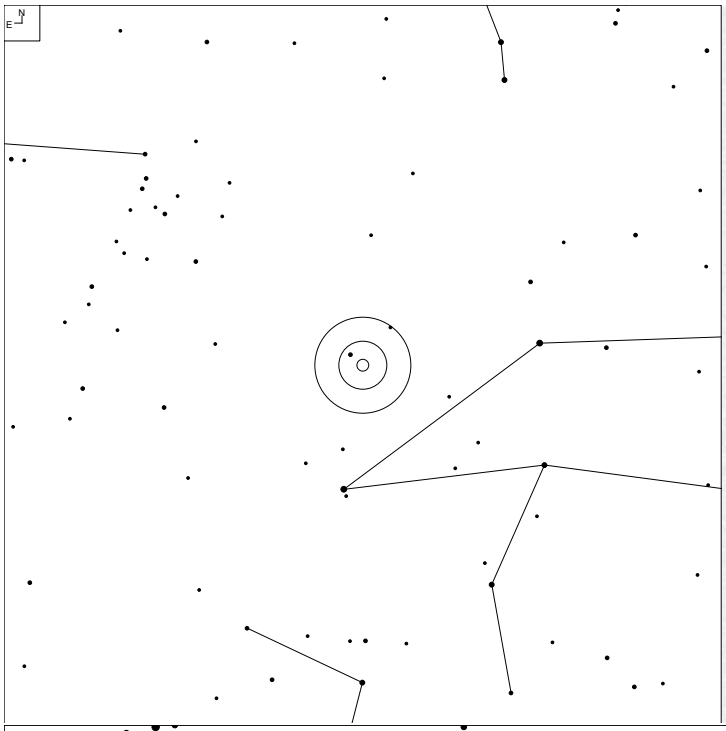


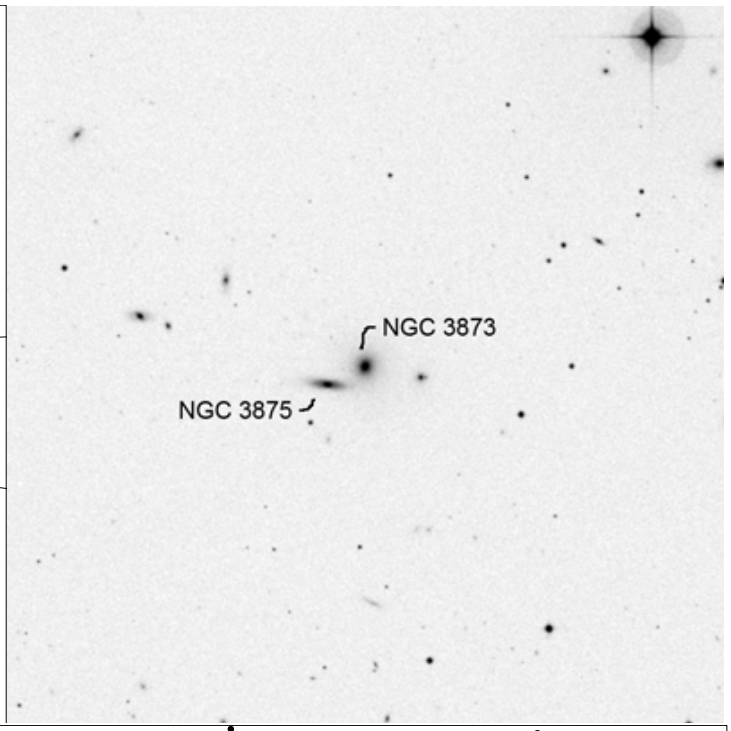


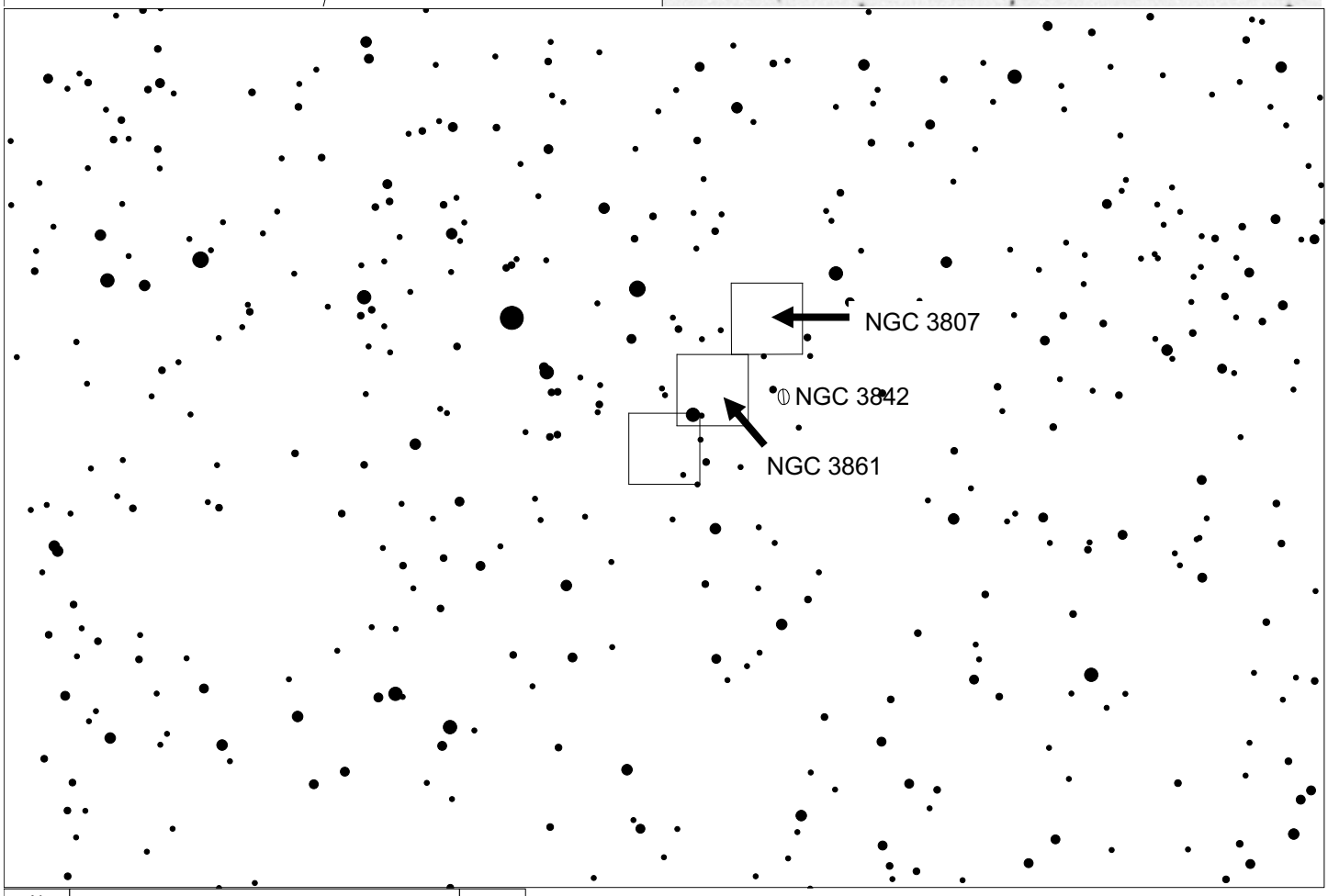


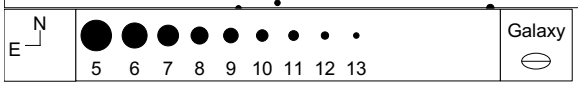


NGC 3873 and NGC 3875 (Leo)

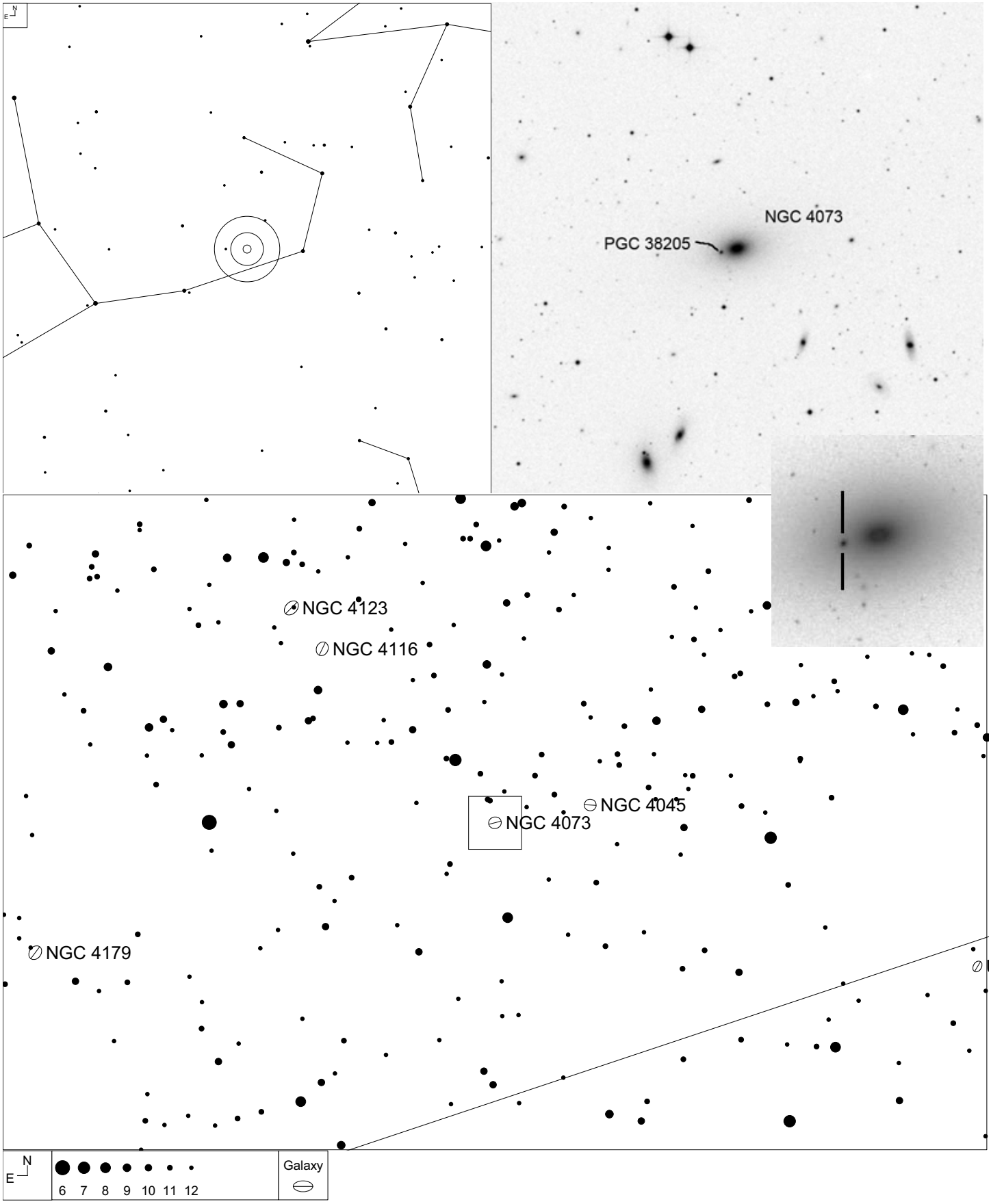




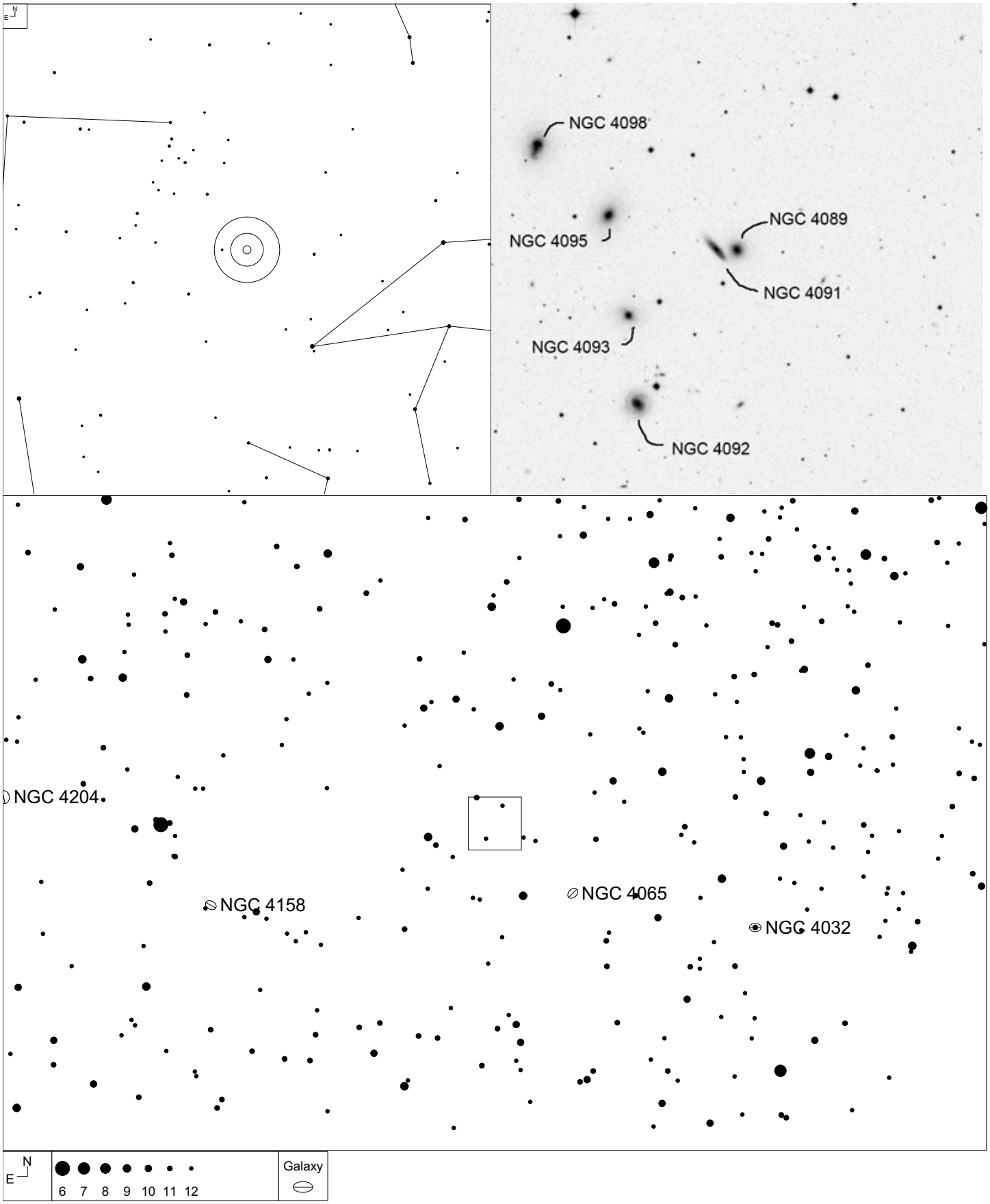




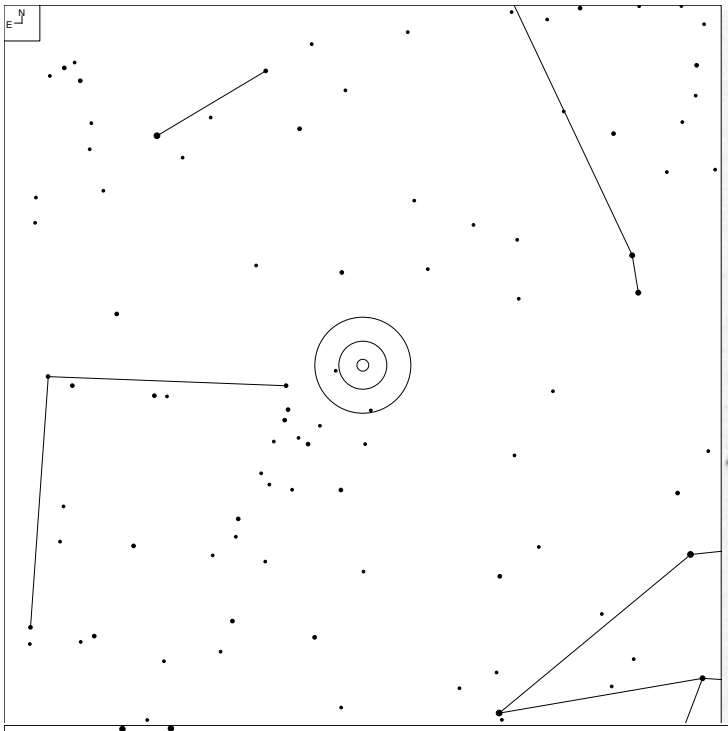
NGC 4073 and PGC 38205 (Virgo)

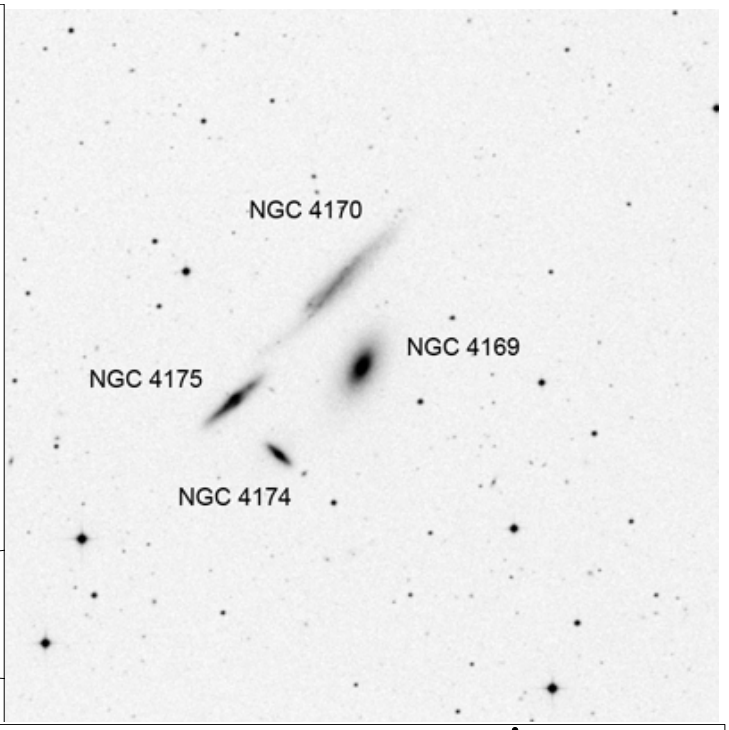


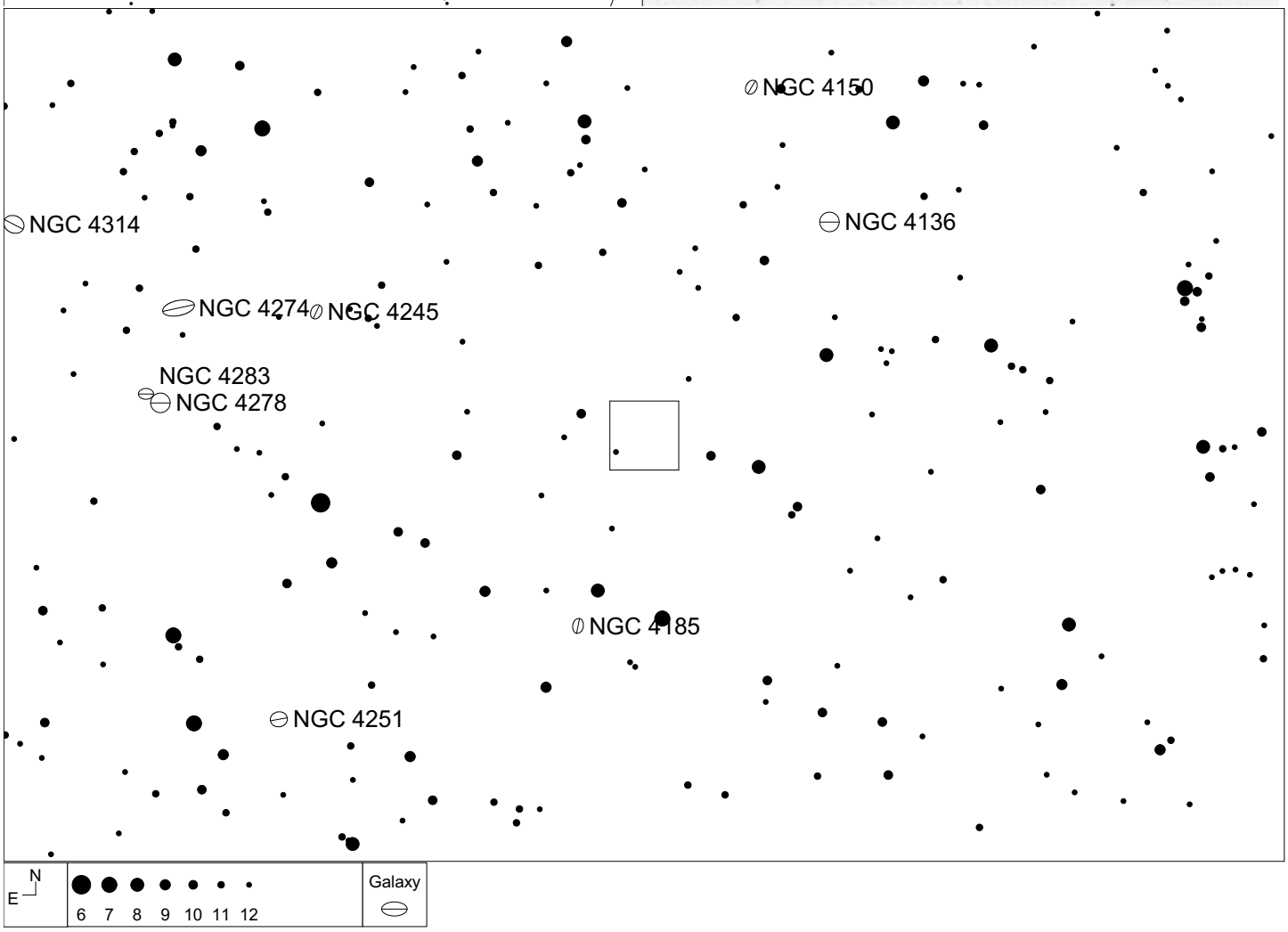
NGC 4089 and NGC 4091 (Coma Berenices)



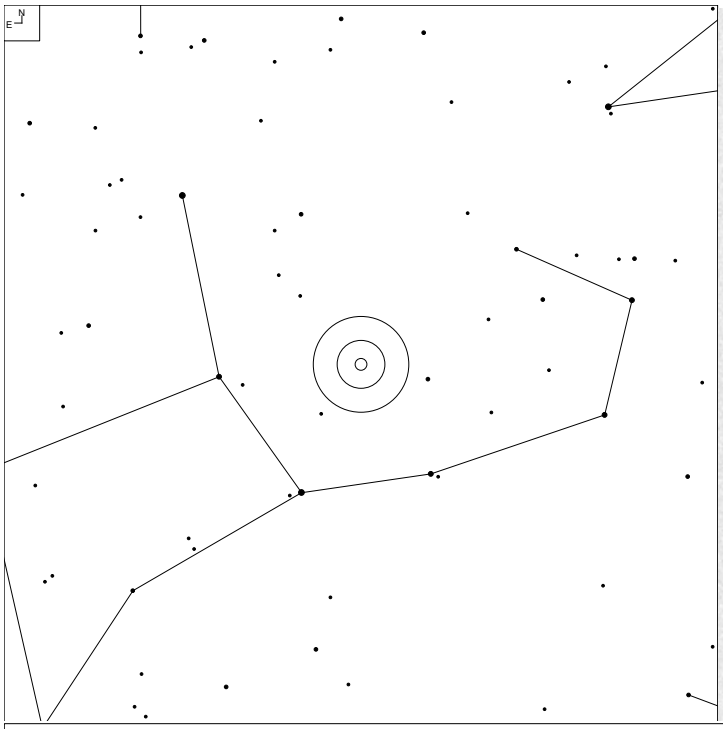
NGC 4169 and NGC 4173 – Hickson 61 (Coma Berenices)

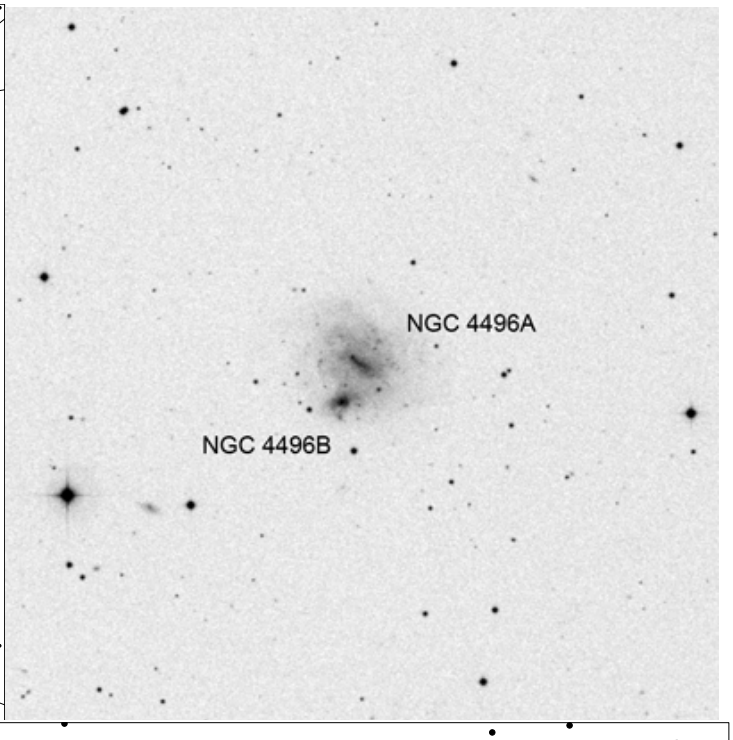


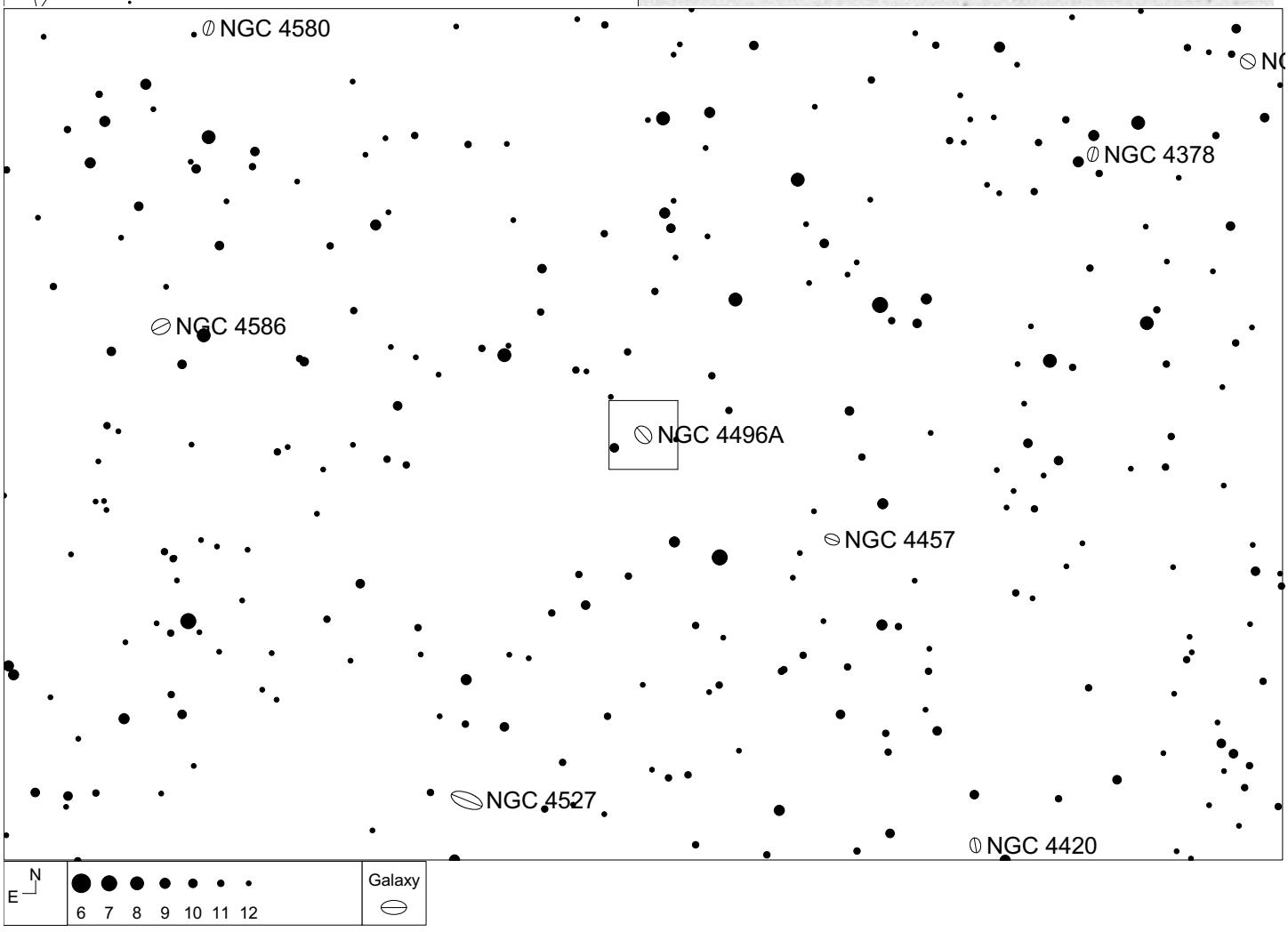




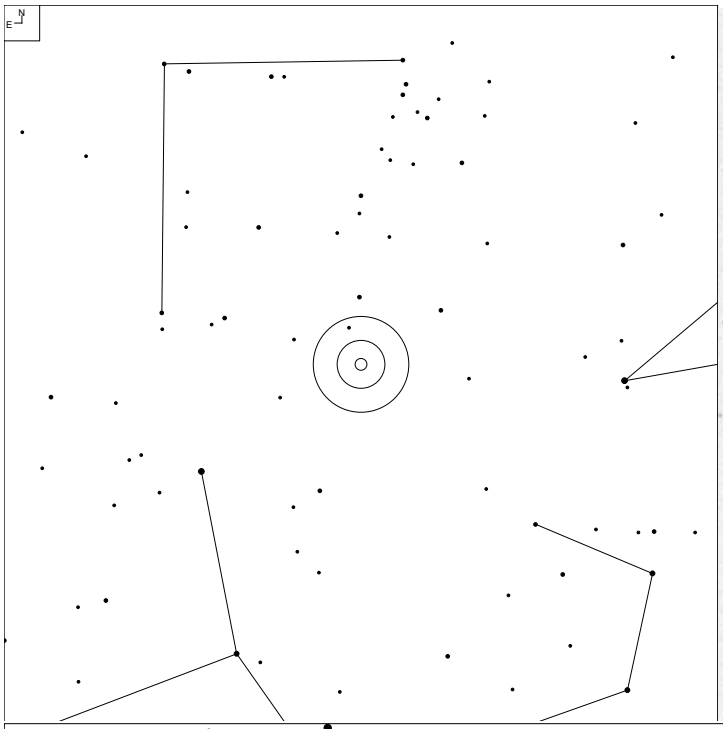
NGC 4496A and NGC 4496B (Virgo

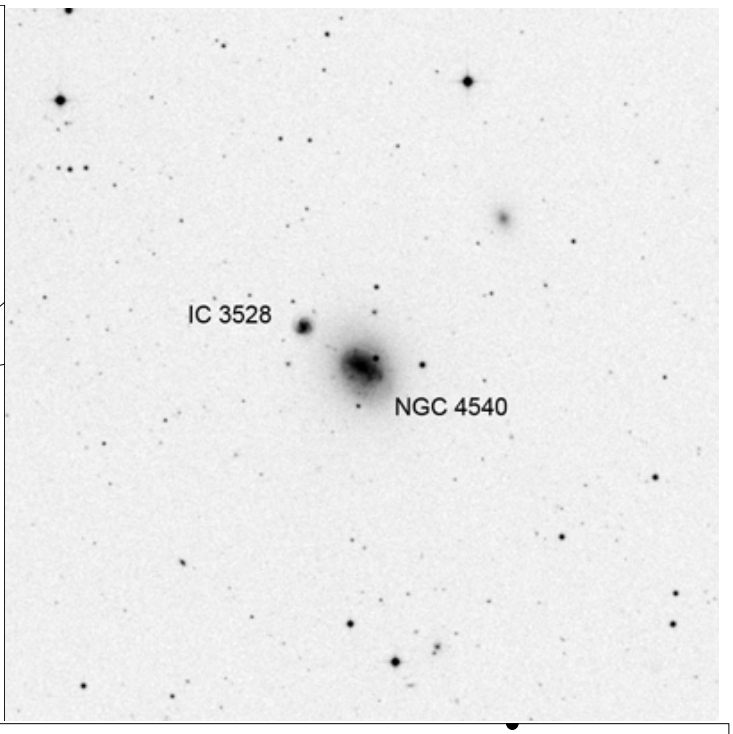


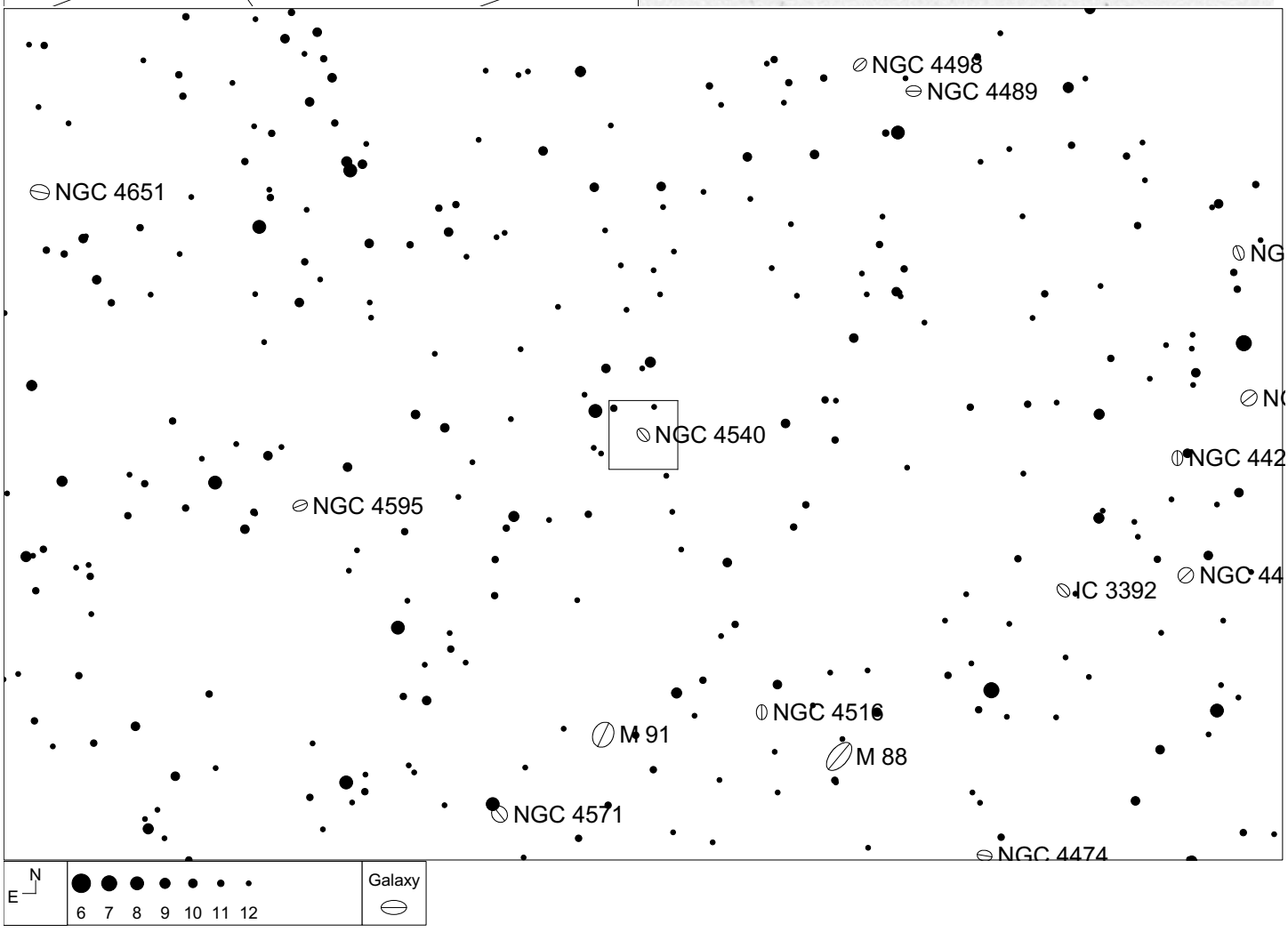




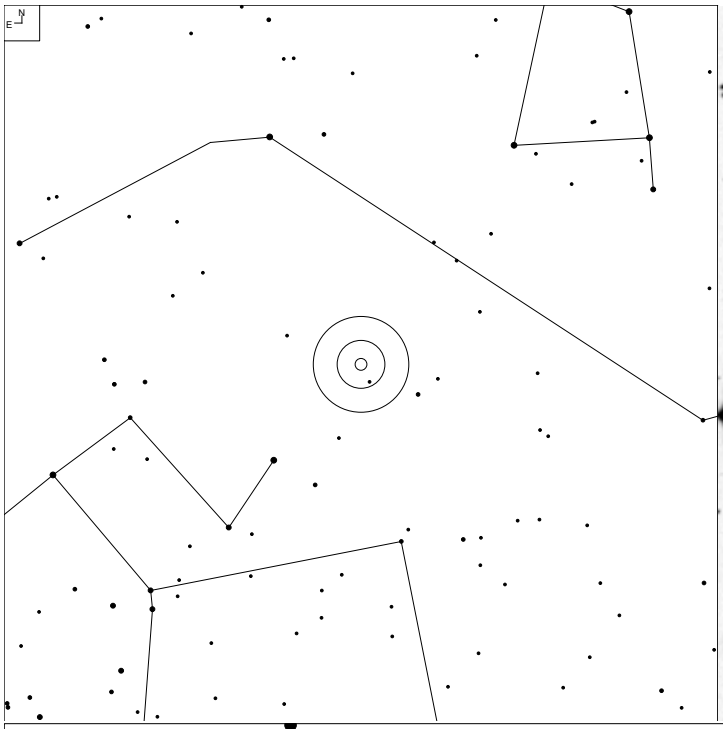
NGC 4540 and IC 3528 (Coma Berenices)

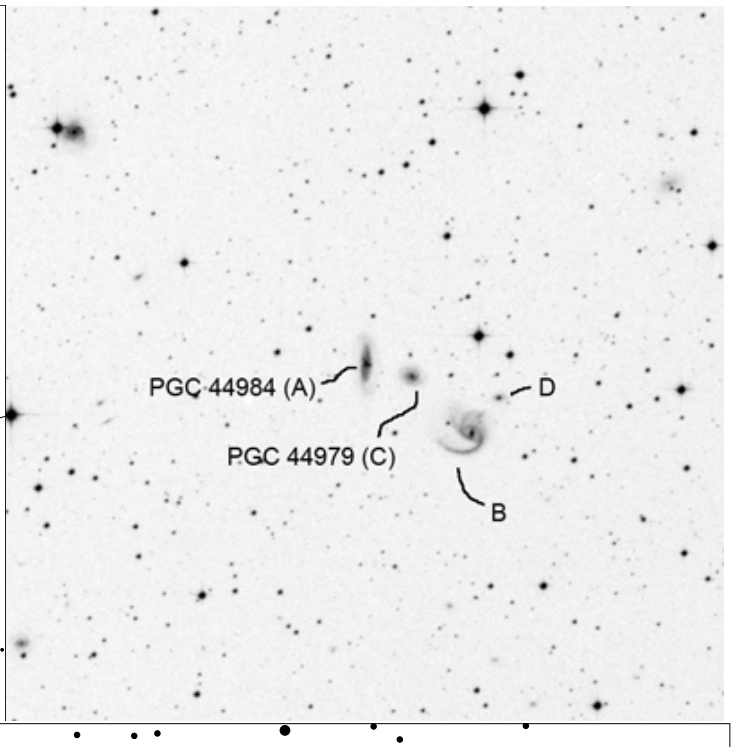


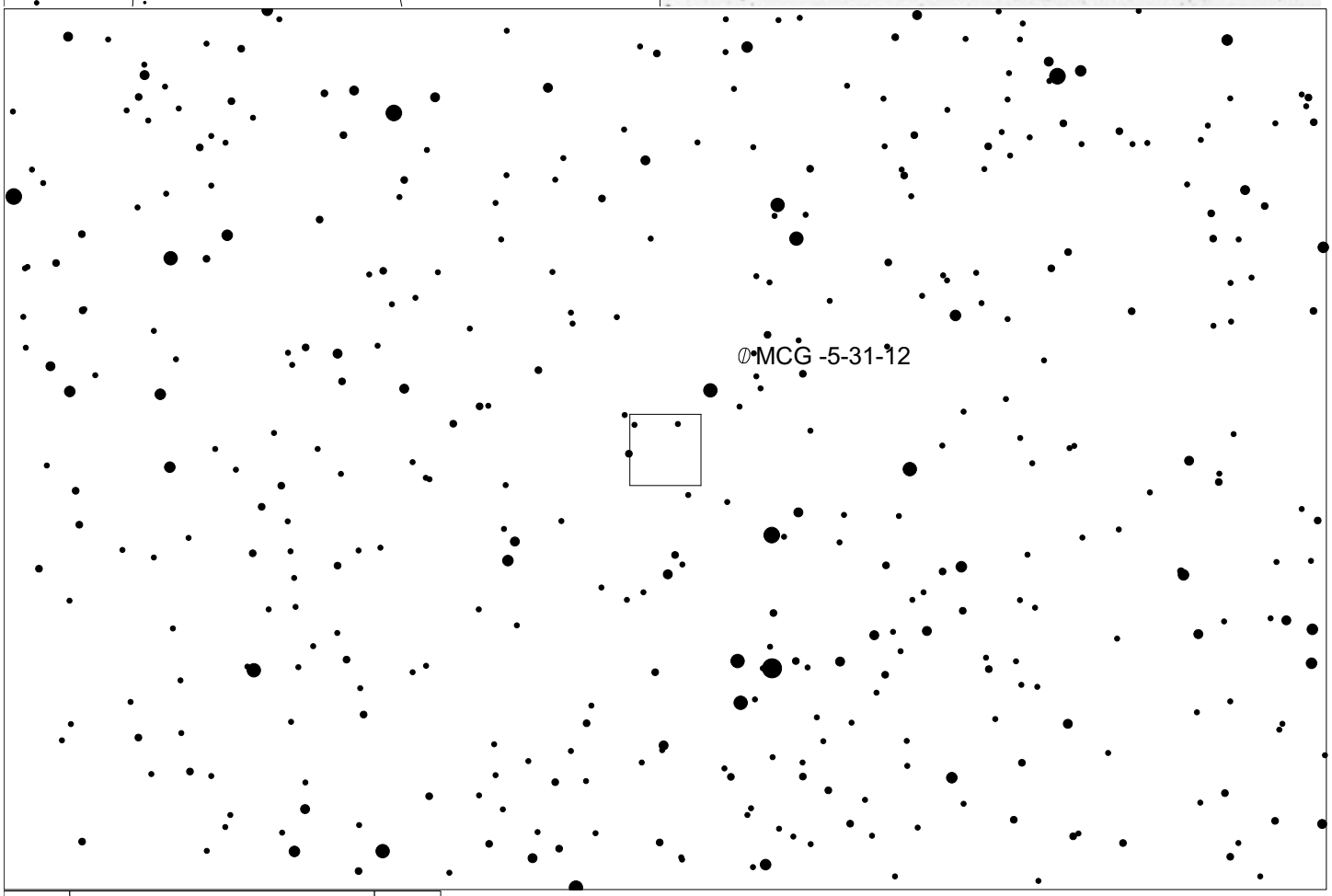


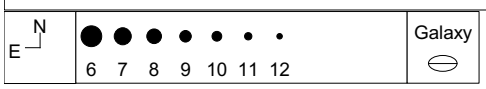


PGC 44984 and PGC 44979 Hickson 63 (Centarus)

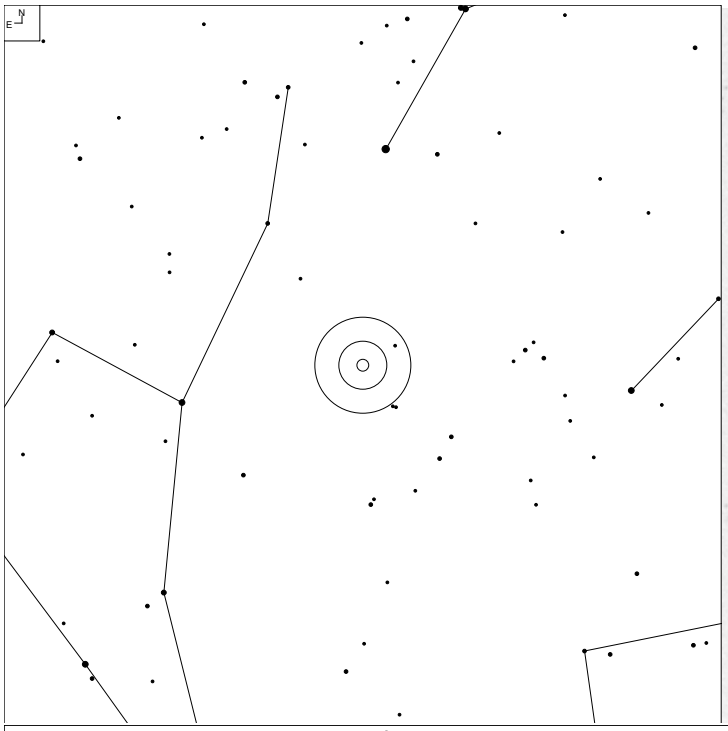


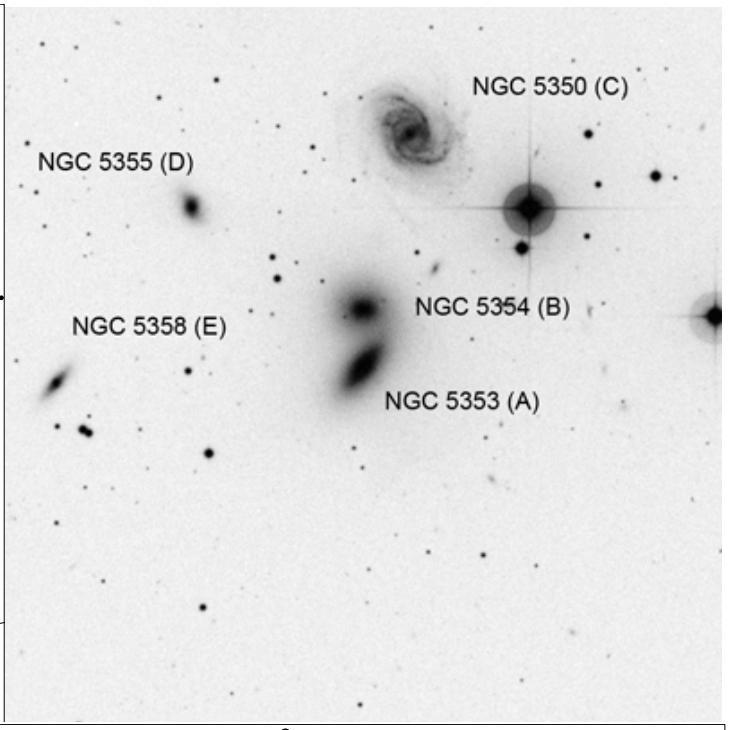


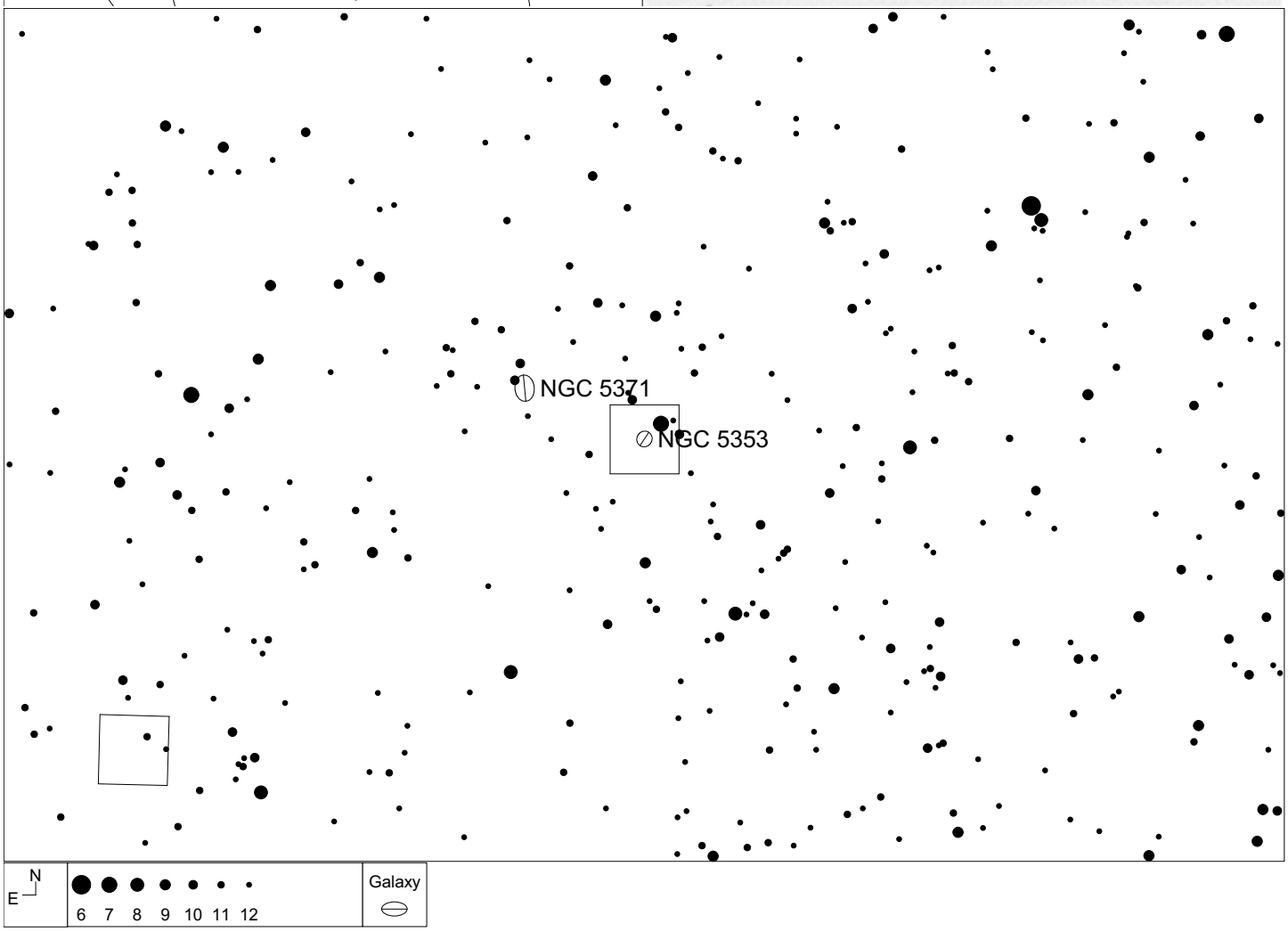




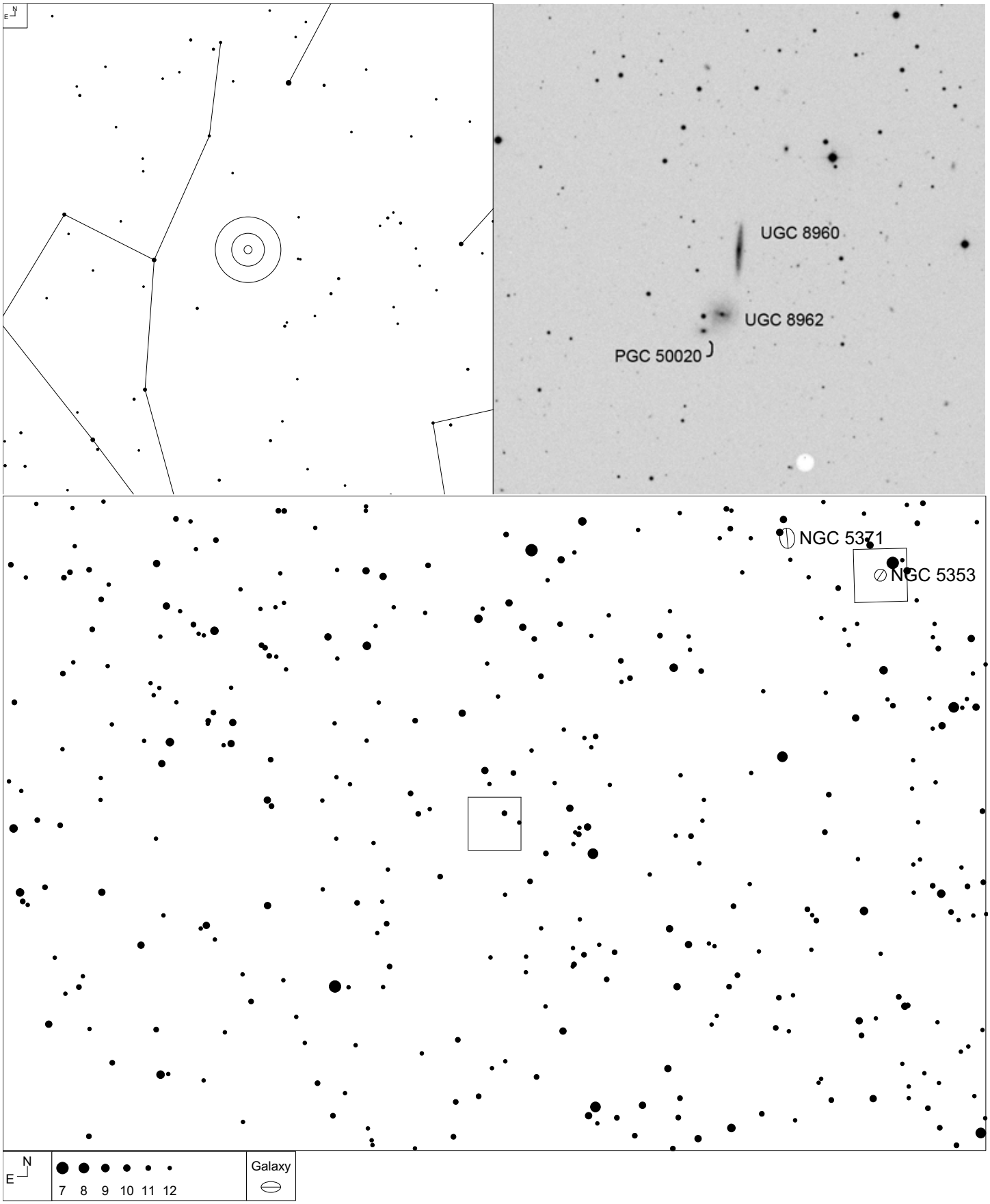
NGC 5353 and NGC 5354 - Hickson 68 (Canes Venatici)



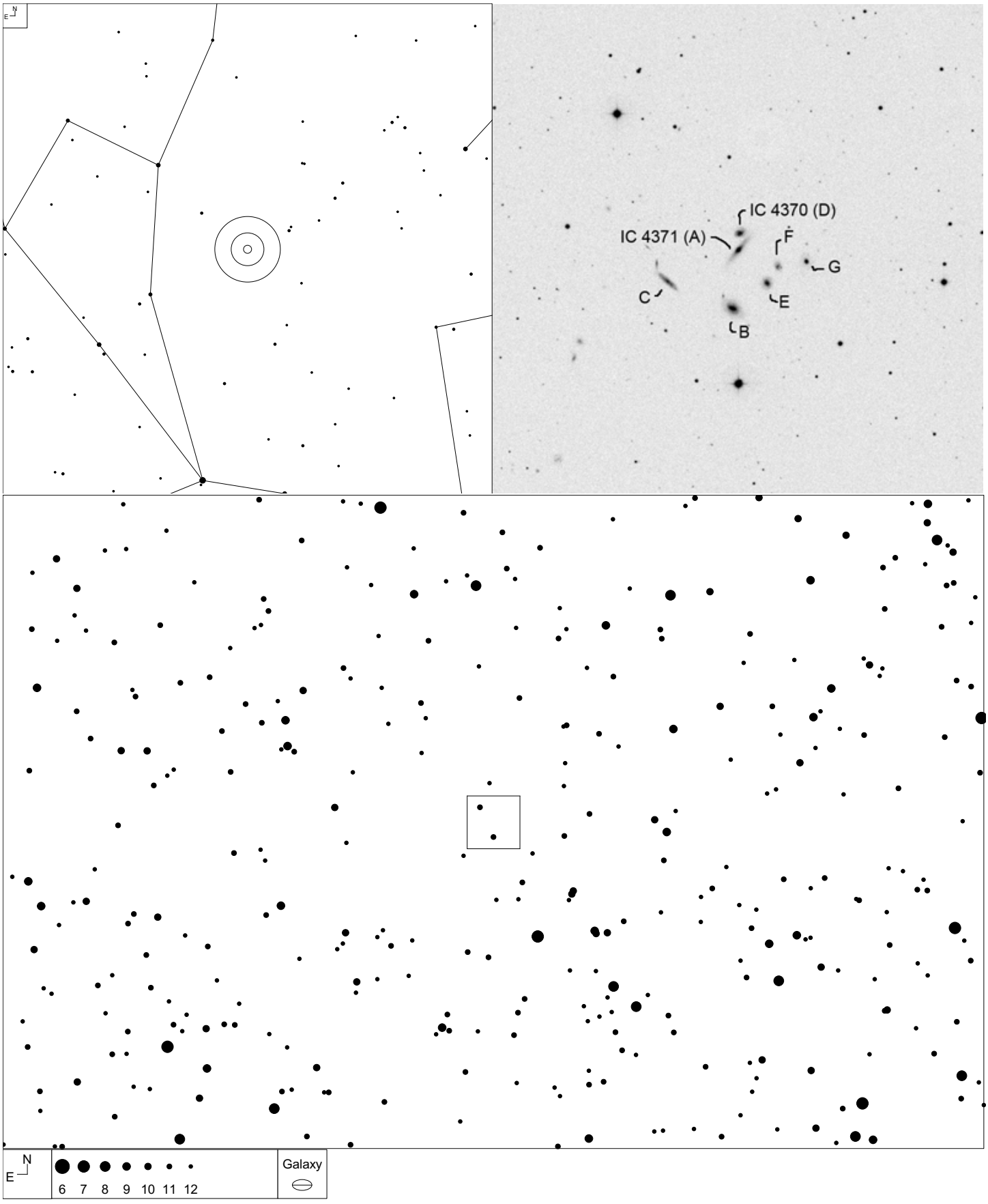




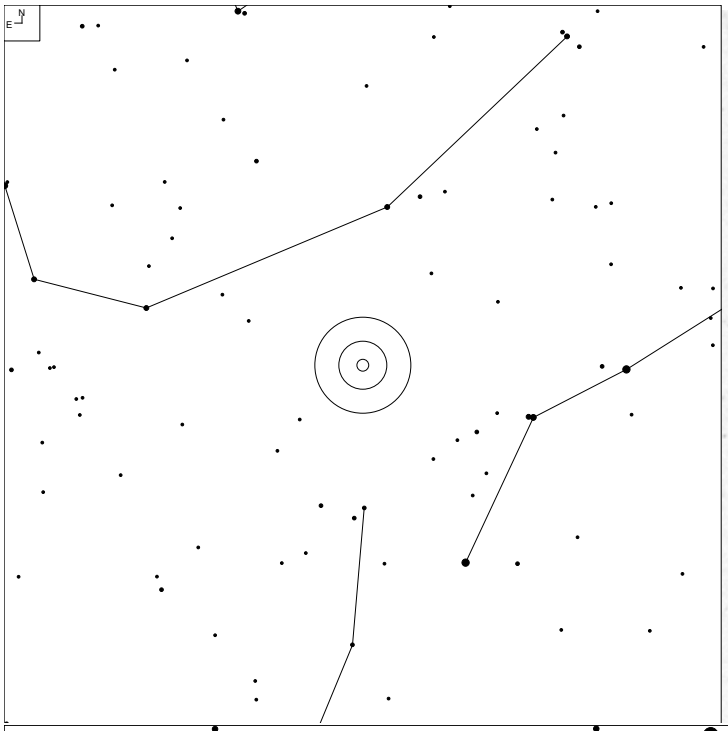
UGC 8960, UGC 8962, PGC 50020 (Canes Venatici)

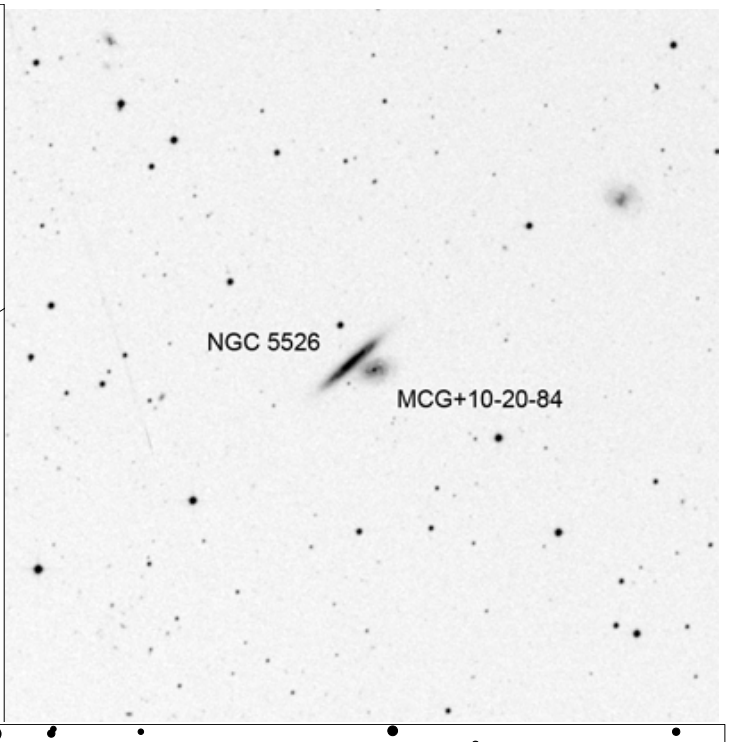


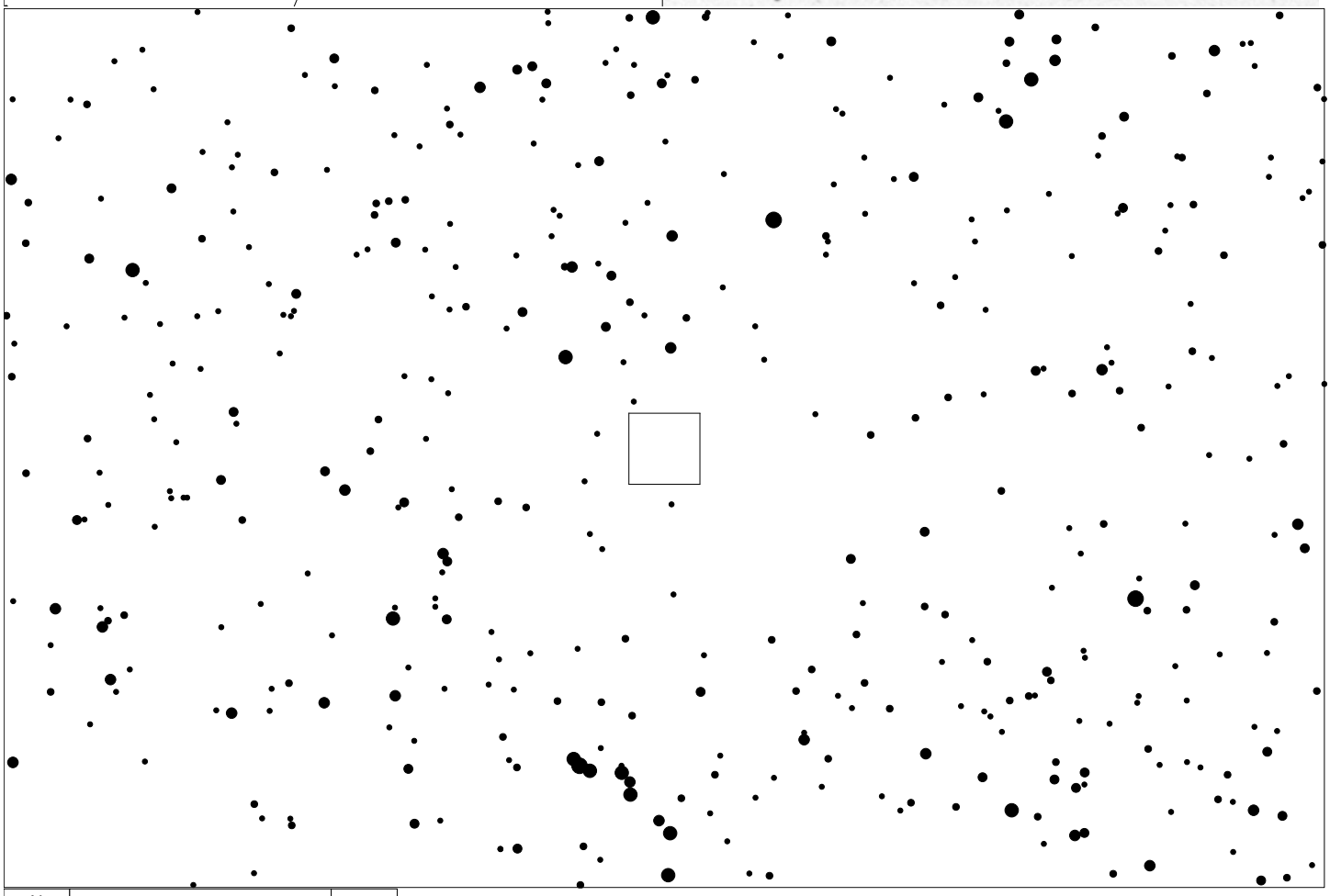
IC 4371 and IC 4370 – Hickson 70 (Canes Venatici)

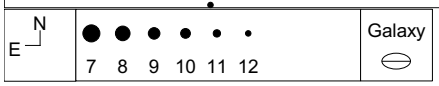


NGC 5526 and MCG+10-20-84 (Ursa Major)

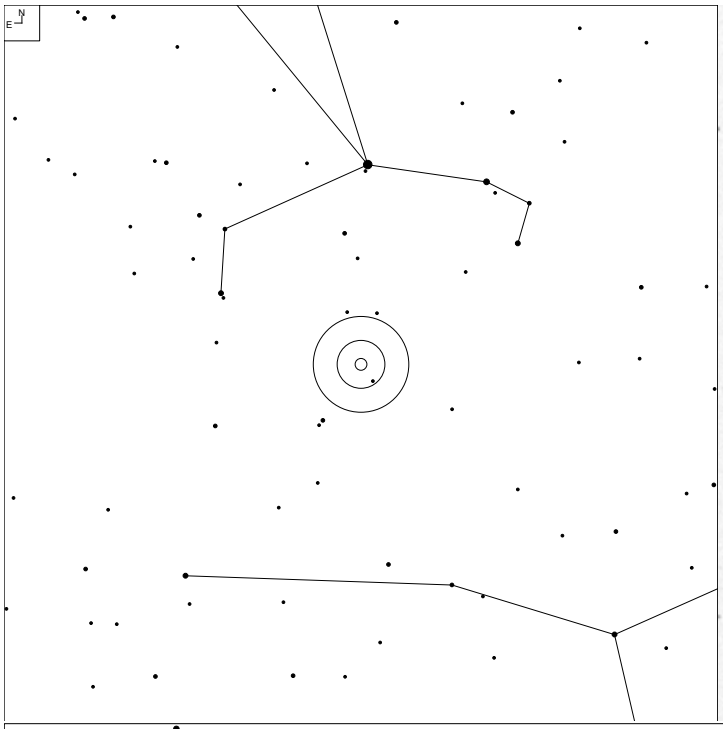


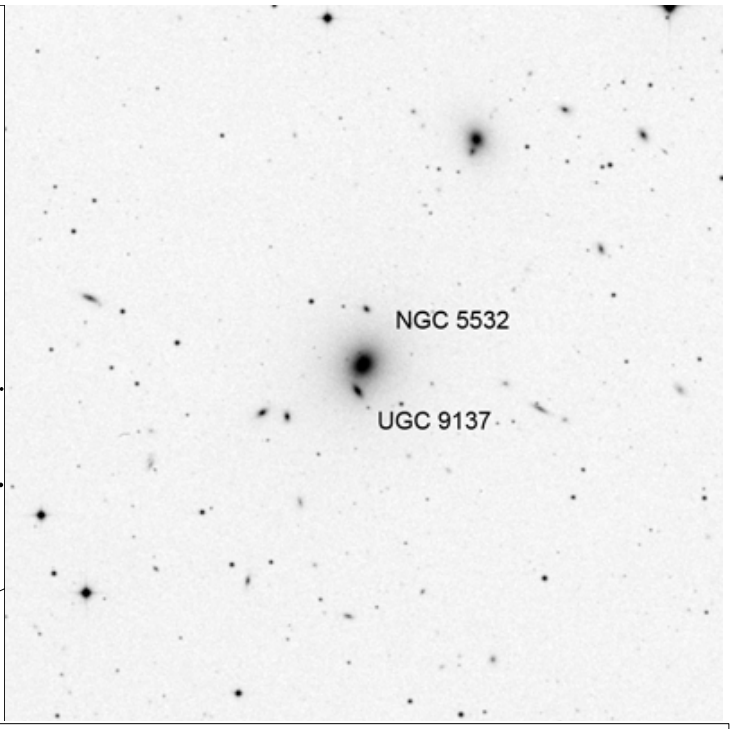


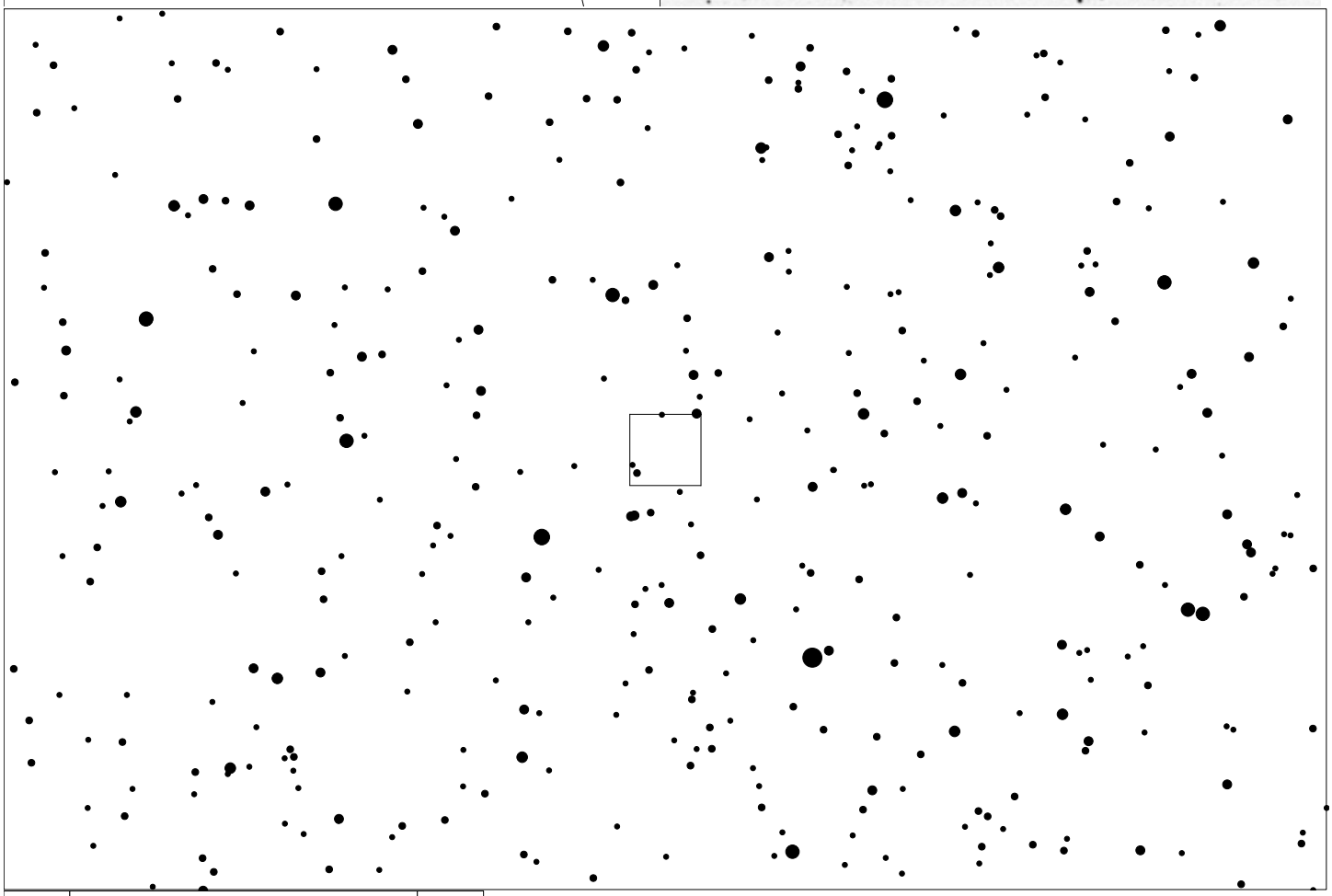


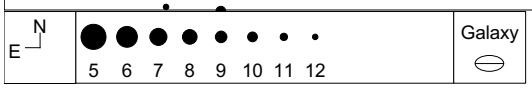


NGC 5532 and UGC 9137 (Bootes)

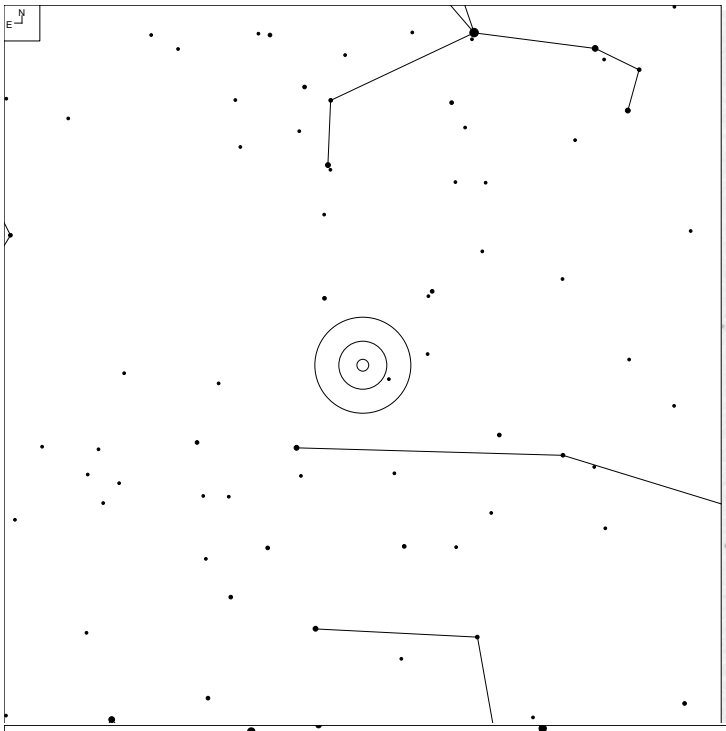


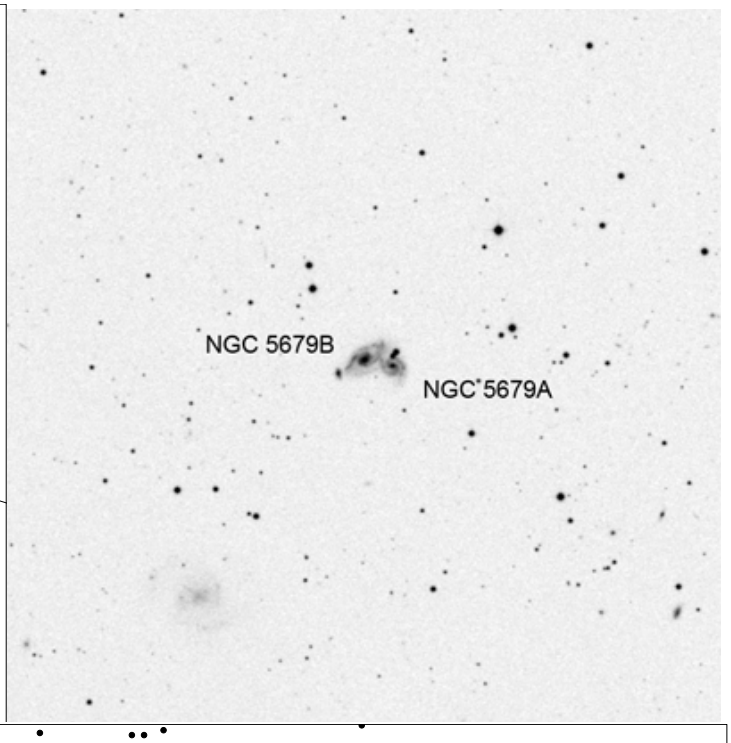


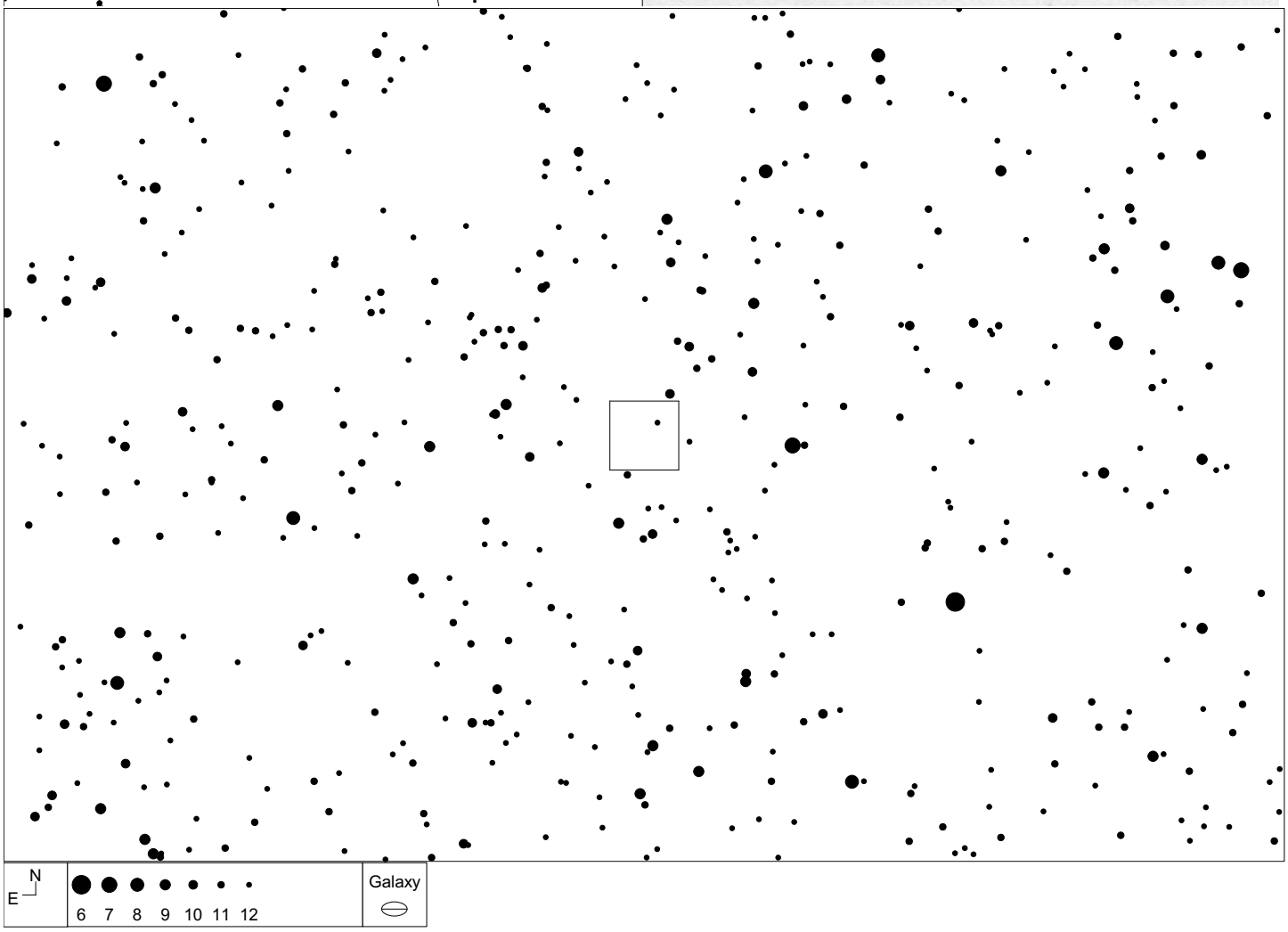




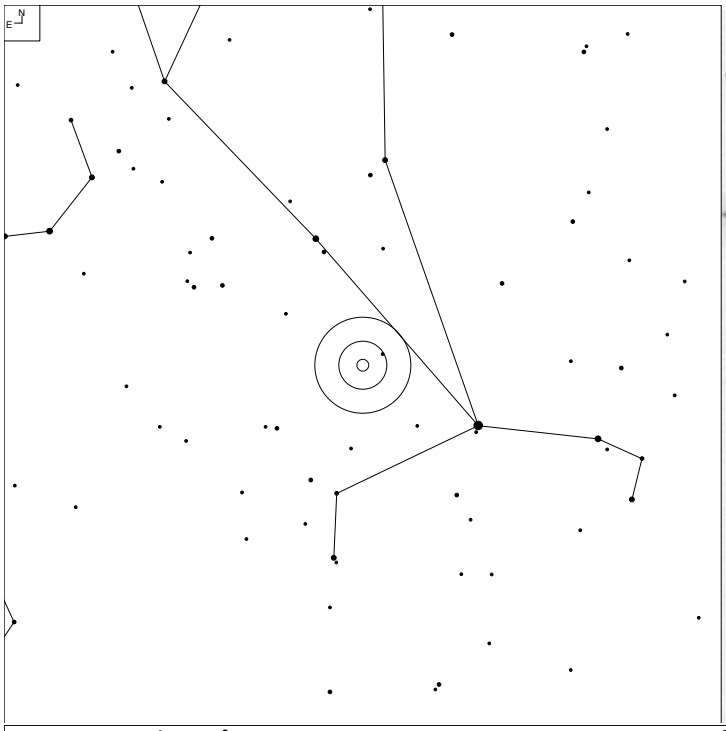
NGC 5679B and NGC 5679A – Arp 274 (Virgo)

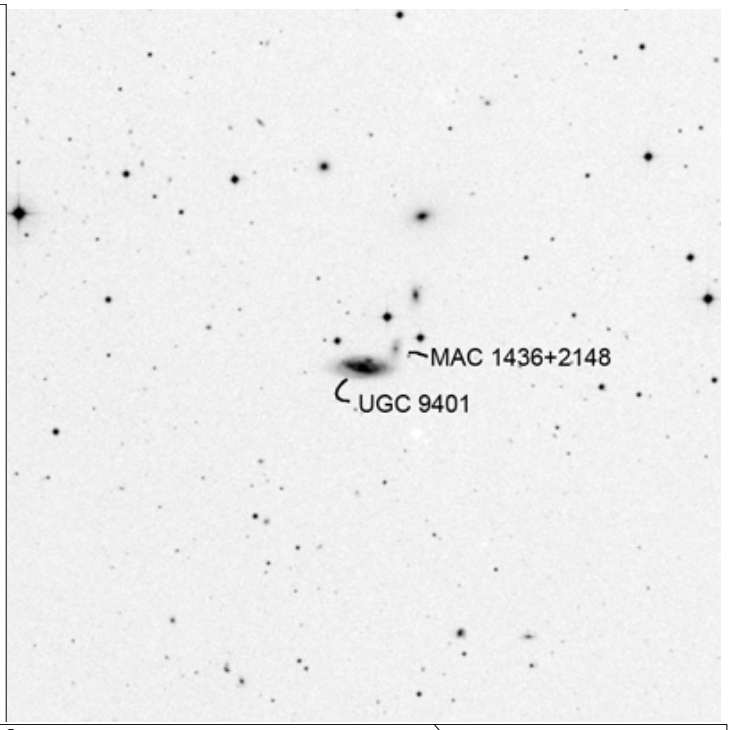


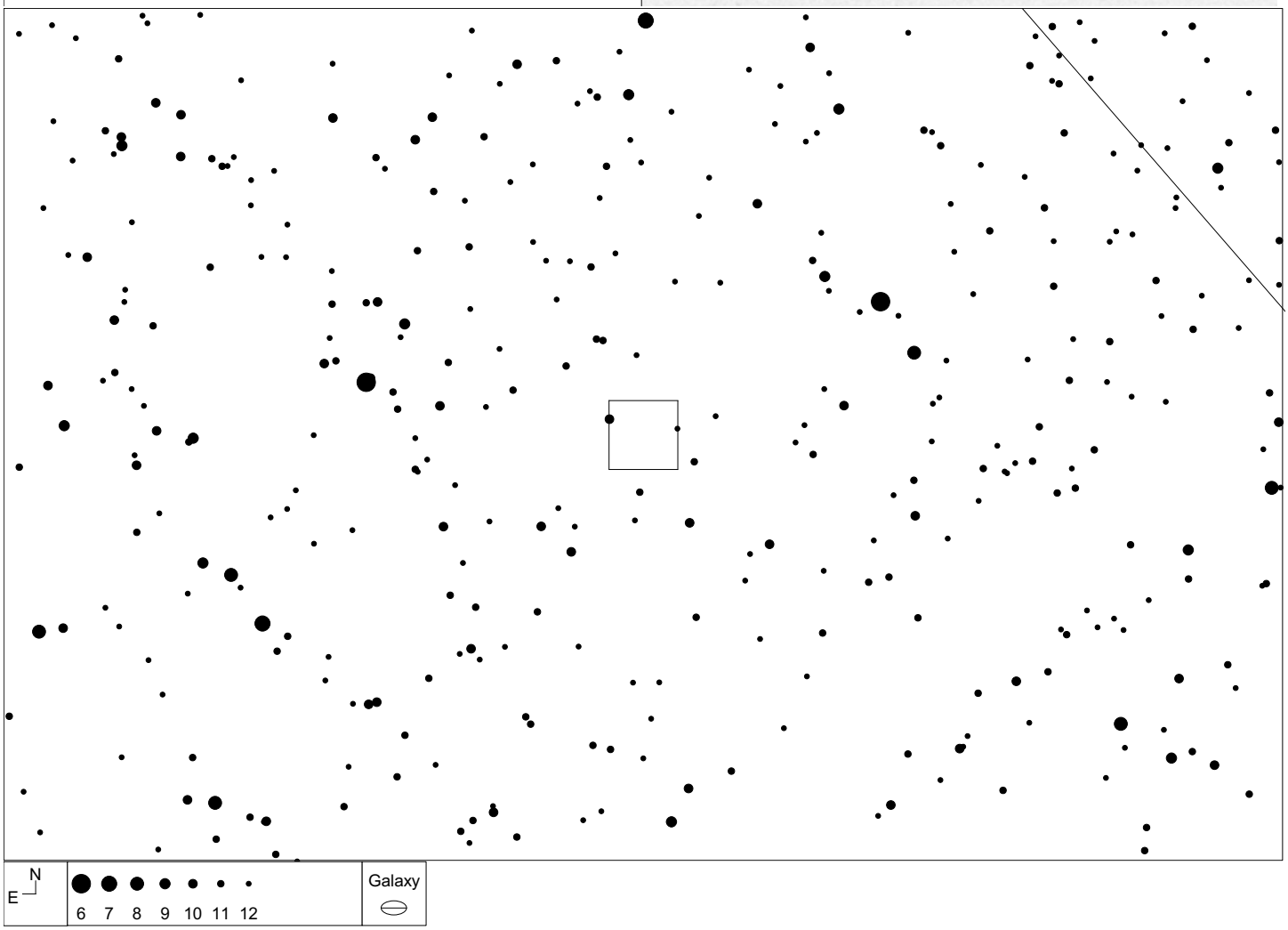




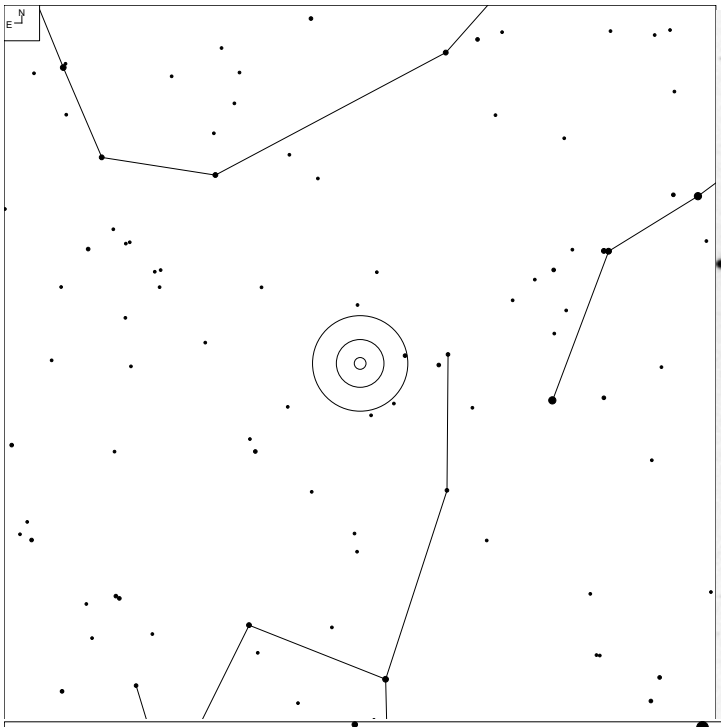
UGC 9401 and MAC 1436+2148 (Bootes)

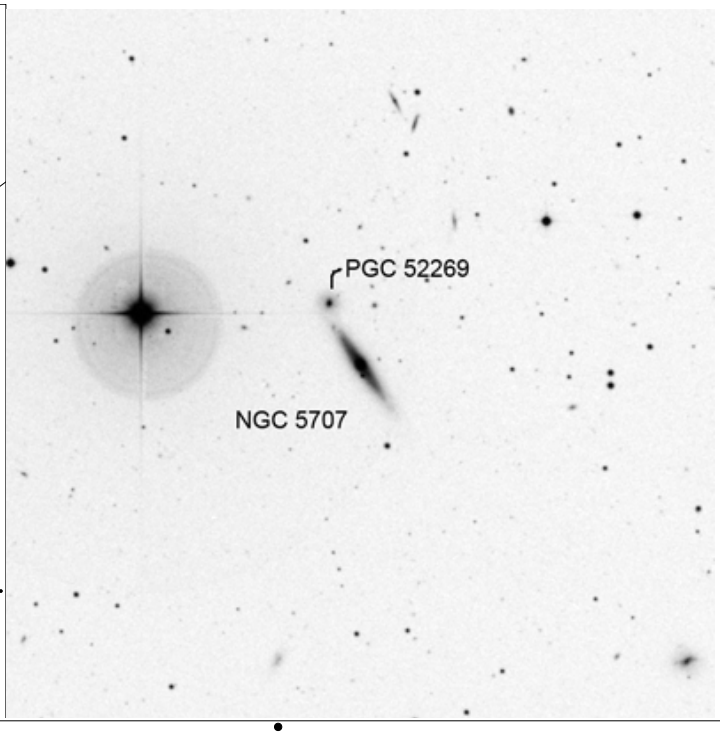


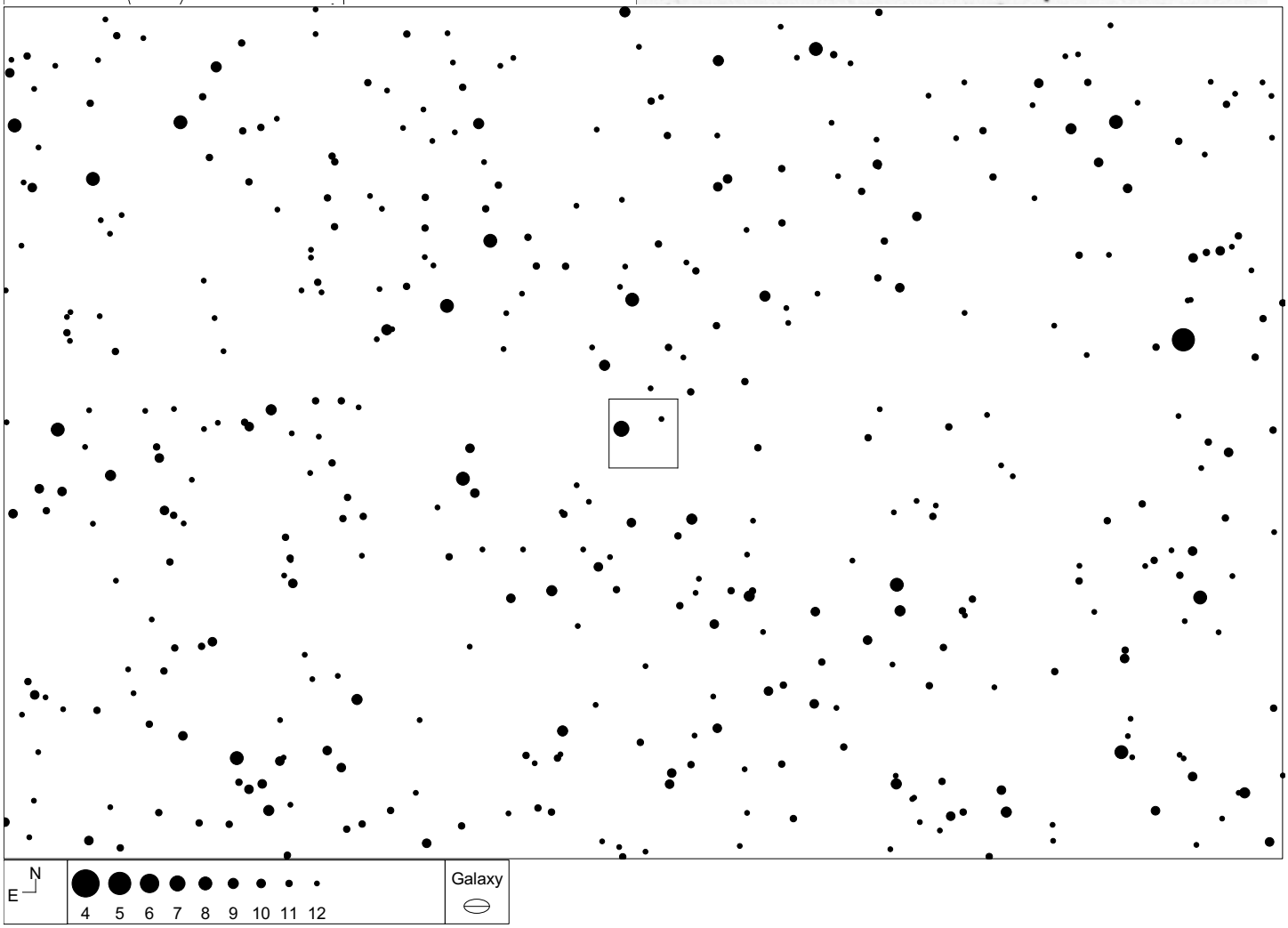




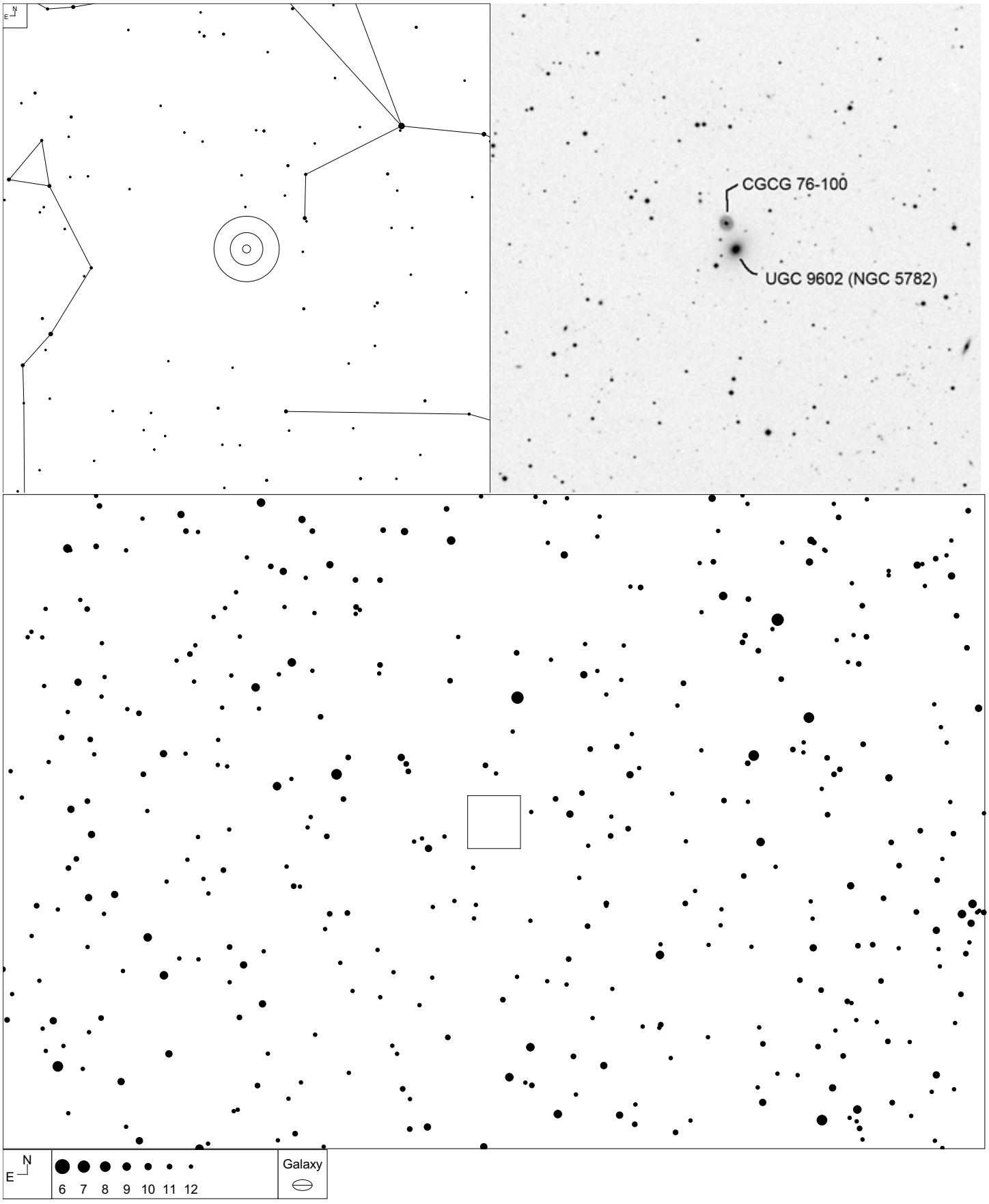
NGC 5707 and PGC 52269 (Bootes)



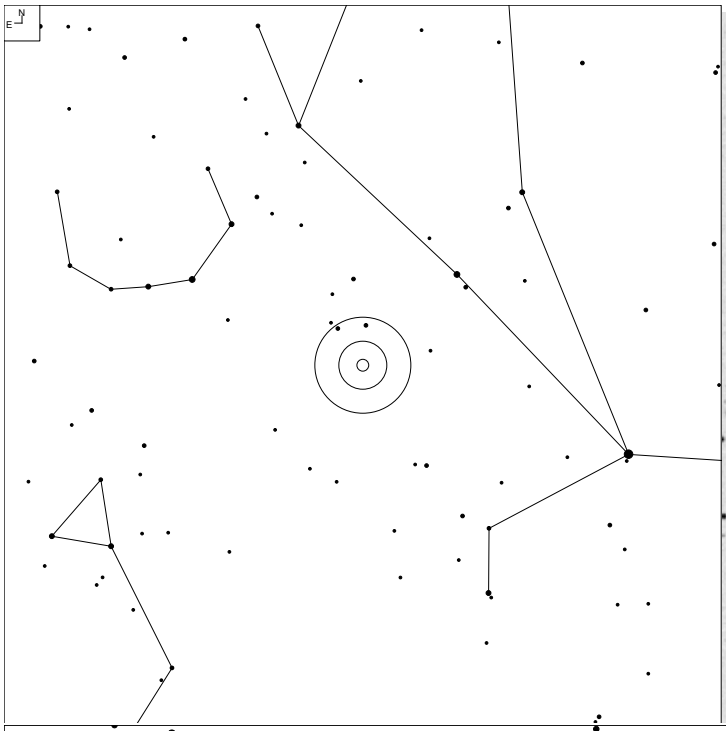


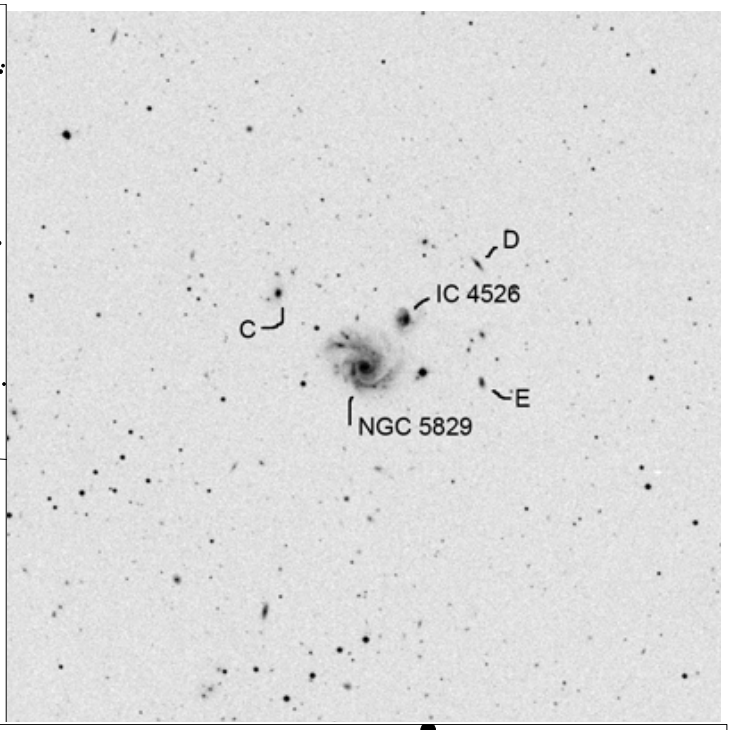


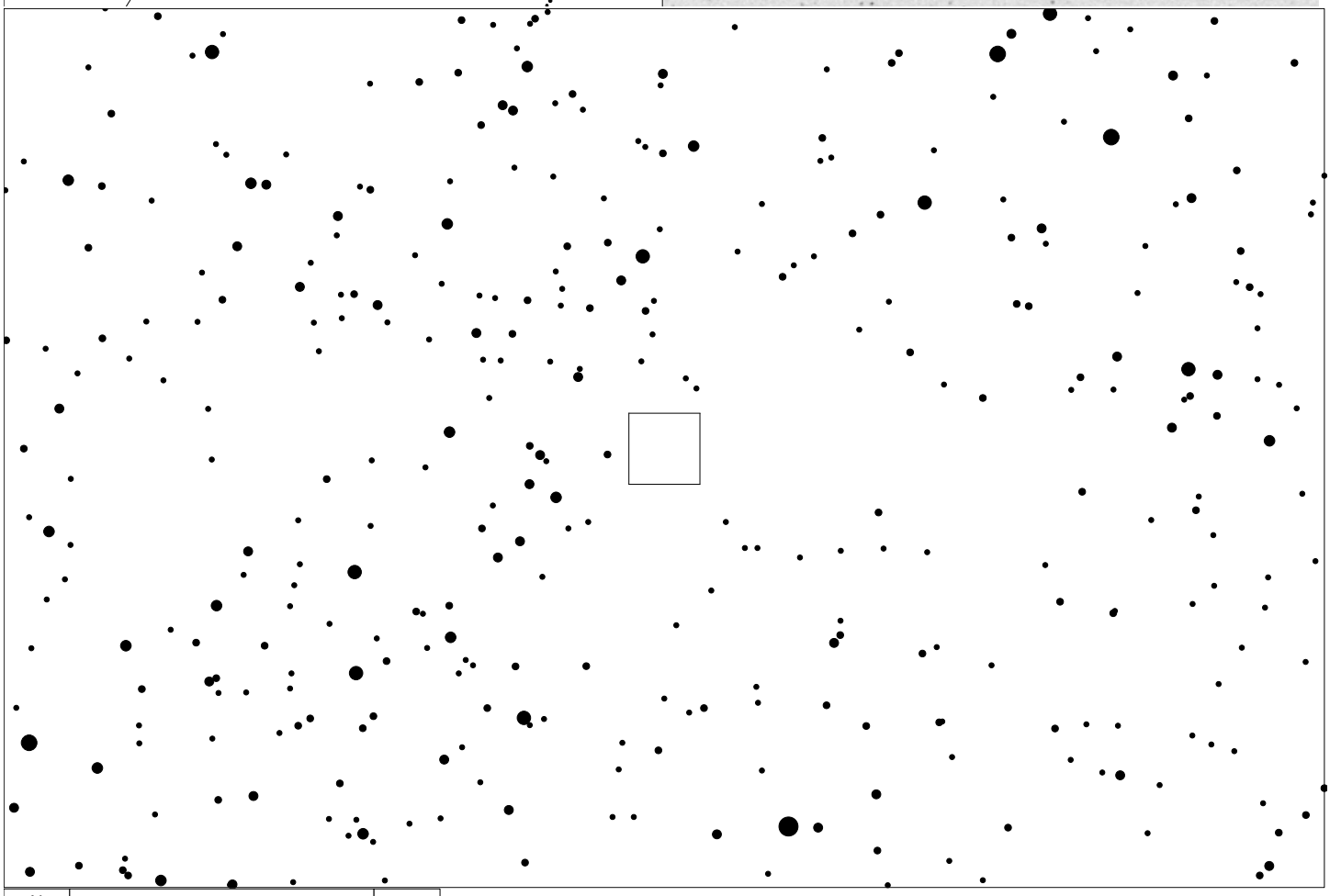
UGC 9602 and CGCG 76-100 (Bootes)

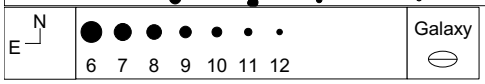


NGC 5829 and IC 4526 – Hickson 73 (Bootes)

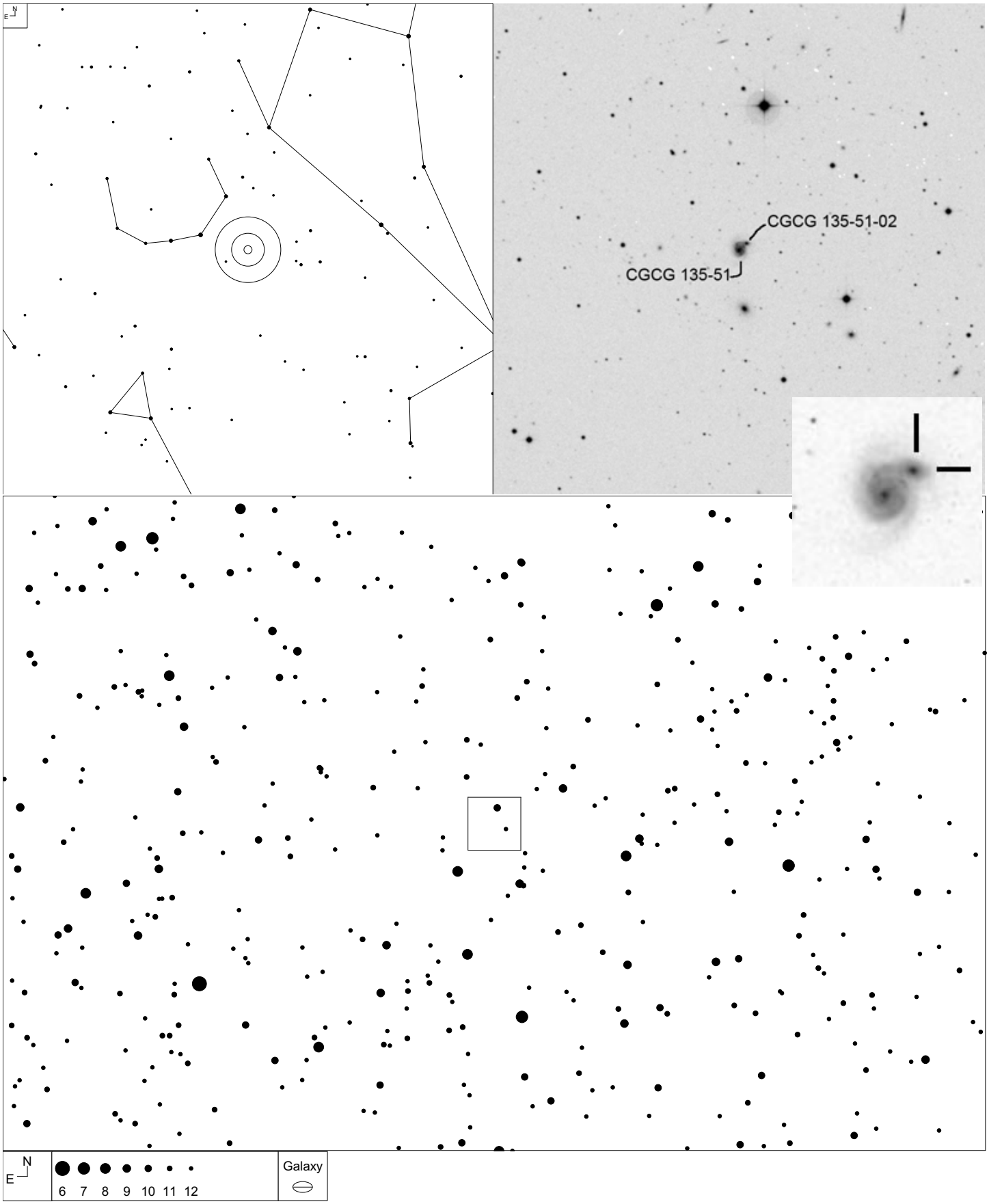




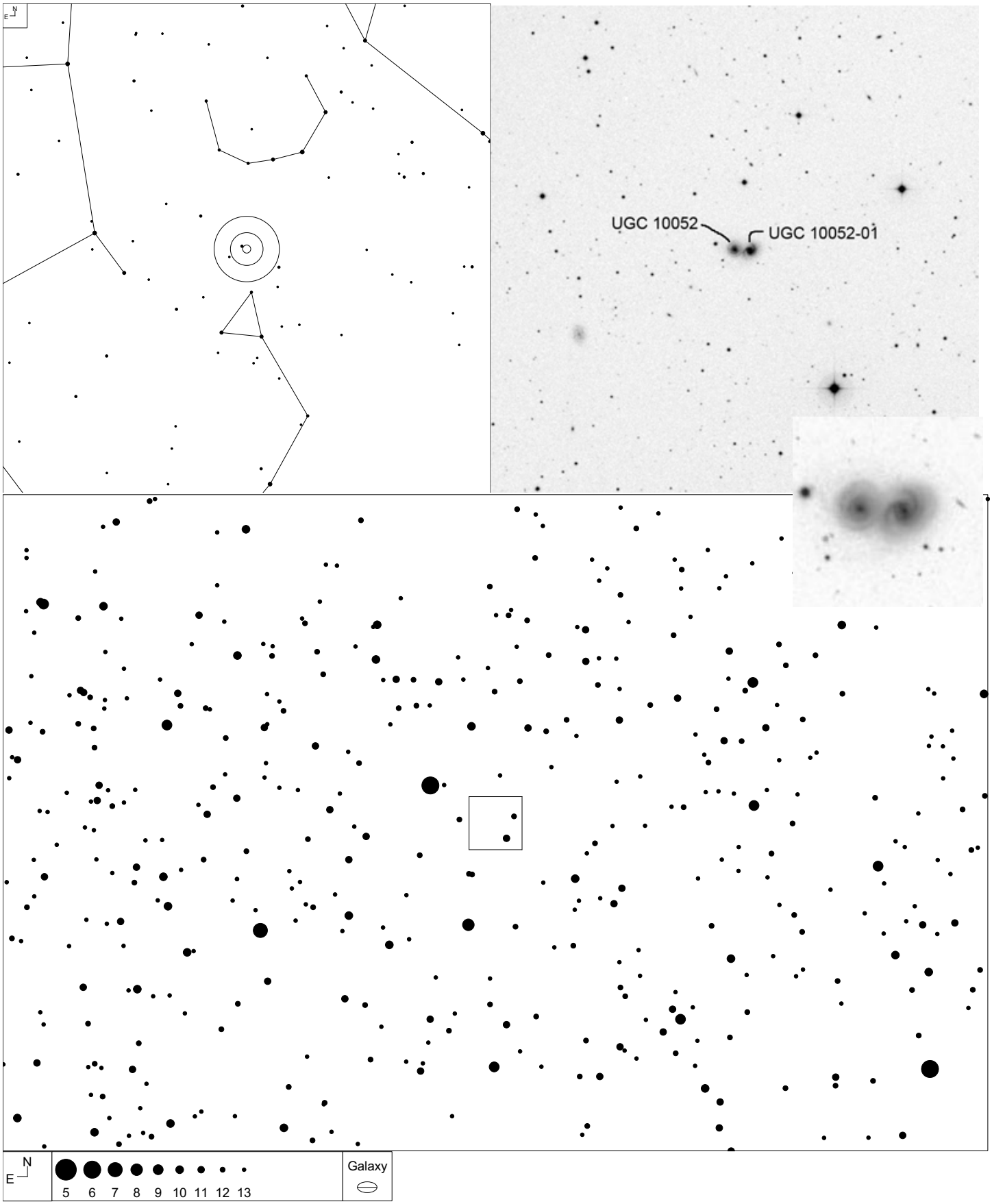




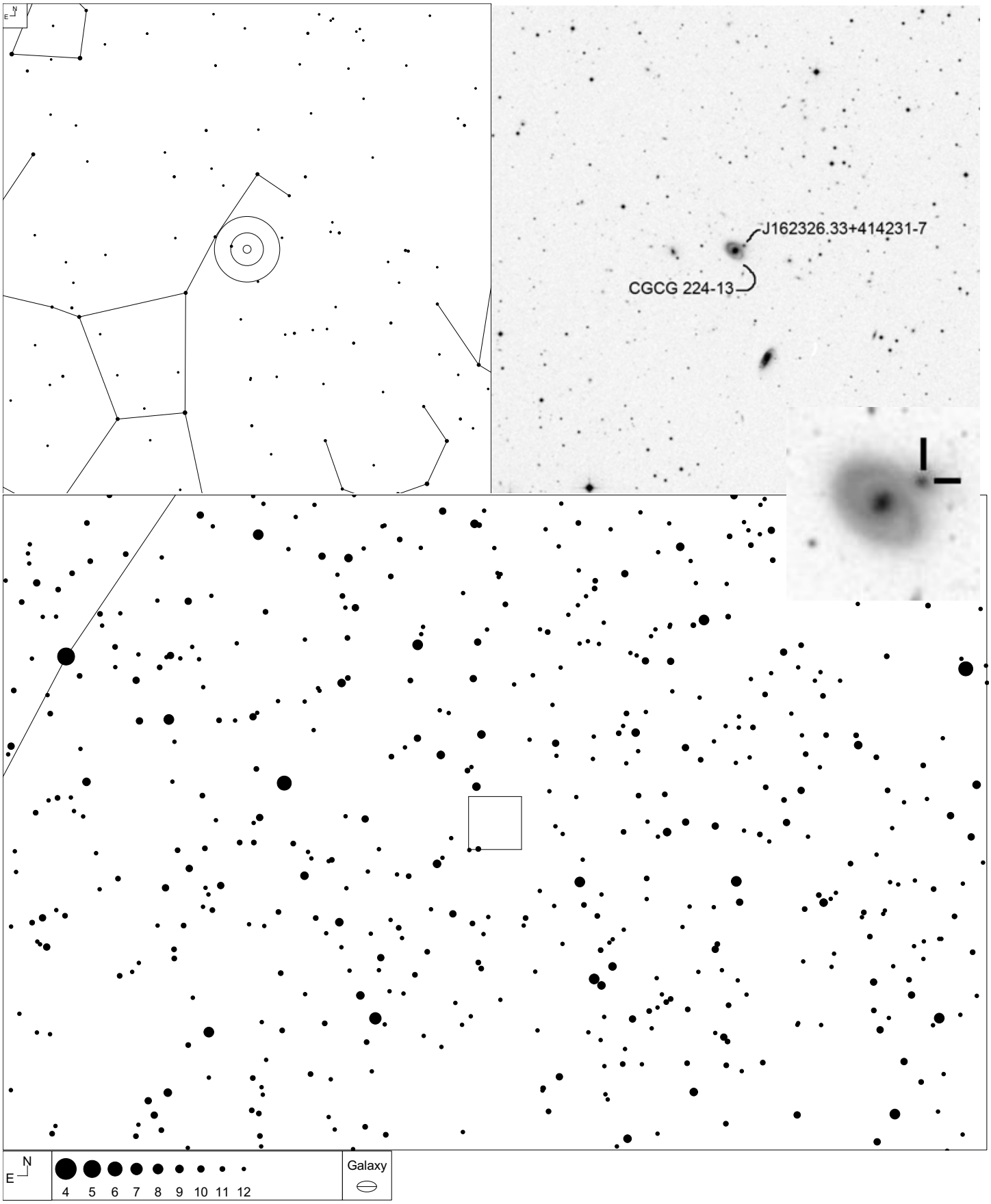
CGCG 135-51 and CGCG 135-51-02 (Corona Borealis)



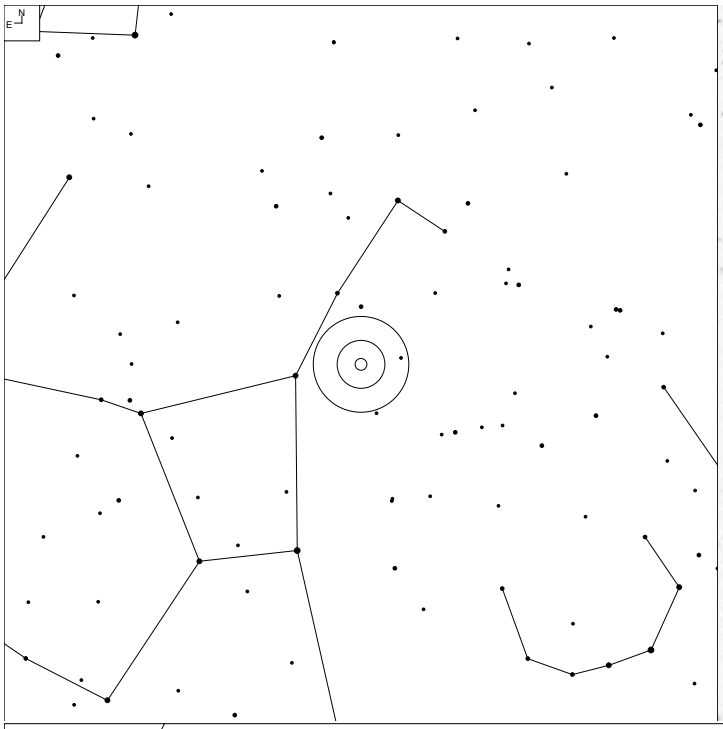
UGC 10052 and UGC 10052-01 (Serpens)

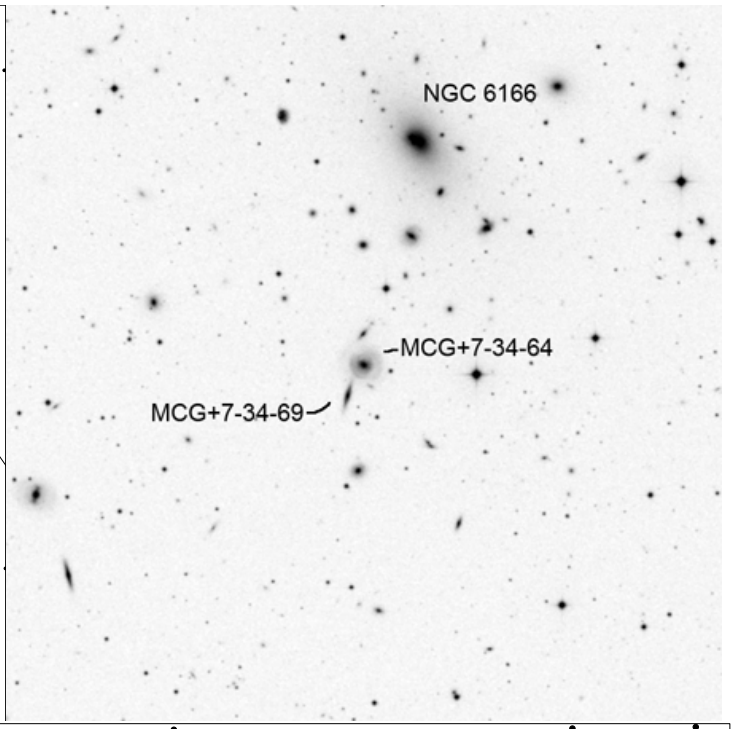


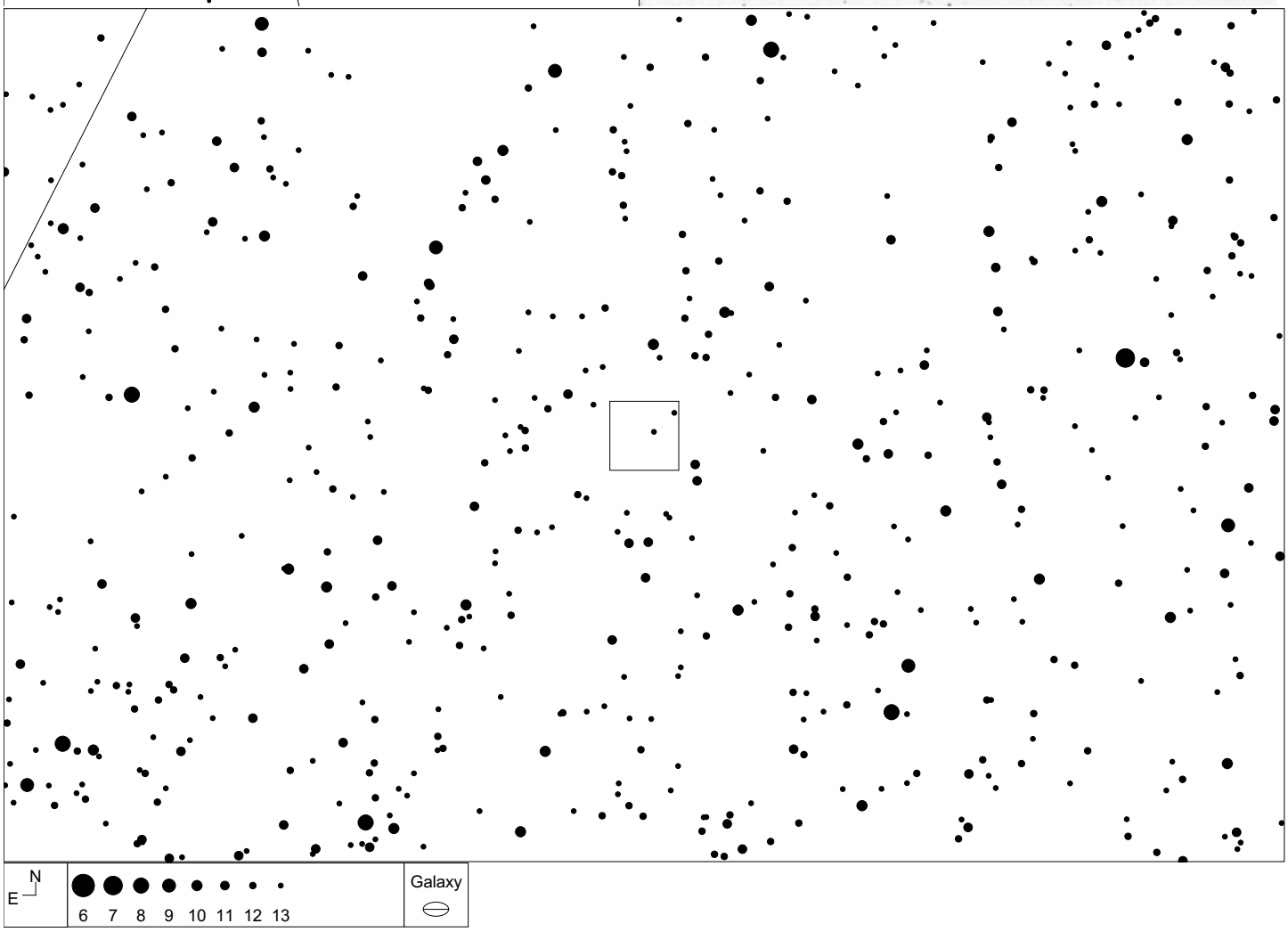
CGCG 224-13 and J162326.33+414231-7 (Hercules)



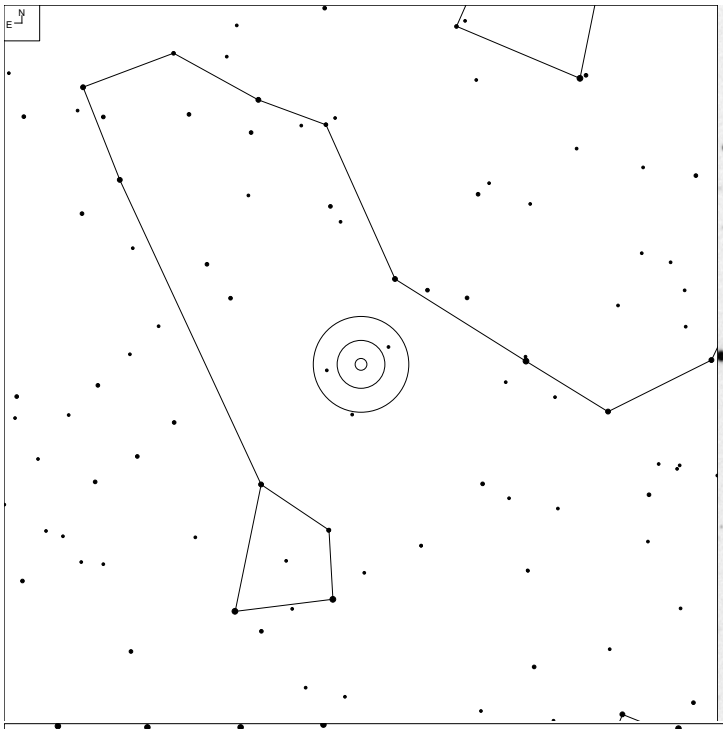
MCG +7-34-64 and MCG +7-34-69 (Hercules)

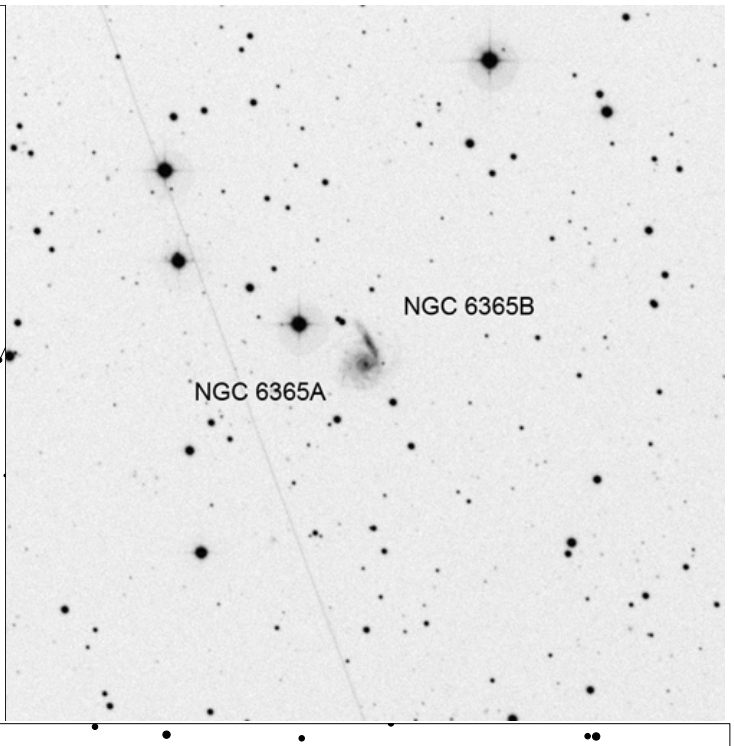


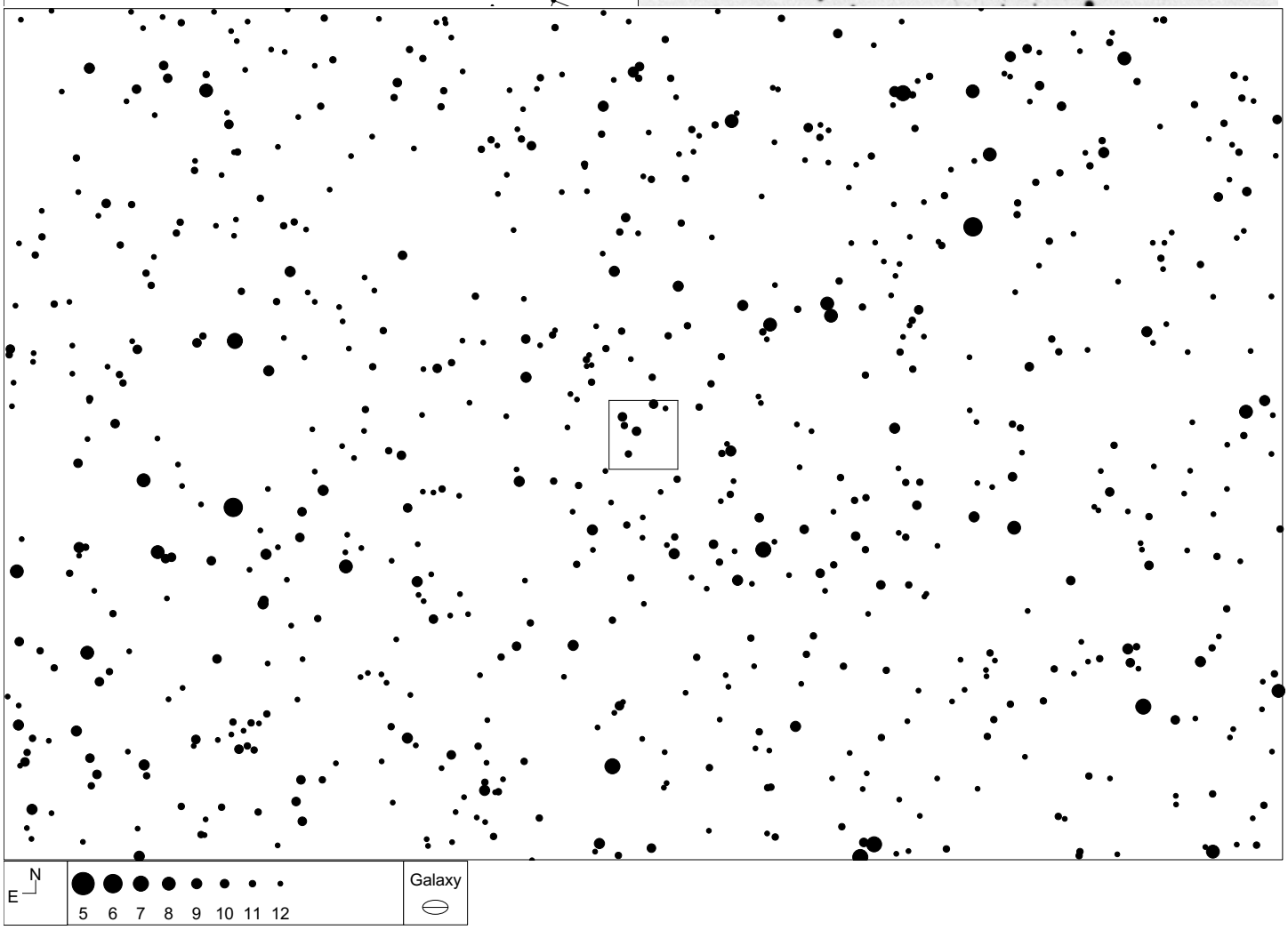




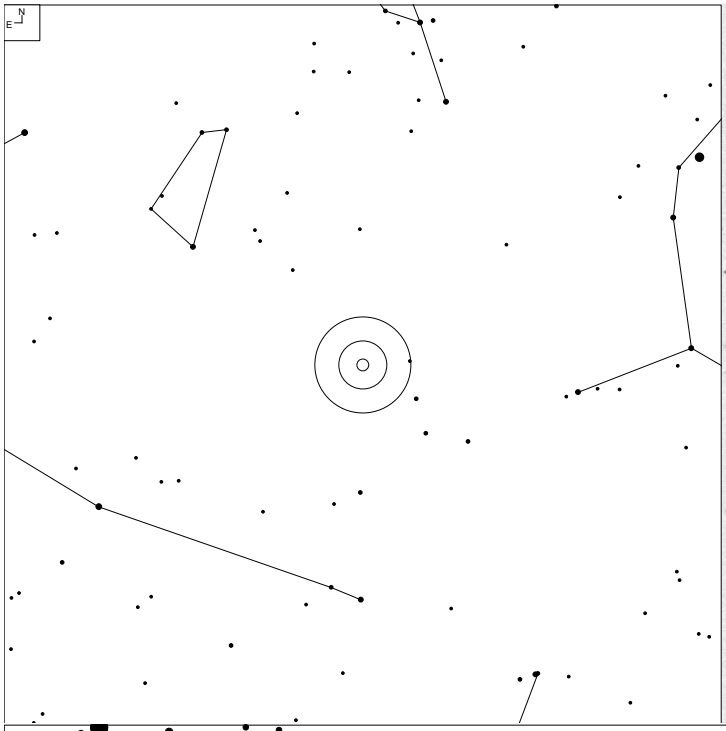
NGC 6365A and NGC 6365B (Draco)

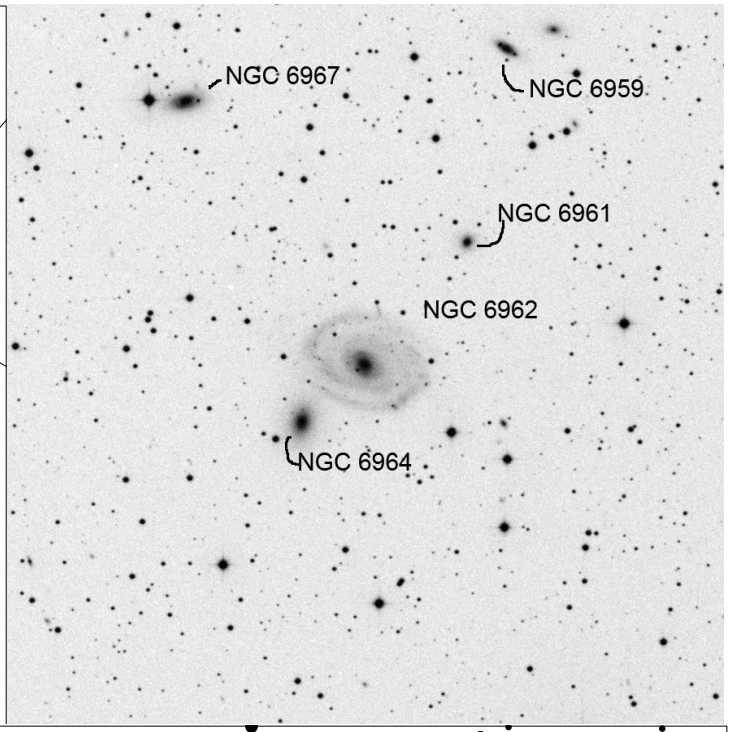


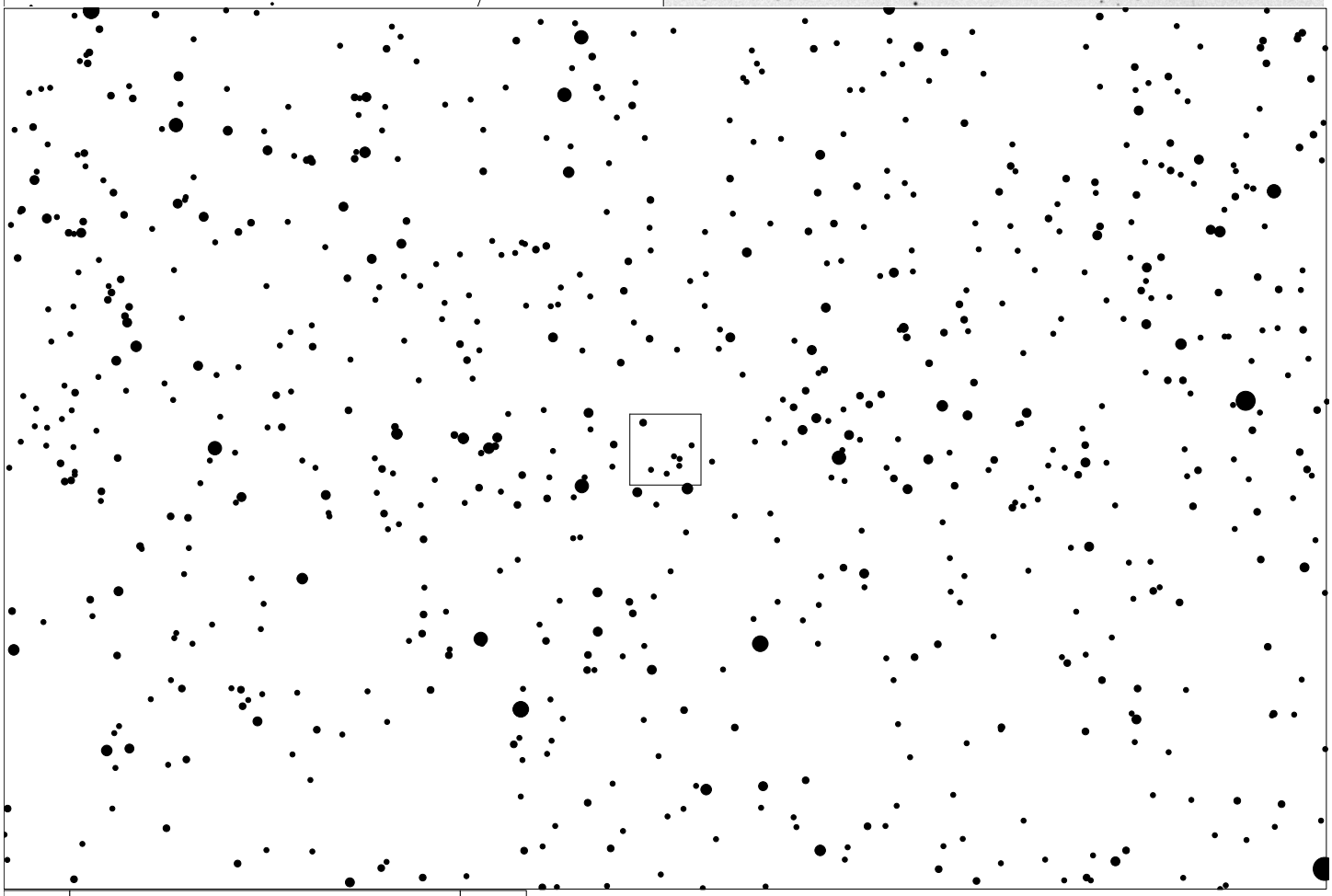


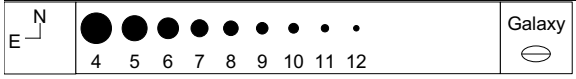


NGC 6962 and NGC 6964 (Aquarius)









2014: Seeing Red

TSP 2014 – "*Seeing Red*" – Advanced Observing List

Observe and Catalog ANY 20 Items

Object:	RA – Dec	Const.	Mag.	Size	Urano 1
☐Sh2-188	01 30 30.0 + 58 23 30	Cas	---	9.0'	U-37
☐NGC 896	02 26 40.0 + 62 05 00	Cas	---	21.0'	U-17
☐V Hydra	10 51 37.3 – 21 15 00.3	Hya	--		U-325
☐SS Virgo	12 25.3+ 00 46.2	Vir			U-238
☐Abell 35	12 53 41.4 – 22 51 42	Hya	12.0 (P)	12.8'	U-329
☐RY Draconis	12 56 25.72 + 65 59 40.4	Dra	5.4		U-26
☐Abell 36	13 40 41.3 – 19 52 57	Vir	13.0 (P)	6.0' x 5.0'	U-331
☐NGC 6072,ESO 389+5	16 12 58.2 – 36 13 48	Sco	14.1 (P)	98" x 72"	U-374
☐IC 4592, LBN 1113	16 13 08.0 – 19 24 00	Sco	---	200' x 60'	U-335
☐IC 4604, Rho Ophiuchus	16 25 20.0 – 23 28 00	Sco	---	80' x 72'	U-336
☐Wolf 630A, B, C	16 55 29.2 – 08 20 03	Oph	9.0 / 17.7		U-292
☐NGC 6357, Sh 2-5	17 24 56.0 – 34 12 15	Sco	---	31.8' x 30.0'	U-376
☐Milky Way Center	17 45 40.04 - 29 00 28.1	Sgr	---		U-377
☐*Barnard's Star	17 57 48.0 + 04 43 10	Oph	9.54 (V)		U-249
☐NGC 6559	18 09 53.0 – 24 04 30	Sgr		8.3' x 4.2'	U-339
☐NGC 6589	18 16 52.0 – 19 46 43	Sgr	---	4.0 x 3.5'	U-339
☐NGC 6590	18 17 02.0 – 19 51 47	Sgr	---	5.6' x 3.3'	U-339
☐Serpen's Object, SVS 2	18 29 56.8 + 01 14 46	Ser	---		U-250
☐T Lyra	18 32 20.08 + 36 59 55.9	Lyr	---		U-117
☐Sh 2-61, PK26+01.0	18 33 21.8 – 04 58 16	Sct	---	2.0'	U-250
☐V Aquila	19 04 24.0 – 05 41 05	Aql	6.5 / 6.6		U-296
☐NGC 6781, PK41-2.1	19 18 28.2 + 06 32 15	Aql	11.8 (P)	1.8'	U-206
☐Sh 2-83	19 24 30.4 + 20 47 30.9	Vul	---	2.0'	U-161
☐Parsamyan 21	19 29 00.6 + 09 39 02	Aql	---		U-207
☐Sh 2-82	19 30 23.3 + 18 17 02	Sge	---	162	U-162
☐*NGC 6820	19 42 27.8 + 23 05 22	Vul	---		U-162
☐CAB2008-V39	19 43 28.1 + 23 20 38	Vul	---		U-162
☐Sh 2-88	19 45 57.0 + 25 19 50	Vul	---	17.5' x 41	U-162
☐Sh 2-90, LBN 144	19 49 12.4 + 26 50 49	Vul	---	5.0 x 3.4	U-162
☐Sh 2-93, LBN 146	19 55 00.5 + 27 12 47	Vul	---	1.8'	U-162
☐Sh 2-101	19 59 55.0 + 35 21 00	Cyg	---	218' 12.0'	U-119
☐RS Cygnus	20 13 23.7 + 38 43 44.8	Cyg	7.6 / 7.1		U-119
☐Sh2-112	20 34 03.0 + 45 38 42	Cyg	---	115.0	U-85
☐B 161, inside IC 1396	21 40 25.3 + 57 48 03	Cep	3.5		U-57
☐Herschel's Garnet Star	21 43 30.4 + 58 46 48.6	Cep	4.02 (V)		U-57
☐NGC 7139	21 46 08.6 + 63 47 31	Cep	13.3 (P)		U-33
☐Kruger 60A & B	22 27 59.5 + 57 41 45	Cep	9.8 / 13.8		U-57

Good Luck-

Larry Mitchell

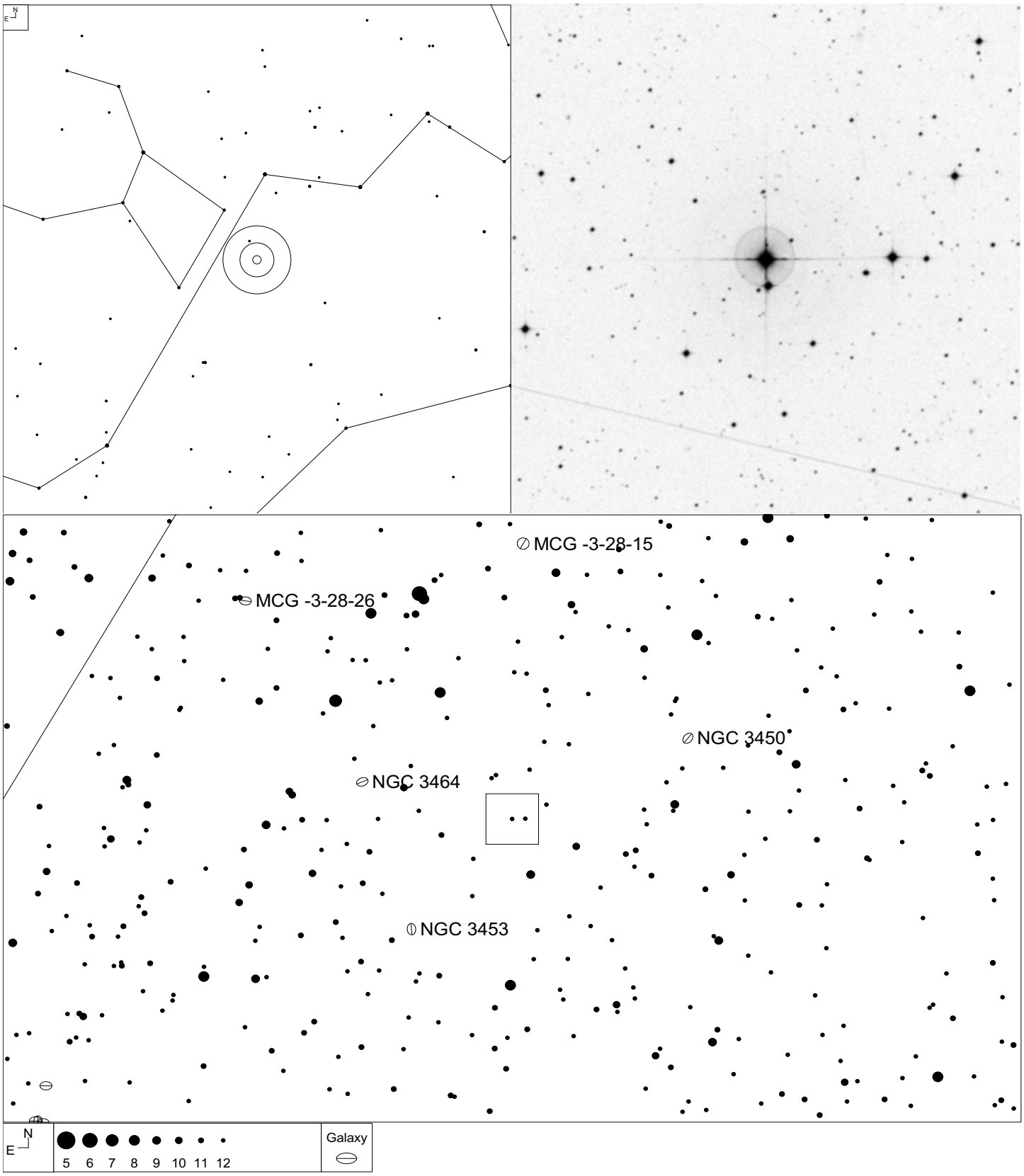
TSP Advanced Program Chairman

***Barnard's Star – An Estimate**

***NGC 6820 – Misplotted in Megastar**

Source: MegaStar 5

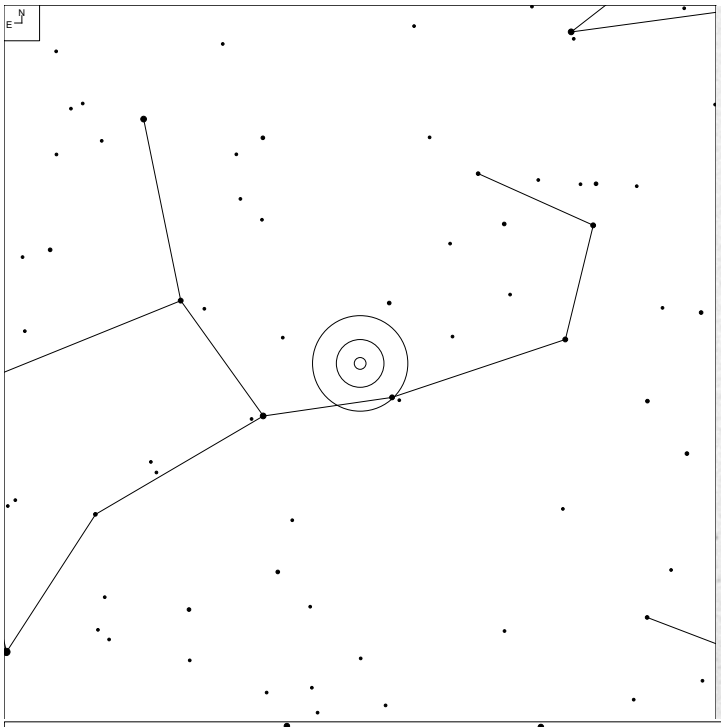
V Hydrae (Hydra)

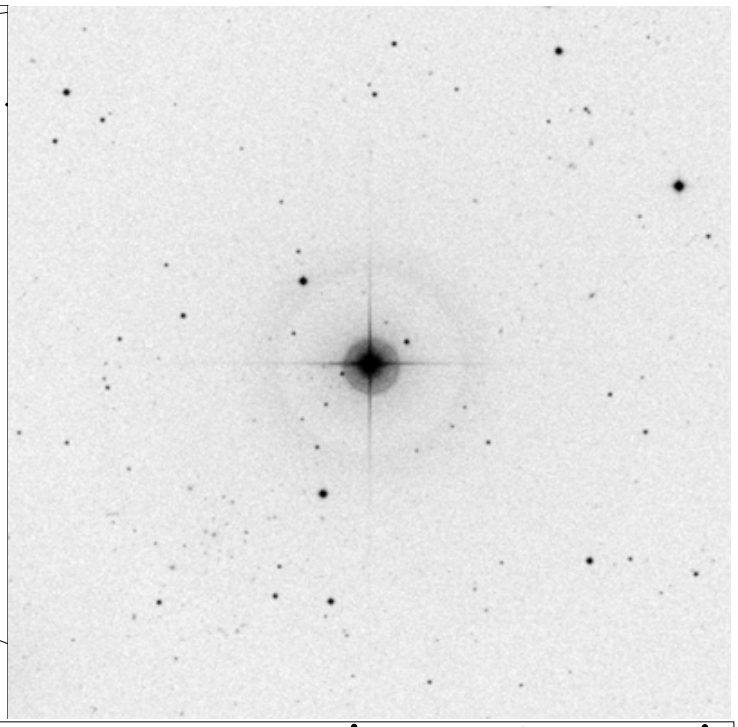


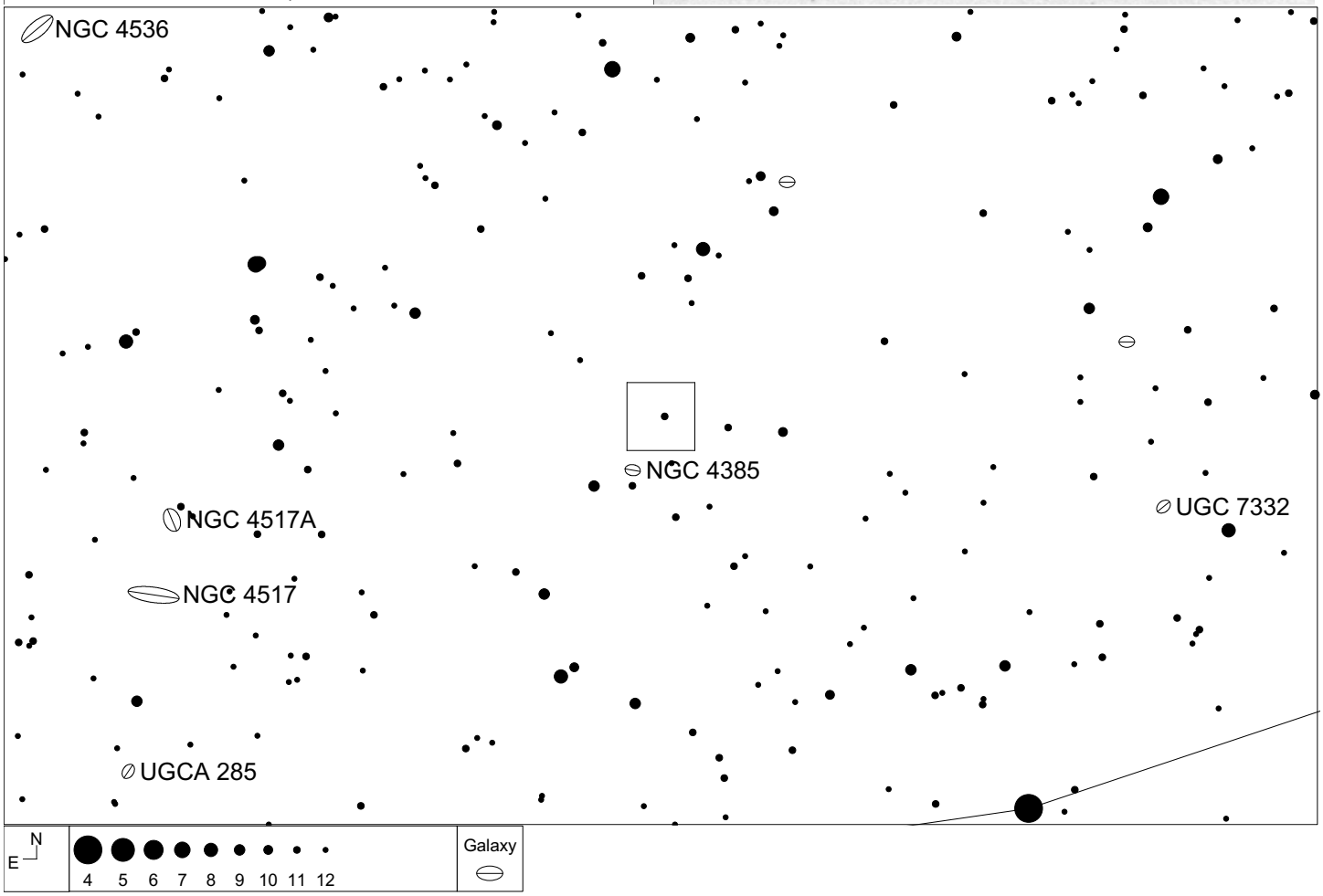
RA	Dec	Mag	Size	Urano 2000.0
10 51 37.3	–21 15 00	7 – 13 (11.9) var	*	151L

http://www.aavso.org/lcotw/v-hydrae
http://www.astroscience.org/abdul-ahad/V_Hydrae.html

SS Virginis (Virgo)



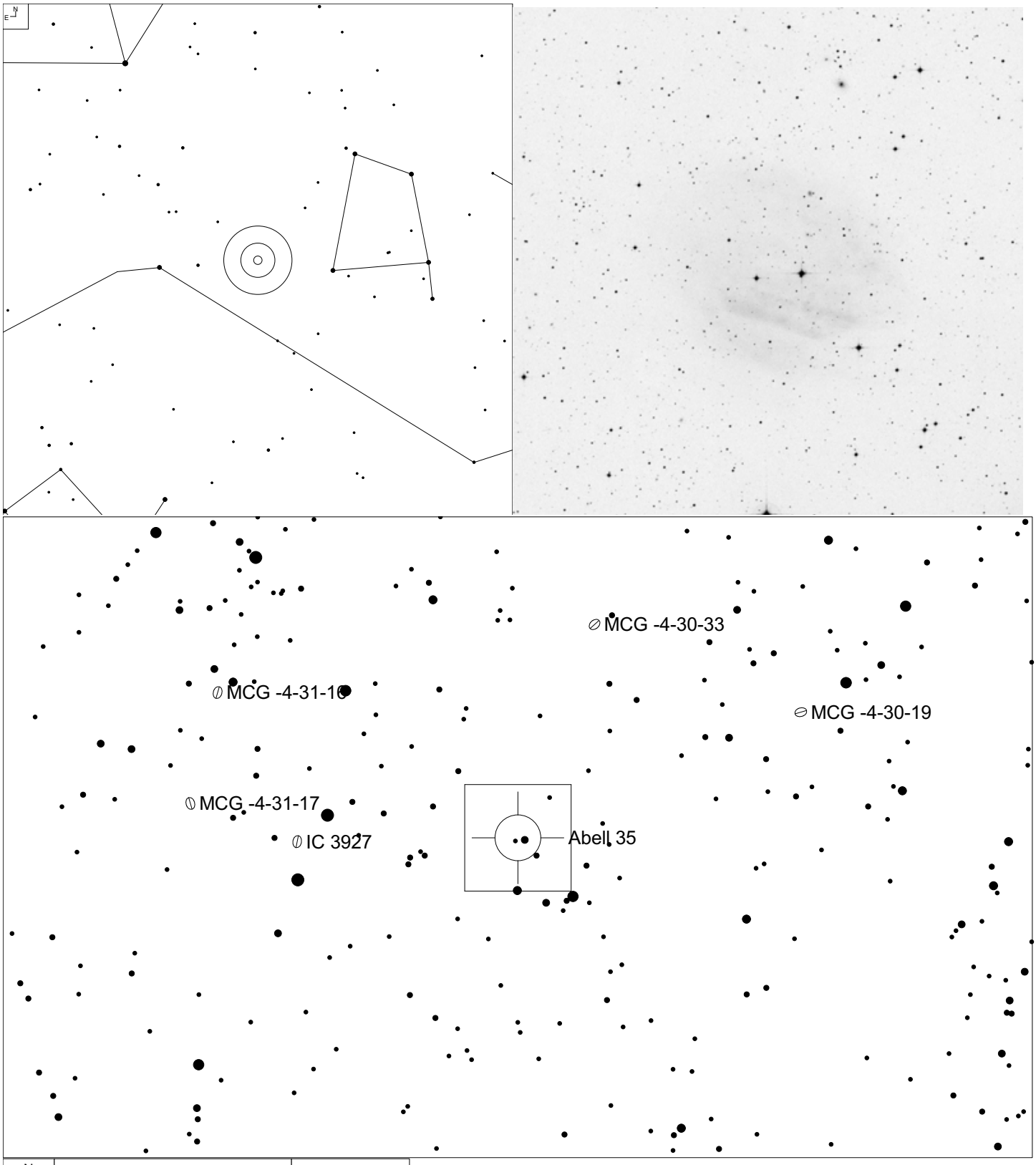




RA	Dec	Mag	Size	Urano 2000.0
12 25 14.4	+00 46 11	7.4 – 9.5 (var)	*	111L

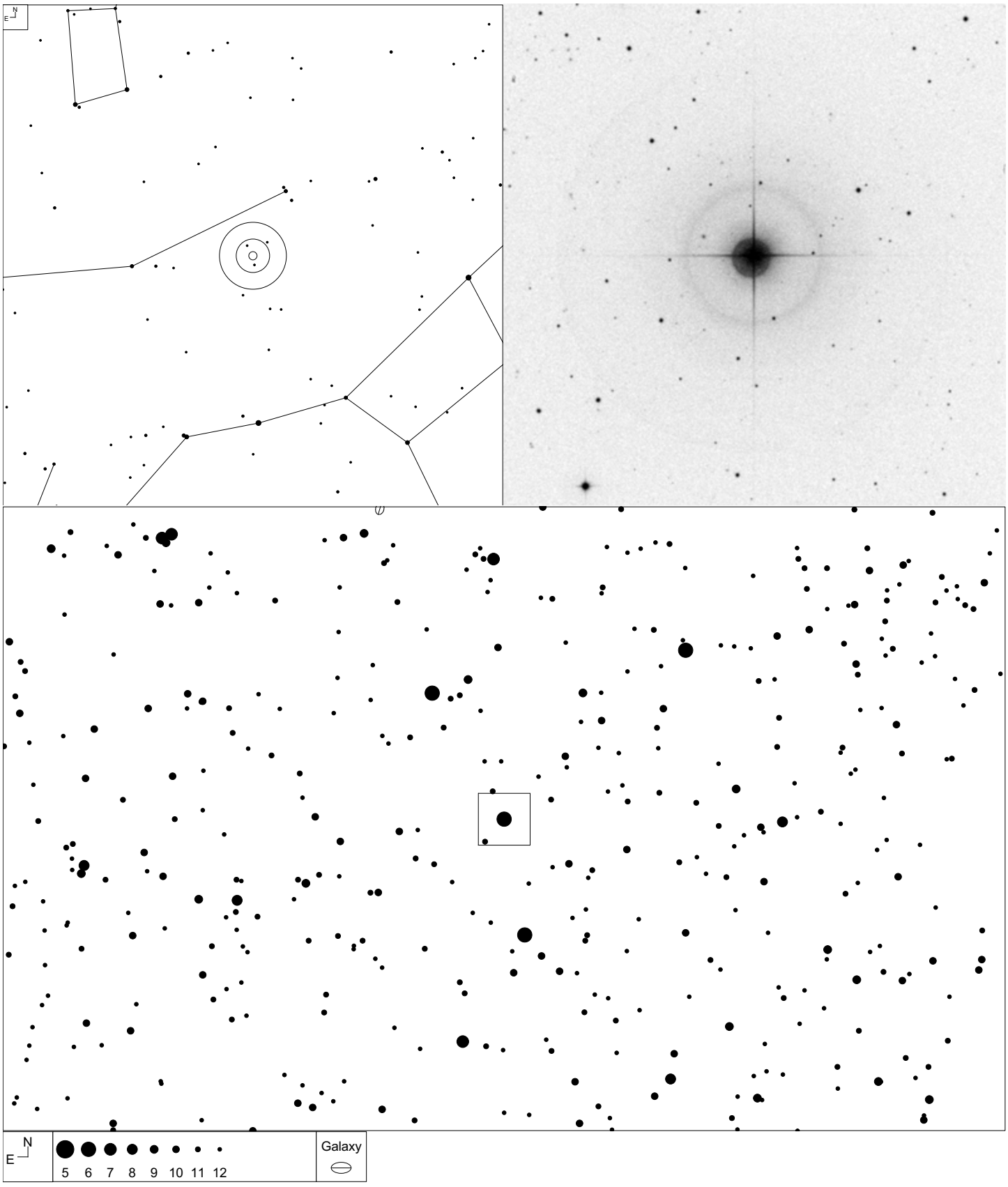
http://en.wikipedia.org/wiki/SS_Virginis

Abell 35 (Hydra)



RA	Dec	Mag	Size	Urano 2000.0
12 53 41.4	–22 51 42	12.0p	12.8’	149R

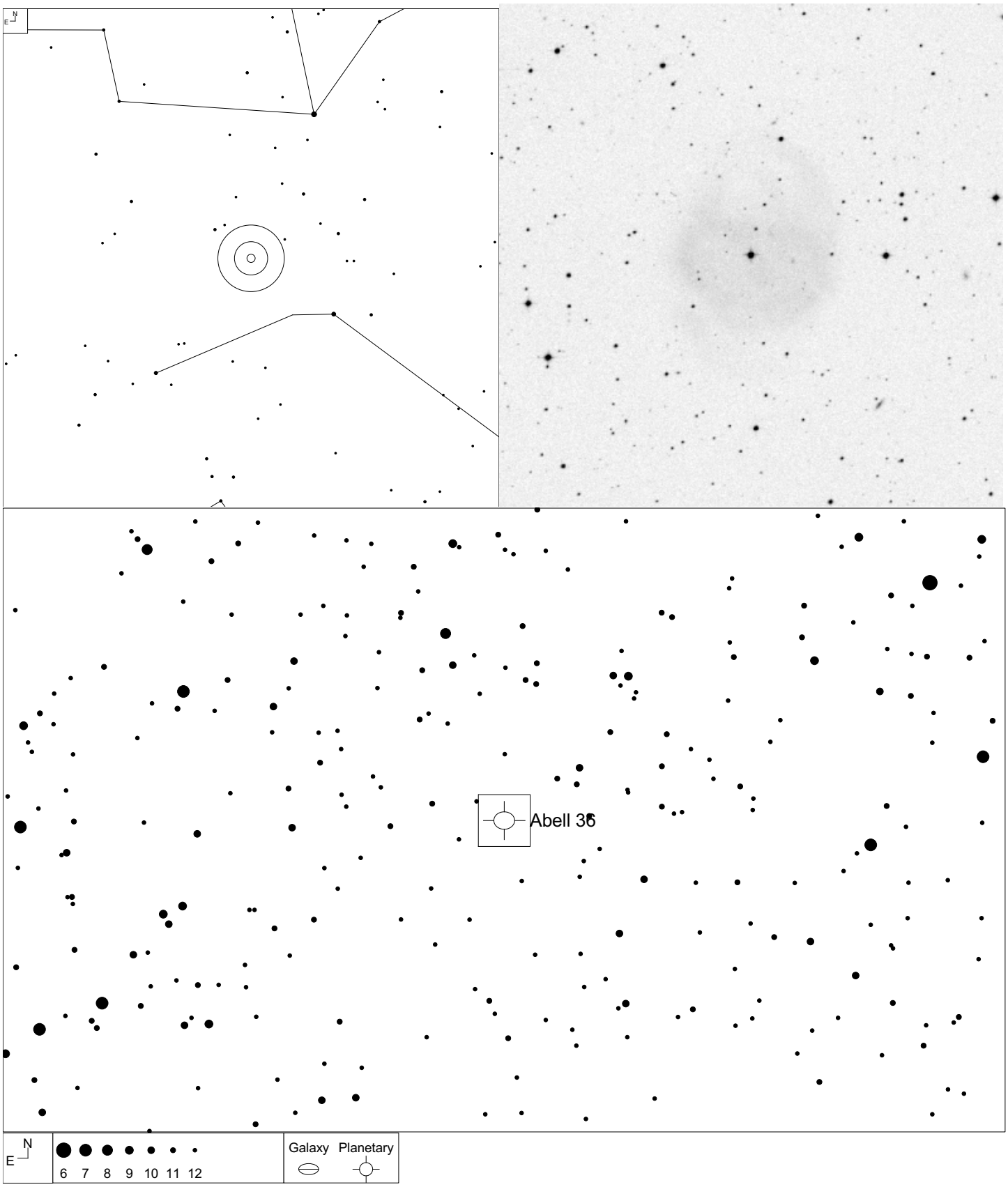
RY Draconis (Draco)



RA	Dec	Mag	Size	Urano 2000.0
12 56 25.72	+65 59 40	5.9	*	13L

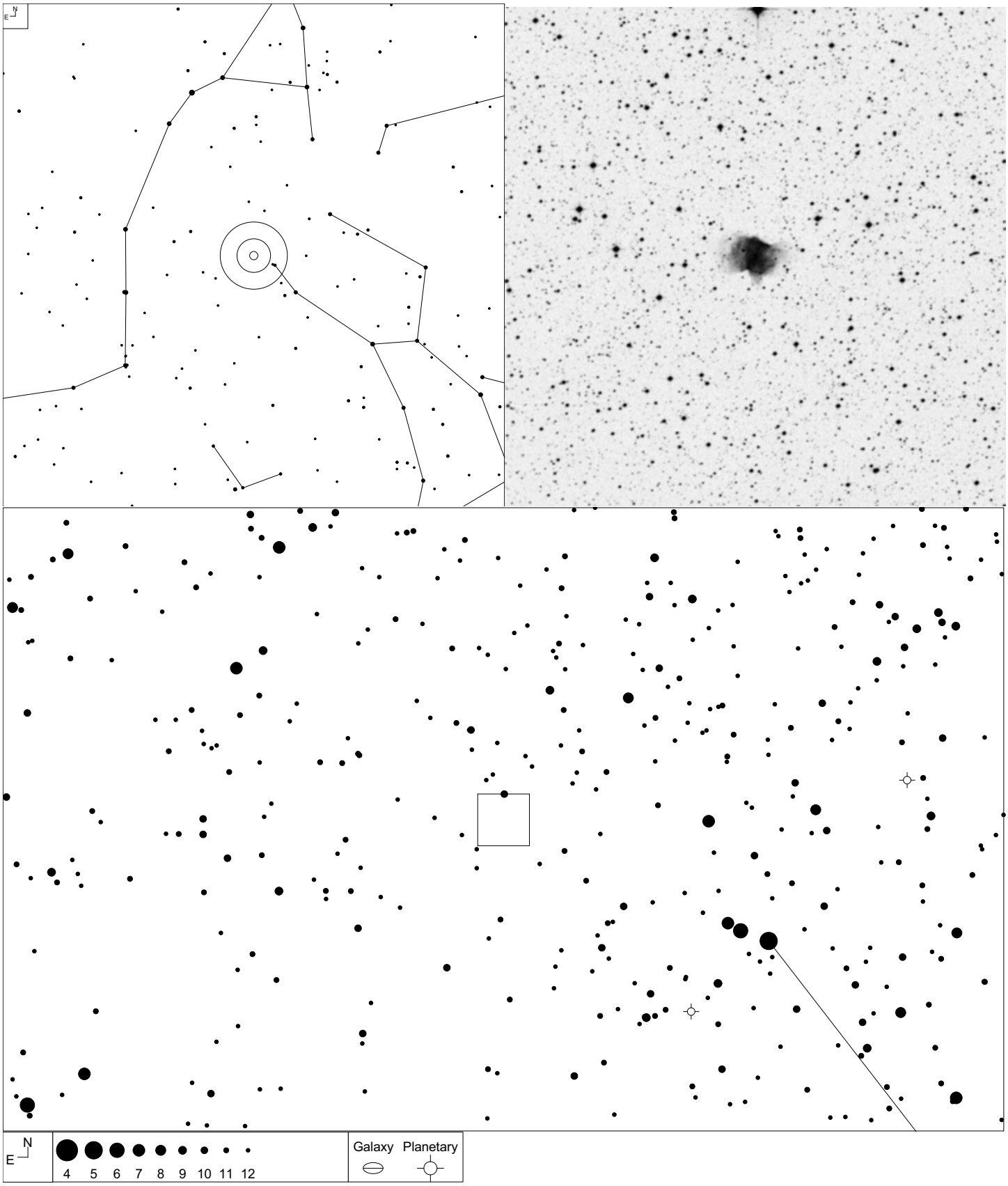
http://www.astroscience.org/abdul-ahad/redstars.html

Abell 36 (Virgo)



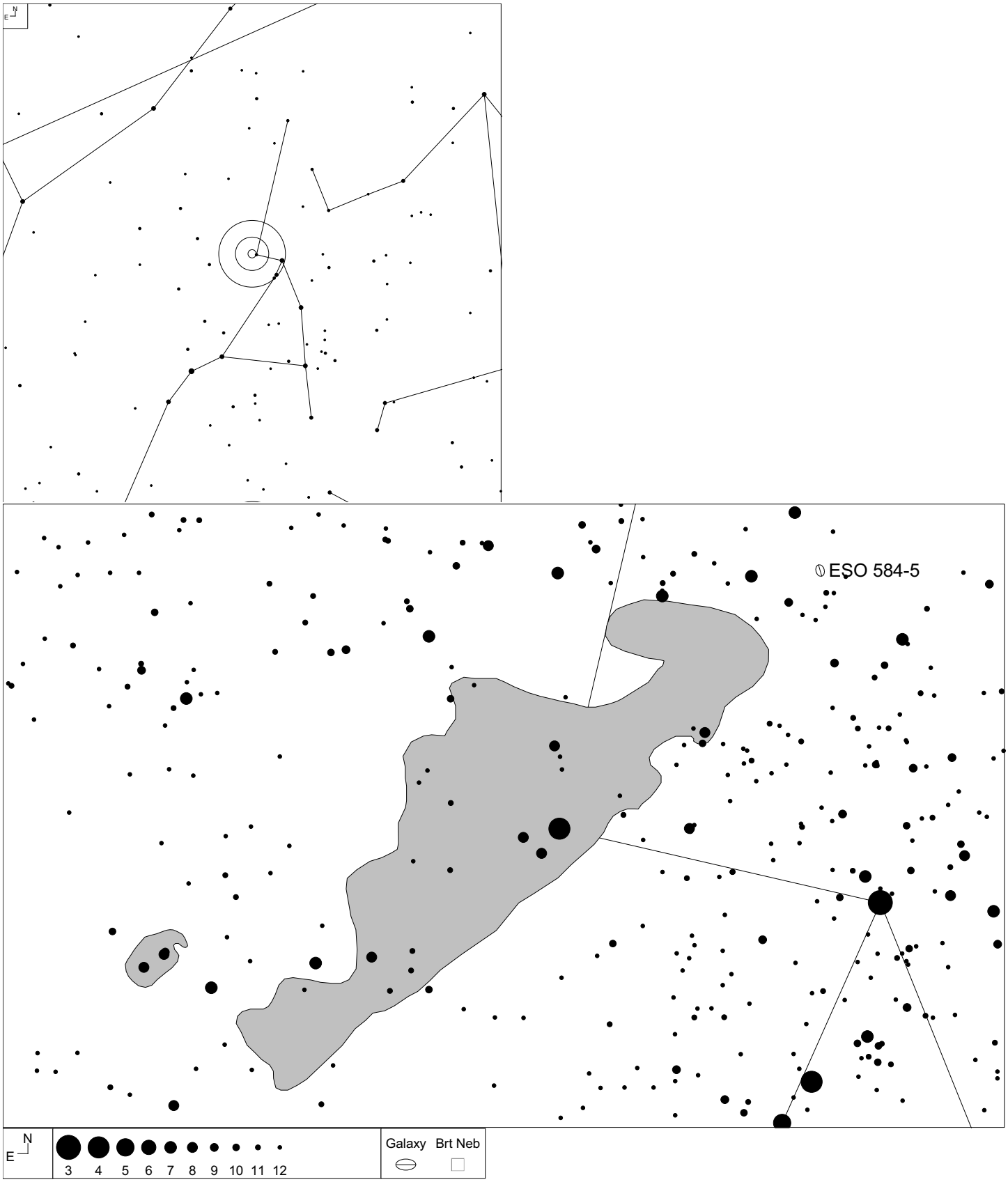
RA	Dec	Mag	Size	Urano 2000.0
13 40 41.3	–19 52 57	13.0p	6.0 x 5.0’	149L

NGC 6072 - ESO 389+5 (Scorpius)



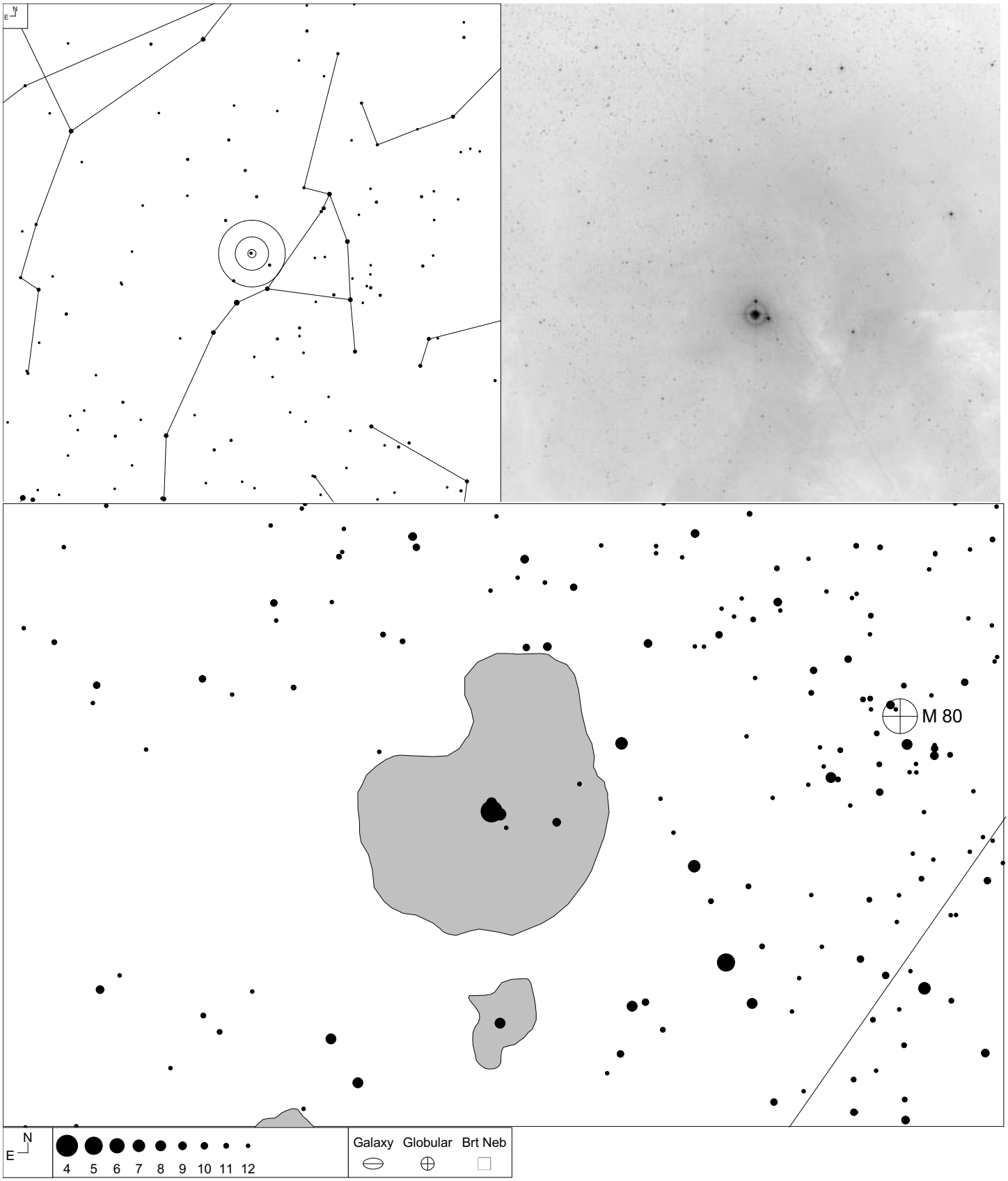
RA	Dec	Mag	Size	Urano 2000.0
16 12 58.2	–36 13 48	14.1p	98 x 72”	165L

IC 4592, LBN 1113 (Scorpius)



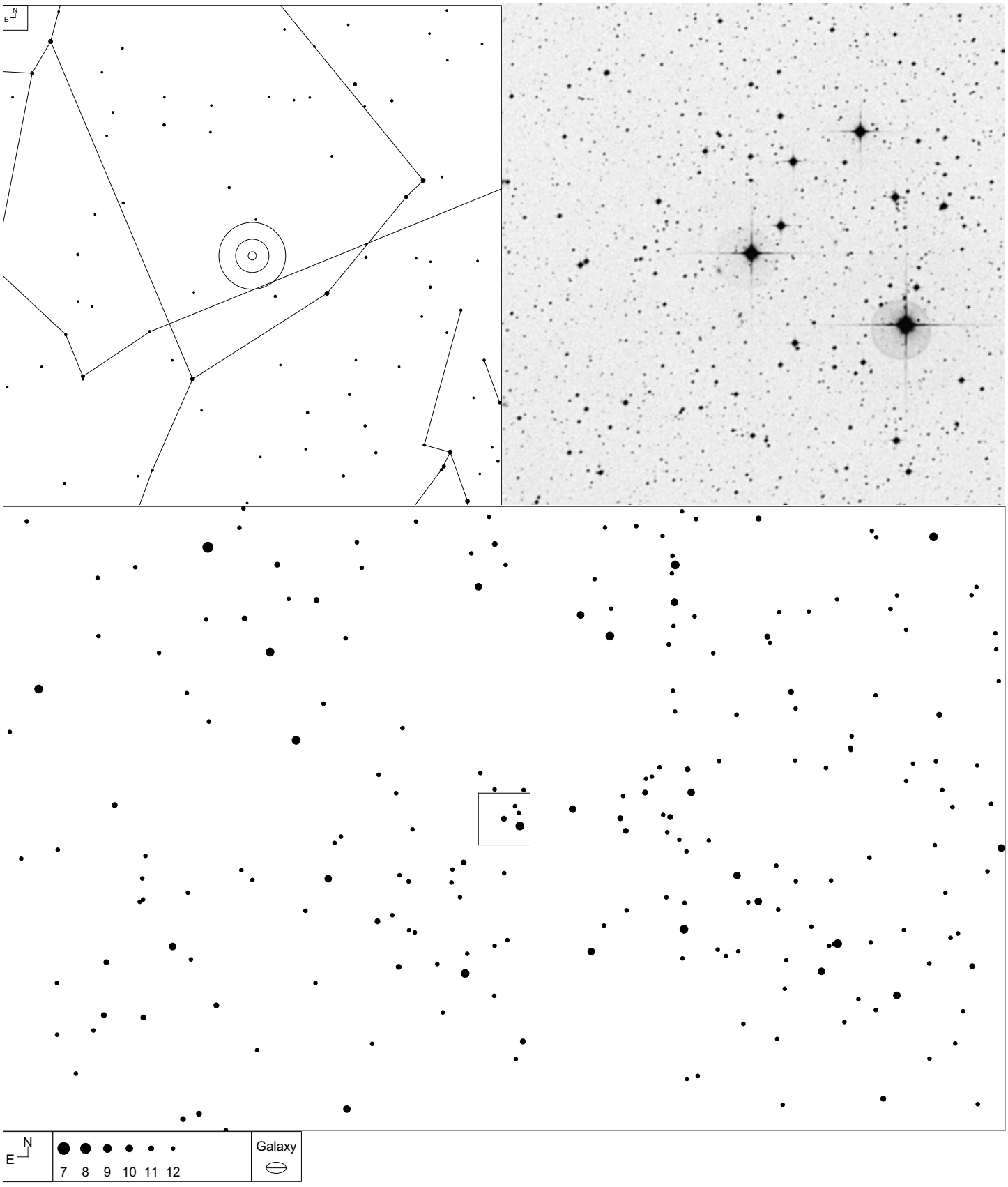
RA	Dec	Mag	Size	Urano 2000.0
16 13 08.0	–19 24 00	-	200 x 60’	147L

IC 4604, Rho Ophiuchus (Scorpius)



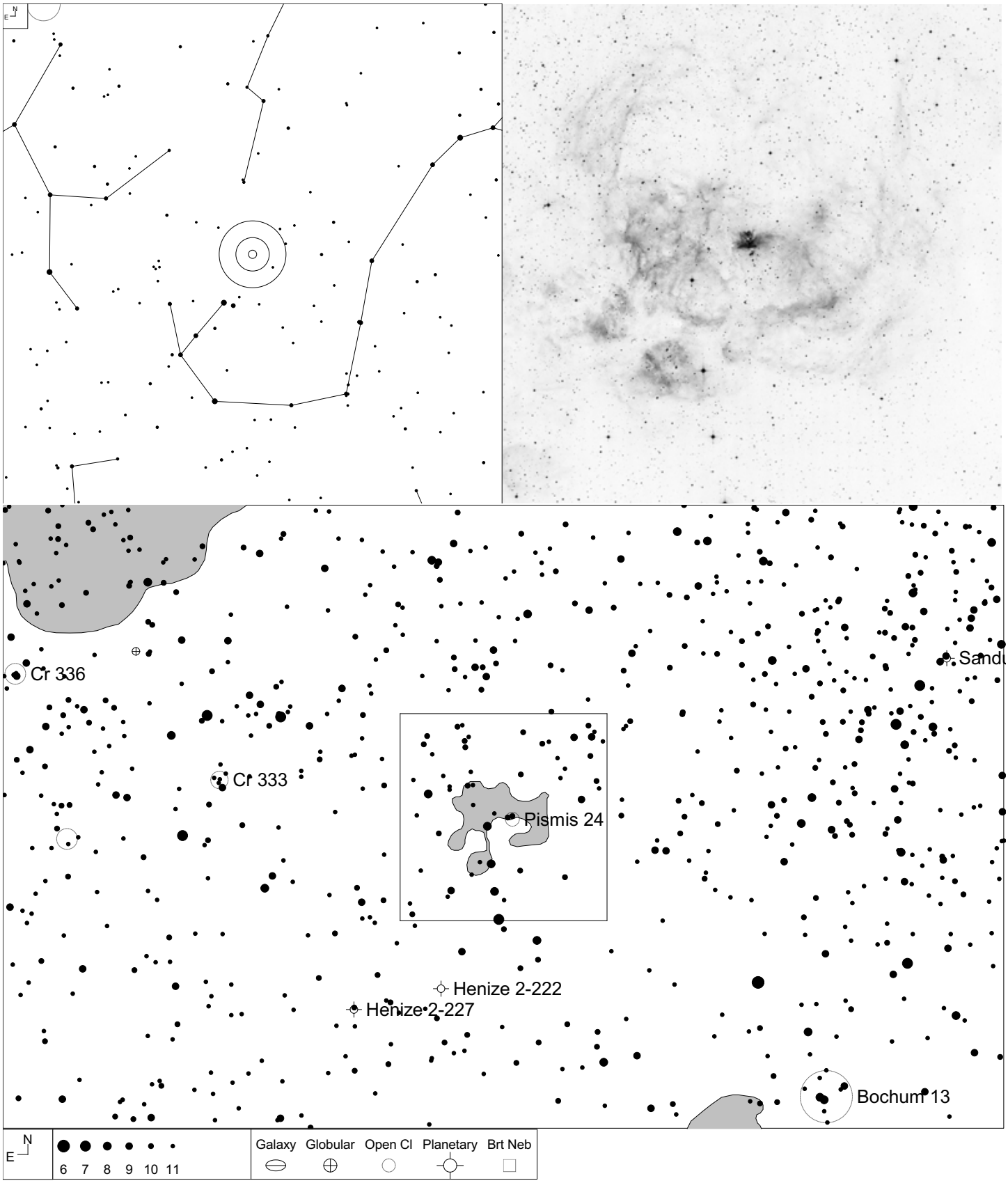
RA	Dec	Mag	Size	Urano 2000.0
16 25 20.0	–23 28 00	-	80 x 72’	147L

Wolf 630A, B, C – V1054 Ophiuchi (Ophiuchus)



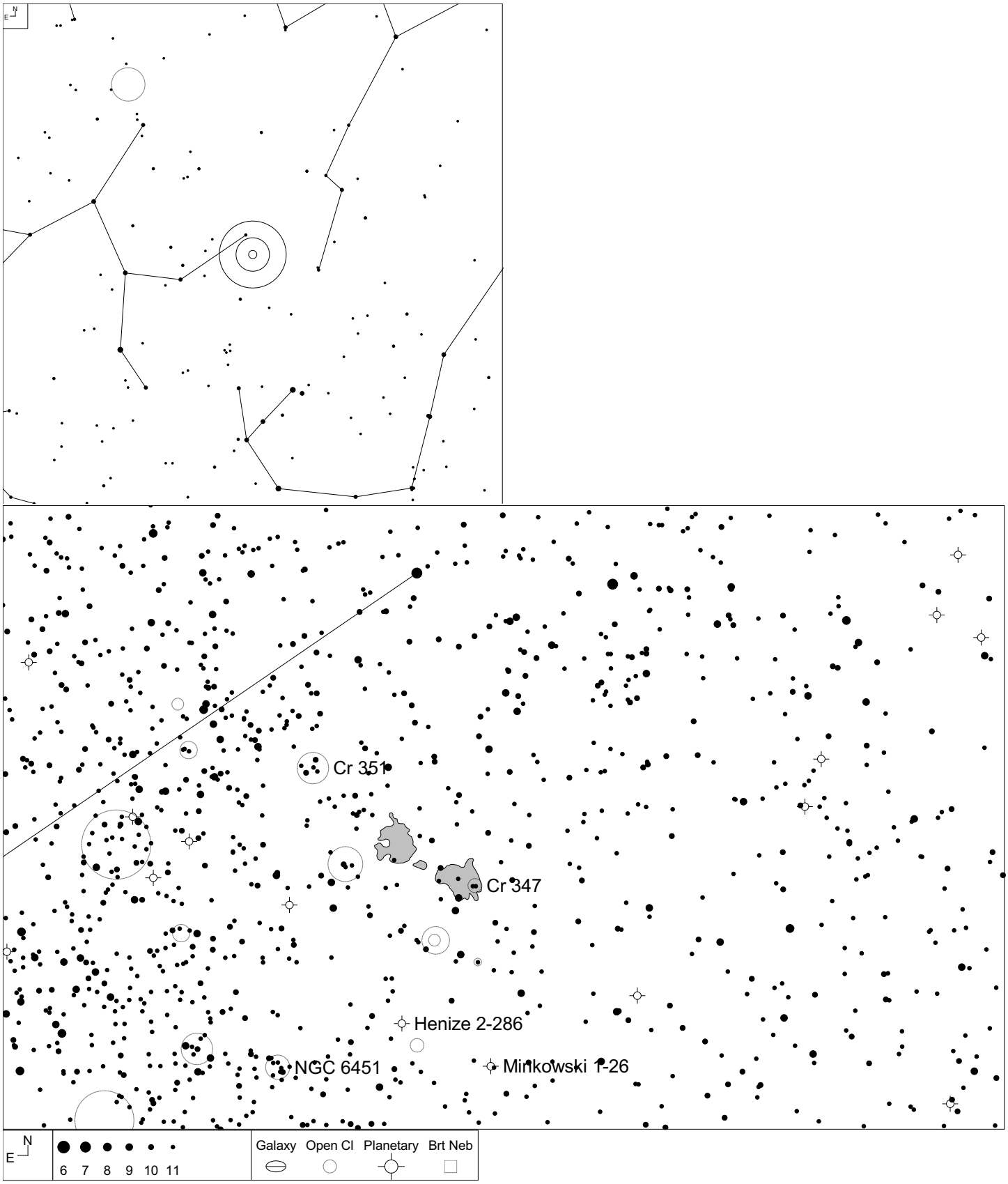
RA	Dec	Mag	Size	Urano 2000.0
16 55 29.2	–08 20 03	9.0, 10.3, 17.7	quintuple star	128R

NGC 6357, Sharpless 2-5 (Scorpius)



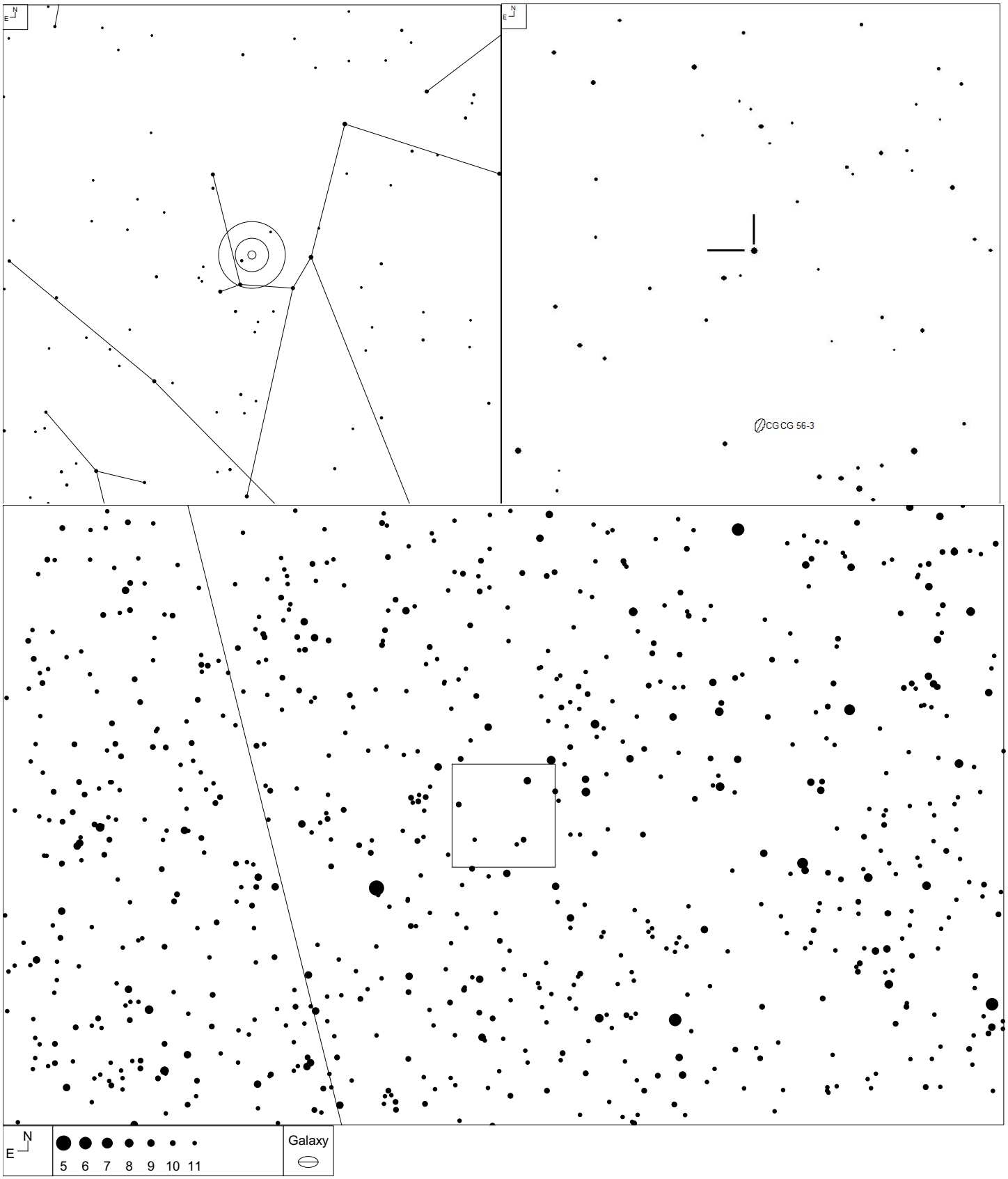
RA	Dec	Mag	Size	Urano 2000.0
17 24 56.0	–34 12 15	-	31.8 x 30.0’	164L

Milky Way Center (Sagittarius)



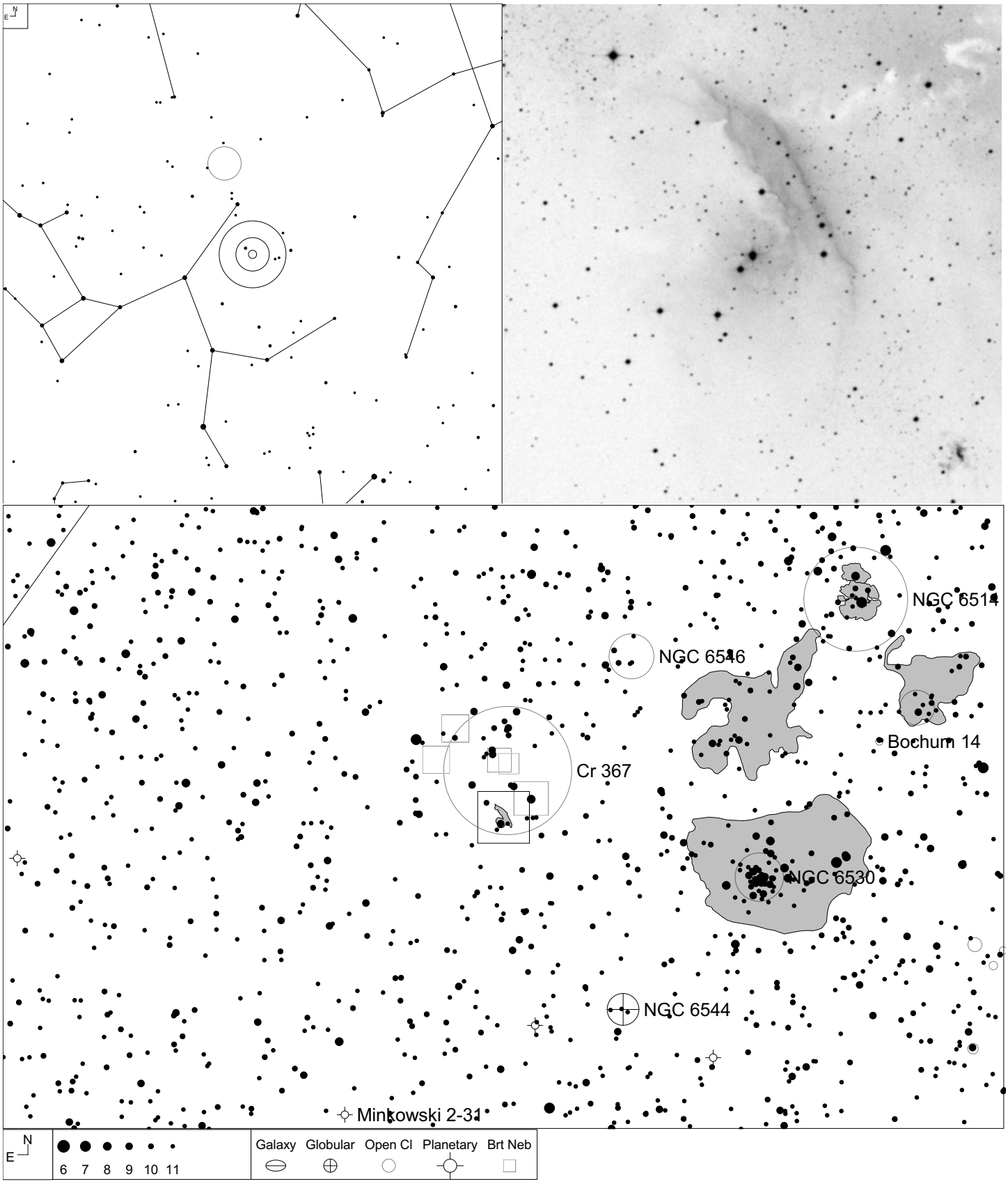
RA	Dec	Mag	Size	Urano 2000.0
17 45 40.04	–29 00 28			146L

Barnard's Star (Ophiuchus)



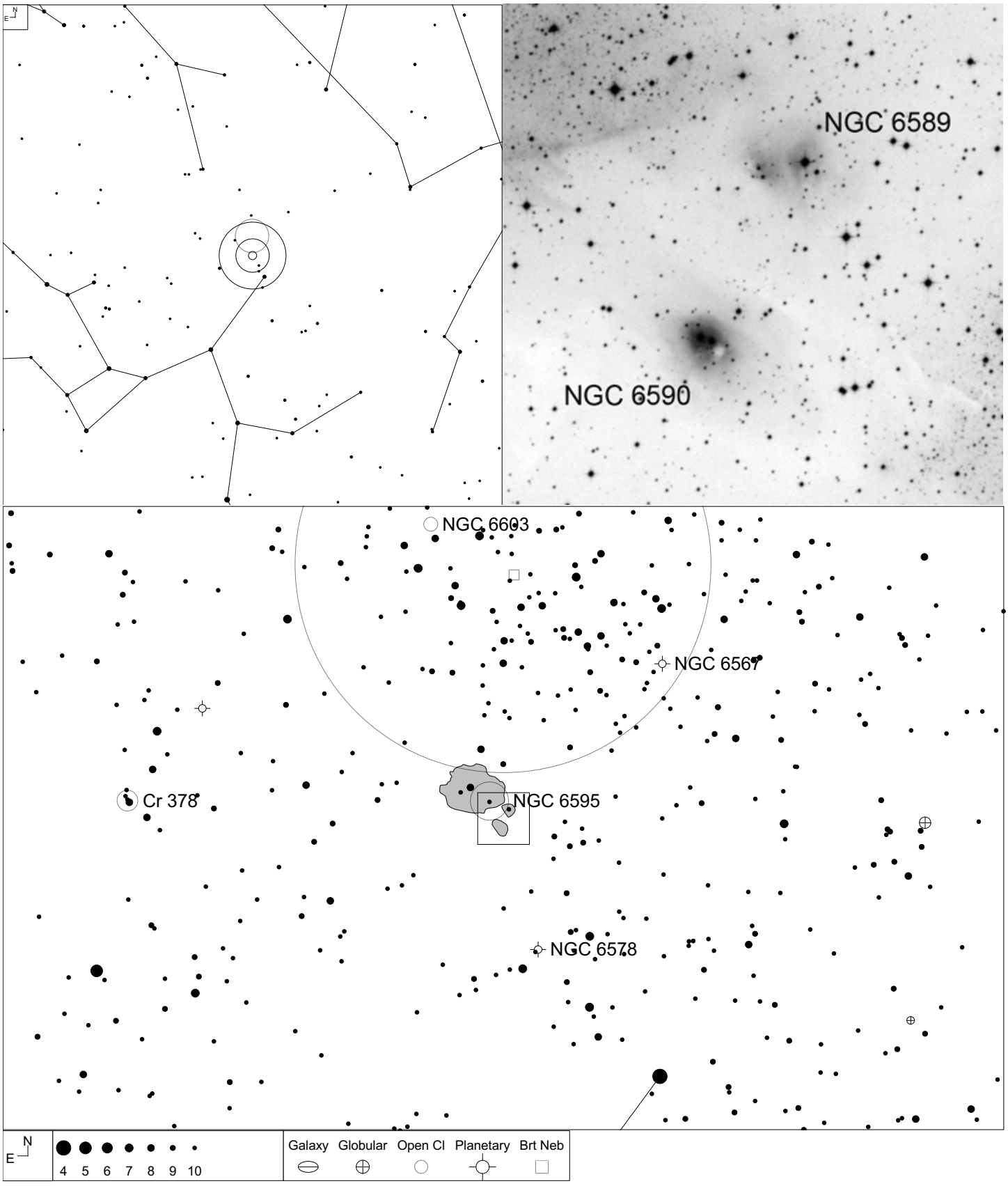
RA	Dec	Mag	Size	Urano 2000.0
17 57 48.0	+04 43 10	9.54v	*	106R

NGC 6559 (Sagittarius)



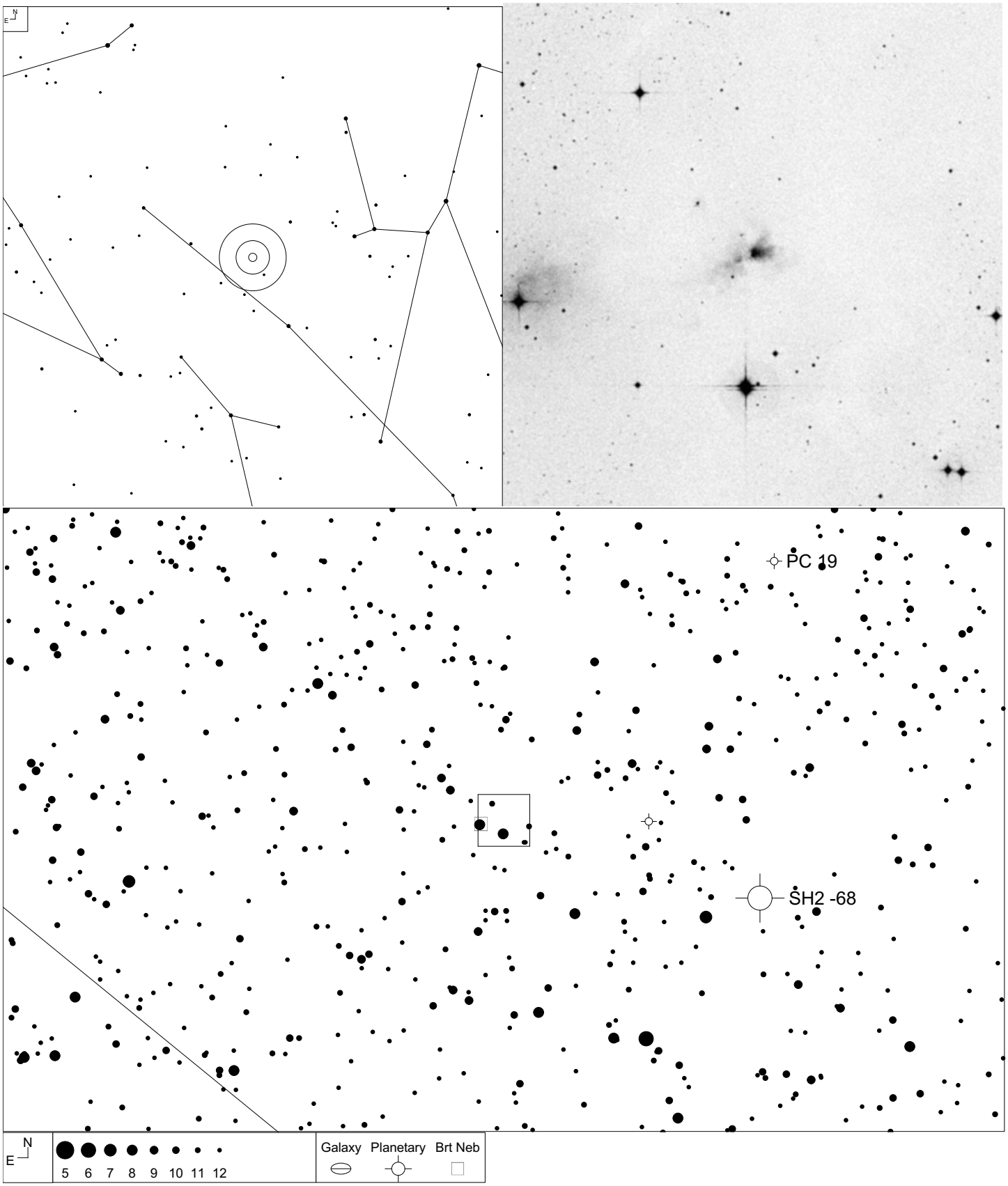
RA	Dec	Mag	Size	Urano 2000.0
18 09 53.0	–24 04 30	-	8.3 x 4.2’	145R

NGC 6589 and NGC 6590 (Sagittarius)



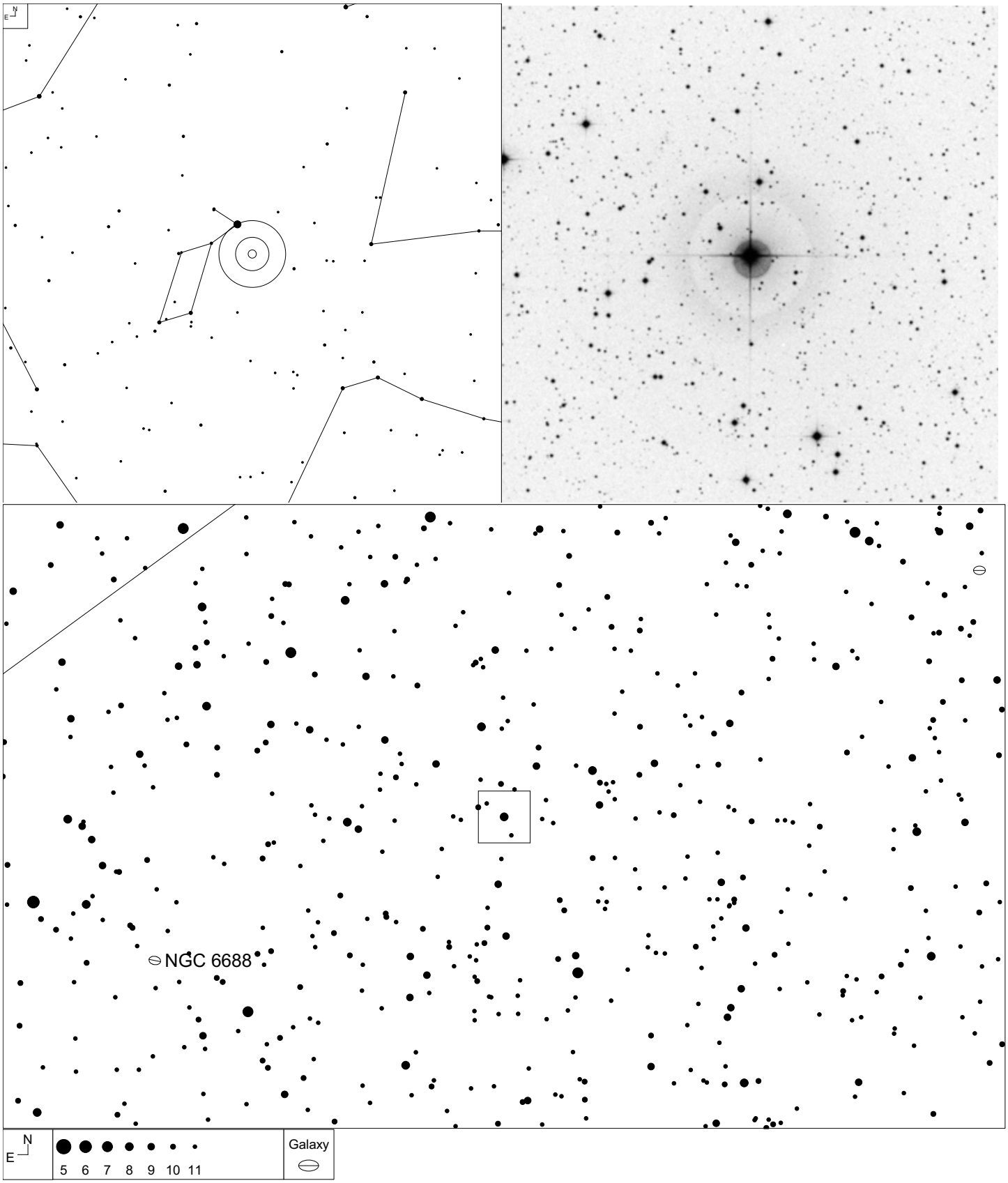
	RA	Dec	Mag	Size	Urano 2000.0
NGC 6589	18 16 52.0	–19 46 43	-	4.0 x 3.5’	145R
NGC 6590	18 17 02.0	–19 51 47	-	5.6 x 3.3’	

Serpen's Object - SVS 2 (Serpens)



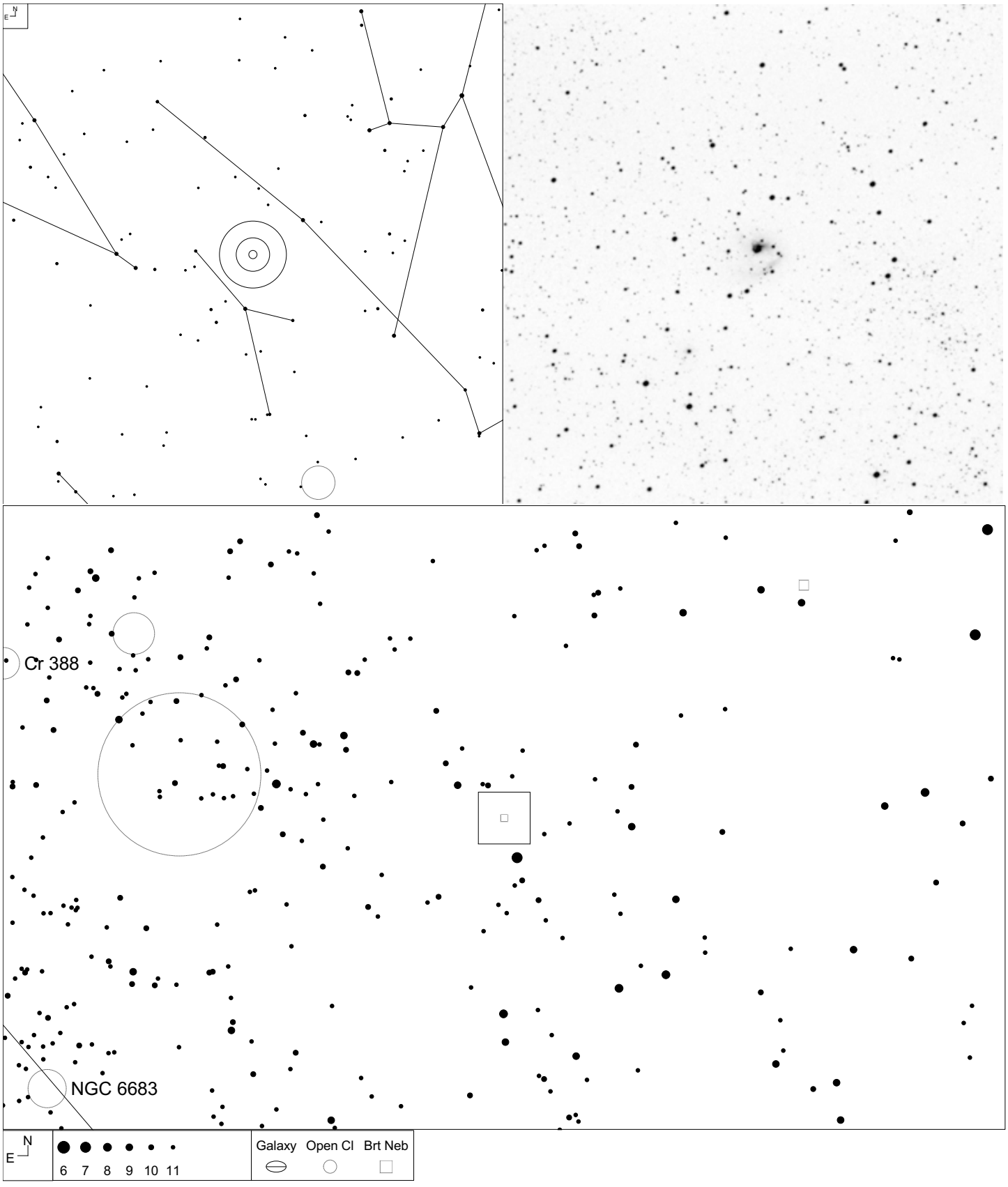
RA	Dec	Mag	Size	Urano 2000.0
18 29 56.8	+01 14 46		2.0 x 1.4'	106L

T Lyrae (Lyra)



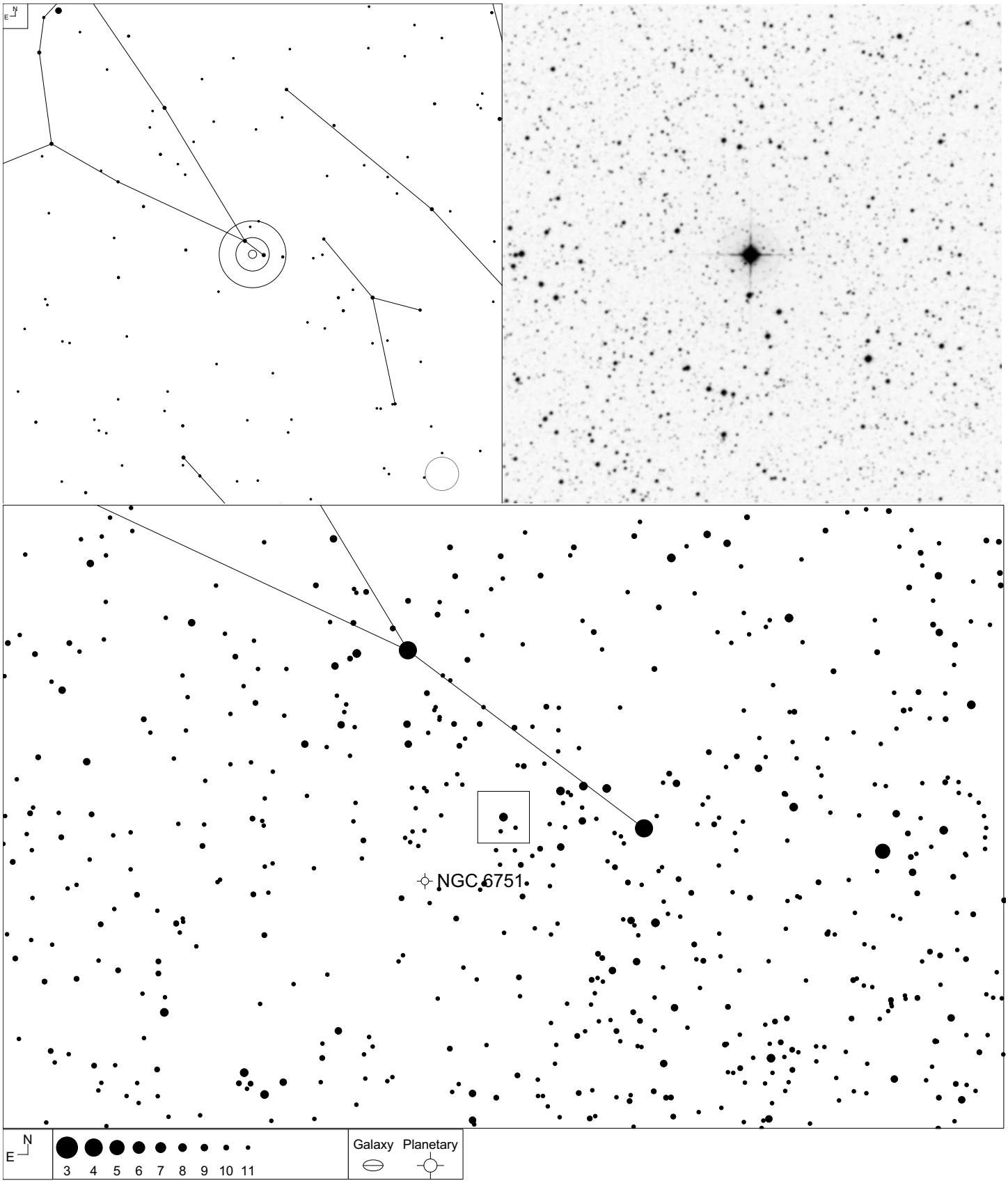
RA	Dec	Mag	Size	Urano 2000.0
18 32 20.08	+36 59 56	7.5 – 9.3 (var)	*	49R

Sharpless 2-61, PK26+01.0 (Scutum)



RA	Dec	Mag	Size	Urano 2000.0
18 33 21.8	–04 58 16		2.0’	106L

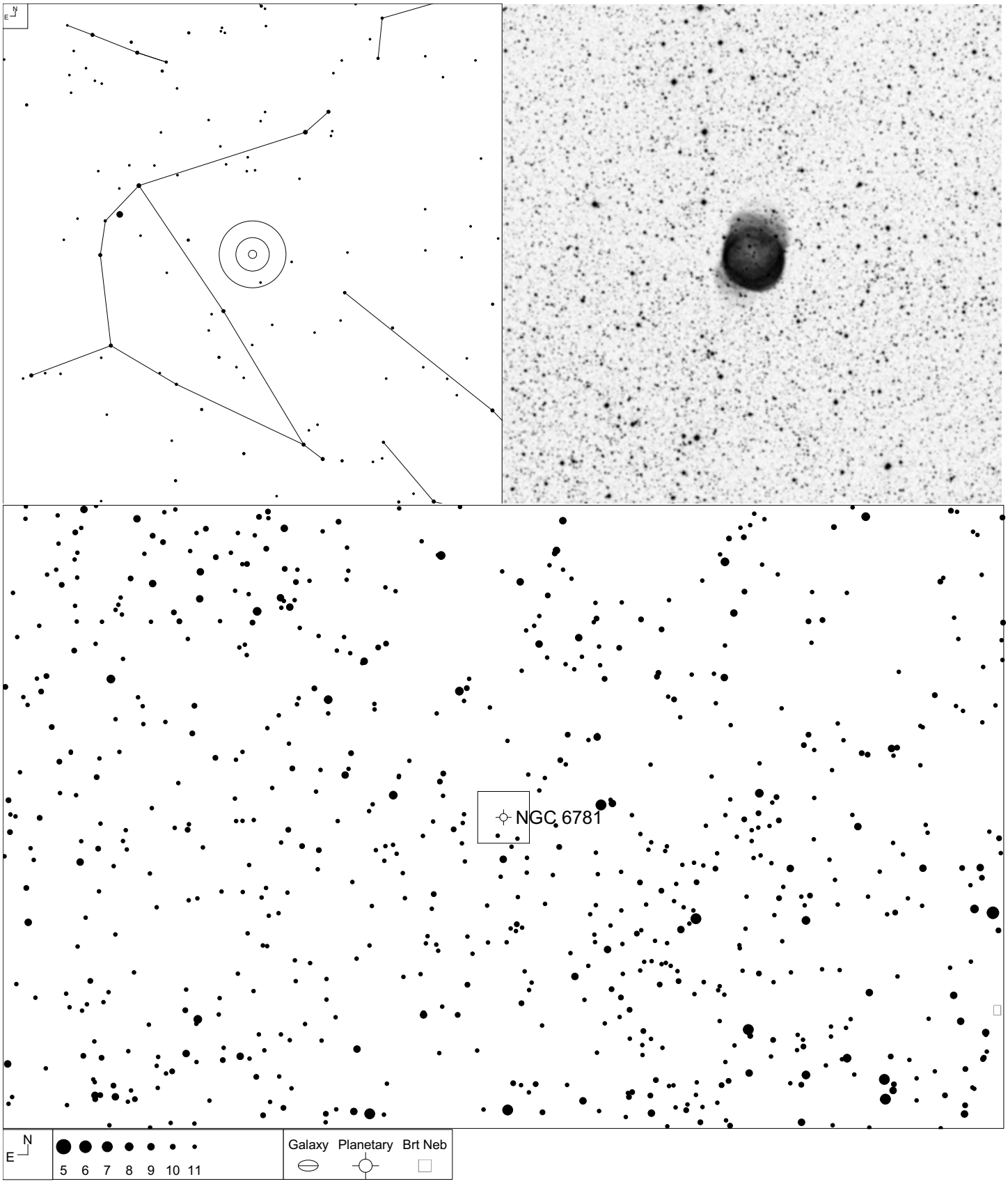
V Aquilae (Aquila)



RA	Dec	Mag	Size	Urano 2000.0
19 04 24.0	–05 41 05	6.6 – 8.4 (var)	*	127L

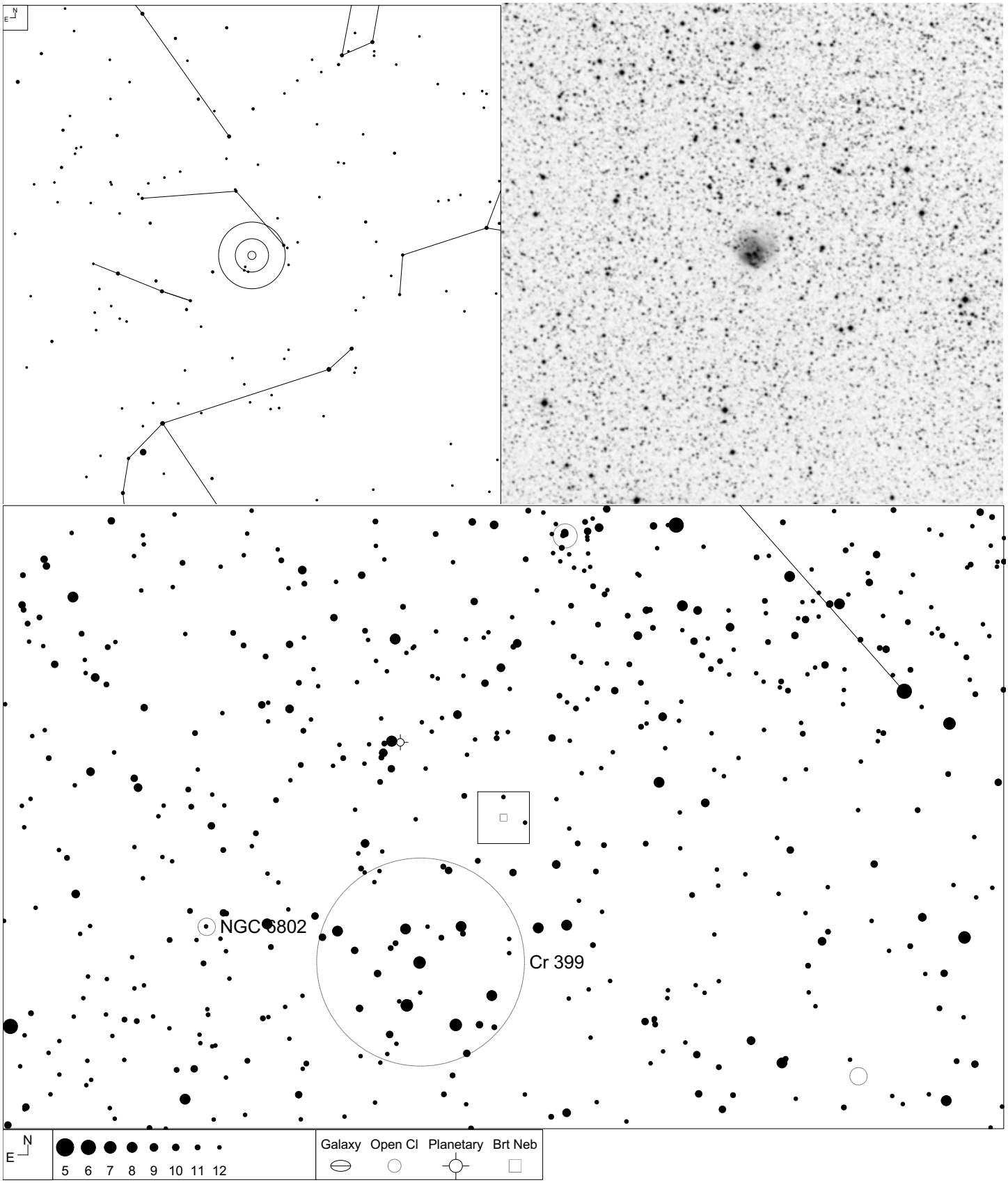
www.klima-luft.de/steinicke/Artikel/V%20Aquilae.pdf

NGC 6781, PK41-2.1 (Aquila)



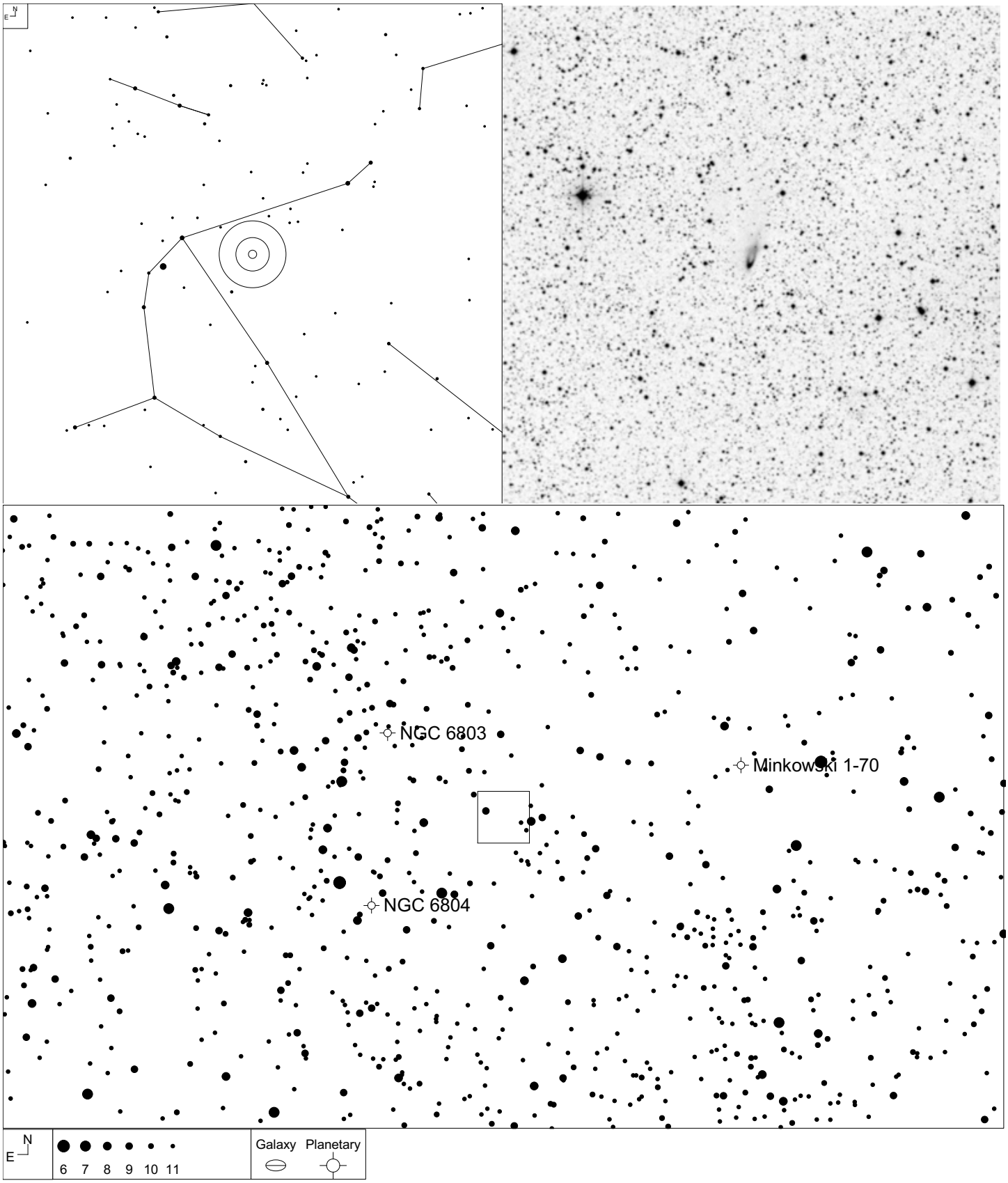
RA	Dec	Mag	Size	Urano 2000.0
19 18 28.2	+06 32 15	11.8p	1.8’	85L

Sharpless 2-83 (Vulpecula)



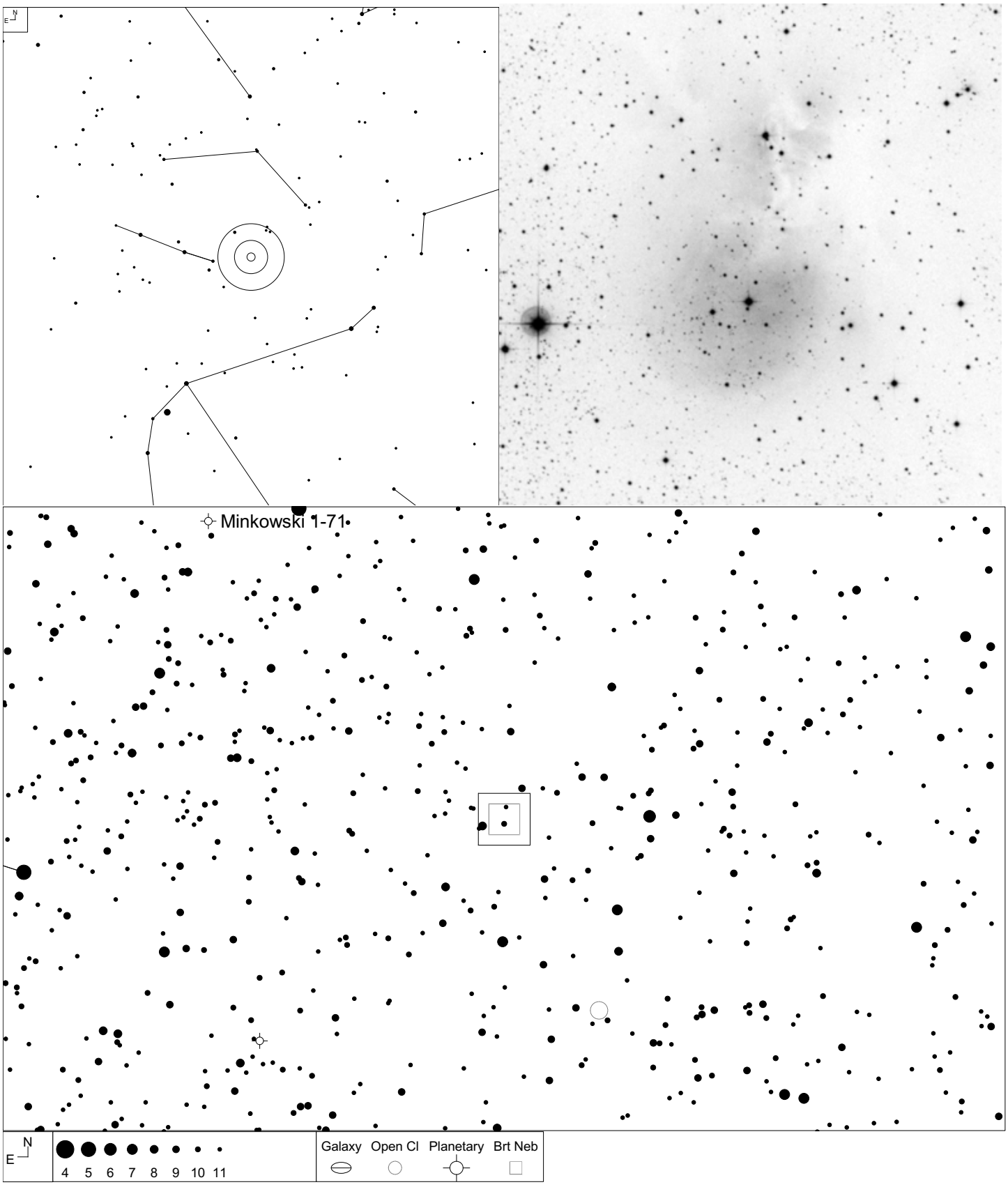
RA	Dec	Mag	Size	Urano 2000.0
19 24 30.4	+20 47 31		2.0’	66R

Parsamyan 21 (Aquila)



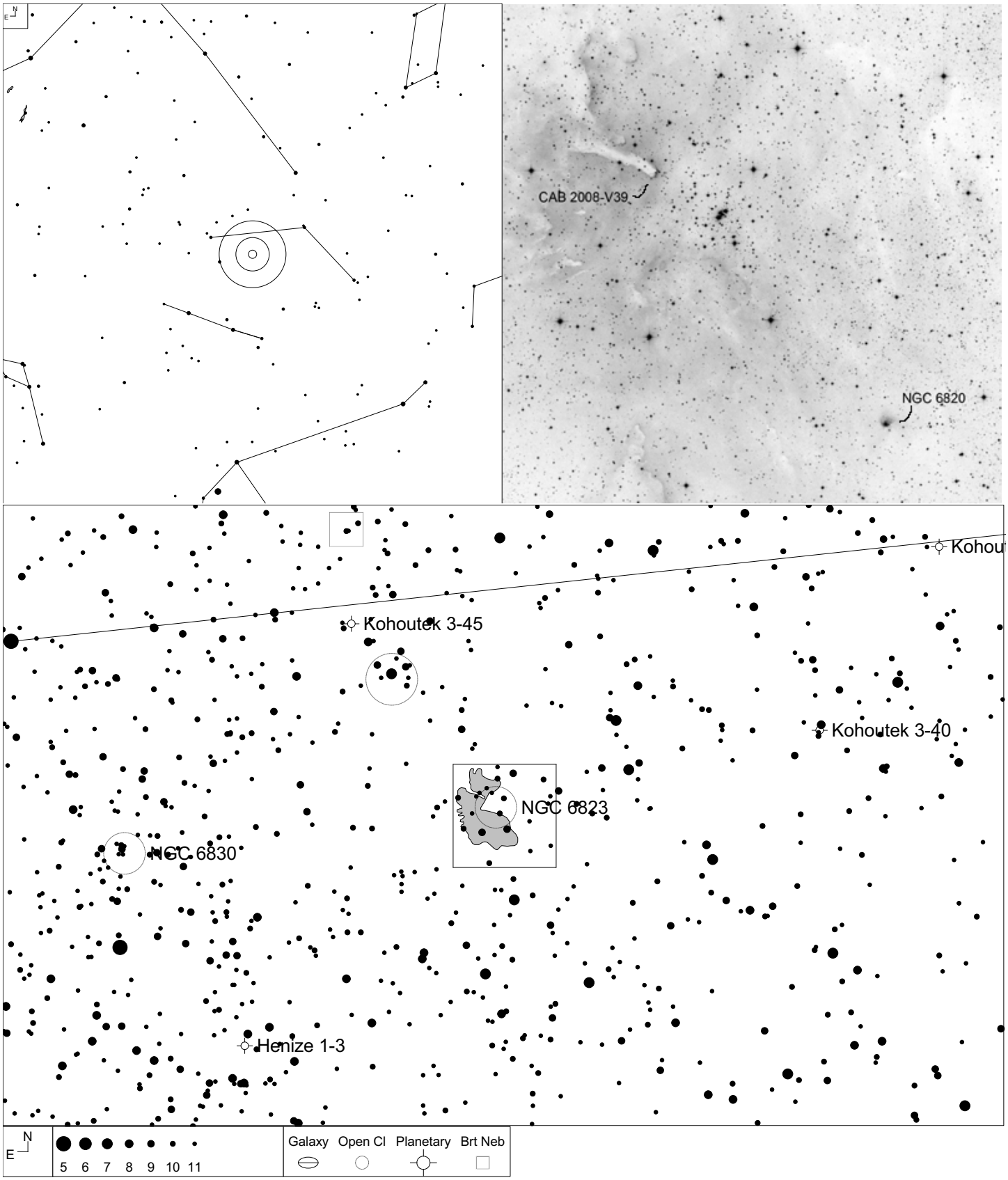
RA	Dec	Mag	Size	Urano 2000.0
19 29 00.6	+09 39 02		42 x 19”	85L

Sharpless 2-82 (Vulpecula)



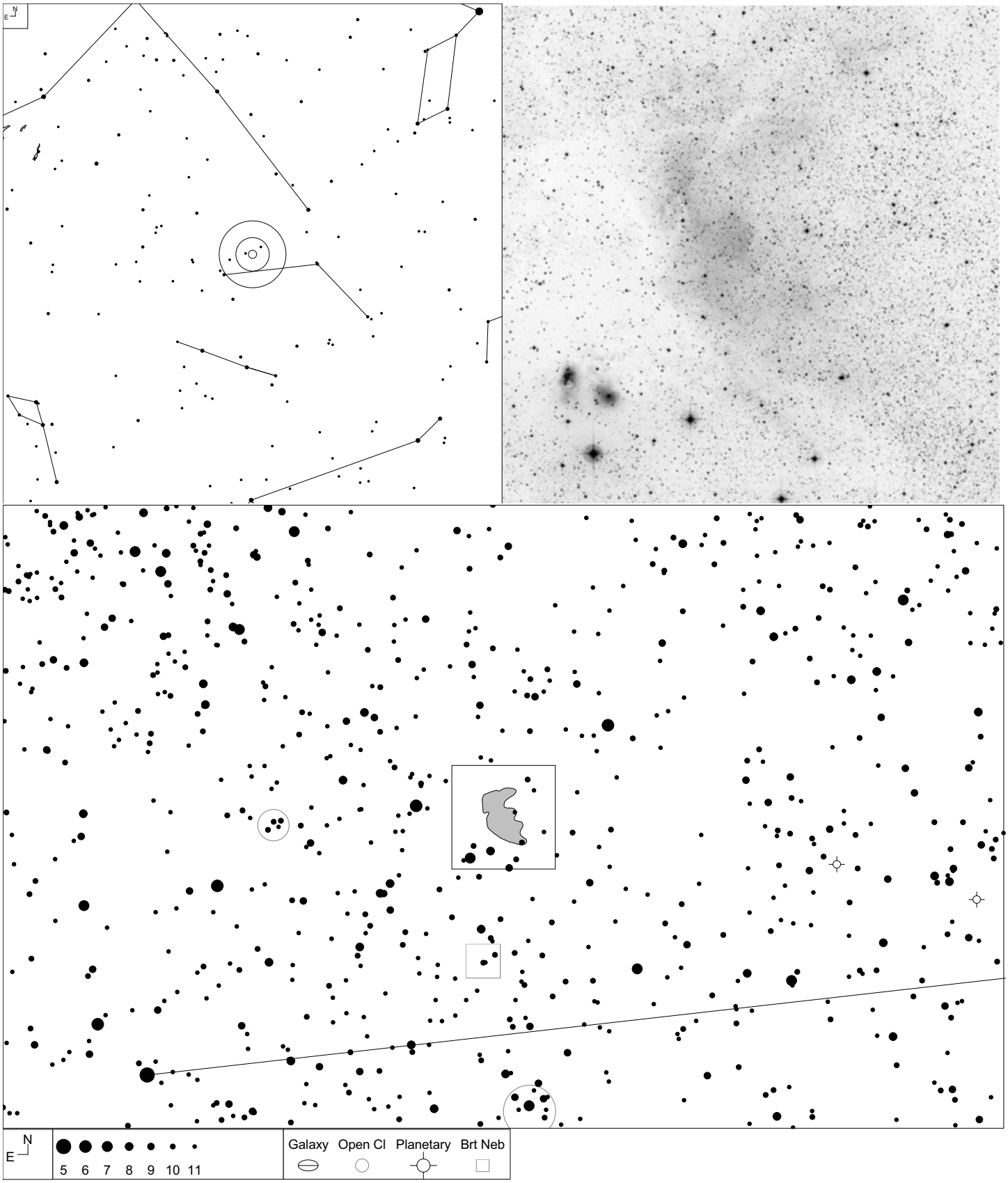
RA	Dec	Mag	Size	Urano 2000.0
19 30 23.3	+18 17 02		9.0’	66R

NGC 6820 and CAB2008-V39 (Vulpecula)



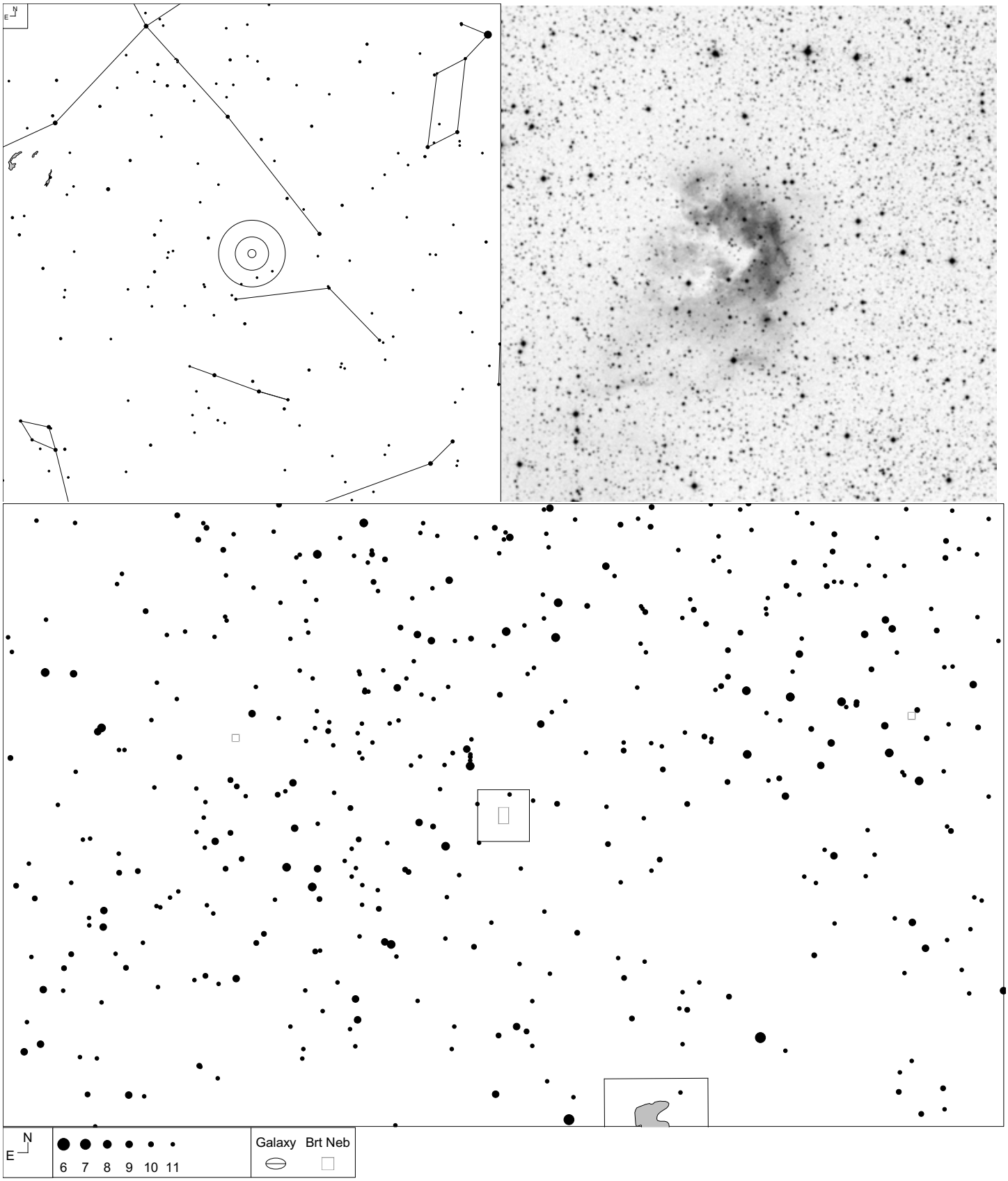
	RA	Dec	Mag	Size	Urano 2000.0
NGC 6820	19 42 53.0	+23 12 23	-	24.7 x 12.0’	66R
CAB2008-V39	19 43 28.1	+23 20 38	-	0.5 x 5.0’	

Sharpless 2-88 (Vulpecula)



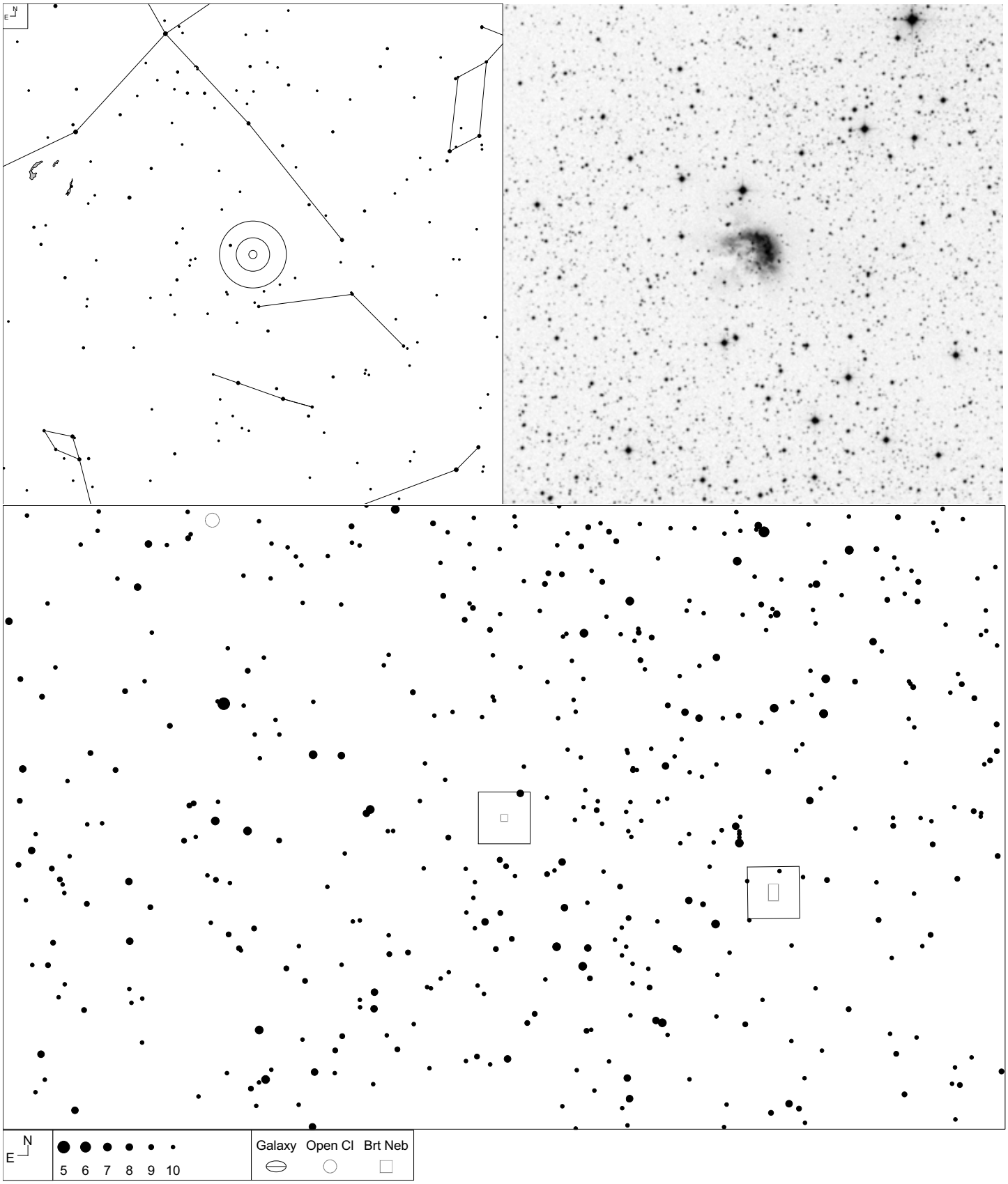
RA	Dec	Mag	Size	Urano 2000.0
19 45 57.0	+25 19 50		17.5 x 41’	66R

Sharpless 2-90, LBN 144 (Vulpecula)



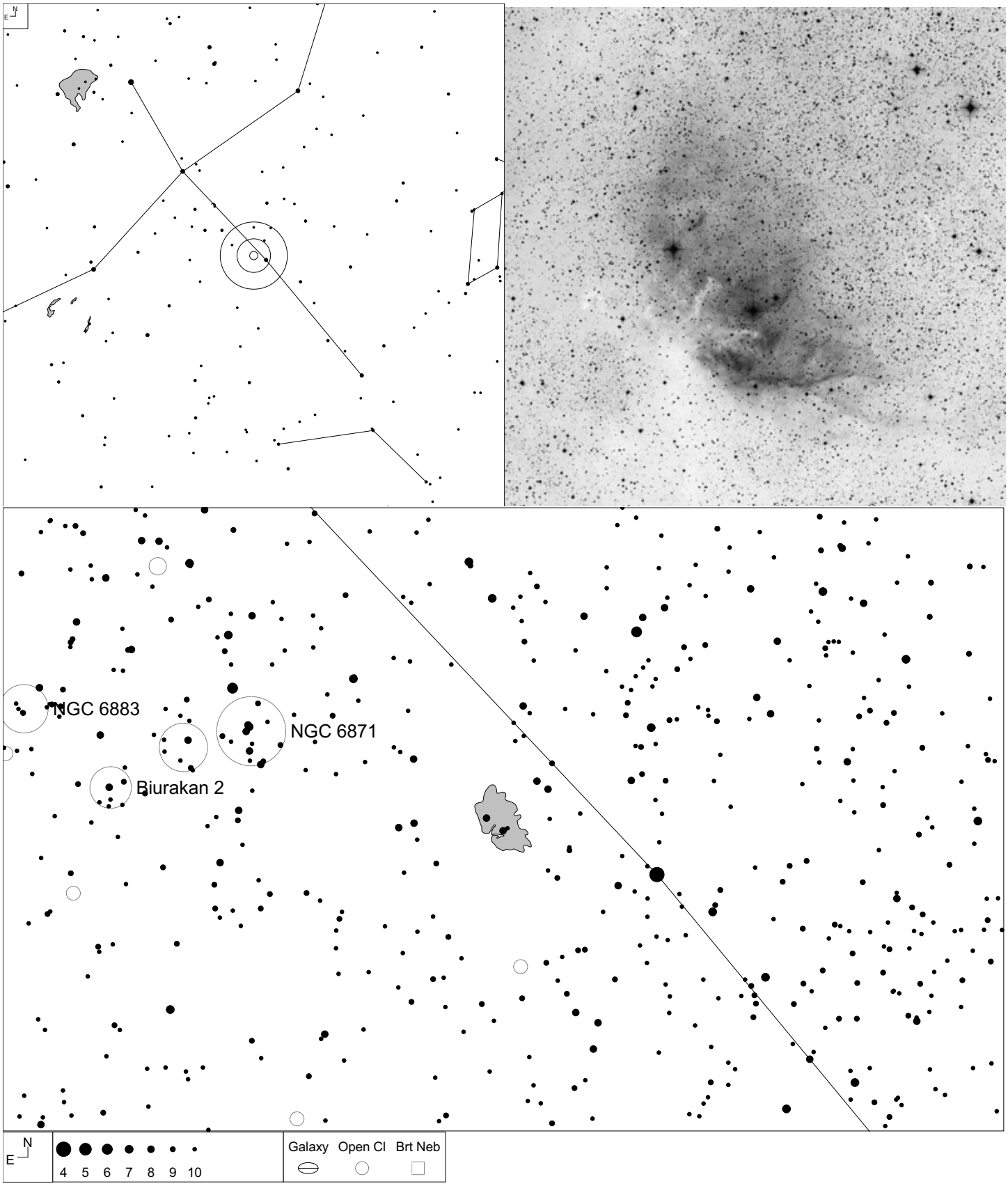
RA	Dec	Mag	Size	Urano 2000.0
19 49 12.4	+26 50 49		5.0 x 3.4’	66R

Sharpless 2-93, LBN 146 (Vulpecula)



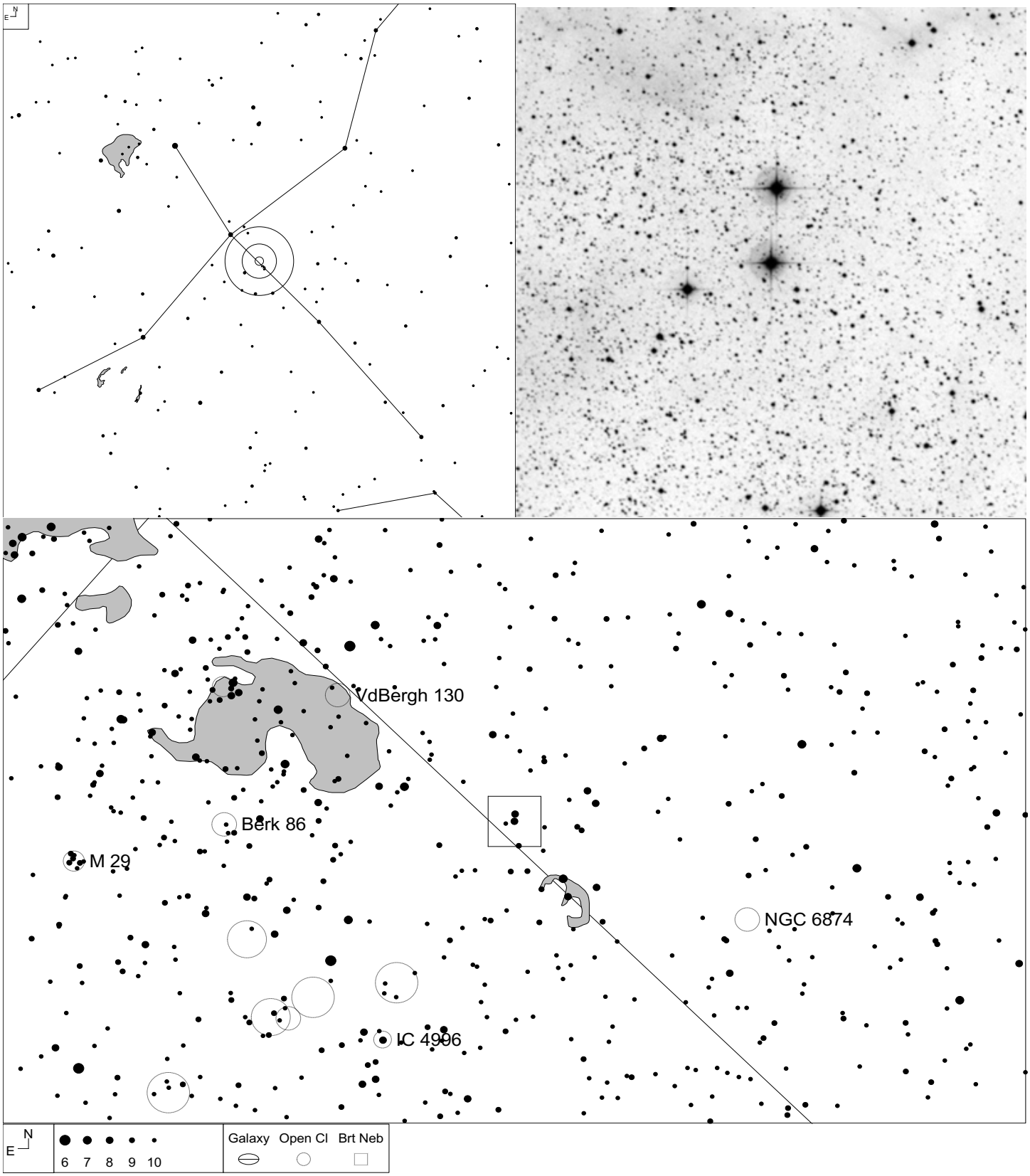
RA	Dec	Mag	Size	Urano 2000.0
19 55 00.5	+27 12 47		1.8’	66R

Sharpless 2-101 (Cygnus)



RA	Dec	Mag	Size	Urano 2000.0
19 59 55.0	+35 21 00		21.8 x 12.0’	48R

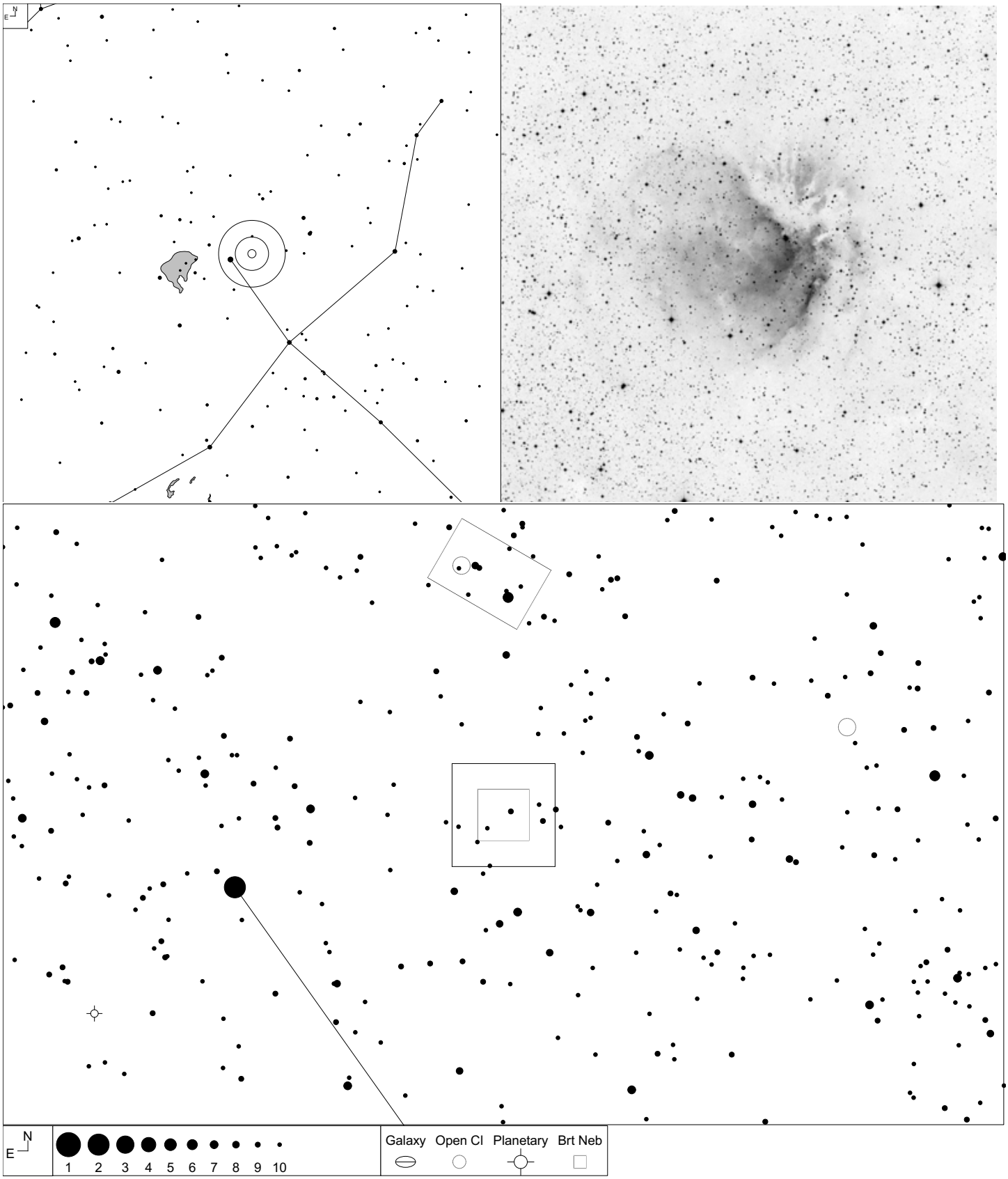
RS Cygni (Cygnus)



RA	Dec	Mag	Size	Urano 2000.0
20 13 23.7	+38 43 45	7.1 - 7.6 (var)		48L

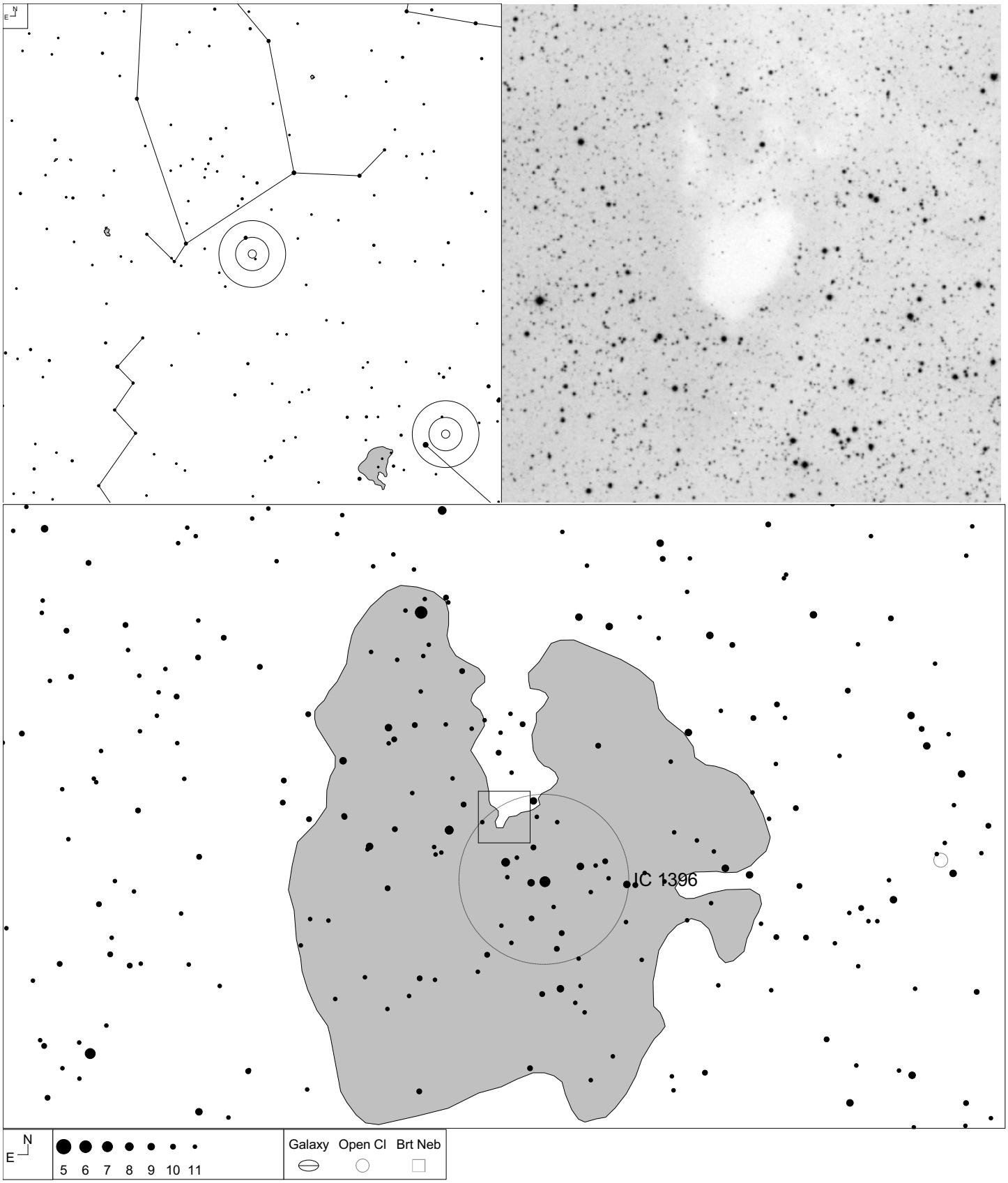
http://www.newforestobservatory.com/2012/07/03/rs-cygni-a-carbon-star-lying-close-to-the-crescent-nebula-in-cygnus/
http://www.astroscience.org/abdul-ahad/RS_Cygni.html

Sharpless 2-112 (Cygnus)



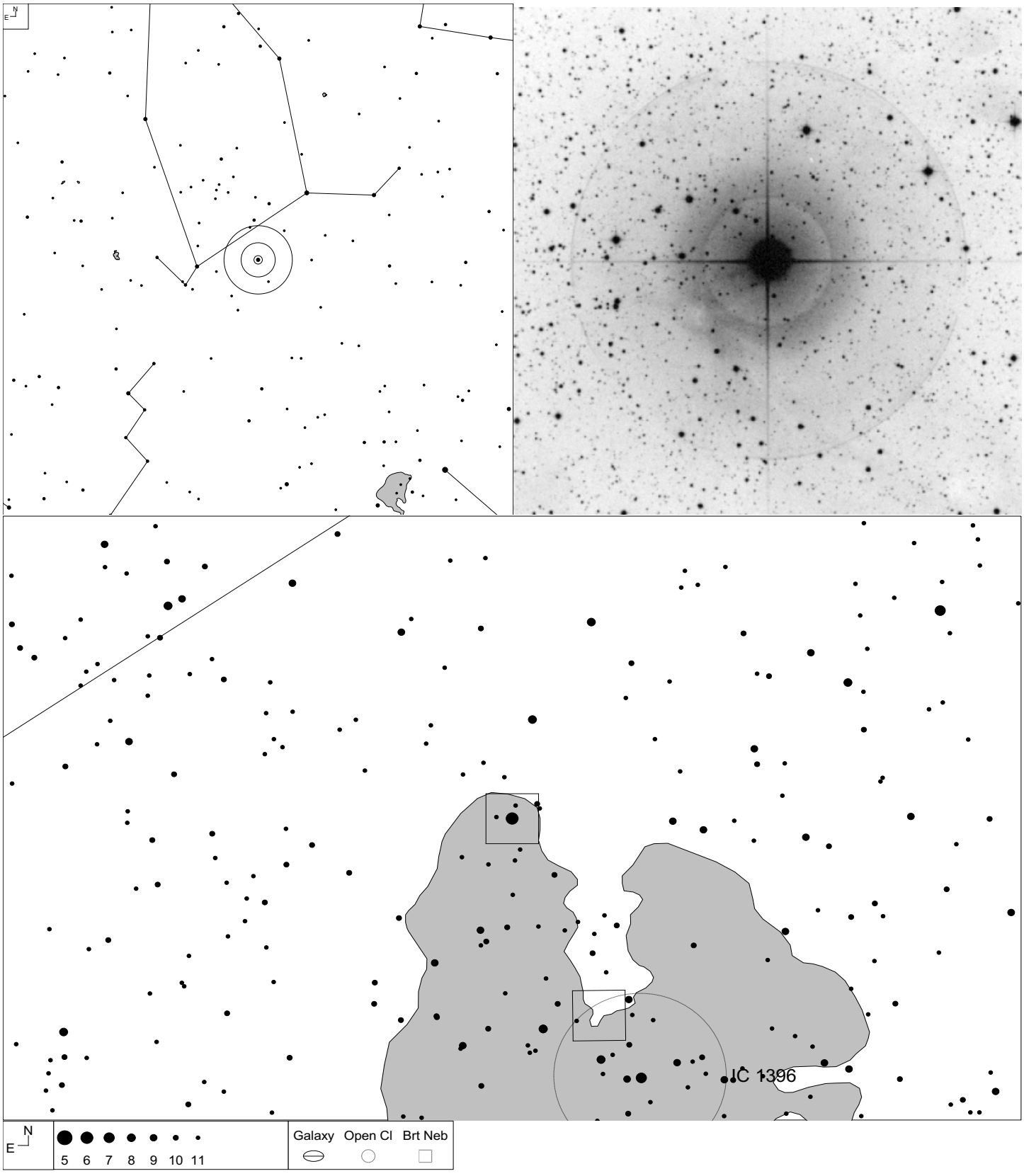
RA	Dec	Mag	Size	Urano 2000.0
20 34 03.0	+45 38 42		115’	32R

B 161, inside IC 1396 (Cepheus)



RA	Dec	Mag	Size	Urano 2000.0
21 40 25.3	+57 48 03		3.9 x 2.5’	19R

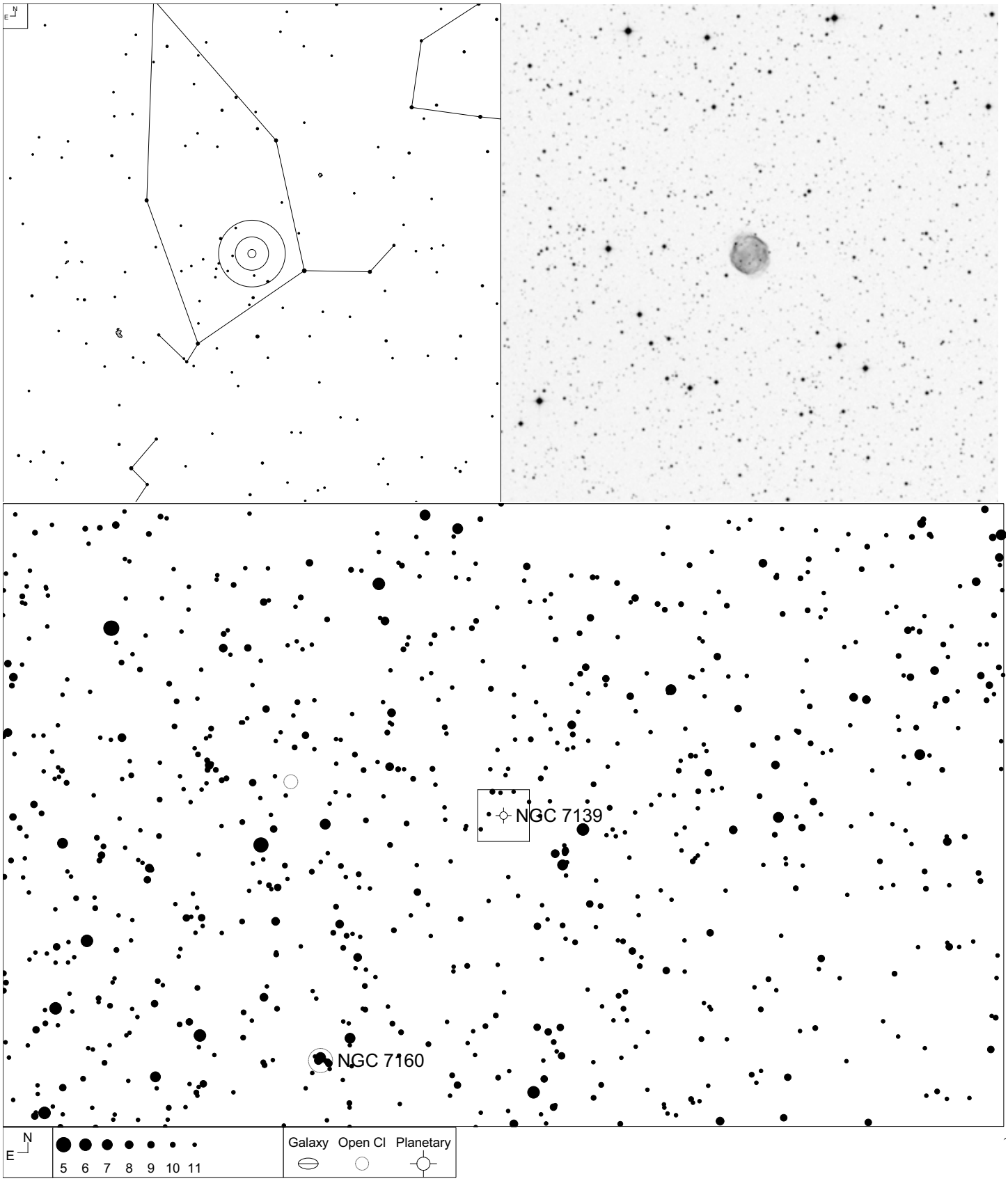
Herschel's Garnet Star (Cepheus)



RA	Dec	Mag	Size	Urano 2000.0
21 43 30.4	+58 46 49	4.02v	*	19R

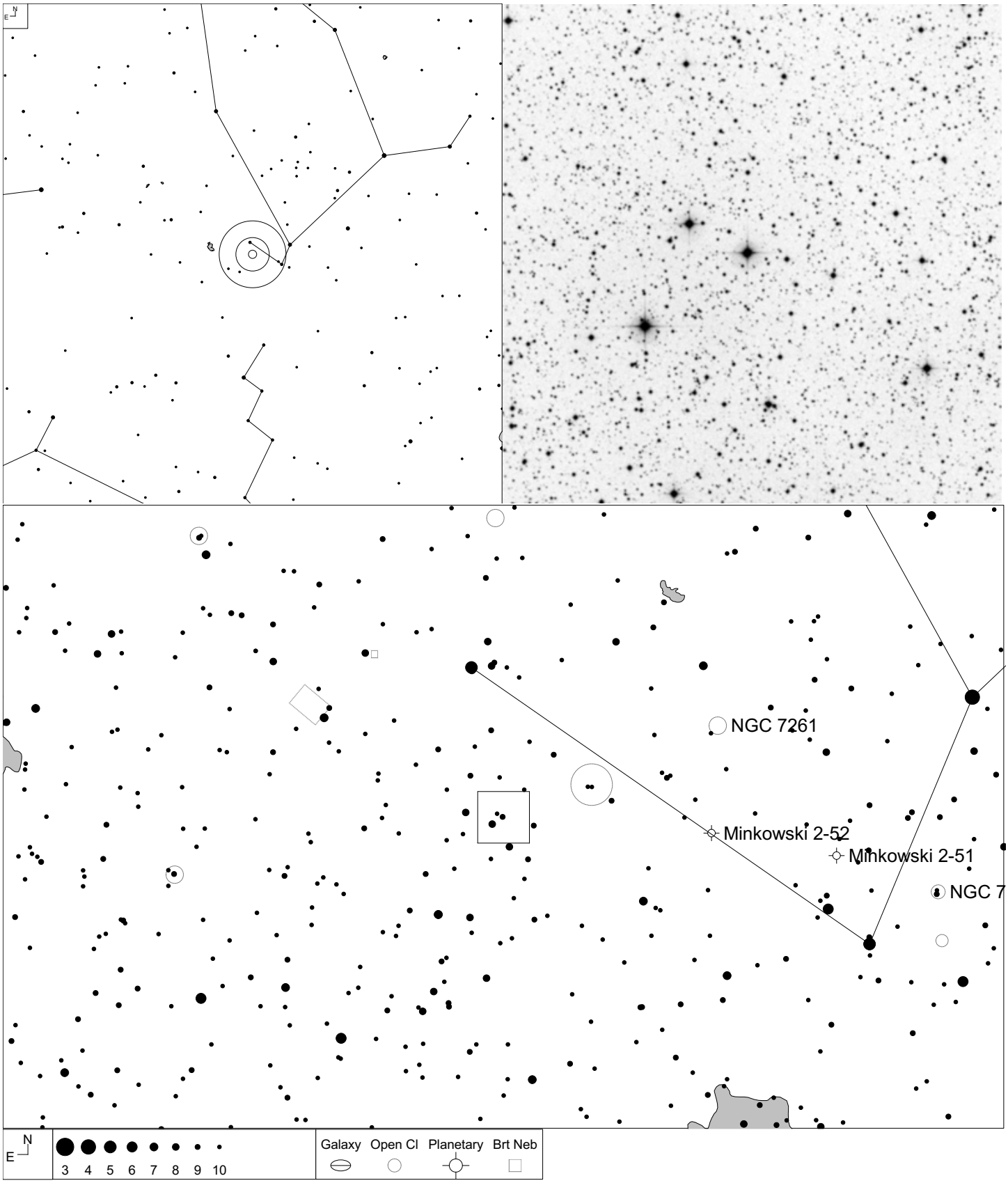
http://www.universetoday.com/103491/seeing-red-hunting-herschels-garnet-star/
http://en.wikipedia.org/wiki/Mu_Cephei

NGC 7139 (Cepheus)



RA	Dec	Mag	Size	Urano 2000.0
21 46 08.6	+63 47 31	13.3p	77”	9L

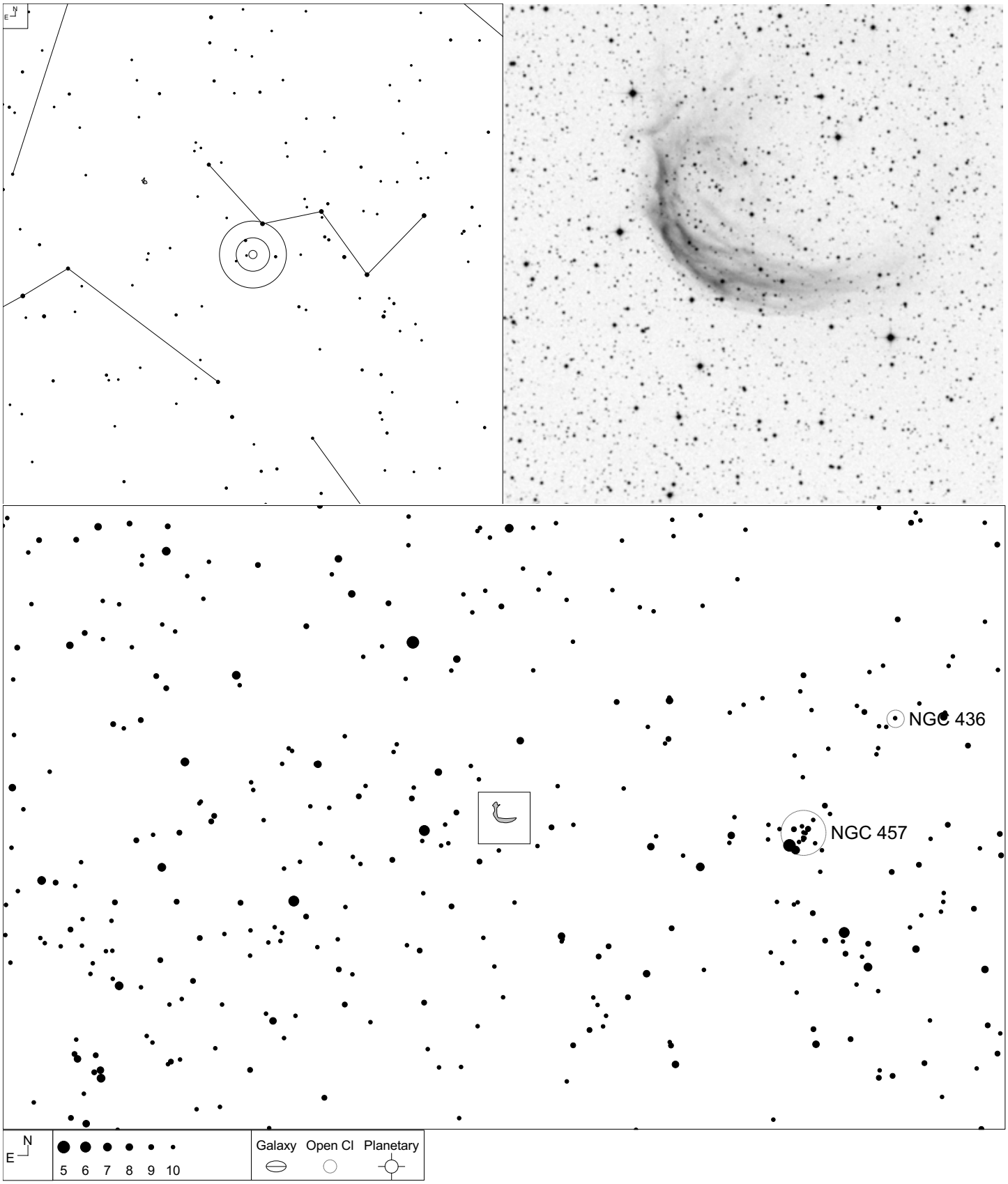
Kruger 60A & B (Cepheus)



RA	Dec	Mag	Size	Urano 2000.0
22 27 59.5	+57 41 45	9.6, 11.4	2.5”	19L

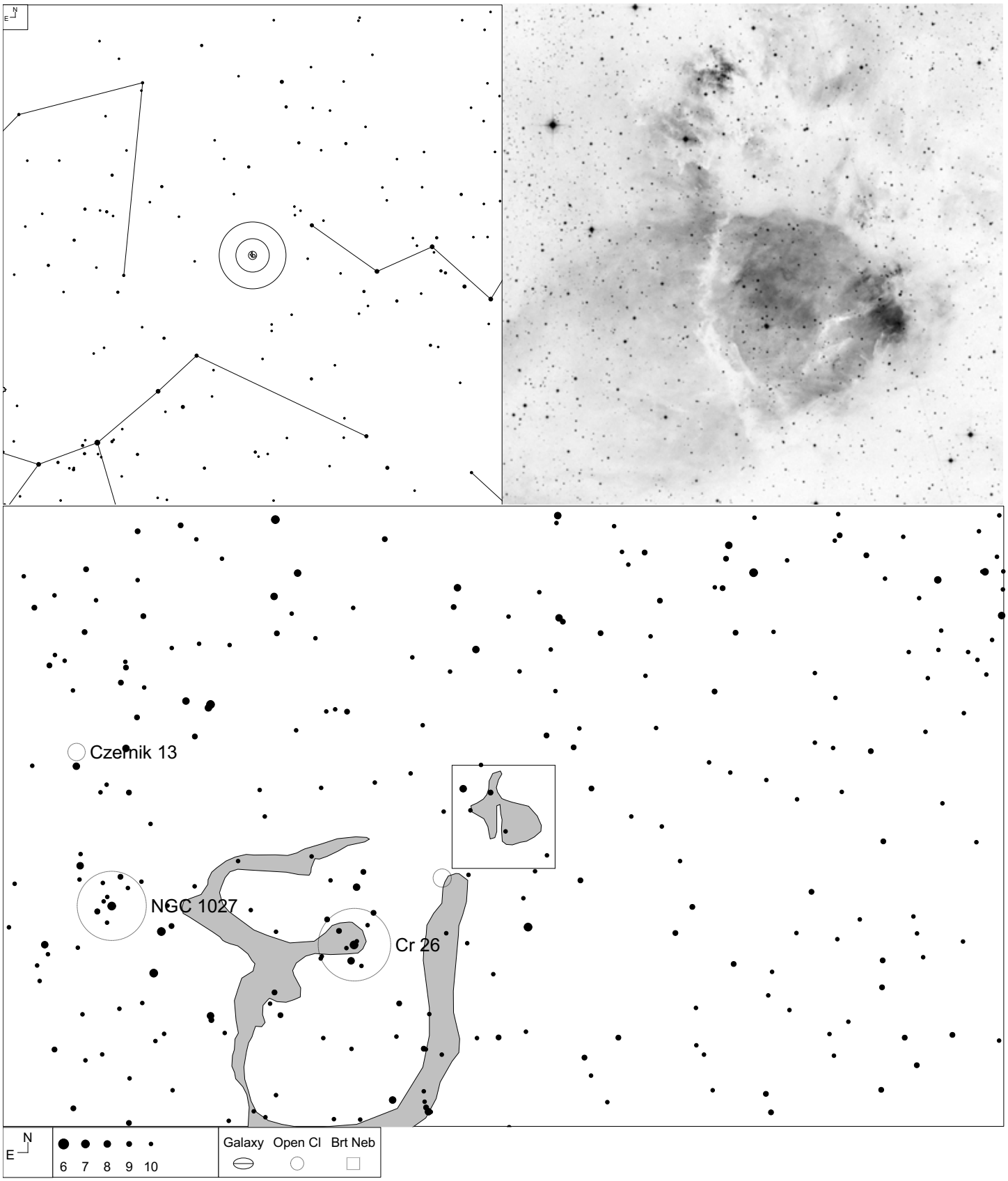
http://www.perseus.gr/Astro-Star-Dwarf-Krueger-60.htm

Sharpless 2-188 (Cassiopeia)



RA	Dec	Mag	Size	Urano 2000.0
01 30 30.0	+58 23 30		9.0’	29R

NGC 896 (Cassiopea)



RA	Dec	Mag	Size	Urano 2000.0
02 26 40.0	+62 05 00		21.0’	29L

2015: Markarian Galaxies

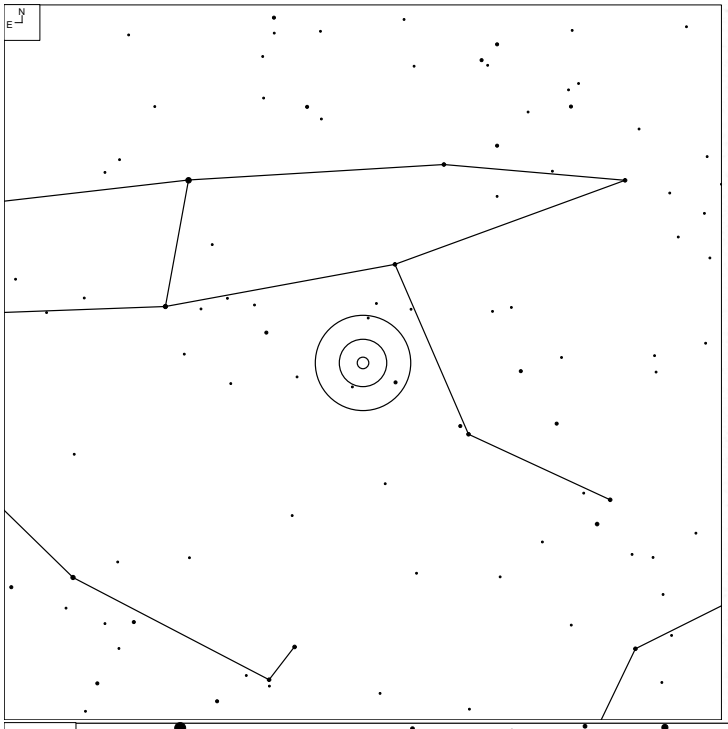
The Texas Star Party – Advanced Observing Program – 2015 –

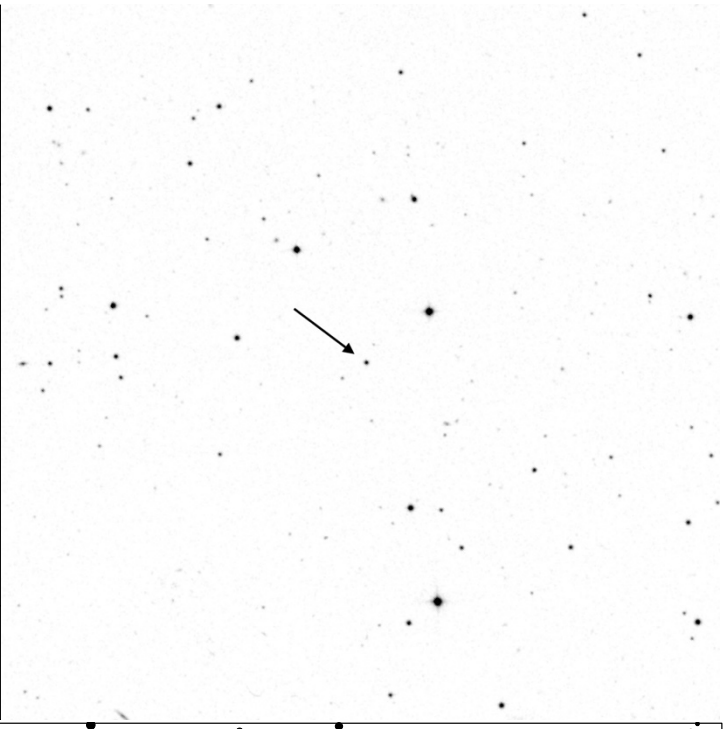
Markarian Galaxies

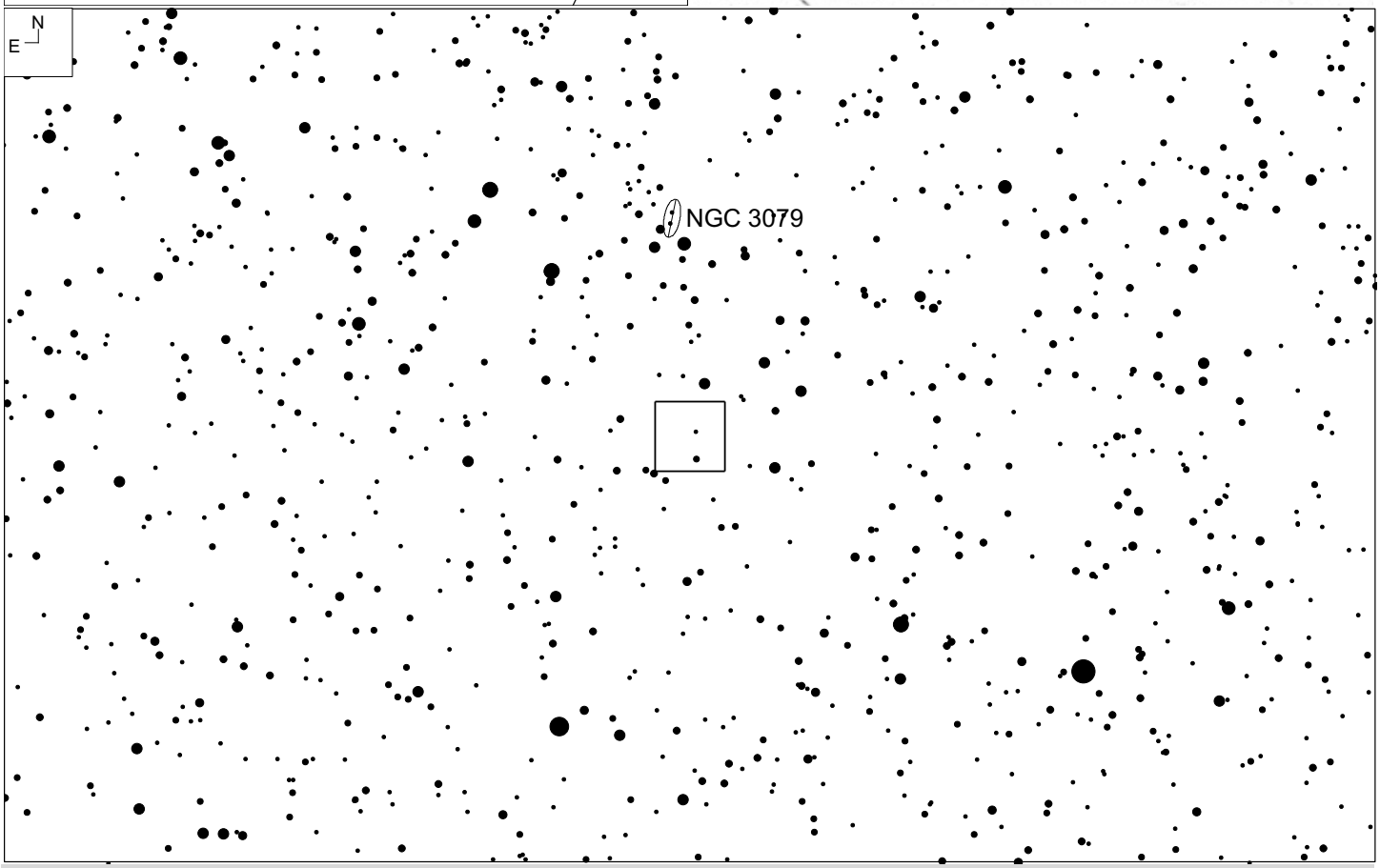
The Goal is to Observe the Markarian Object – NOT Just the Host Galaxy.....20 Observations = Pin Awarded

Markarian No.	Host Galaxy	Coordinates 2000	Host Galaxy Const.	Galaxy Type	Mrk. Mag.	Mrk. Type	Mrk. Ab. Mag.	3K CMB Redshift	CoMoving Rad. Dist. MLyrs	Urano No. 1
□Mrk. 132	0958+551	10 01 29.6 + 54 54 38	Uma	Quasar	16.0	QSO	-27.0	1.7617	15,447B	45
□Mrk. 171a/b	NGC3690	11 28 32.3 + 58 33 43	Uma	Im Pec	13.1B	HII	-20.8	0.0109	146.1	46
□Mrk. 180	CGCG334-43	11 36 26.4 + 70 09 27	Dra	Compact	15.5	BL Lac	-21.2	0.0455	603.4	25
□Mrk. 205	PGC39975	12 21 44.2 + 75 18 39	Dra	Pec	14.5	Sy 1	-22.2	0.0710	936.1	9
□Mrk. 213	NGC4500	12 31 22.1 + 57 57 53	Uma	SB(s)a	13.1	SB	-20.2	0.0109	145.1	47
□Mrk. 220	MCG9-21-34	12 43 47.9 + 54 53 46	Uma	Pec Comp	14.1	SB	-20.3	0.0170	226.7	48
□Mrk. 231	UGC8058	12 56 14.2 + 56 52 25	Uma	SA(rs)c? Pec	14.4	Sy 1	-22.3	0.0426	567.5	48
□Mrk. 256	NGC5144	13 22 53.7 + 70 30 44	UMi	SSc? pec	13.4	HII	-20.3	0.0107	142.5	26
□Mrk. 266a	NGC5256	13 38 17.8 + 48 16 41	Uma	Com Pair	14.0	Sy 2	-21.4	0.0284	378.3	76
□Mrk. 266b	NGC5256	13 38 17.3 + 48 16 32	Uma	Com Pair	14.0	LINER	-21.4	0.0284	378.3	76
□Mrk. 404	NGC2964	09 42 56.8 + 31 50 45	Leo	SABbc	11.3	HII	-19.4	0.0053	70.8	104
□Mrk. 421	UGC6132	11 04 27.3 + 38 12 32	Uma	E1 or S?	12.8V	BL Lac	-22.6	0.0309	411.0	10
□Mrk. 449	NGC5014	13 11 31.2 + 36 16 56	CVn	Sa Pec	13.3	SB	-17.6	0.0045	60.7	109
□Mrk. 474	NGC5683	14 34 52.4 + 48 39 43	Boo	SB0	15.2	Sy 1	-20.6	0.0366	486.0	77
□Mrk. 501	1652+398	16 53 52.2 + 39 45 37	Her	E2/SO	14.2	BL Lac	-22.3	0.0336	446.8	80
□Mrk 506,	CGC170-020	17 22 39.9 + 30 52 53	Her	Sa	15.1	Sy 1.5	-21.4	0.0429	570.8	11
□Mrk. 538,	NGC7714	23 36 14.1 + 02 09 19	Psc	SB(s)b pec	12.5B	SB	-20.1	0.0081	108.3	259
□Mrk. 665	NGC5421a	14 01 41.4 + 33 49 37	CVn	SBc	14.2	Pair	-21.1	0.0270	358.8	110
□Mrk. 673	IC4395	14 17 21.1 + 26 51 27	Boo	S	14.4	Sy 2	-20.9	0.0372	495.8	152
□Mrk. 679	1421 + 330	14 23 26.1 + 32 52 20	Boo	Compact	16.6	QSO	-27.3	1.9091	16,200B	111
□ Mrk. 691	NGC5996	15 46 58.9 + 17 53 03	Ser	SBd	13.4	SB	-20.3	0.0114	152.0	155
□Mrk. 710	NGC3049	09 54 49.5 + 09 16 16	Leo	SB(rs)ab	13.6	SB	-18.0	0.0060	79.9	189
□Mrk. 739a	NGC3758	11 36 29.4 + 21 35 49	Leo	S ?	15.2	Sy 1 (E)	-20.8	0.0309	411.0	147
□Mrk. 739b	NGC3758	11 36 29.4 + 21 35 46	Leo	S ?	15.2	SB	-20.8	0.0312	411.0	147
□Mrk. 744	NGC3786	11 39 42.5 + 31 54 33	Uma	SAB(rs)a Pec	13.0B	Sy 1.8	-19.5	0.0099	132.1	106
□Mrk 766	NGC4253	12 18 26.5 + 29 48 46	Com	SB(s)a	13.5r	Sy 1	-20.1	0.0139	185.3	107
□Mrk. 781	NGC4779	12 53 50.8 + 09 42 36	Vir	SB(rs)bc	13.2	SB	-19.5	0.0105	140.6	194
□Mrk. 799	NGC5430	14 00 45.7 + 59 19 42	UMa	SB(s)b	13.0	SB	-20.5	0.0102	136.7	49
□Mrk. 809a/b	NGC5591	14 22 34.0 + 13 43 00	Boo	Sdm	14.5	SB	-20.8	0.0264	352.2	197
□Mrk. 874a/b	UGC10279	16 11 45.8 + 60 34 56	Dra	Dbl Sys.	14.5	SB	-19.6	0.0136	182.0	51
□Mrk. 897	UGC11680	21 07 45.8 + 03 52 40	Equ	Com	14.5	SB	-21.2	0.0253	335.9	255
□Mrk. 912	NGC7288	22 28 15.0 – 02 53 04	Aqr	SO/a pec	14.3	SB	-19.7	0.0154	205.5	257
□Mrk. 915	PGC 69307	22 36 46.5 – 12 32 43	Aqr	S?	13.6R	Sy 1	-19.8	0.0230	305.9	302
□Mrk. 1126	NGC7450	23 00 47.8 – 12 55 07	Aqr	SB(r)a	14.0	Sy 1.5	-18.1	0.0095	126.5	303
□Mrk. 1236	PGC28275	09 49 54.1 + 00 36 58	Sex	SABcd	13.5	WR HII	-18.5	0.0075	99.8	233
□Mrk. 1261	UGC5849	10 43 52.6 – 01 17 40	Sex	I?	14.7	HII	-21.2	0.0273	362.0	23
□Mrk. 1291	NGC3660	11 23 32.3 – 08 39 31	Crt	SB(r)bc	13.1	SB	-18.1	0.0135	180.	281
□Mrk. 1325a	NGC4410a	12 26 29.9 + 09 01 07	Vir	Sab pec	13.6	LINER	-21.6	0.0253	335.9	193
□Mrk. 1325b	NGC4410b	12 26 28.2 + 09 01 15	Vir	SO pec	13.6	LINER	-21.6	0.0253	335.9	193
□Mrk. 1330	NGC4593	12 39 39.4 - 05 20 39	Vir	SB(rs)b	11.7	Sy 1	-18.8	0.0101	135.7	284
□Mrk. 1376	NGC5506	14 13 14.9 – 03 12 27	Vir	Sa Pec	12.8	Sy 1.9	-18.5	0.0071	94.3	242
□Mrk. 1379	NGC5534	14 17 40.2 – 07 25 03	Vir	SAB(s) pec	12.8B	SB	-19.6	0.0096	128.5	287
□Mrk. 1392	CGC48-115	15 05 56.5 + 03 42 26	Vir	Sbc	14.3	Sy 1.8	-20.9	0.0368	489.2	243
□Mrk. 1485	NGC5350	13 53 21.6 + 40 21 50	CVn	SB(r)b	12.2	SB	-20.3	0.0084	111.9	76

Markarian 132 (Ursa Major)

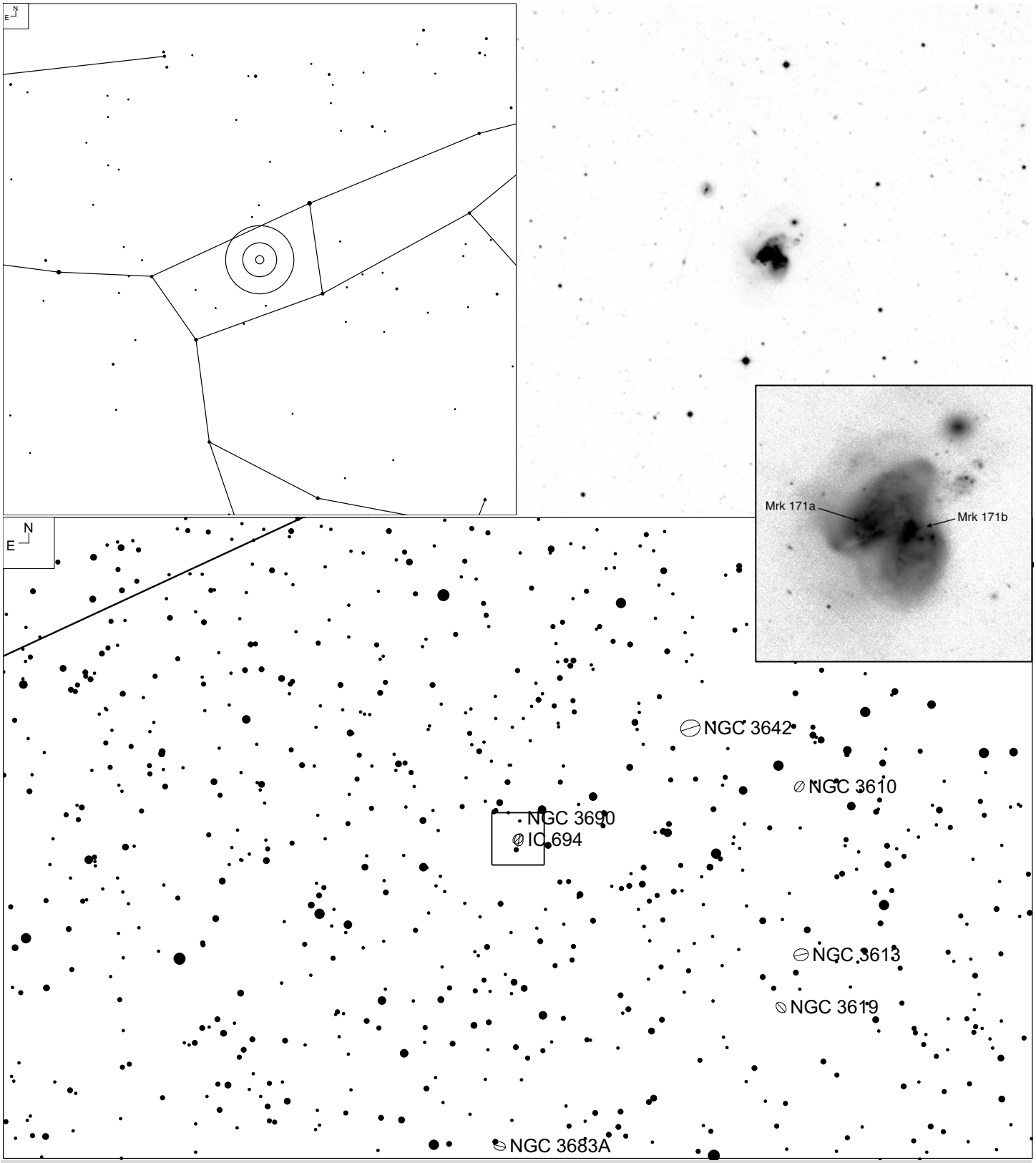






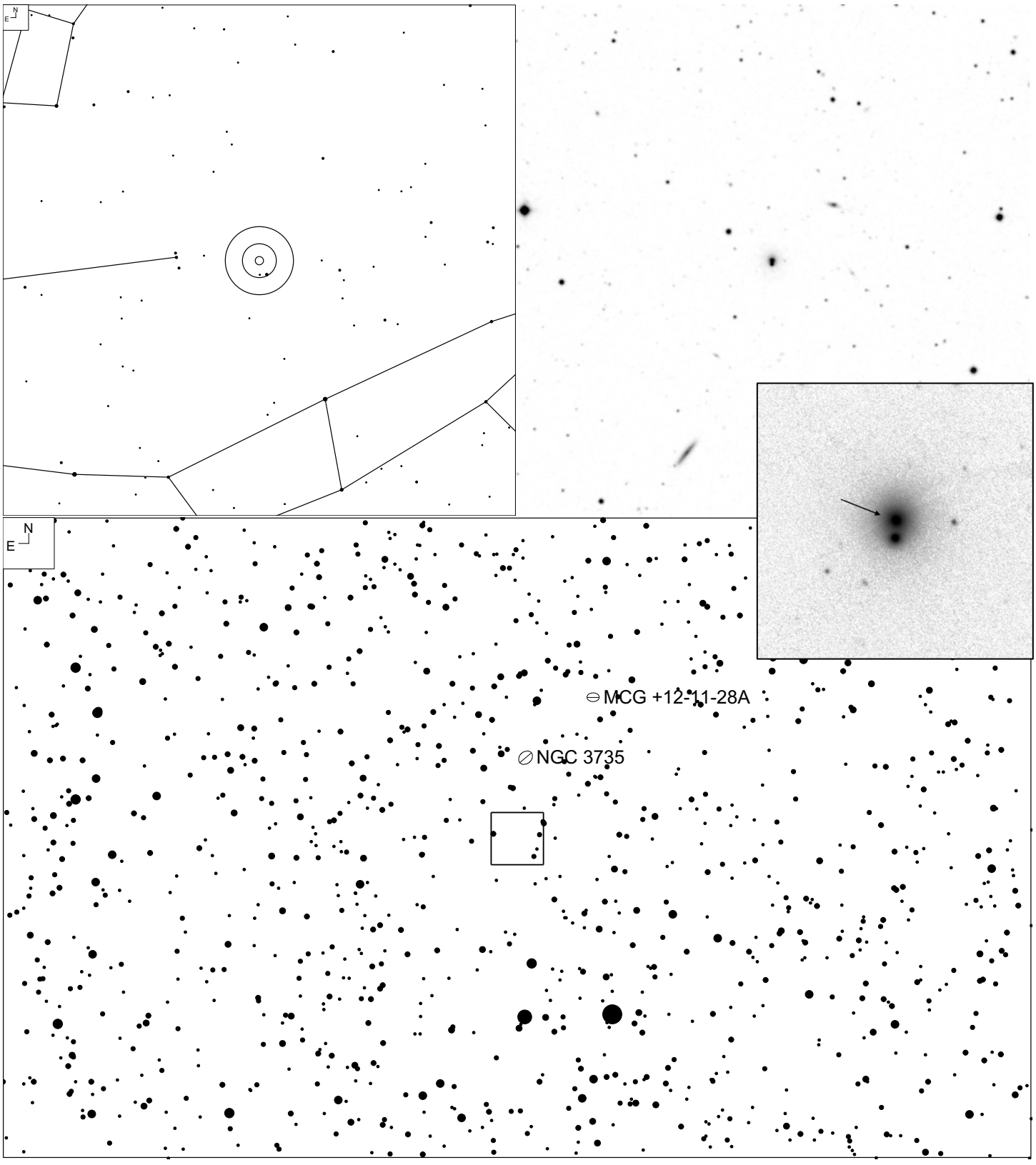
Host	RA	Dec	Mag	Type	Urano 2	iDSA
0958+551	10 01 29.6	+54 54 38	16.0	QSO	25	12

Markarian 171a/b (Ursa Major)



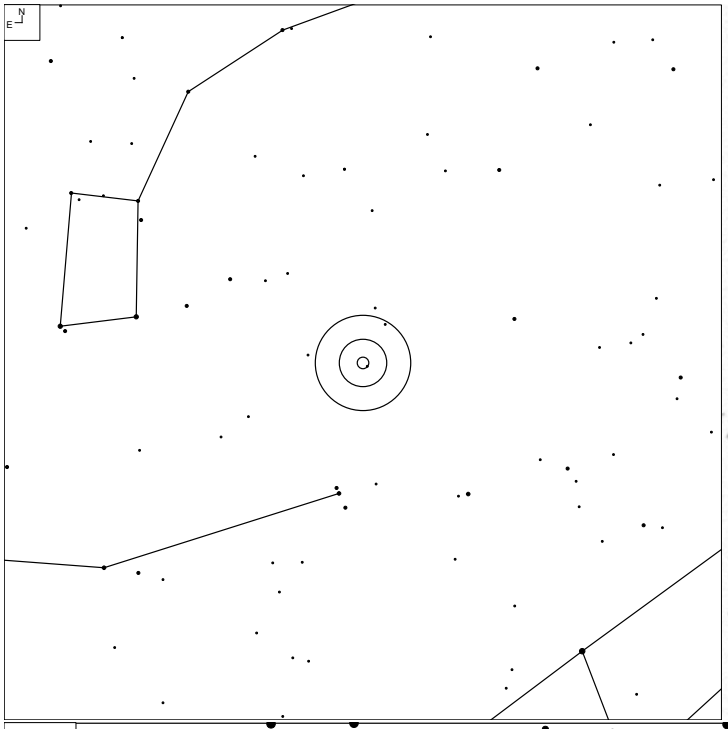
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 3690, IC 694	11 28 32.3	+ 58 33 43	13.1b	HII	24	12

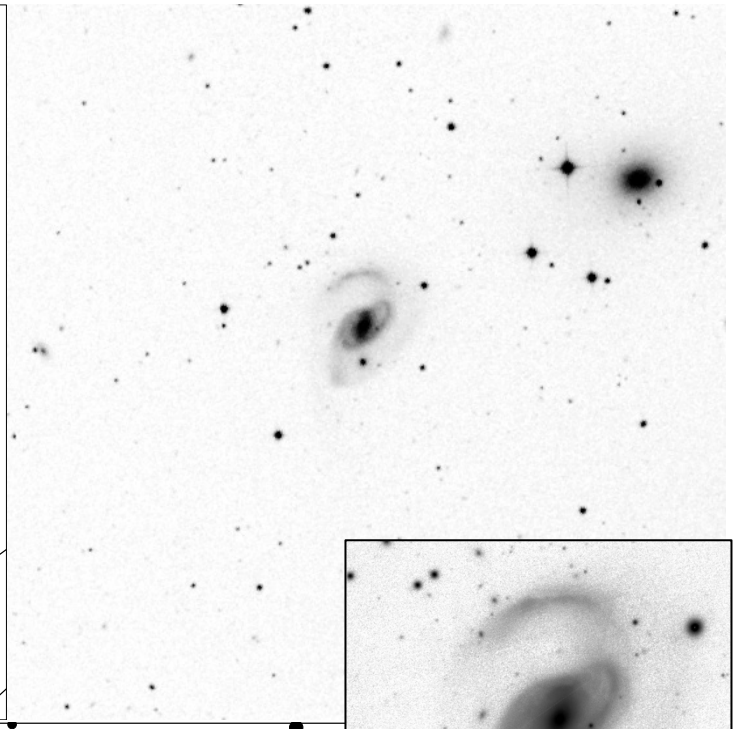
Markarian 180 (Draco)

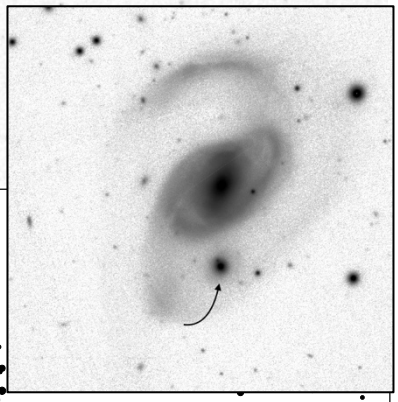


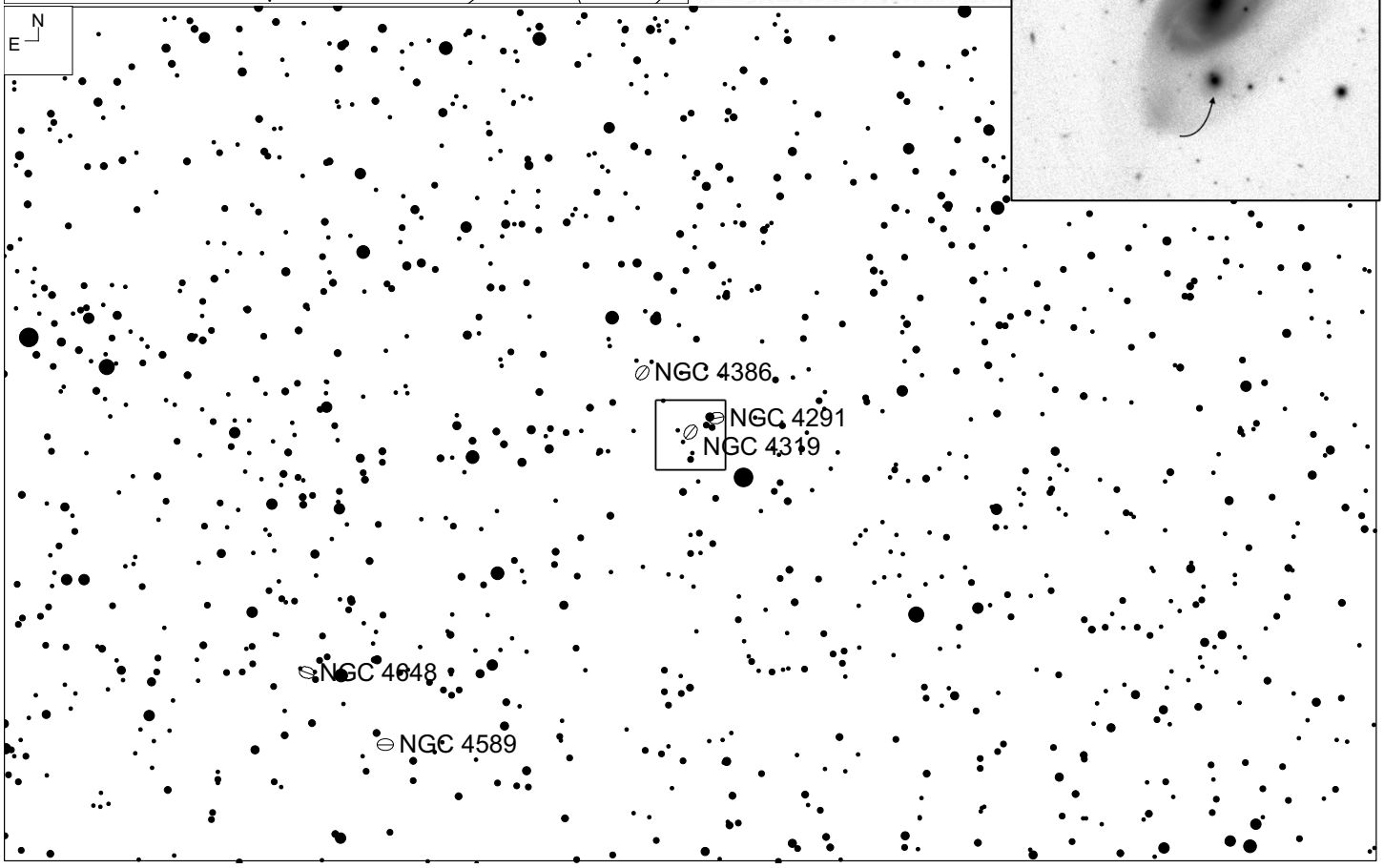
Host	RA	Dec	Mag	Type	Urano 2	iDSA
CGCG334-43	11 36 26.4	+ 70 09 27	15.5	BL Lac	13	5

Markarian 205 (Draco)



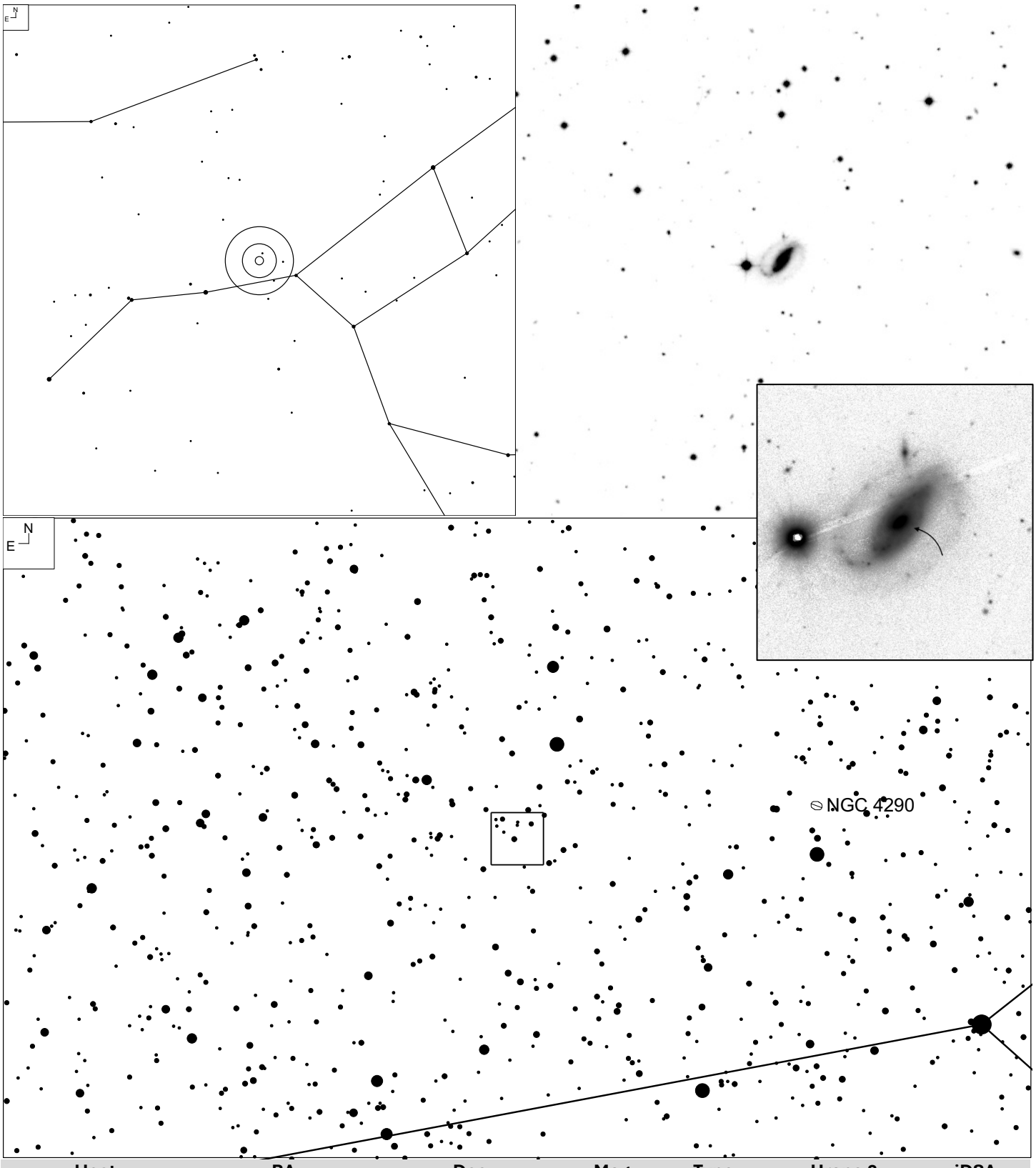






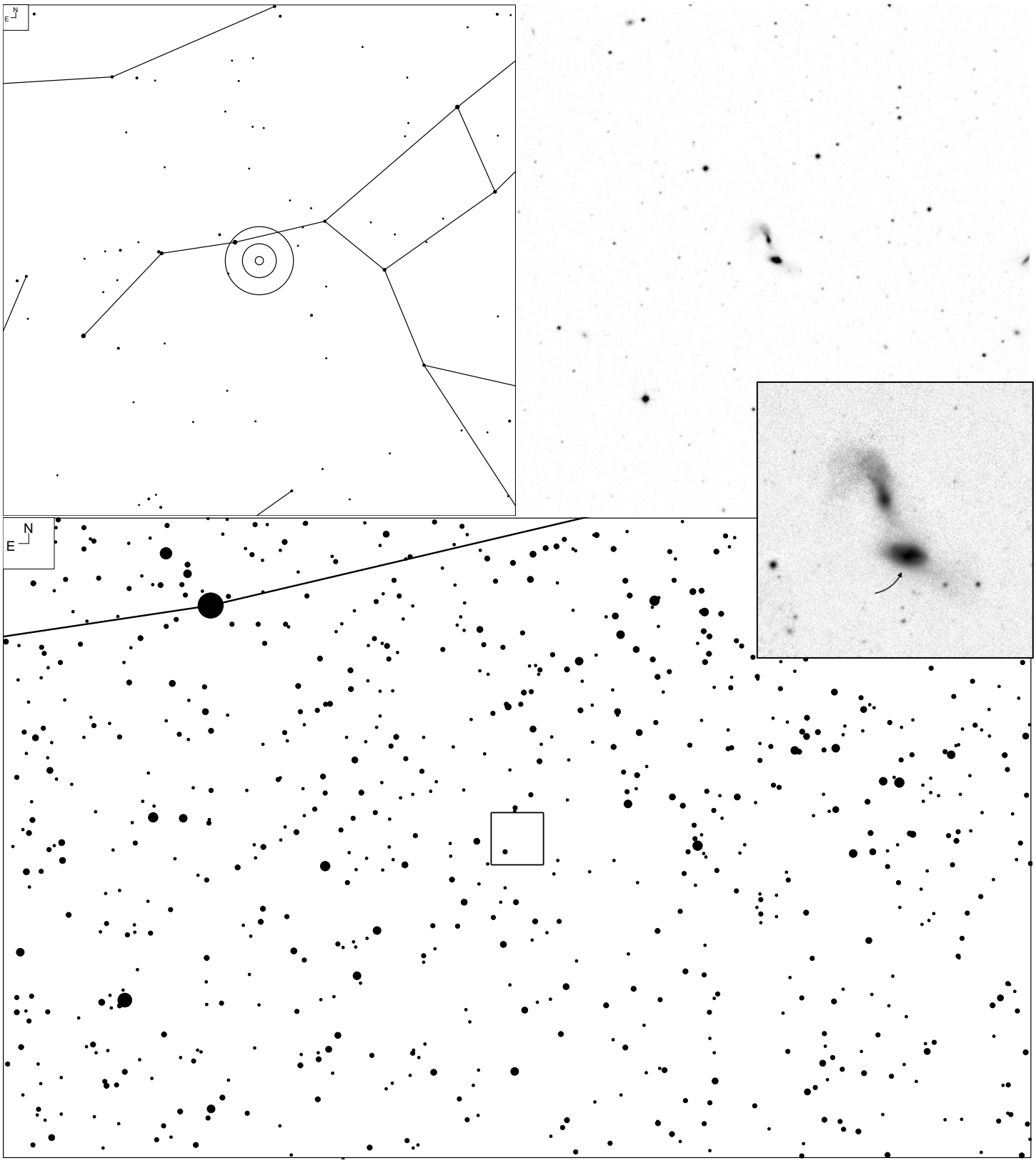
Host	RA	Dec	Mag	Type	Urano 2	iDSA
PGC 39975	12 21 44.2	+ 75 18 39	14.5	Sy 1	5	4

Markarian 213 (Ursa Major)



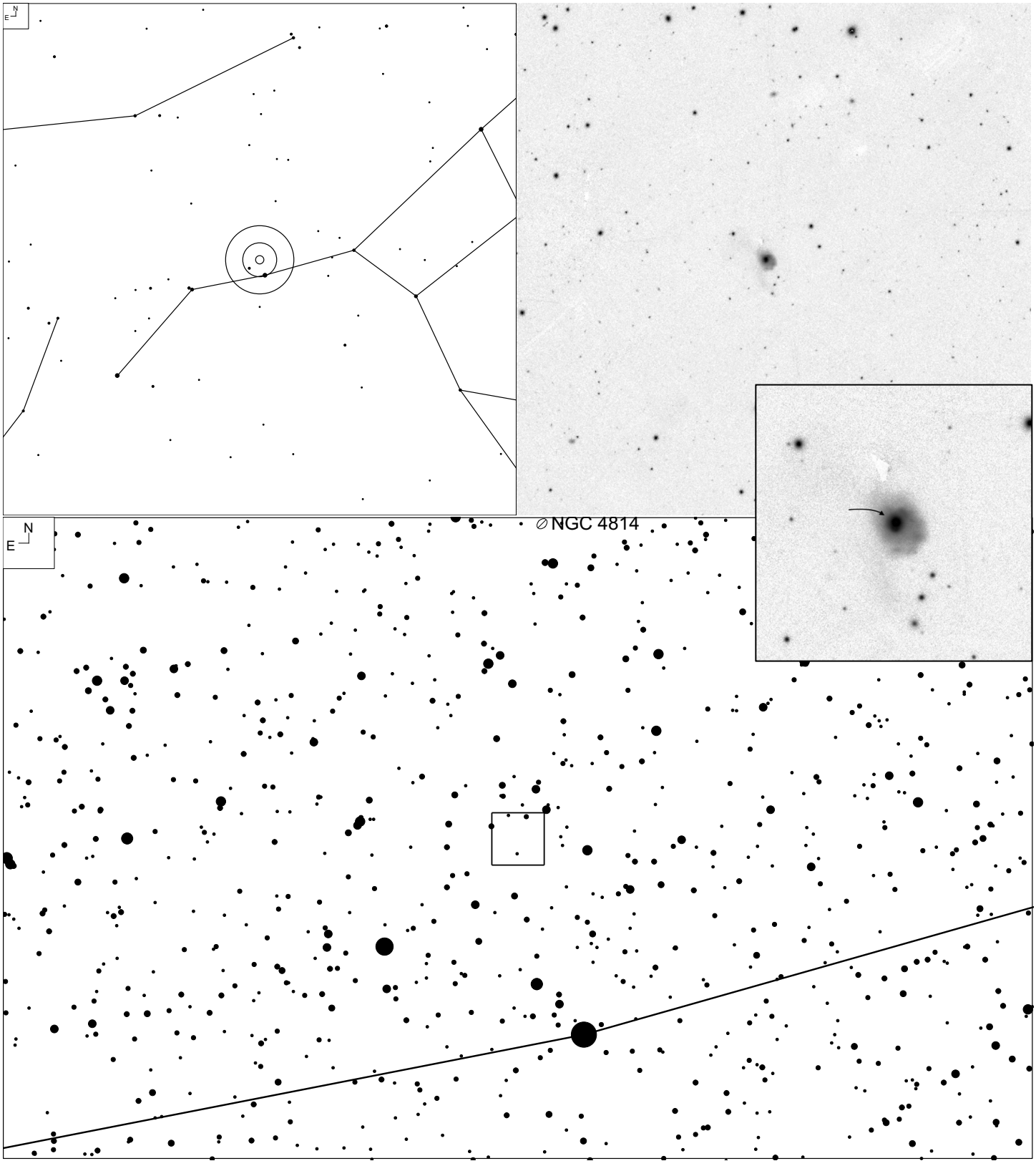
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 4500	12 31 22.1	+ 57 57 53	13.1	SB	24	11

Markarian 220 (Ursa Major)



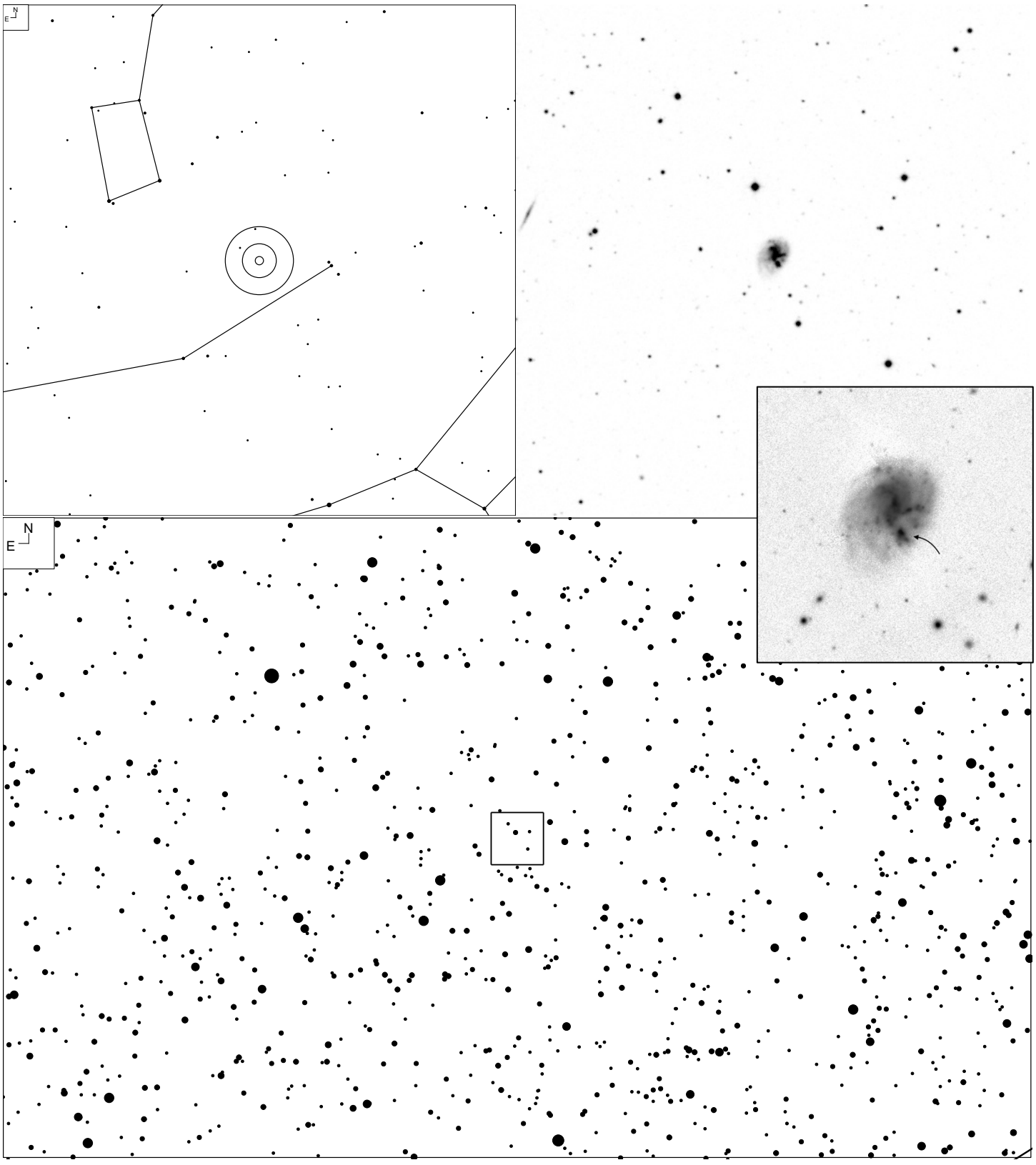
Host	RA	Dec	Mag	Type	Urano 2	iDSA
MCG 9-21-34	12 43 47.9	+ 54 53 46	14.1	SB	24	11

Markarian 231 (Ursa Major)



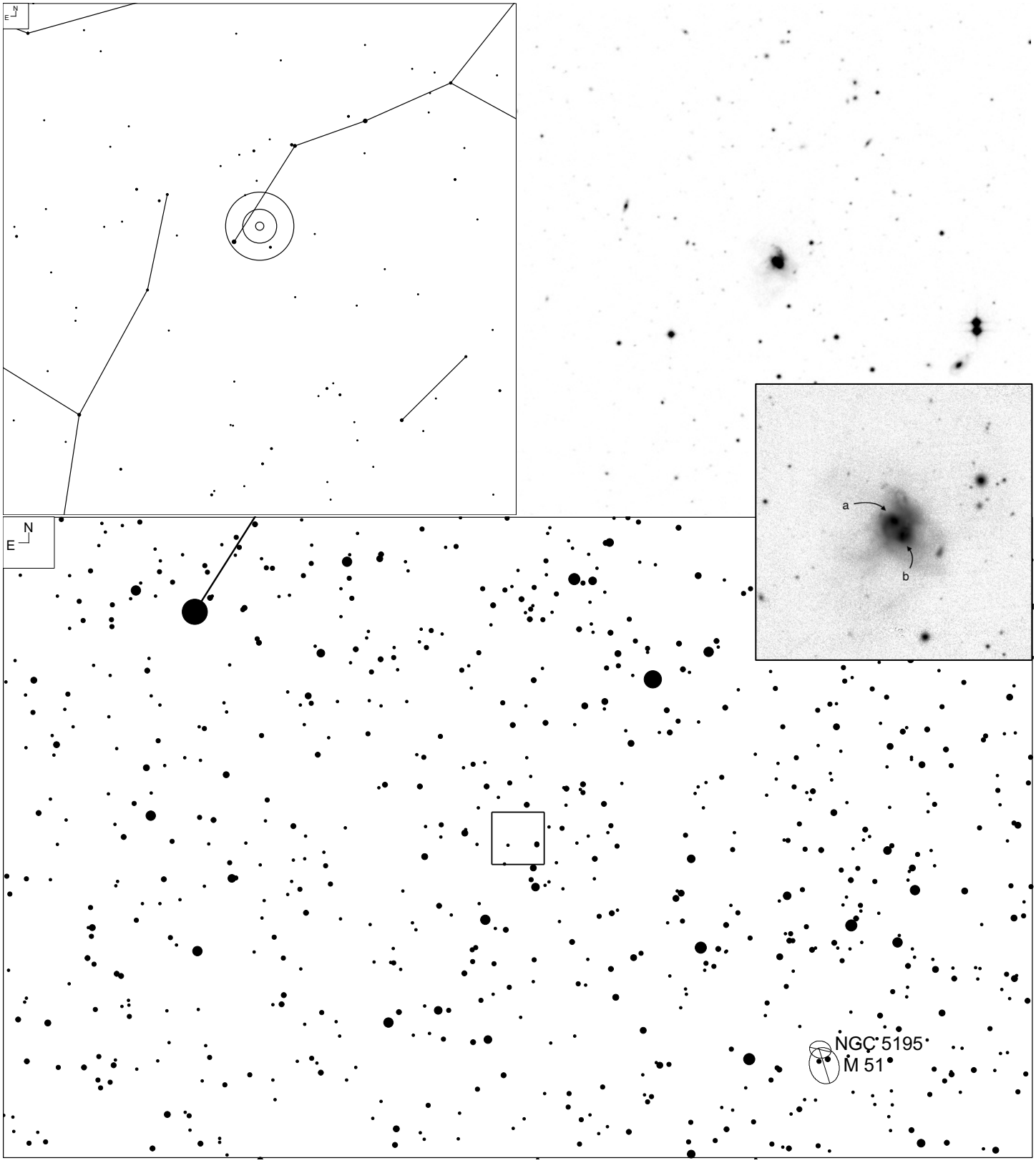
Host	RA	Dec	Mag	Type	Urano 2	iDSA
UGC 8058	12 56 14.2	+ 56 52 25	14.4	Sy 1	24	11

Markarian 256 (Ursa Minor)



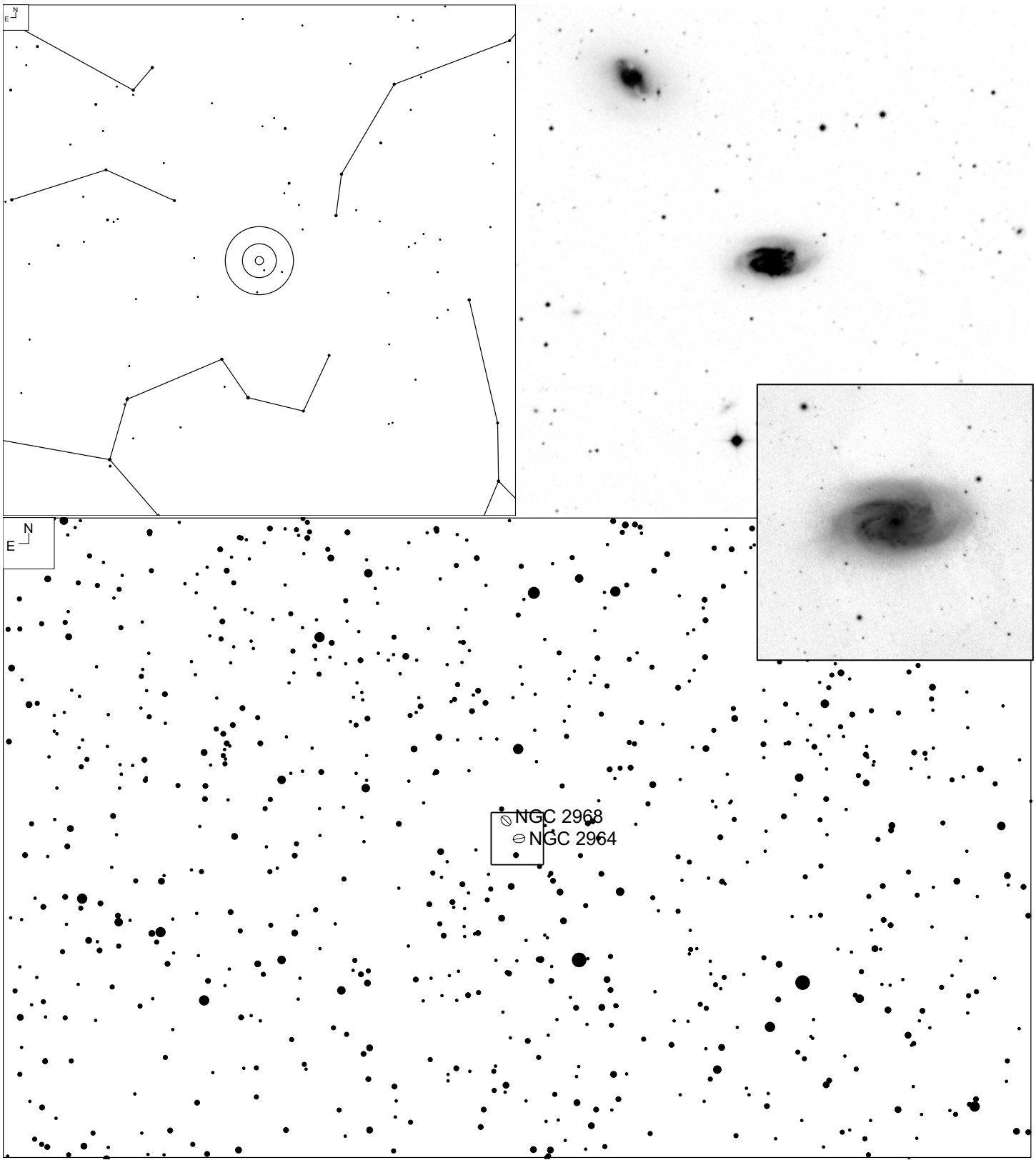
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5144	13 22 53.7	+ 70 30 44	13.4	HII	12	4

Markarian 266a/b (Ursa Major)



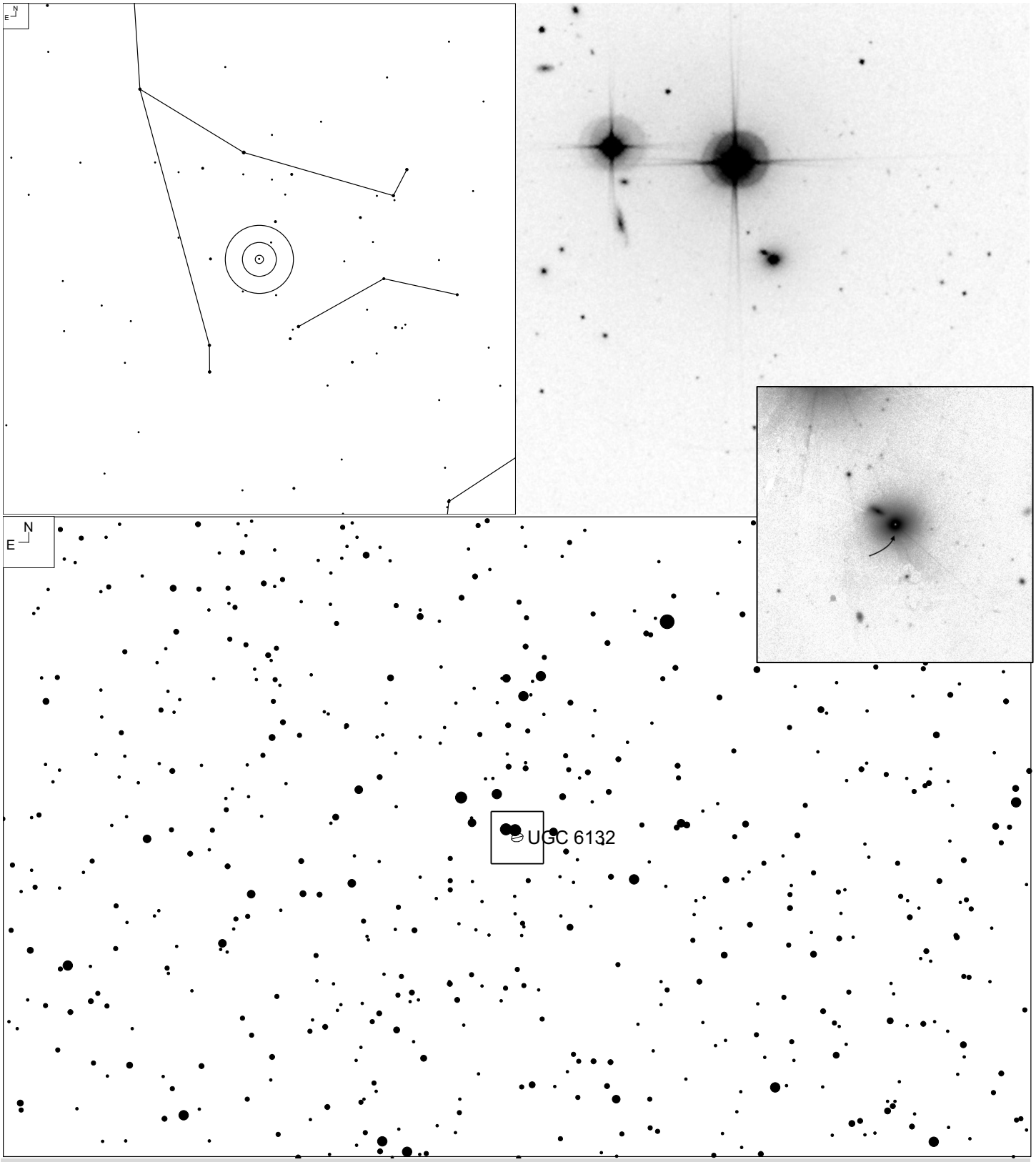
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5256	13 38 17.8	+ 48 16 41	14.0 /14.0	Sy 2 / LINER	36	21

Markarian 404 (Leo)



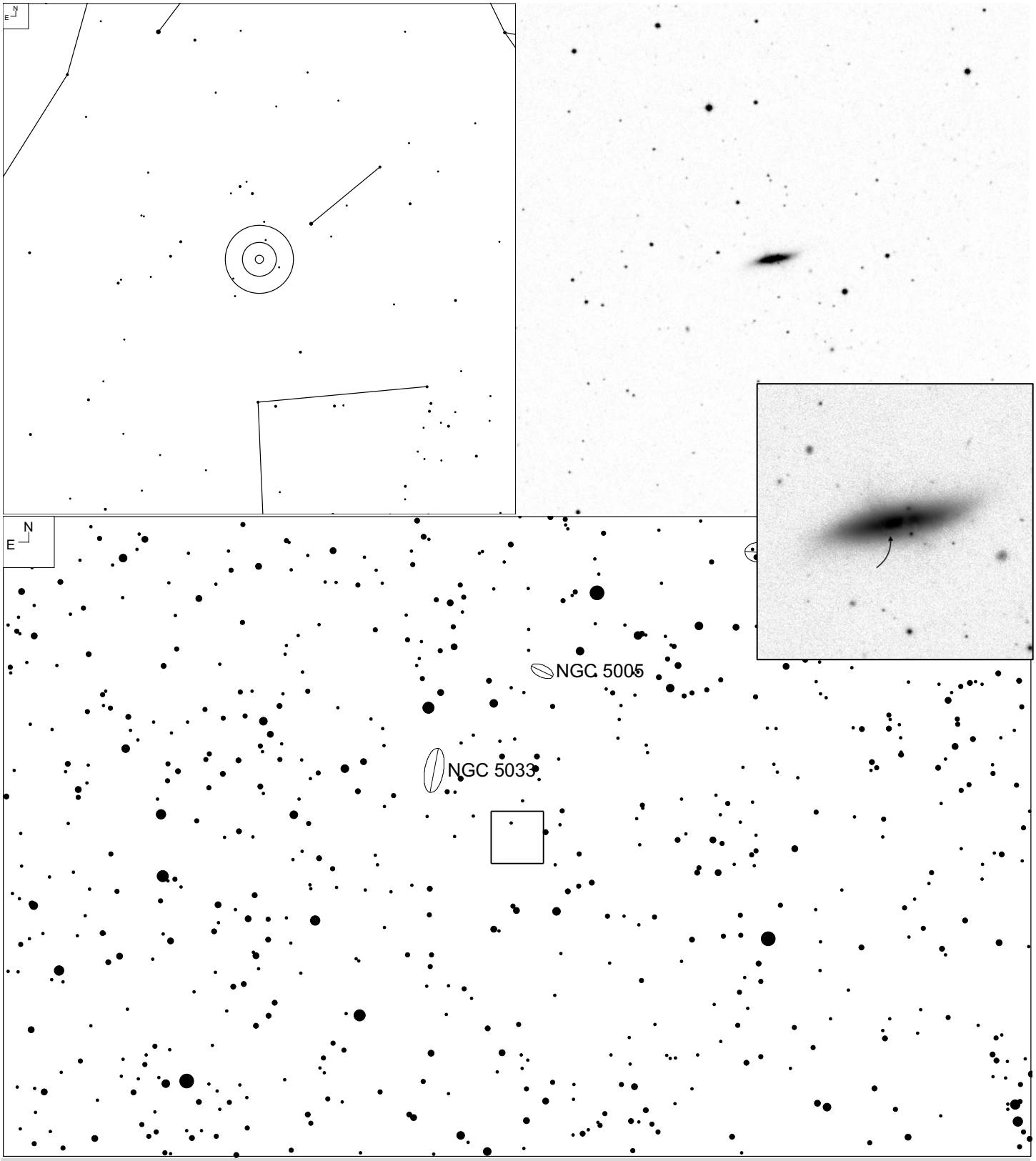
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 2964	09 42 56.8	+ 31 50 45	11.3	HII	56	35

Markarian 421 (Ursa Major)



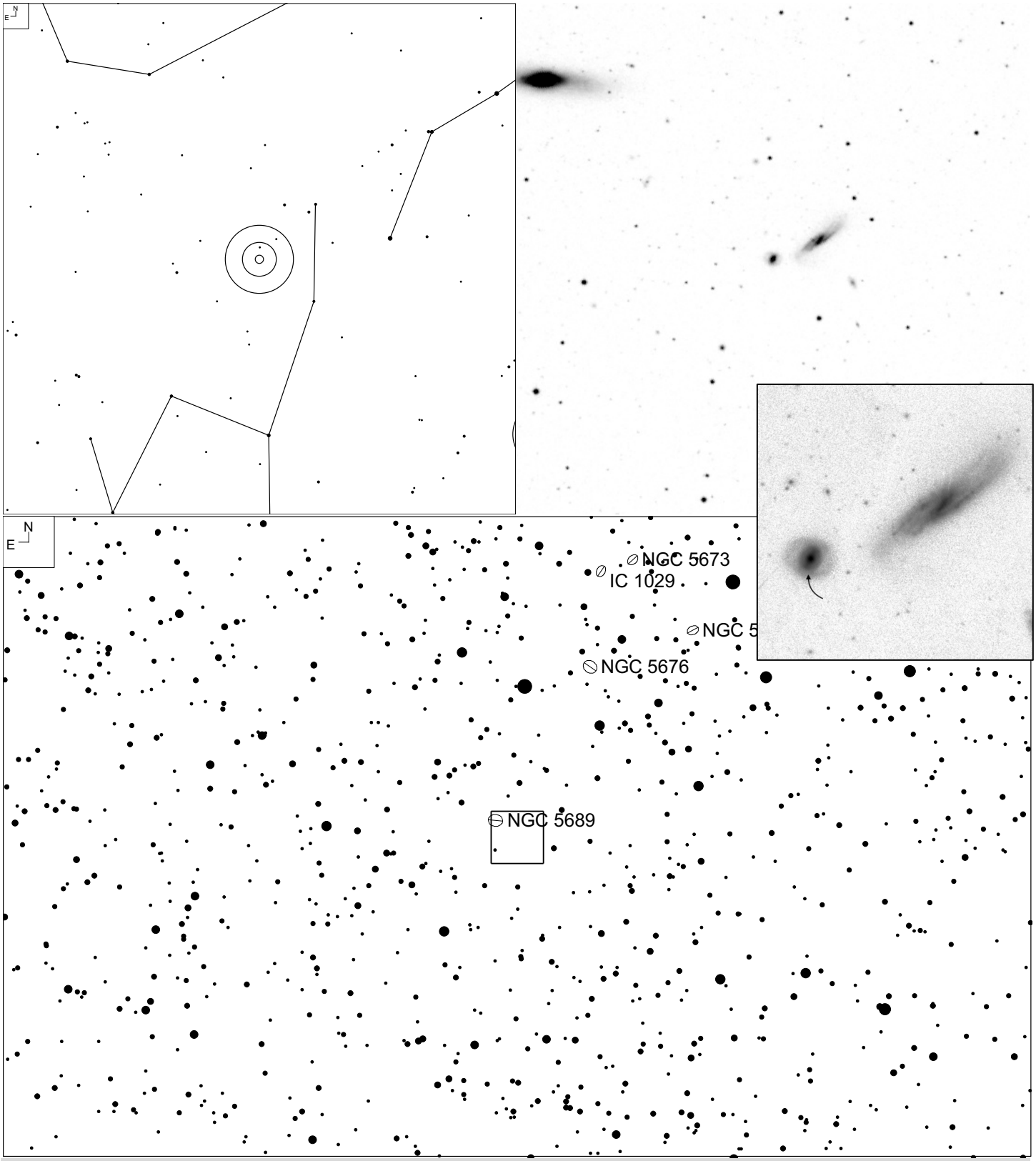
Host	RA	Dec	Mag	Type	Urano 2	iDSA
UGC 6132	11 04 27.3	+ 38 12 32	12.8v	BL Lac	55	22

Markarian 449 (Canes Venatici)



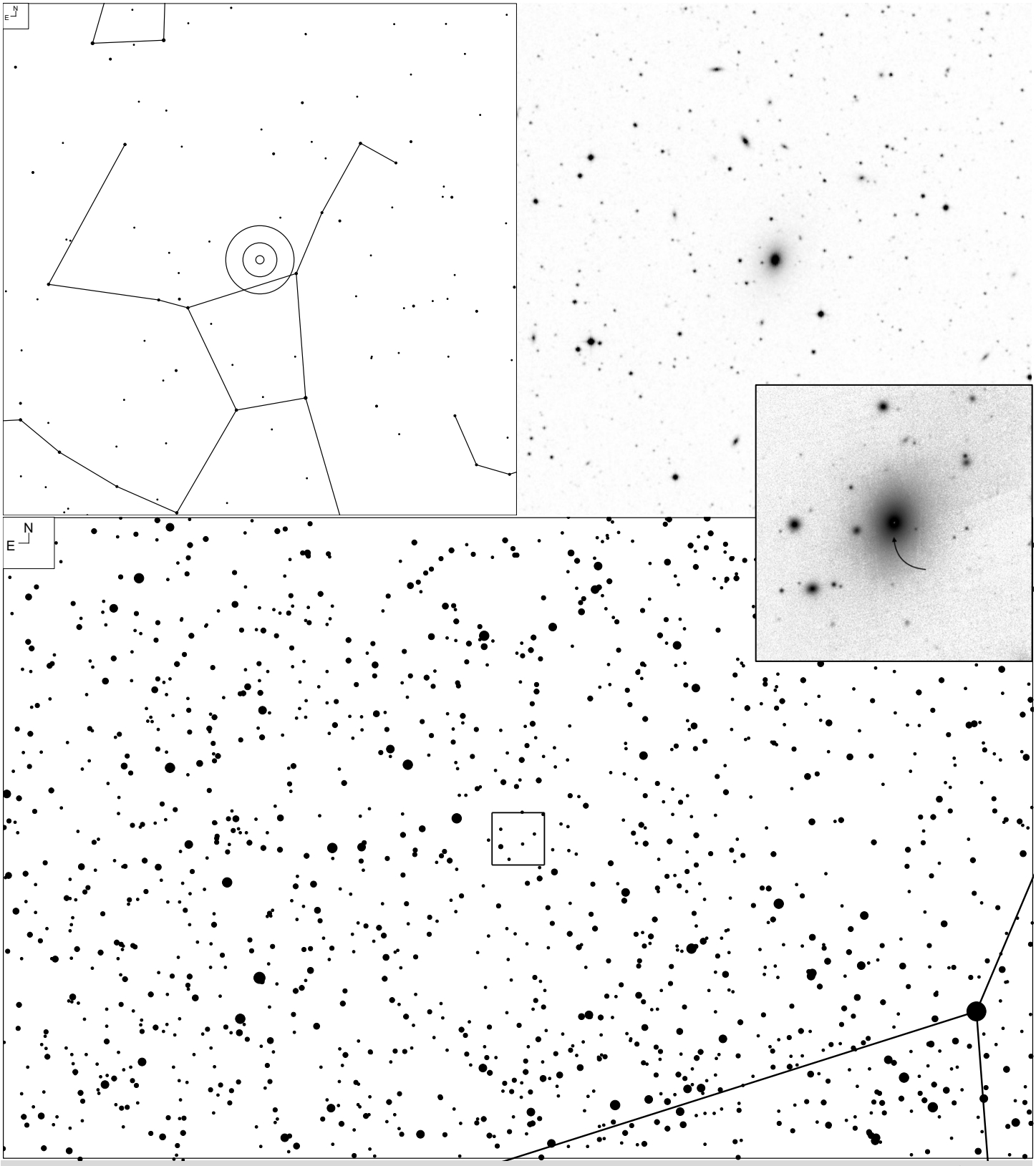
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5014	13 11 31.2	+ 36 16 56	13.3	SB	53	33

Markarian 474 (Boötes)



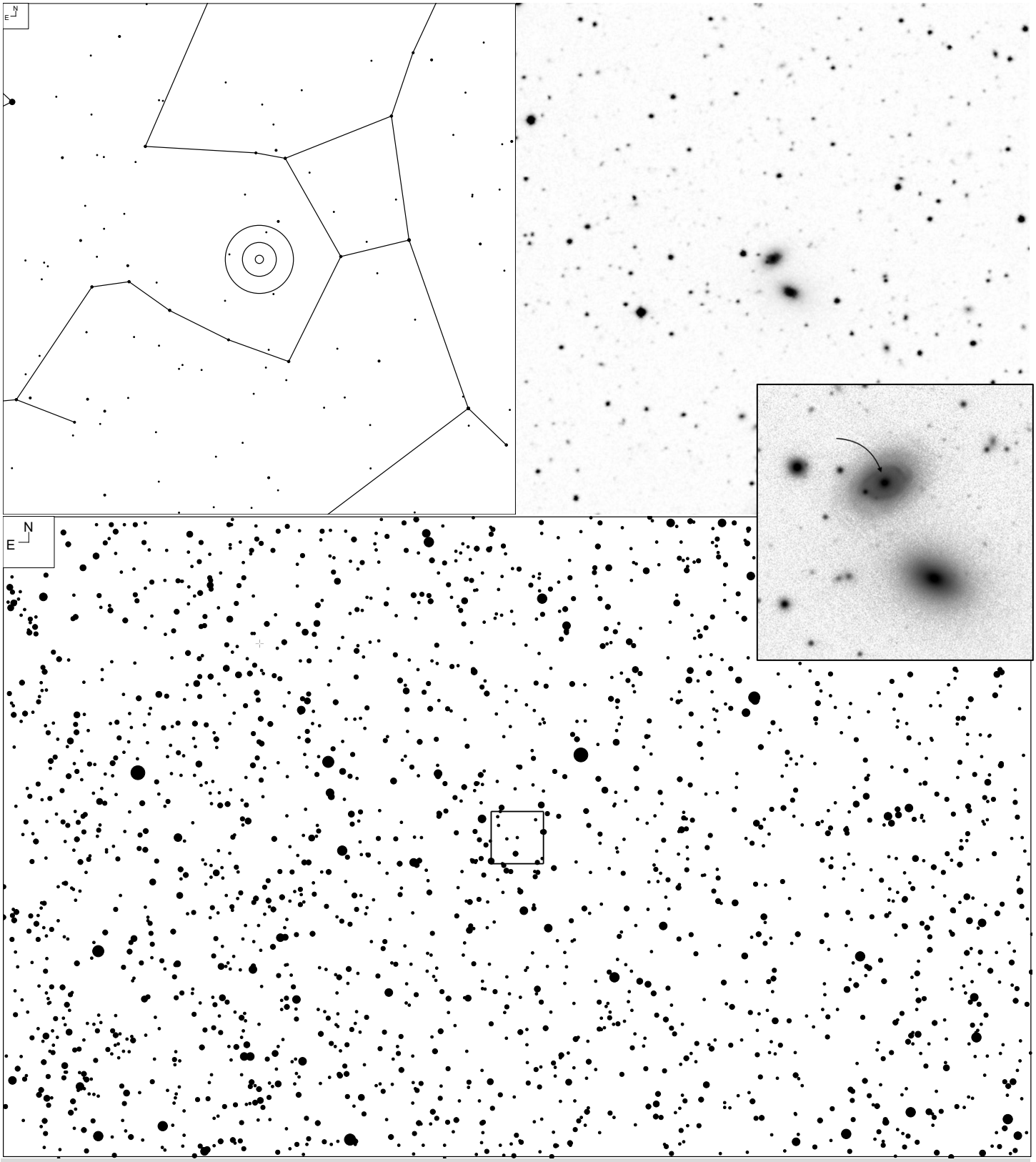
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5683	14 34 52.4	+ 48 39 43	15.2	Sy 1	36	20

Markarian 501 (Hercules)



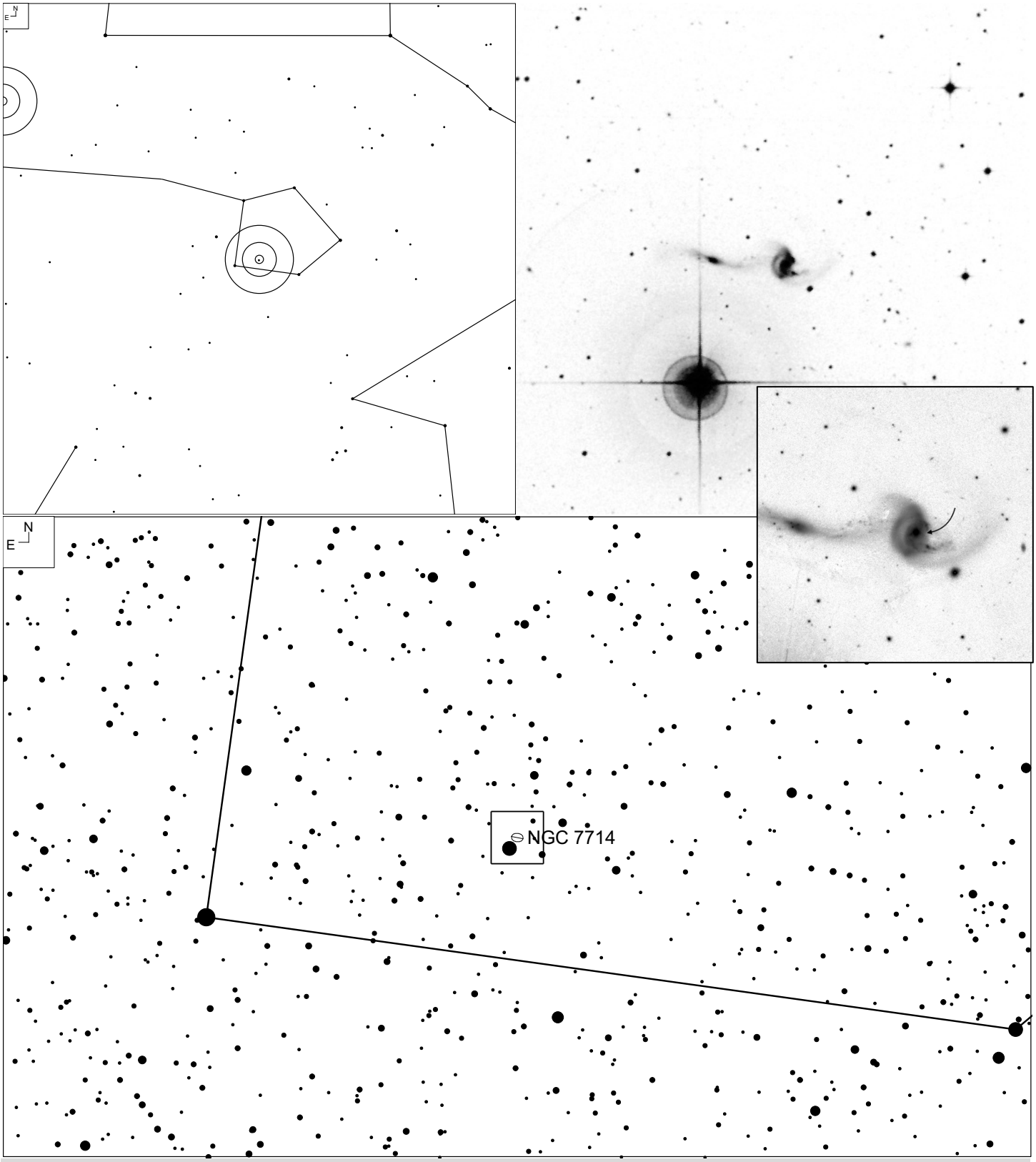
Host	RA	Dec	Mag	Type	Urano 2	iDSA
1652+398	16 53 52.2	+ 39 45 37	14.2	BL Lac	50	19

Markarian 506 (Hercules)



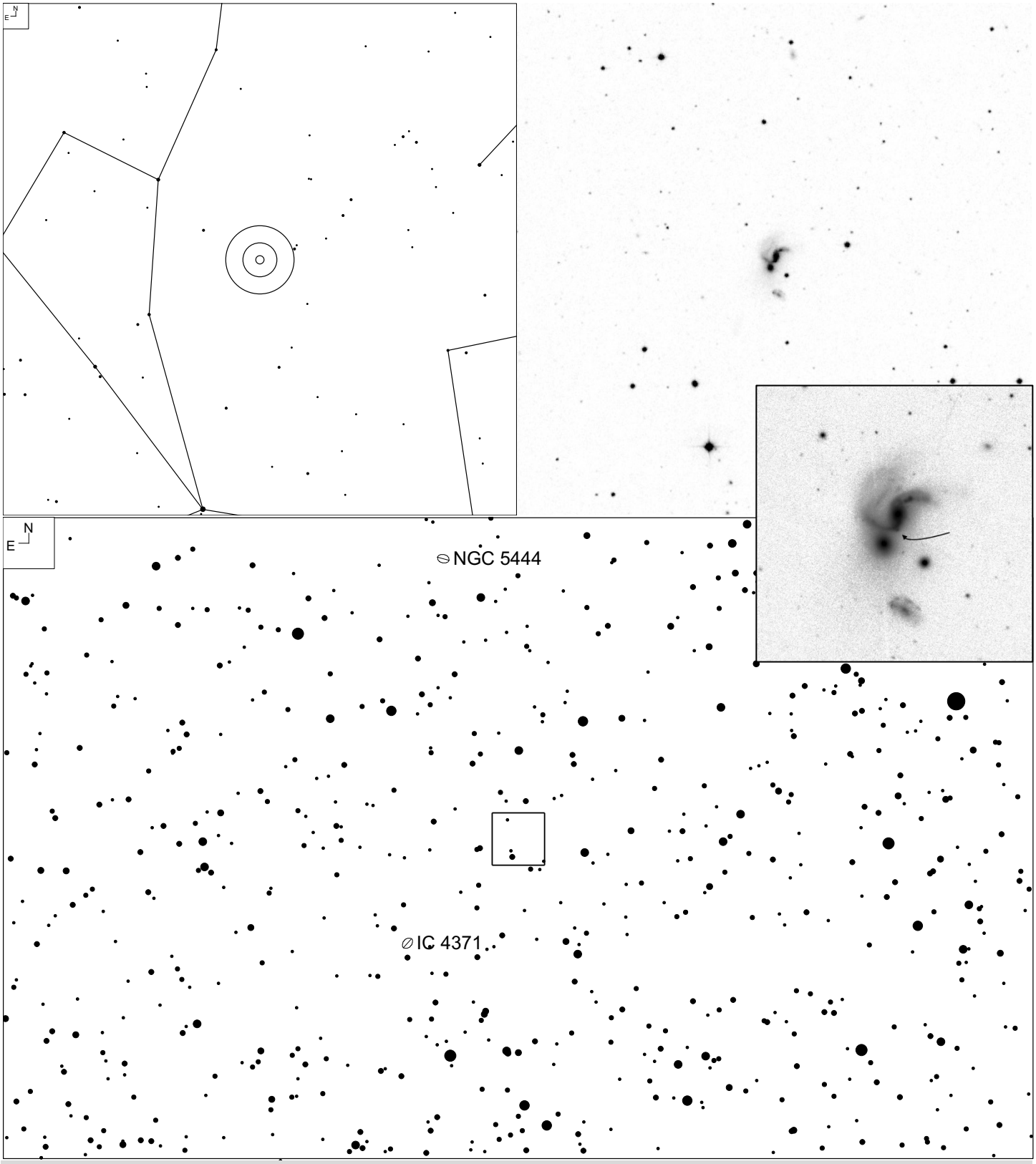
Host	RA	Dec	Mag	Type	Urano 2	iDSA
CGC 170-020	17 22 39.9	+ 30 52 53	15.1	Sy 1.5	50	31

Markarian 538 (Pisces)



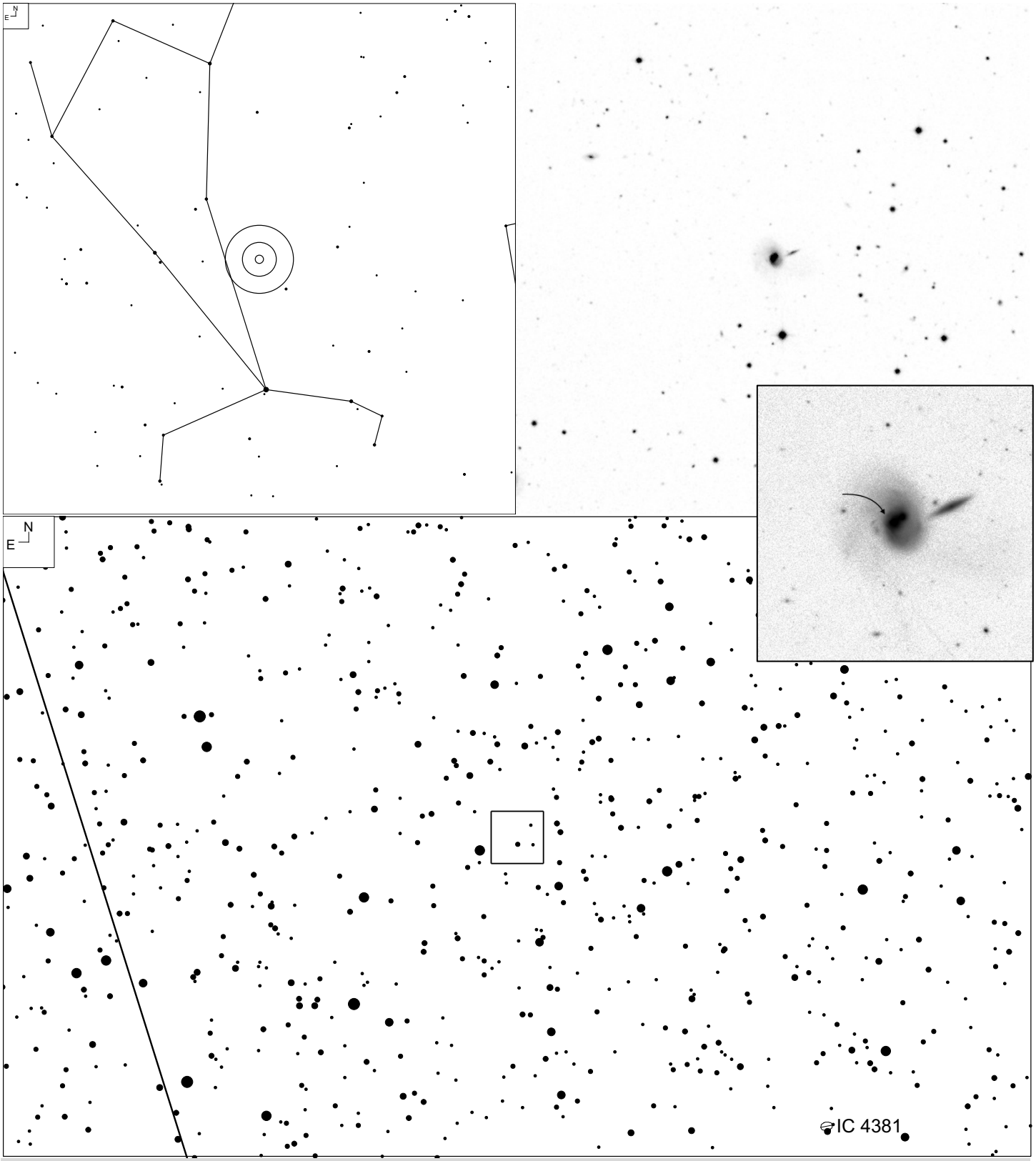
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 7714	23 36 14.1	+ 02 09 19	12.5b	SB	101	52

Markarian 665 (Canes Venatici)



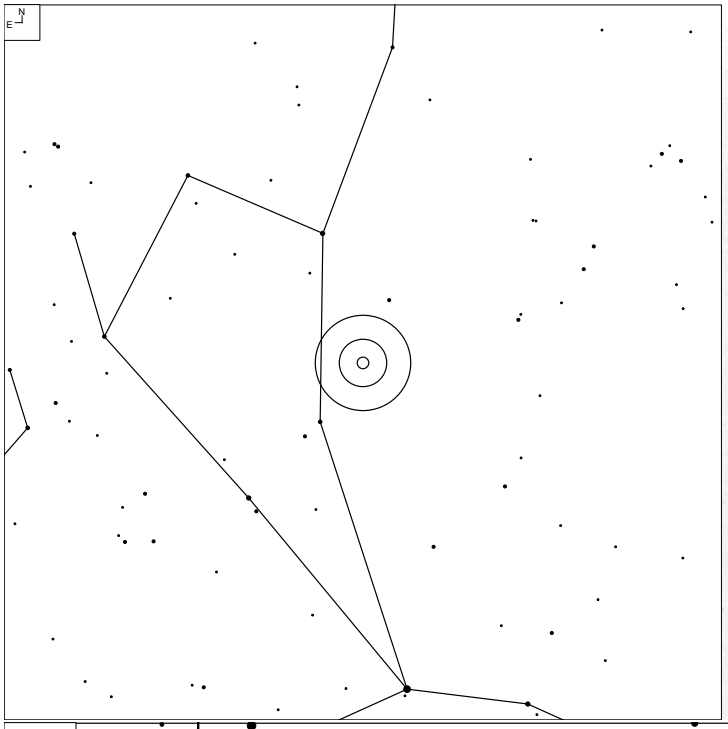
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5421a	14 01 41.4	+ 33 49 37	14.2	Pair	52	32

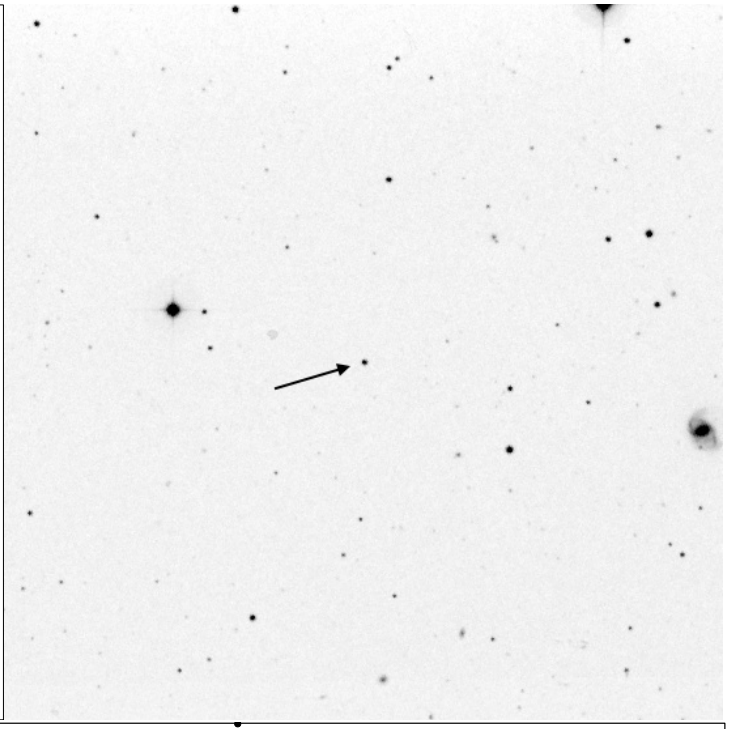
Markarian 673 (Boötes)

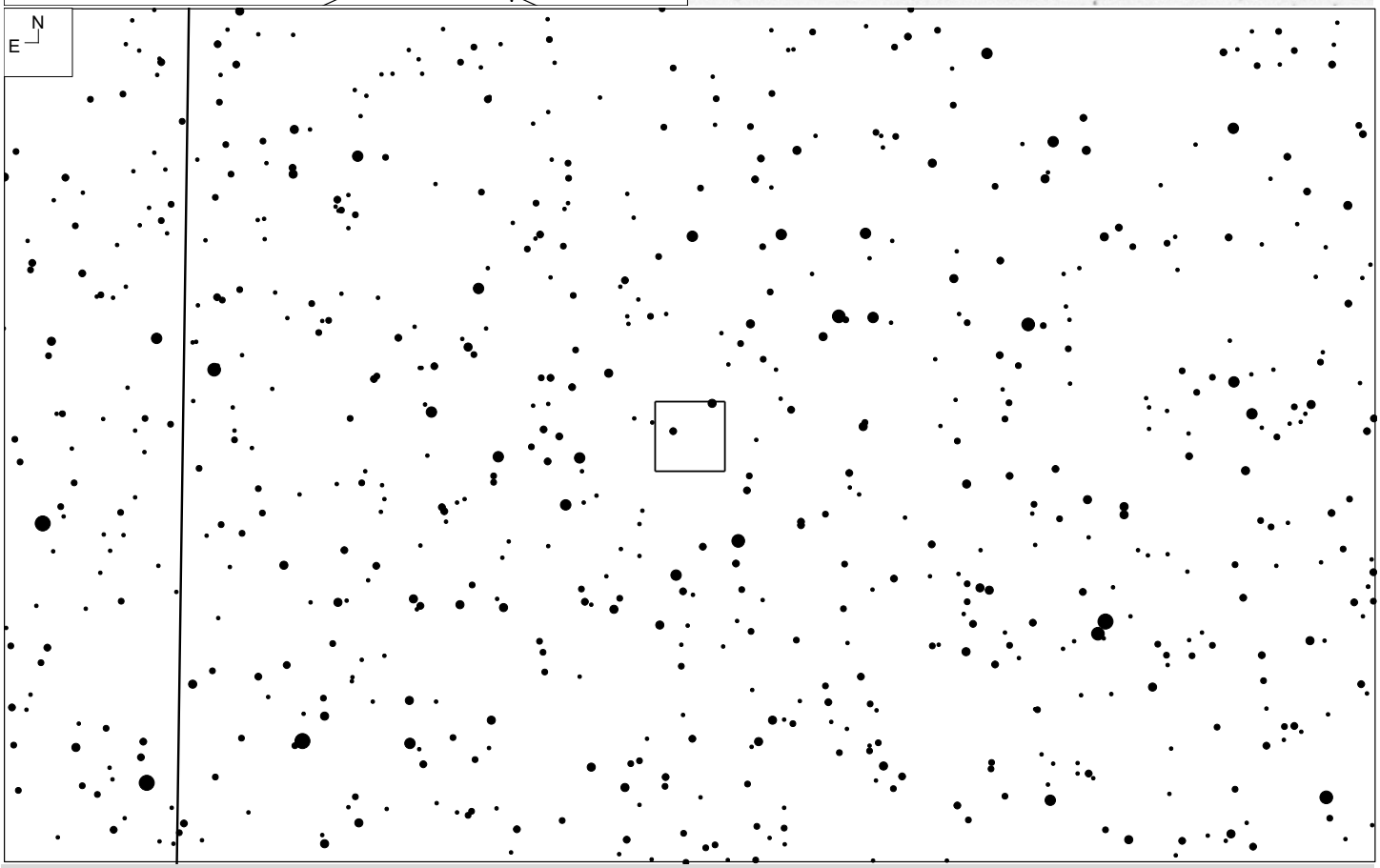


Host	RA	Dec	Mag	Type	Urano 2	iDSA
IC 4395	14 17 21.1	+ 26 51 27	14.4	Sy 2	70	32

Markarian 679 (Boötes)

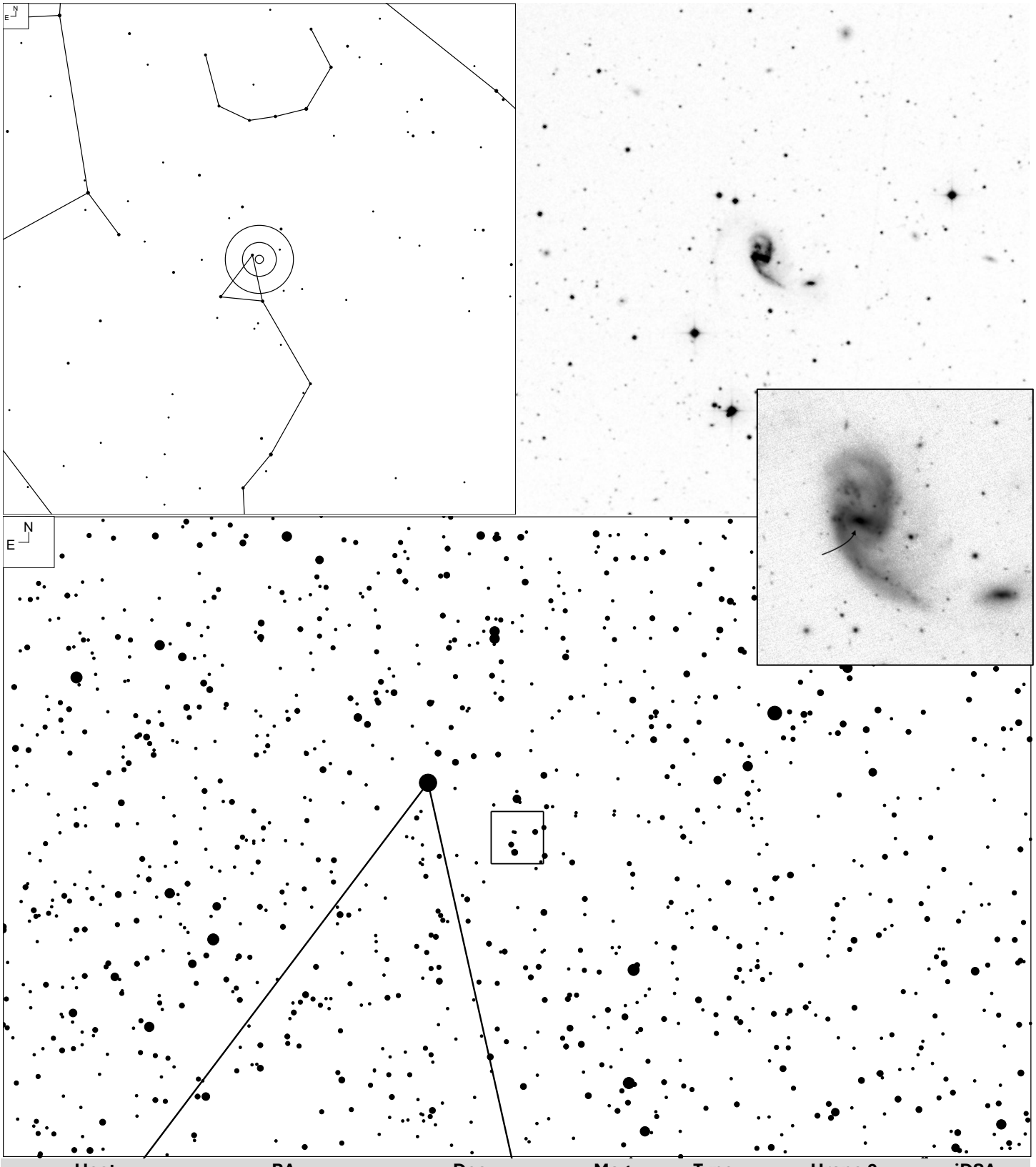






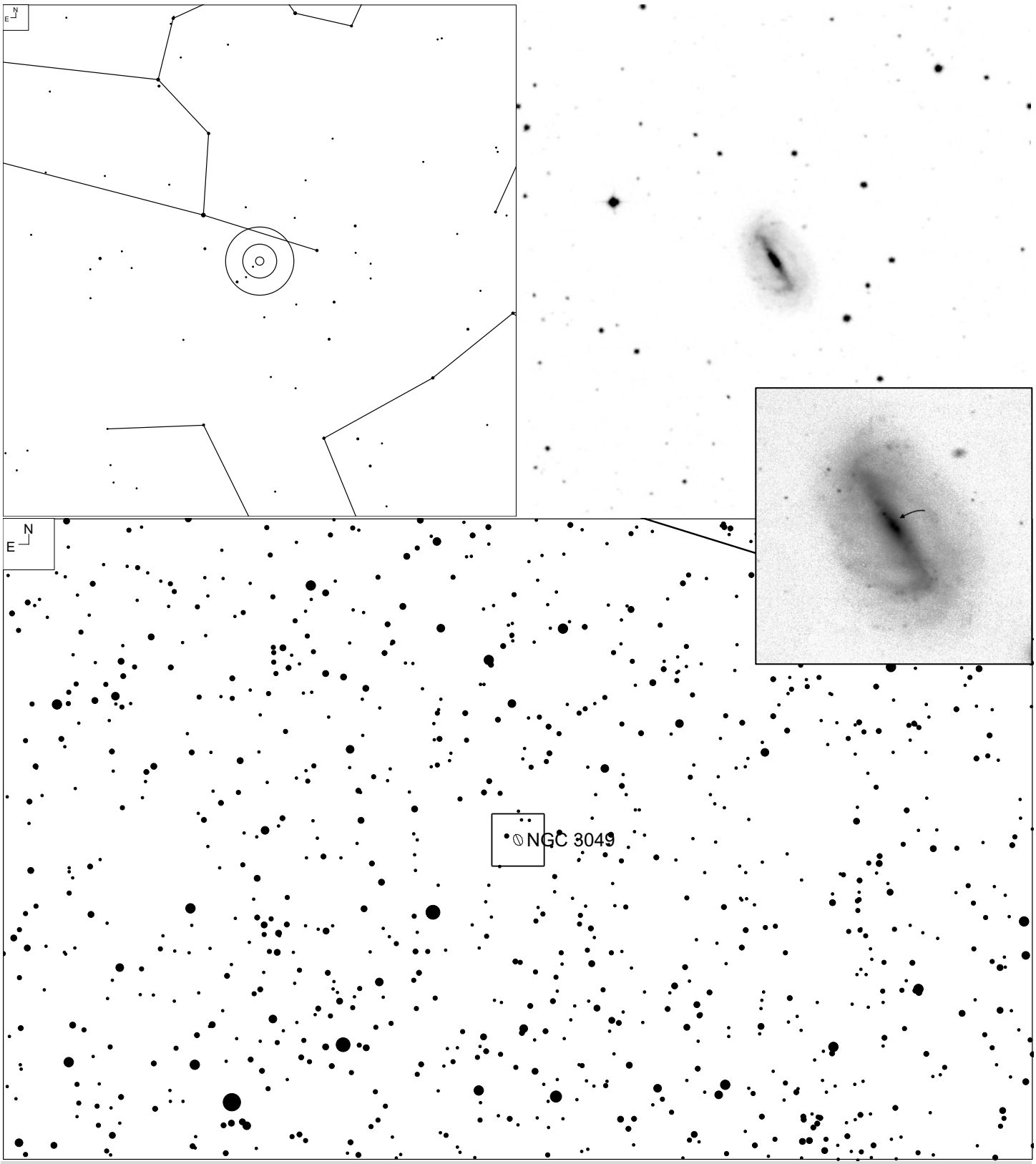
Host	RA	Dec	Mag	Type	Urano 2	iDSA
1421 + 330	14 23 26.1	+ 32 52 20	16.6	QSO	52	32

Markarian 691 (Serpens)



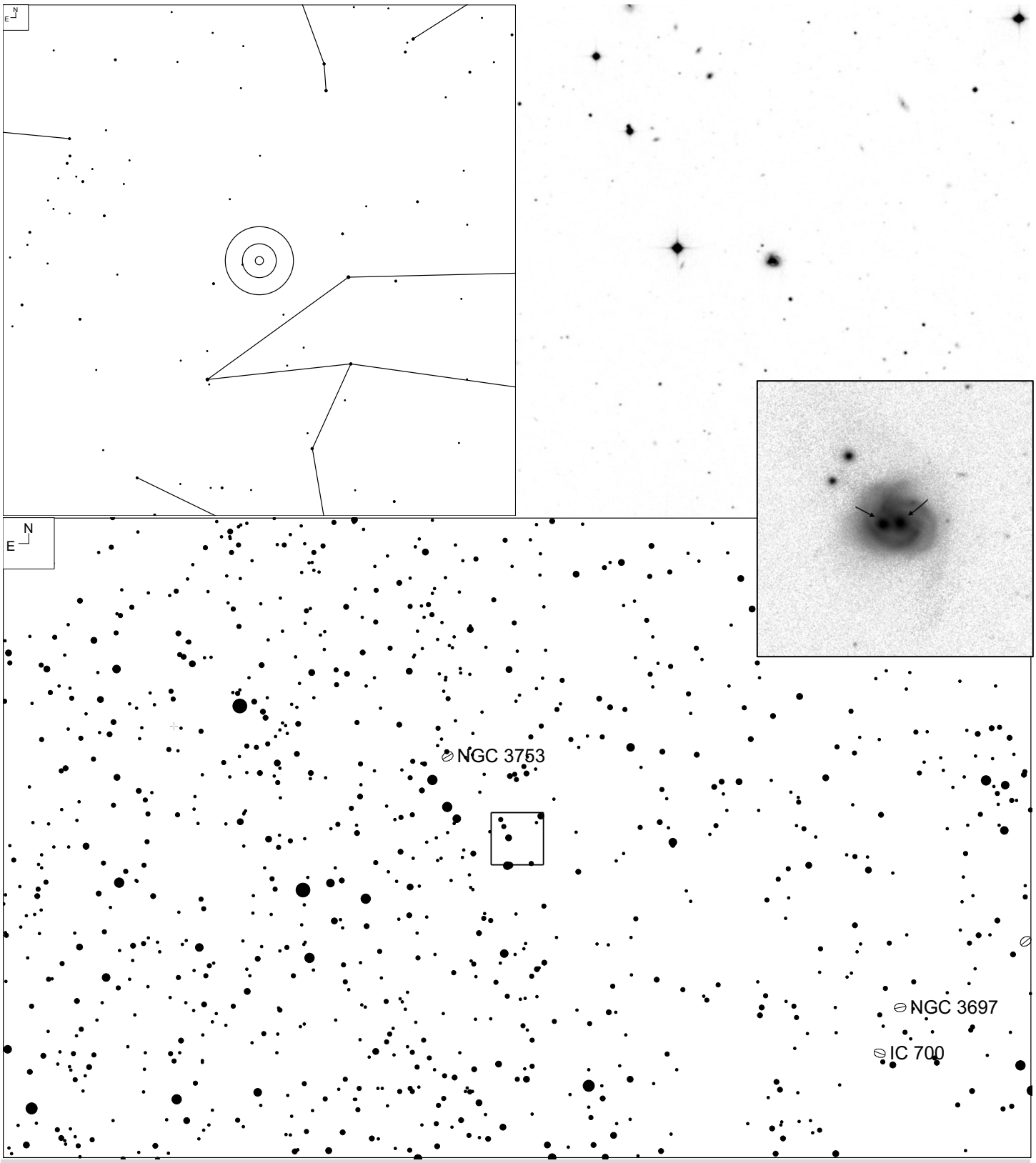
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5996	15 46 58.9	+ 17 53 03	13.4	SB	88	44

Markarian 710 (Leo)



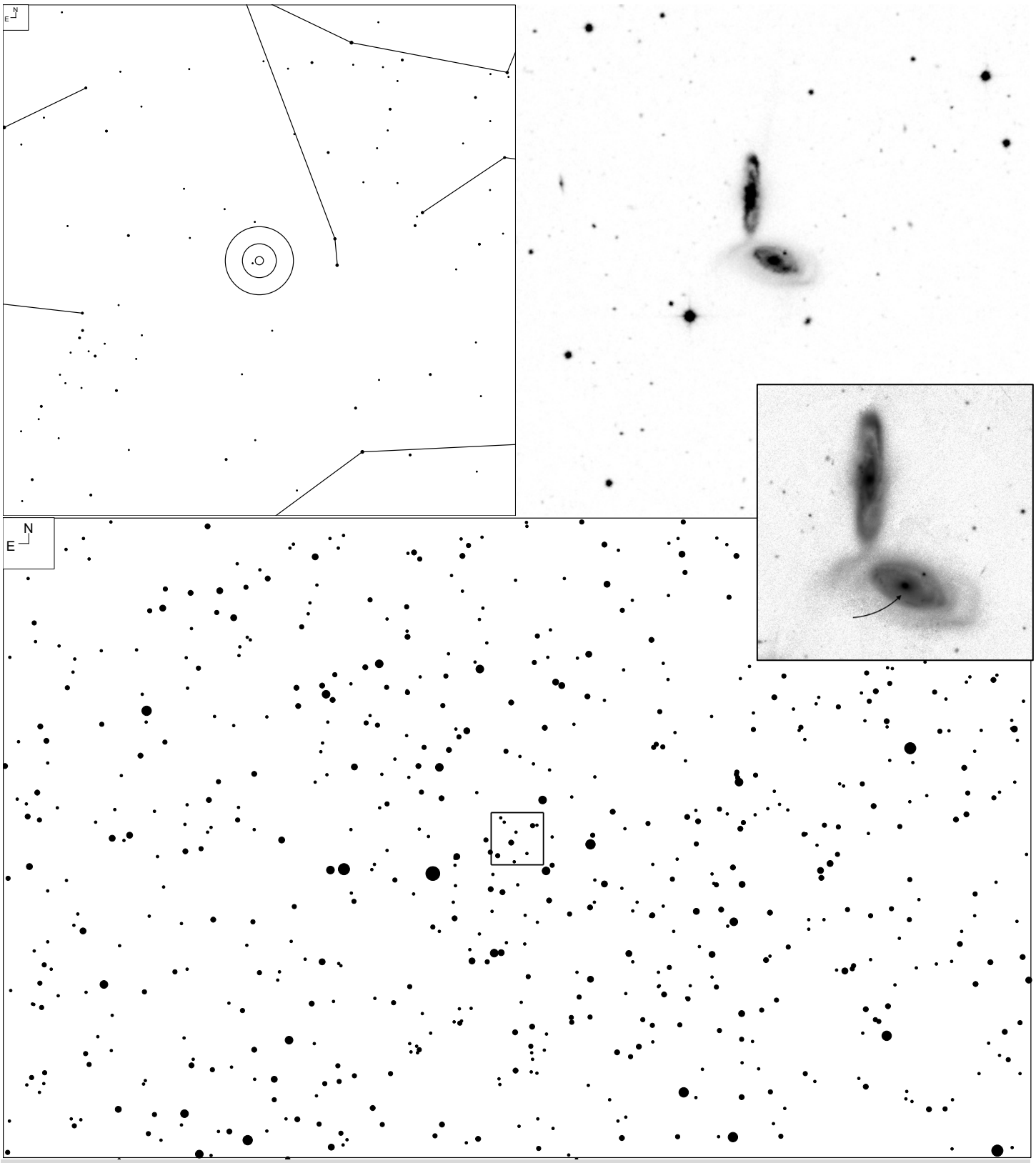
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 3049	09 54 49.5	+ 09 16 16	13.6	SB	93	47

Markarian 739a/b (Leo)



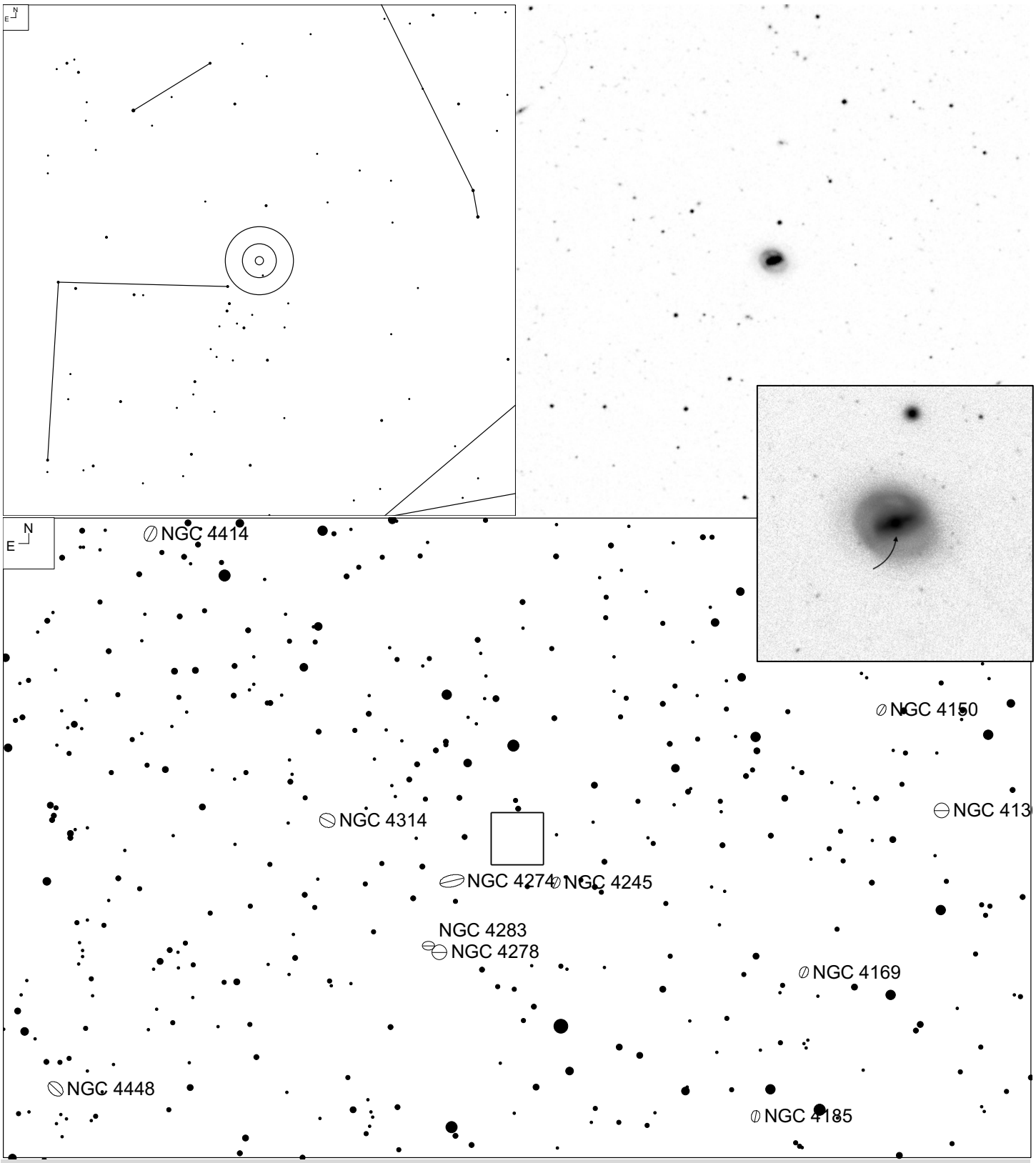
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 3758	11 36 29.4	+ 21 35 49	15.2 / 15.2	Sy 1 (E) / SB	72	46

Markarian 744 (Ursa Major)



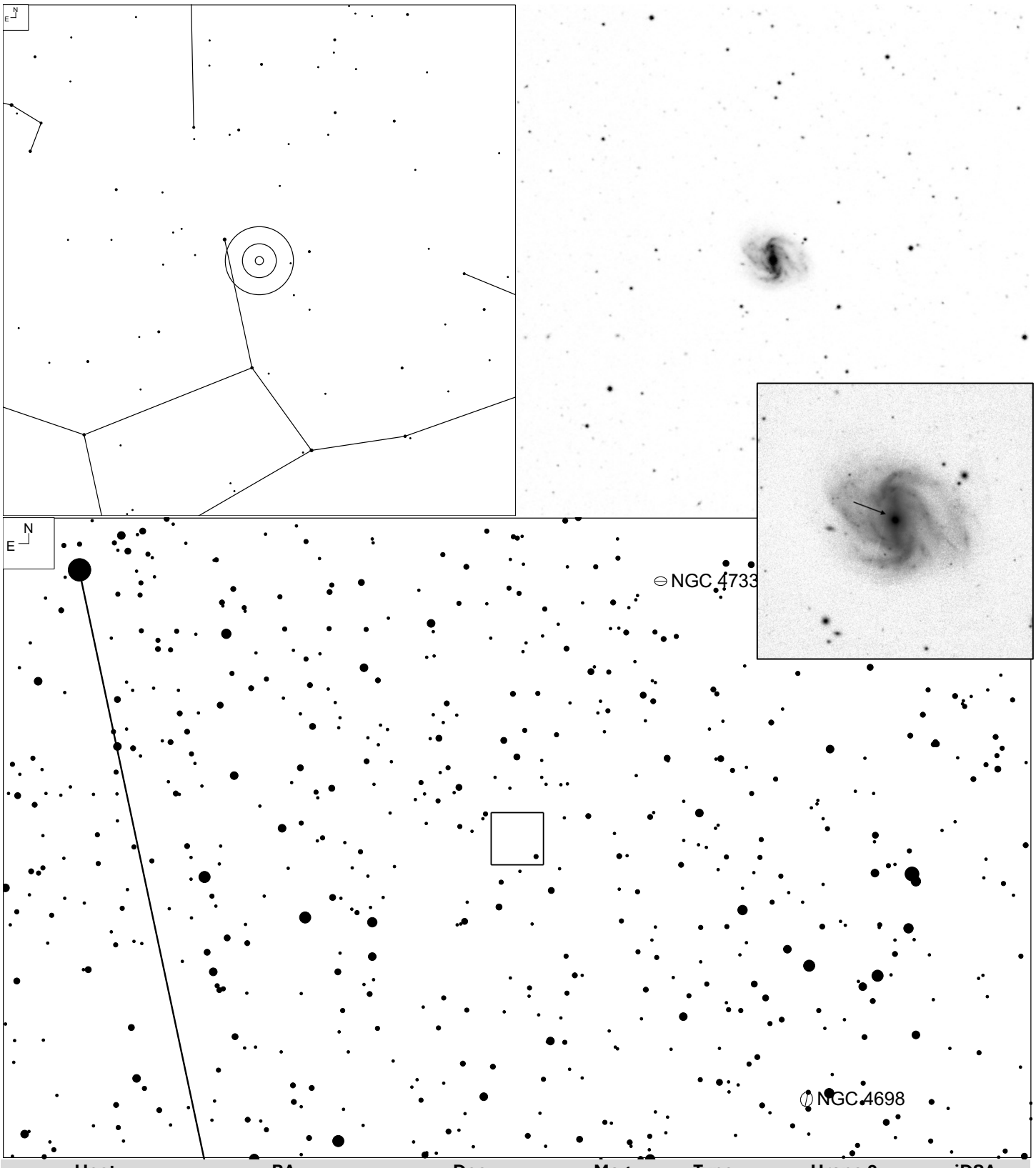
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 3786	11 39 42.5	+ 31 54 33	13.0b	Sy 1.8	54	34

Markarian 766 (Coma Berenices)



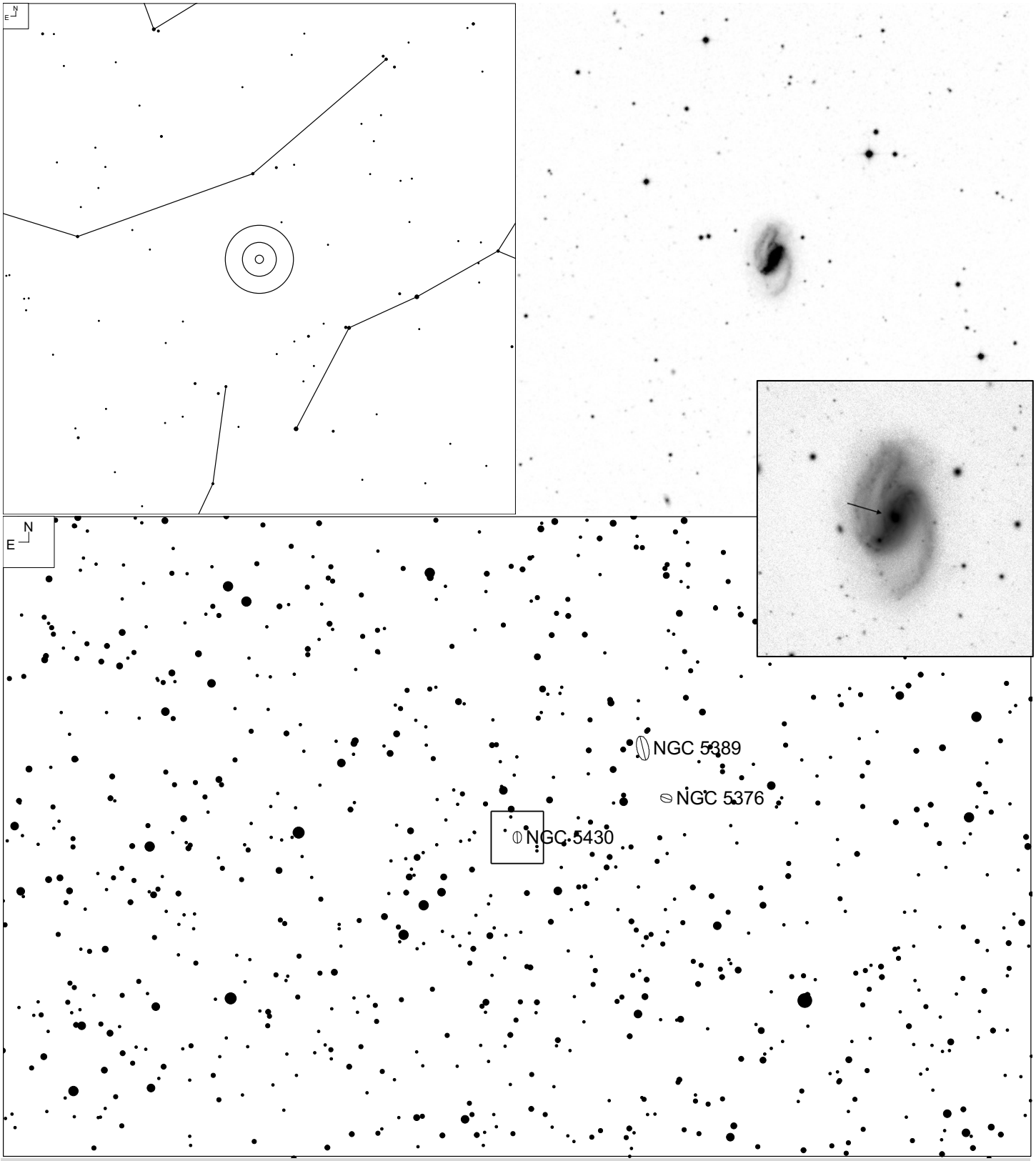
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 4253	12 18 26.5	+ 29 48 46	13.5r	Sy 1	72	33

Markarian 781 (Virgo)



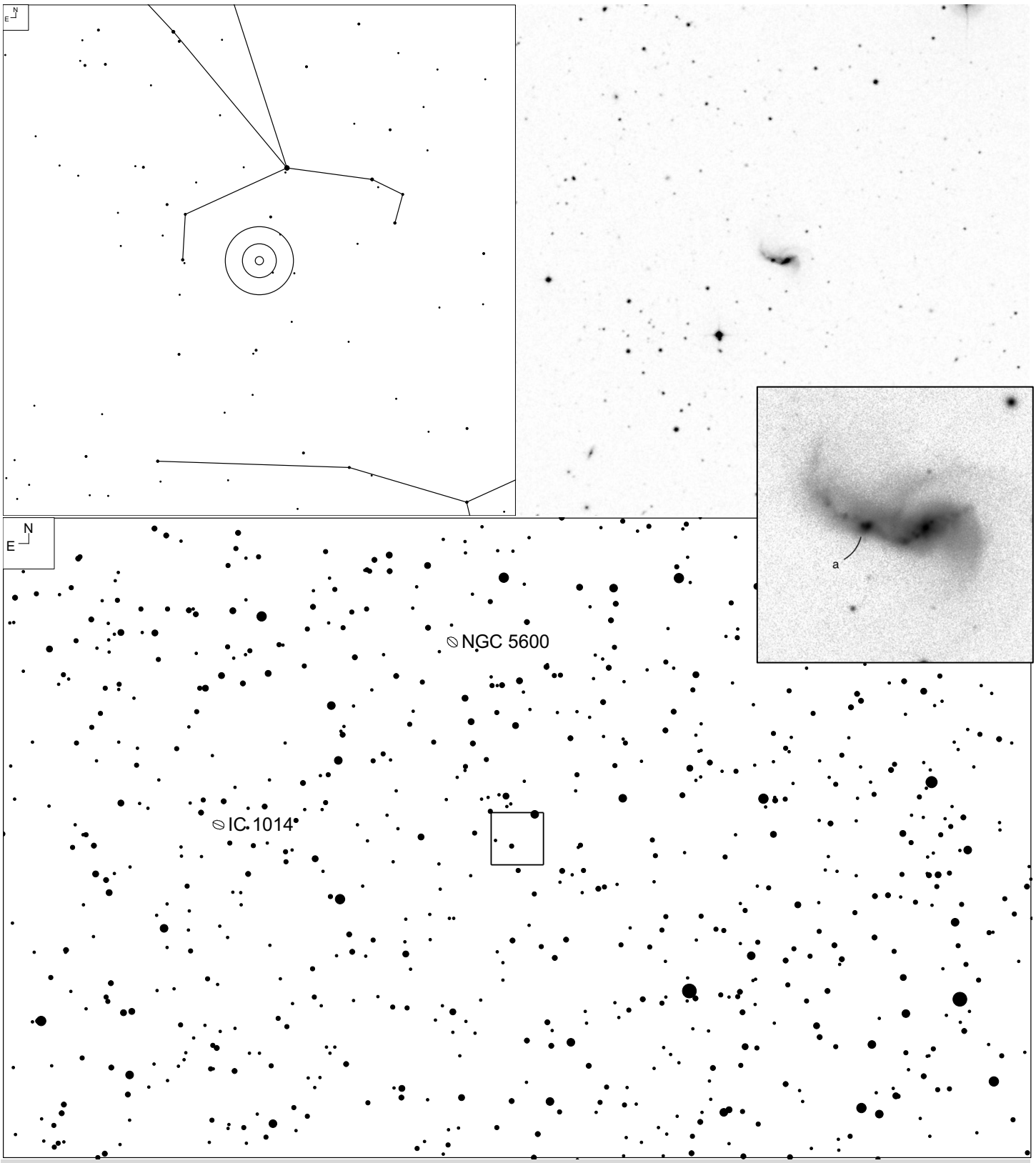
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 4779	12 53 50.8	+ 09 42 36	13.2	SB	90	45

Markarian 799 (Ursa Major)



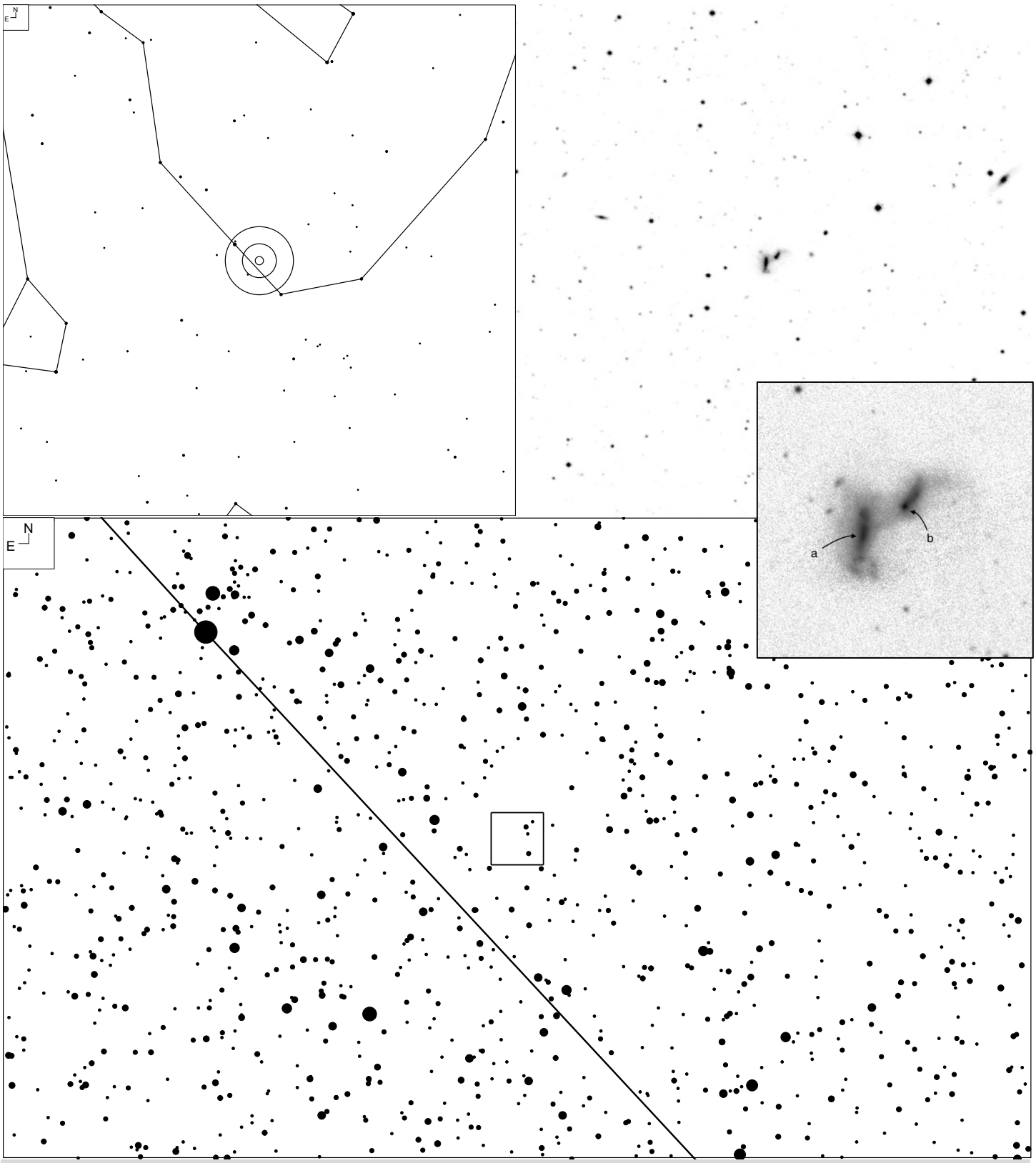
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5430	14 00 45.7	+ 59 19 42	13.0	SB	23	11

Markarian 809a/b (Boötes)



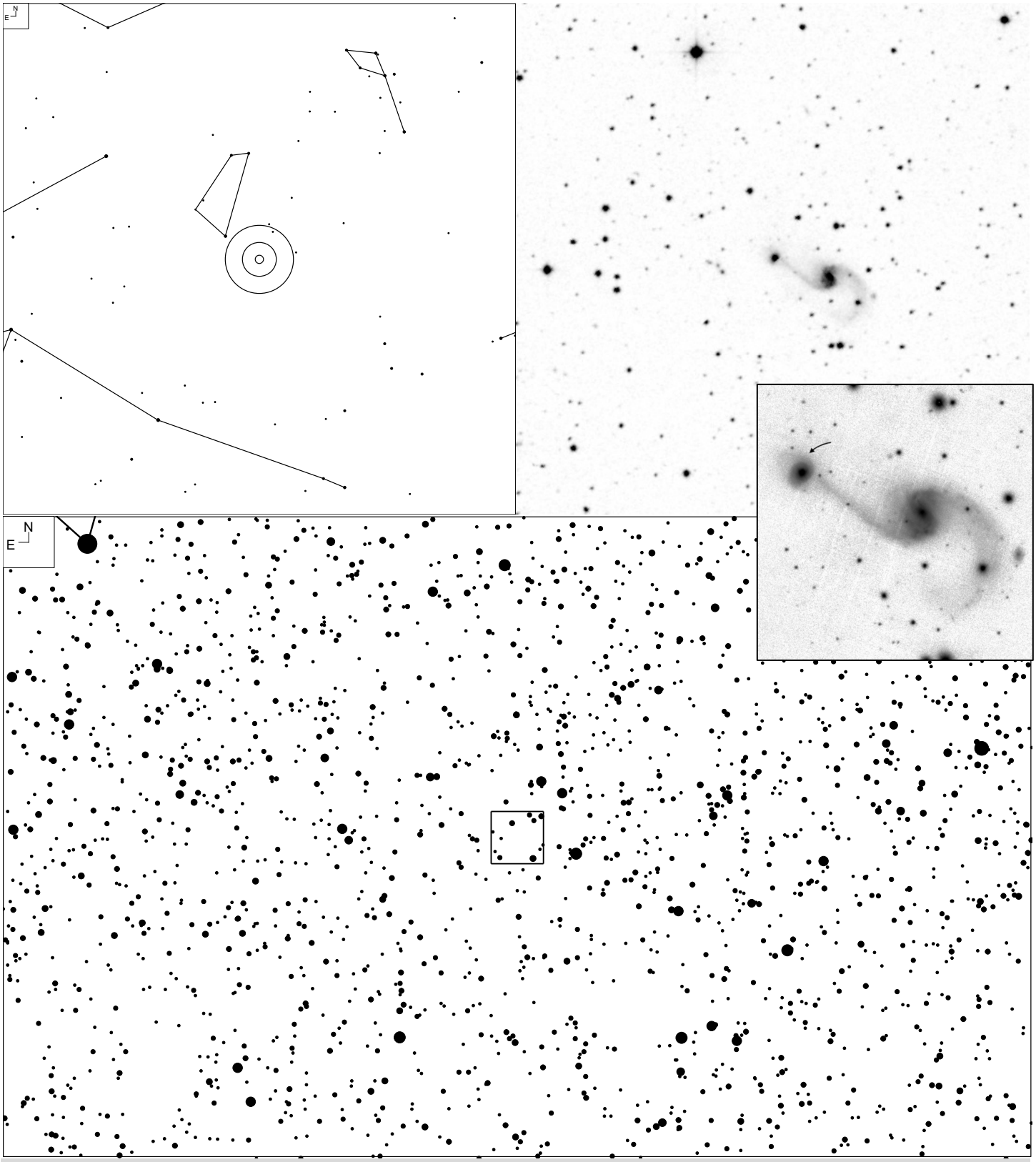
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5591	14 22 34.0	+ 13 43 00	14.5	SB	89	44

Markarian 874a/b (Draco)



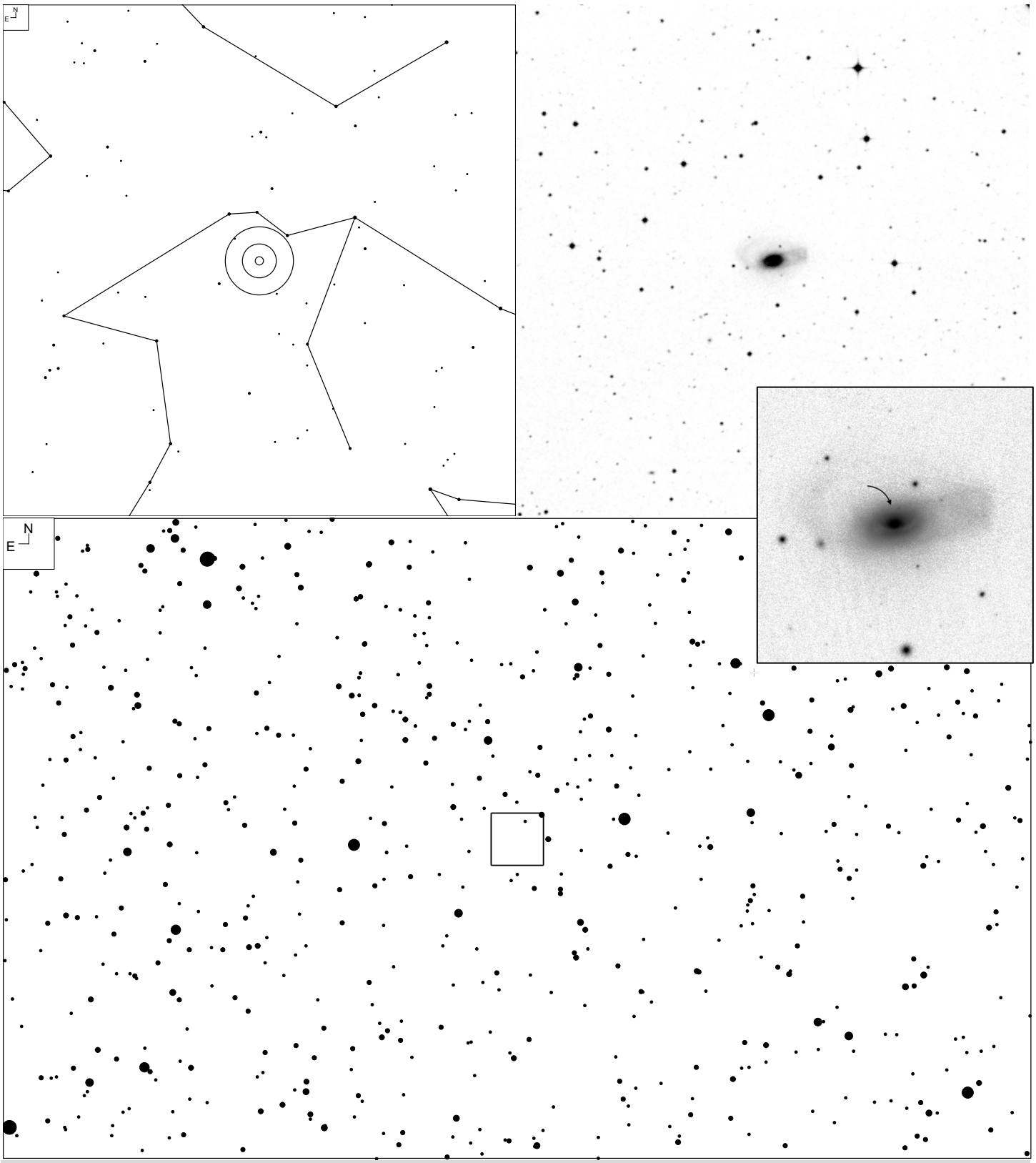
Host	RA	Dec	Mag	Type	Urano 2	iDSA
UGC 10279	16 11 45.8	+60 34 56	14.5	SB	22	10

Markarian 897 (Equalus)



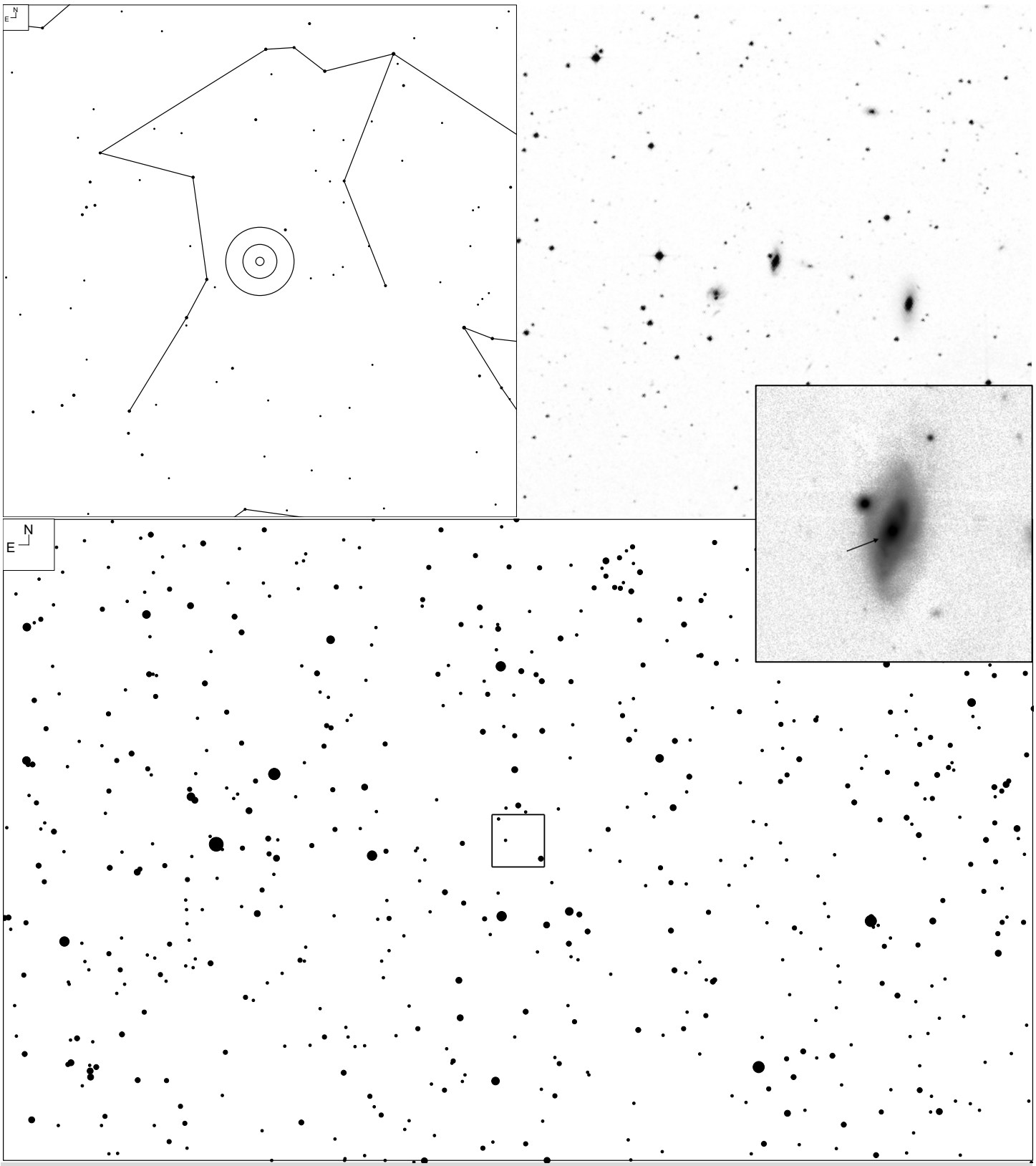
Host	RA	Dec	Mag	Type	Urano 2	iDSA
UGC 11680	21 07 45.8	+ 03 52 40	14.5	SB	103	53

Markarian 912 (Aquarius)



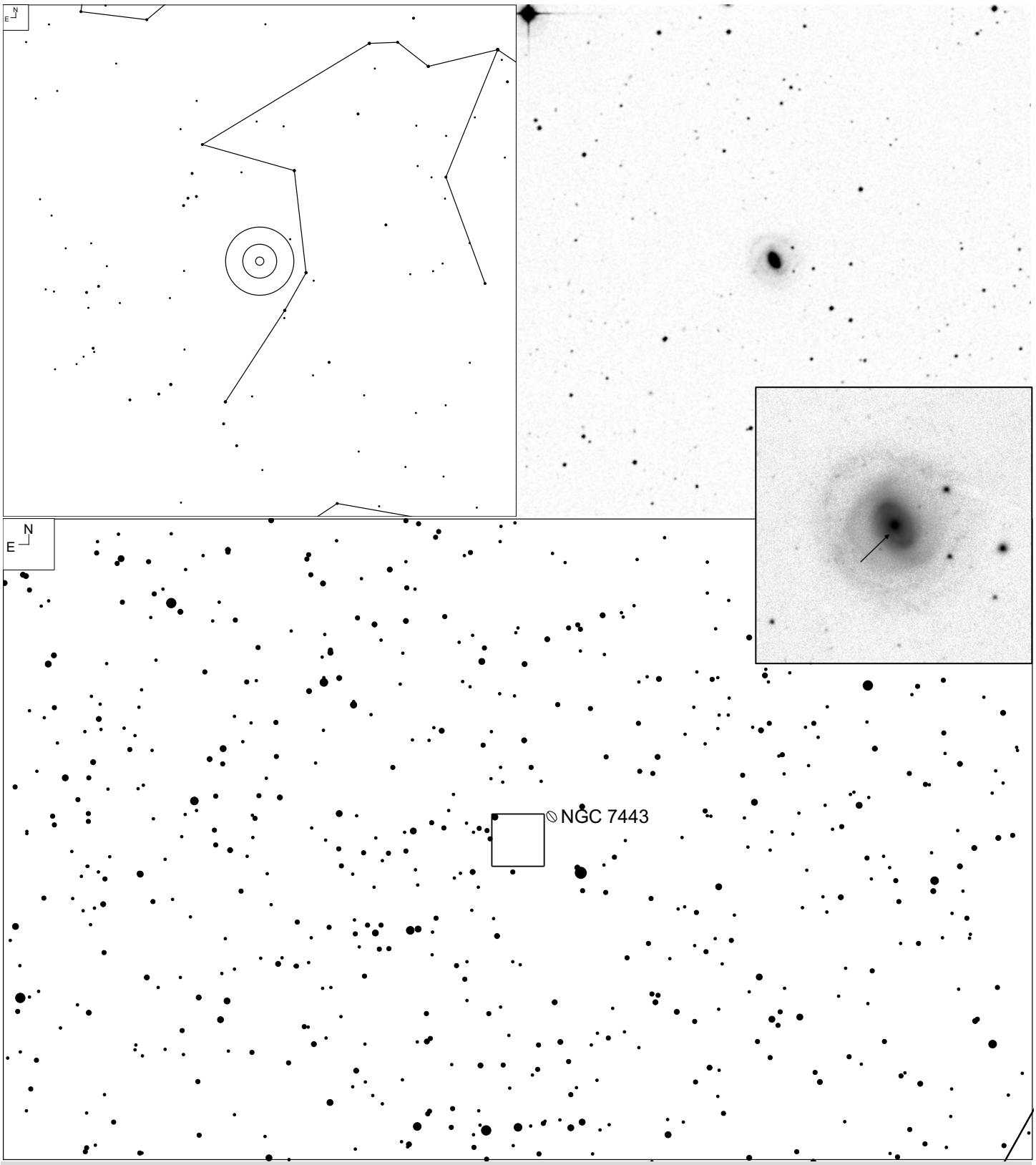
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 7288	22 28 15.0	– 02 53 04	14.3	SB	102	52

Markarian 915 (Aquarius)



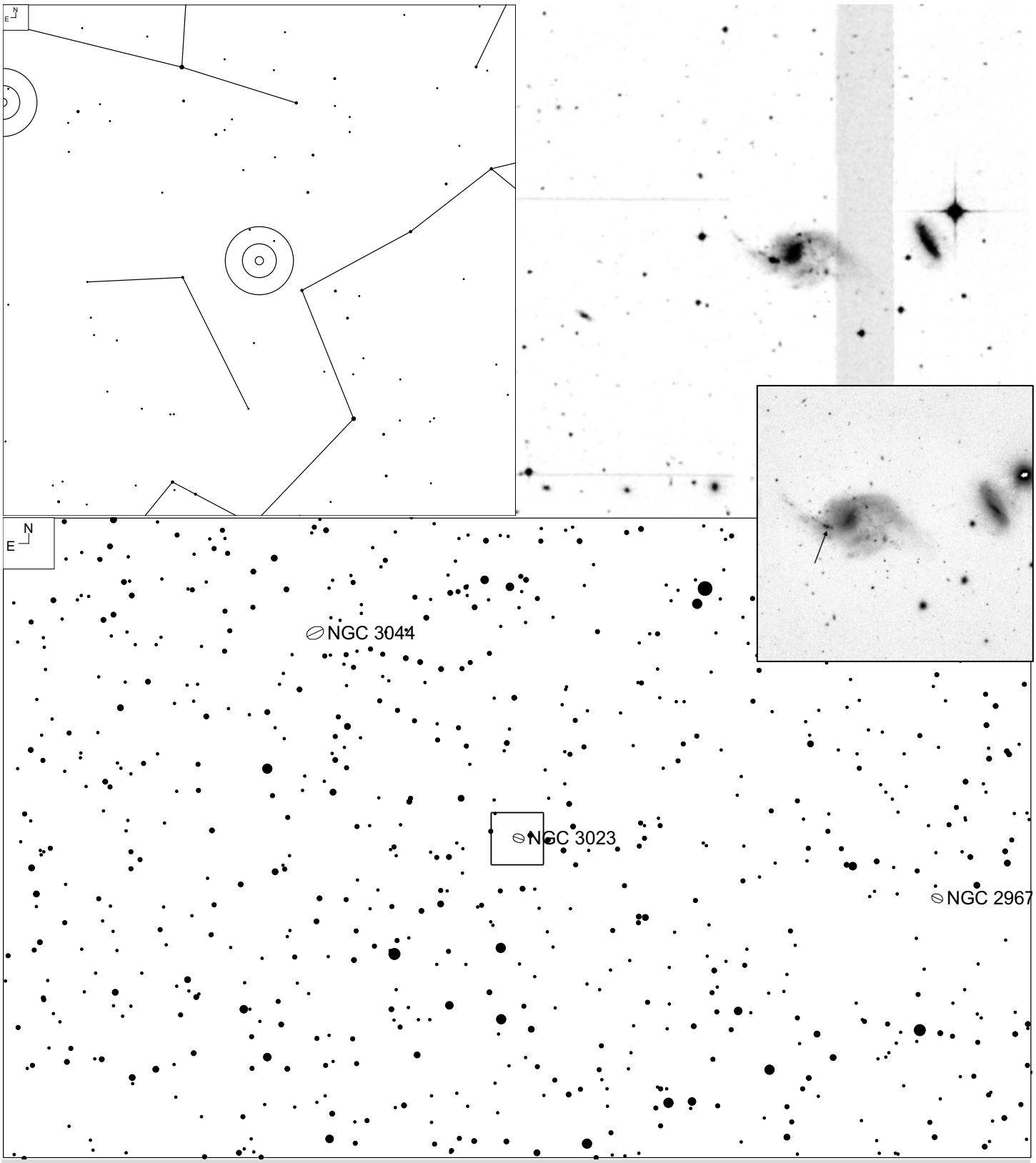
Host	RA	Dec	Mag	Type	Urano 2	iDSA
PGC 69307	22 36 46.5	– 12 32 43	13.6r	Sy 1	122	64

Markarian 1126 (Aquarius)



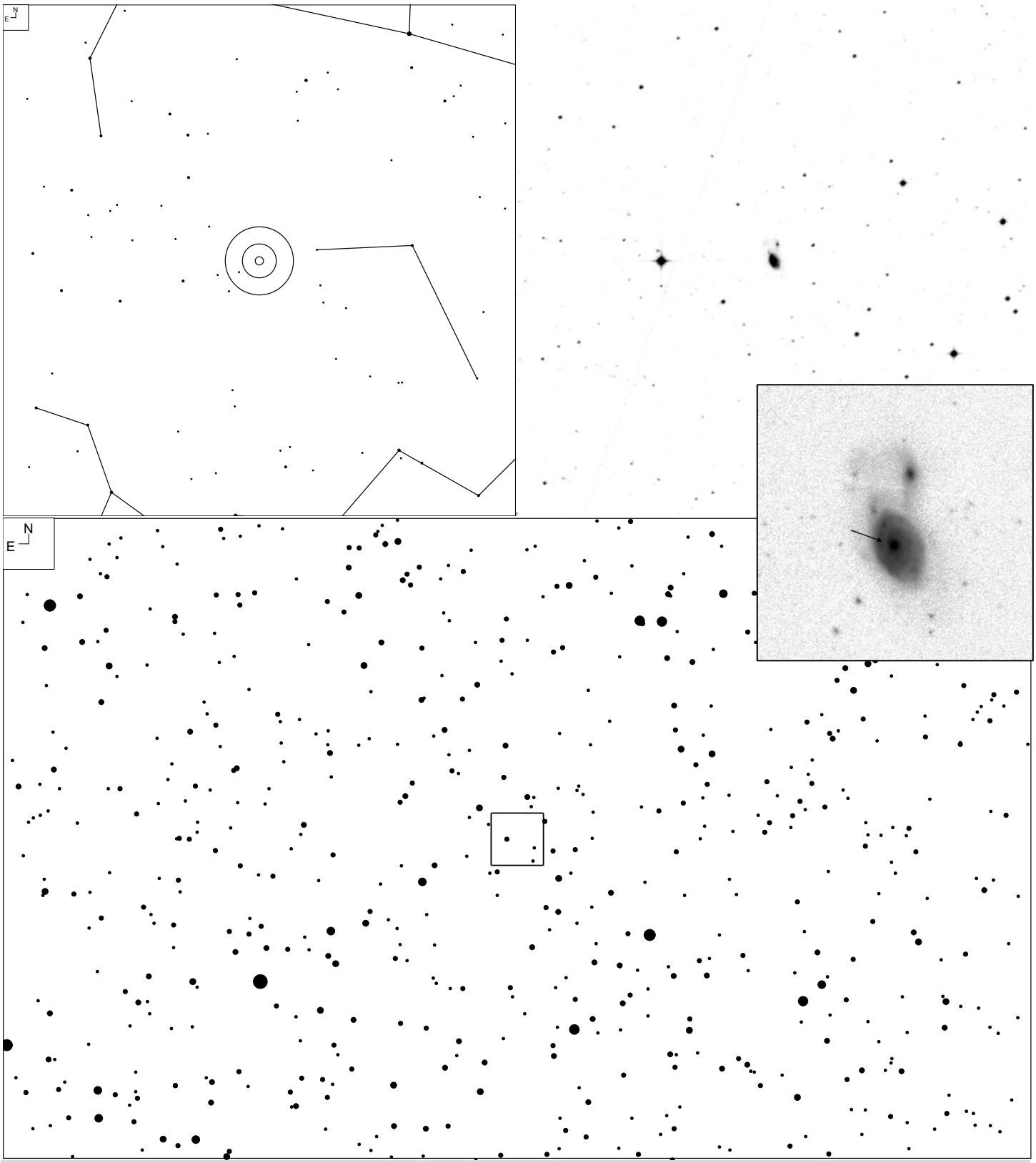
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 7450	23 00 47.8	-12 55 07	14.0	Sy 1.5	122	64

Markarian 1236 (Sextans)



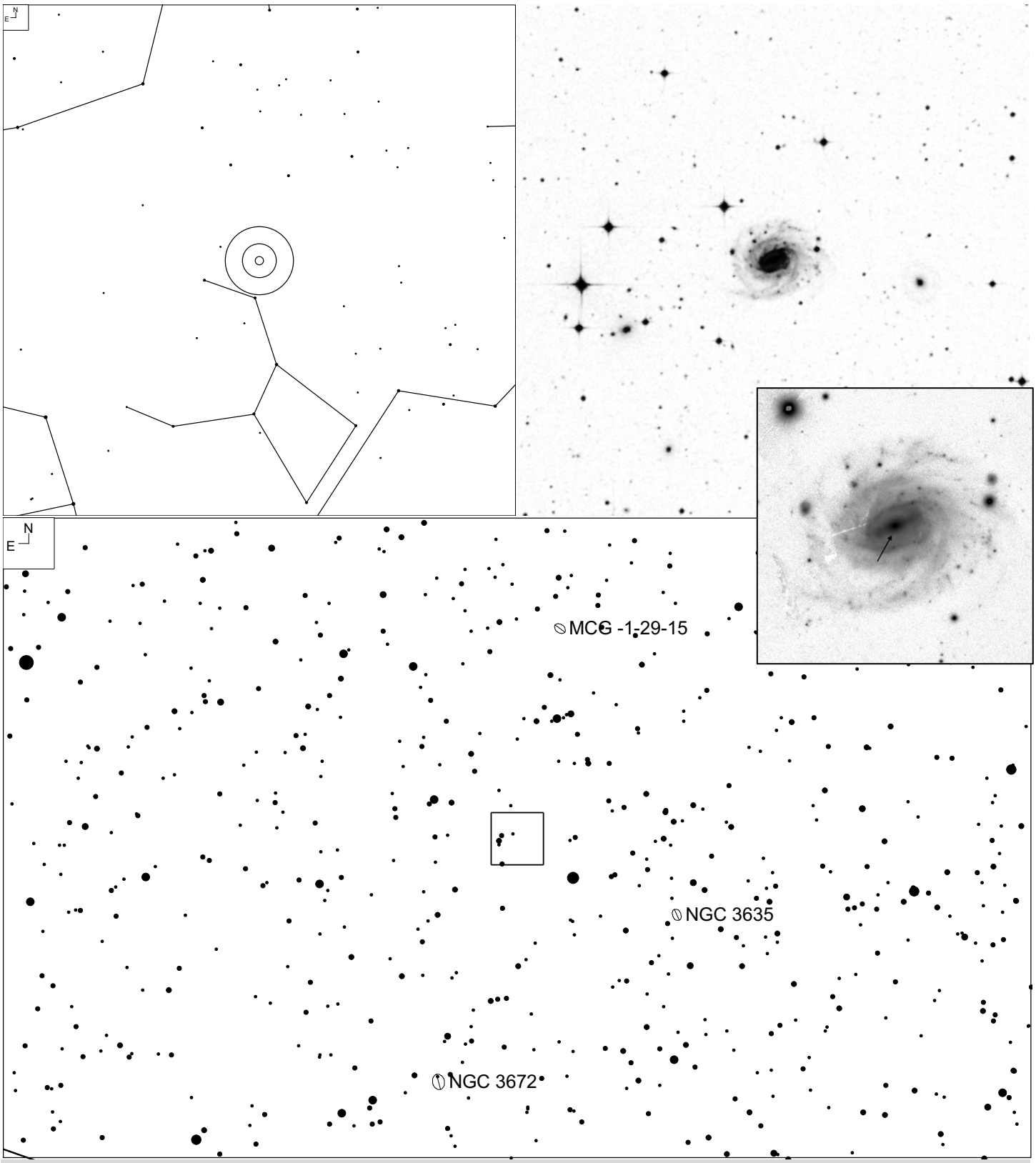
Host	RA	Dec	Mag	Type	Urano 2	iDSA
PGC 28275	09 49 54.1	+ 00 36 58	13.5	WR HII	113	59

Markarian 1261 (Sextans)



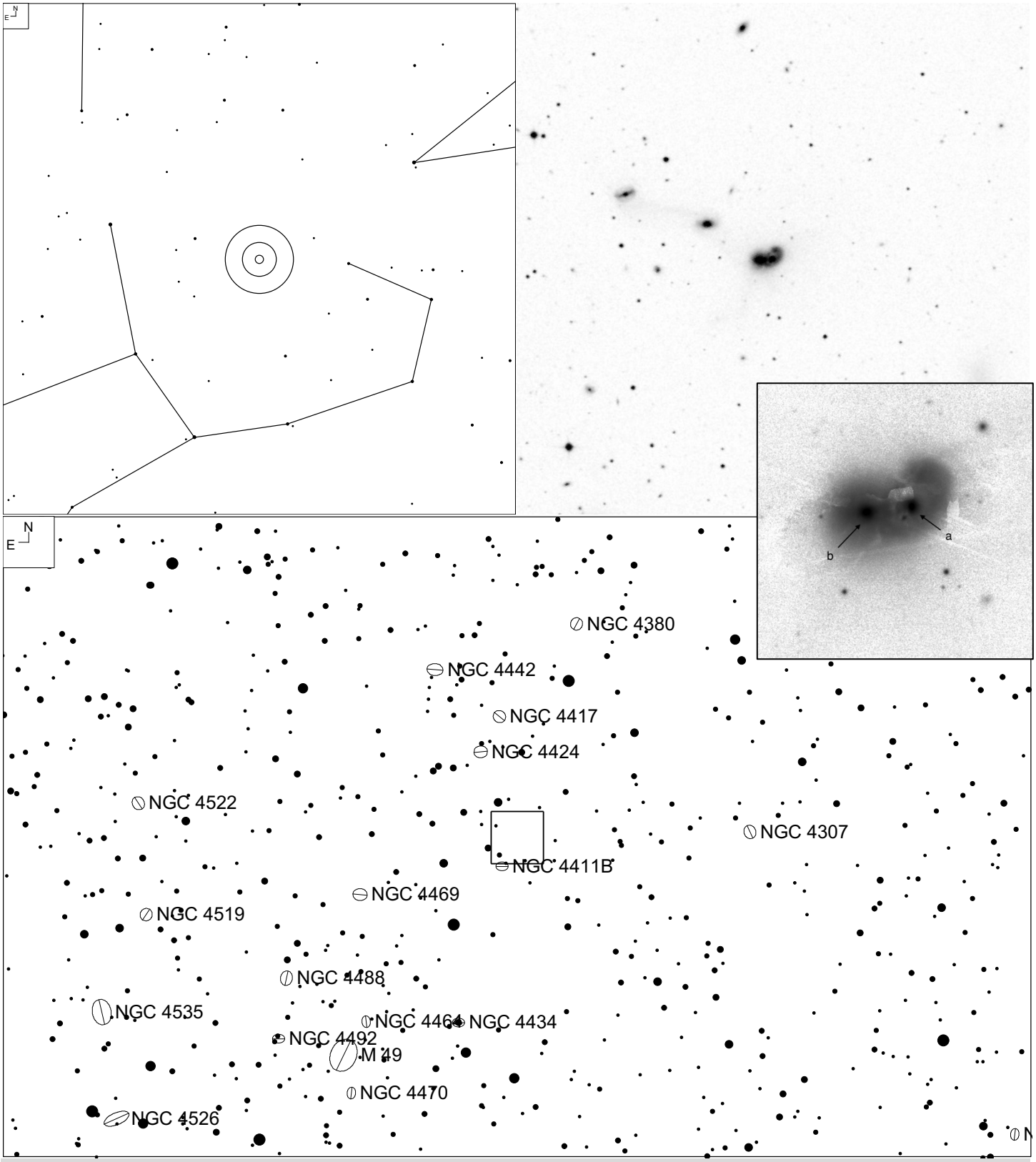
Host	RA	Dec	Mag	Type	Urano 2	iDSA
UGC 5849	10 43 52.6	– 01 17 40	14.7	HII	112	58

Markarian 1291 (Crater)



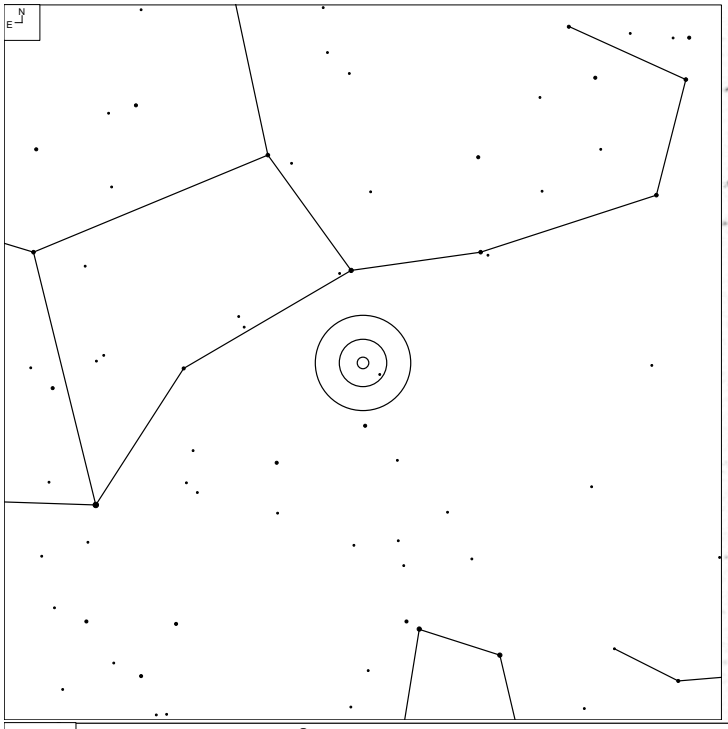
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 3660	11 23 32.3	– 08 39 31	13.1	SB	131	70

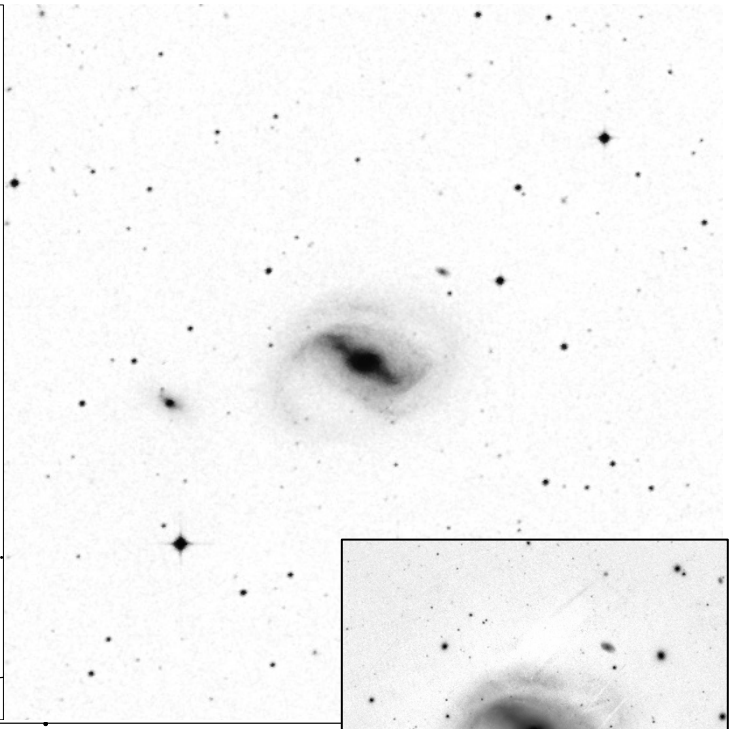
Markarian 1325a/b (Virgo)

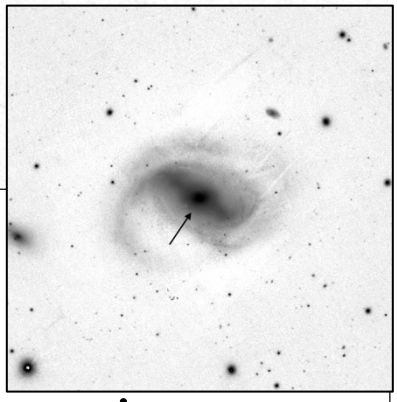


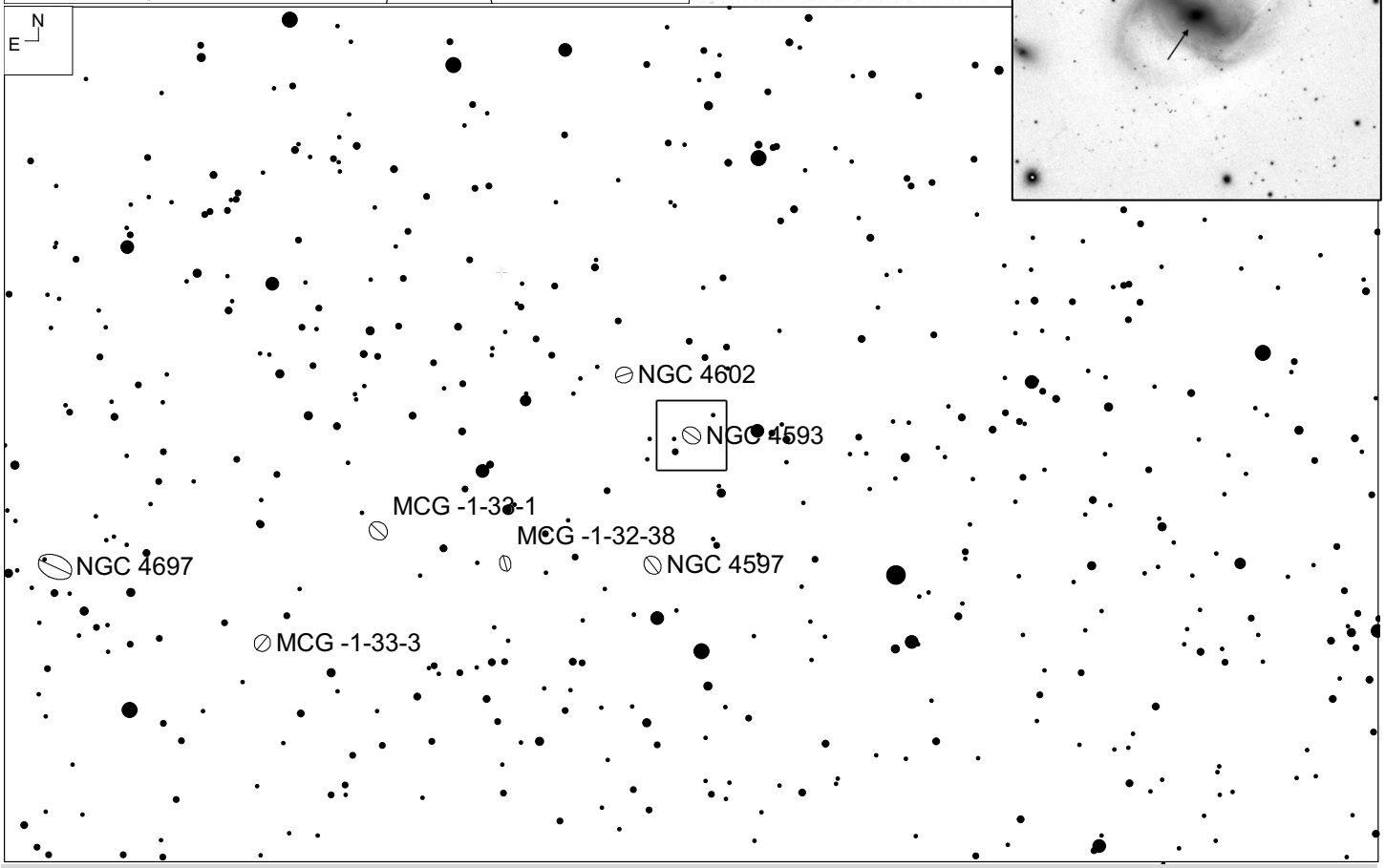
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 4410a/b	12 26 29.9	+ 09 01 07	13.1 / 13.6	LINER / LINER	91	45

Markarian 1330 (Virgo)



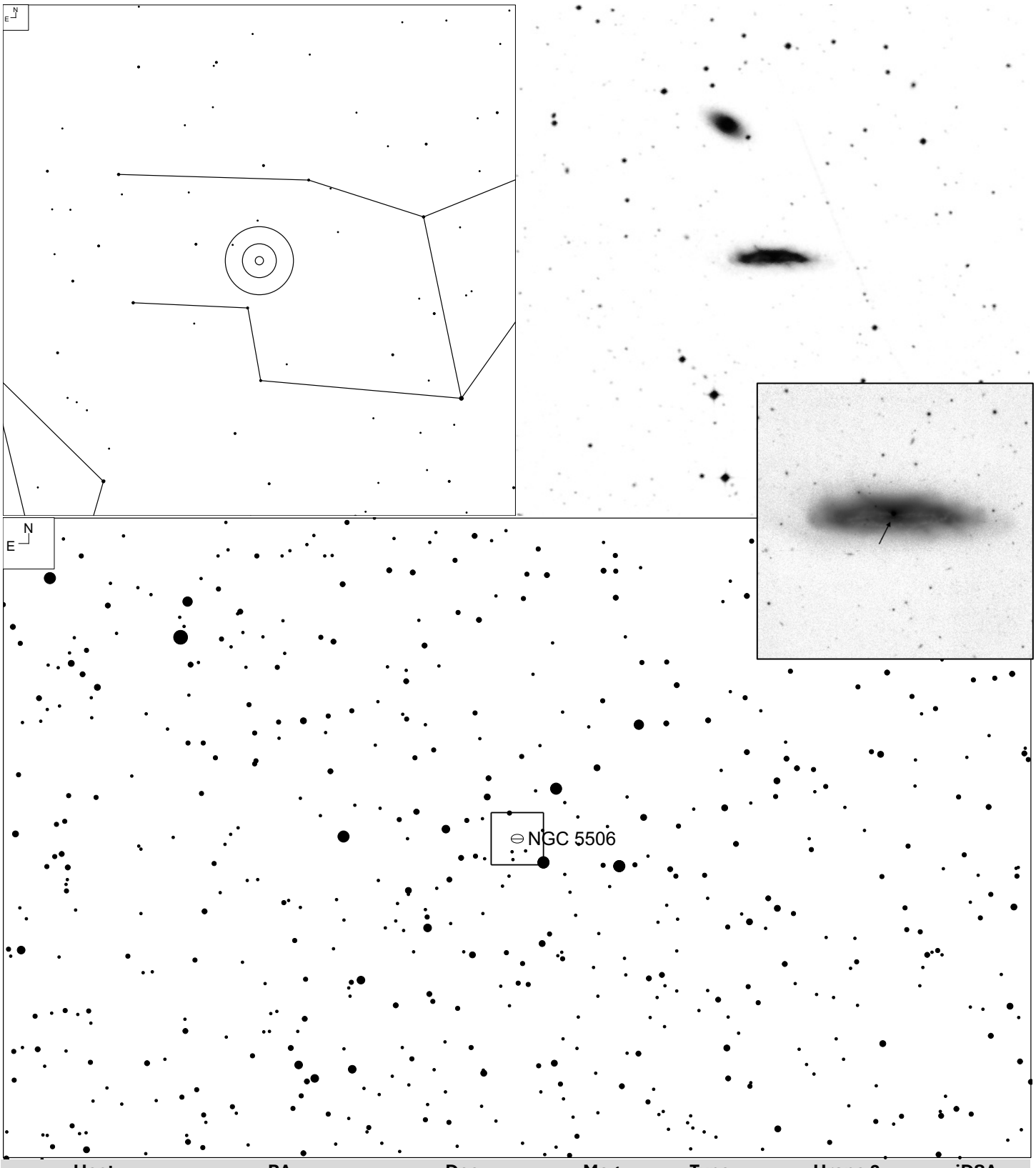






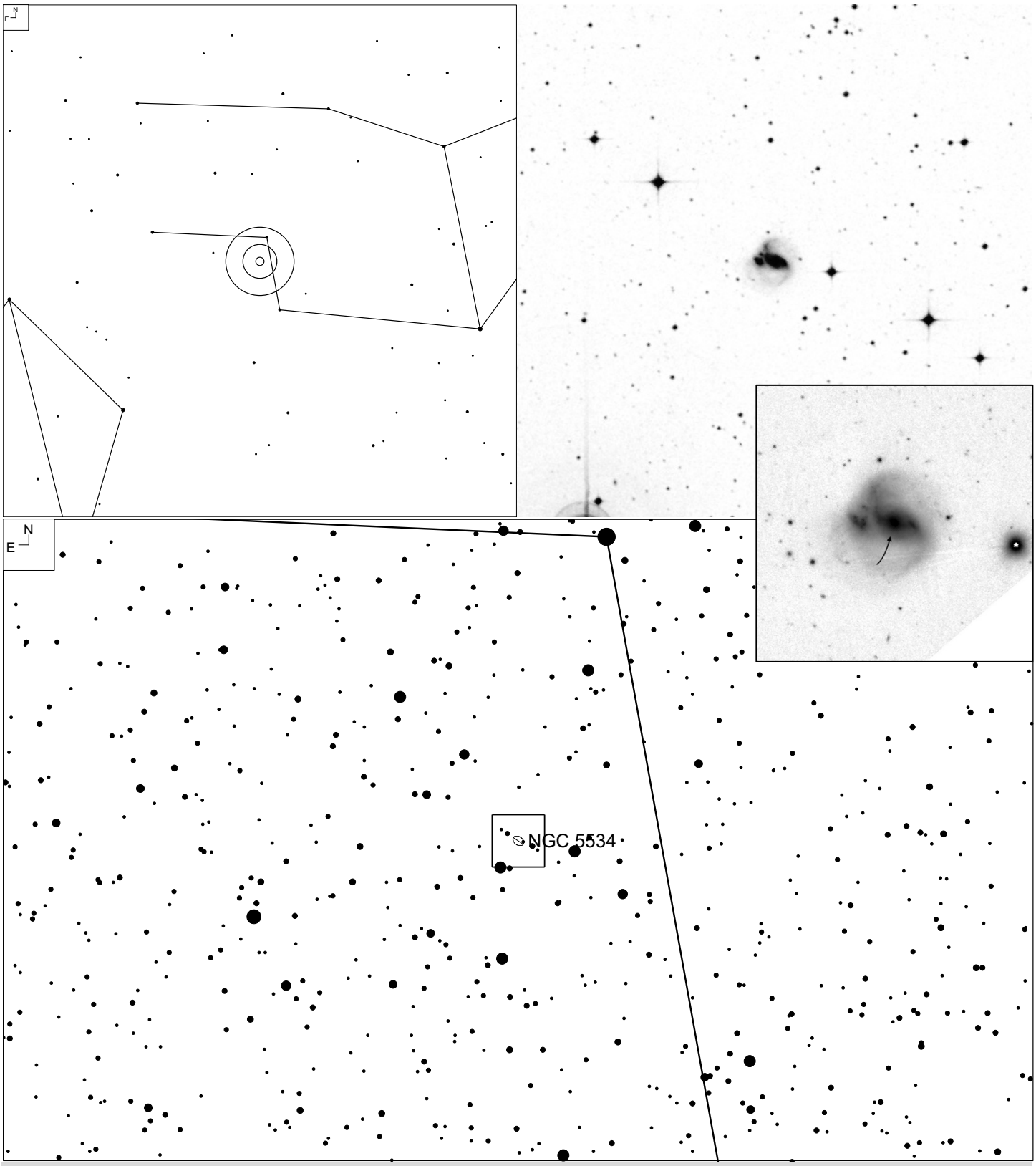
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 4593	12 39 39.4	- 05 20 39	11.7	Sy 1	110	57

Markarian 1376 (Virgo)



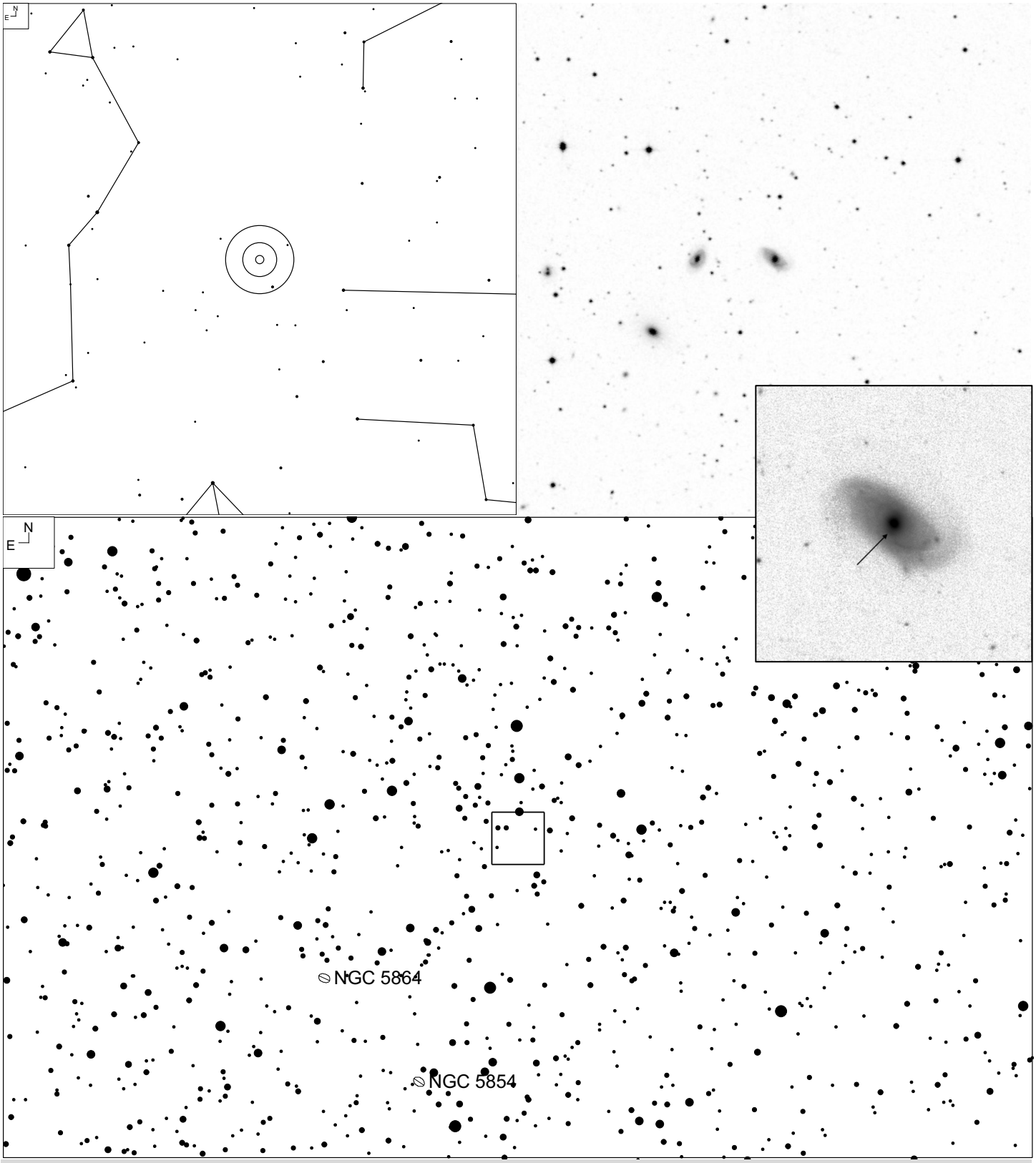
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5506	14 13 14.9	– 03 12 27	12.8	Sy 1.9	109	56

Markarian 1379 (Virgo)



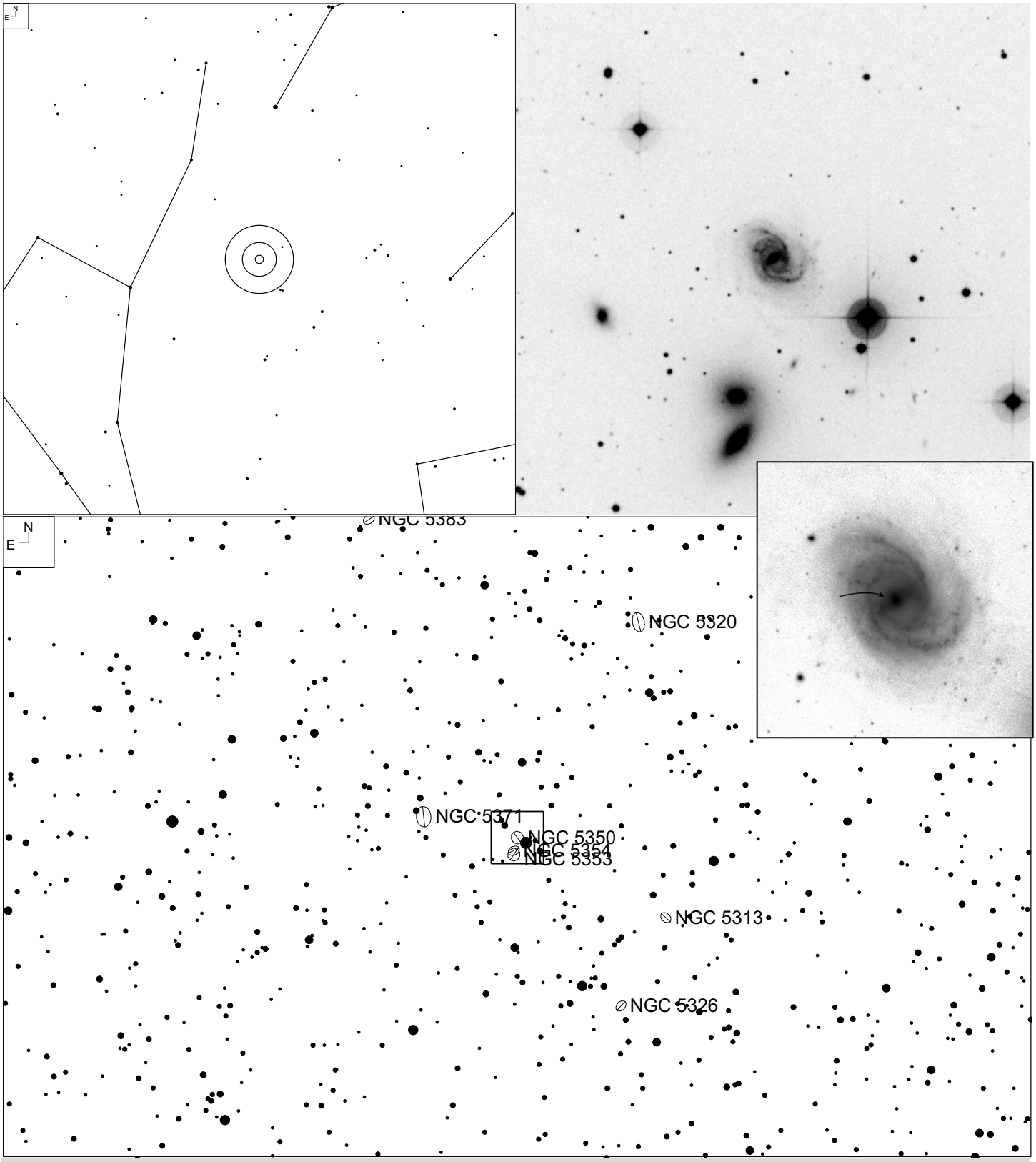
Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5534	14 17 40.2	– 07 25 03	12.8v	SB	129	56

Markarian 1392 (Virgo)



Host	RA	Dec	Mag	Type	Urano 2	iDSA
CGC48-115	15 05 56.5	+ 03 42 26	14.3	Sy 1.8	108	56

Markarian 1485 (Canes Venatici)



Host	RA	Dec	Mag	Type	Urano 2	iDSA
NGC 5350	13 53 21.6	+ 40 21 50	12.2	SB	53	20

2016: The Science of Byurakan

The Texas Star Party – Advanced Observing List - 2016

"The Science of Byurakan"

Observe ANY 20 Objects – An Observing Pin Will Be Awarded

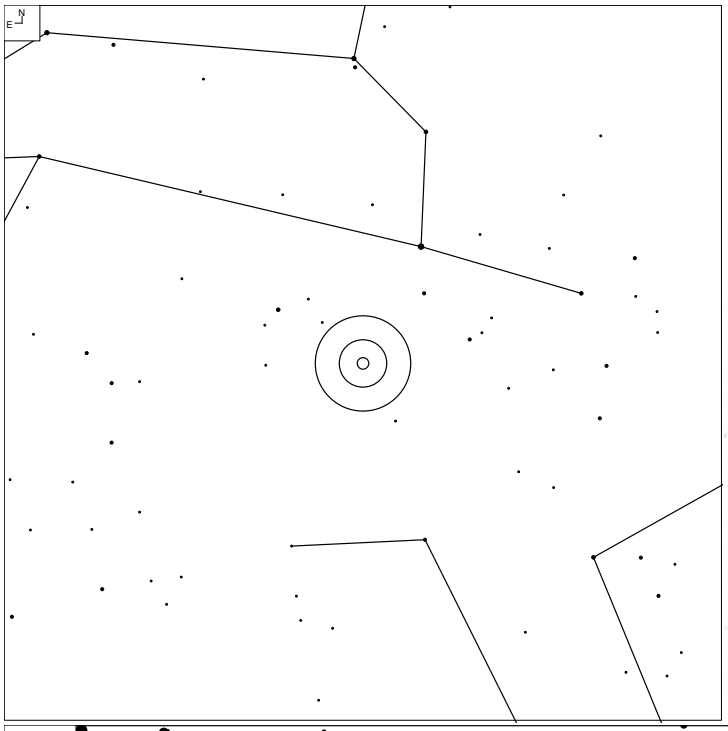
Name	Coordinates 2000	Const.	Mag.	Size	Class	Rad. Vel.	Urano 1
Arakelian 237, IC 0602	10 18 19.7 + 07 02 58	Leo	13.7	0.8 x 0.5'	S	+3780	U189
Arakelian 265	10 53 13.1 + 16 14 06	Leo	14.5	0.8 x 0.7'	--	+6673	U190
Shakhbazian 26	11 02 12.6 + 50 20 52	UMa	13.4-16.0	1.1 x 0.2'	Clstr	>30,000	U46
Arakelian 291, NGC3652	11 22 39.0 + 37 45 54	Uma	13.1	3.1 x 1.6'	Scd	+1997	U106
Shakhbazian 154	11 22 52.0 + 01 06 32	Leo	16.0	2.5 x 1.0'	Clstr	+21,885	U236
Arakelian 293	11 26 56.6 + 63 25 31	Uma	14.3	0.5 x 0.4'	E	+3624	U25
Shakhbazian 63	11 29 34.7 + 42 26 15	UMa	16.0-16.5	50" x 40"	G-Clstr	>30,000	U73
Arakelian 302	11 36 28.4 + 19 48 41	Leo	14.6	0.5 x 0.5'	E/SAO	+6640	U147
Arakelian 308, IC 719	11 40 18.5 + 09 00 36	Vir	13.6	1.2 x 0.3'	SO	+1833	U192
Arakelian 317, UGC 6711	11 44 29. 7 + 69 43 47	Dra	14.2	0.7 x 0.4'	S	+2702	U25
Arakelian 320, UGC 6732	11 45 33.1 + 58 58 41	Uma	13.4	1.0 x 0.8'	SO	+2979	U47
Arakelian 345, UGC 7032	12 03 27.3 + 16 29 09	Com	14.4	0.6 x 0.5'	S	+4063	U193
Kazarian 390, NGC 4455	12 28 44.1 + 22 49 14	Com	12.9	2.7 x 0.7'	SB(s)d	+637	U148
Arakelian 383, UGC 07813	12 39 01.1 + 00 21 56	Vir	14.1	0.5 x 0.5'	E	+6957	U239
Kazarian 31, NGC 4648	12 41 44.4 + 74 25 15	Dra	13.0	2.1 x 1.5'	E3	+1414	U9
Kazarian 247, UGC 08120	12 59 56.2 + 73 41 33	Dra	14.4	1.8 x 0.8'	Sd	+1665	U9
Kazarian 248, NGC 4954	13 02 19.9 + 75 24 15	Dra	14.2	0.8 x 0.6'	SO	+9282	U10
Arakelian 402	13 08 50.1 – 00 49 02	Vir	14.1	1.0 x 0.4'	SO	+5338	U240
Arakelian 404	13 10 23.8 – 01 00 38	Vir	14.4	0.5 x 0.4'	SO	+5594	U240
Shakhbazian 376	13 56 31.8 + 23 21 22	Boo	15.5-18.4	2.4 x 1.1'	G-Clstr	+19,996	U151
Arakelian 444, NGC 5536	14 16 23.8 + 39 30 08	Boo	14.1	0.8 x 0.8'	SBa	+5848	U77
SBS 1444+517, VV713	14 45 45.1 + 51 34 51	Boo	14.3	0.8 x 0.7'	S	+8936	U50
Kazarian 409, NGC 5832	14 57 45.7 + 71 40 56	UMi	12.9	3.7 x 2.1'	SB(rs)b	+447	U27
Arakelian 468, NGC5845	15 06 00.8 + 01 38 02	Vir	13.5	0.8 x 0.5'	E	+1472	U243
Arakelian 487, NGC 6003	15 49 25.6 + 19 01 55	Ser	14.3	1.0 x 0.8'	SO	+3937	U155
Arakelian 497, UGC 10200	16 05 45.9 + 41 20 41	Her	13.6	0.6 X 0.6'	S	+1991	U79
Kazarian 65, IC 1215	16 15 35.1 + 68 23 52	Dra	14.1	1.1 x 0.6'	SB	+7255	U29
Kazarian 69, IC 1218	16 16 37.1 + 68 12 10	Dra	14.5	1.0 x 0.3'	Sc	+1109	U29
Kazarian 73, NGC 6217	16 32 39.2 + 78 11 53	UMi	11.8	3.0 x 2.4'	(R)SB(rs)	+1362	U11
Kazarian 76, UGC 10500	16 38 59.4 + 57 43 27	Dra	13.9	1.4 x 1.3'	SO/a	+5218	U52
Kazarian 88, NGC 6236	16 44 34.6 + 70 46 49	Dra	12.6	2.9 x 1.6'	SAB(s)cd	+1280	U29
Kazarian 96, NGC 6244	16 48 03.9 + 62 12 02	Dra	14.4	1.5 x 0.3'	SBa	+4378	U29
SBS 1657+590B, NGC 6286	16 58 31.4 + 58 56 11	Dra	14.1	1.5 x 1.4'	Sb pec	+5501	U52
Kazarian 119, UGC 10713	17 04 34.0 + 72 26 48	Dra	14.0	1.8 x 0.3'	Sb	+1077	U29
Kazarian 5, NGC6306	17 07 37.0 + 60 43 44	Dra	14.4	1.0 x 0.2'	SB(s)ab	+2973	U52
Kazarian 460, NGC 6381	17 27 16.8 + 60 00 51	Dra	13.7	1.3 x 0.9'	SA(s)c	+3265	U52
Kazarian 142, UGC 10888	17 29 59.3 + 60 21 01	Dra	14.2	1.0 x 0.6'	(R)SB(r)b	+6149	U52
Arakelian 532, UGC 11000	17 49 26.6 + 36 08 43	Her	14.4	0.6 x 0.3'	S	+1369	U116
Arakelian 534, UGC 11041	17 54 51.8 + 34 46 34	Her	14.1	1.0 x 0.6'	Sab	+4881	U116
Arakelian 536, UGC 11087	18 00 18.9 + 34 38 23	Her	14.6	0.6 x 0.4'	S	+7859	U116
Kazarian 194, NGC 6621	18 12 55.3 + 68 21 48	Dra	14.0	2.0 x 0.7'	Sb pec	+6191	U30
Kazarian 198, NGC 6636	18 22 03.5 + 66 37 13	Dra	14.0	2.1 x 0.3'	S	+3995	U30
Kazarian 210, NGC 6689	18 34 50.2 + 70 31 26	Dra	13.1	3.8 x 1.2'	Sd sp	+467	U30
Arakelian 542, UGC 11566	20 28 11.9 + 00 17 18	Aql	14.2	0.6 x 0.4'	S	+1671	U253

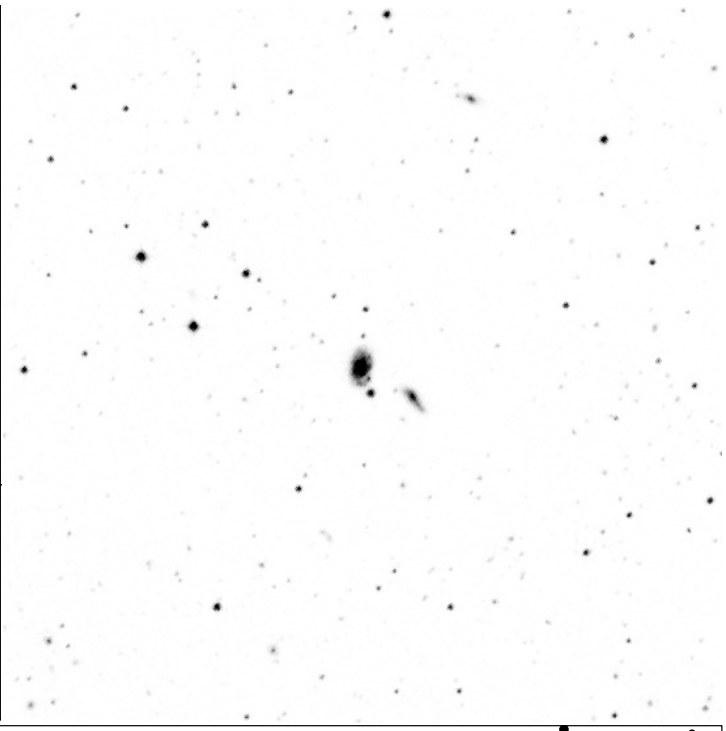
Bona Venatio Fortuna

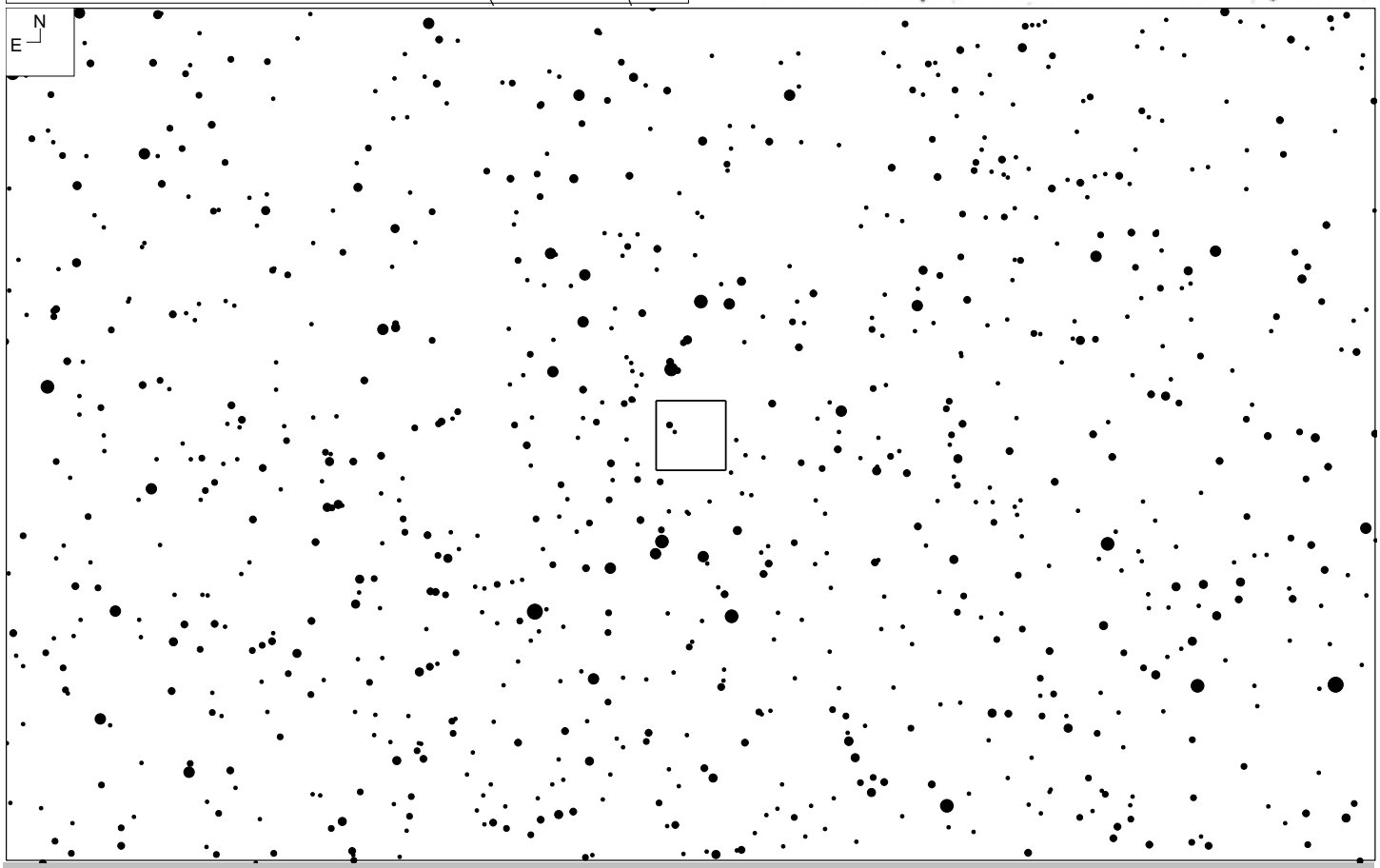
LARRY MITCHELL

TSP - Advanced Observing Program Chairman

Arakelian 237 (Leo)

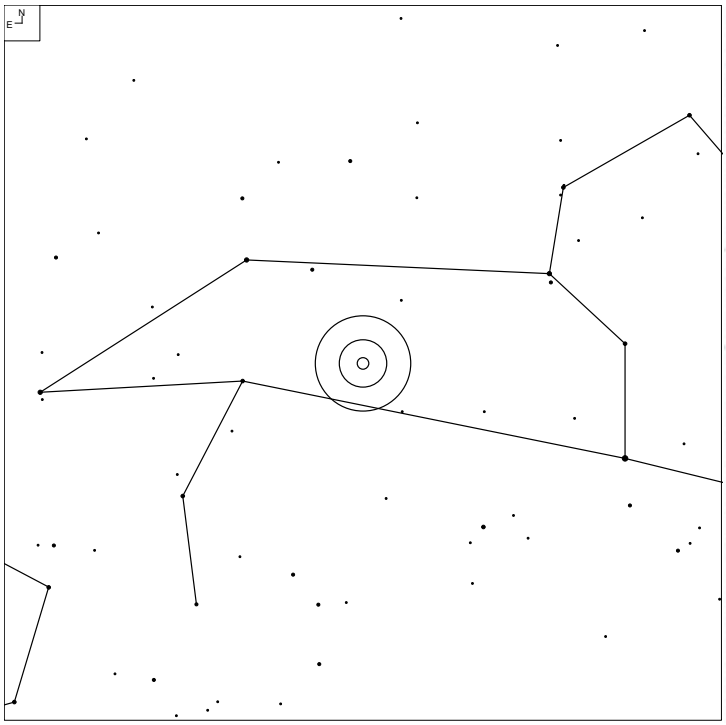


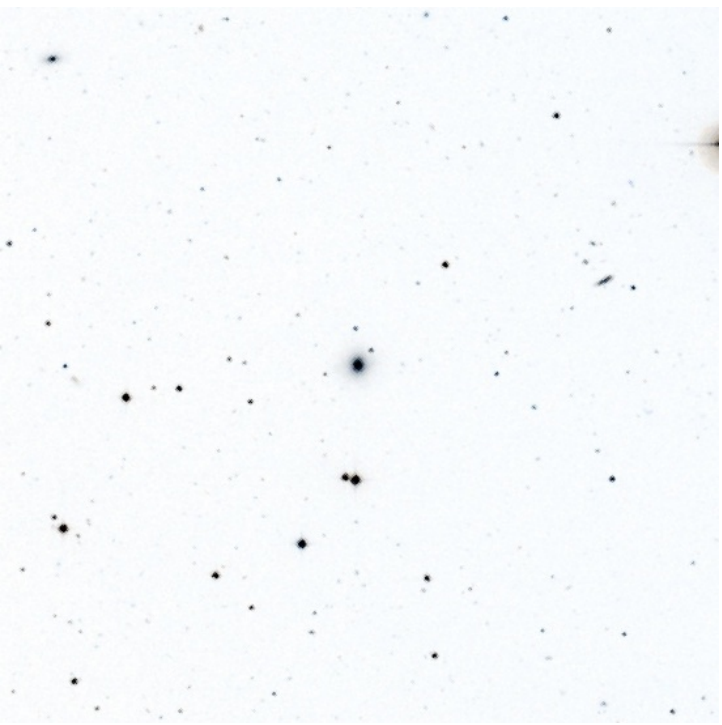


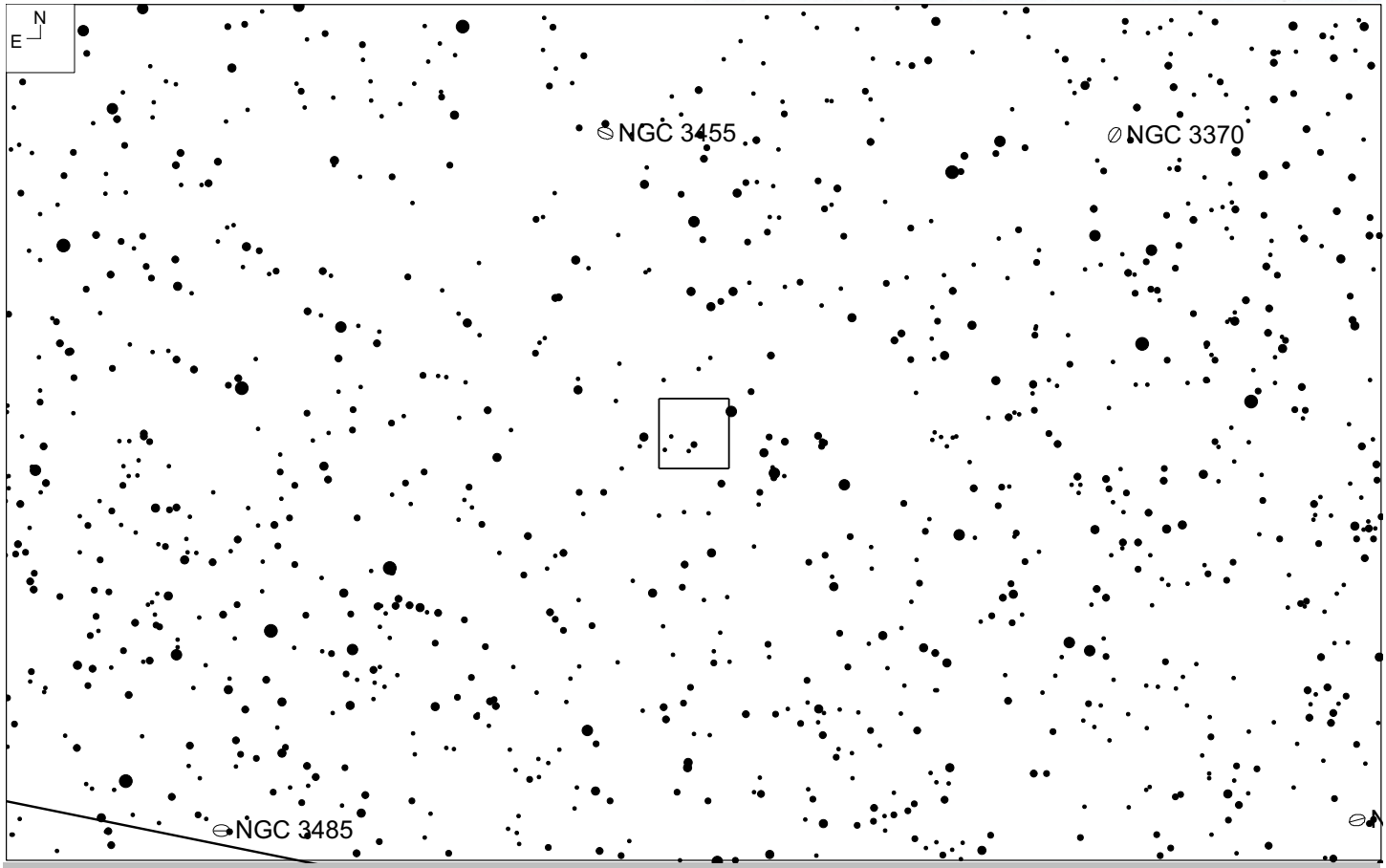


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
IC 602	10 18 19.7	+07 02 58	13.7	0.8 x 0.5’	S	U189	46

Arakelian 265 (Leo)

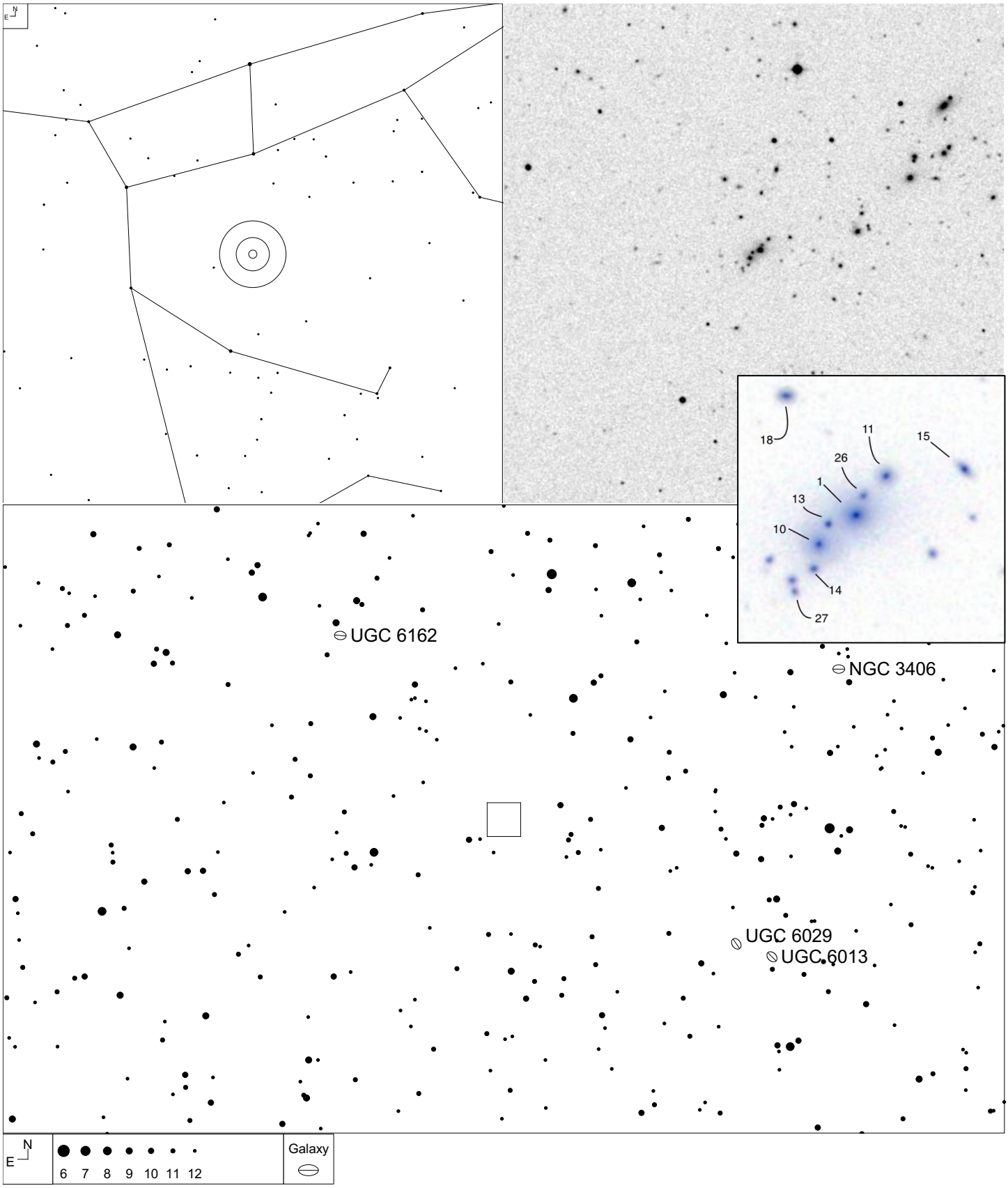






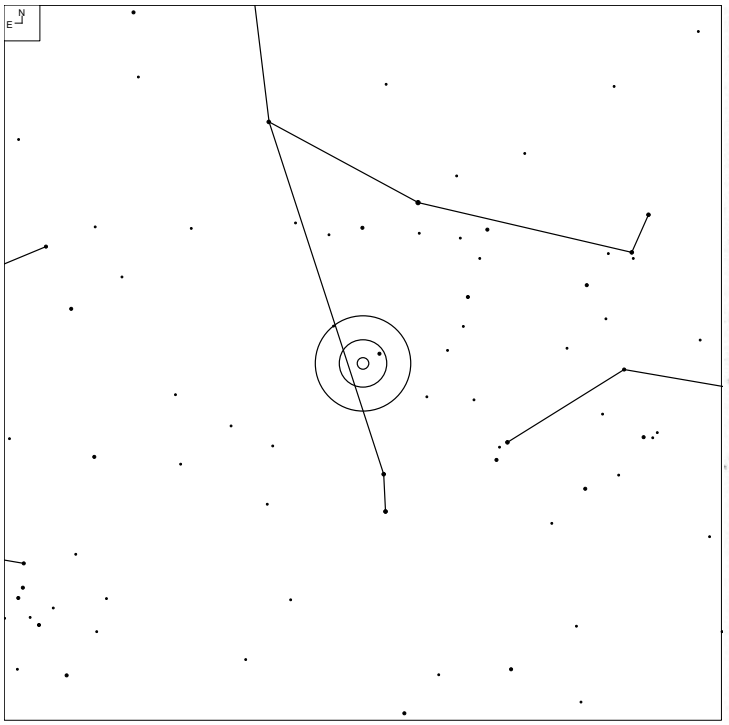
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
	10 53 13.1	+16 14 06	14.5	0.8 x 0.7’	--	92	46

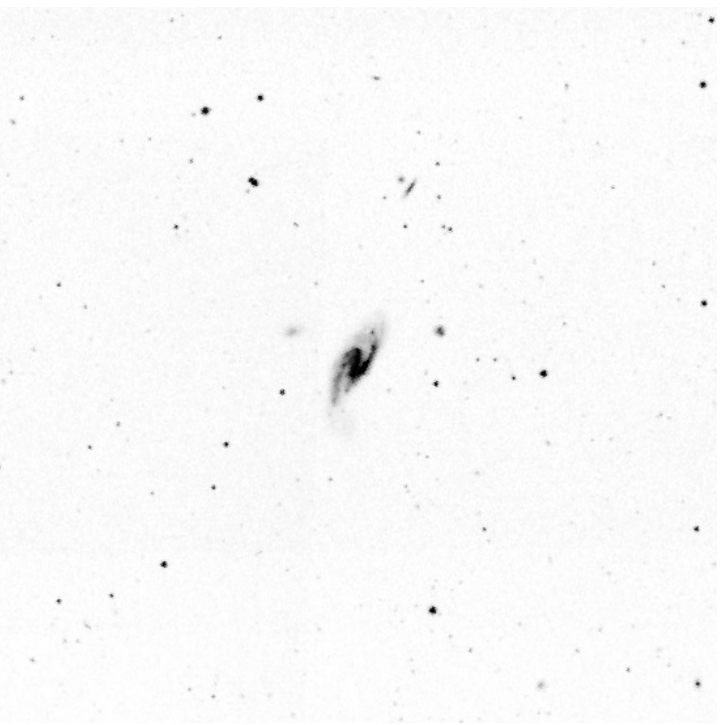
Shakhbazian 26 (Ursa Major)

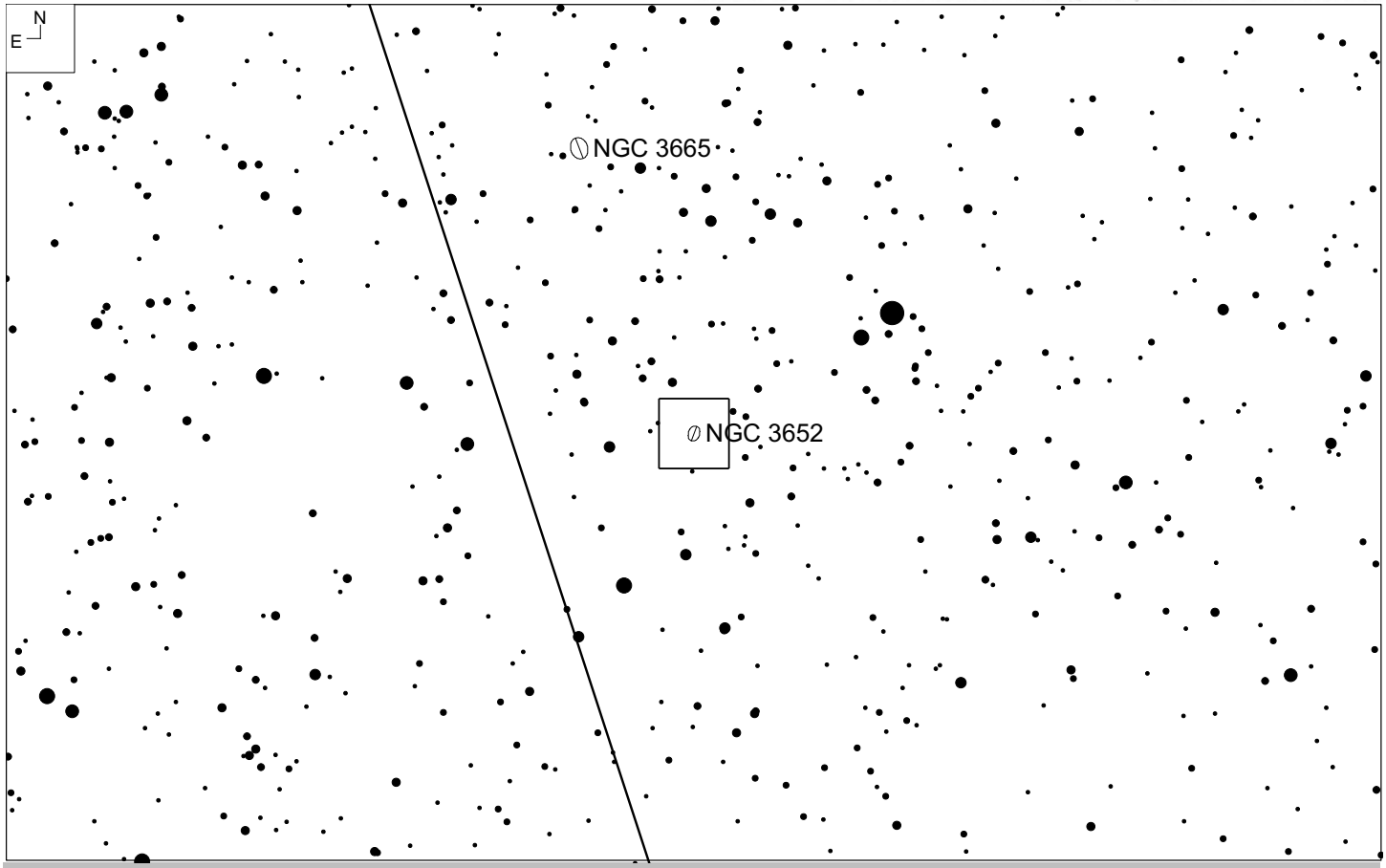


Object	RA	Dec	#	Mag	Size	Cmpt	Urano 2	iDSA
MCG+8-20-69A (AGC 1143)	11 02 12	+50 20 58	9[1]	17.2	1’	0.7	38	22

Arakelian 291 (Ursa Major)

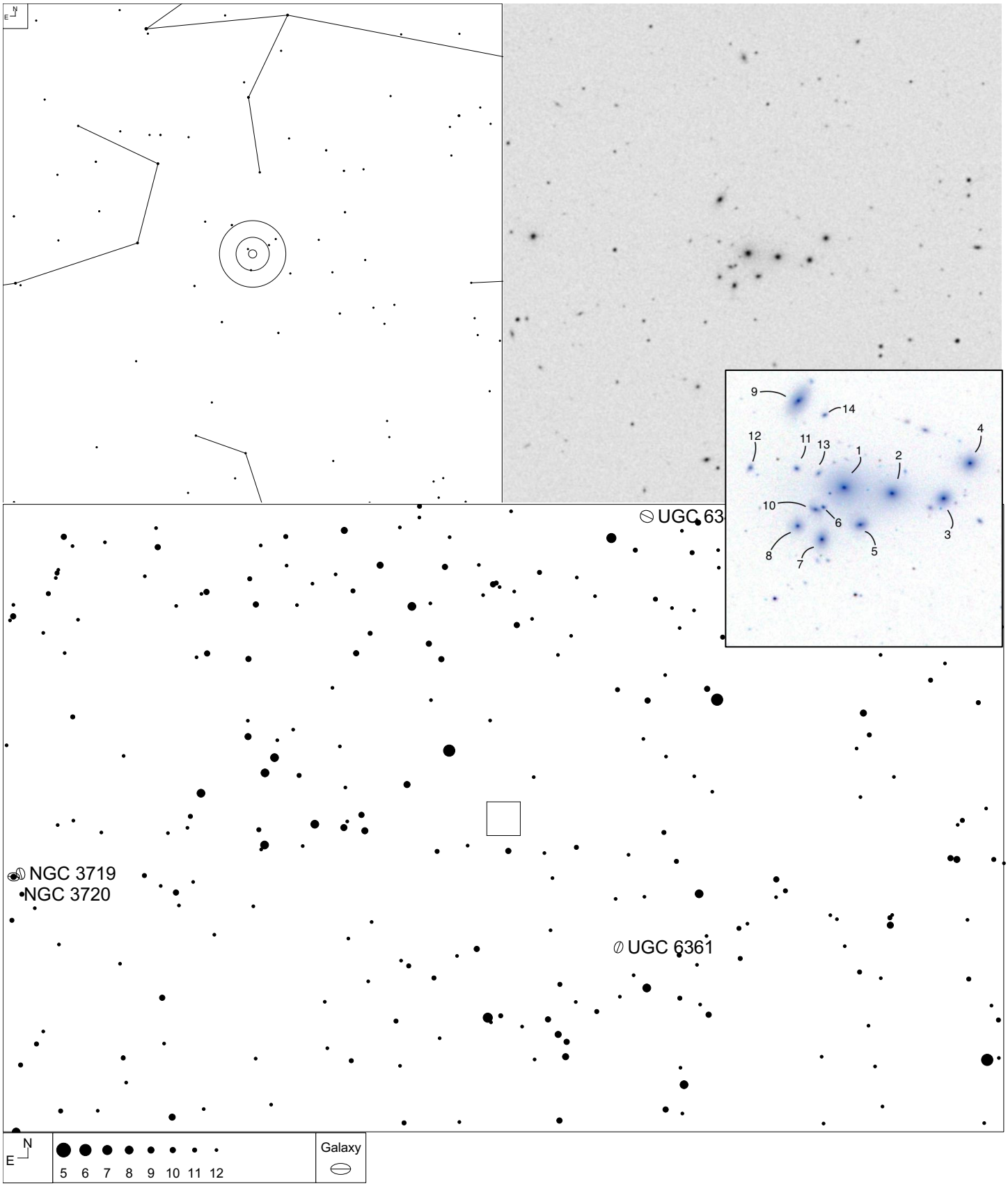






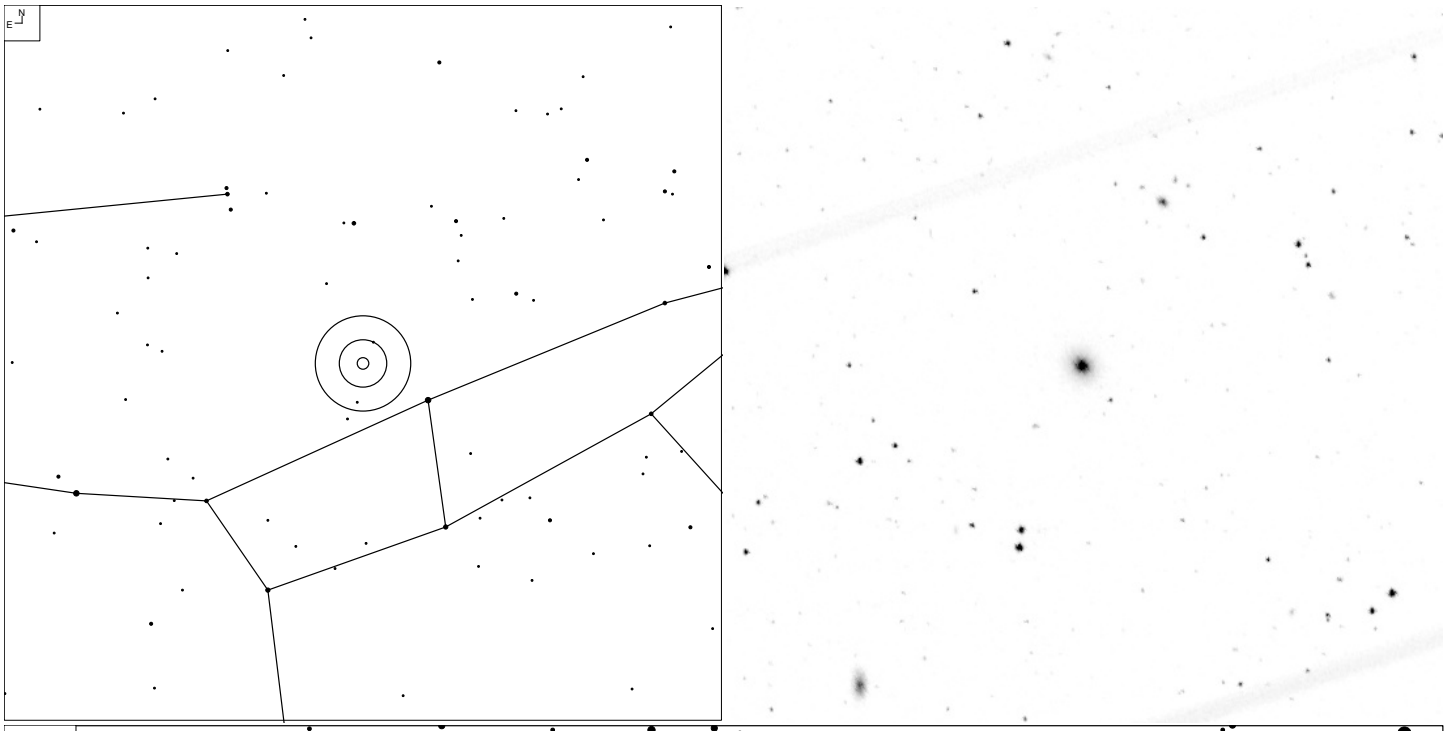
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 3652	11 22 39.0	+37 45 54	13.1	3.1 x 1.6’	Scd	54	22, 34

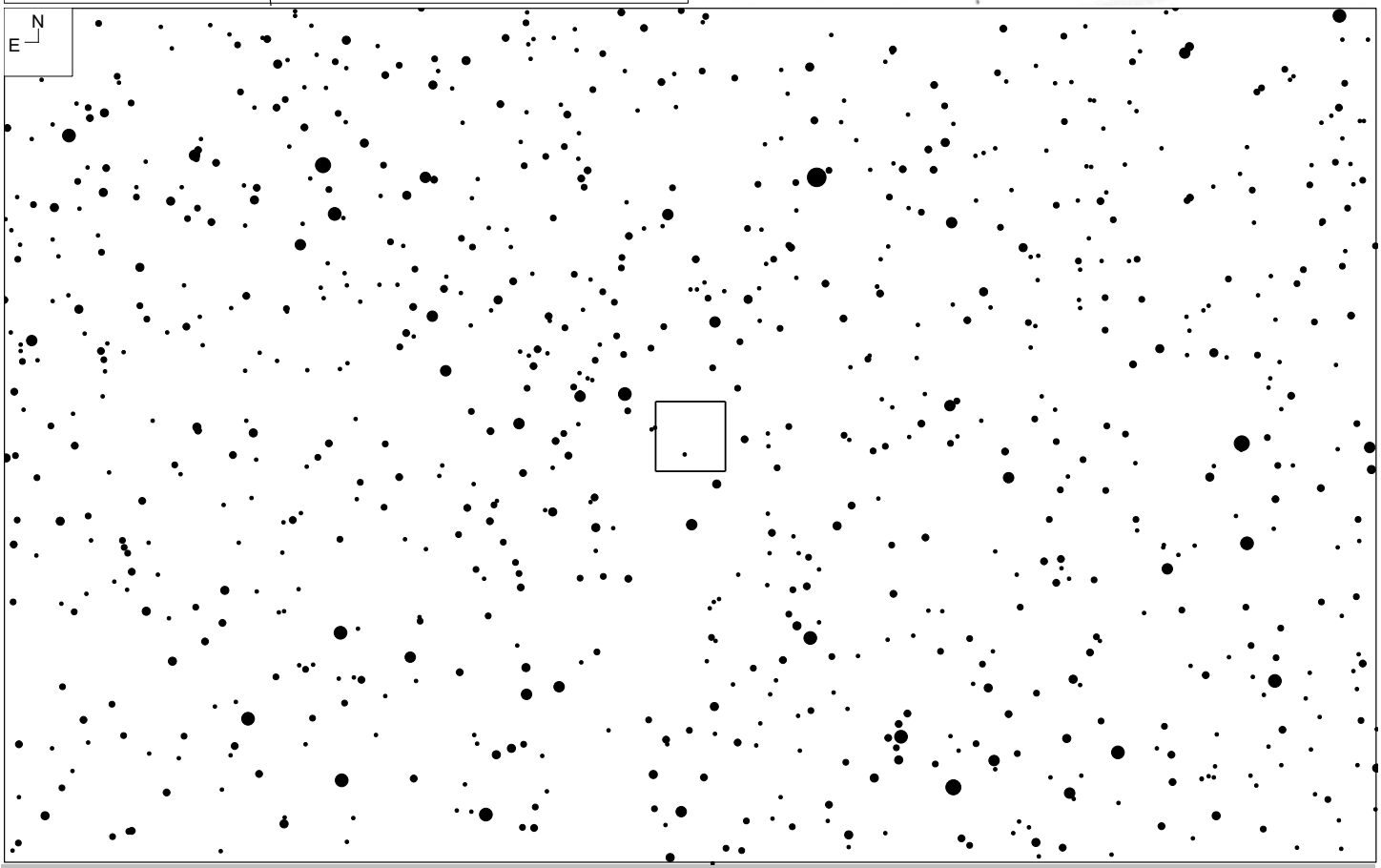
Shakhbazian 154 (Leo)



Object	RA	Dec	#	Mag	Size	Cmpt	Urano 2	iDSA
AGC 1238	11 22 54	+01 06 52	14	16.37*	2’	0.9	111	58

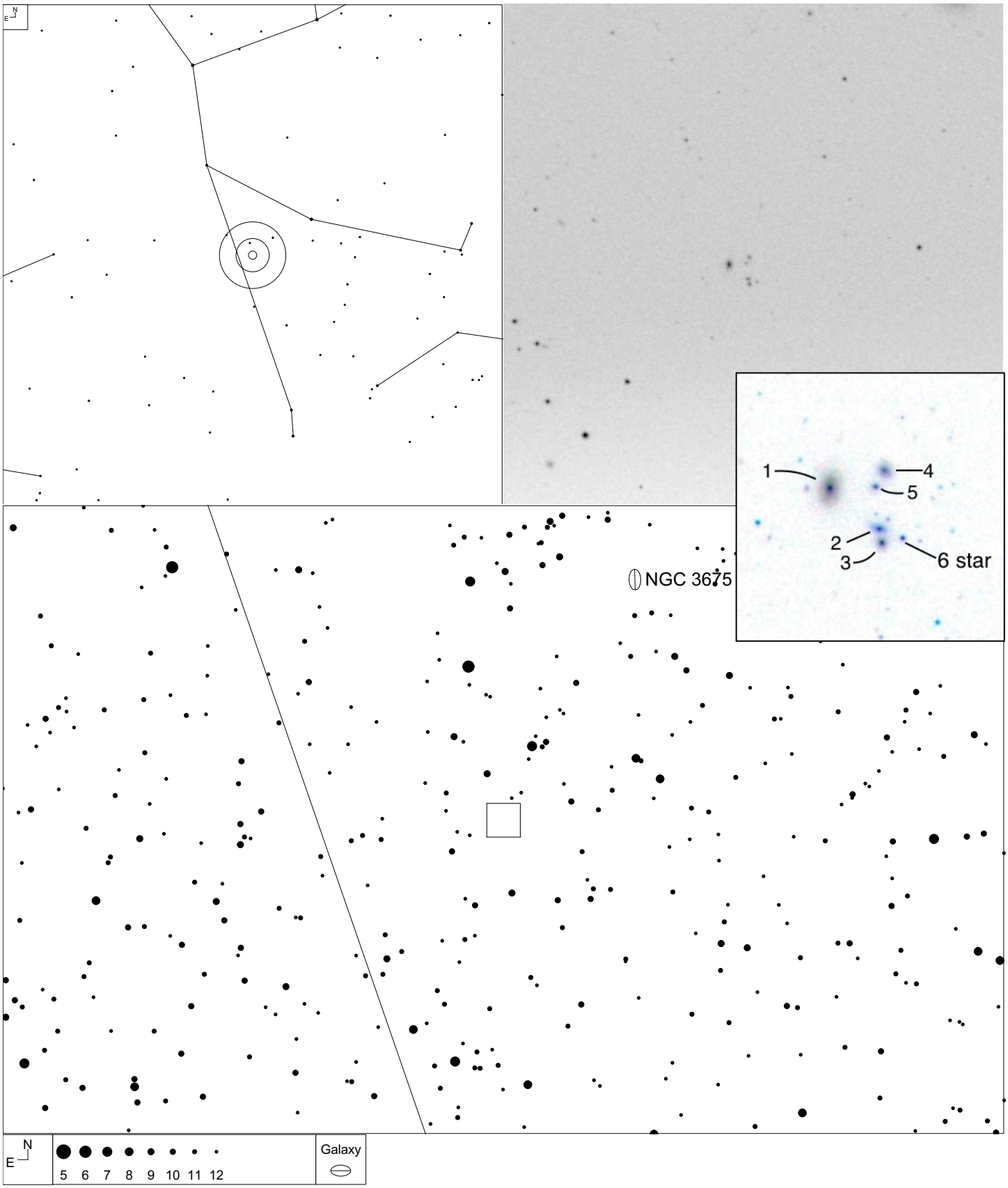
Arakelian 293 (Ursa Major)





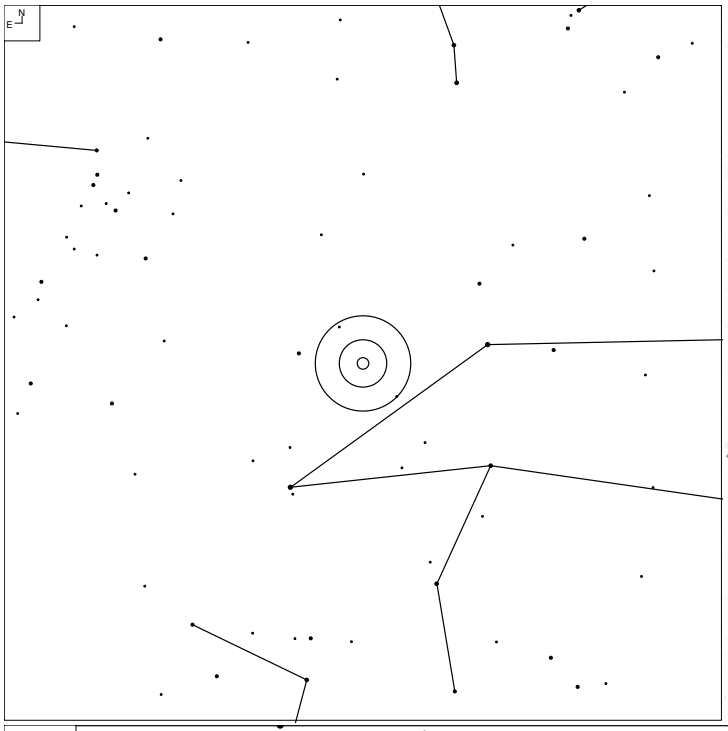
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
	11 26 56.6	+63 25 31	14.3	0.5 x 0.4’	E	13	12

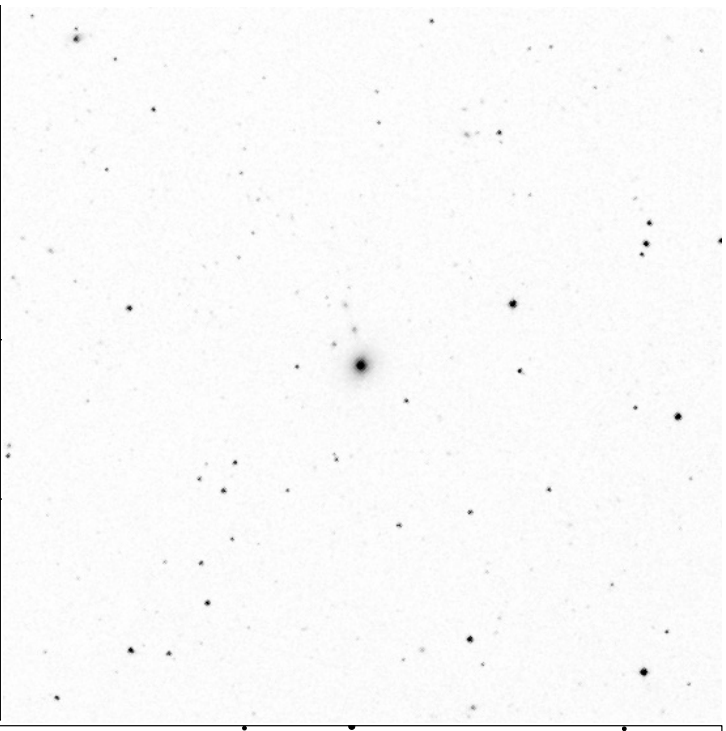
Shakhbazian 63 (Ursa Major)

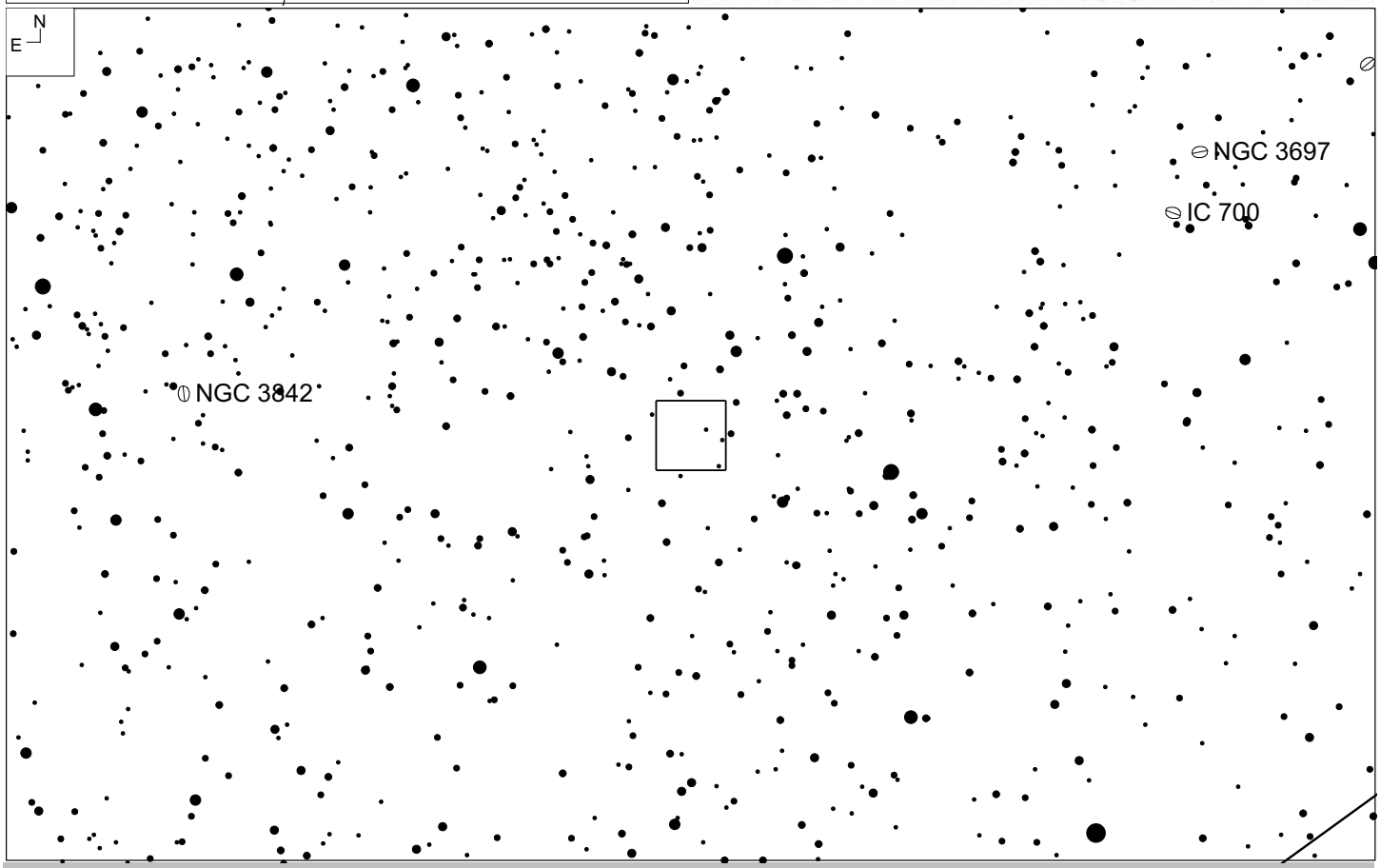


Object	RA	Dec	#	Mag	Size	Cmpt	Urano 2	iDSA
	11 29 36	+42 26 25	6	16.0	0.9’	0.7	38	22

Arakelian 302 (Leo)

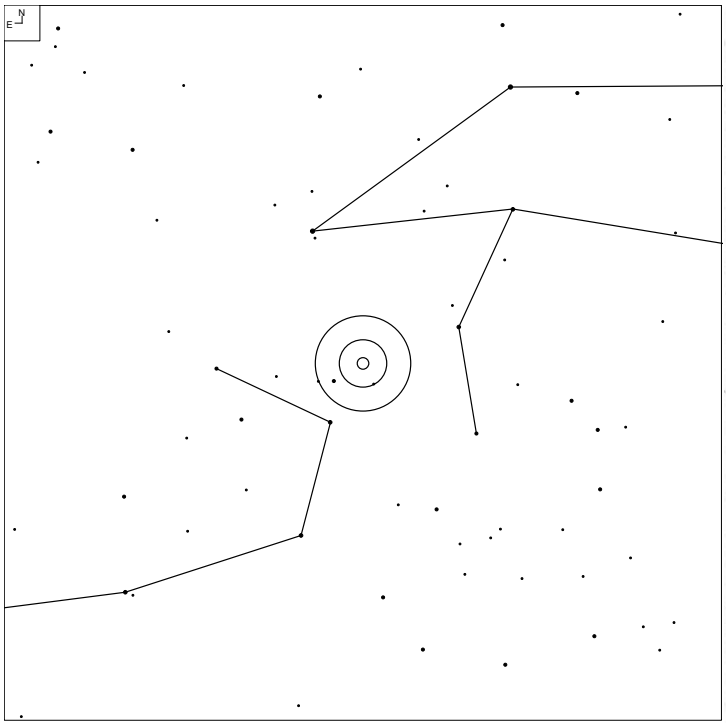


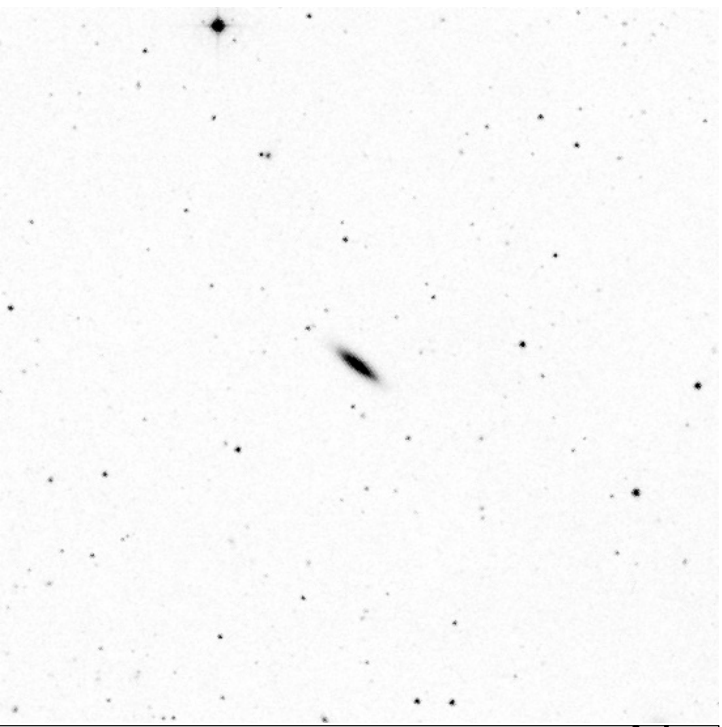


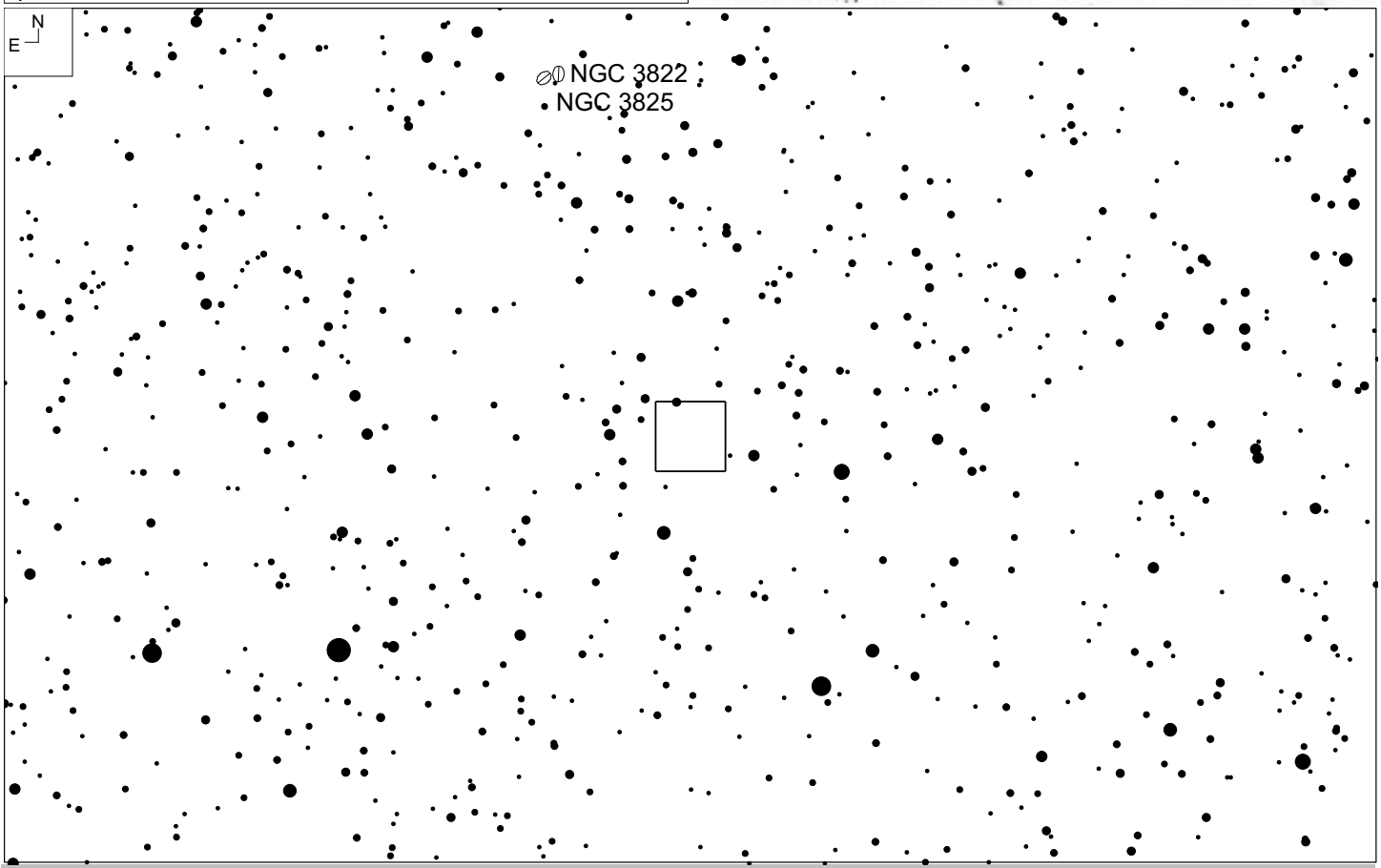


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
	11 36 28.4	+19 48 41	14.6	0.5 x 0.5’	E/SAO	72	46

Arakelian 308 (Virgo)

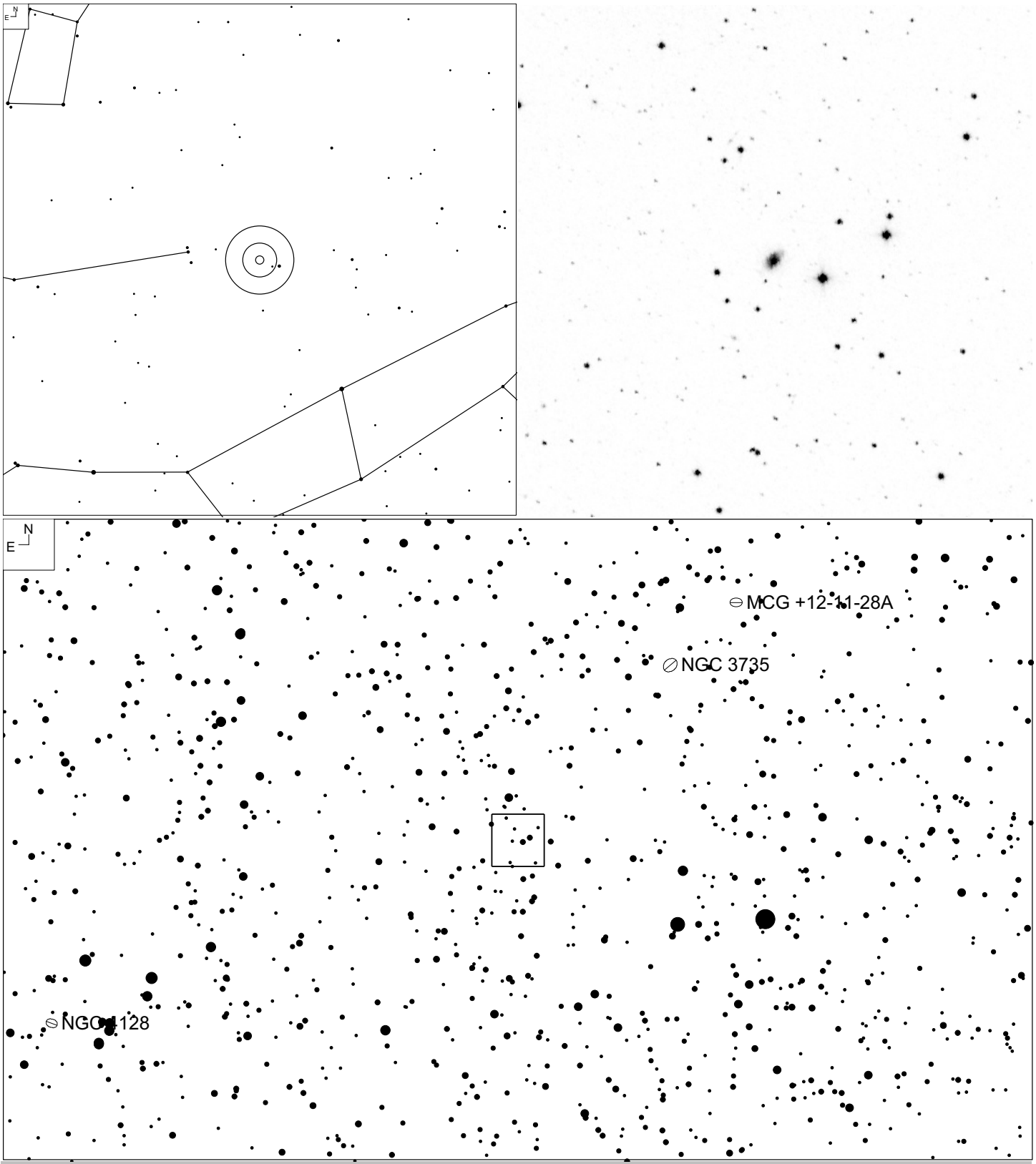






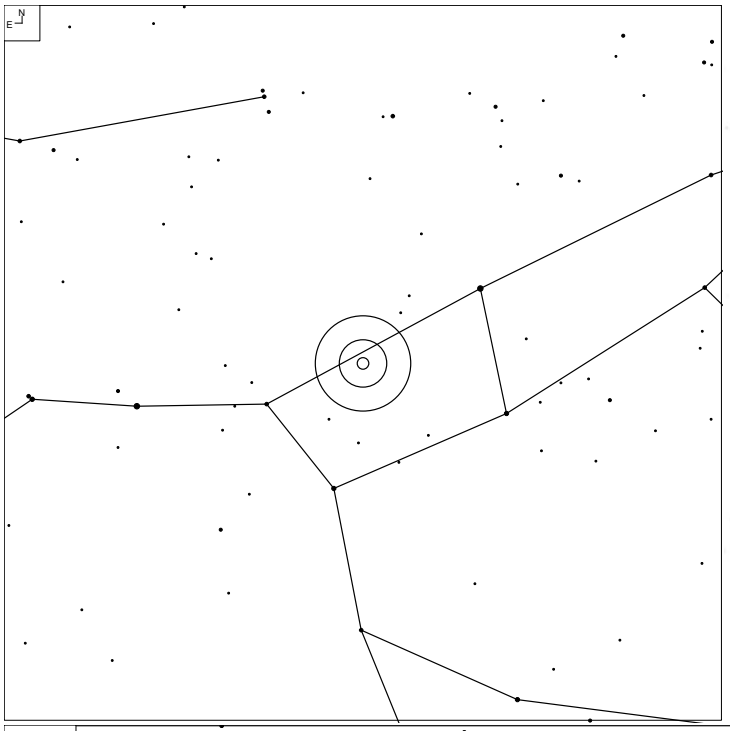
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
IC 719	11 40 18.5	+09 00 36	13.6	1.2 x 0.3’	SO	91	58

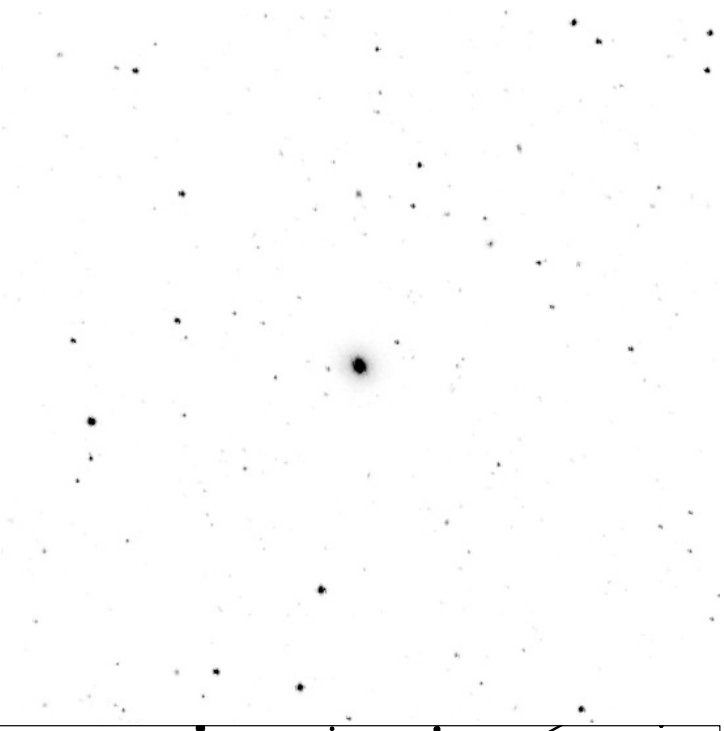
Arakelian 317 (Draco)

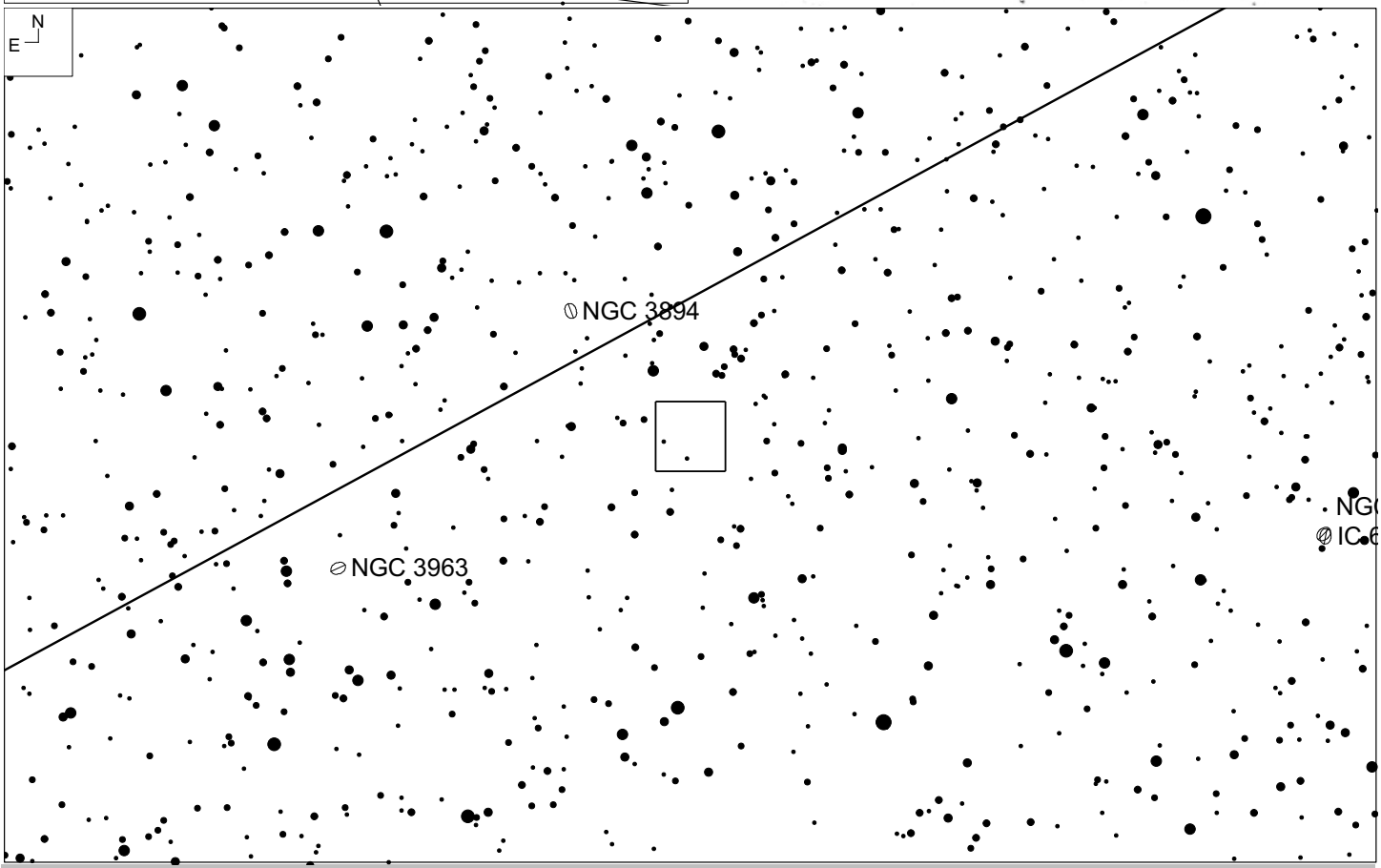


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 6711	11 44 29. 7	+69 43 47	14.2	0.7 x 0.4’	S	13	12

Arakelian 320 (Ursa Major)

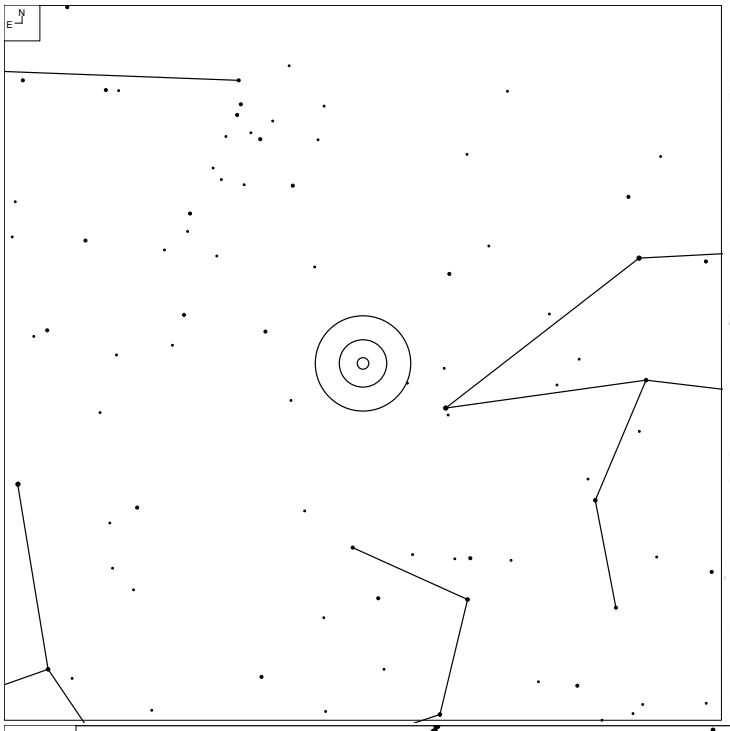


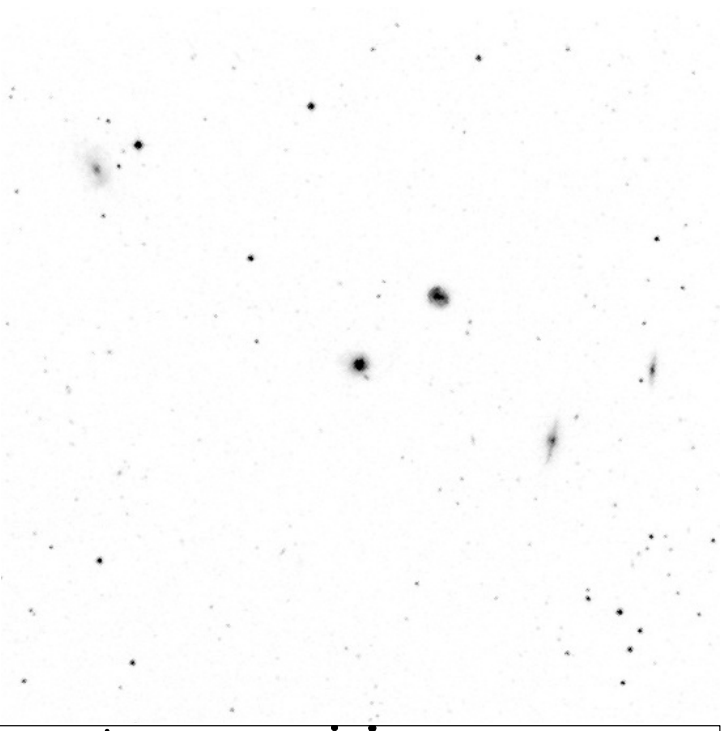


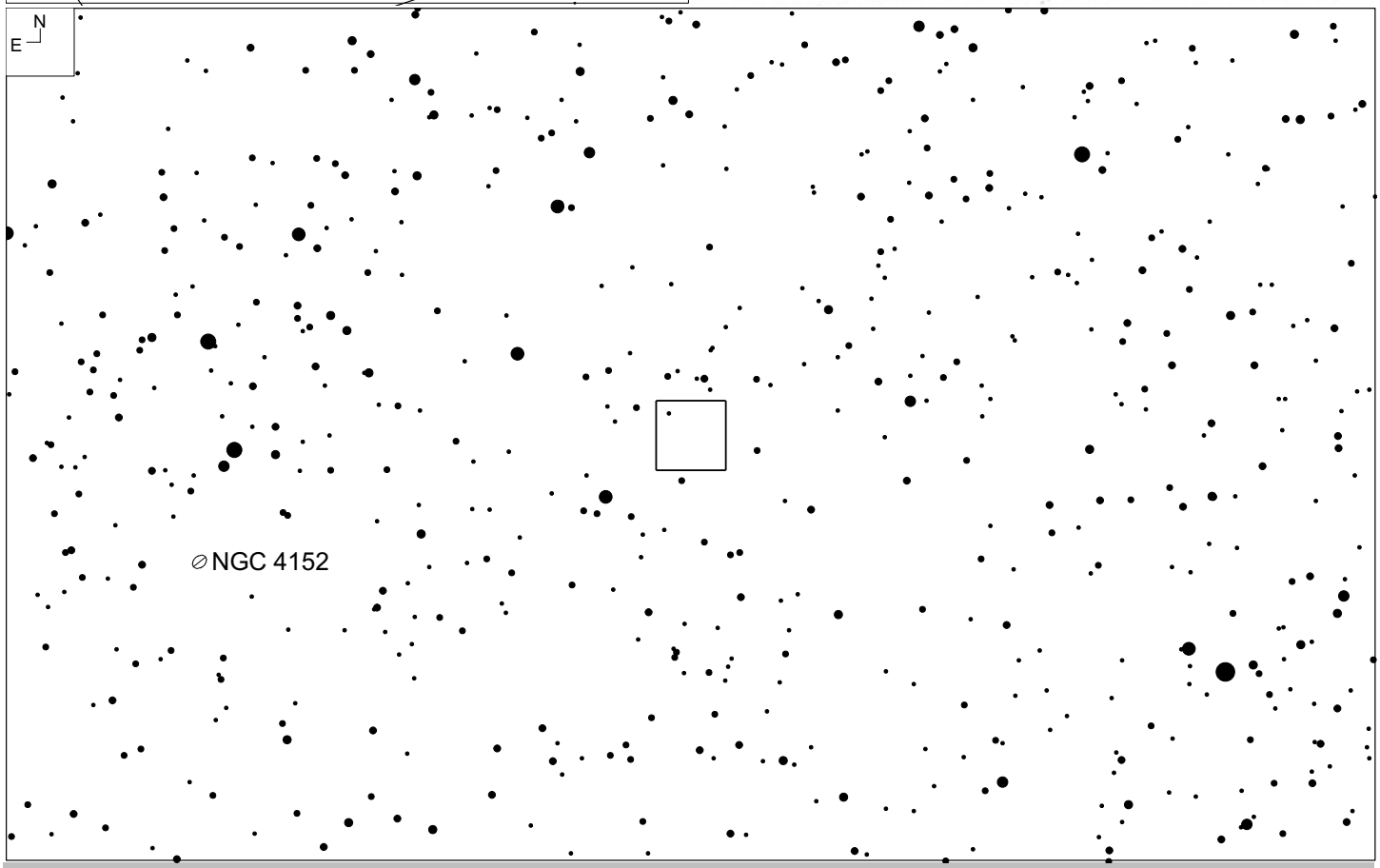


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 6732	11 45 33.1	+58 58 41	13.4	1.0 x 0.8’	SO	24	12

Arakelian 345 (Coma Berenices)

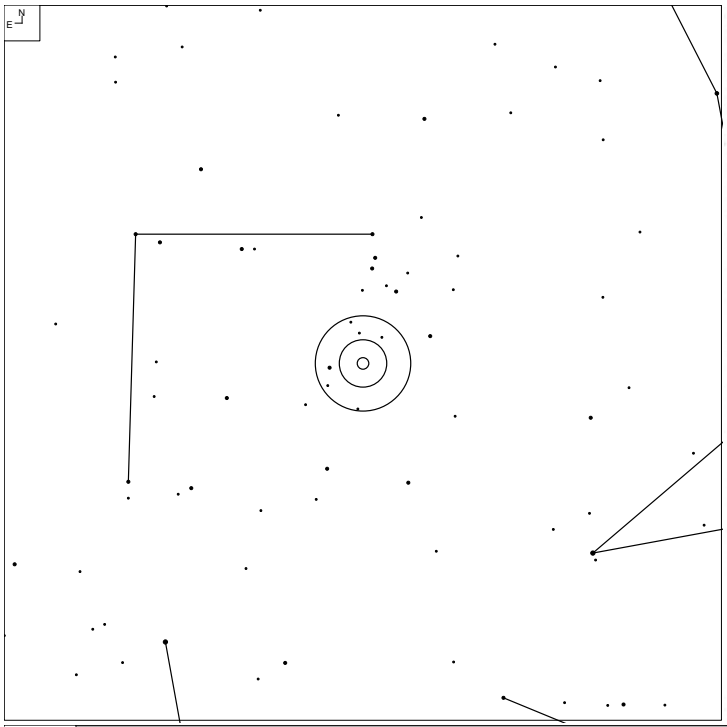


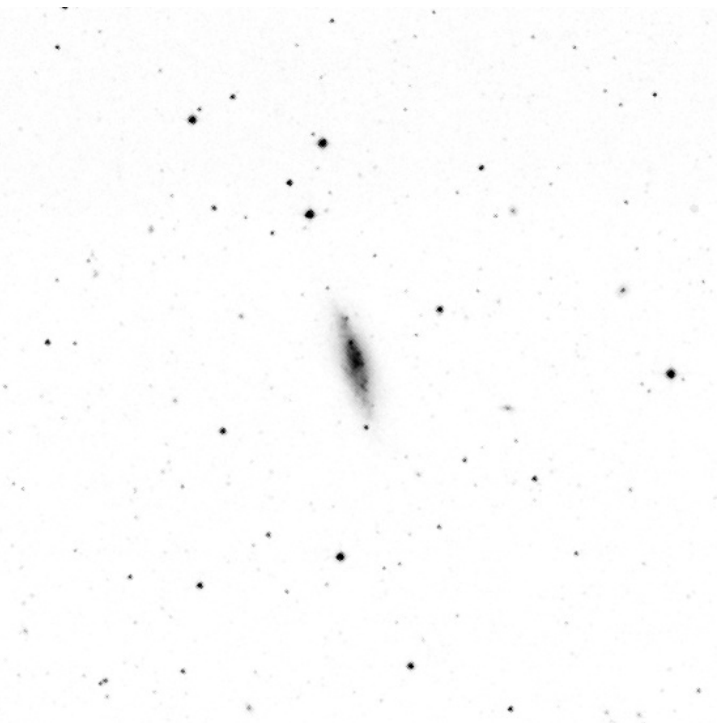


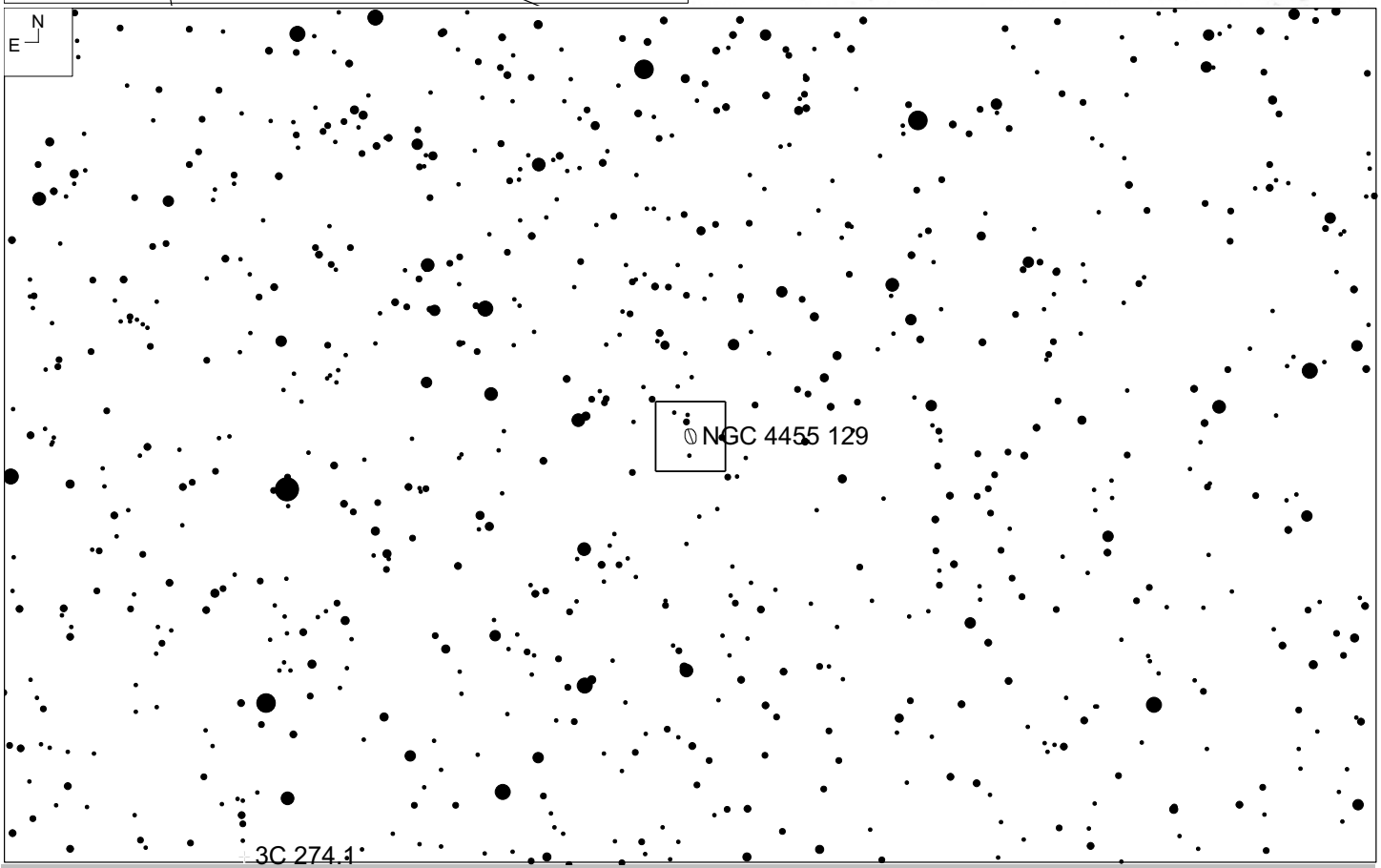


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 7032	12 03 27.3	+16 29 09	14.4	0.6 x 0.5’	S	91	45

Kazarian 390 (Coma Berenices)

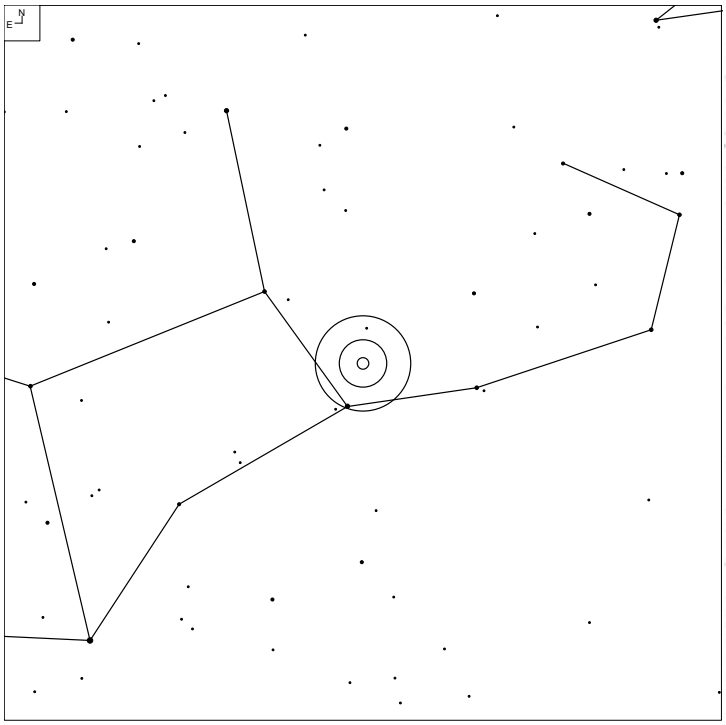


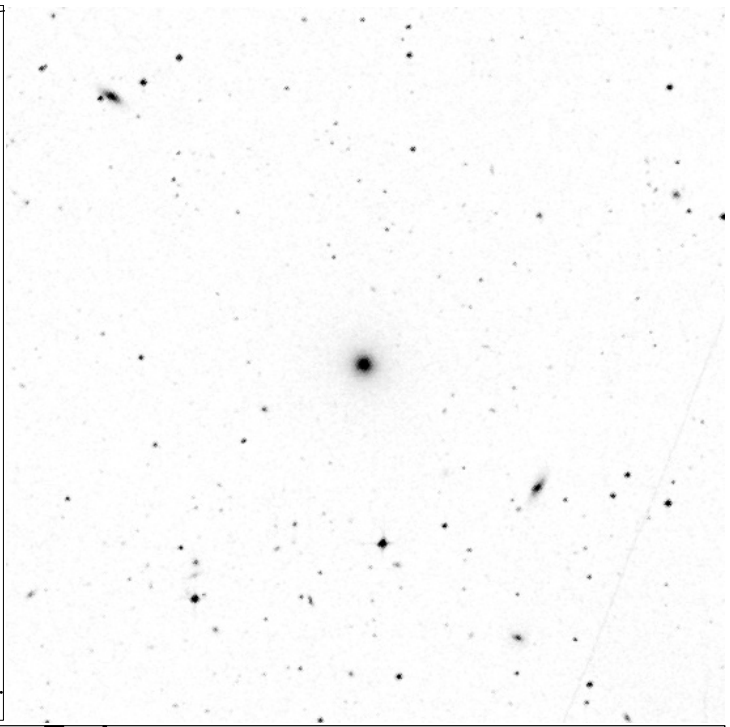


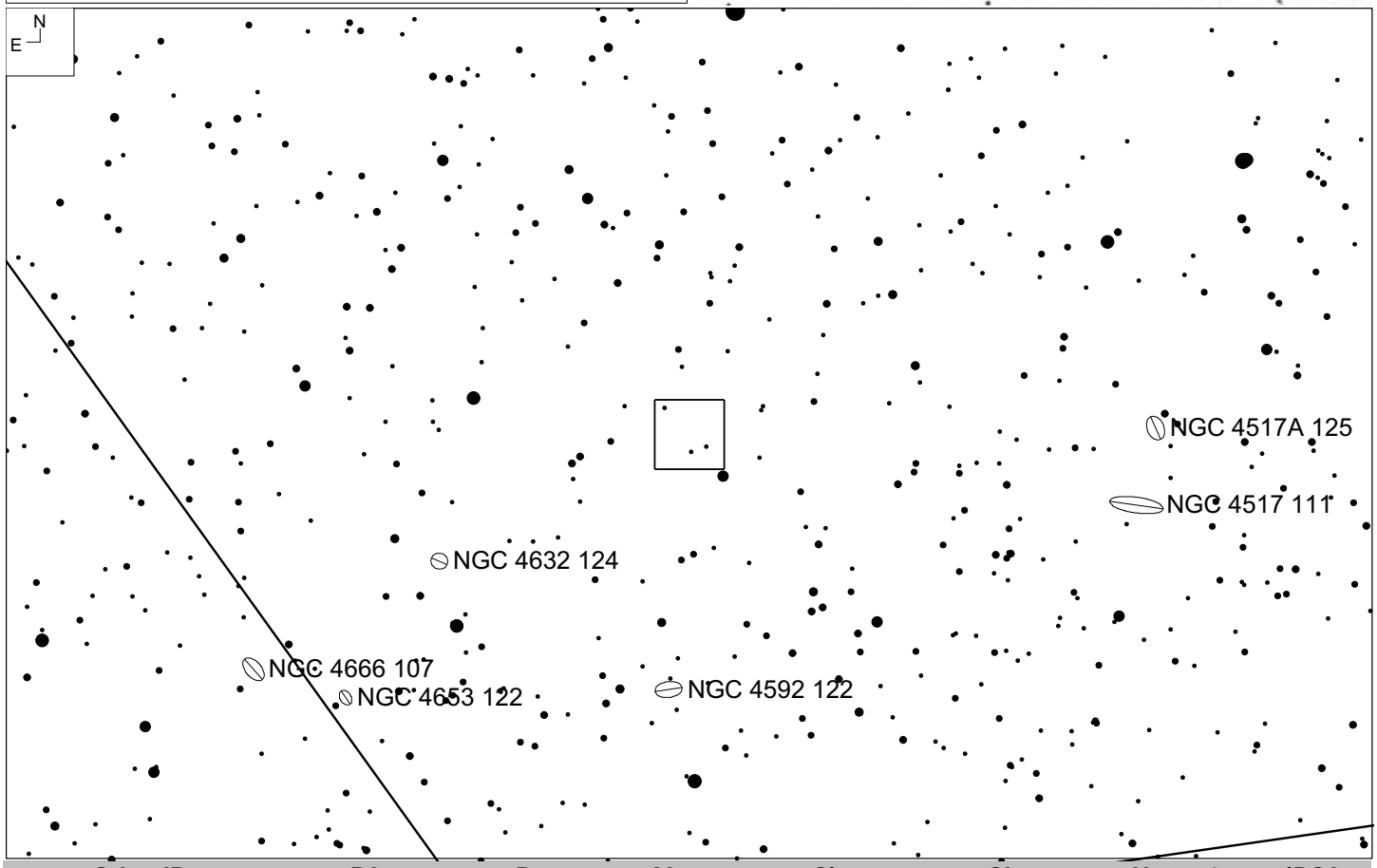


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 4455	12 28 44.1	+22 49 14	12.9	2.7 x 0.7’	SB(s)d	72	33

Arakelian 383 (Virgo)

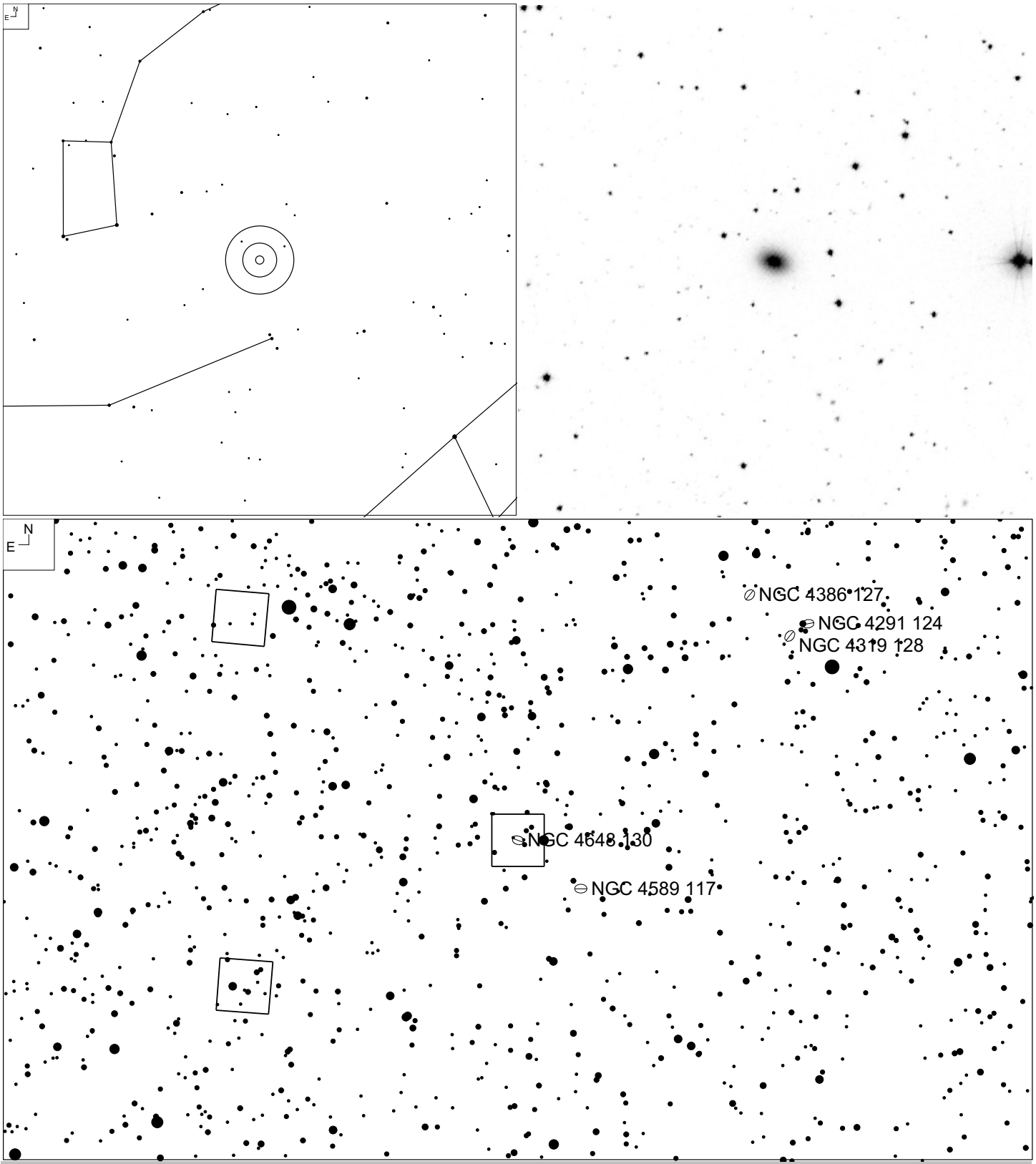






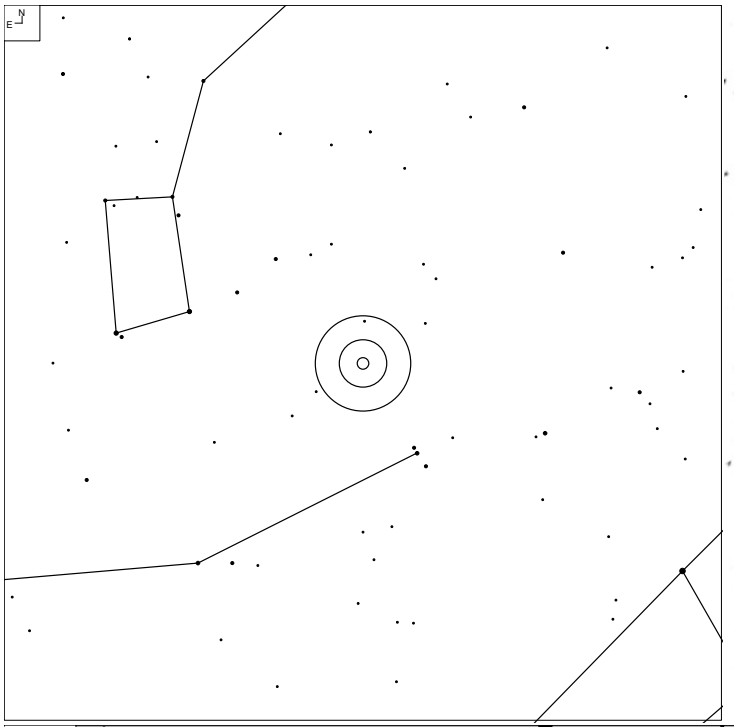
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 7813	12 39 01.1	+00 21 56	14.1	0.5 x 0.5’	E	110	57

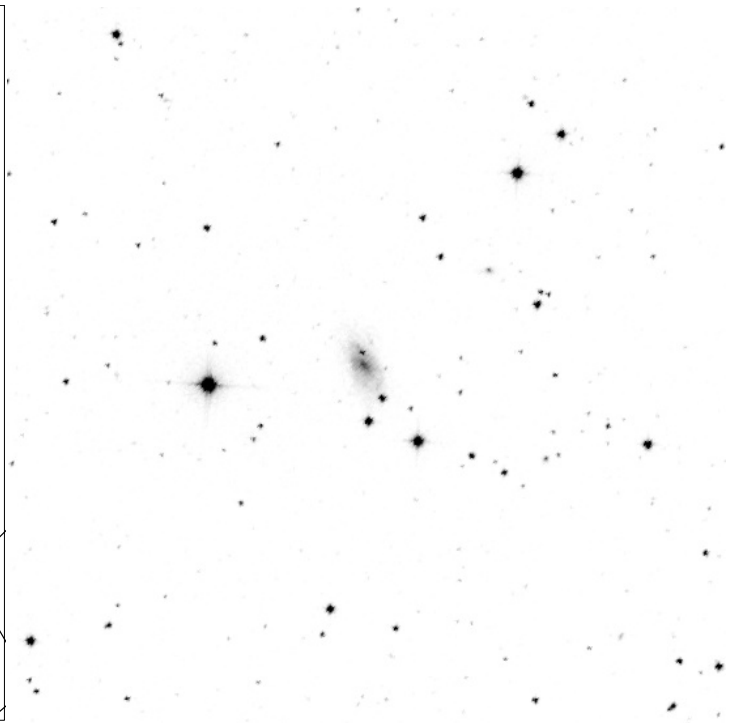
Kazarian 31 (Draco)

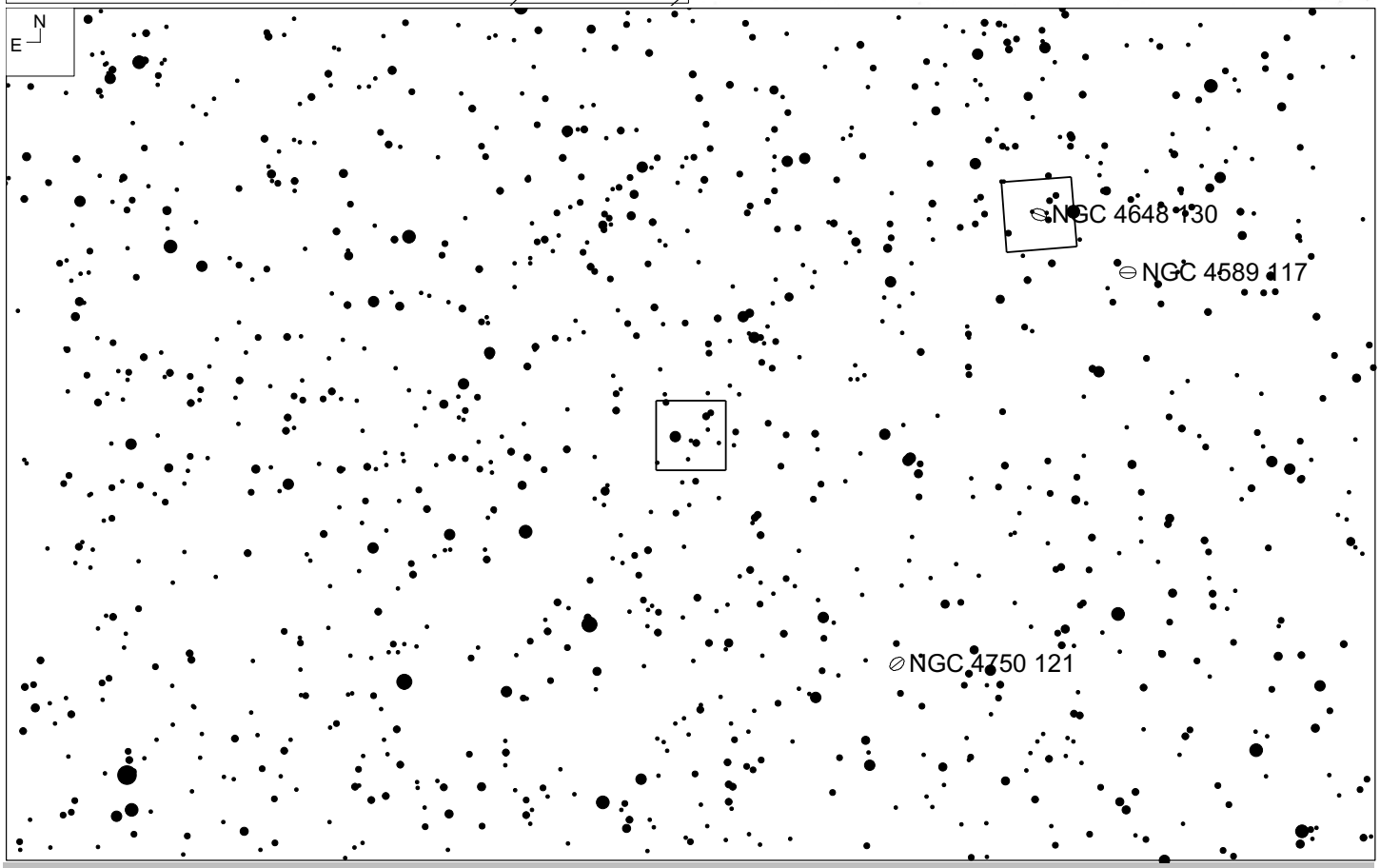


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 4648	12 41 44.4	+74 25 15	13.0	2.1 x 1.5’	E3	5	4

Kazarian 247 (Draco)

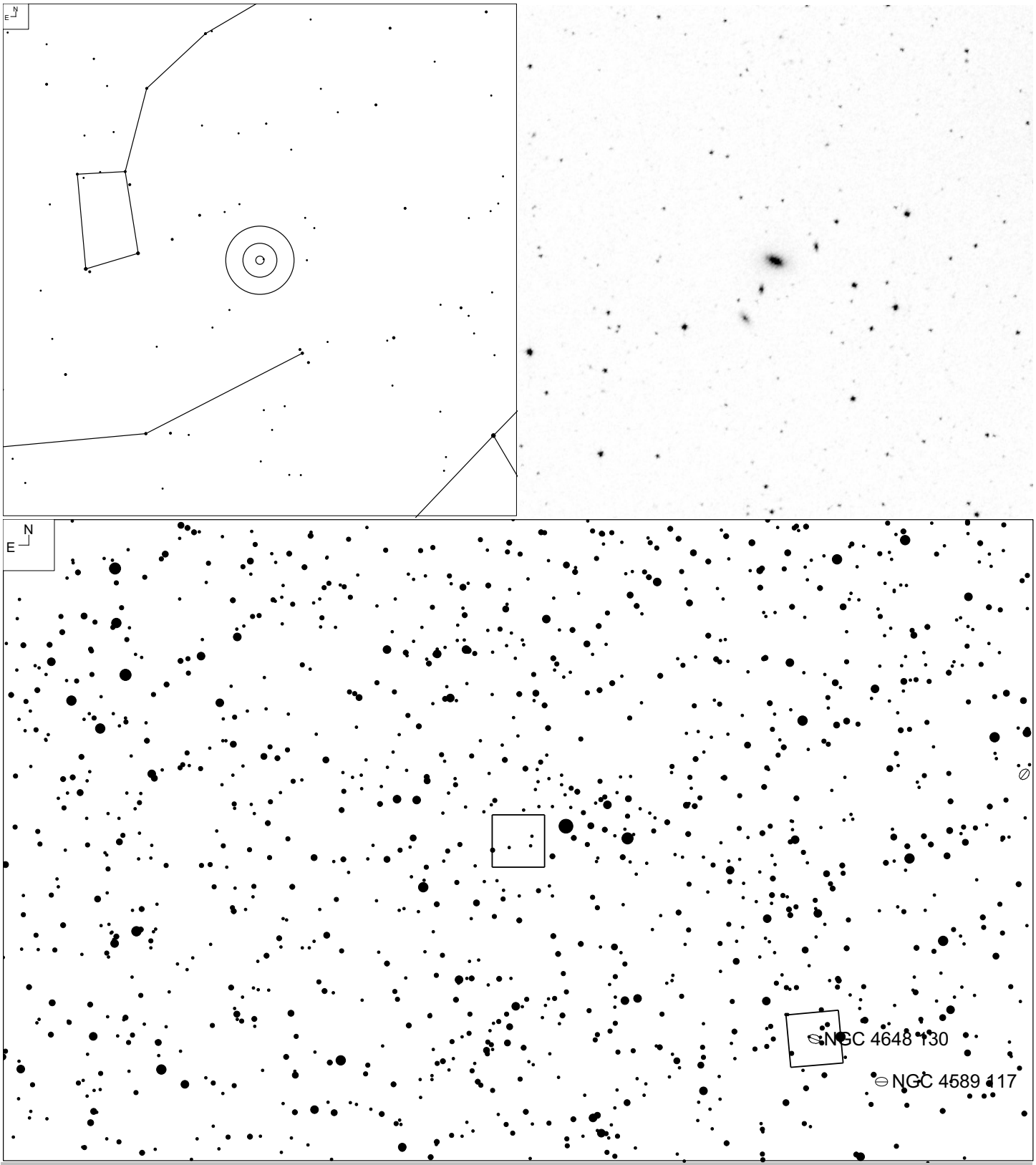






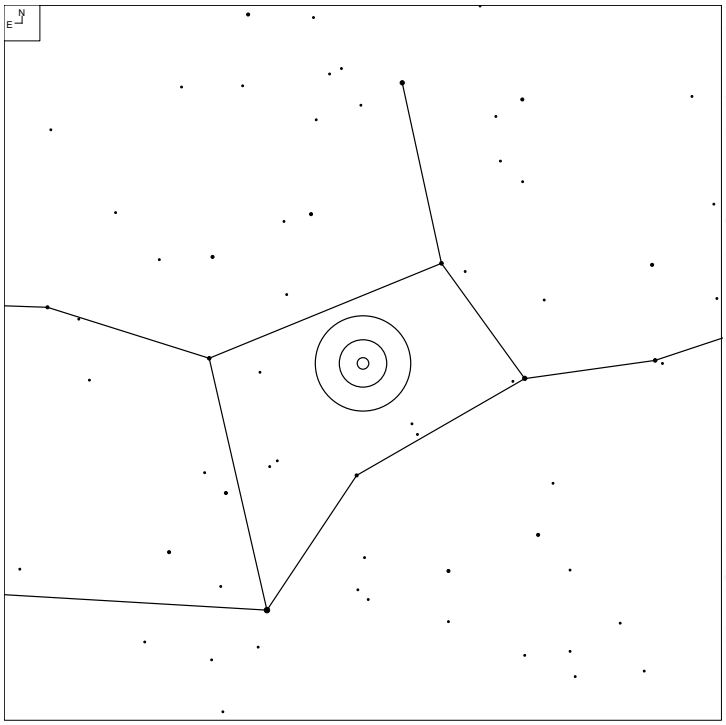
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 8120	12 59 56.2	+73 41 33	14.4	1.8 x 0.8’	Sd	13	4

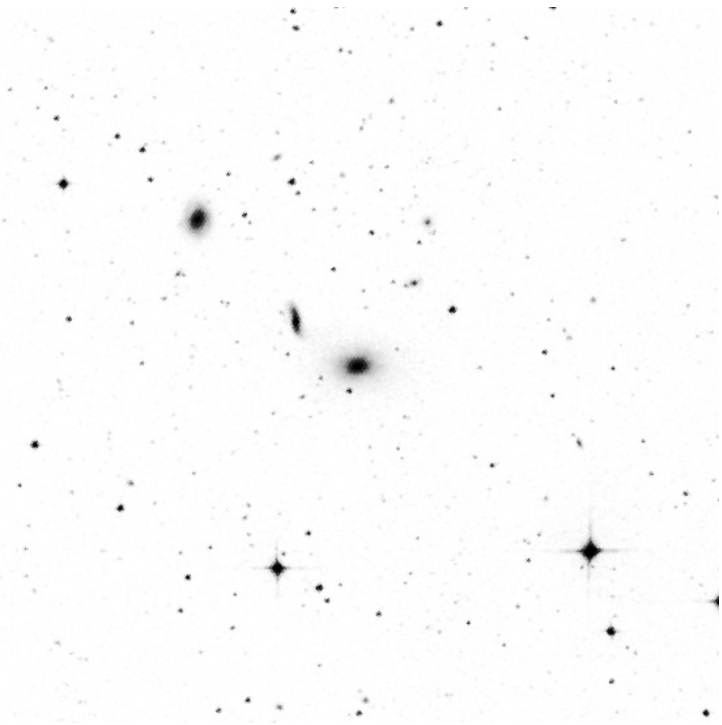
Kazarian 248 (Draco)

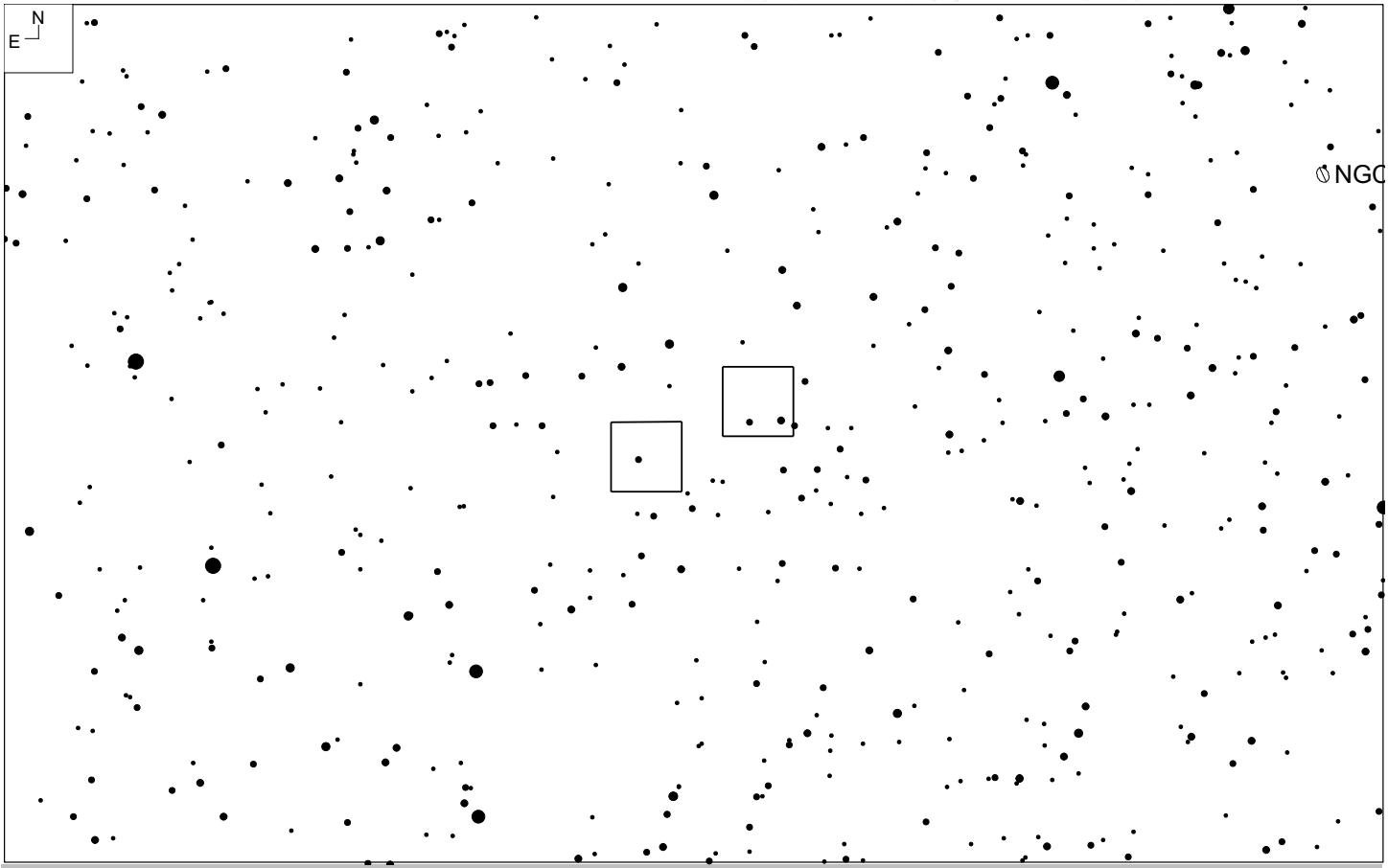


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 4954	13 02 19.9	+75 24 15	14.2	0.8 x 0.6’	SO	5	4

Arakelian 402 (Virgo)

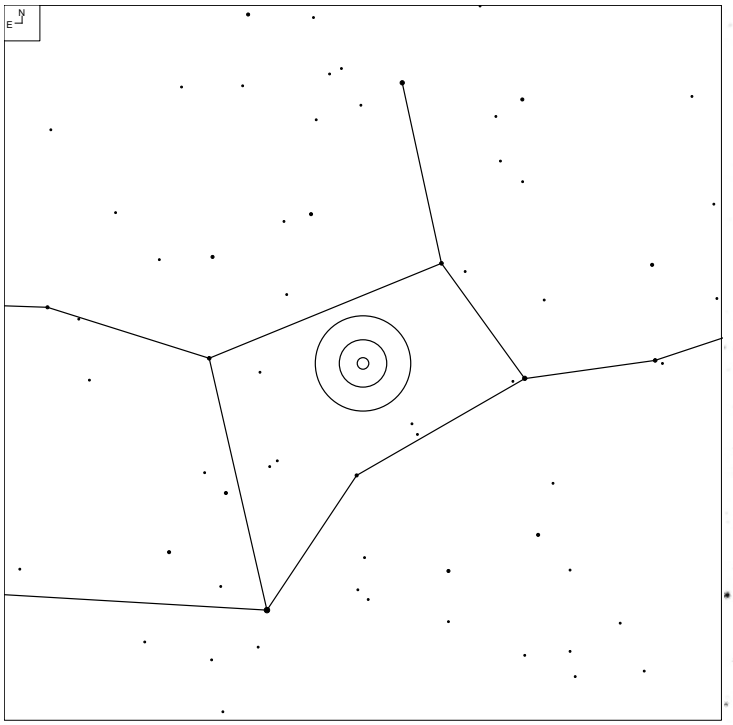


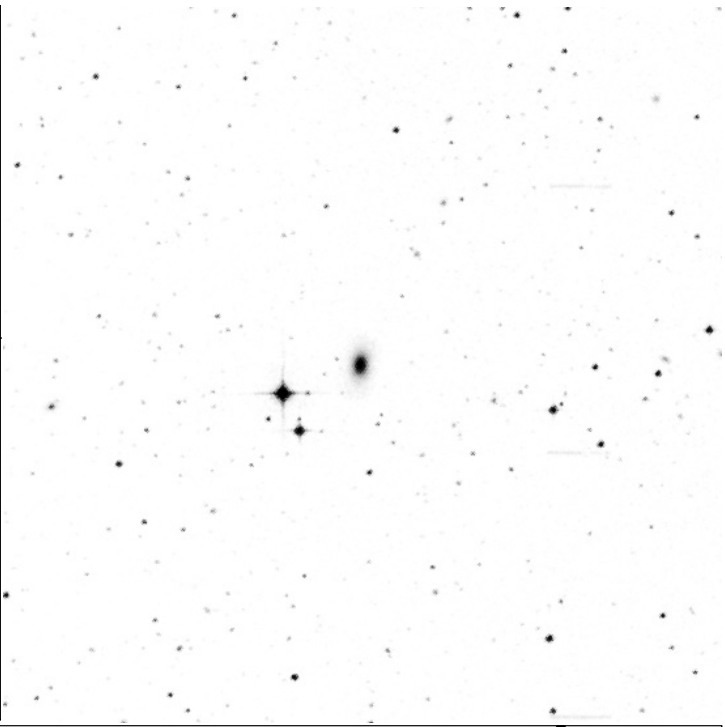


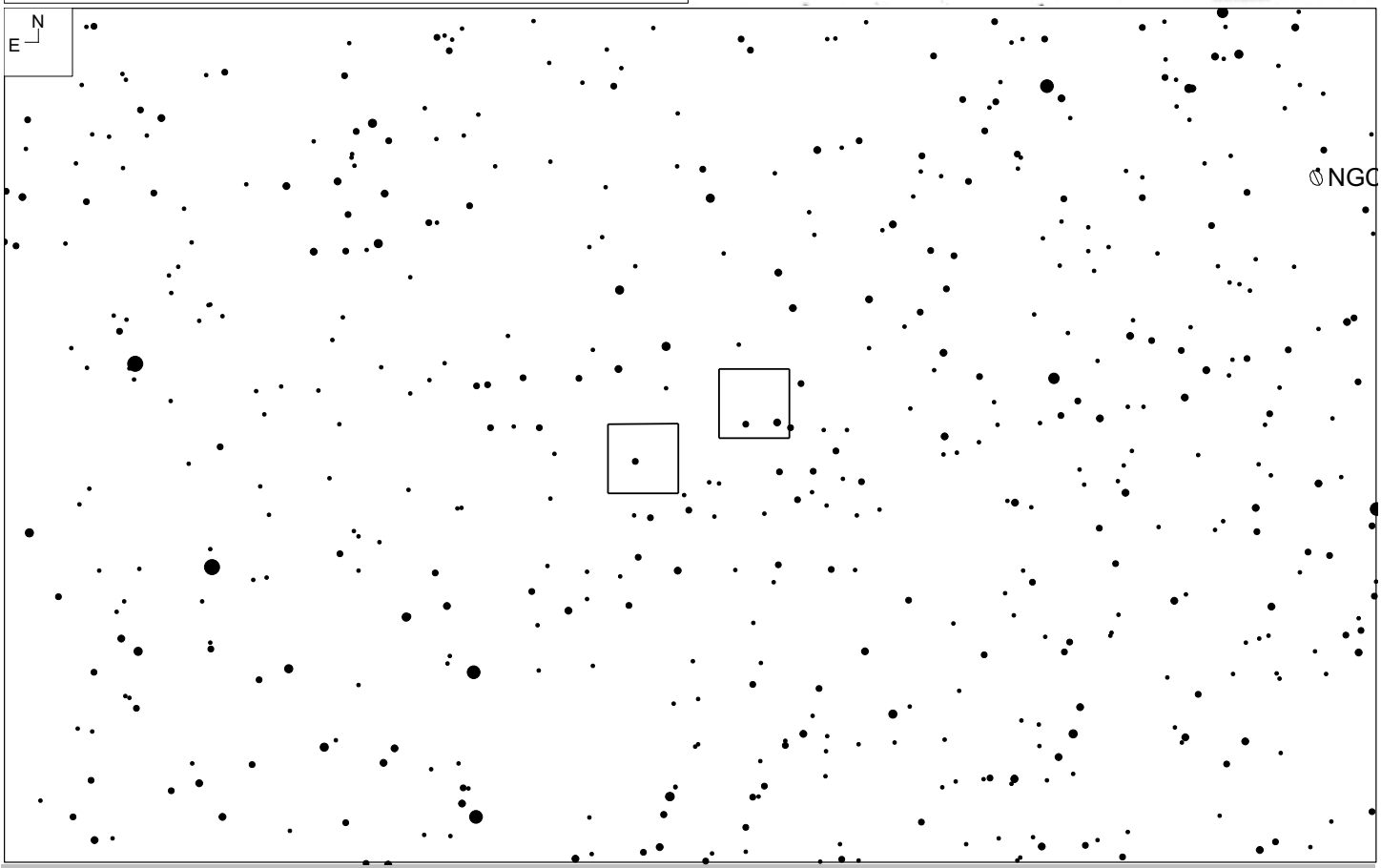


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
	13 08 50.1	–00 49 02	14.1	1.0 x 0.4’	SO	110	57

Arakelian 404 (Virgo)

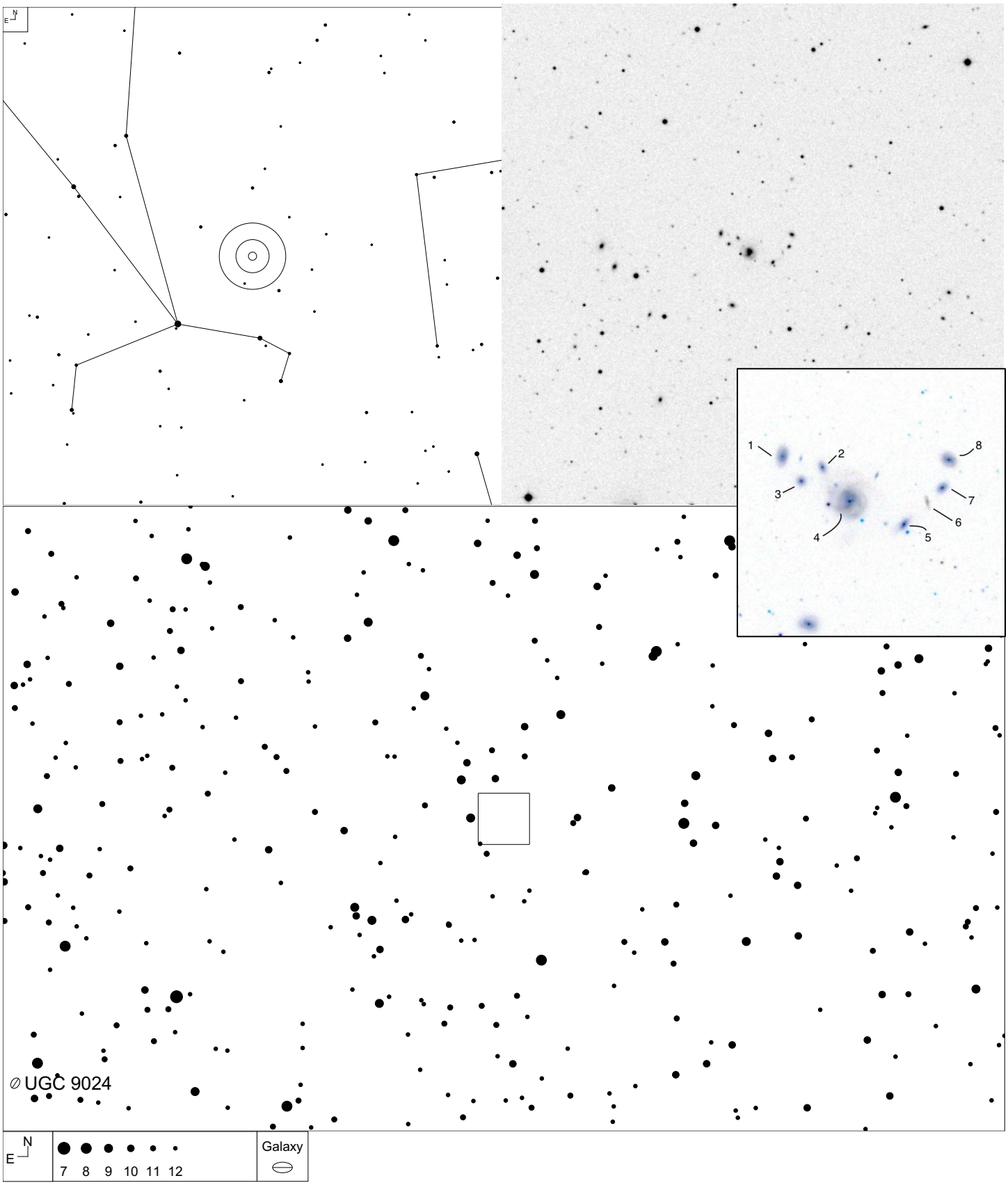






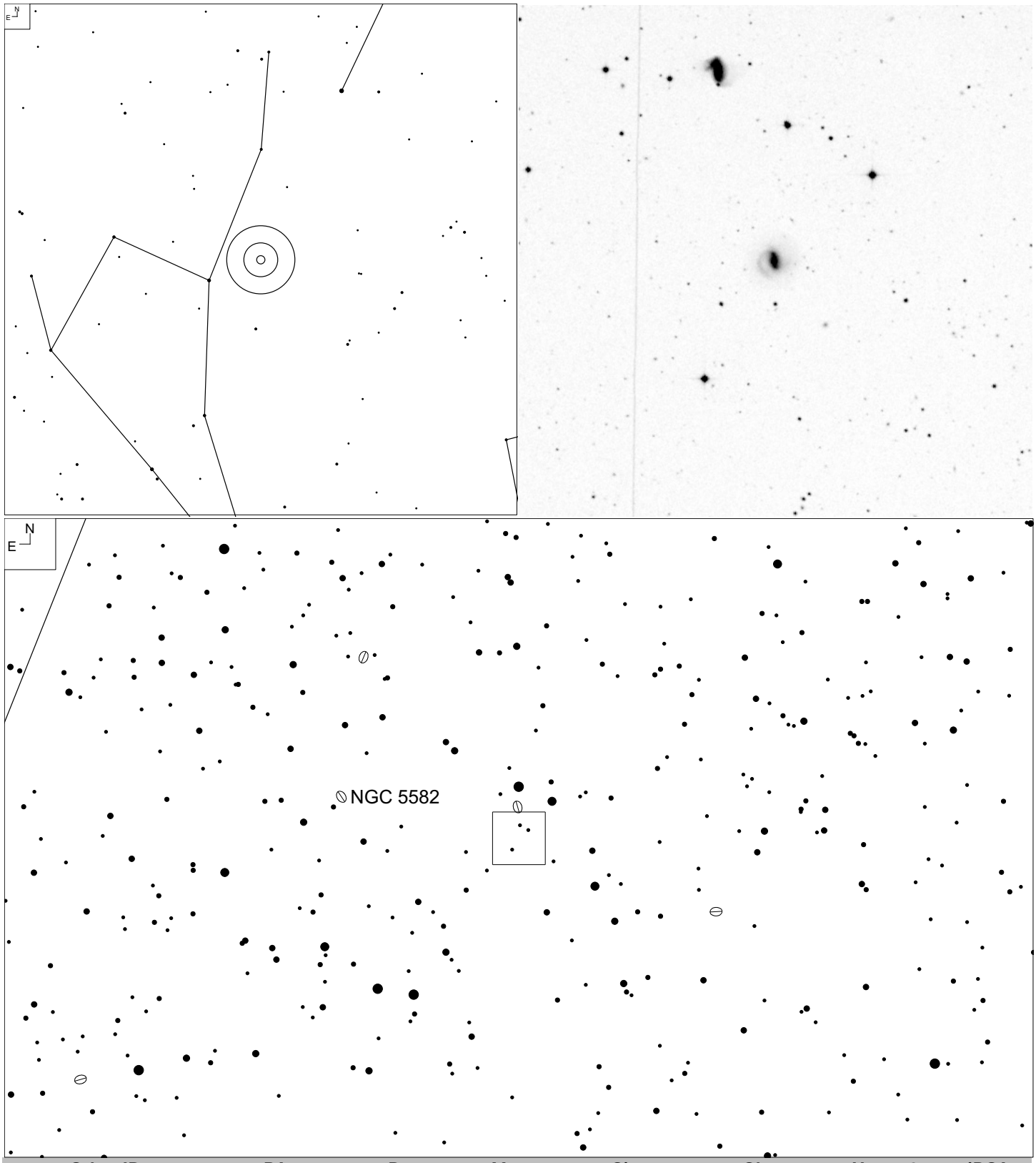
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
	13 10 23.8	–01 00 38	14.4	0.5 x 0.4’	SO	110	57

Shakhbazian 376 (Boötes)



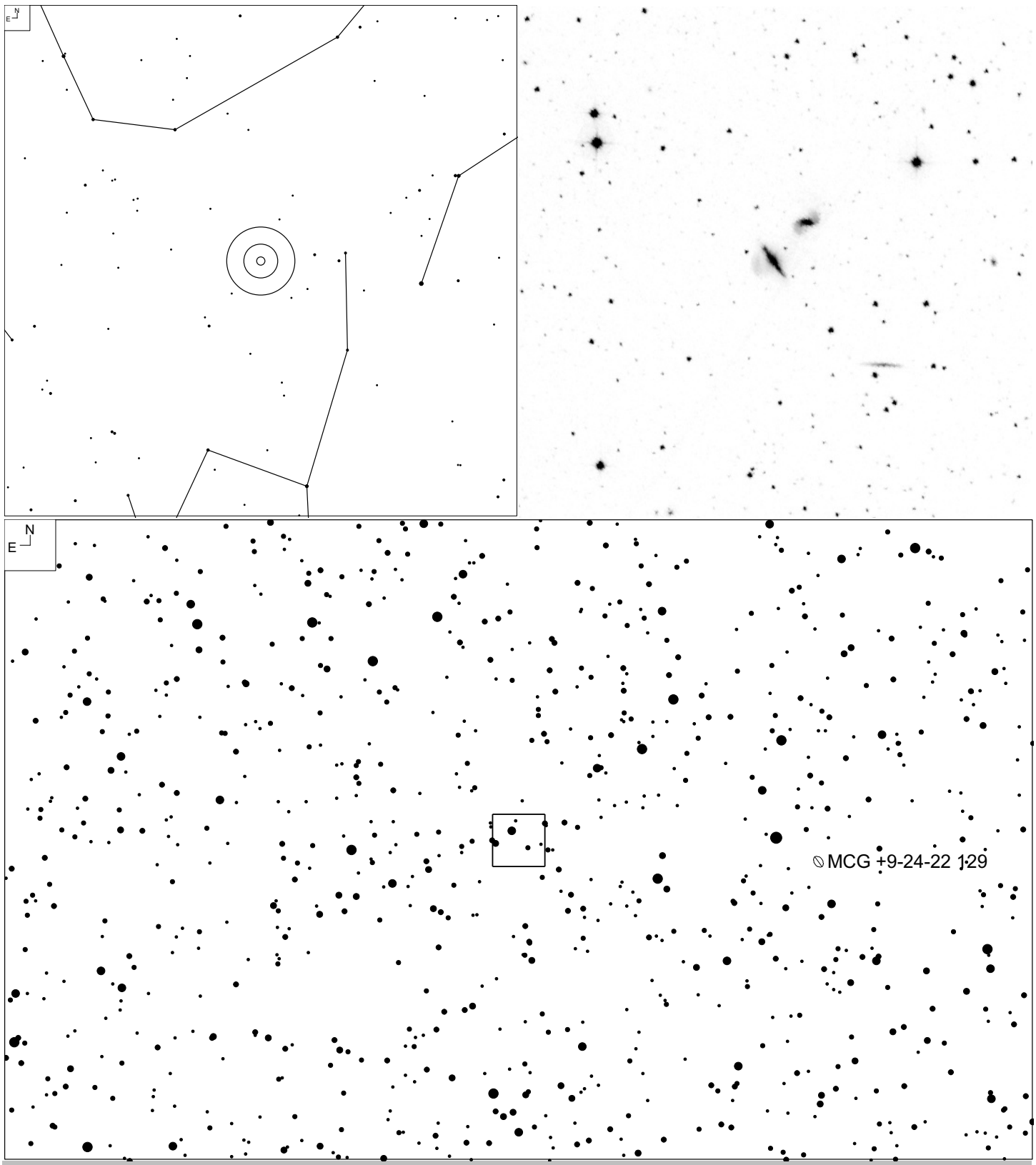
Object	RA	Dec	#	Mag	Size	Cmpt	Urano 2	iDSA
	13 56 35	+23 21 31	8	16.9	1.9'	0.5	71	33

Arakelian 444 (Boötes)



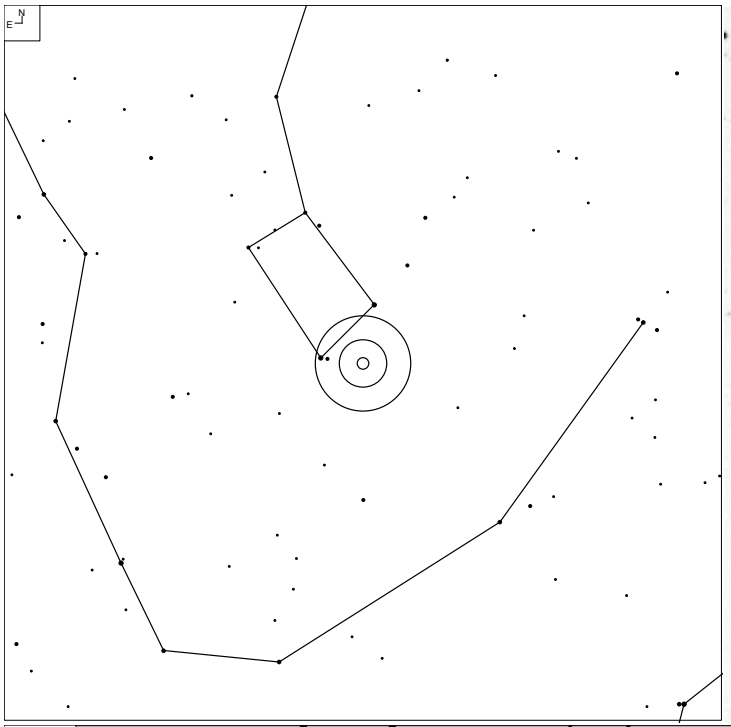
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 5536	14 16 23.8	+39 30 08	14.1	0.8 x 0.8’	SBa	52	32

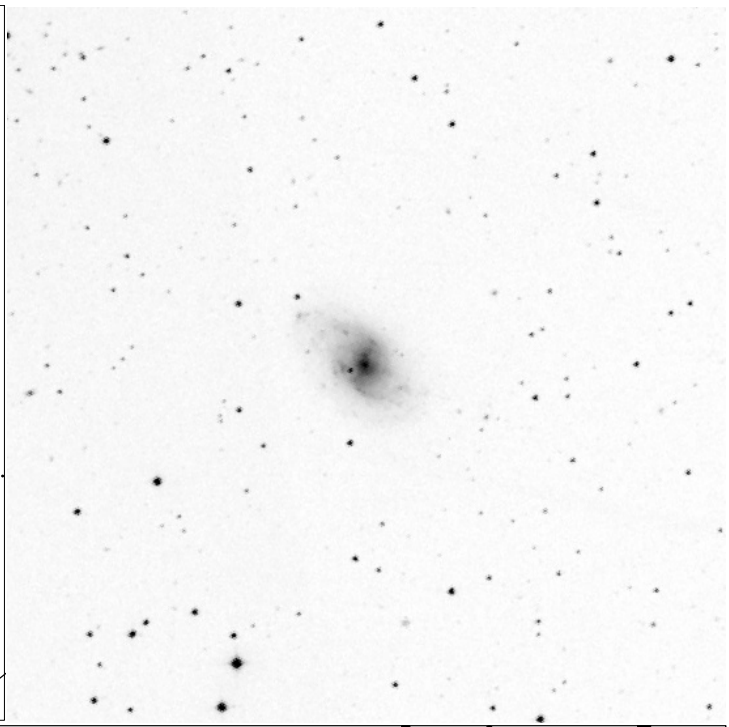
SBS 1444+517 (Boötes)

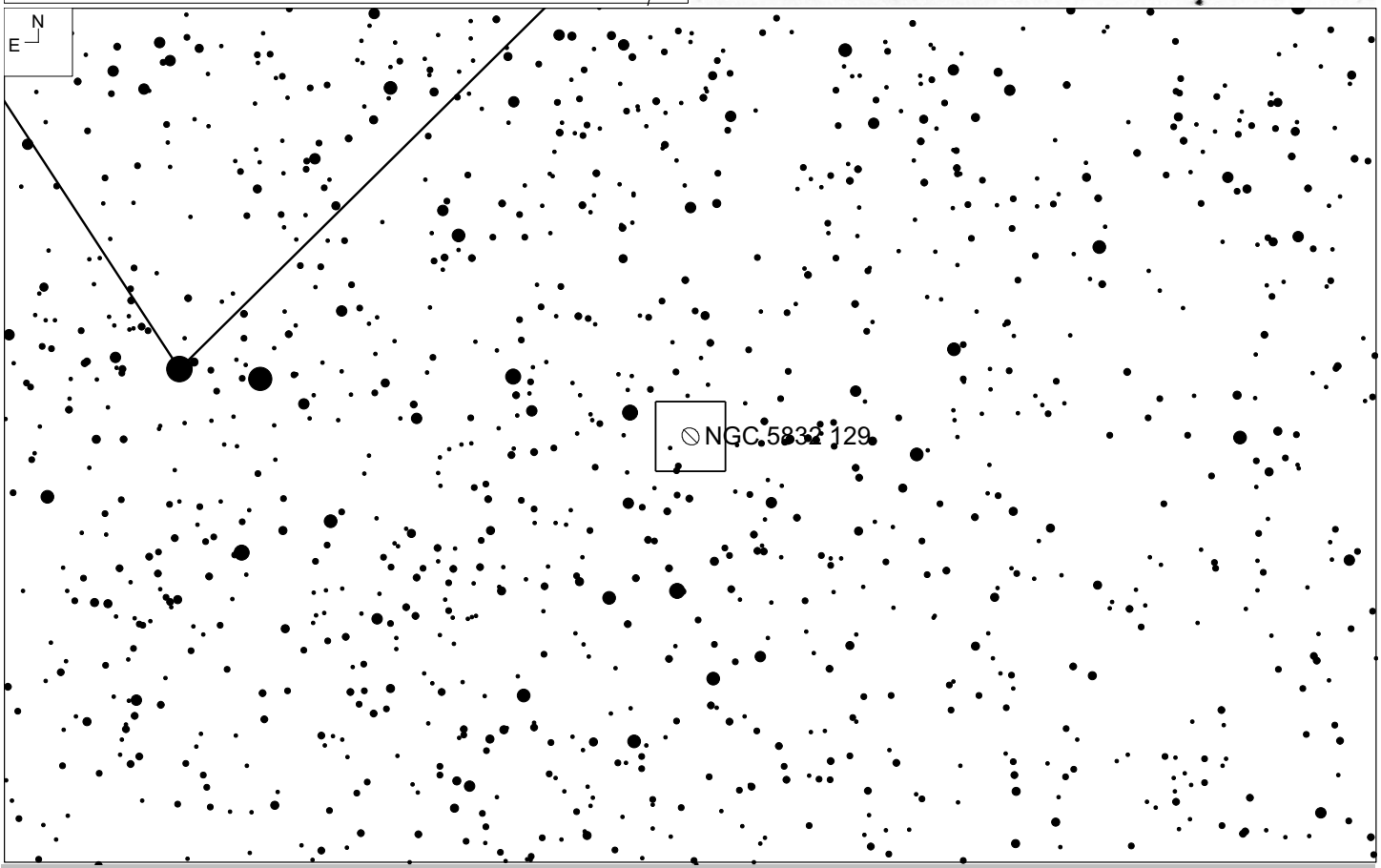


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
VV713	14 45 45.1	+51 34 51	14.3	0.8 x 0.7’	S	36	20

Kazarian 409 (Ursa Minor)

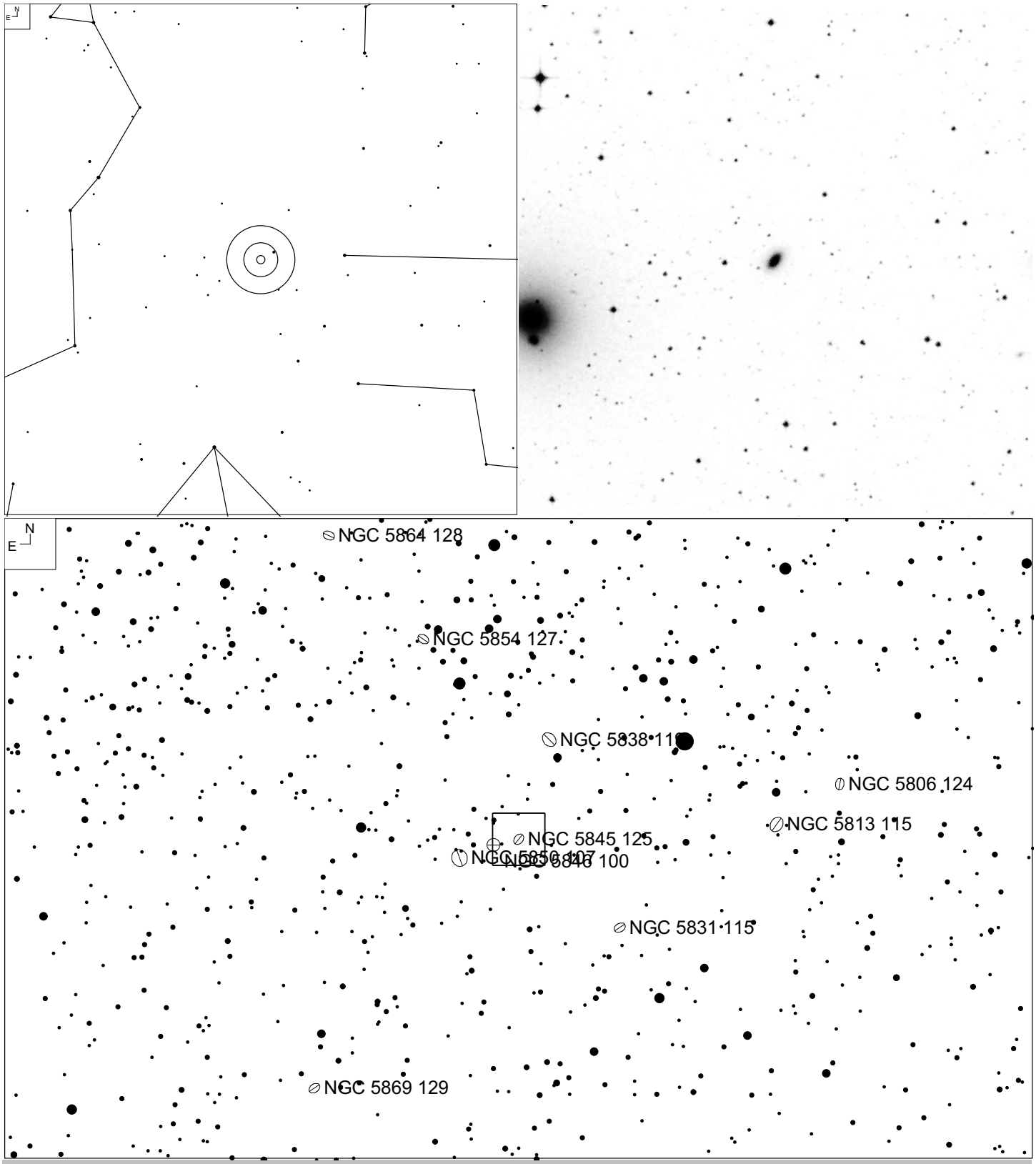






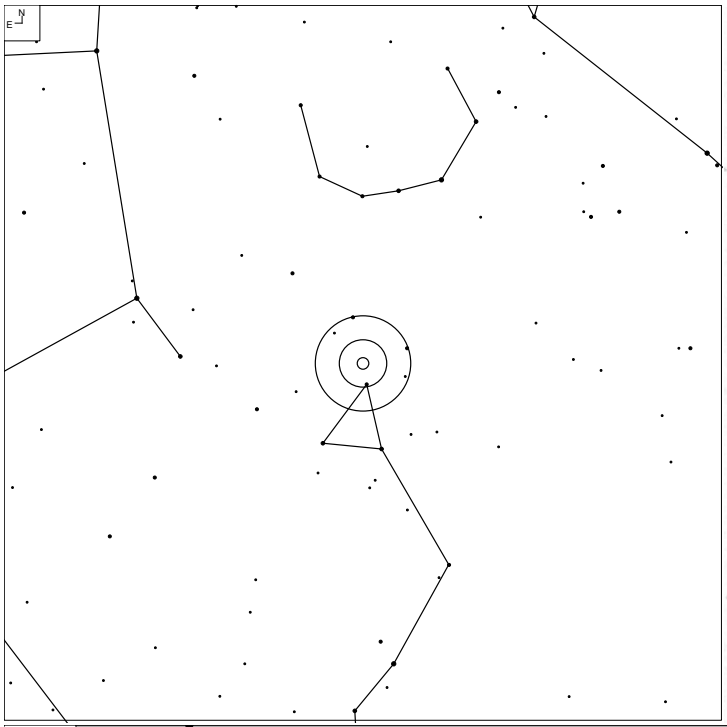
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 5832	14 57 45.7	+71 40 56	12.9	3.7 x 2.1’	SB(rs)b	12	4

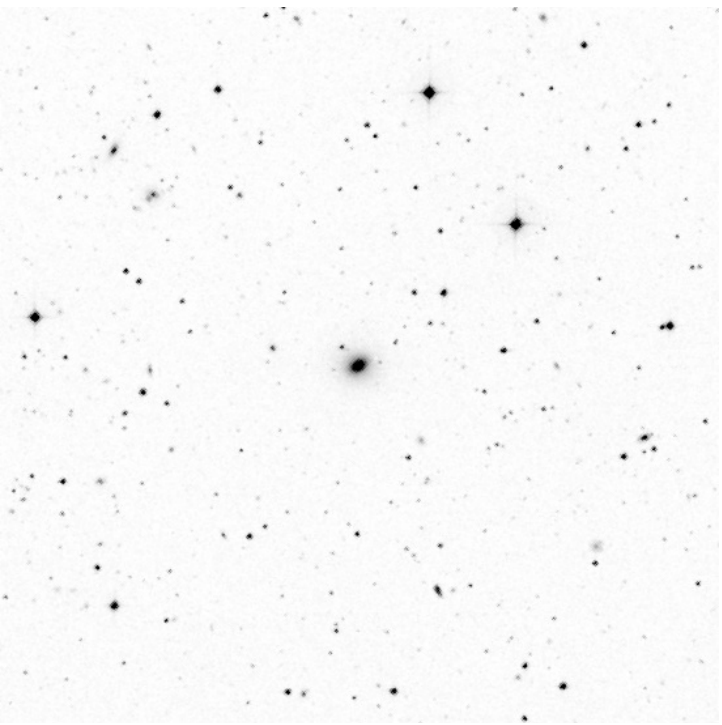
Arakelian 468 (Virgo)

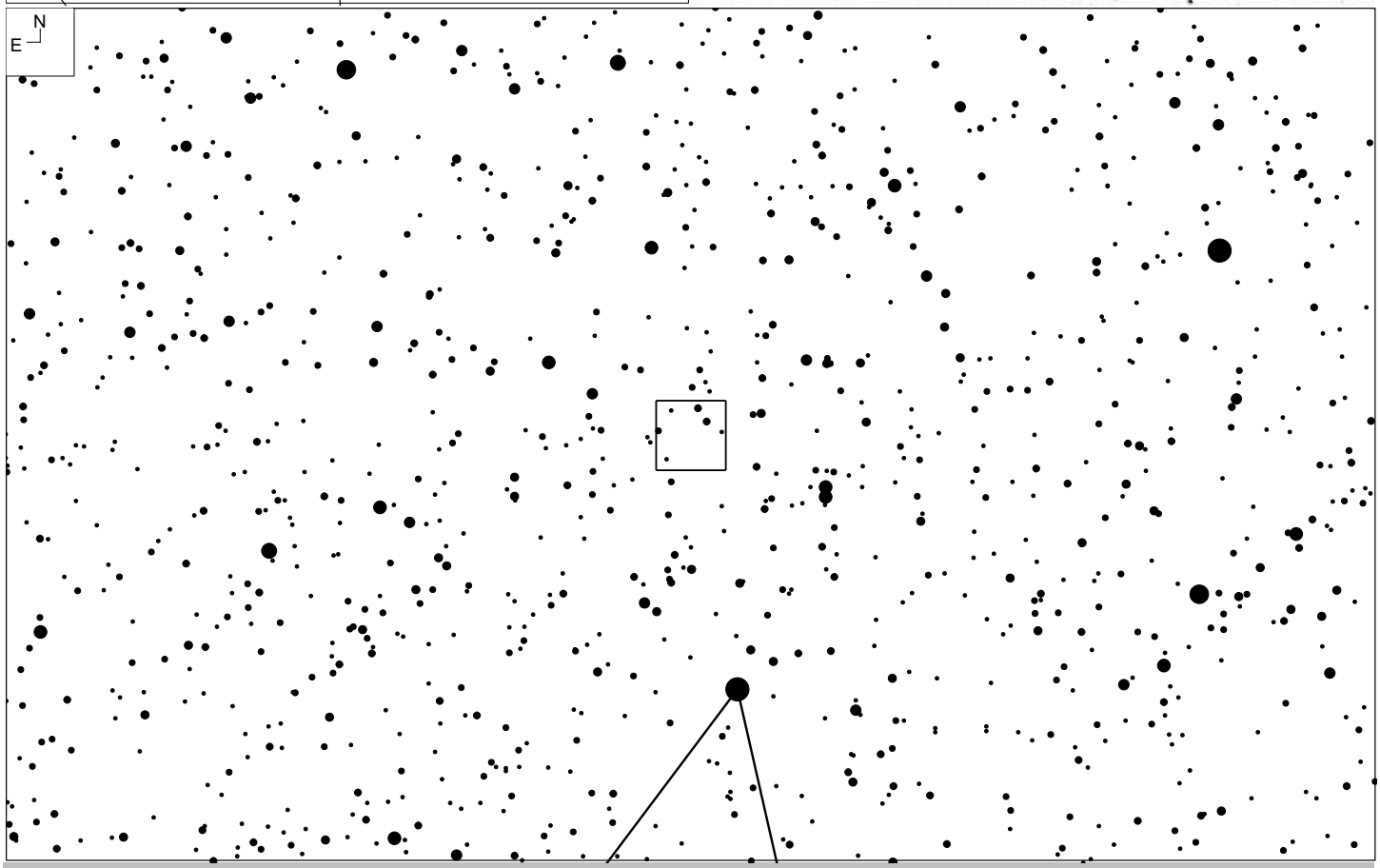


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 5845	15 06 00.8	+01 38 02	13.5	0.8 x 0.5’	E	108	56

Arakelian 487 (Serpens)

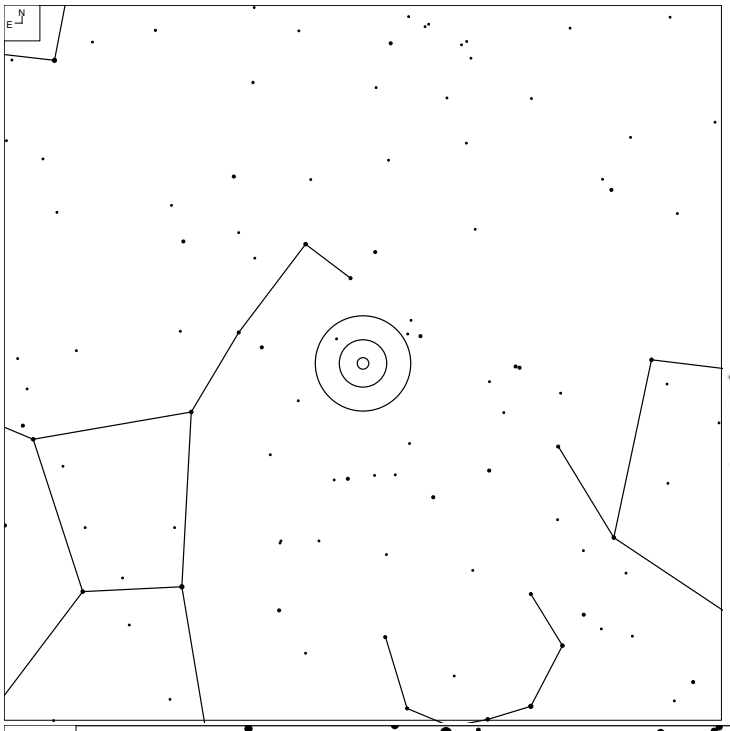


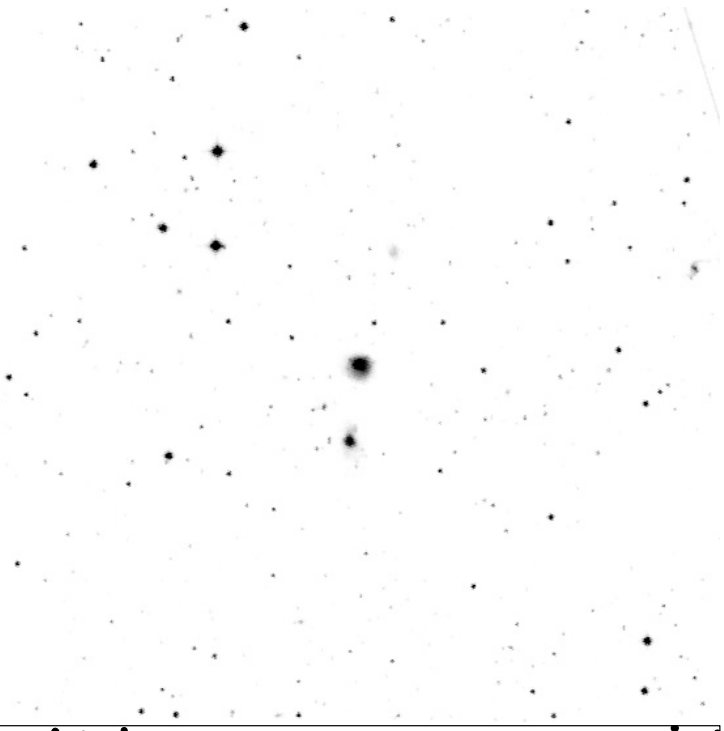


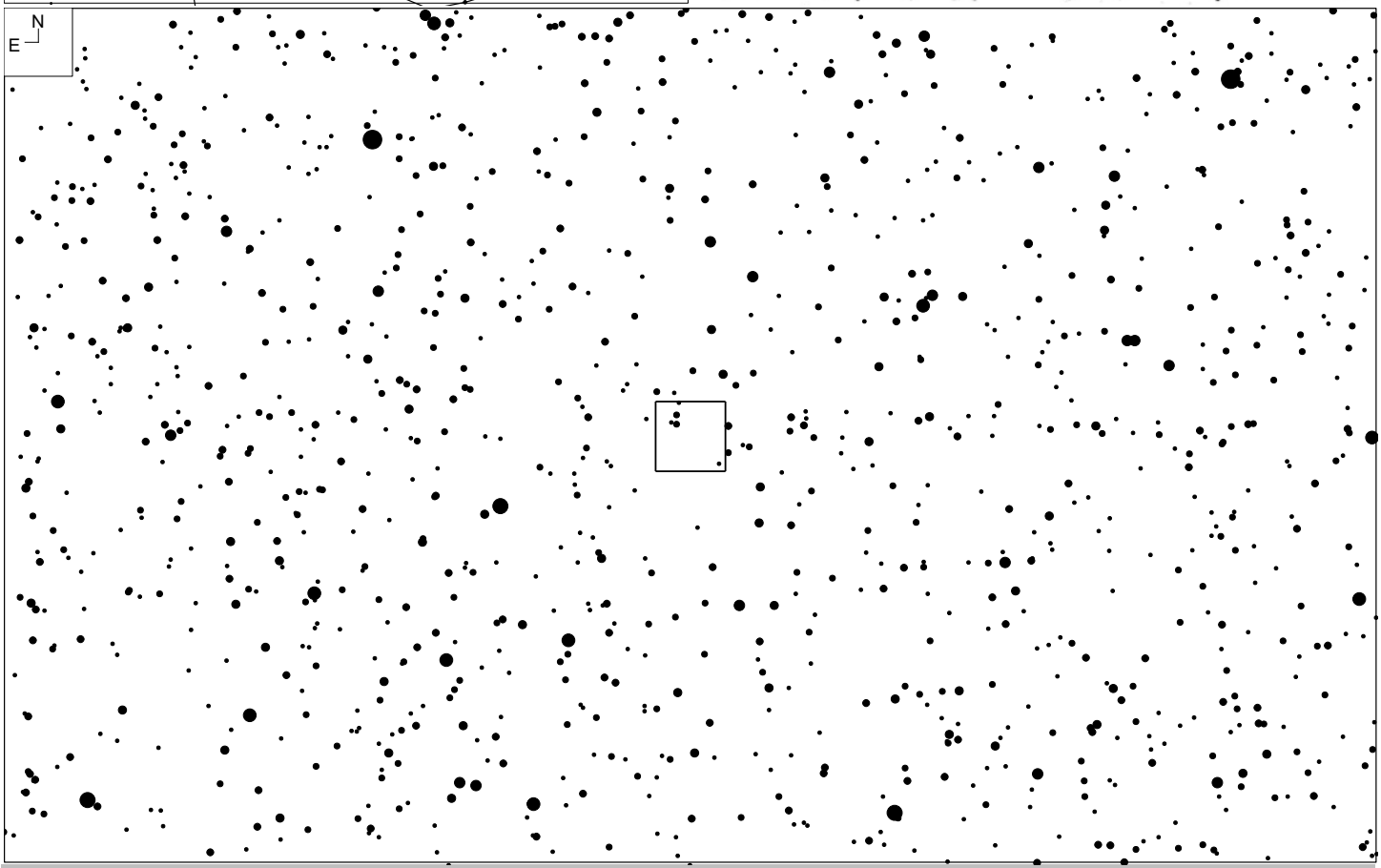


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6003	15 49 25.6	+19 01 55	14.3	1.0 x 0.8’	SO	69	44

Arakelian 497 (Hercules)

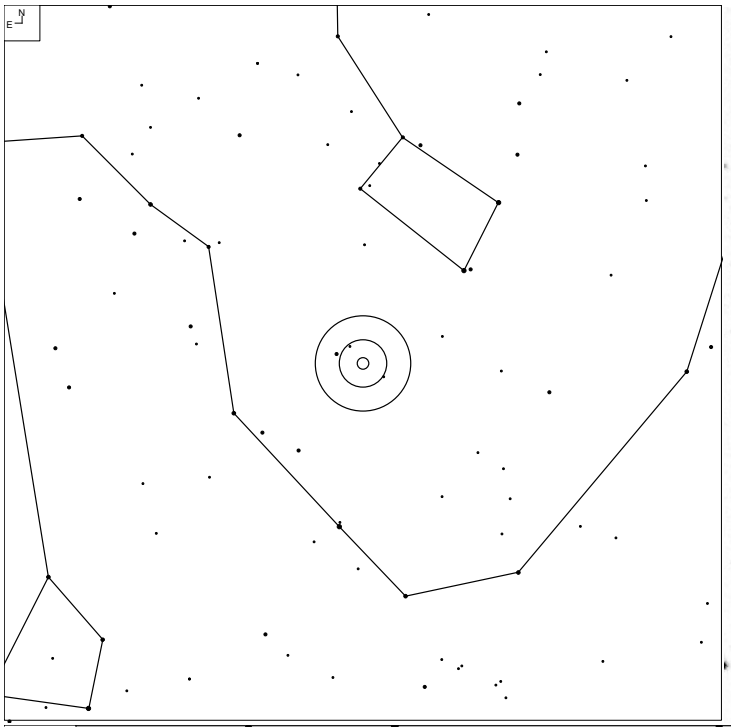


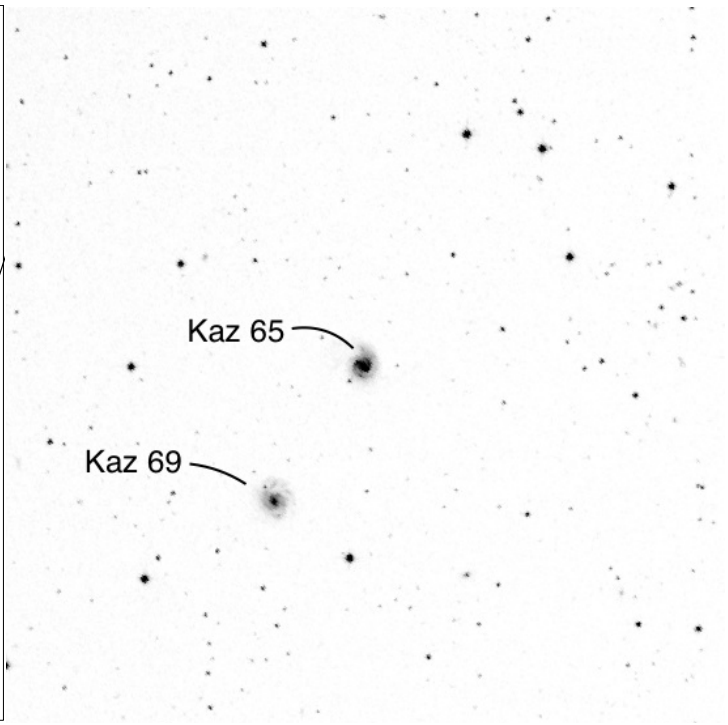


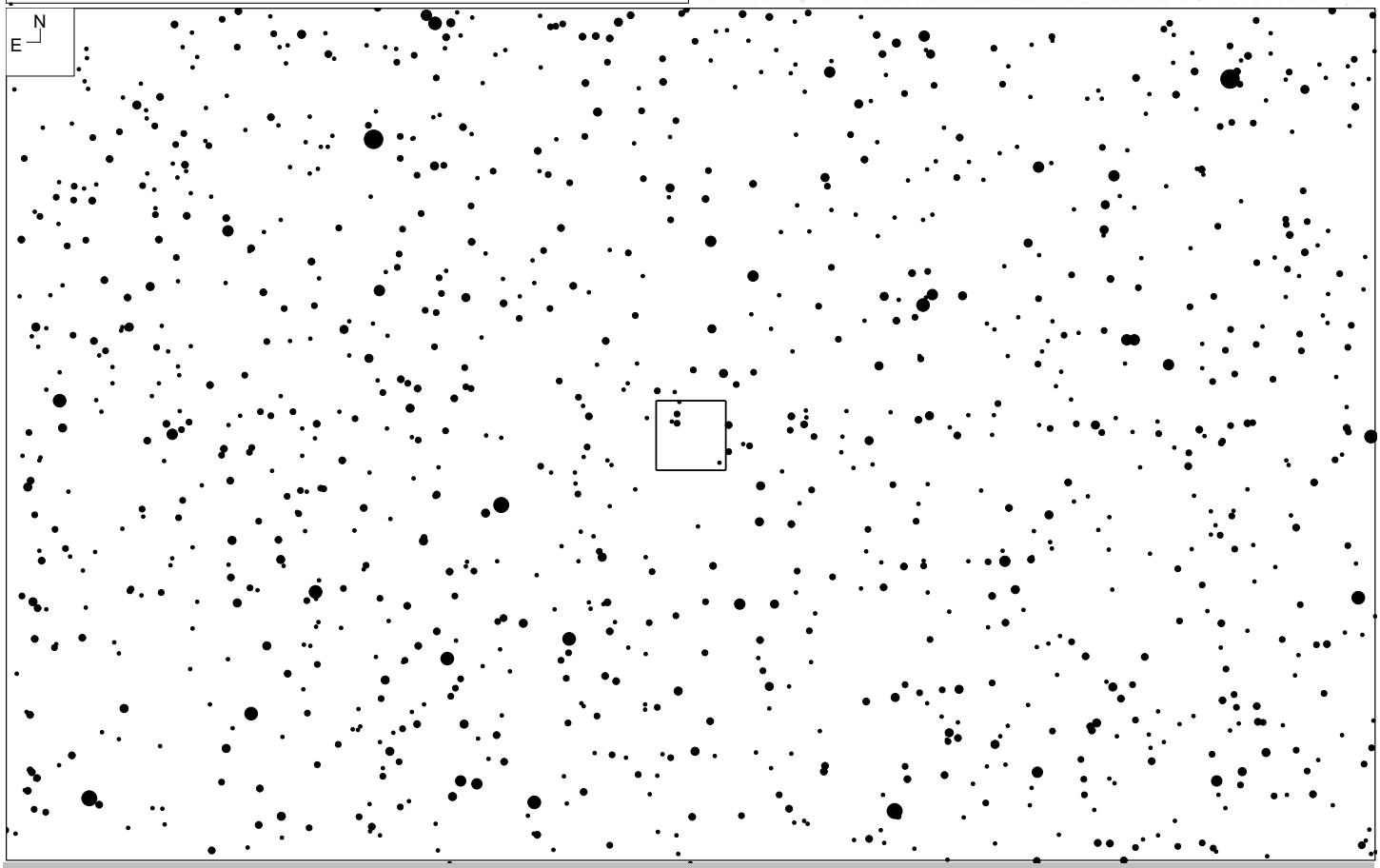


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 10200	16 05 45.9	+41 20 41	13.6	0.6 X 0.6’	S	51	19

Kazarian 65 and 69 (Draco)

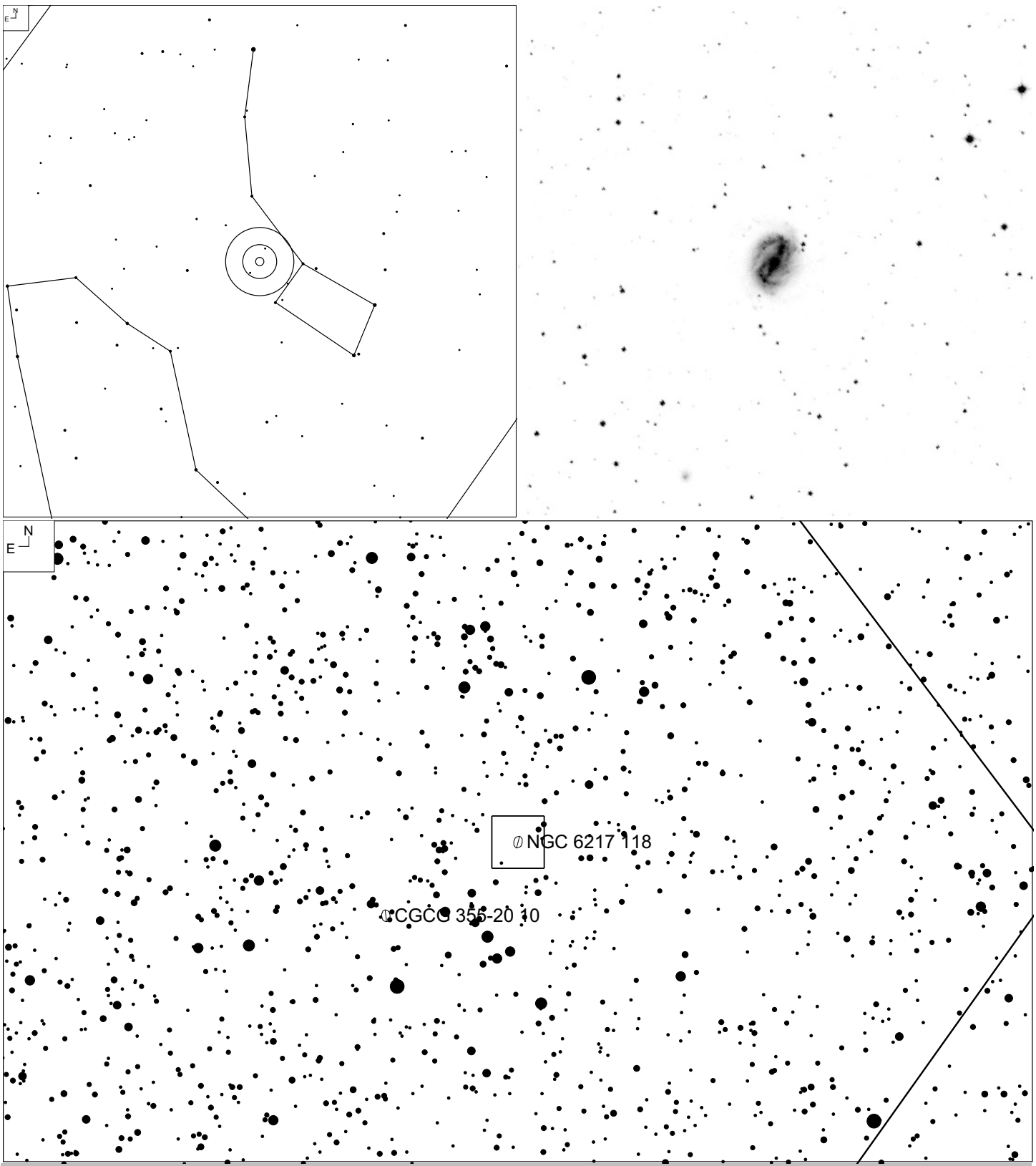






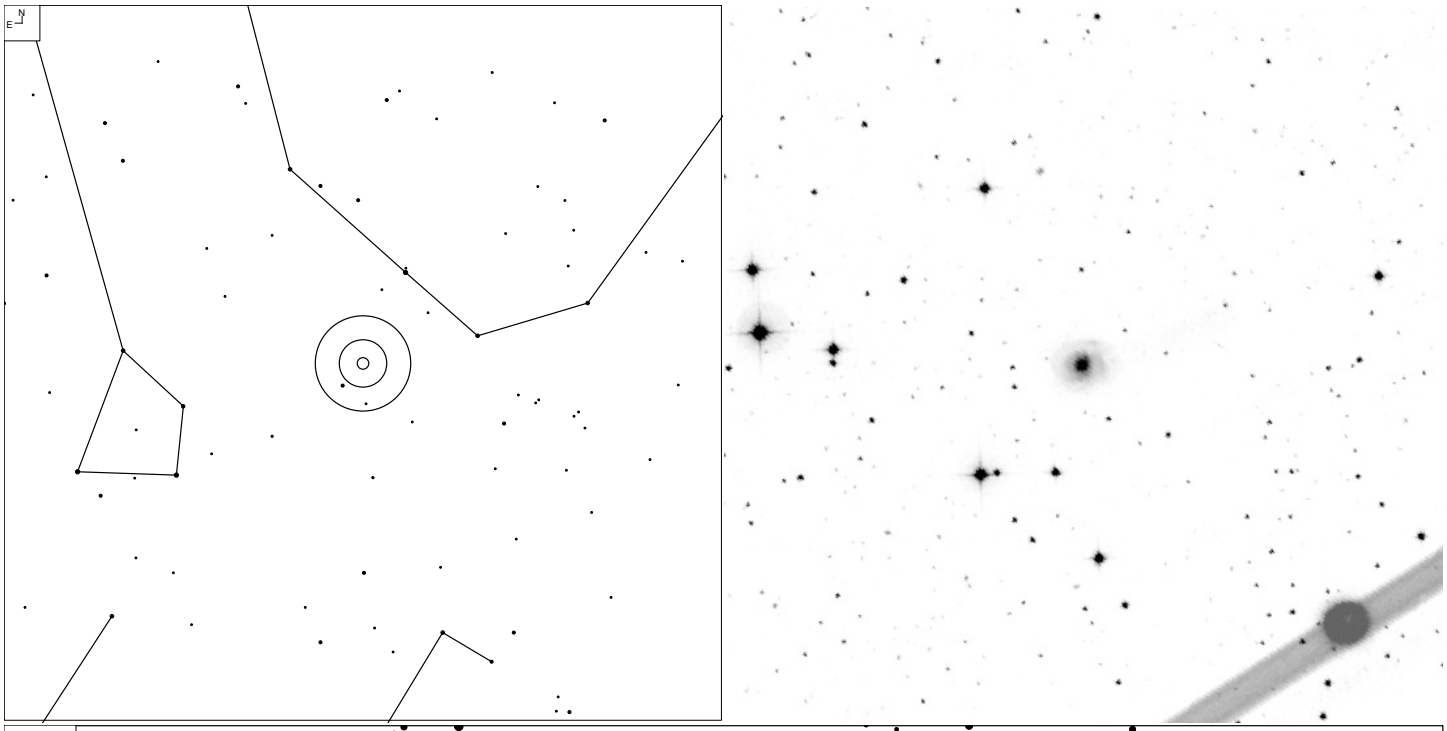
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
IC 1215	16 15 35.1	+68 23 52	14.1	1.1 x 0.6’	SB	11	3
IC 1218	16 16 37.1	+68 12 10	14.5	1.0 x 0.3’	Sc		

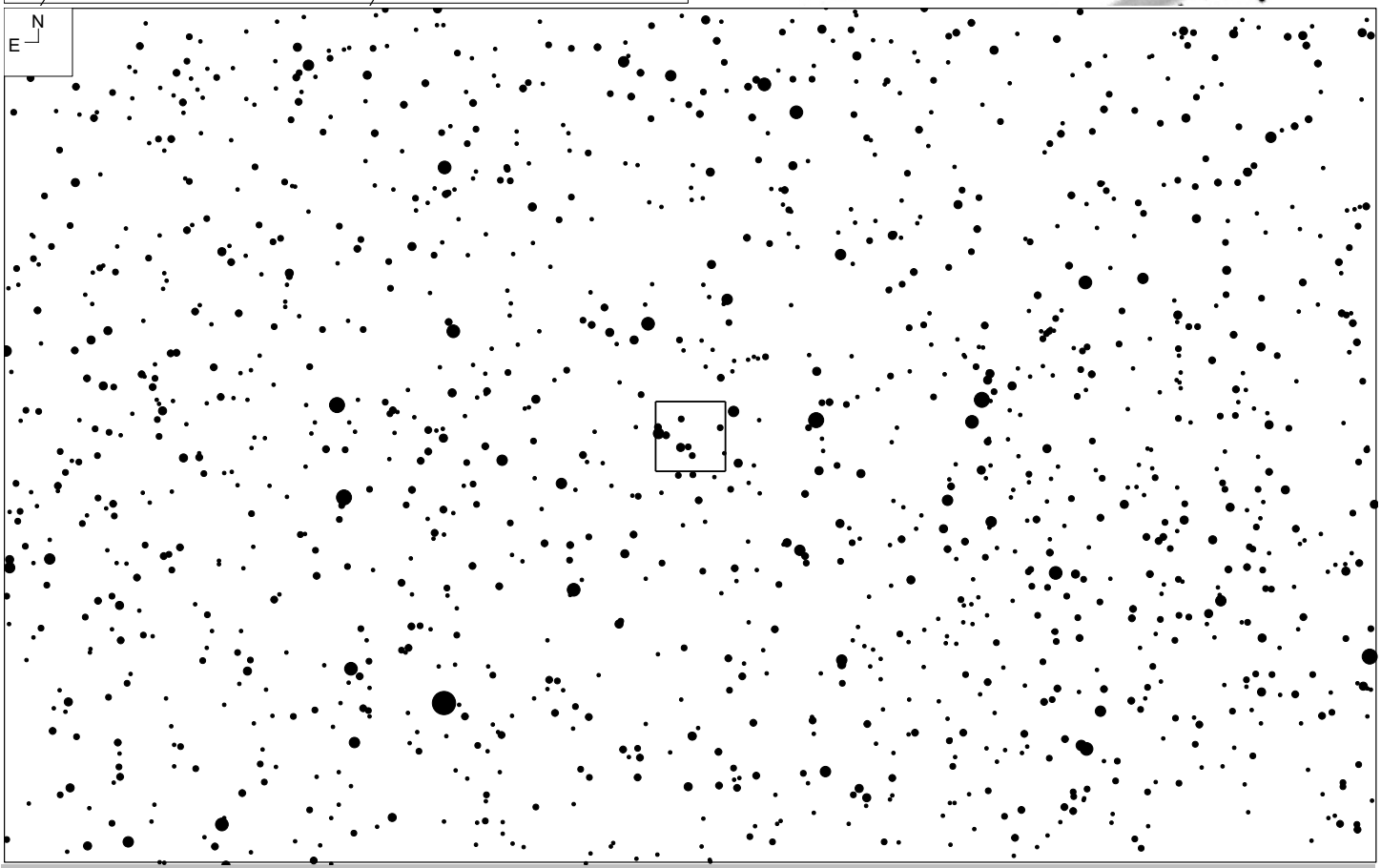
Kazarian 73 (Ursa Minor)



Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6217	16 32 39.2	+78 11 53	11.8	3.0 x 2.4’	(R)SB(rs)	4	3

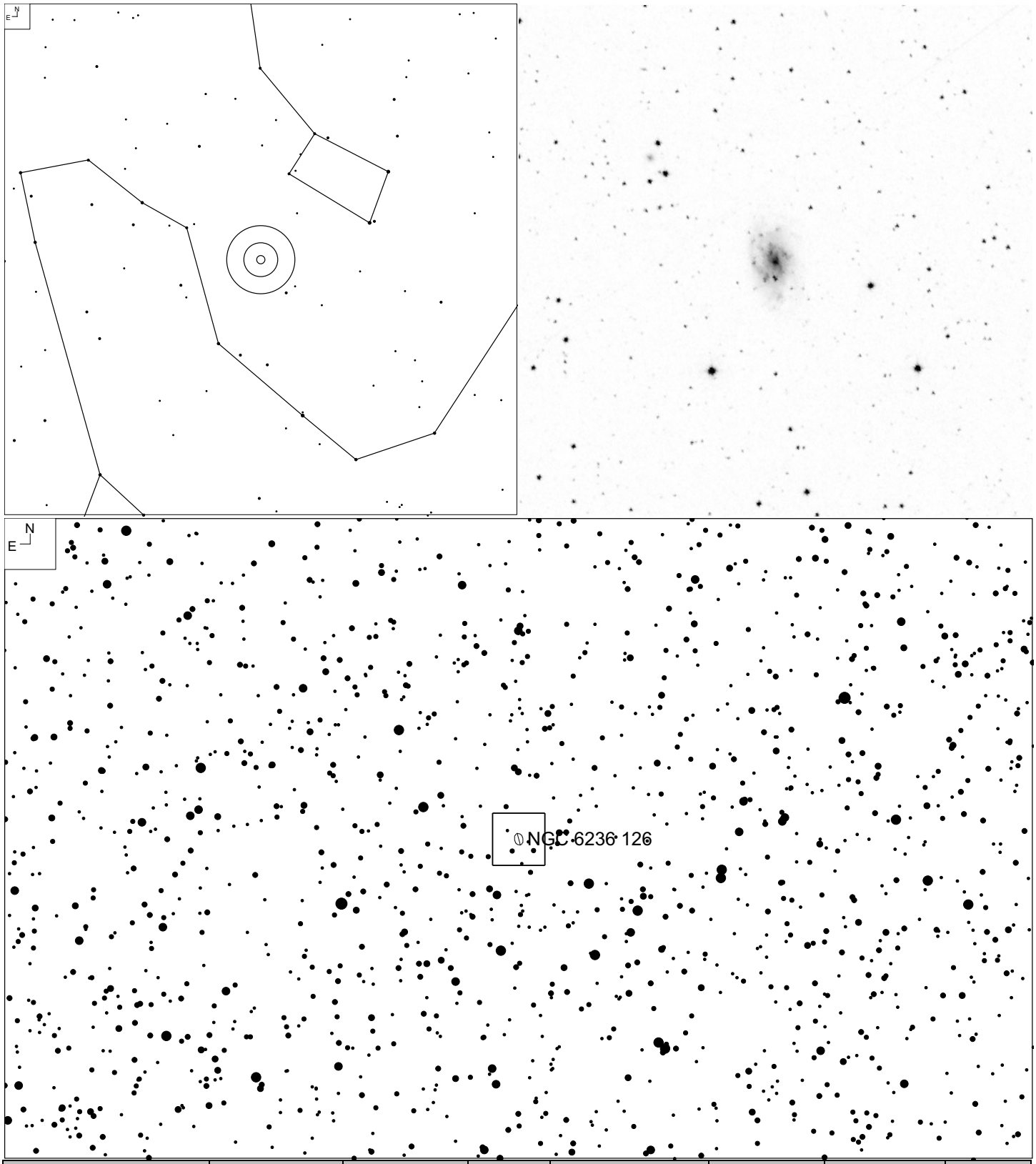
Kazarian 76 (Draco)





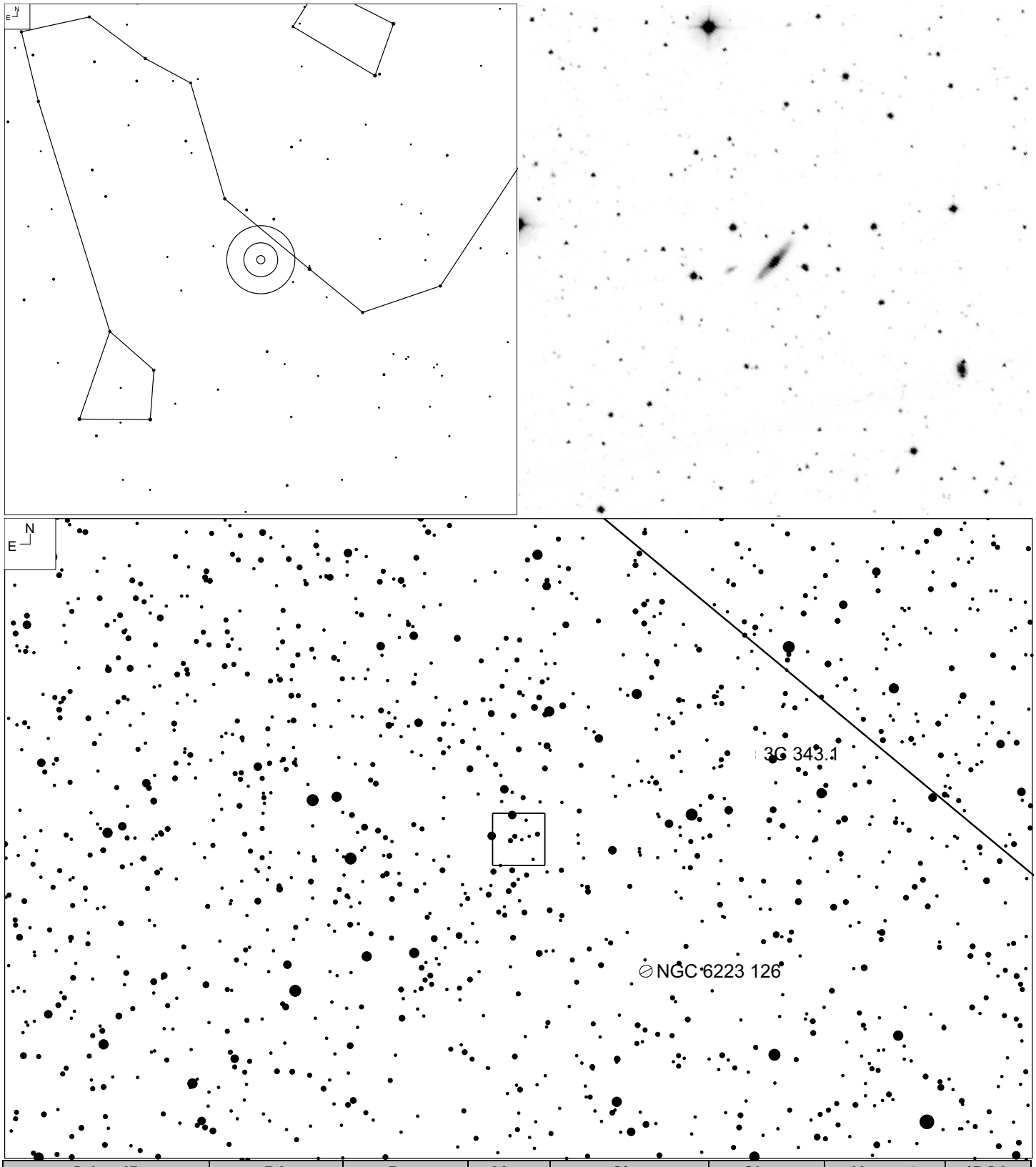
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 10500	16 38 59.4	+57 43 27	13.9	1.4 x 1.3’	SO/a	22	10

Kazarian 88 (Draco)



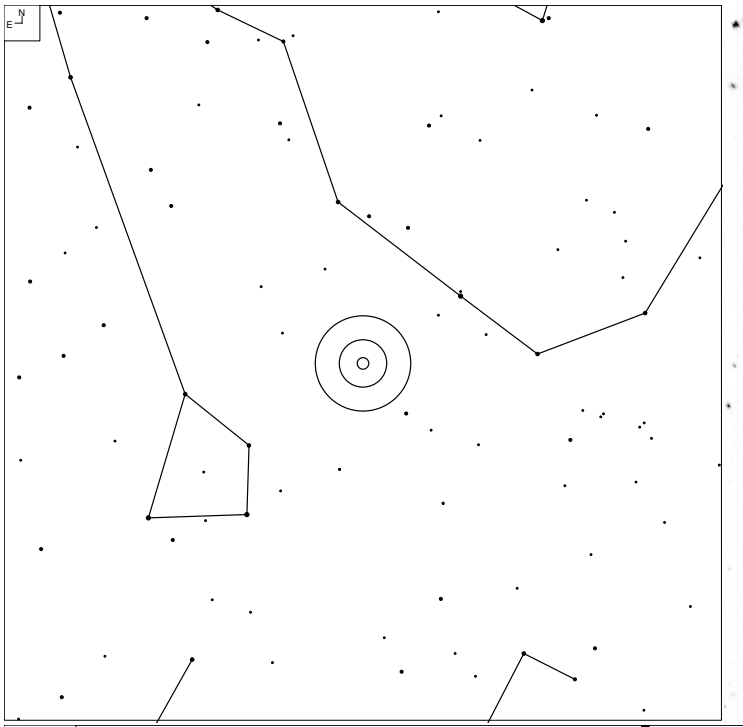
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6236	16 44 34.6	+70 46 49	12.6	2.9 x 1.6’	SAB(s)cd	11	3

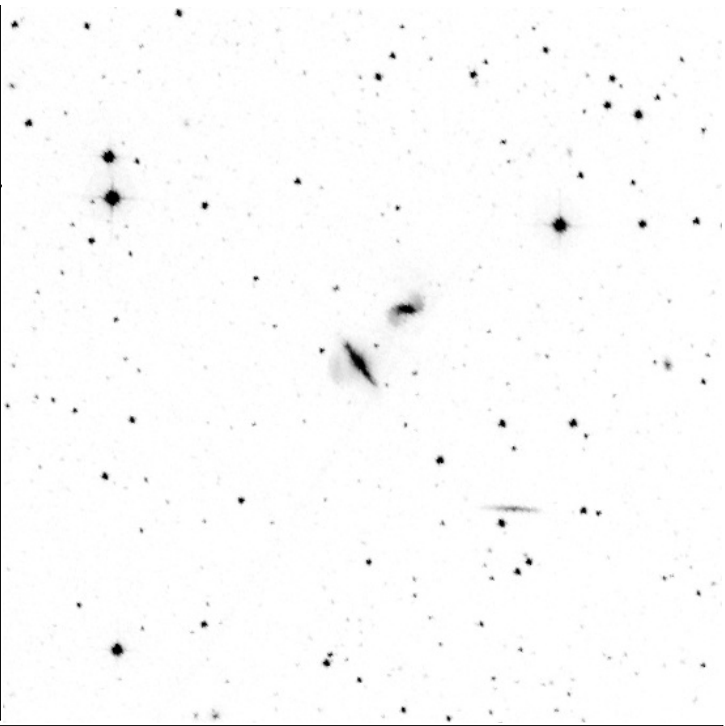
Kazarian 96 (Draco)

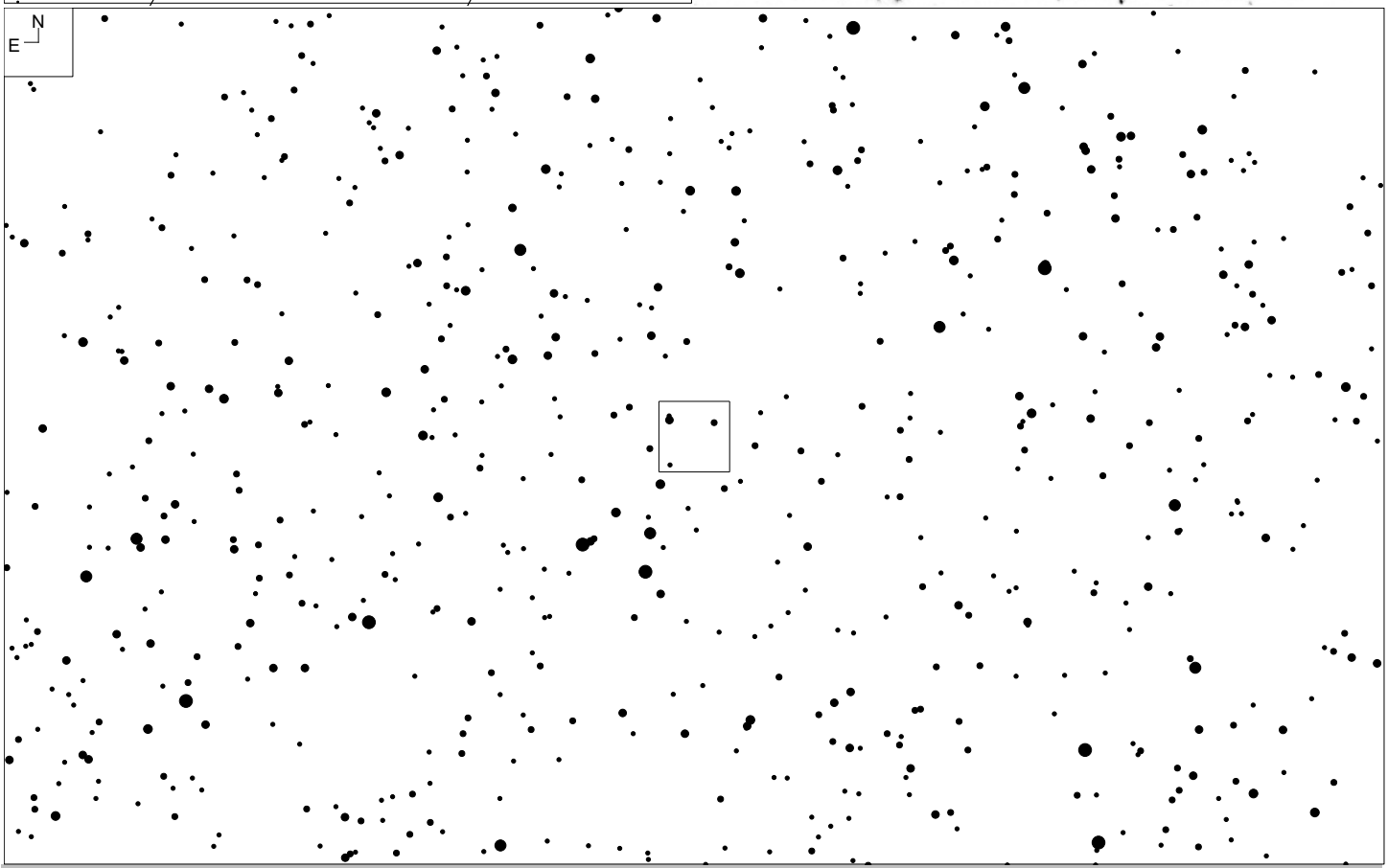


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6244	16 48 03.9	+62 12 02	14.4	1.5 x 0.3’	SBa	22	10

SBS 1657+590B (Draco)

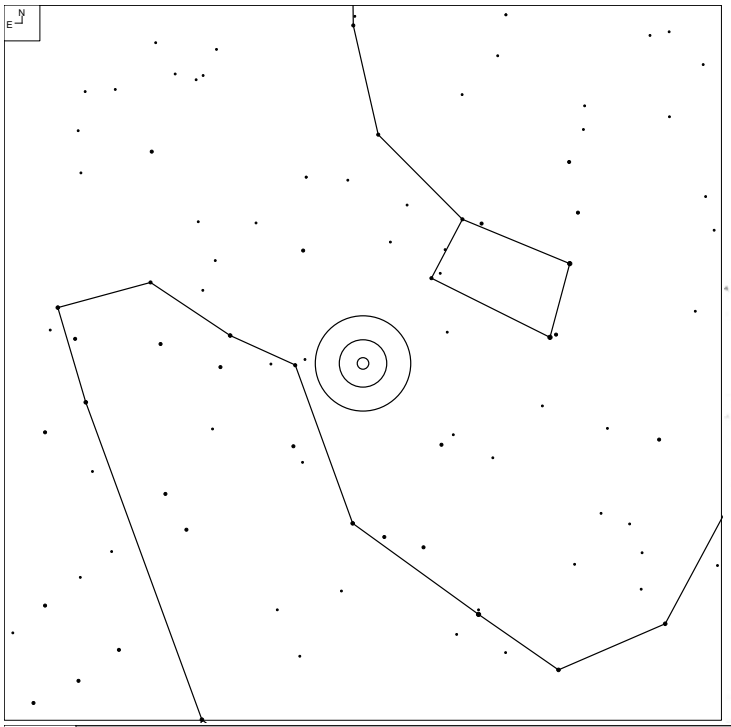


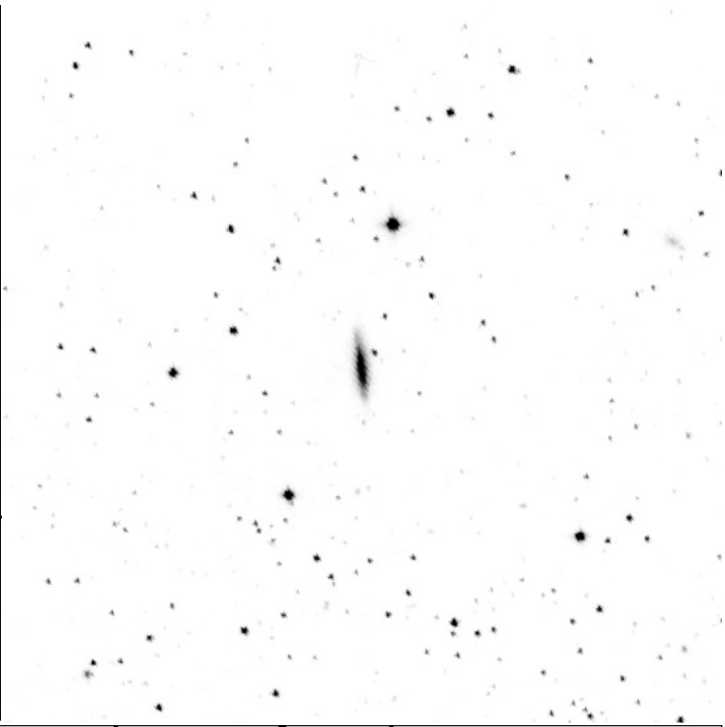


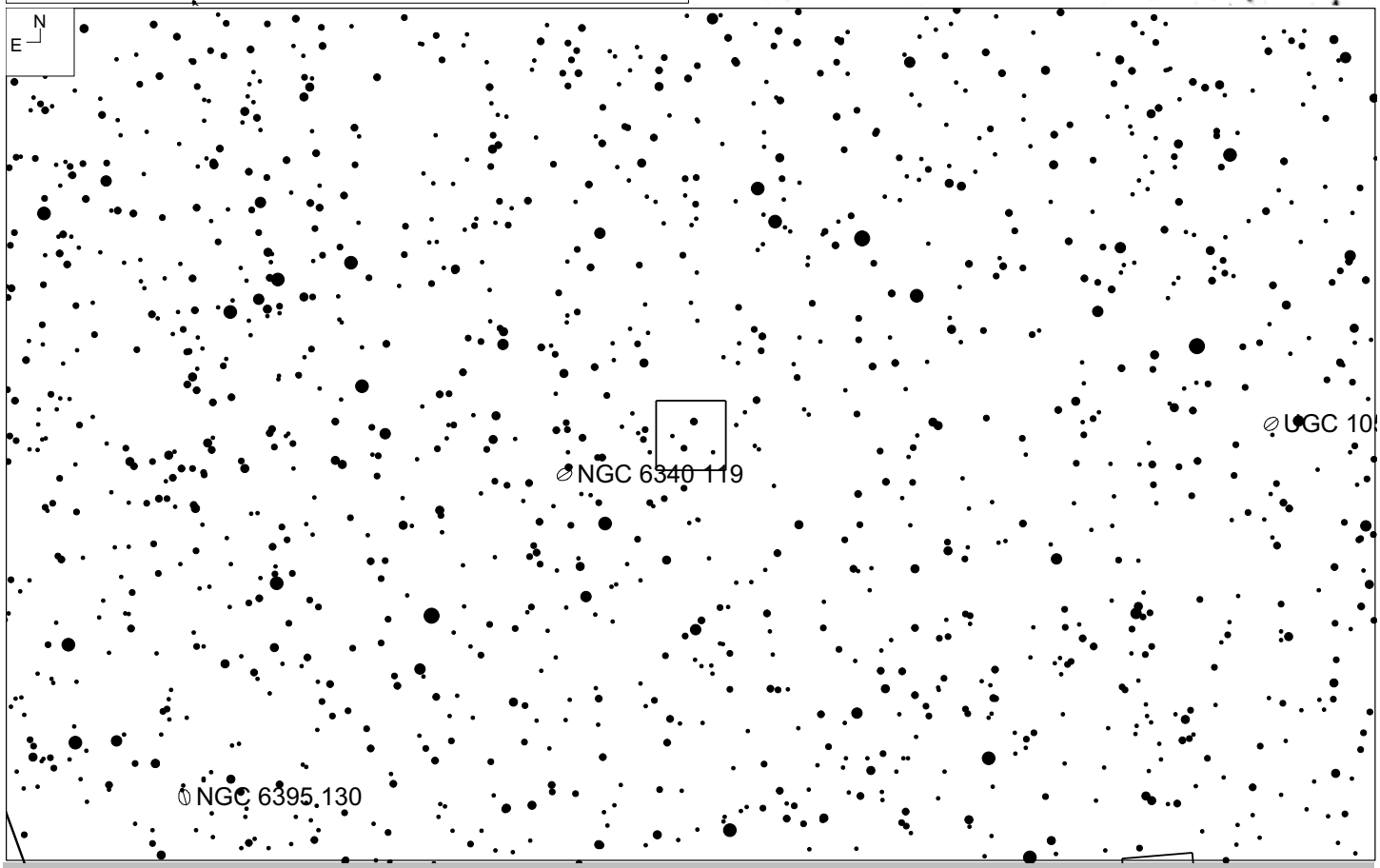


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6286	16 58 31.4	+58 56 11	14.1	1.5 x 1.4’	Sb pec	22	10

Kazarian 119 (Draco)

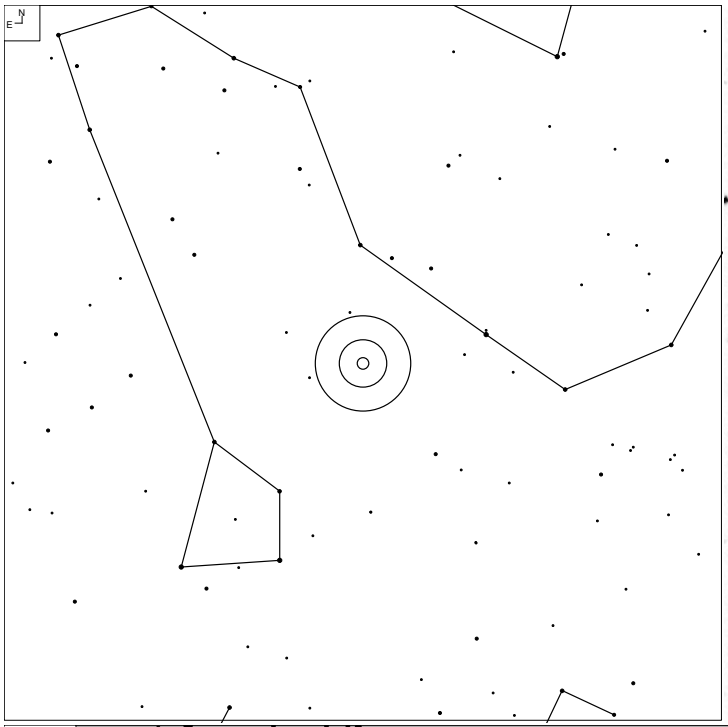


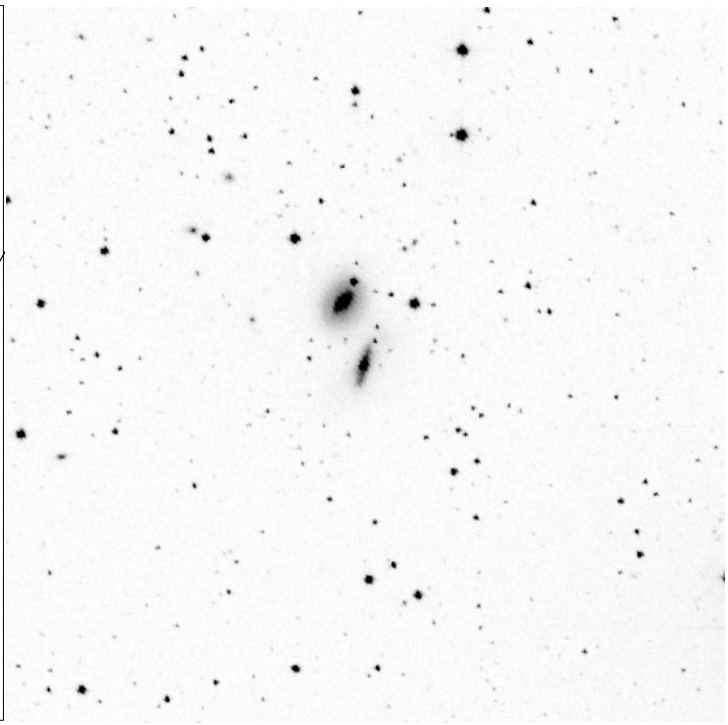


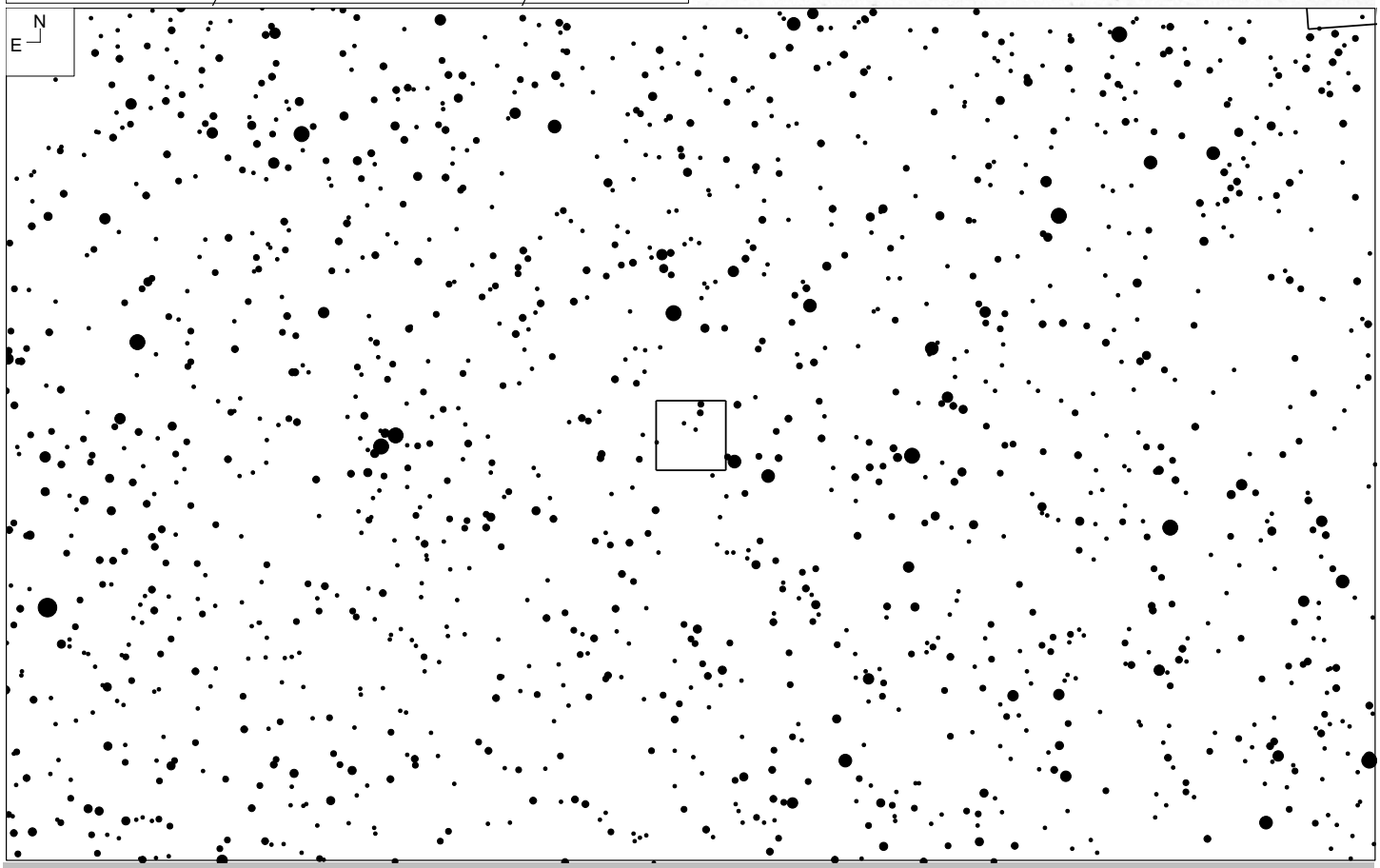


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 10713	17 04 34.0	+72 26 48	14.0	1.8 x 0.3’	Sb	11	3

Kazarian 5 (Draco)

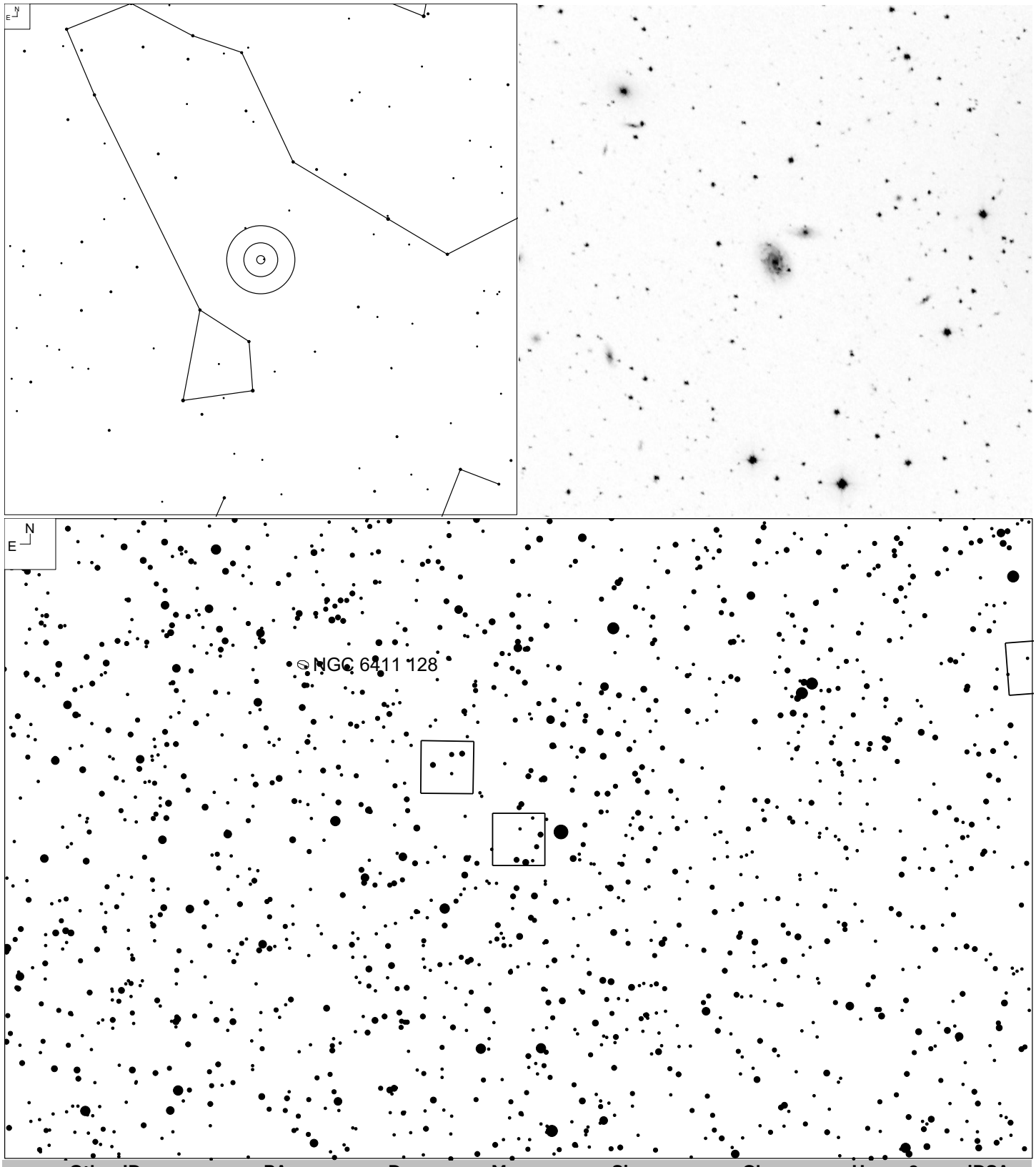






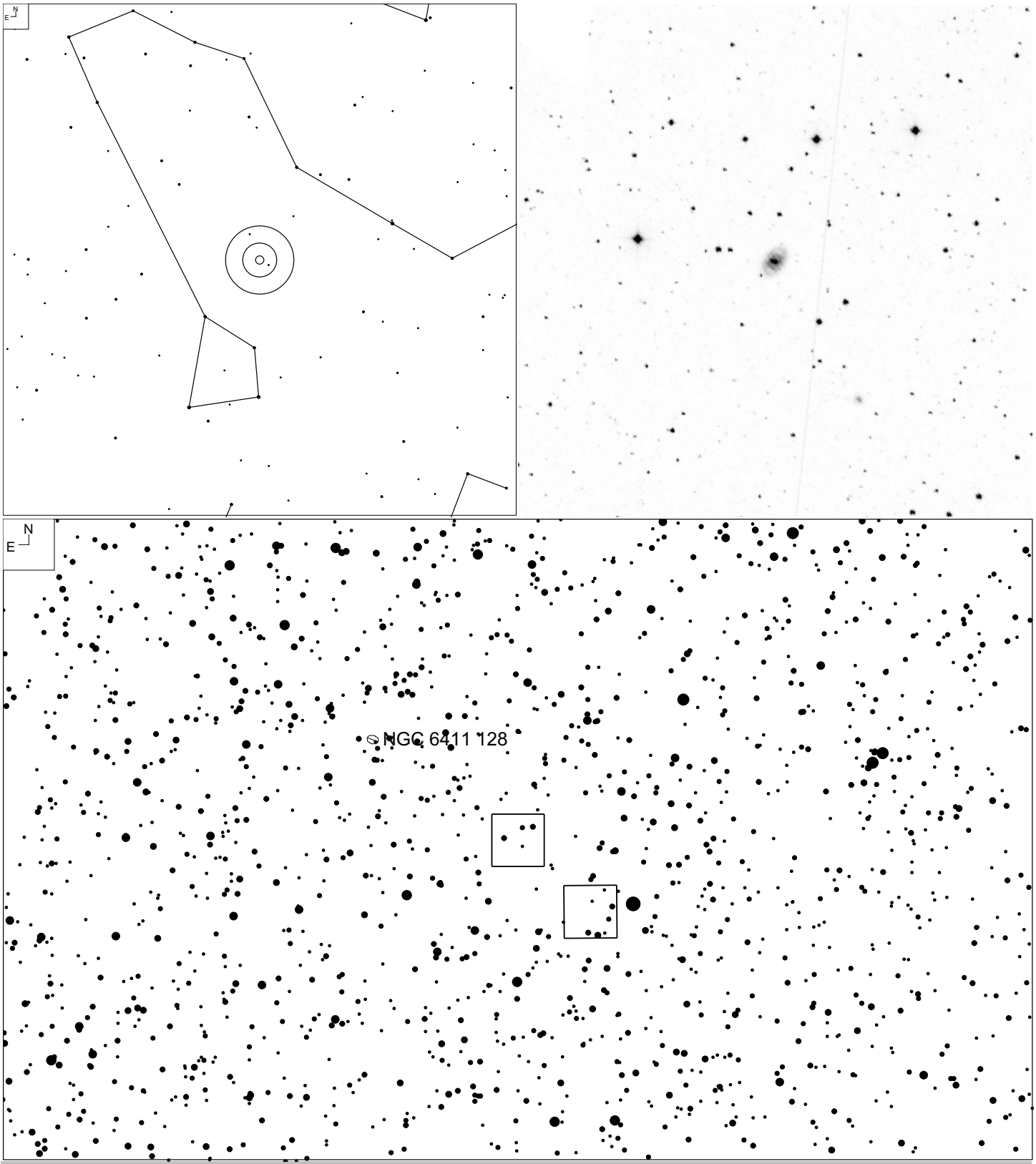
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6306	17 07 37.0	+60 43 44	14.4	1.0 x 0.2’	SB(s)ab	21	10

Kazarian 460 (Draco)



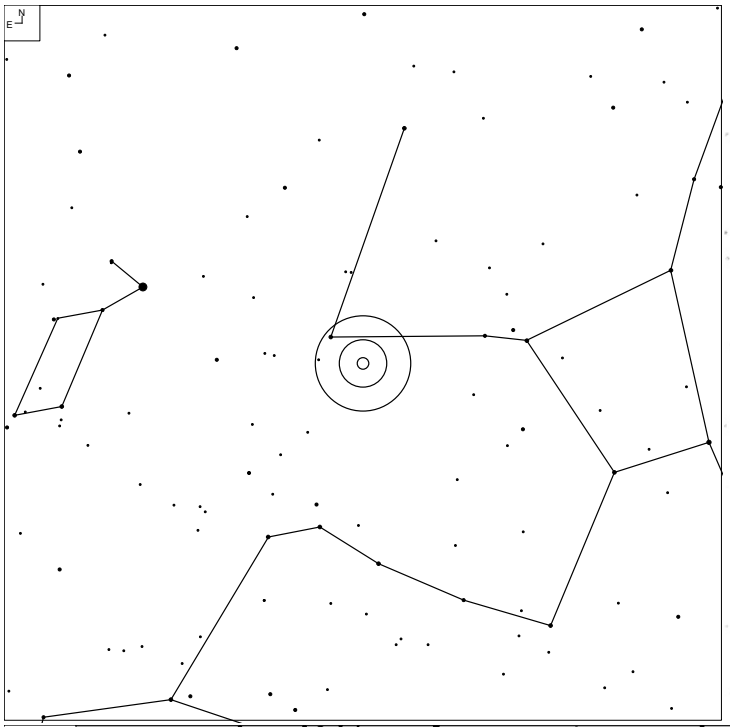
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6381	17 27 16.8	+60 00 51	13.7	1.3 x 0.9’	SA(s)c	21	10

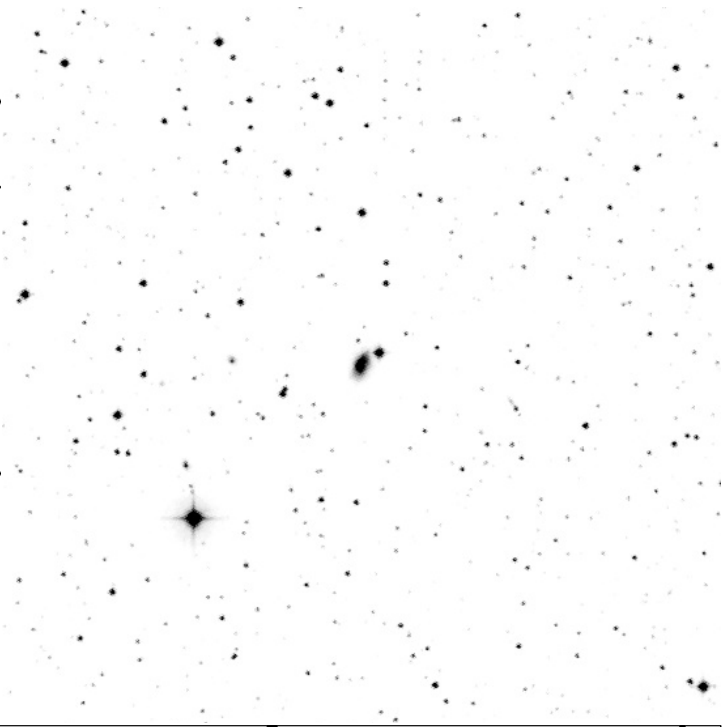
Kazarian 142 (Draco)

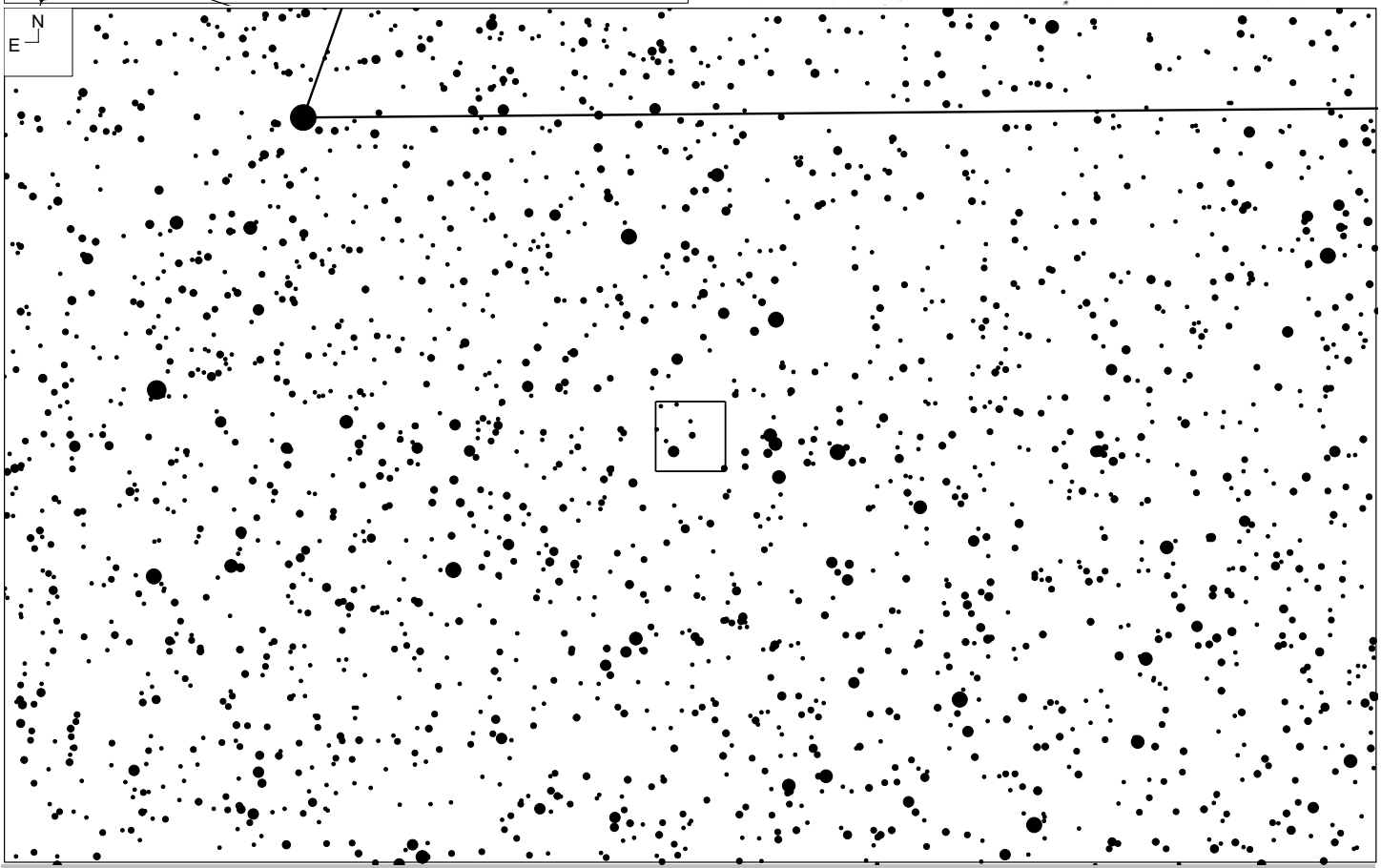


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 10888	17 29 59.3	+60 21 01	14.2	1.0 x 0.6’	(R)SB(r)b	21	10

Arakelian 532 (Hercules)

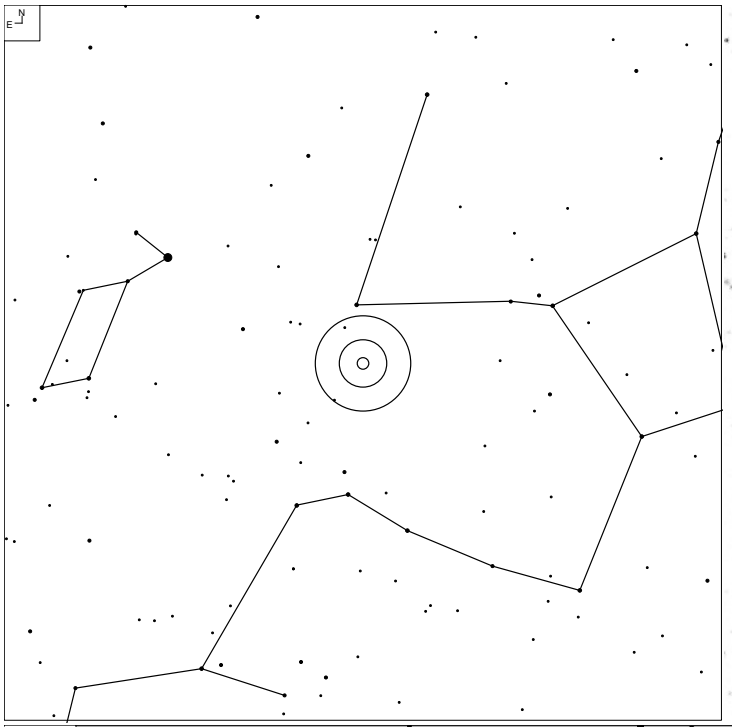


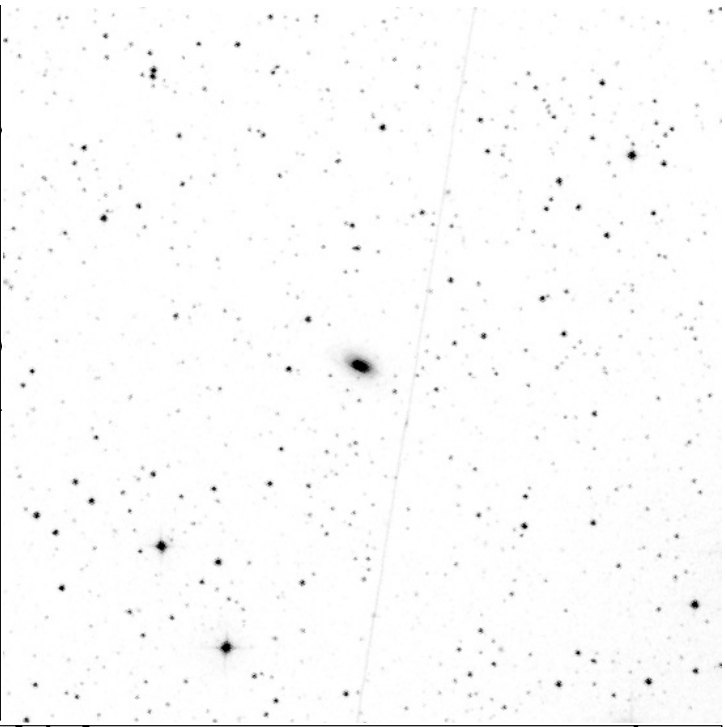


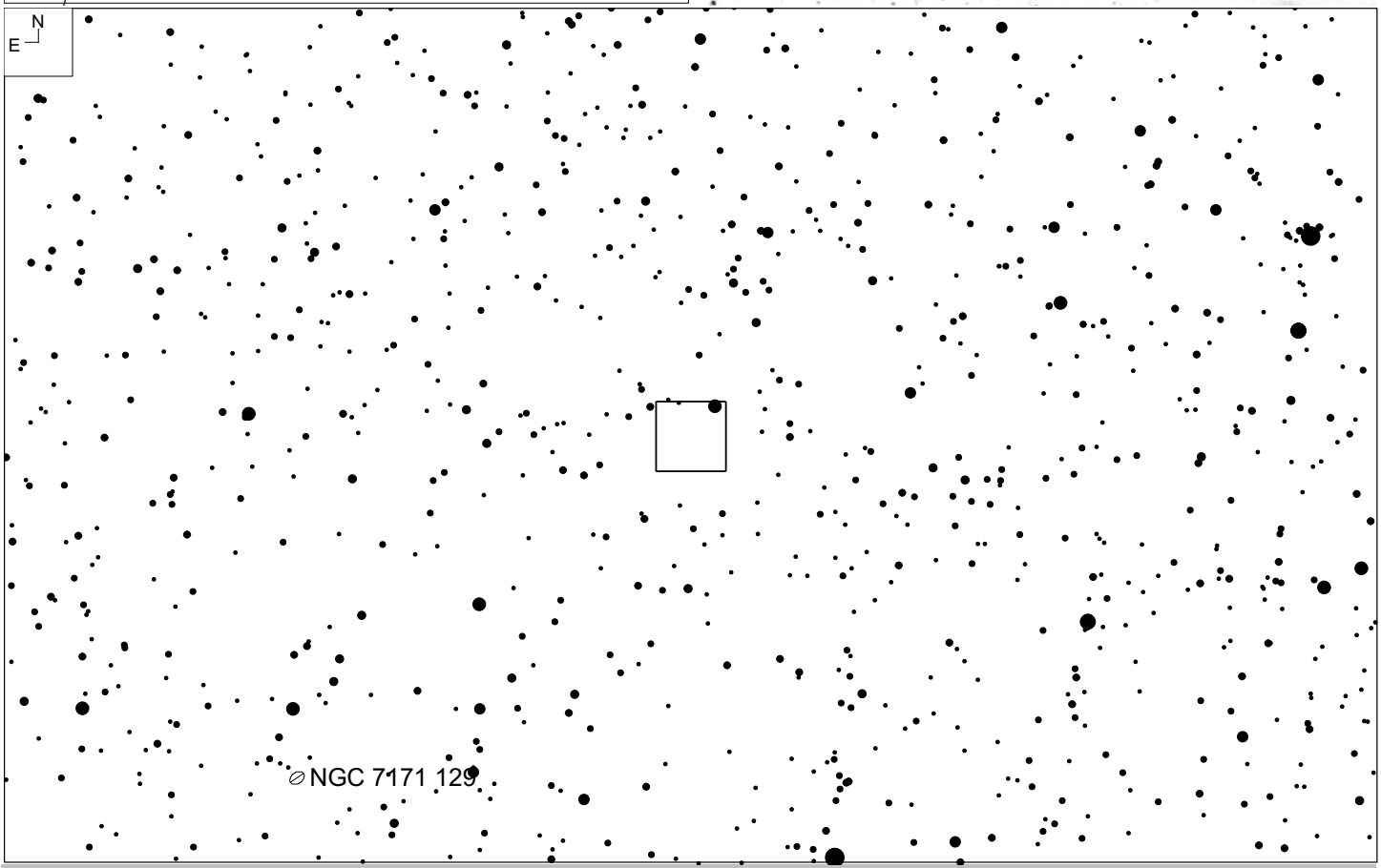


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 11000	17 49 26.6	+36 08 43	14.4	0.6 x 0.3’	S	50	10

Arakelian 534 (Hercules)

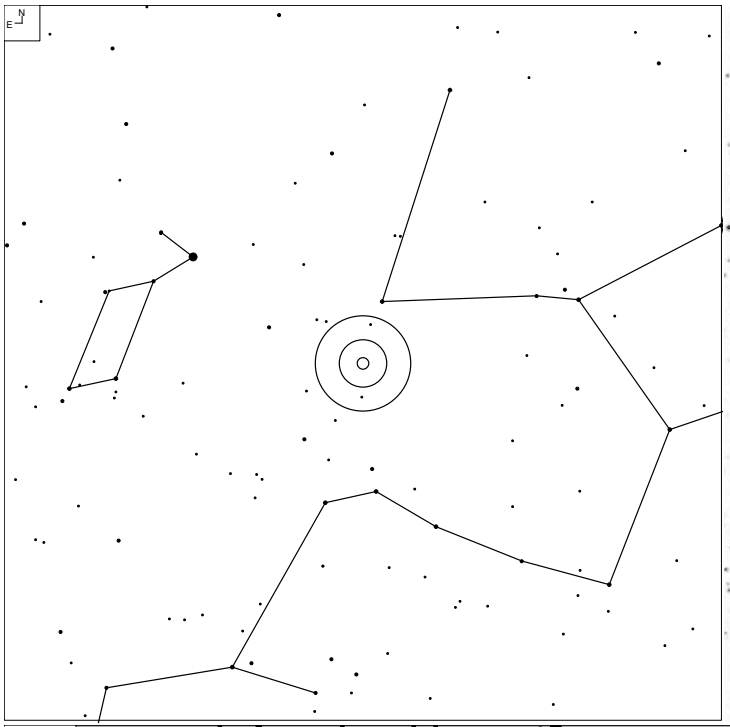


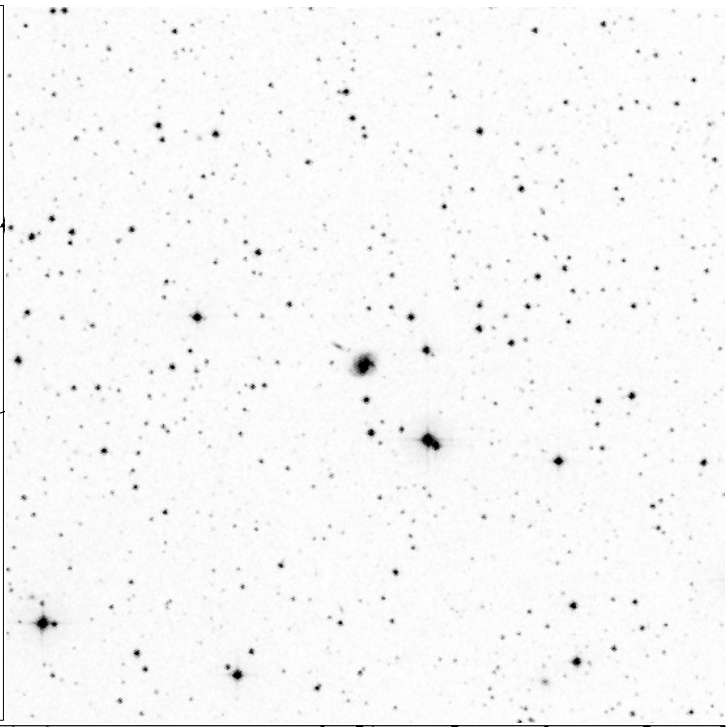


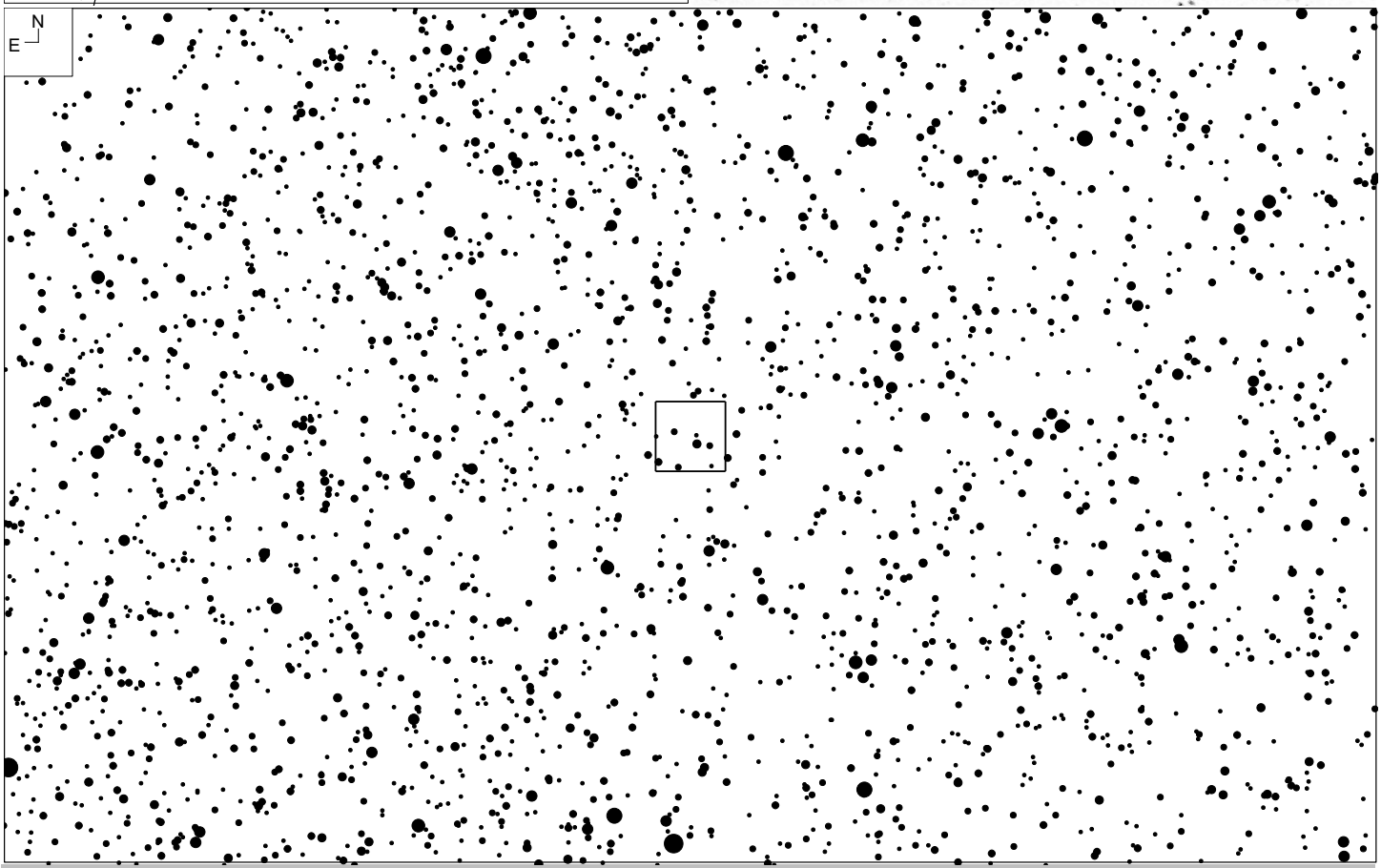


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 11041	17 54 51.8	+34 46 34	14.1	1.0 x 0.6’	Sab	50	31

Arakelian 536 (Hercules)

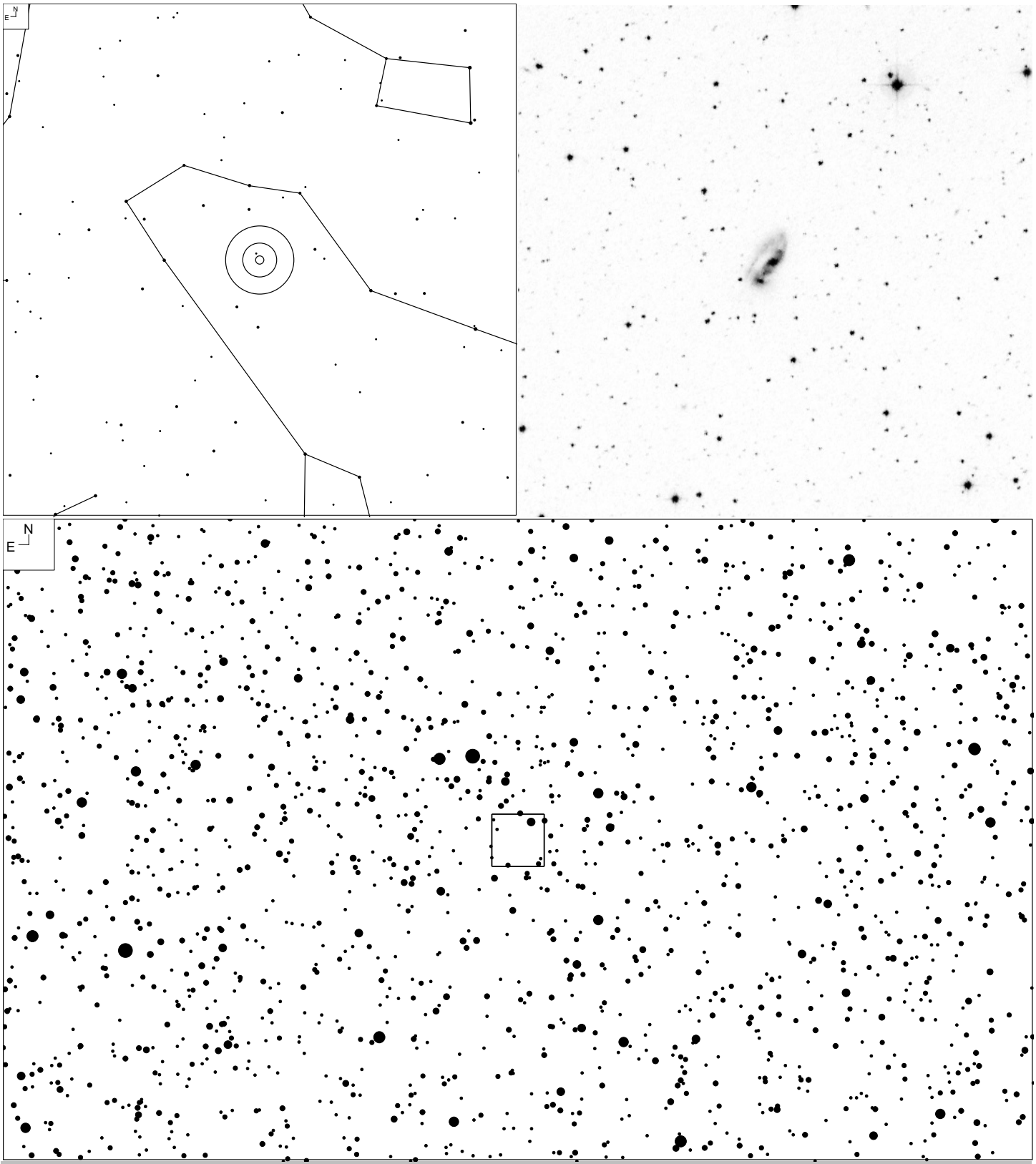






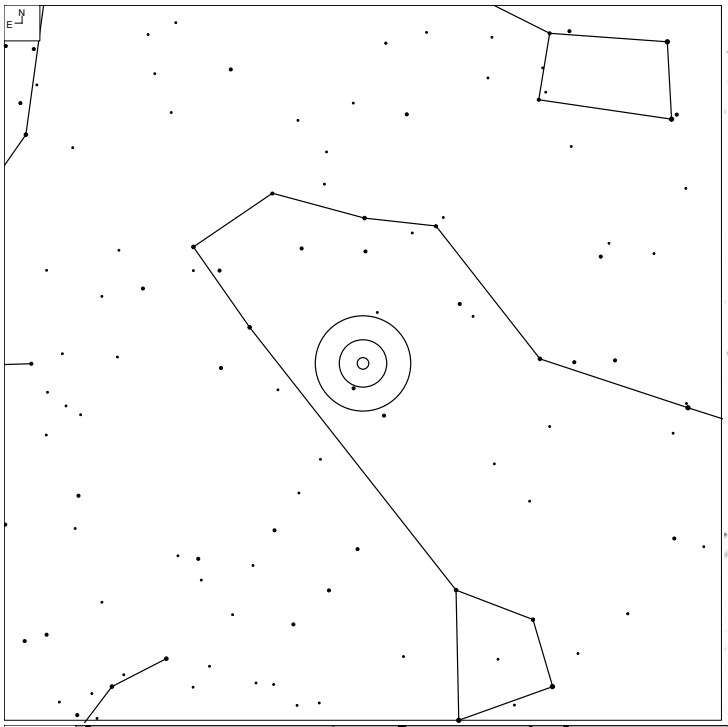
Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 11087	18 00 18.9	+34 38 23	14.6	0.6 x 0.4’	S	49	30

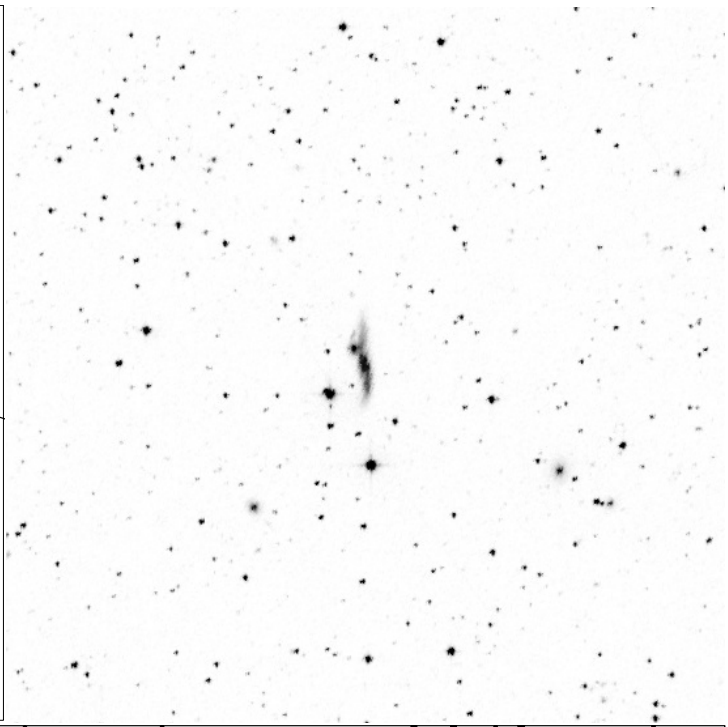
Kazarian 194 (Draco)

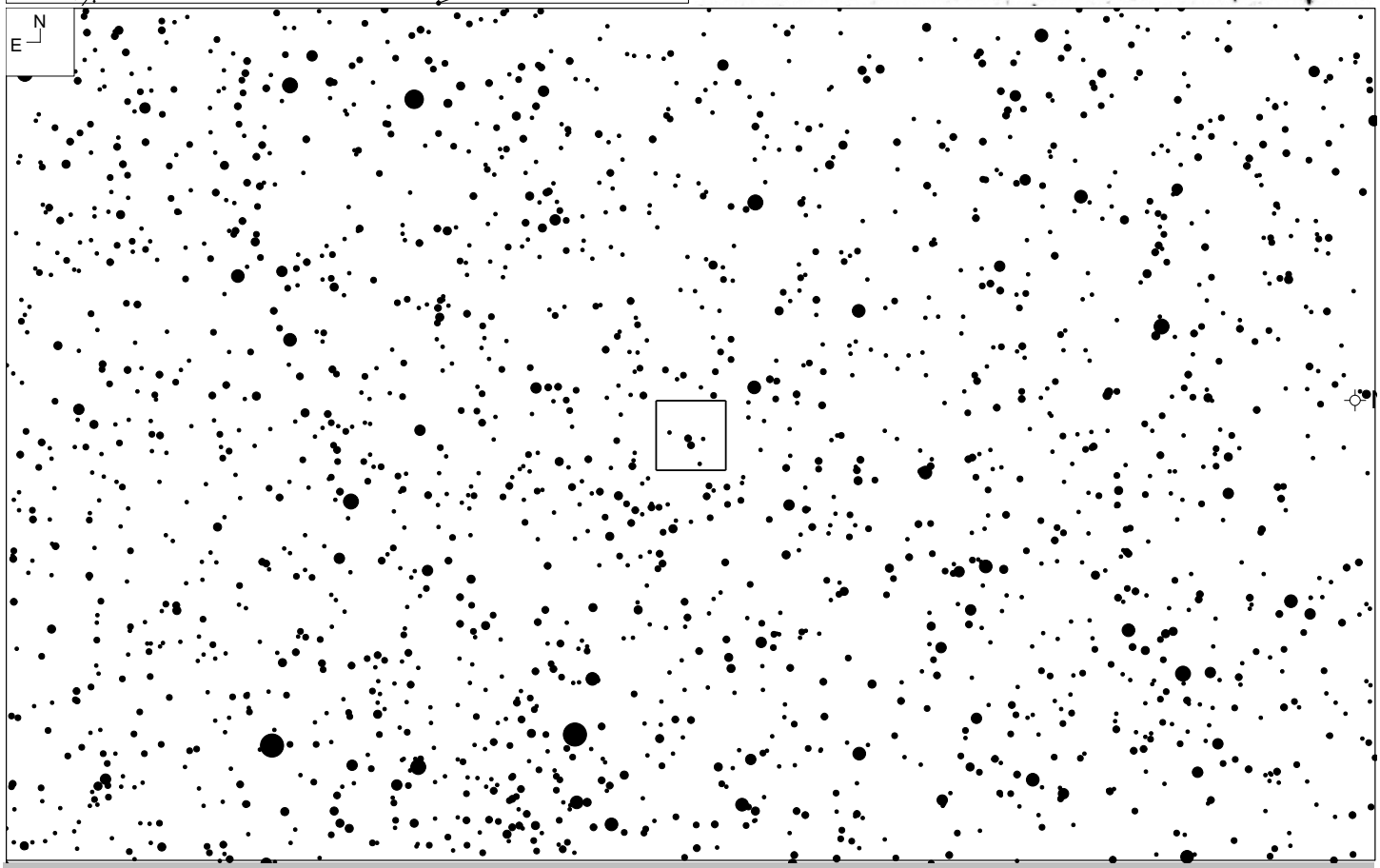


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6621	18 12 55.3	+68 21 48	14.0	2.0 x 0.7’	Sb pec	10	3

Kazarian 198 (Draco)

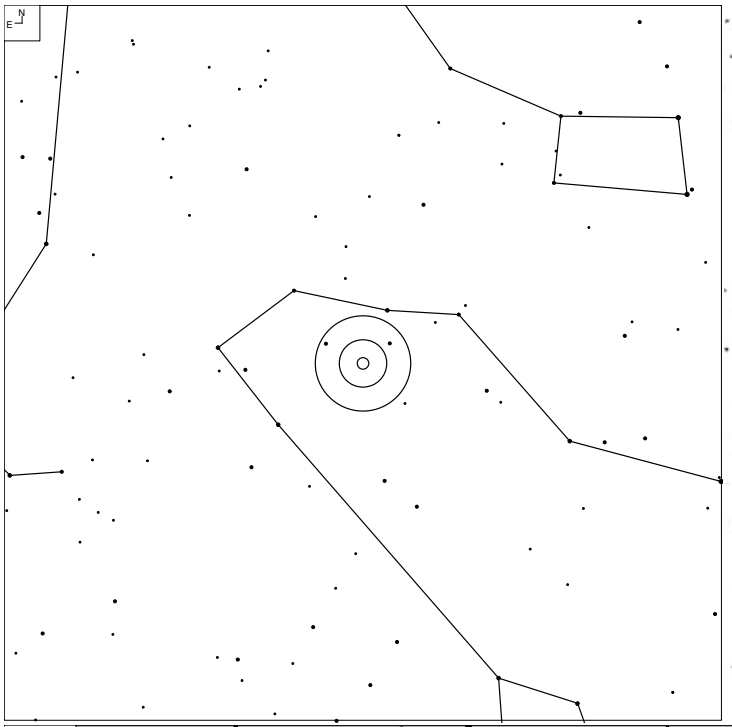


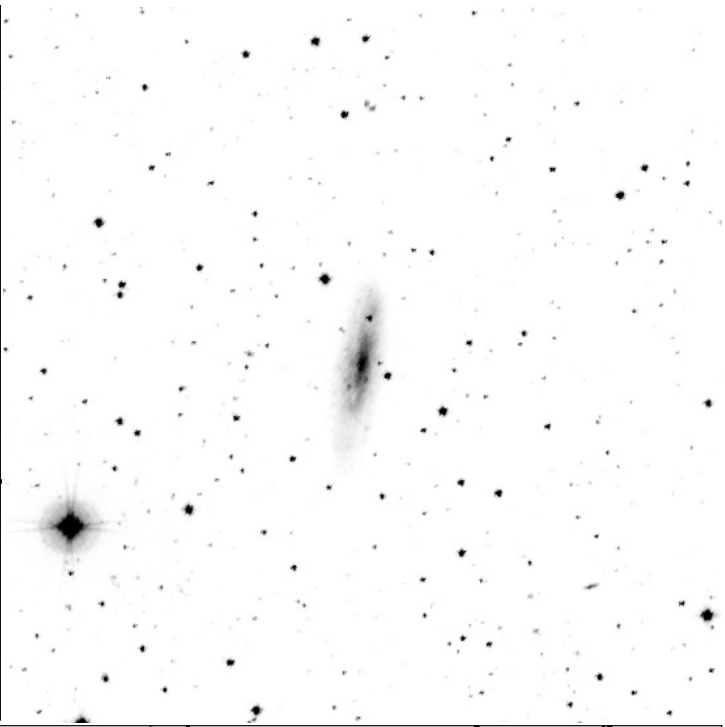


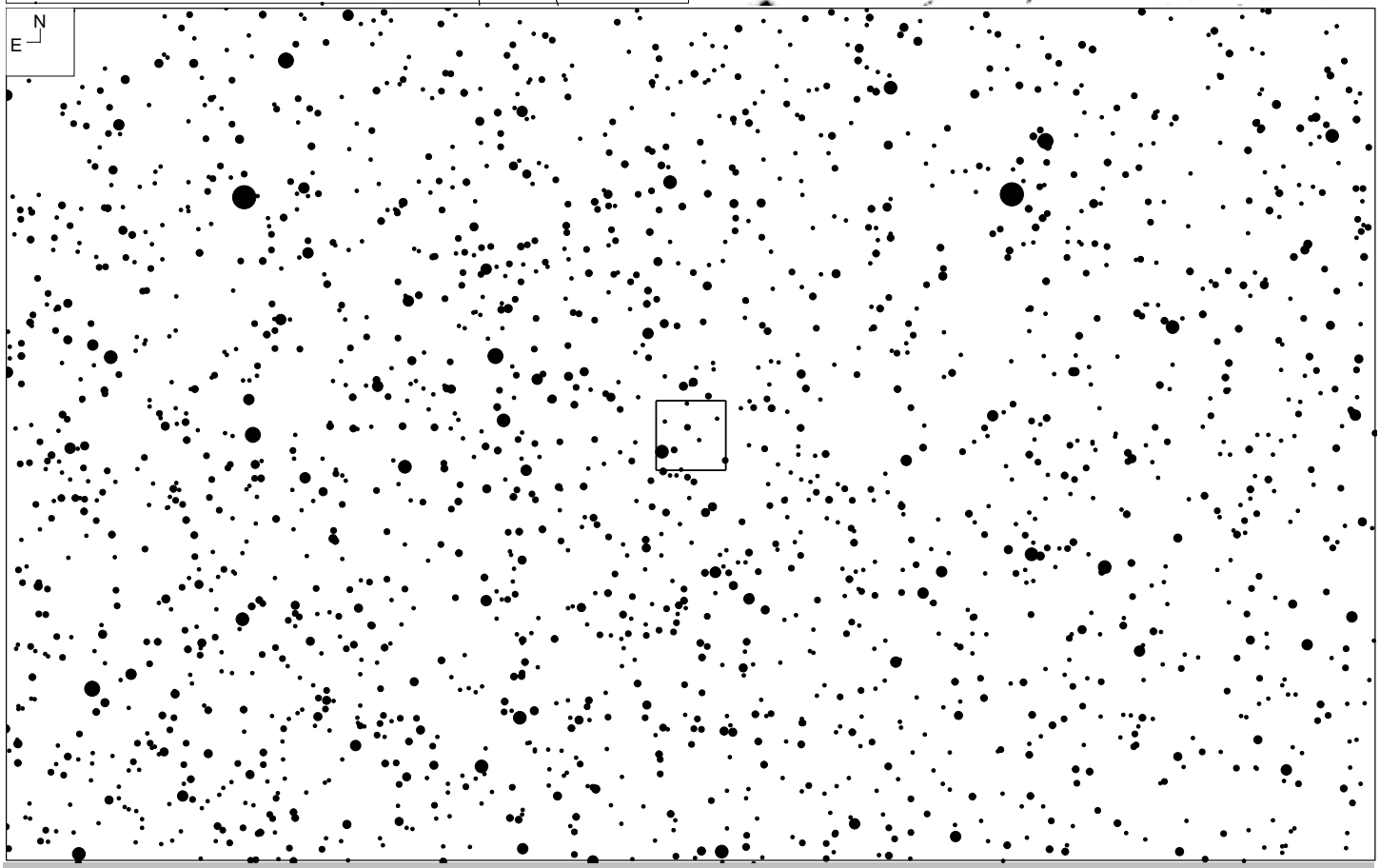


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6636	18 22 03.5	+66 37 13	14.0	2.1 x 0.3’	S	10	9

Kazarian 210 (Draco)

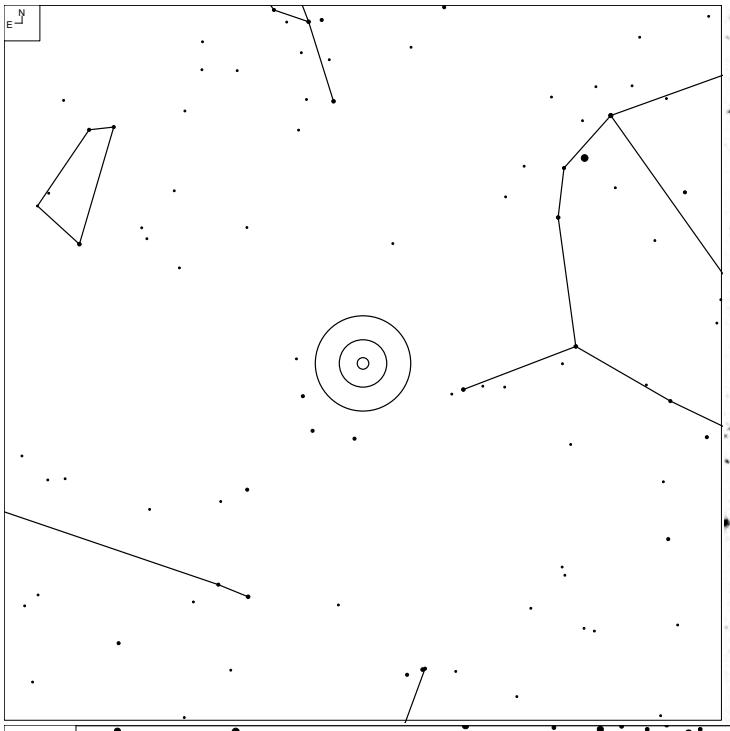


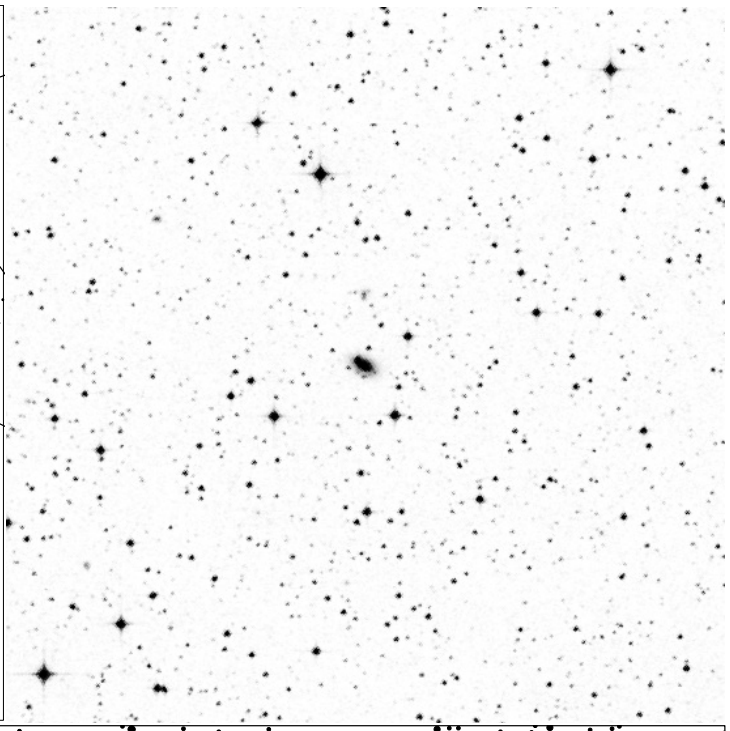


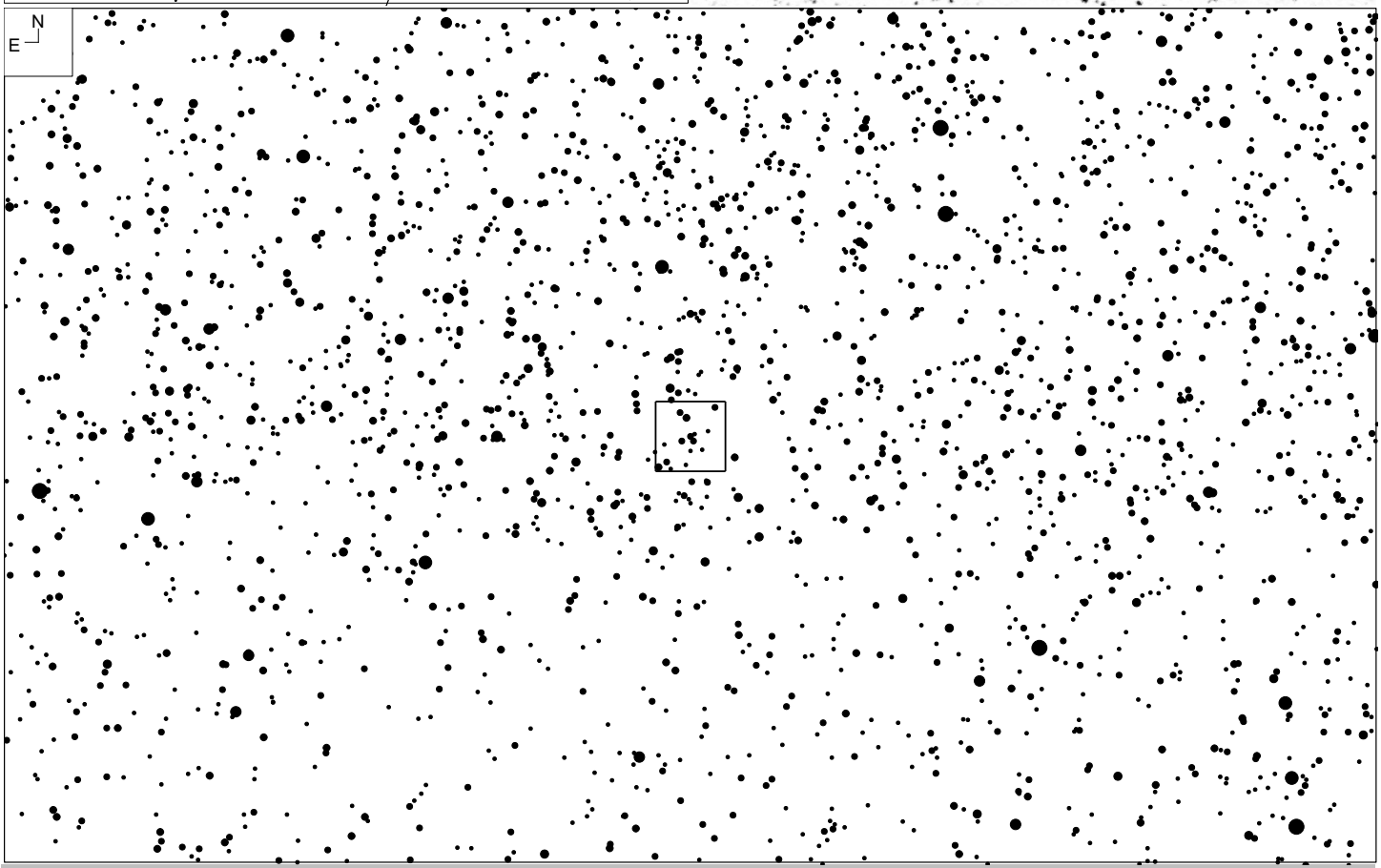


Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
NGC 6689	18 34 50.2	+70 31 26	13.1	3.8 x 1.2’	Sd sp	10	3

Arakelian 542 (Aquila)







Other ID	RA	Dec	Mag	Size	Class	Urano 2	iDSA
UGC 11566	20 28 11.9	+00 17 18	14.2	0.6 x 0.4’	S	104	41

2017: Open Clusters and Asterisms

The Texas Star Party
Advanced Observing 2017:
"Open Clusters and Asterisms"

Cluster	Coordinates 2000	Const	Type	Diam Arc'	V Mag.	No. Stars	Bt* V-m	Dist. Lt. Yrs	Trum. Type	Urano One
□ Alessi - J11046	11 04 37.2 – 31 57 39	Hya	Ast	3.3'	11.8	8	12.3			367
□ Brosch 1	12 33 19.5 – 00 38 52	Vir	Ast	0.7'		5	11.5			239
□ ESO 518-03	16 47 04.7 – 25 48 18	Sco	Cl	5.0'		72	11.5	4,127	I2p	336
□ Lynga 13	16 48 54.0 – 43 26 12	Sco	Cl	9.0'		356		3,713	III1m	407
□ Ruprecht 122	16 55 08.3 – 40 56 36	Sco	Cl	5.0'		42	10.5	5,239		407
□ VdB-Ha 205	16 56 11.7 – 40 40 06	Sco	Cl	4.0'		19	6.68	7,042		407
□ ESO 587-04	17 04 21.9 – 19 27 24	Oph	Cl	2.3'		17	11.4	17,183		337
□ Dol-Dzim7	17 11 25.7 + 15 28 35	Her	Cl	3.0'		6	9.7		IV1p	202
□ Trumpler 25	17 24 30.3 – 39 01 16	Sco	Cl	8.0'	11.7	449	11.3	5,927	II1m	408
□ Ruprecht 124	17 27 56.8 – 40 43 28	Sco	Cl?	2.0'		15	12.0		III1p	408
□ Collinder 333	17 31 31.3 – 34 00 37	Sco	Cl	7.0'	9.8	159	8.6	2,787	II2m	376
□ Terzan-Ju 20	17 33 31.6 – 29 19 13	Oph	Ast	2.5'		9	9.9			376
□ Trumpler 27	17 36 12.7 – 33 29 10	Sco	Cl?	6.0'	6.7	155	8.39	3,948	III3m	376
□ Trumpler 28	17 36 56.2 – 32 28 02	Sco	Cl	5.0'	7.7	146	9.84	4,479	III2m n	376
□ Collinder 347	17 46 18.4 – 29 20 02	Sgr	Cl	10.0'	8.8	393	10.7	4,936	II2m n	377
□ NGC 6520/B86	18 03 24.0 – 27 53 18	Sgr	Cl	2.0'	7.6	99	9.0	6,194	III1p n	339
□ Collinder 469	18 16 34.0 – 18 18 42	Sgr	Cl	3.0'	9.1	112	10.7	4,828	IV1p	339
□ Trumpler 32	18 17 10.7 – 13 20 44	Ser	Cl	12.0'	12.2	75	11.8	5,607	I2m	294
□ Ruprecht 170	18 25 12.0 – 10 00 00	Sct	Cl	8.0'		226	13.0	18,859	IV1m	295
□ Bica 3	18 26 06.1 – 13 03 38	Sct	Cl	3.5'		85	11.8	5,346		295
□ Dias 6	18 30 30.0 – 12 18 59	Sct	Cl	6.0'		105	12.0	7,299		295
□ NGC 6645	18 32 36.0 – 16 53 00	Sgr	Cl	14.8'	8.5	72	9.9	4,059	IV1m	295
□ Ruprecht 144	18 33 34.0 – 11 25 00	Sct	Cl	12.0'		358	12.0	5,216	IV1p	295
□ Kemble 2	18 35 00.0 + 72 23 00	Dra	Ast	30.0'		17	7.0			30
□ Apriamasvili 1	18 48 06.0 – 05 51 00	Sct	Cl	5.0'	8.9	94	12.6	7,100	IV1p	295
□ Archinal 1	18 54 49.0 + 05 32 54	Ser	Cl?	1.5'		11	13.4	4,606	II2p	205
□ Alessi 62	18 55 19.0 + 21 36 06	Her	Cl	23.0'		15	8.6	1,780		160
□ Berkeley 82	19 11 20.0 + 13 07 06	Aql	Cl?	2.0'		31	14.0	3,195	III1p	206
□ Berkeley 45	19 19 06.2 + 15 43 07	Aql	Cl	2.0'		83	15.0	7,661	II1p	206
□ Berkeley 46	19 20 53.0 + 37 46 18	Lyr	Cl	10.0'	9.5	321	15.0	13,000	I2r	118
□ King 25	19 24 34.1 + 13 42 14	Aql	Cl?	5.0'		40	14.0		III2m	206
□ Kronberger 13	19 25 15.0 + 13 56 42	Aql	Cl	1.2'		28		4,500		206
□ Teutsch 42	19 30 13.1 + 18 32 09	Sge	Cl	1.1'		28	13.3	5,216		162
□ Teutsch 27	19 37 20.6 + 18 41 51	Sge	Cl	3.6'		65		8,085		162
□ SkiffJ1942+38.6	19 42 24.0 + 38 39 00	Cyg	Cl	10.0'		285	11.3	8,613	II1p	119
□ Teutsch 43	19 42 47.3 + 29 51 10	Cyg	Cl	2.6'		59	11.9	6,846		119
□ Czernik 41	19 50 50.8 + 25 16 47	Vul	Cl	8.0'		68	9.2		III2m	162
□ Kronberger 52	19 58 08.0 + 30 53 12	Cyg	Cl	1.2'		39	14.6	2,300		119
□ Roslund 3	19 58 41.6 + 20 30 39	Sge	Cl	5.0'		153	9.9	4,782	IV1p	162
□ Berkeley 49	19 59 31.0 + 34 38 48	Cyg	Cl?	2.5'	13.0	43	16.0	6,813	I1p	119
□ Kronberger 54	20 03 06.5 + 31 58 05	Cyg	Cl	0.8'		46	13.9	5,600		119
□ Alessi-J20046	20 04 36.0 – 10 31 46	Aql	Ast	20.0'	7.5	20	8.9			298
□ Berkeley 84	20 04 43.0 + 33 54 18	Cyg	Cl	2.5'		57	16.0	8,965	II1p n	119
□ Roslund 4	20 04 45.8 + 29 13 44	Sge	Cl	5.0'	10.0	80	9.5	6,520	II3m n	162
□ IC 1311	20 10 47.4 + 41 13 00	Cyg	Cl	5.0'	13.1	91	17.0	19,645	I1rn n	84
□ AH03-J2011.9	20 11 57.2 + 26 44 38	Vul	Ast	4.5		9	7.6	8,368		163

The Texas Star Party – Advanced Observing 2017 (Cont.):
"Open Clusters and Asterisms"

Cluster	Coordinates 2000	Const	Type	Diam Arc'	V Mag.	No. Stars	Bt* V-m	Dist. Lt. Yrs	Trum. Type	Urano One
□ Kronberger 73	20 13 44.4 + 36 45 05	Cyg	Cl	1.2′		60	17.0	5,526		119
□ IC 4996	20 16 30.0 + 37 38 00	Cyg	Cl	2.2′	7.3	65	8.0	7,817	II3p n	119
□ Berkeley 86	20 20 12.0 + 38 41 24	Cyg	Cl	6.0′	7.9	73	9.2	3,625	IV2m n	120
□ Collinder 421	20 23 18.0 + 41 42 00	Cyg	Cl	3.6′	10.1	22	9.8	3,423	III1p n	84
□ Berkeley 89	20 24 28.8 + 46 02 36	Cyg	Cl	3.0′		66	15.0	6,650	III1p	85
□ Dolidze 9	20 25 32.8 + 41 54 29	Cyg	Cl?	5.0′	10.47	8	6.8	3,465	IV2pn	85
□ Bica 1	20 33 10.0 + 41 13 07	Cyg	Cl	3.0′		27	11.0	5,868		85
□ Bica 2	20 33 15.0 + 41 18 42	Cyg	Cl	4.0′		55	7.5	5,868		85
□ Stein 1	20 35 11.2 + 46 05 23	Cyg	Ast	1.5′		6	9.5			85
□ Berkeley 53	20 55 57.9 + 51 04 52	Cyg	Cl	22.0′		393	16.0	10,106	III2m	56
□ French 1	21 07 26.4 + 16 18 17	Del	Ast	13.0′			8.8			210
□ Platais 1	21 30 02.0 + 48 58 36	Cyg	Cl	10.0′		414	8.9	4,134		86
□ Barkhatova 2	21 43 38.0 + 51 04 17	Cyg	Cl	5.0′	8.4	69	10.0	5,464	III1p	57
□ Teutsch 74	21 45 40.0 + 58 05 37	Cep	Cl	4.0′		39	14.0	8,639		57

Observe ANY Twenty Objects (20 out of 60!) – Collect a TSP Advanced Observing Pin

Headings:

Type: ***Cl*** = Cluster; ***Ast*** = Asterism; ***Cl? / Ast?*** = Type Status Not Clear

Diameter : Arc': Approximate size in arcmin. to 25 mags. per square arcsecond Isophote

V-Magnitude: Visual Magnitude, rough values good to 0.5 to 1.0 magnitude.

Bt* V-m: V-magnitude of the Brightest Star in the Cluster

***** Trumpler ("Trum.") Type*****

Concentration:

I. Detached, Strong Concentration
II. Detached, Slight Concentration
III. Detached, No Concentration
IV. Not Detached

Range of Brightness:

1. Most Stars of Near Same Brightness
2. Medium Range in Brightness
3. Bright and Faint Stars in Cluster

Richness:

vp Very Poor
p Poor
m Medium
r Rich
Vr Very rich
n Nebulosity

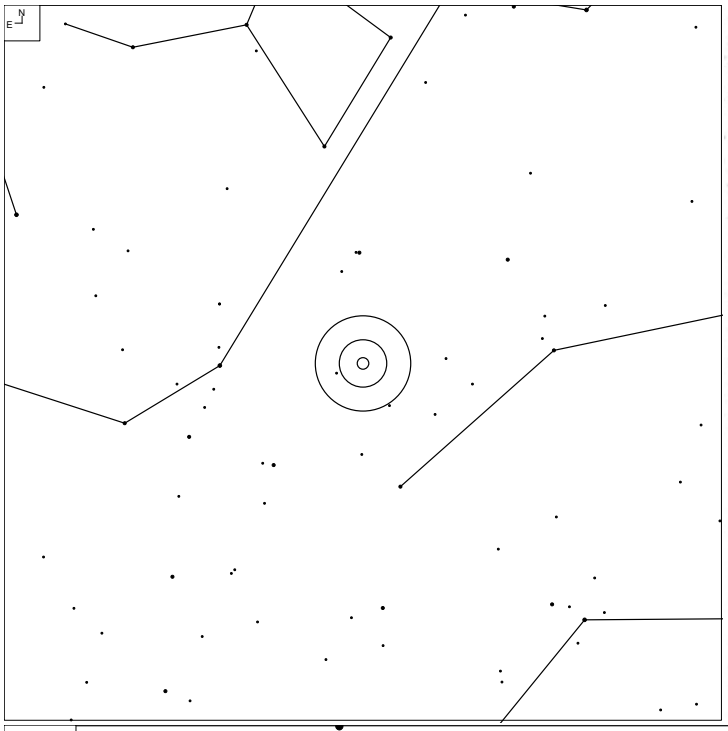
Source: "MegaStar", Wilman Bell

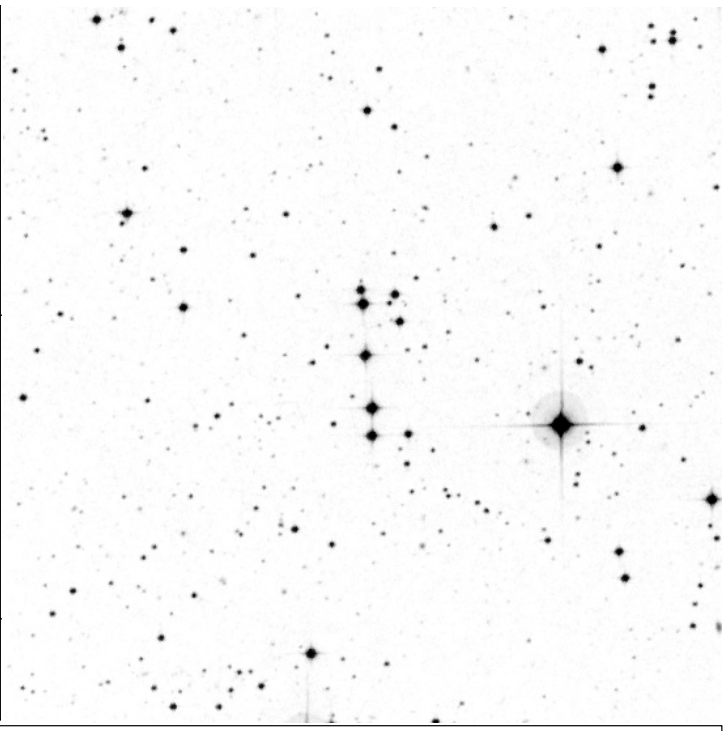
Clear – Steady Skies – Happy Hunting,

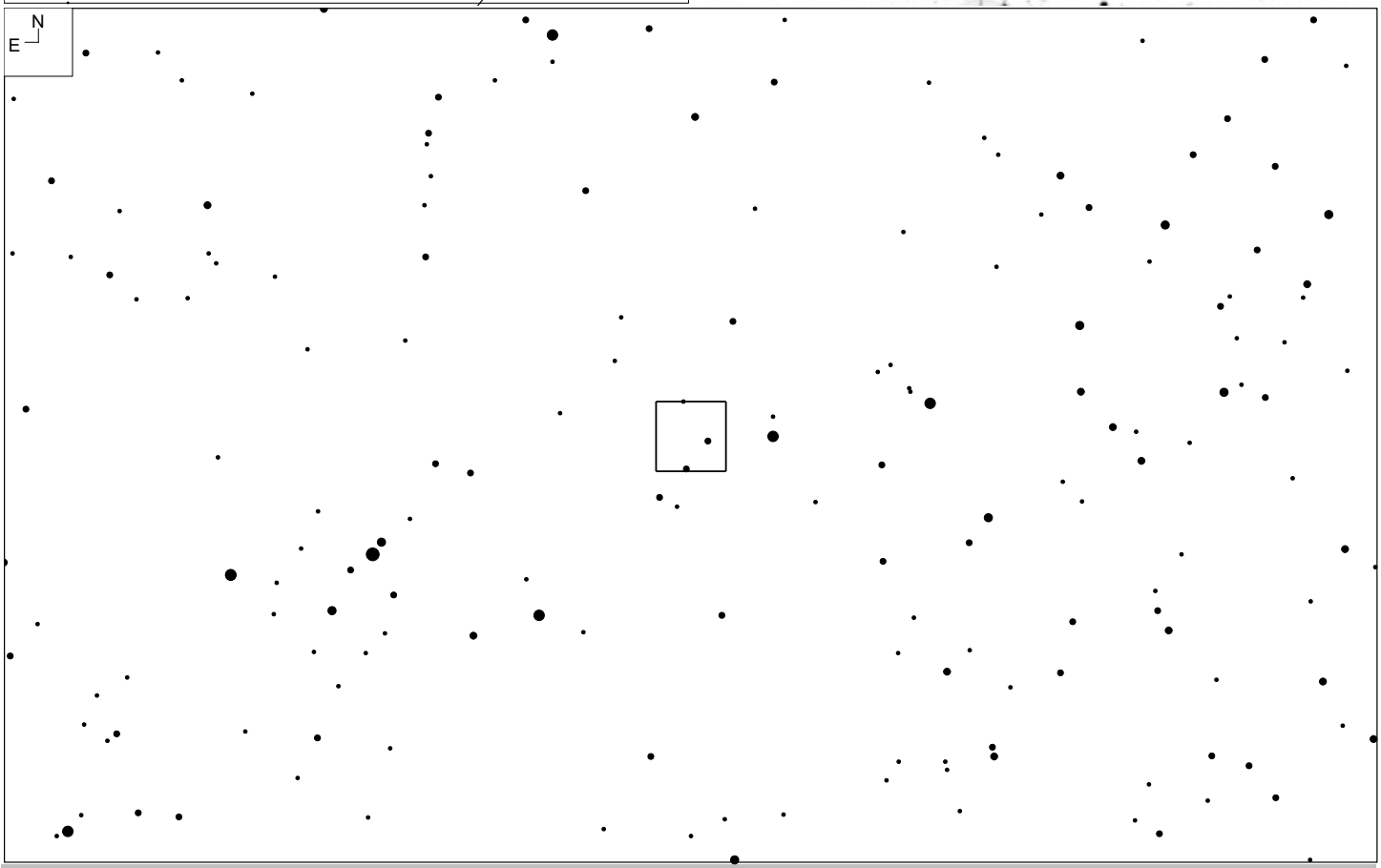
Larry Mitchell

TSP Advanced Observing Chairman

Alessi - J11046 (Hydra)

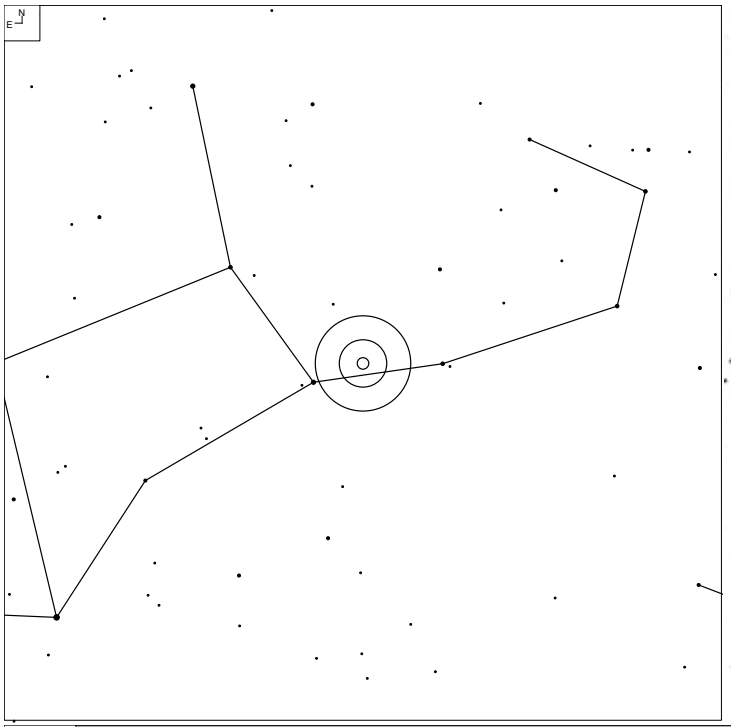


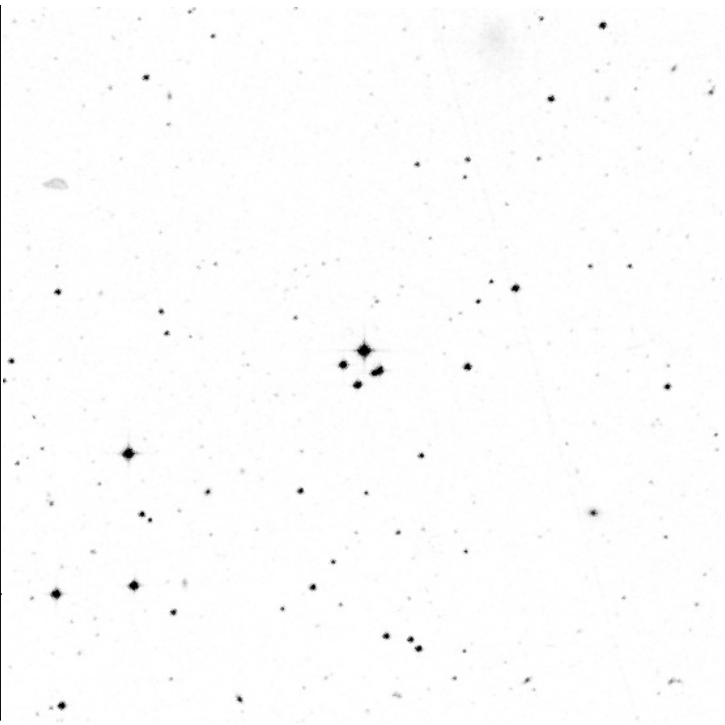


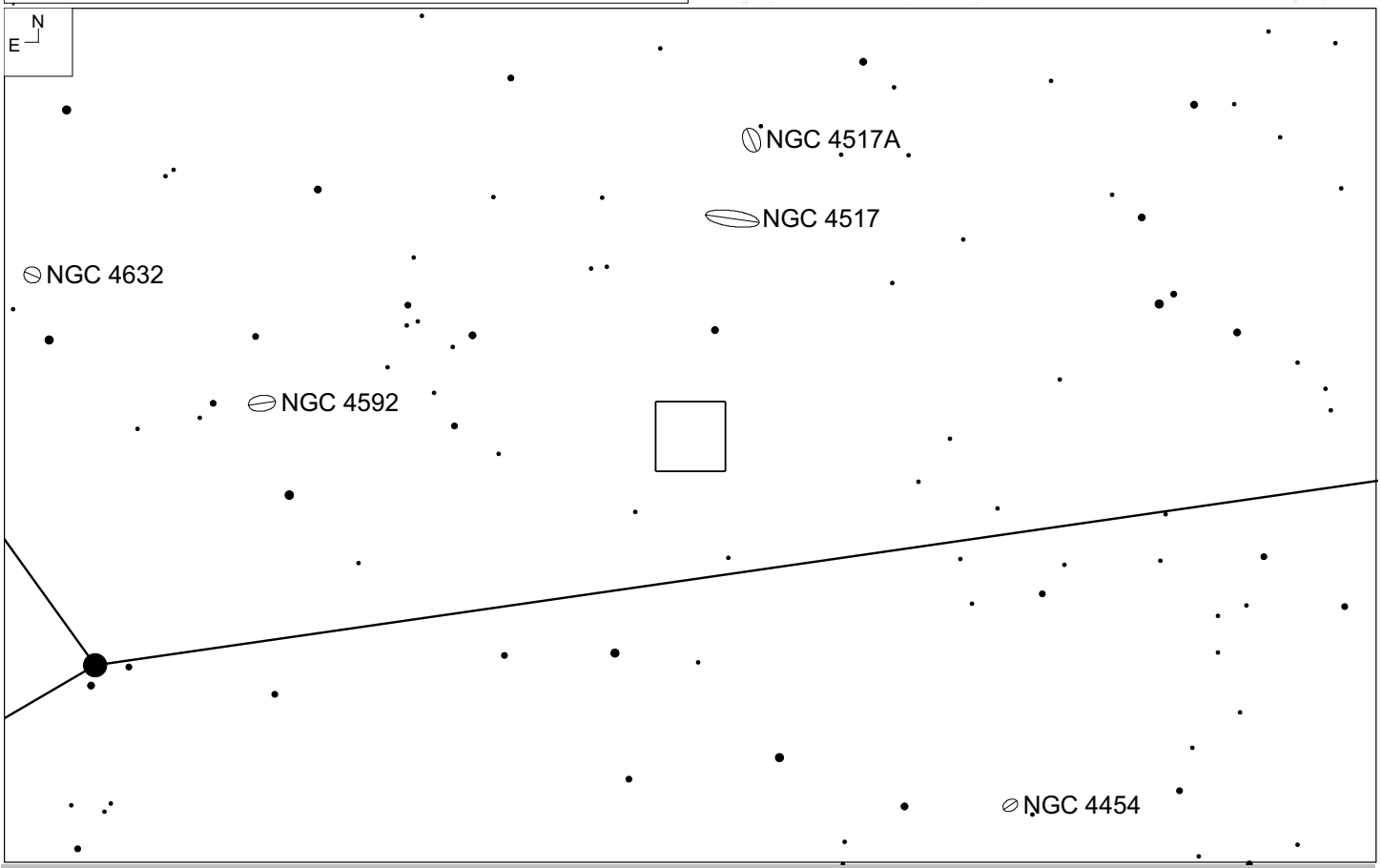


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
11 04 37.2	–31 57 39	3.3’	11.8	8	12.3	-	169	82

Brosch 1 (Virgo)

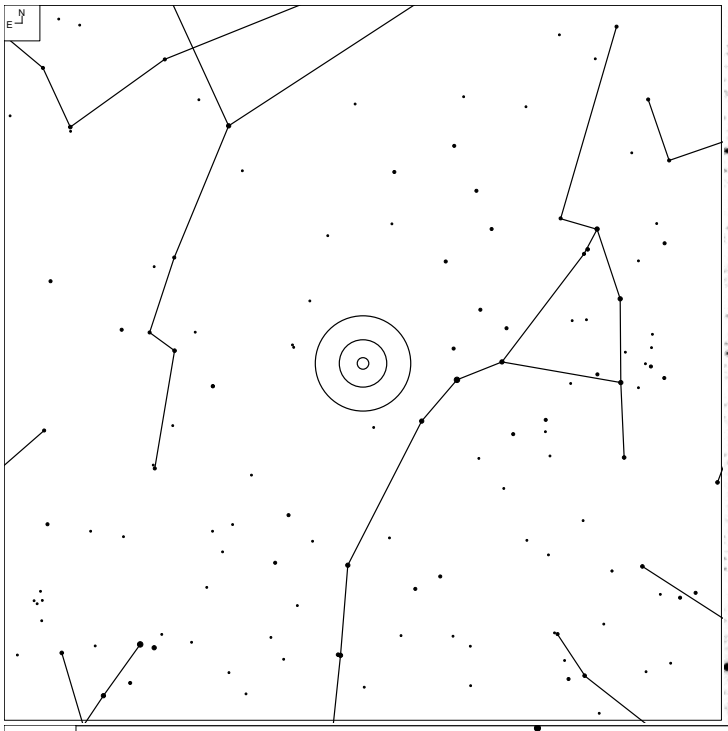


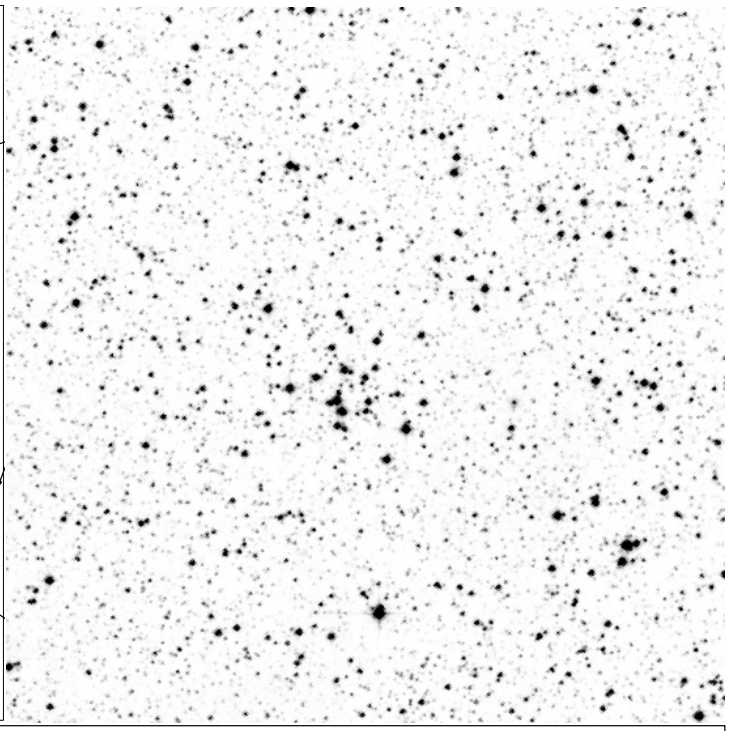


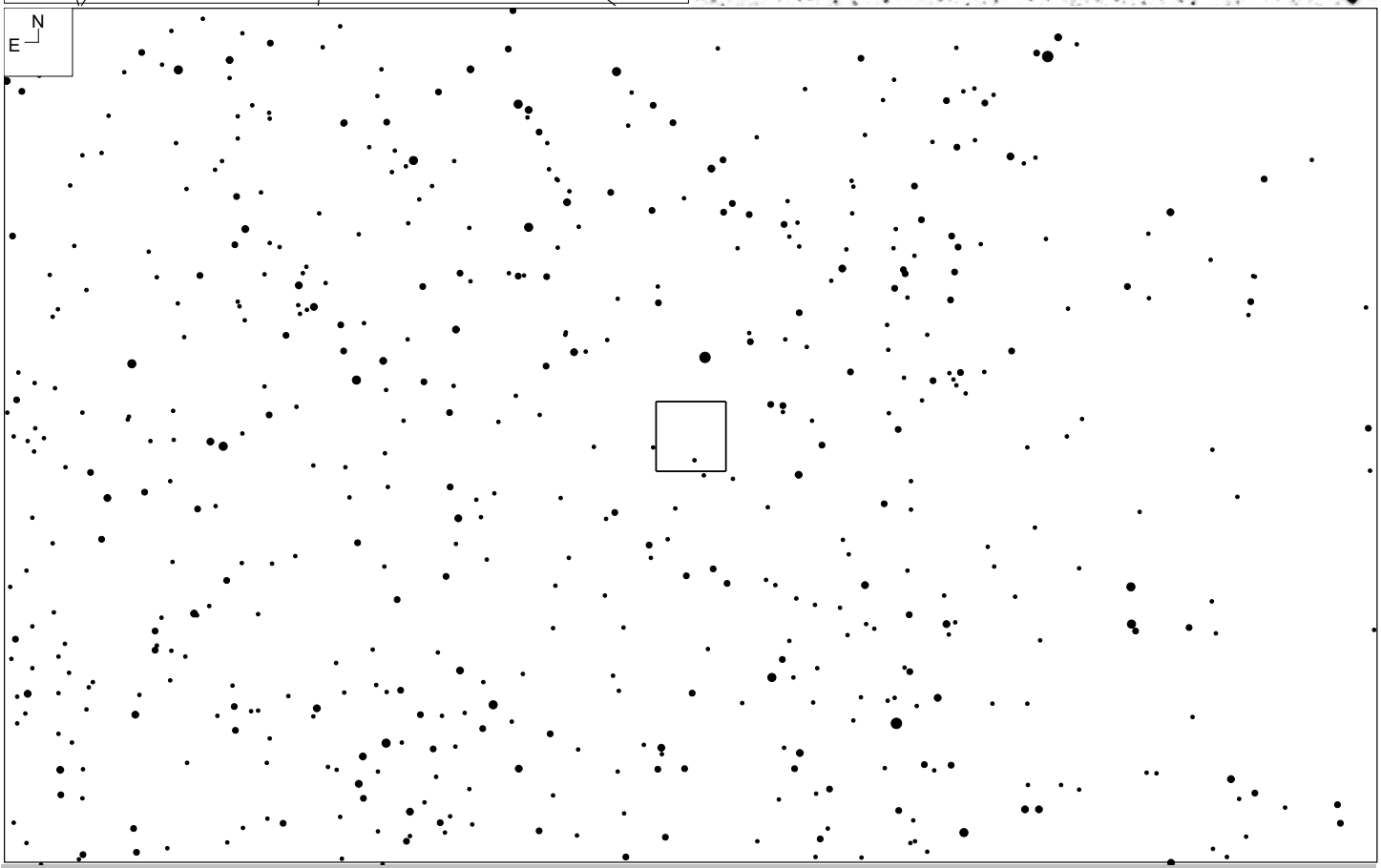


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
12 33 19.5	–00 38 52	0.7’	-	5	11.5	-	111	57

ESO 518-03 (Scorpius)

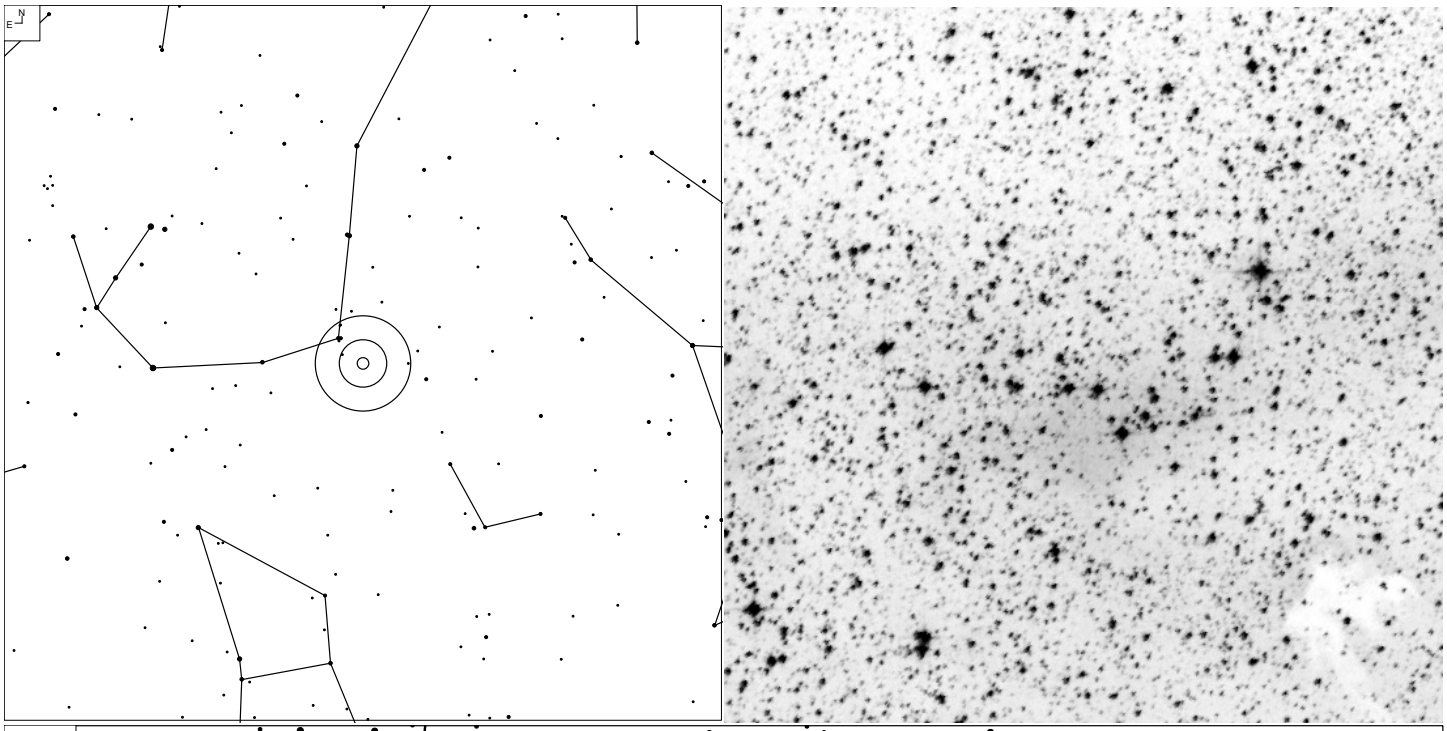


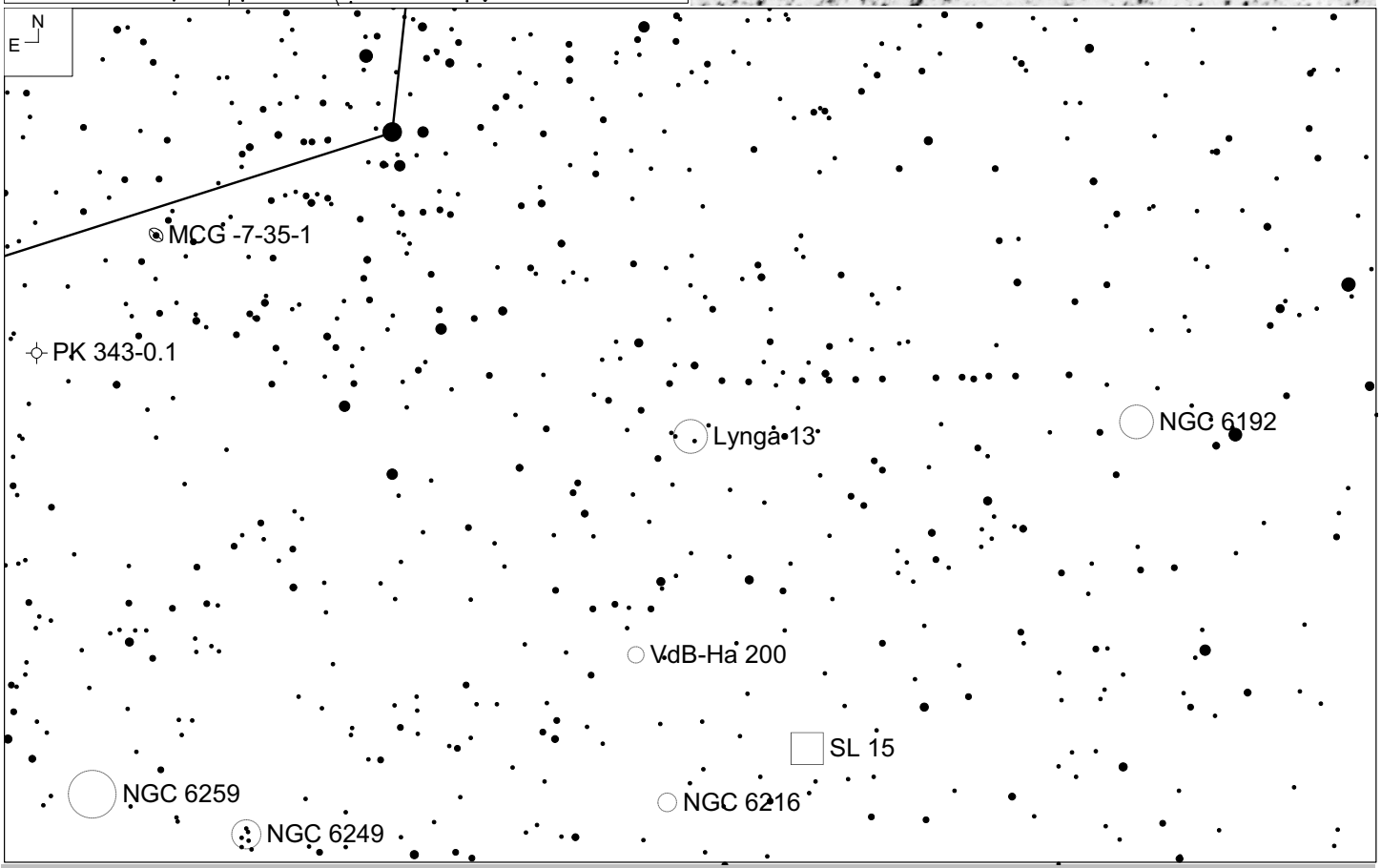




RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
16 47 04.7	–25 48 18	5.0’	-	72	11.5	I2p	146	79

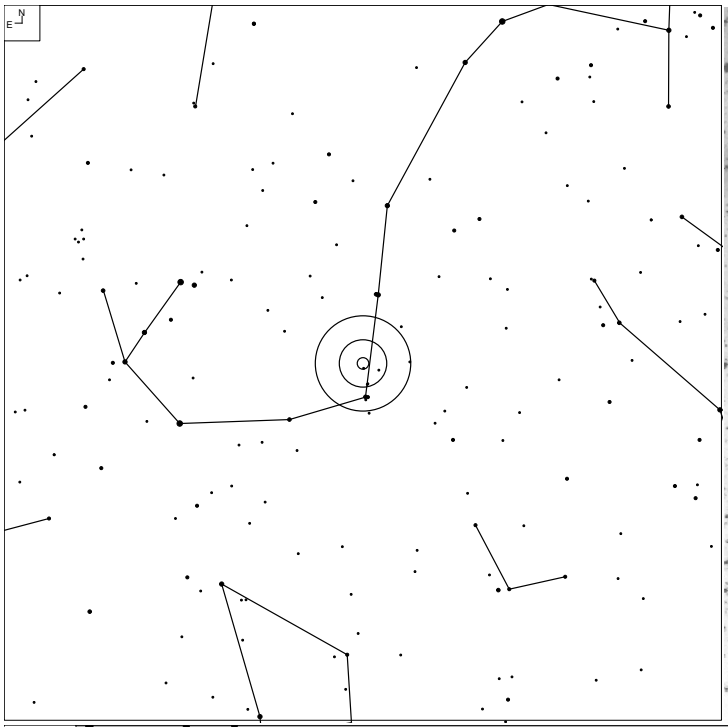
Lynga 13 (Scorpius)

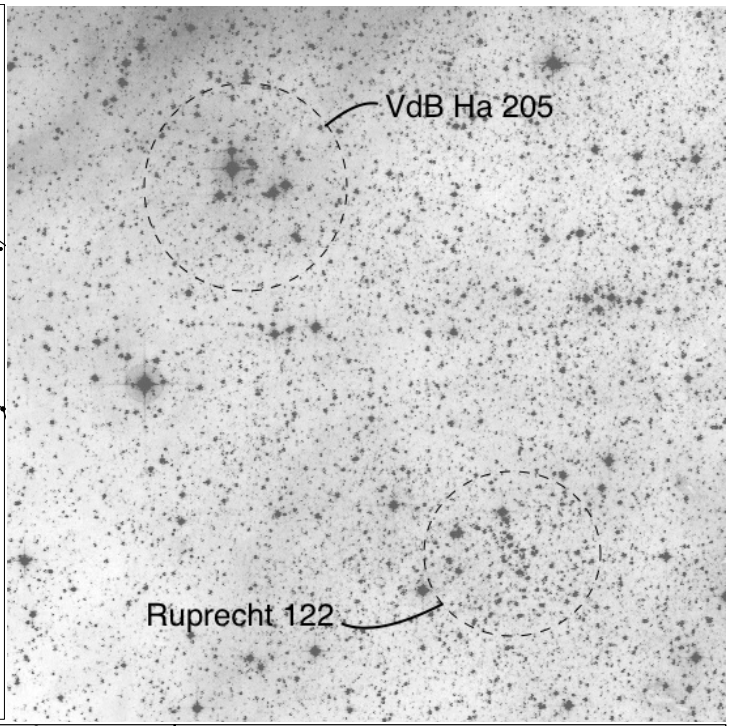


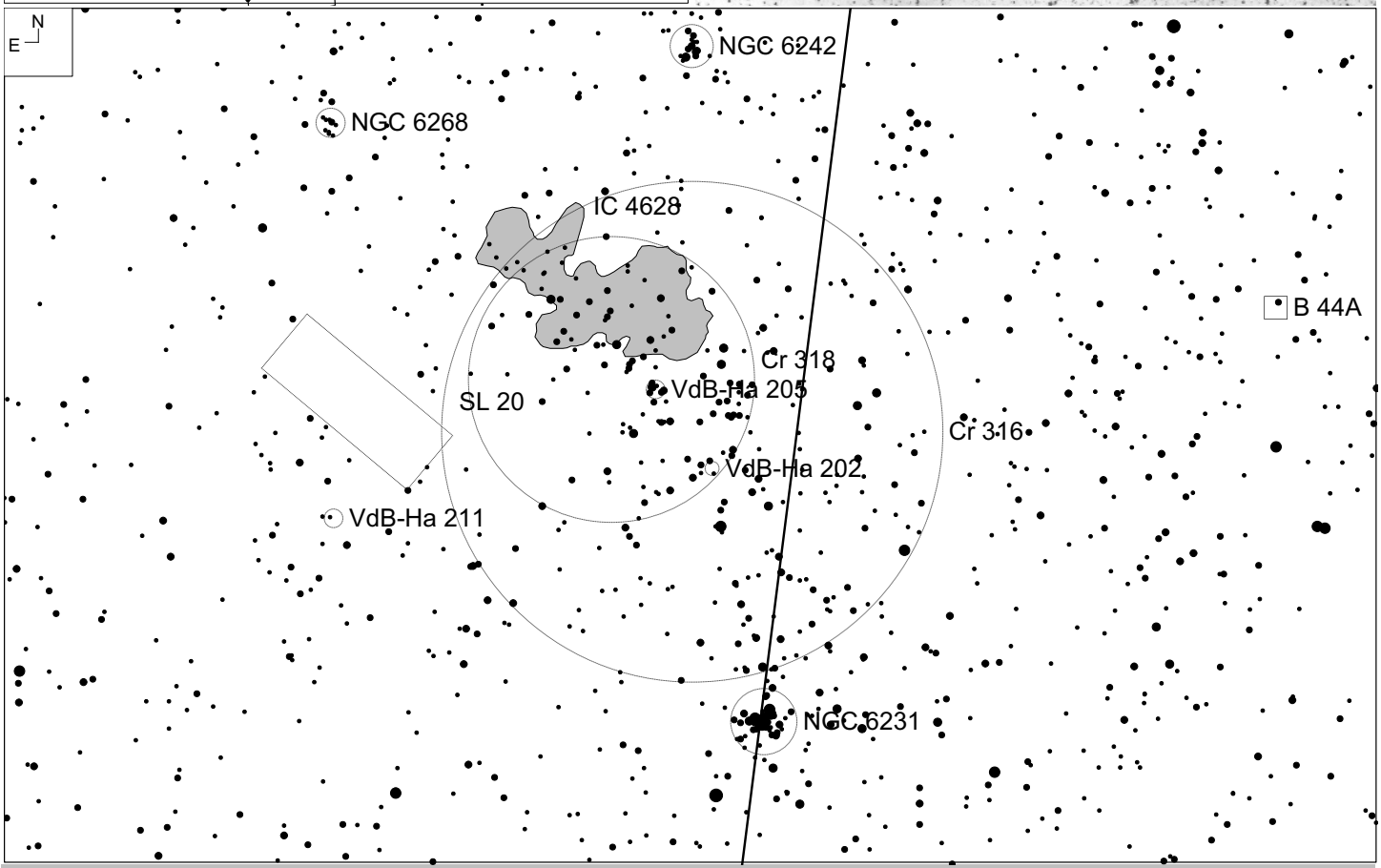


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
16 48 54.0	–43 26 12	9’	-	356	-	III1m	181	91

Ruprecht 122 and VdB-Ha 205 (Scorpius)

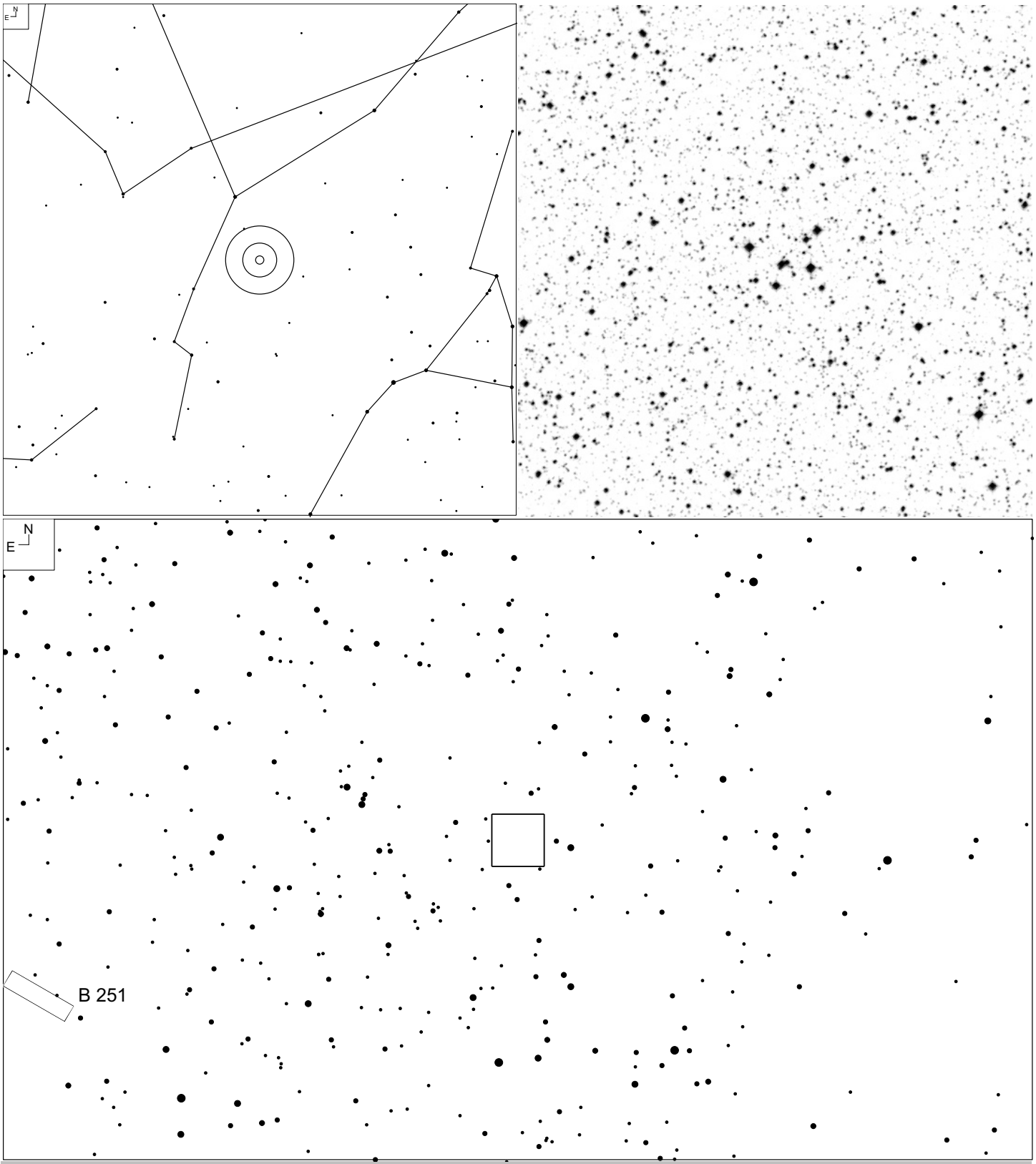






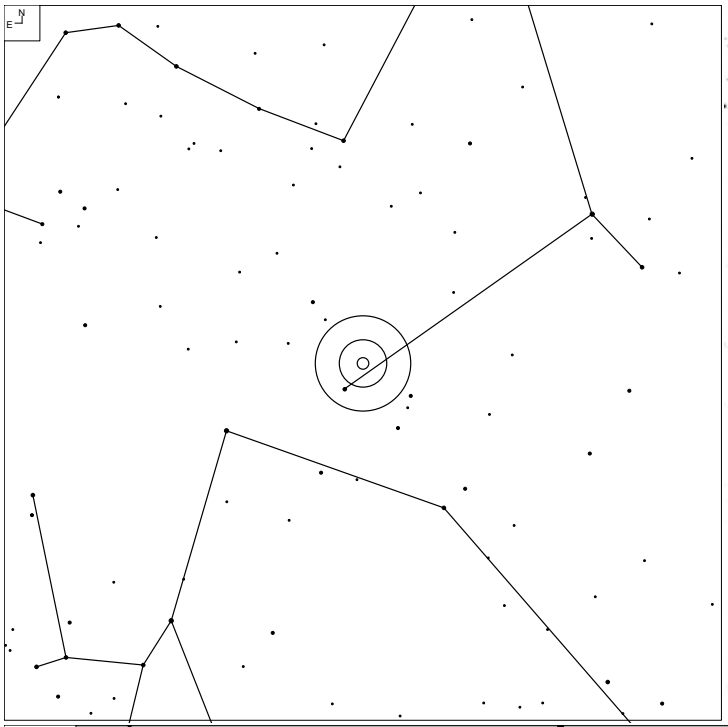
Other ID	RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
VdB Ha 202	16 55 08.3	–40 56 36	5’	-	42	10.5	-	164	91
	16 56 11.7	–40 40 06	4’	-	19	6.68	-		

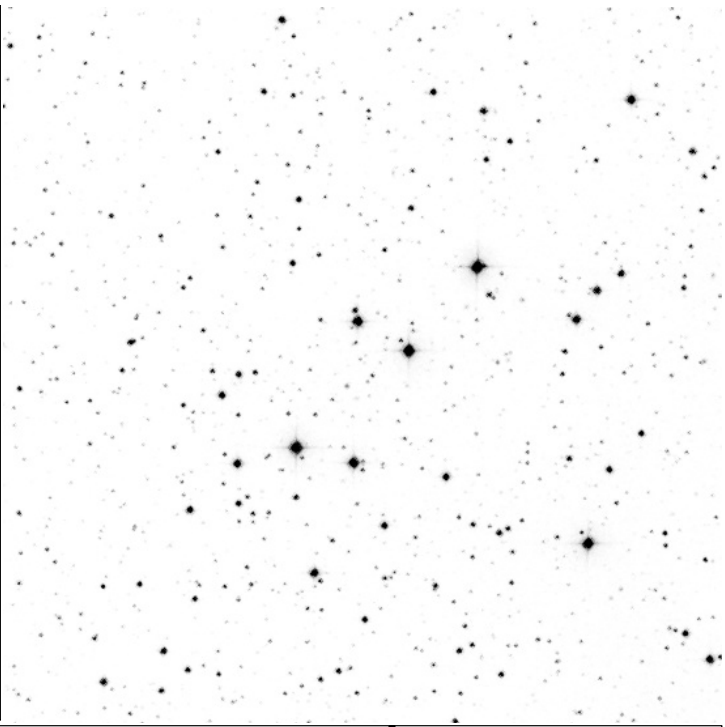
ESO 587-04 (Ophiuchus)

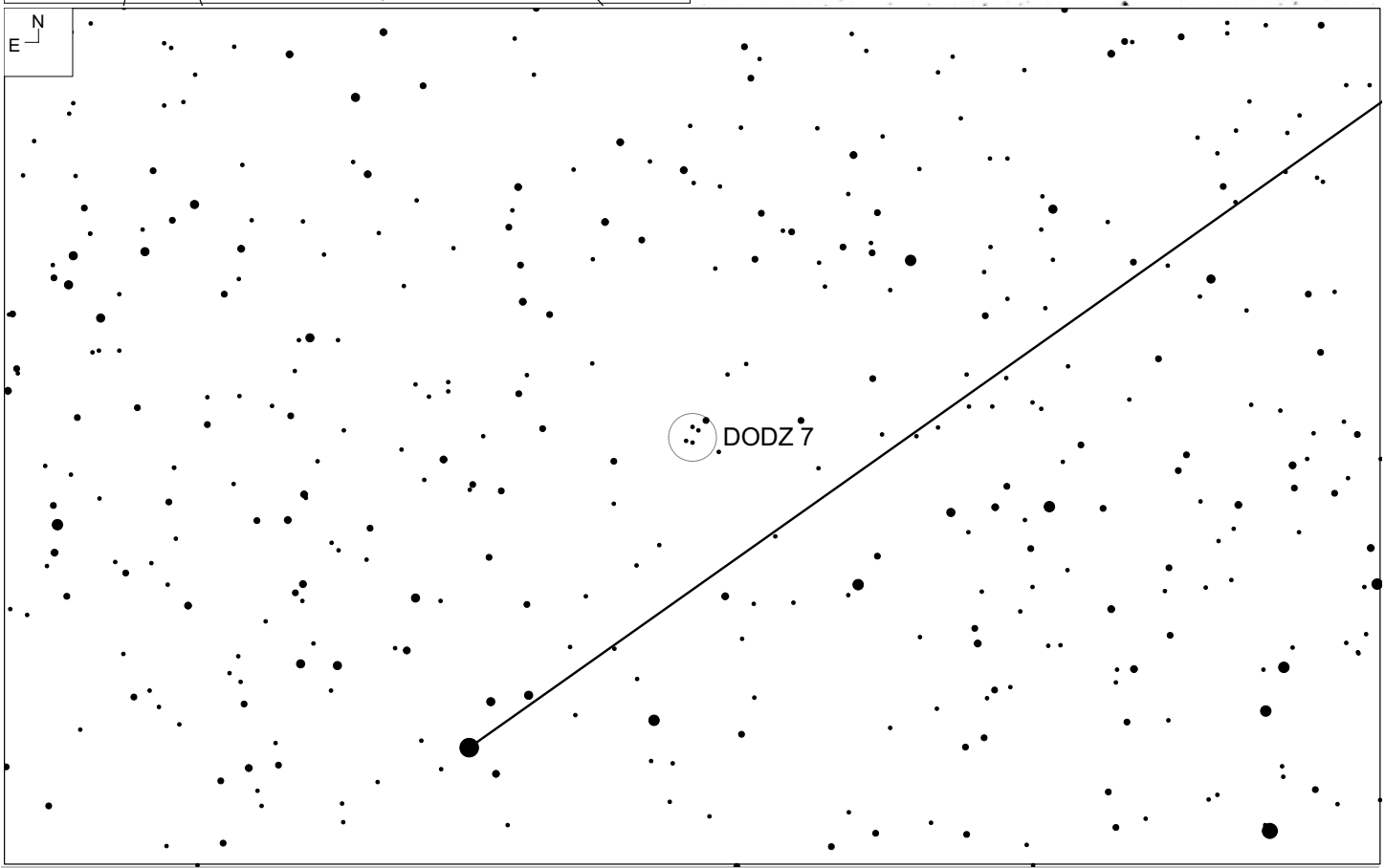


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
17 04 21.9	–19 27 24	2.3’	-	17	11.4	-	146	67

Dol-Dzim 7 (Hercules)

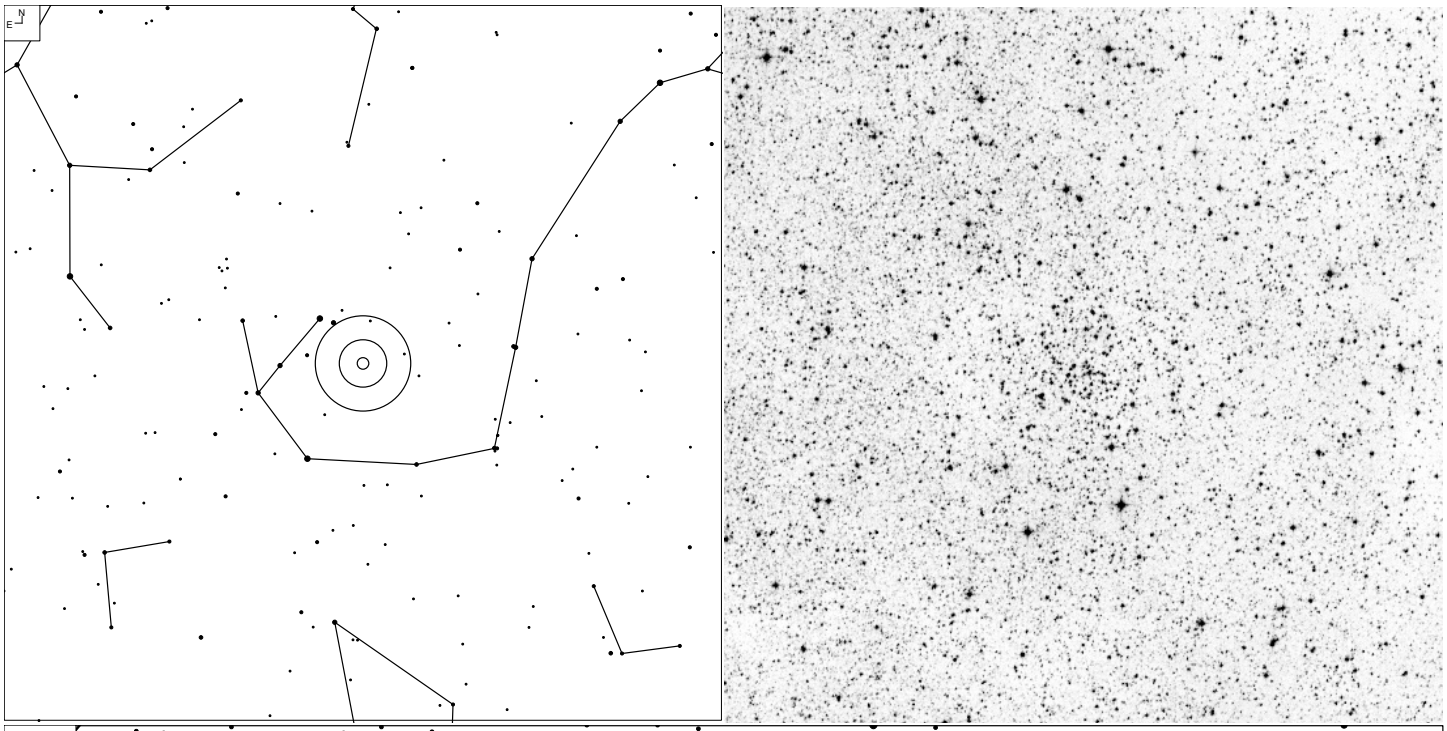


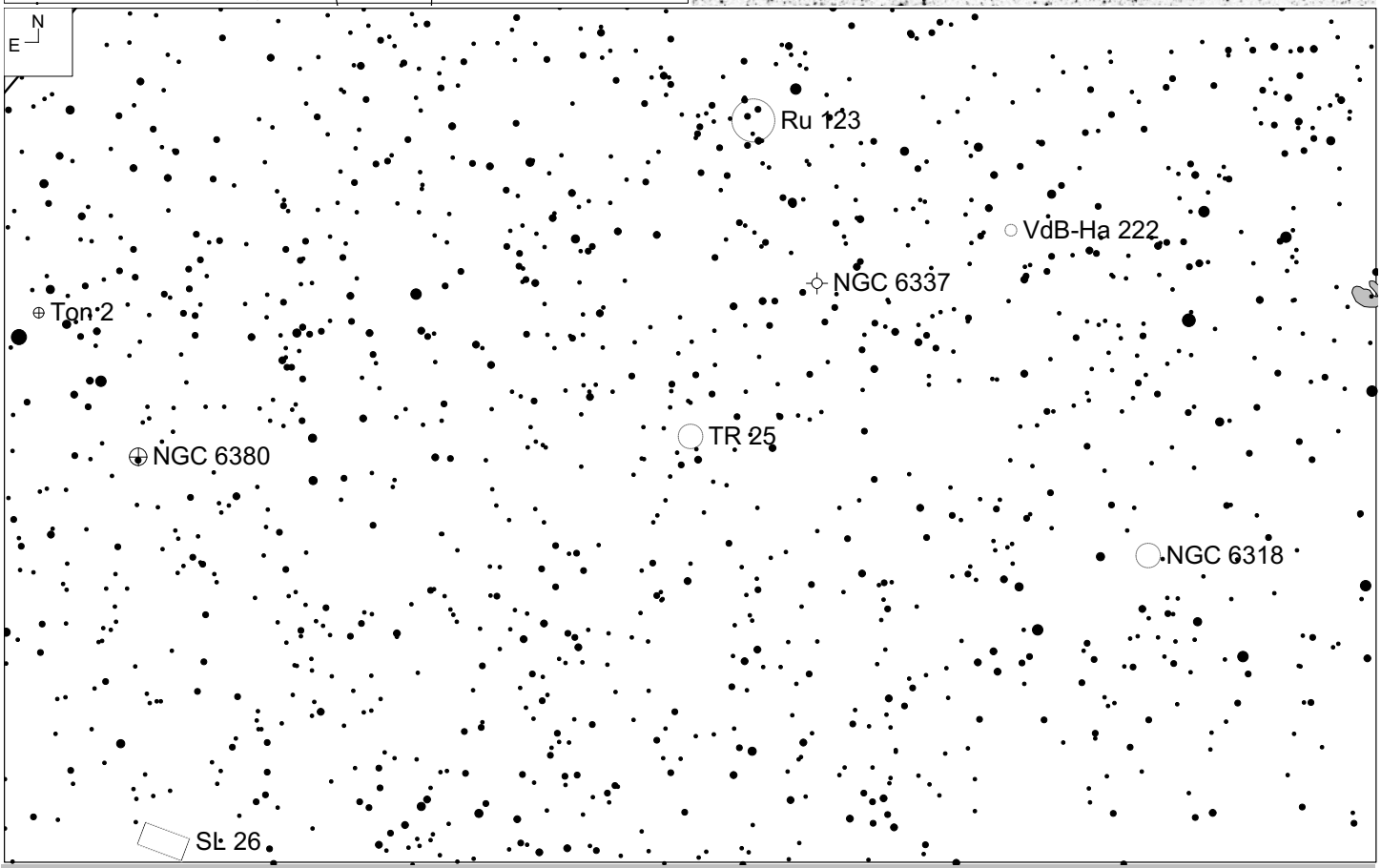




RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
17 11 25.7	+15 28 35	10’	-	6	9.7	IV1p	87	43

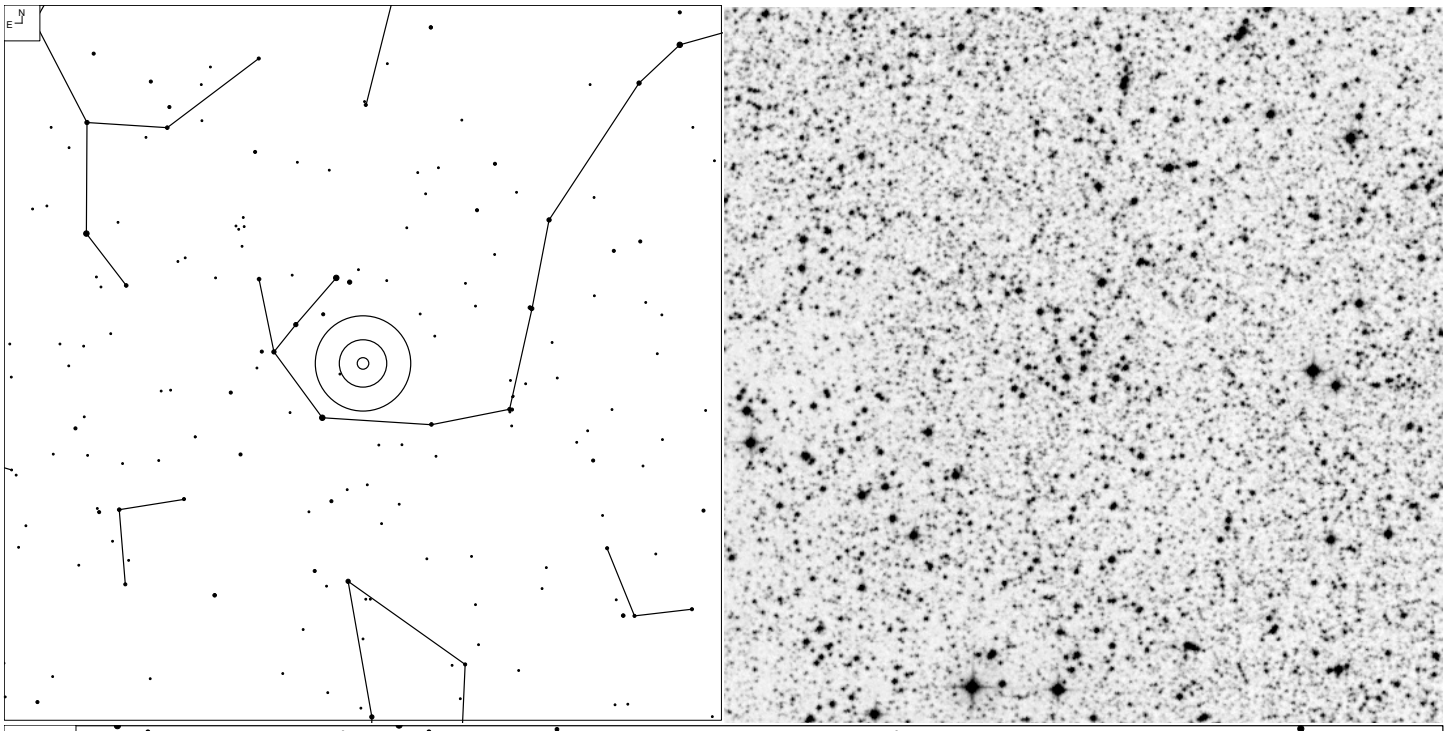
Trumpler 25 (Scorpius)

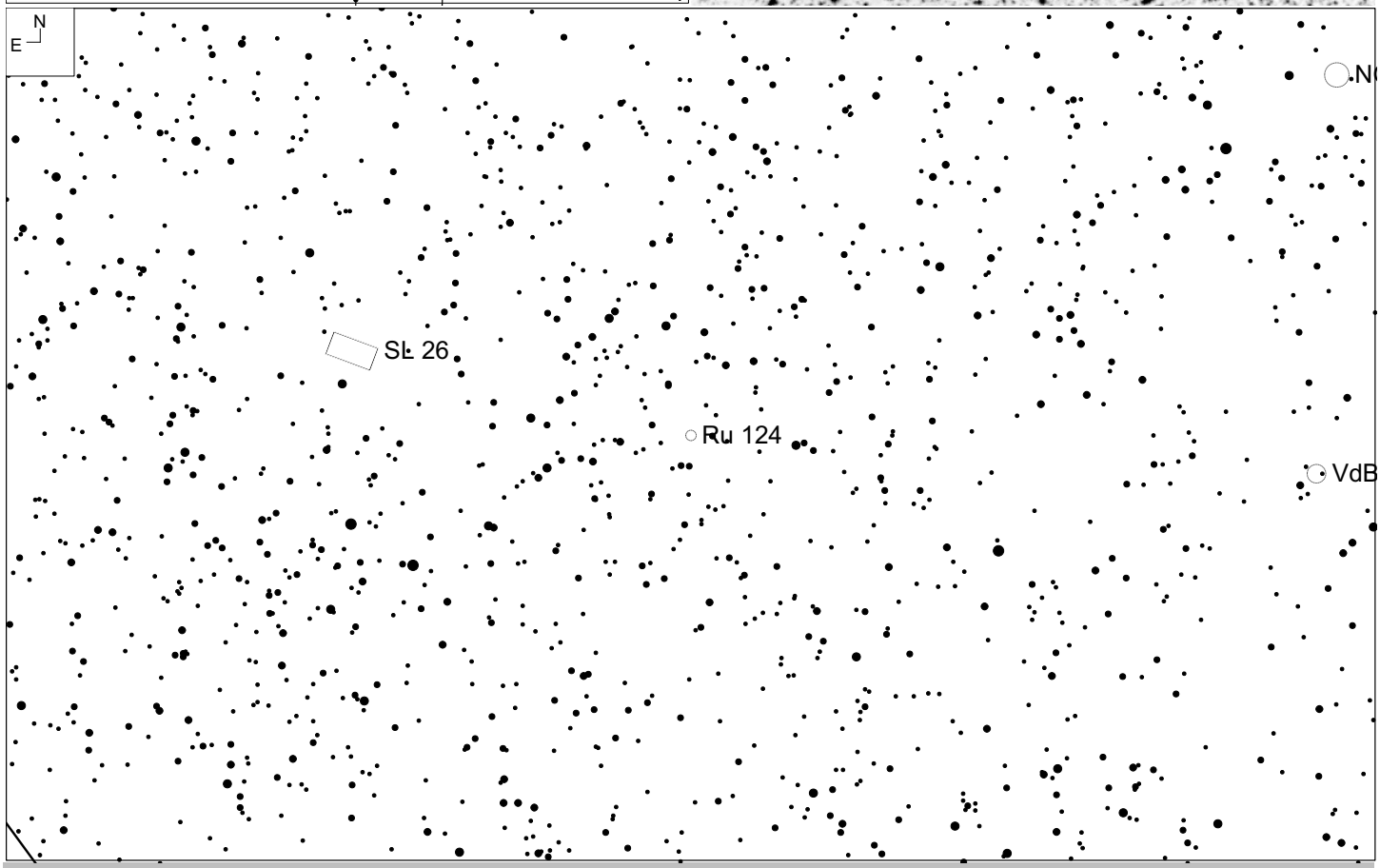




RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
17 24 30.3	–39 01 16	8’	11.7	449	11.3	II1m	164	91

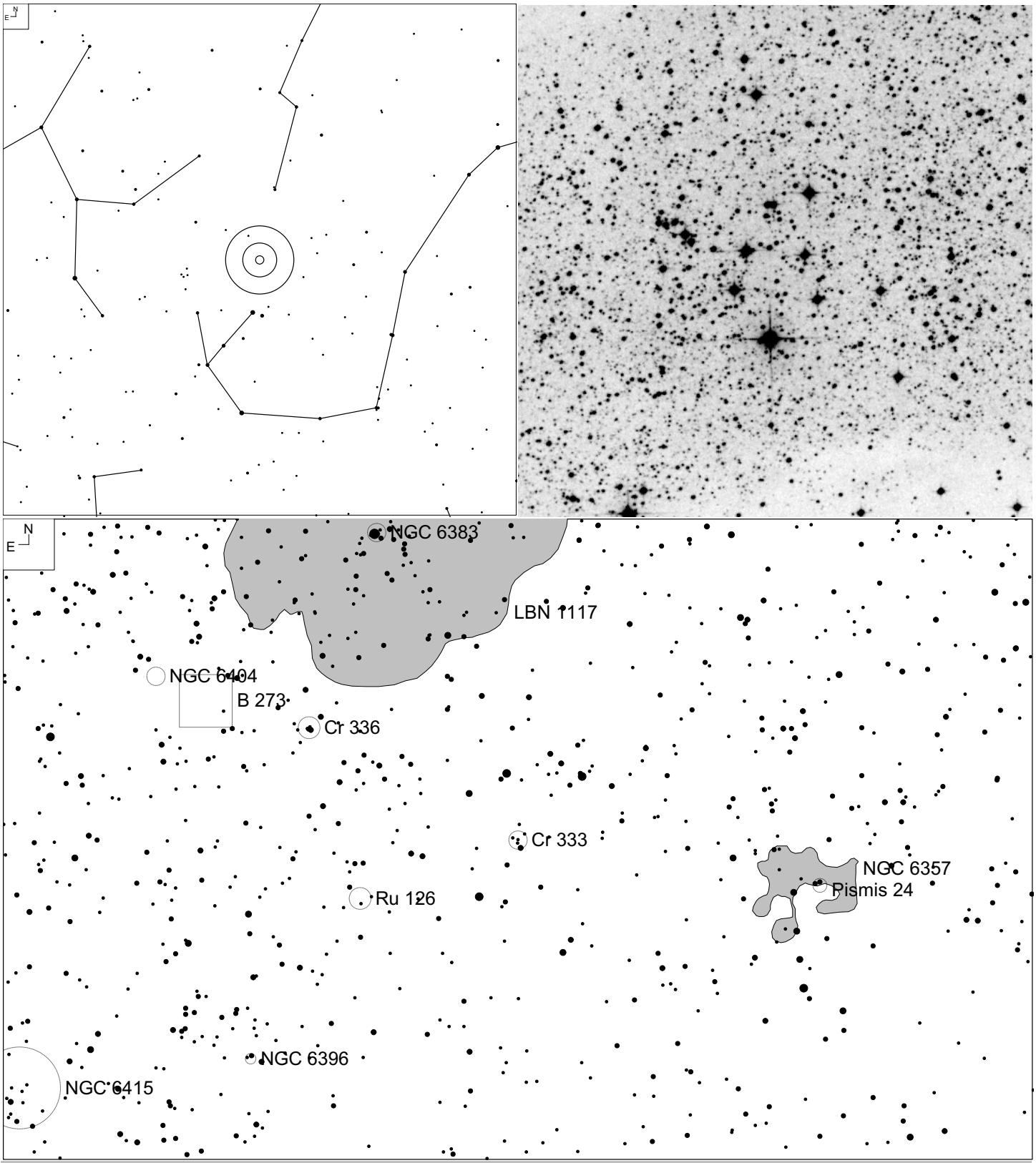
Ruprecht 124 (Scorpius)





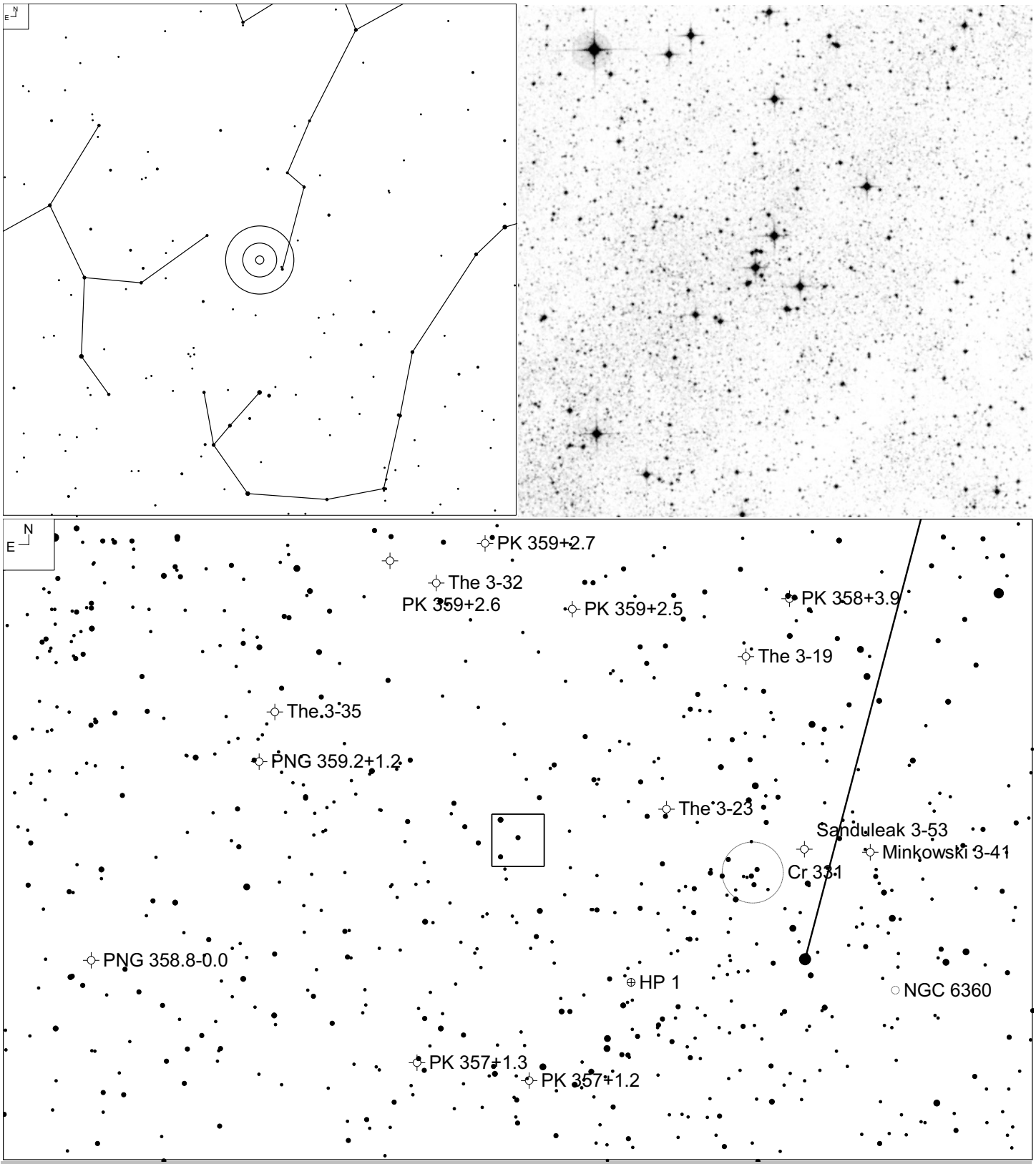
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
17 27 56.8	–40 43 28	2’	-	15	12.0	III1p	164	91

Collinder 333 (Scorpius)



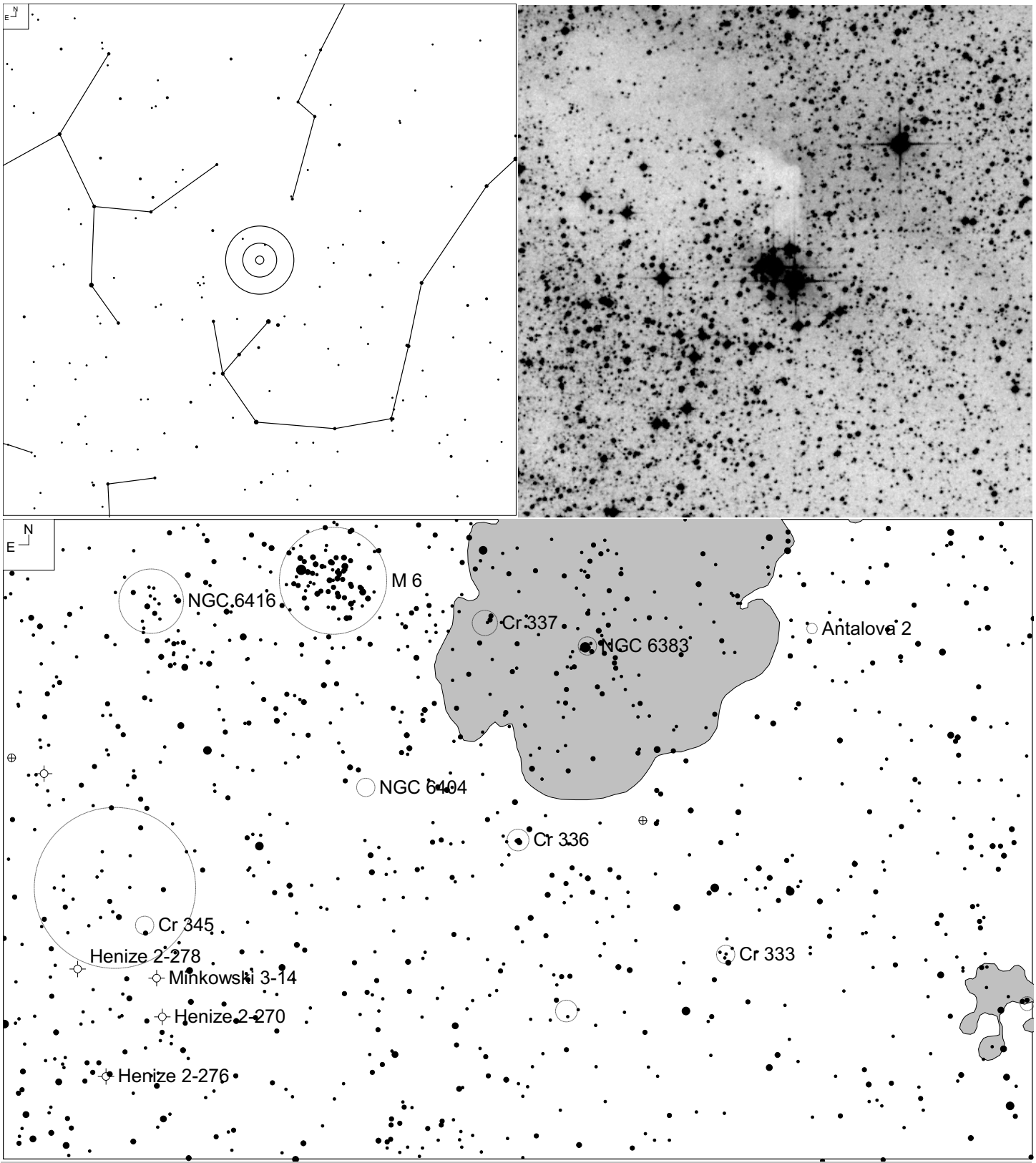
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
17 31 31.3	–34 00 37	7’	9.8	159	8.6	II2m	164	79

Terzan-Ju 20 (Scorpius)



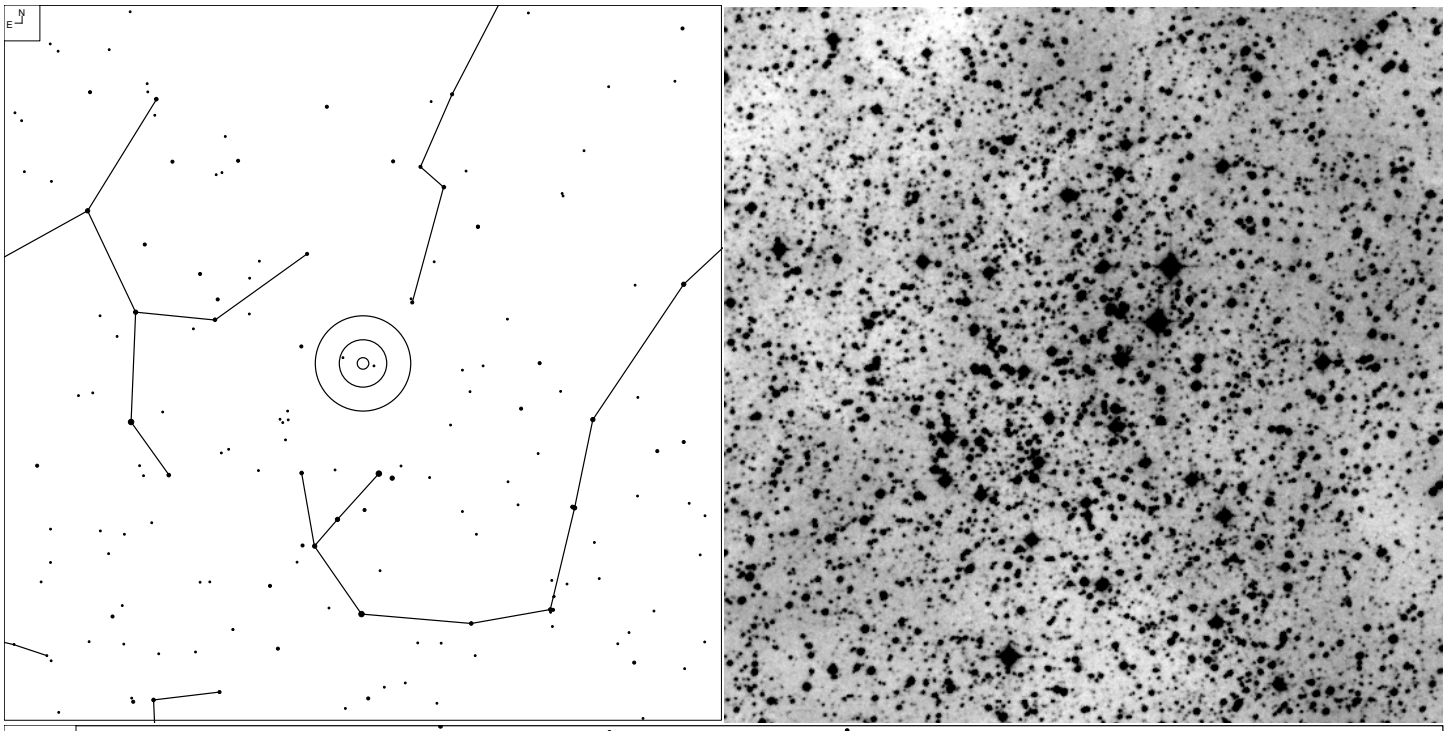
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
17 33 31.6	-29 19 13	-	-	9	9.9	-	146	79

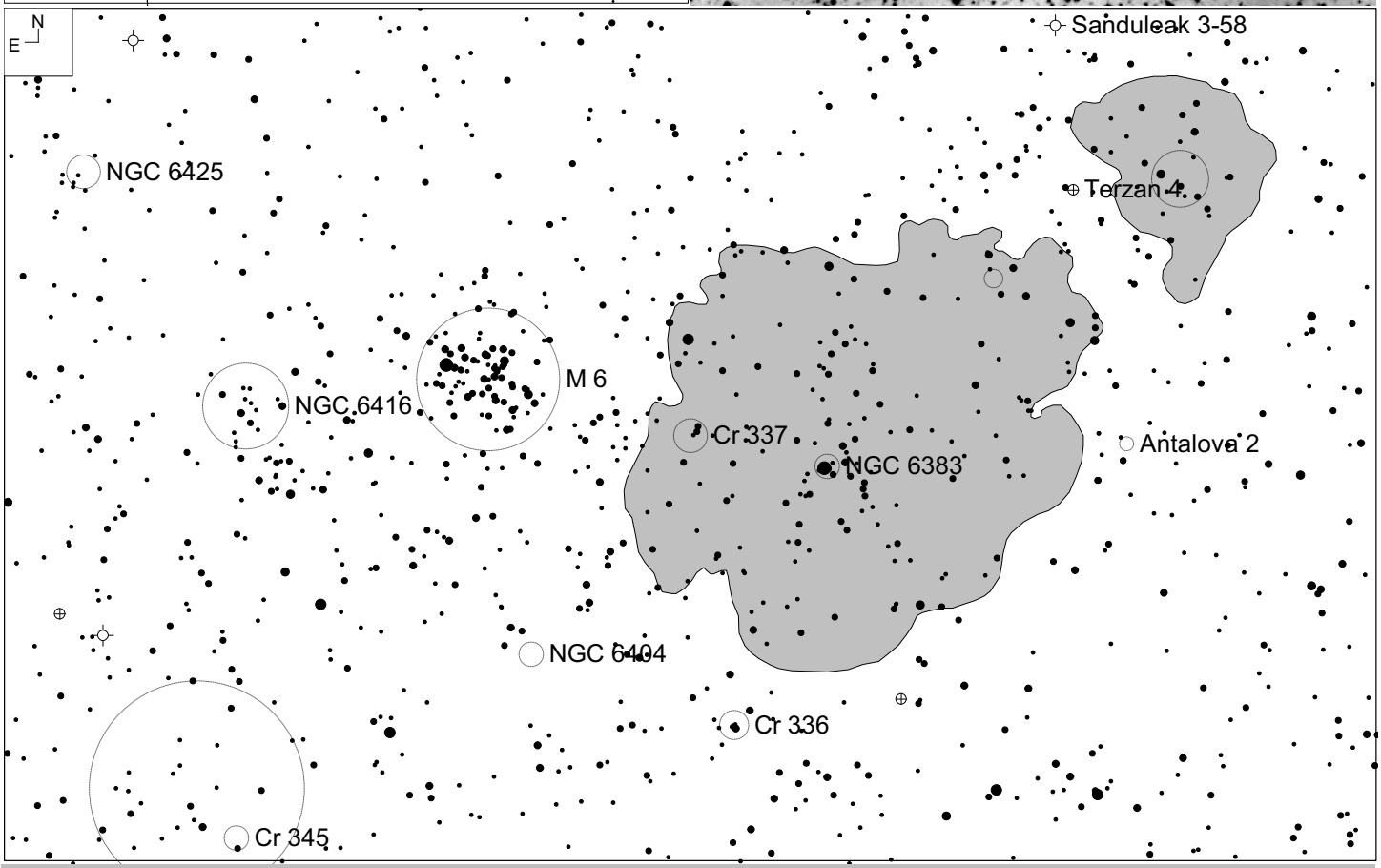
Trumpler 27 (Scorpius)



Other ID	RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
Cr 336	17 36 12.7	-33 29 10	6’	6.7	155	8.39	III3m	164	79

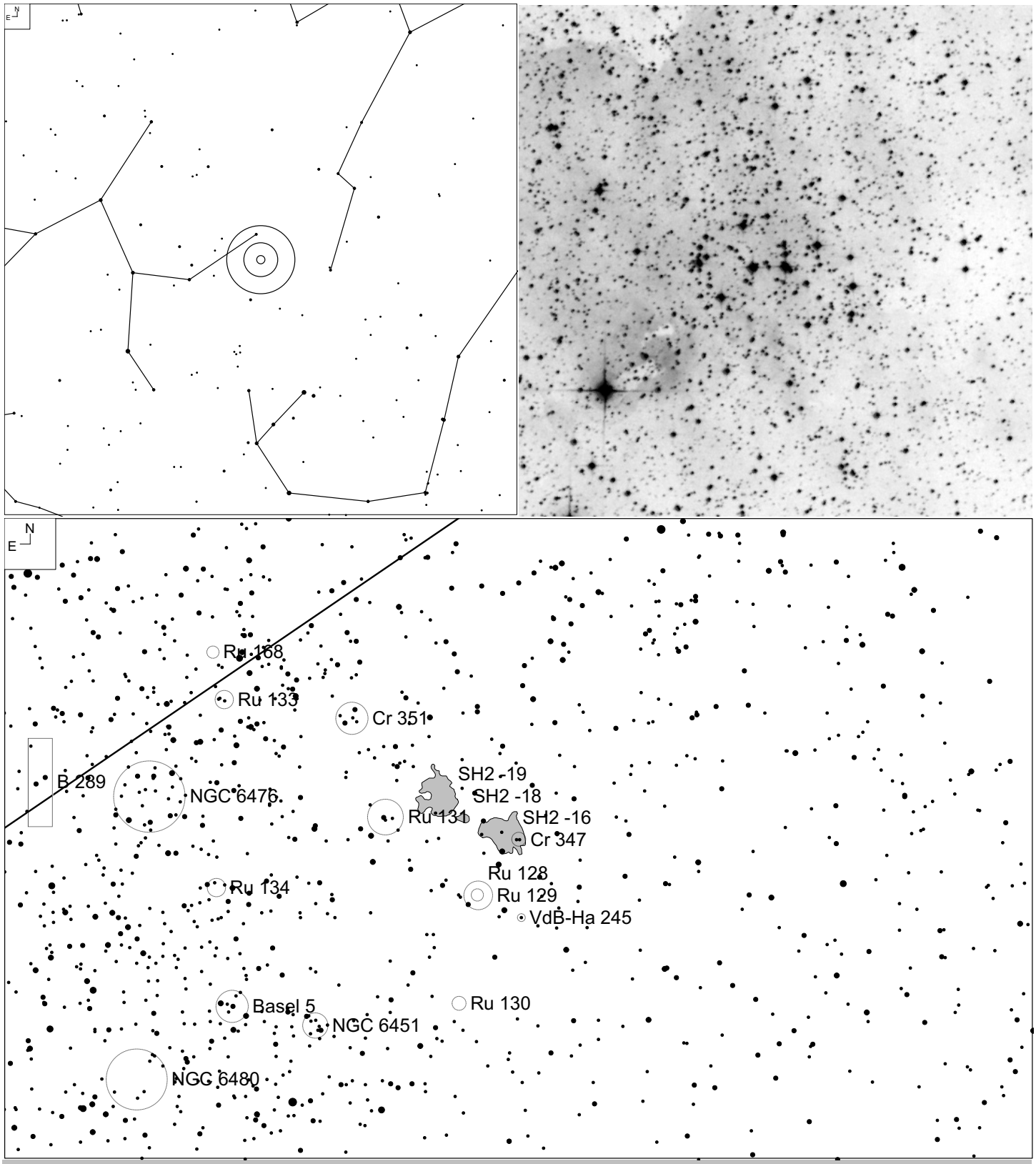
Trumpler 28 (Scorpius)





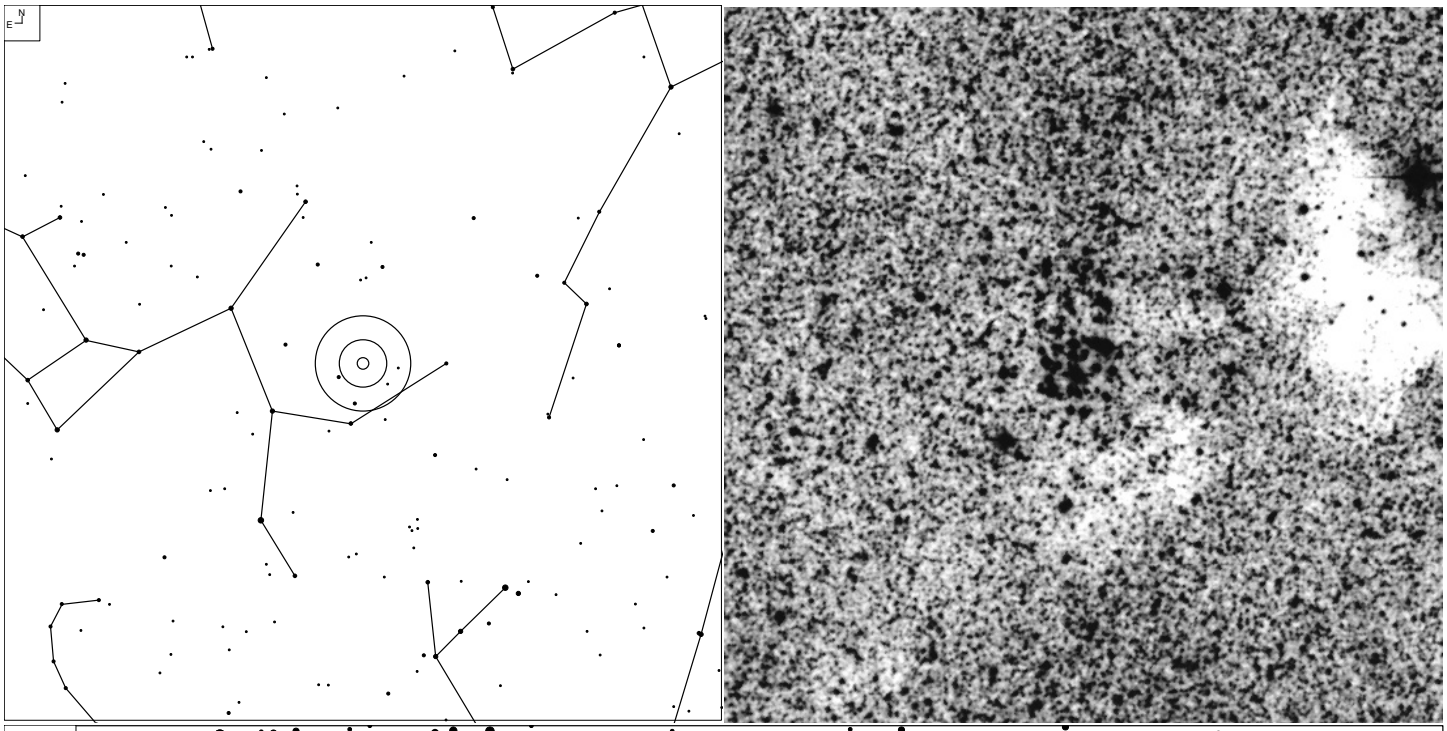
Other ID	RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
Cr 337	17 36 56.2	-32 28 02	5’	7.7	146	9.84	III2m	164	79

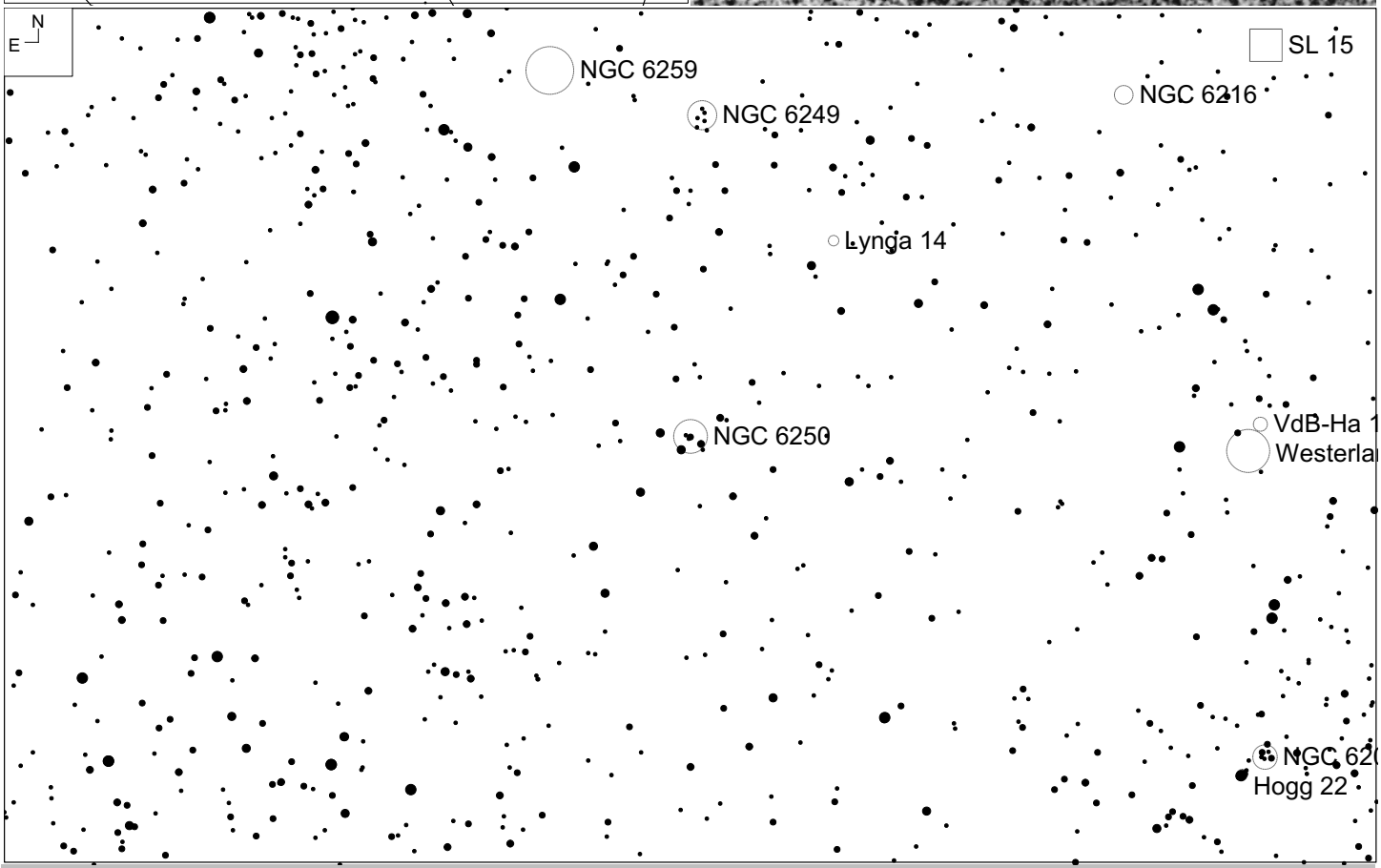
Collinder 347 (Sagittarius)



RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
17 46 18.4	-29 20 02	10.0’	8.8	393	10.7	II2m n	146	79

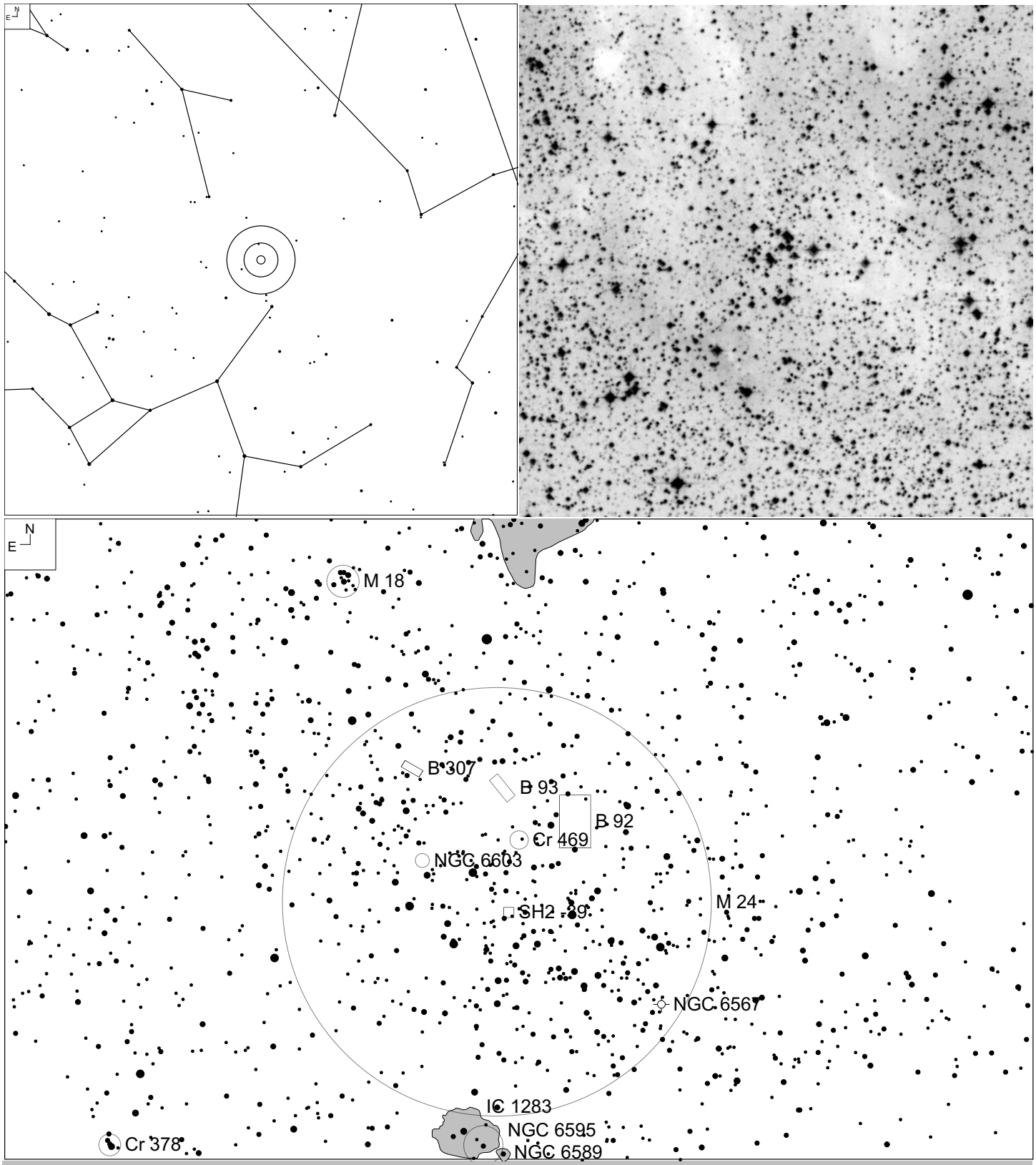
NGC 6520 / B86 (Sagittarius)





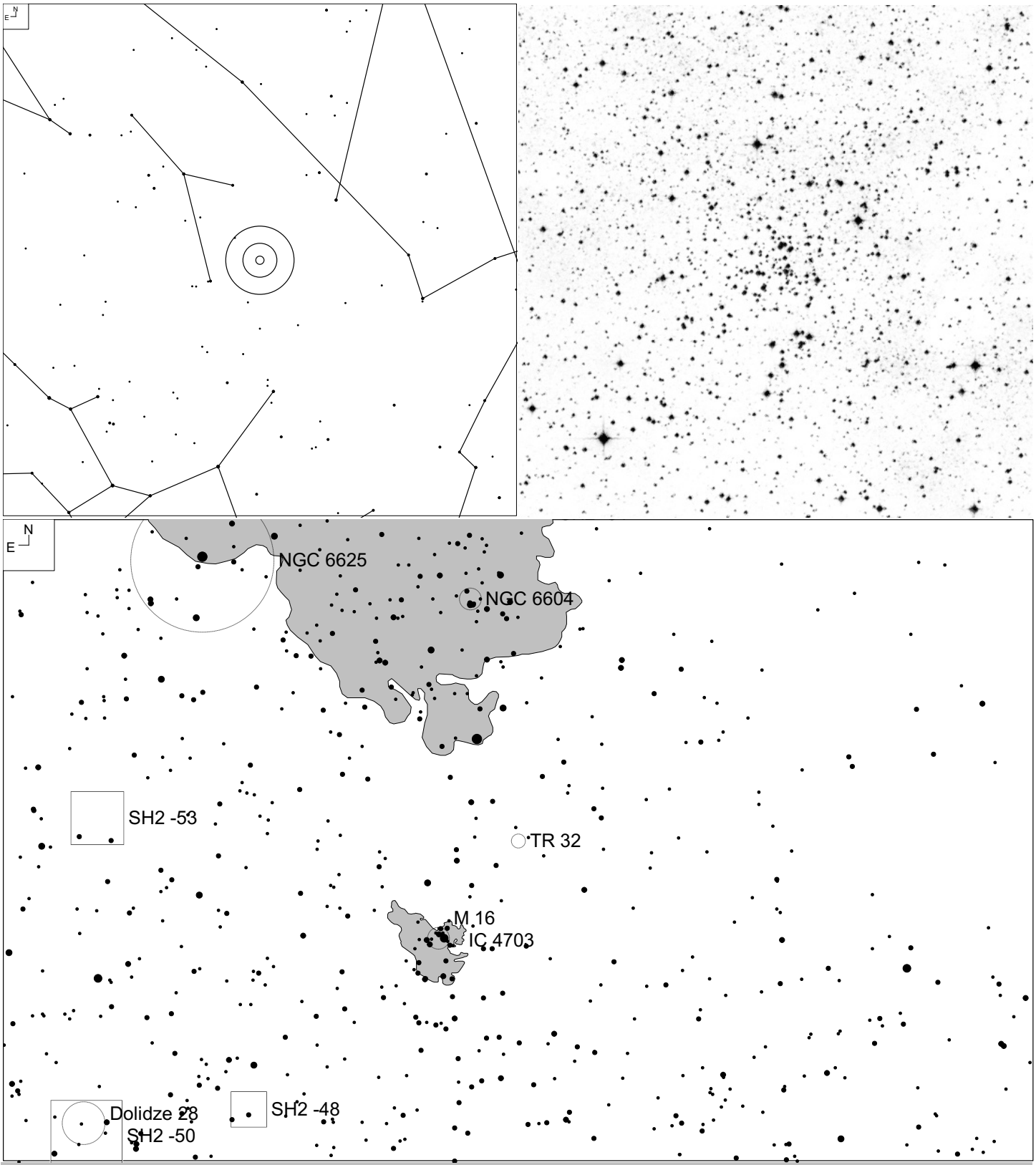
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 03 24.0	-27 53 18	2.0’	7.6	99	9.0	III1p n	145	78

Collinder 469 (Sagittarius)



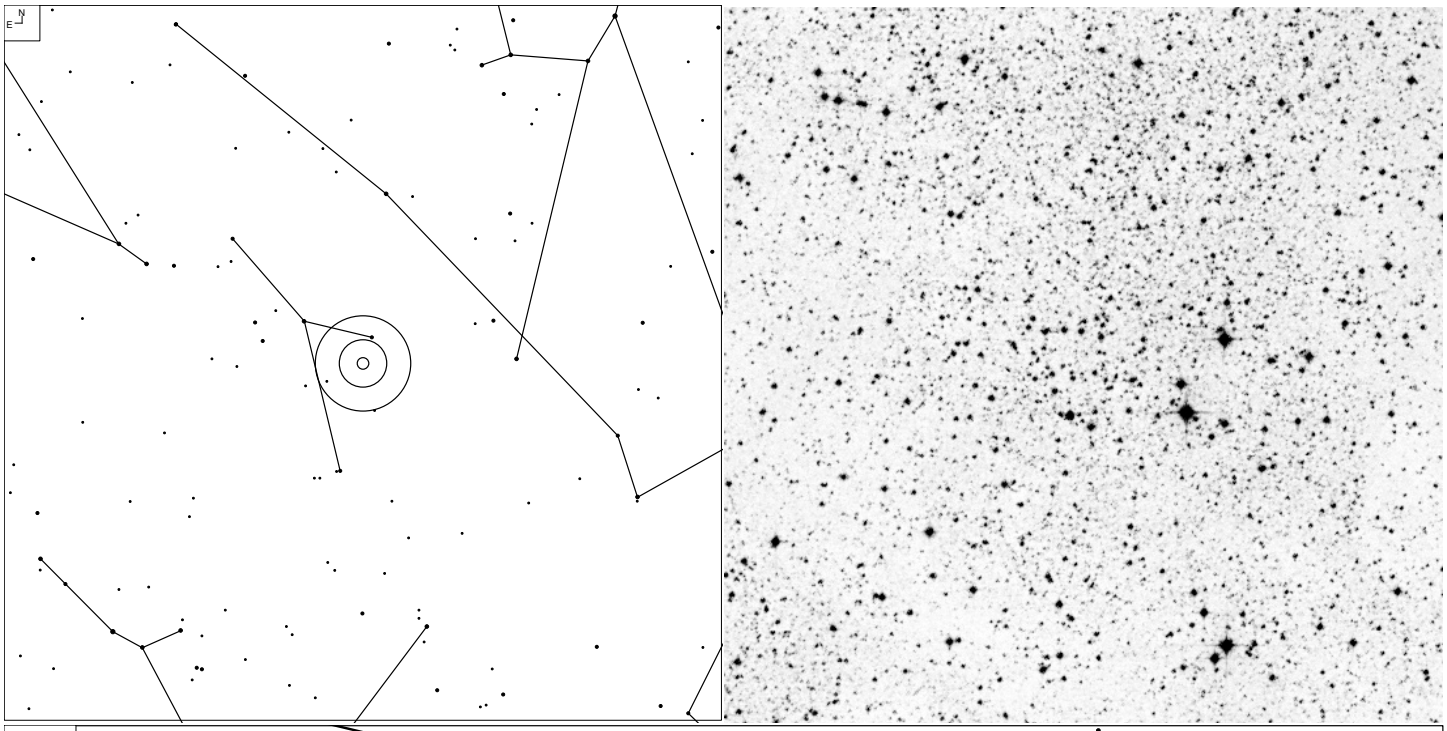
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 16 34.0	-18 18 42	3.0’	9.1	112	10.7	IV1p	145	66

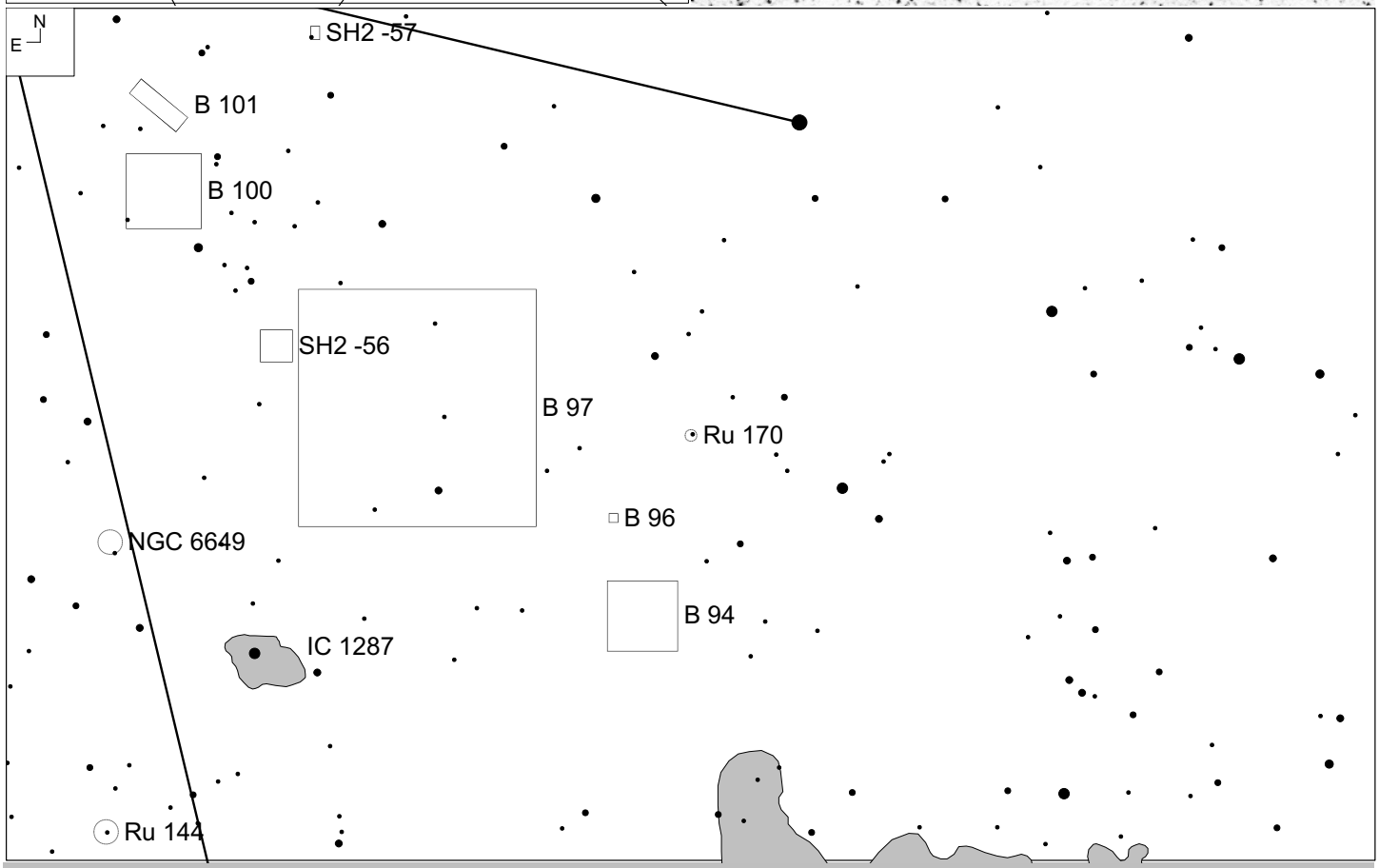
Trumpler 32 (Serpens)



RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 17 10.7	–13 20 44	12.0’	12.2	75	11.8	I2m	126	66

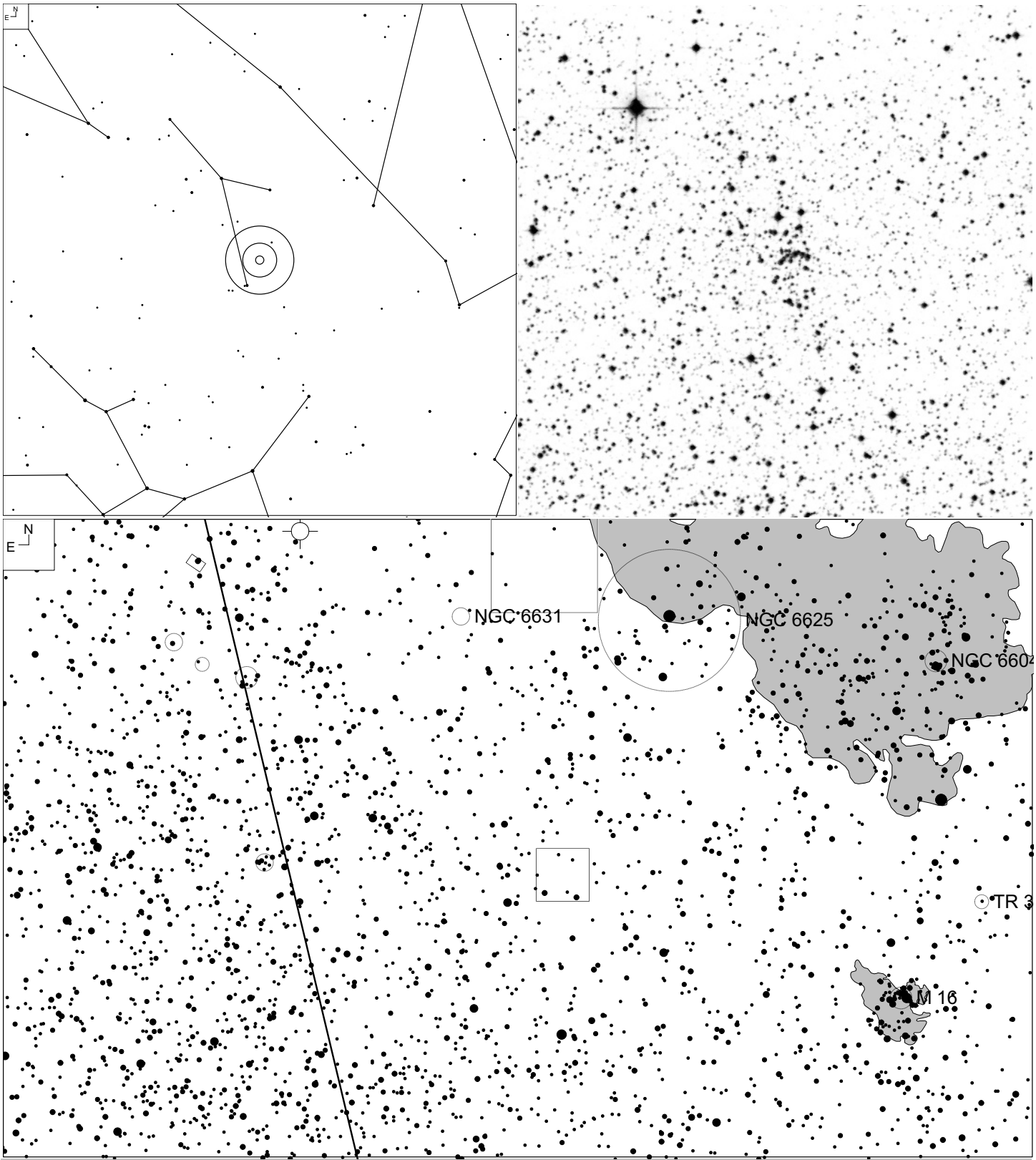
Ruprecht 170 (Scutum)





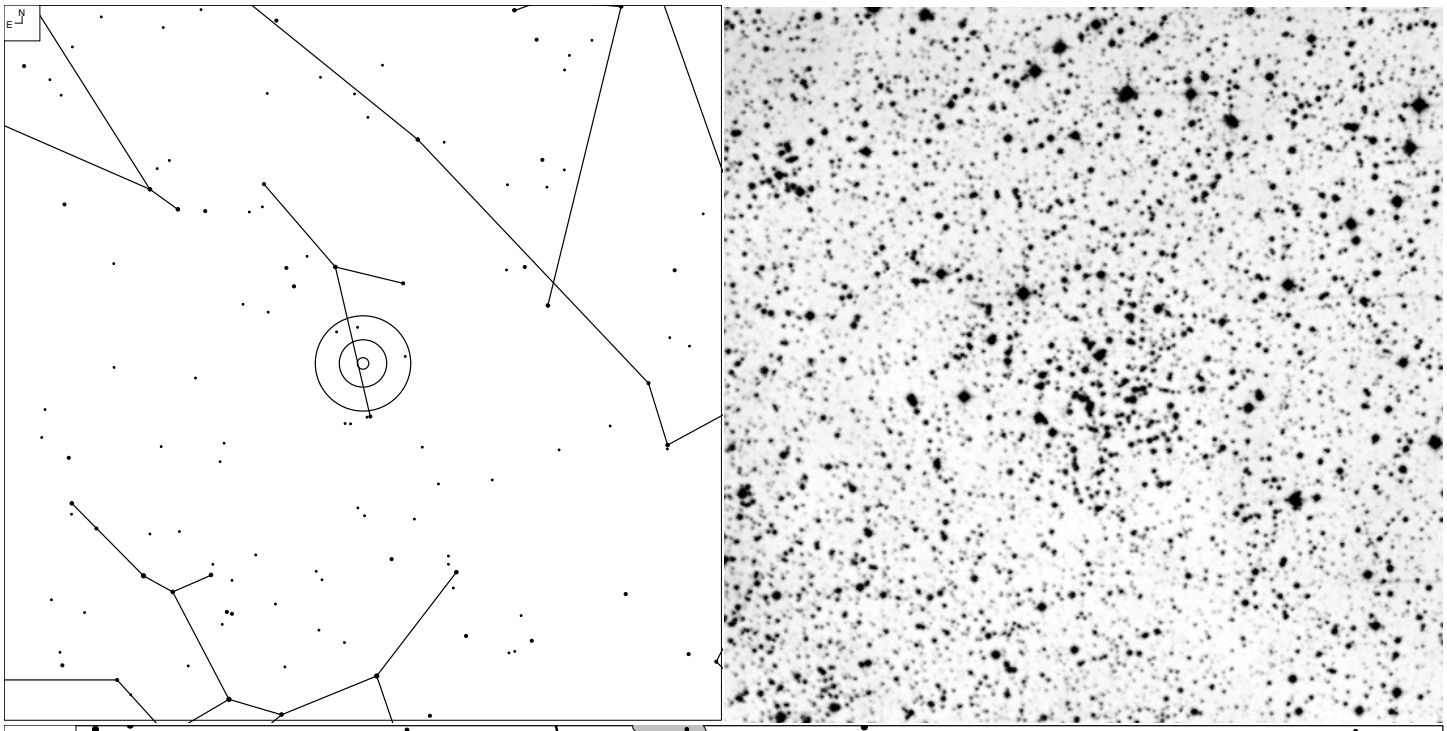
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 25 12.0	-10 00 33	8.0’	-	226	13.0	IV1m	126	66

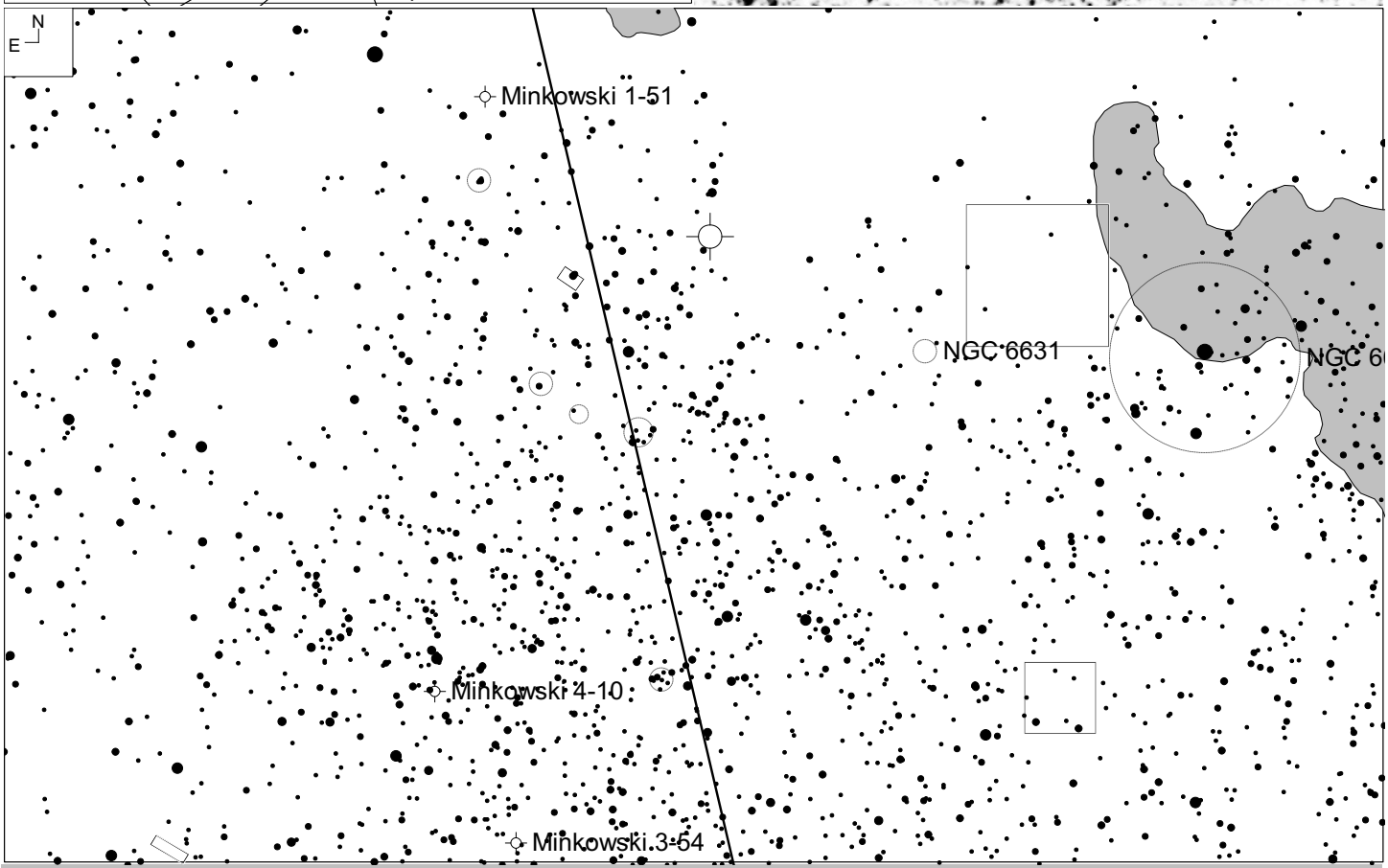
Bica 3 (Scutum)



RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 26 06.1	-13 03 38	3.5’	-	85	11.8	-	126	66

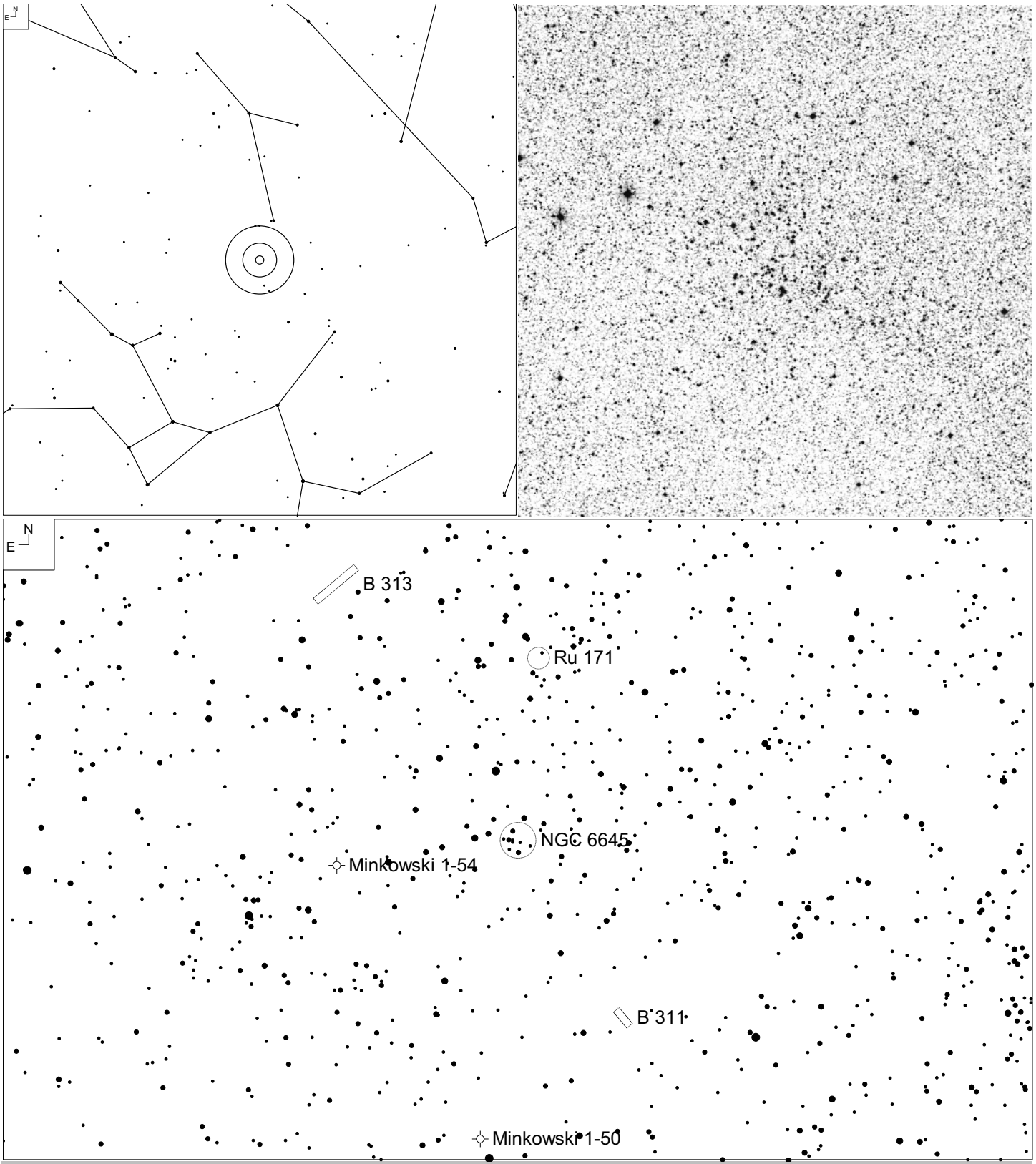
Dias 6 (Scutum)





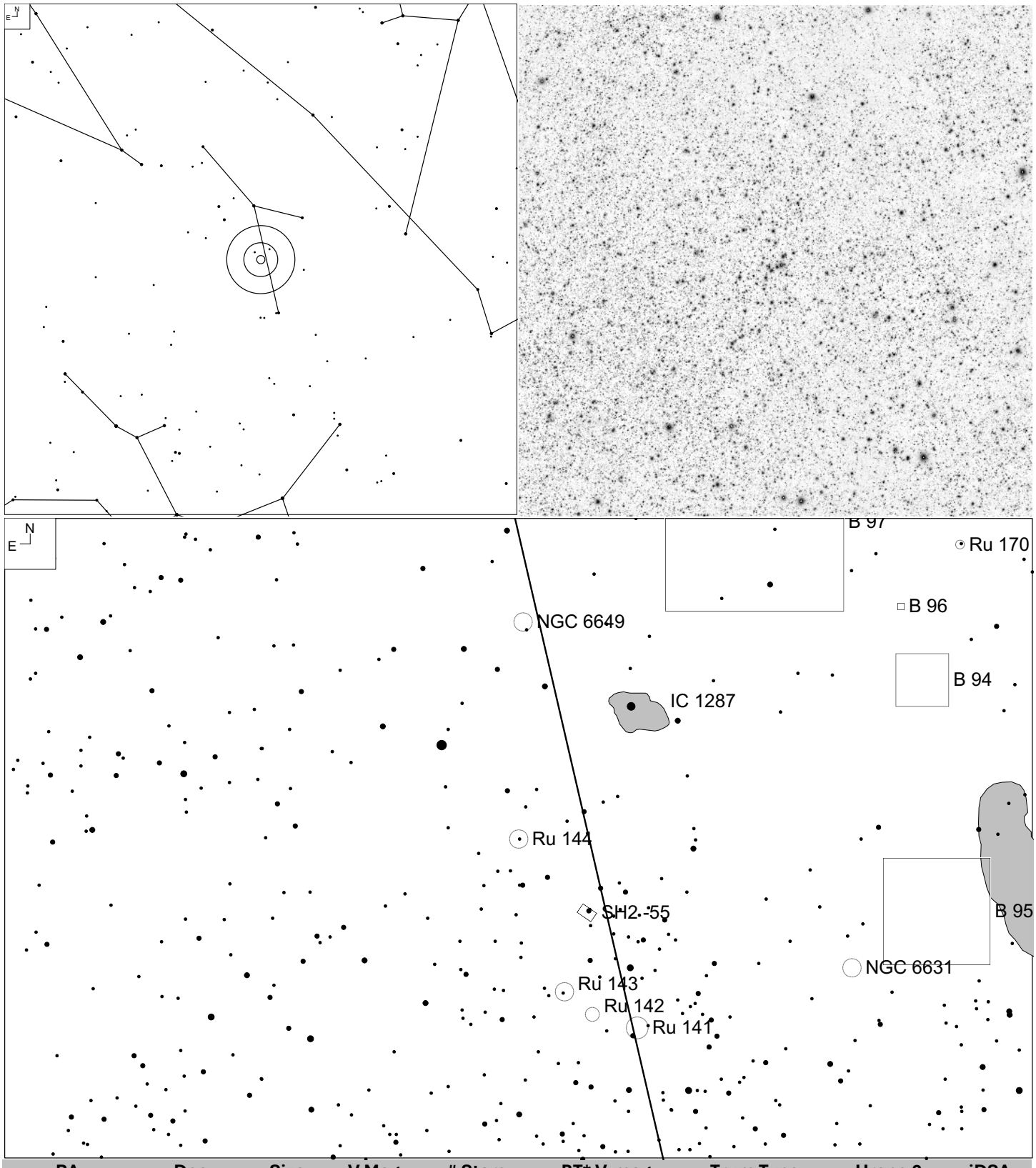
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 30 30.0	-12 18 59	6.0’	-	105	12.0	-	126	66

NGC 6645 (Sagittarius)



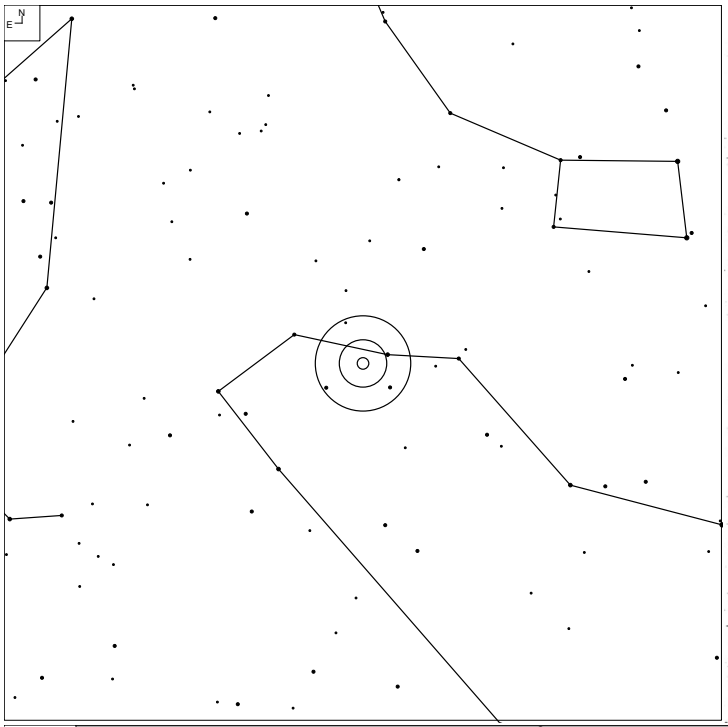
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 32 36.0	–16 53 00	14.8’	8.5	72	9.9	IV1m	126	66

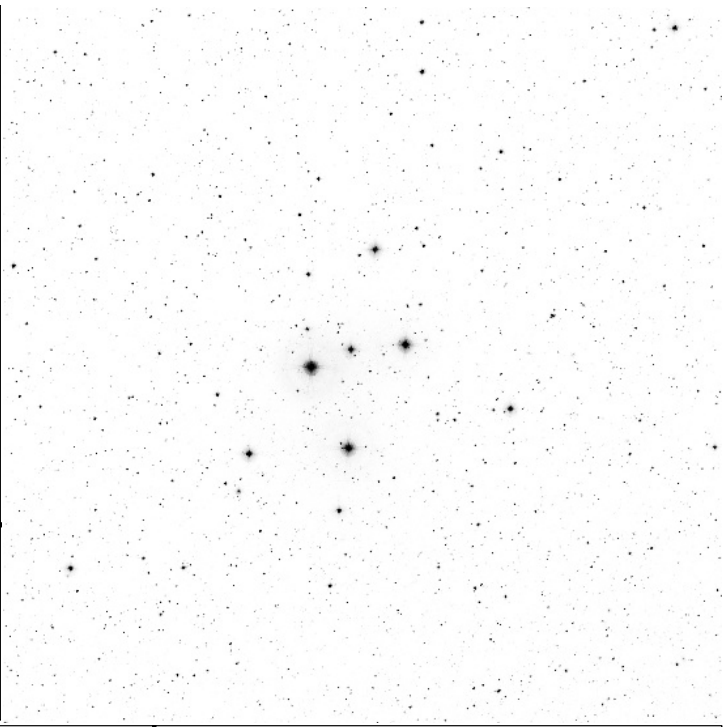
Ruprecht 144 (Scutum)

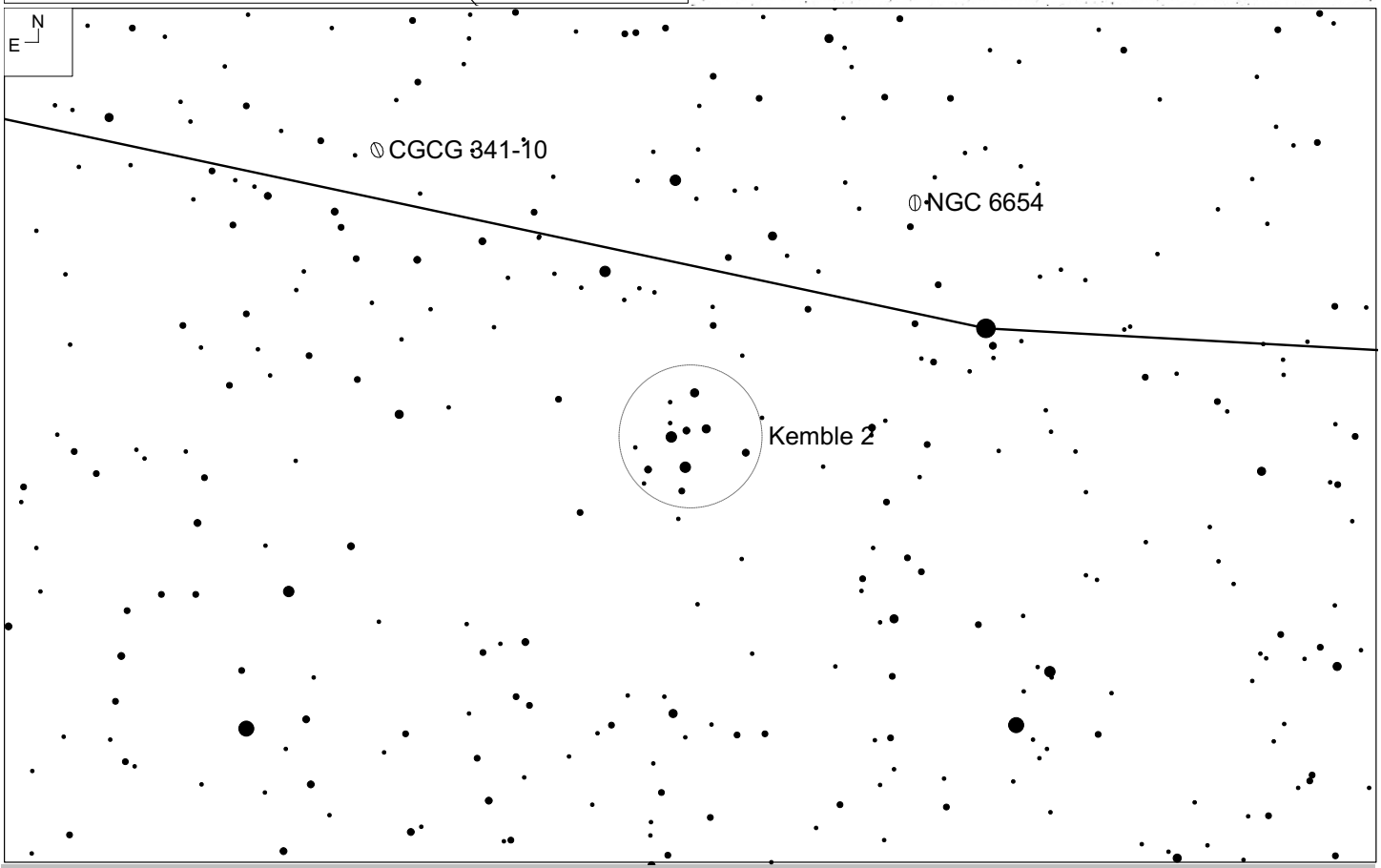


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 33 34.0	-11 25 00	12.0’	-	358	12.0	IV1p	126	66

Kemble 2 (Draco)

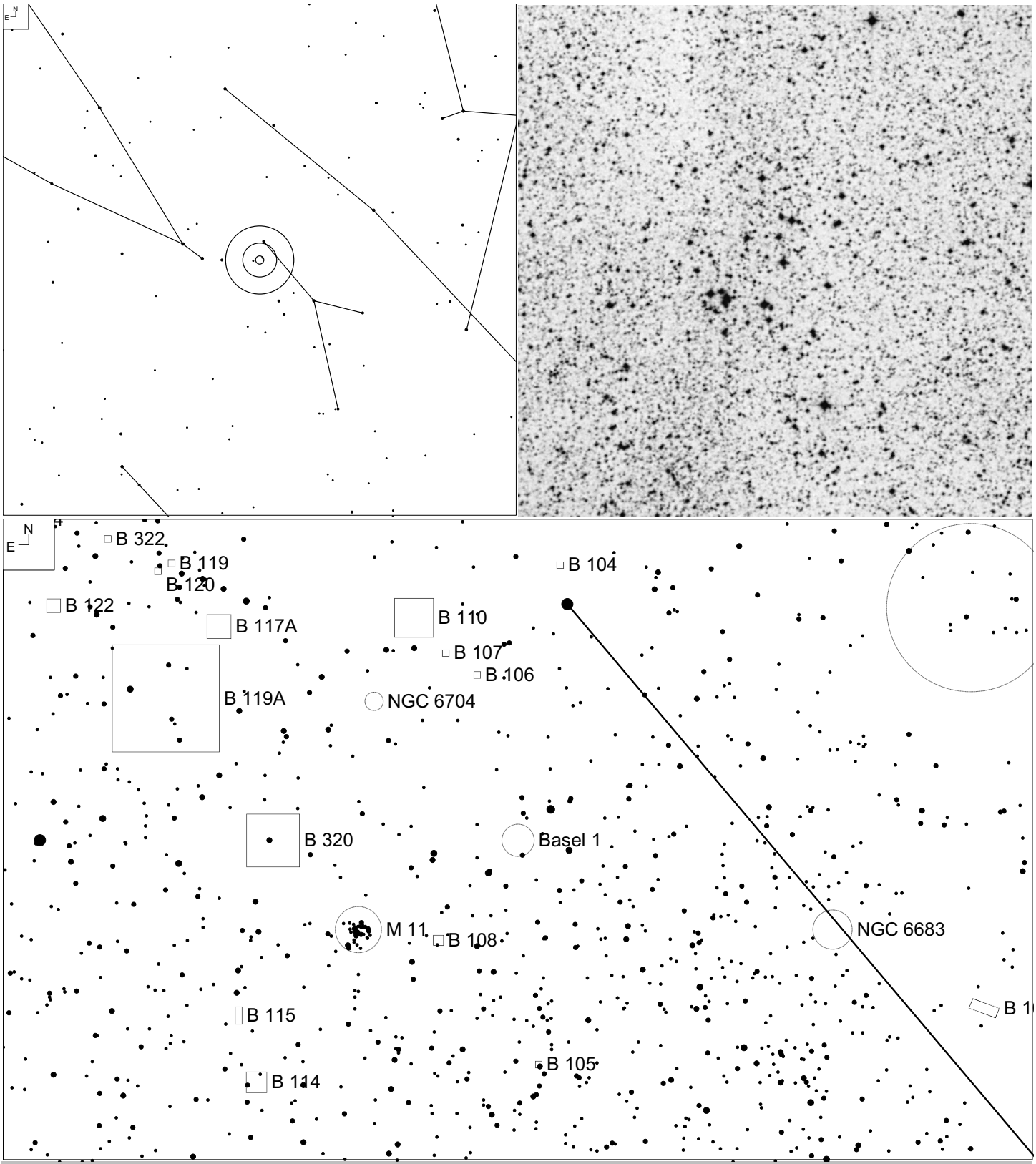






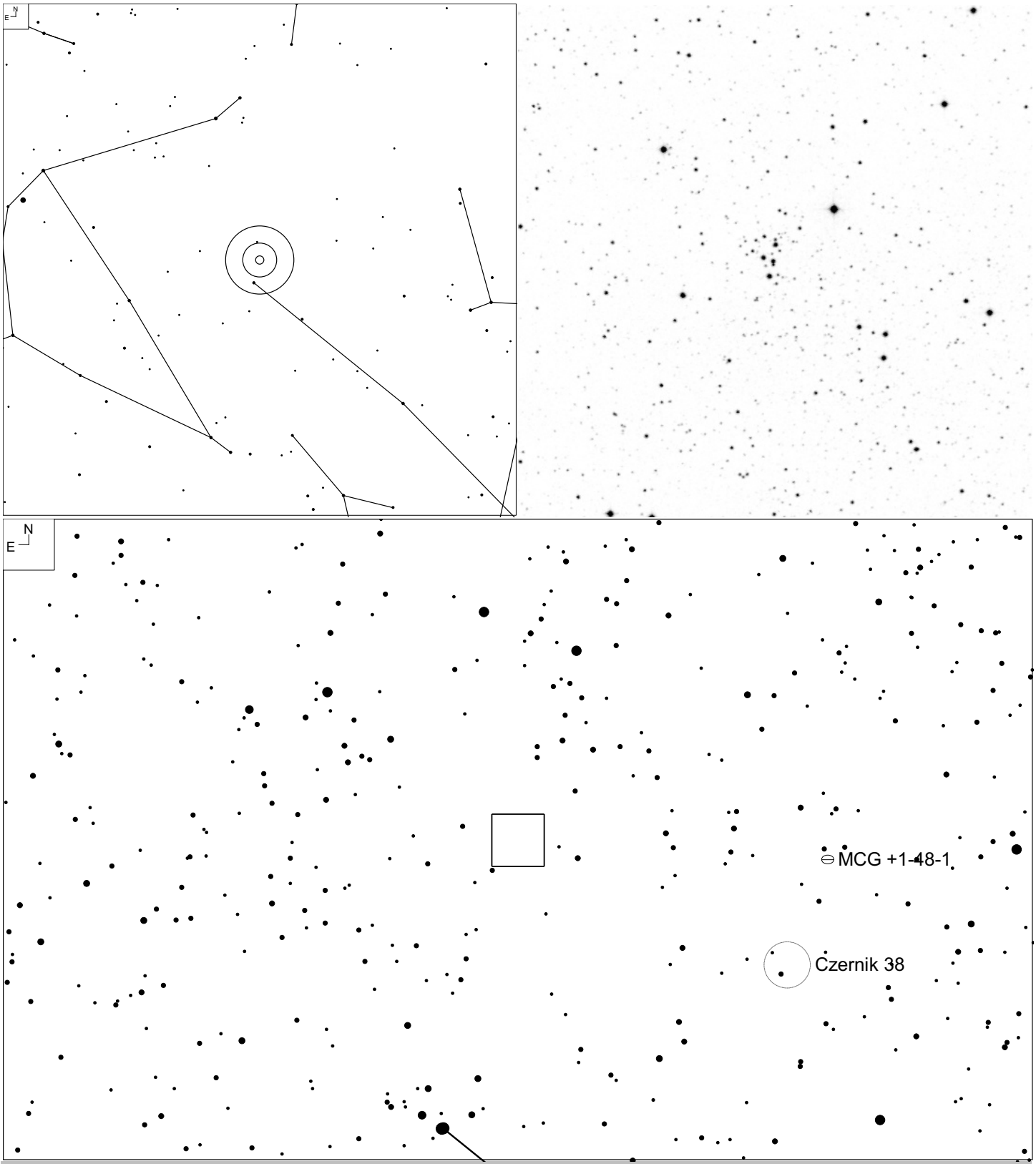
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 35 00.0	+72 23 00	30.0’	-	17	7.0	-	10	3

Apriamasvili 1, Basel 1 (Scutum)



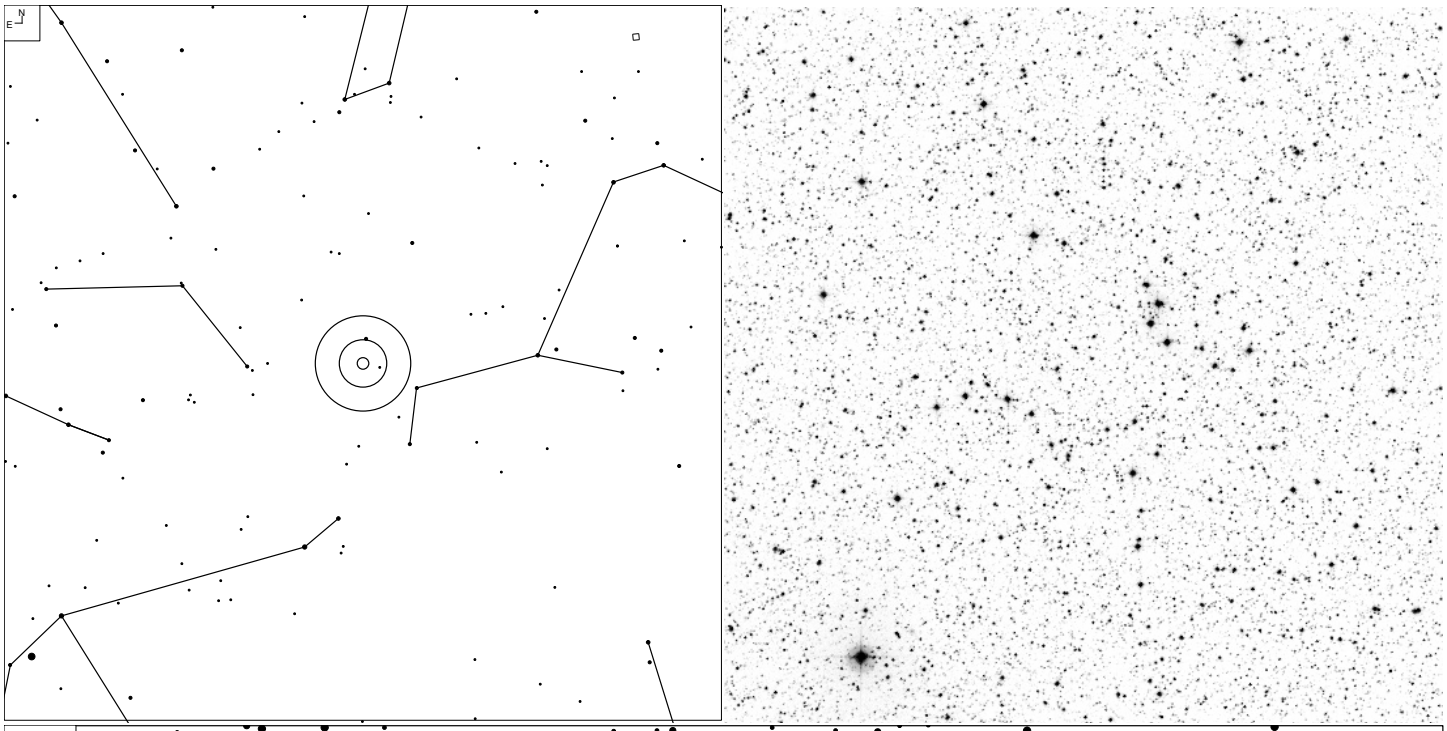
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 48 06.0	-05 51 00	5.0’	8.9	94	12.6	IV1p	105	54

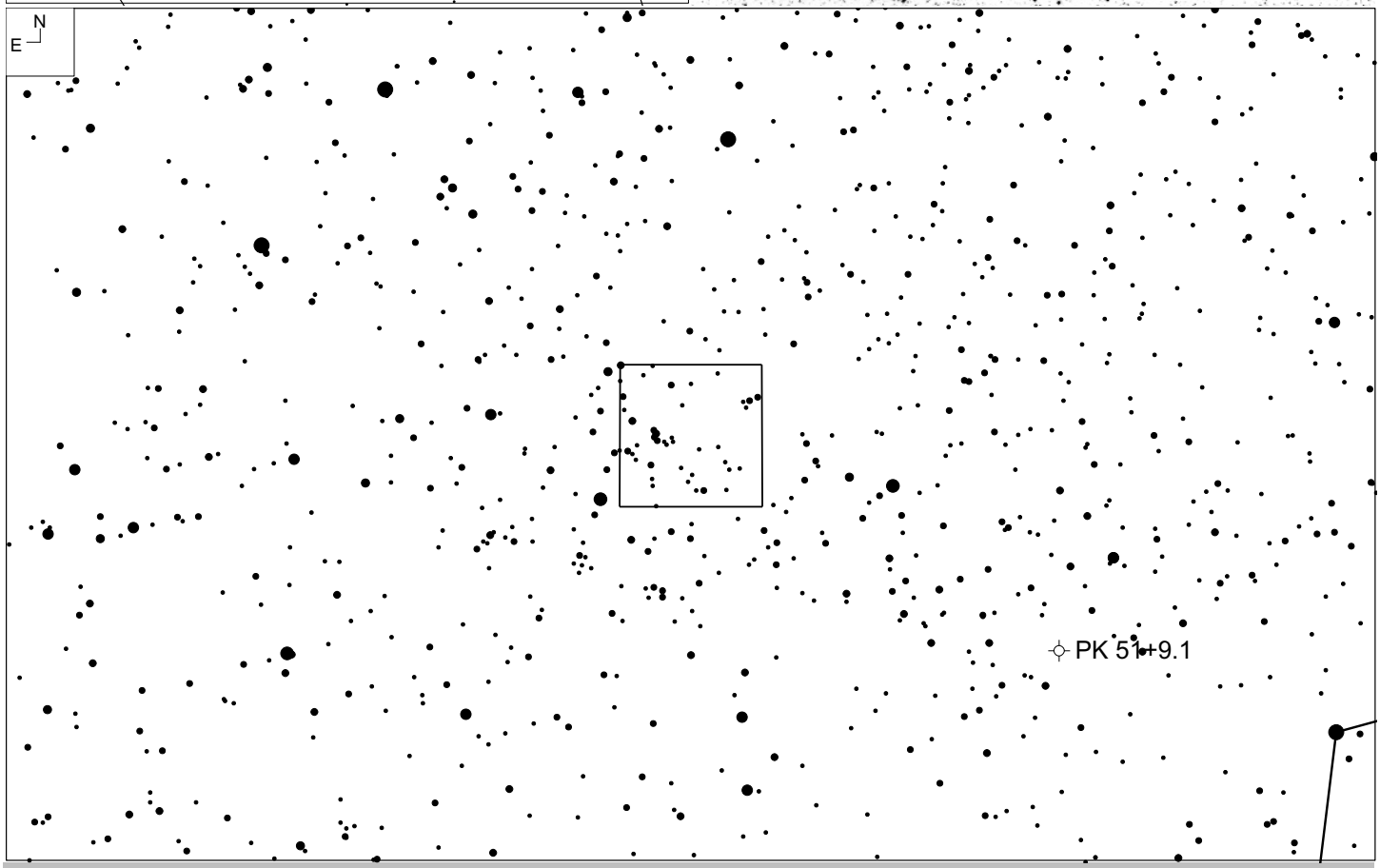
Archinal 1 (Serpens)



RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 54 49.0	+05 32 54	1.5’	-	11	13.4	II2p	105	54

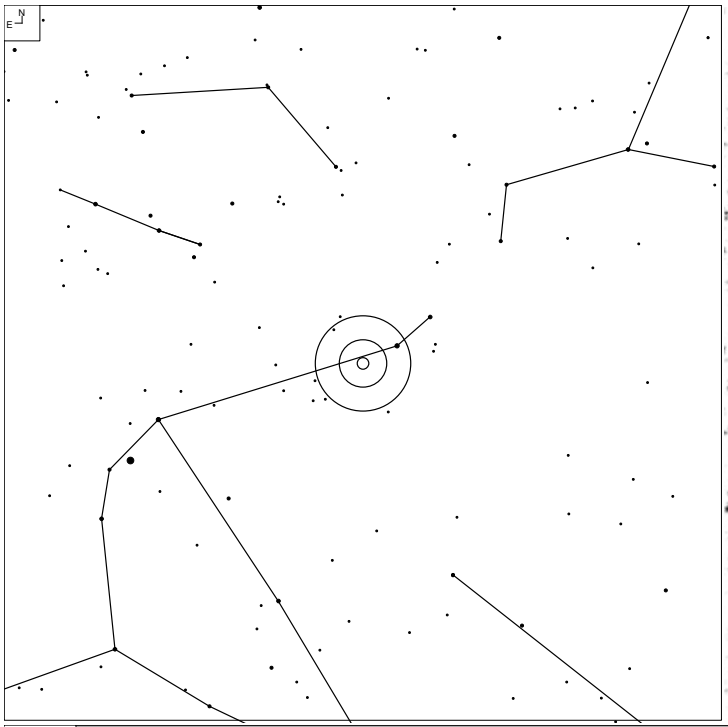
Alessi 62 (Hercules)

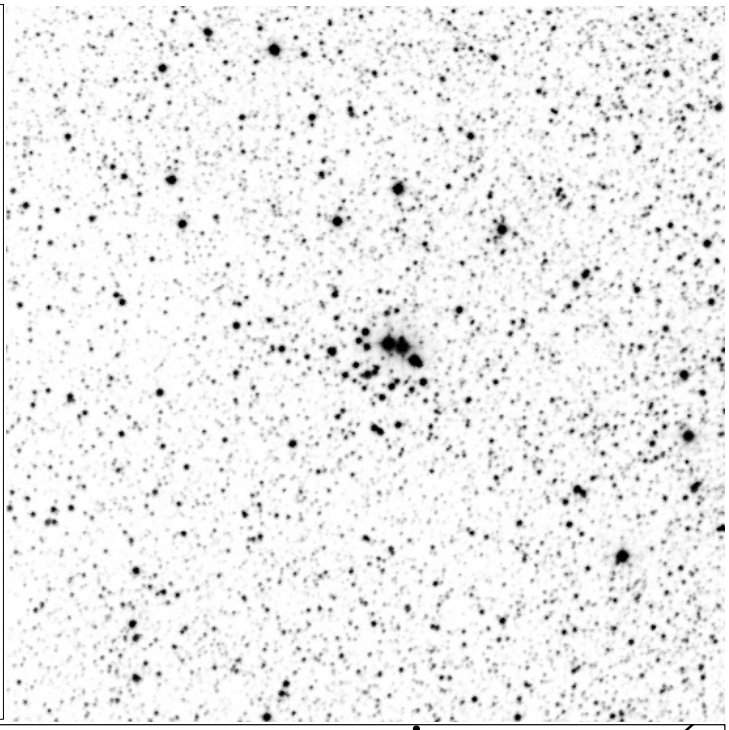


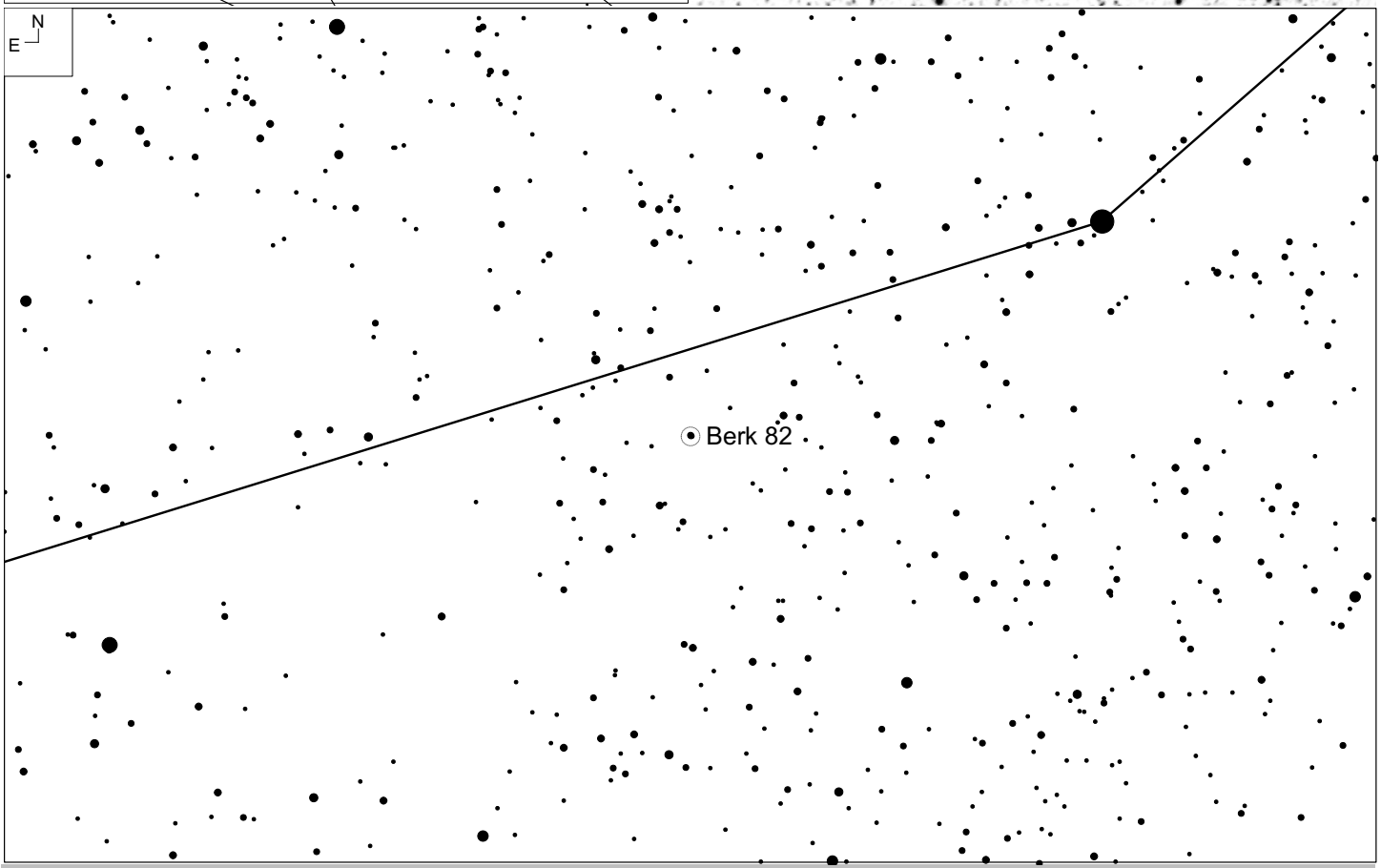


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
18 55 19.0	+21 36 06	23.0’	-	15	8.6	-	67	42

Berkeley 82 (Aquila)

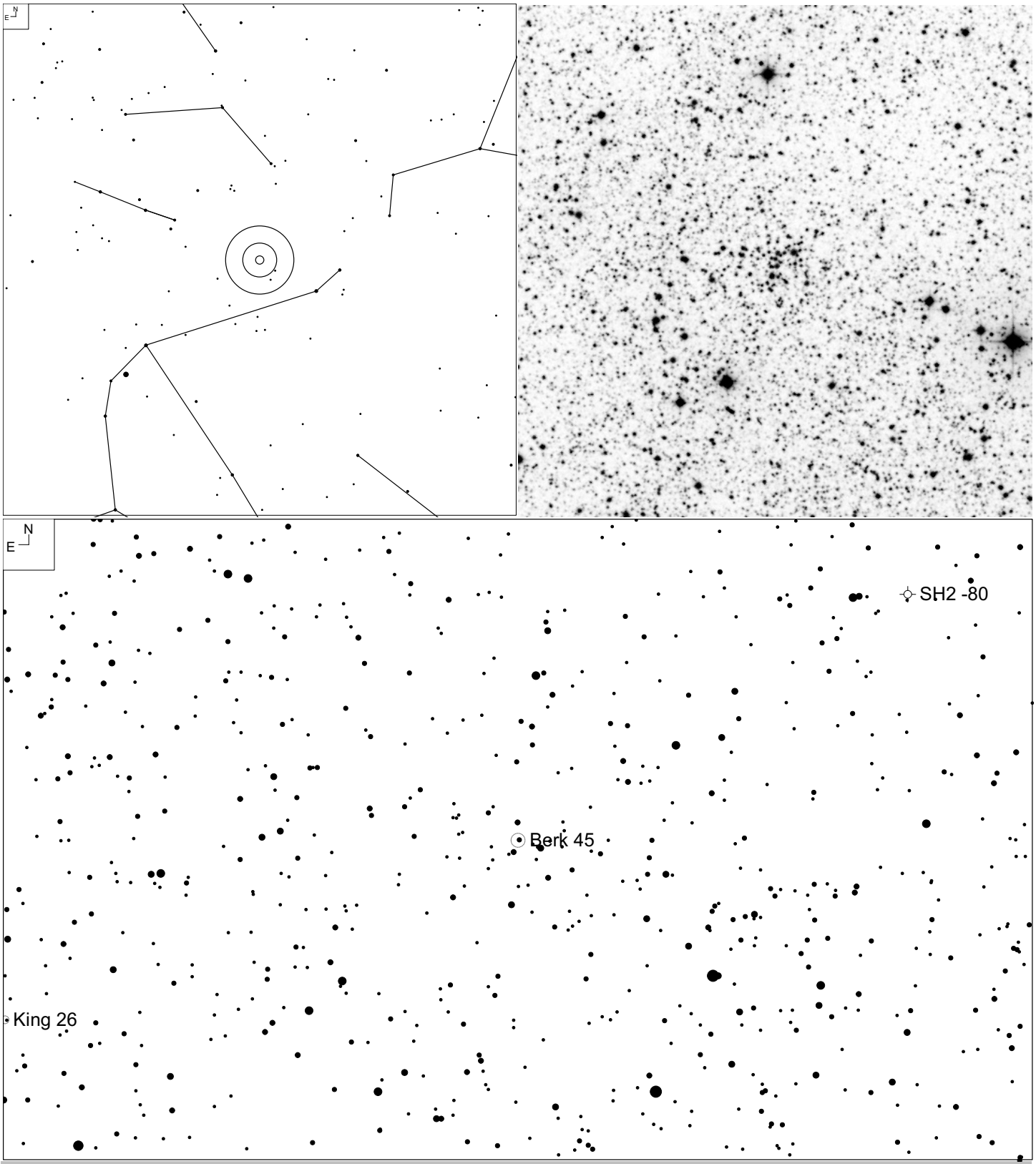






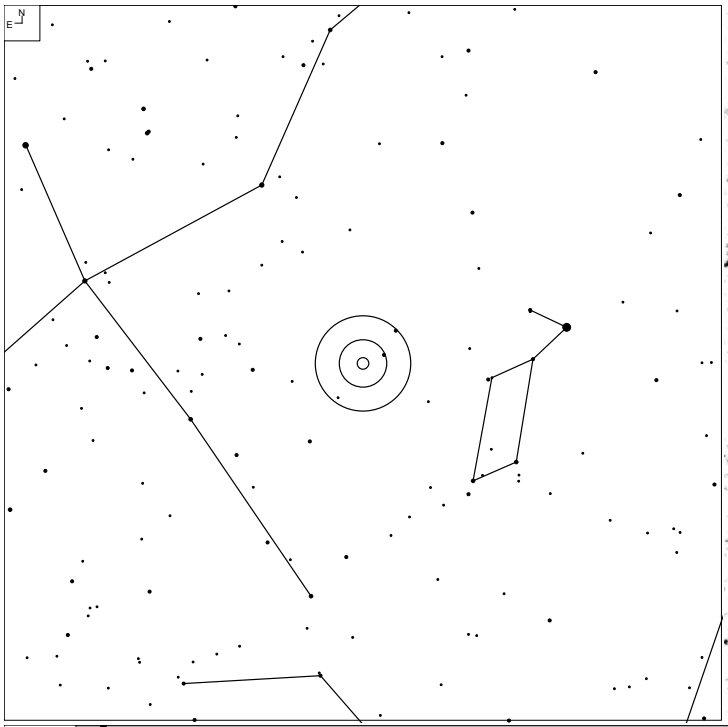
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 11 20.0	+13 07 06	2.0’	-	31	14.0	III1p	85	42

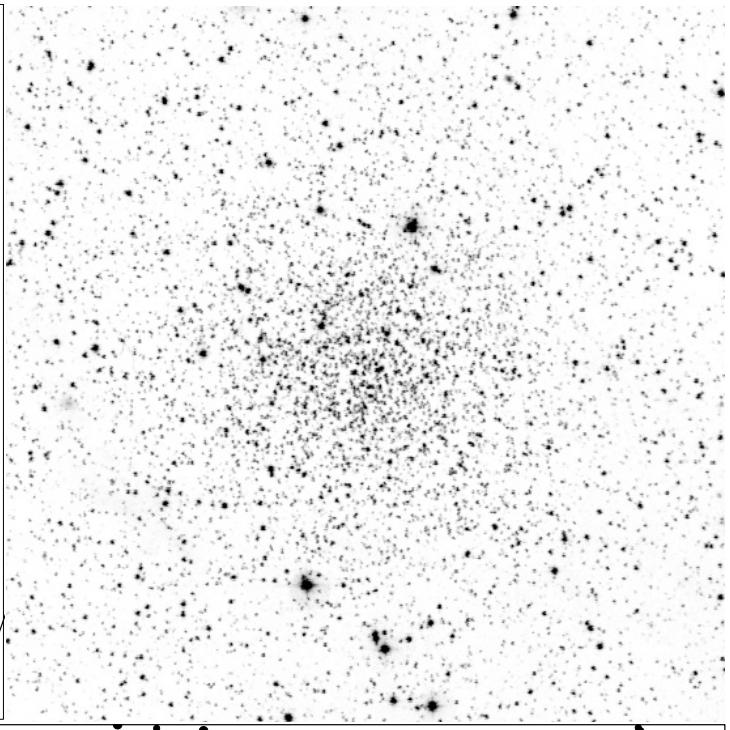
Berkeley 45 (Aquila)

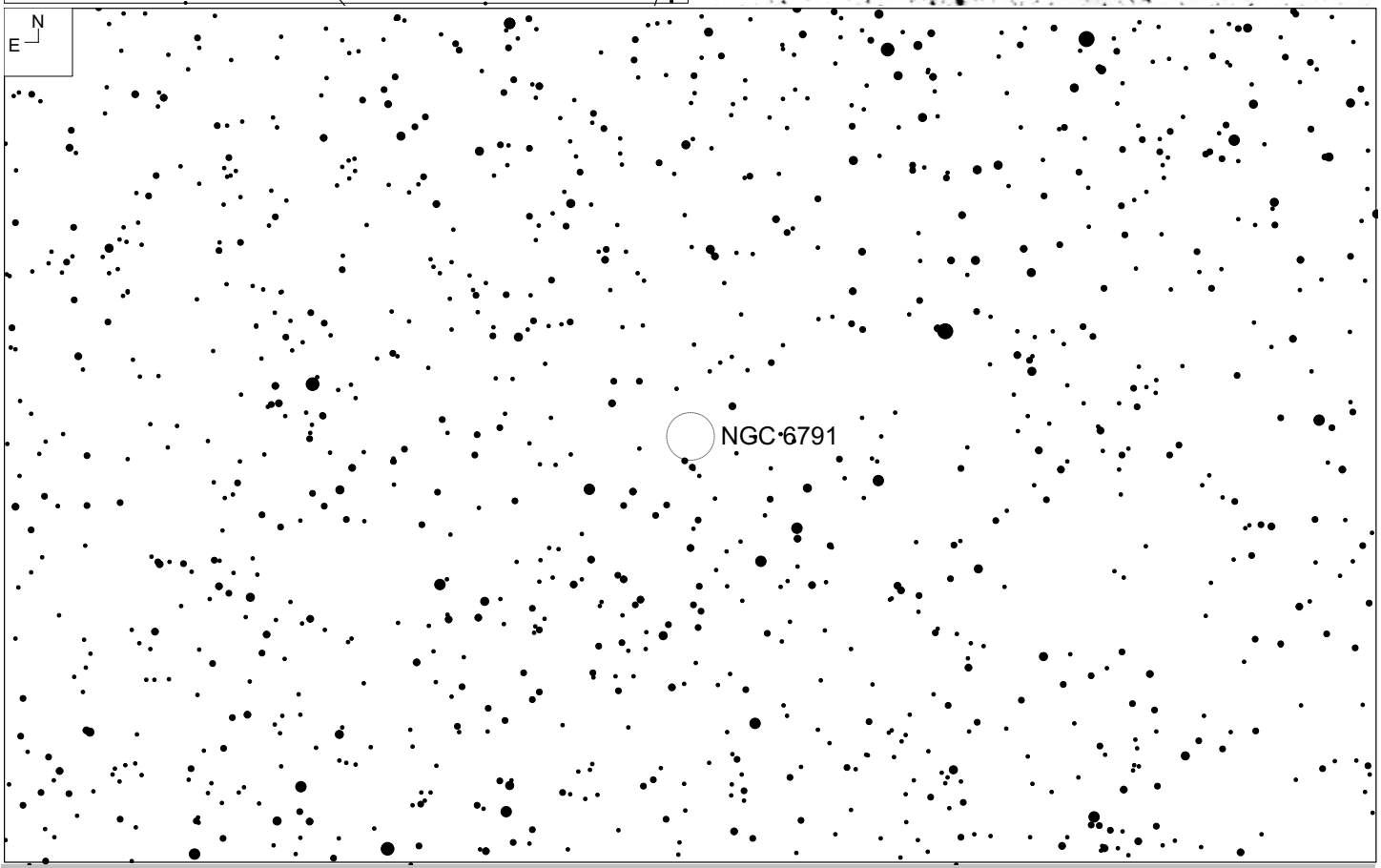


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 19 06.2	+15 43 07	2.0’	-	83	15.0	II1p	85	42

Berkeley 46 (Lyra)

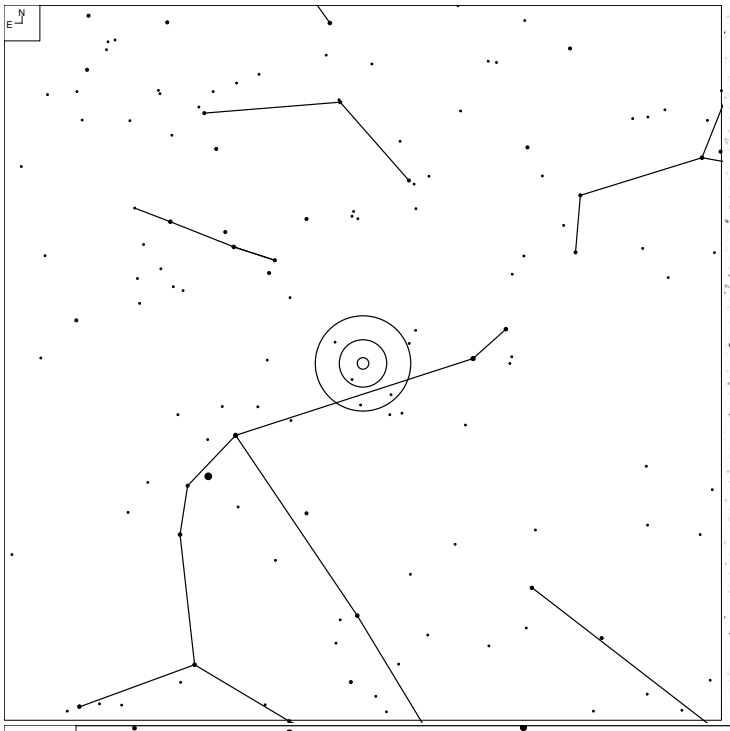


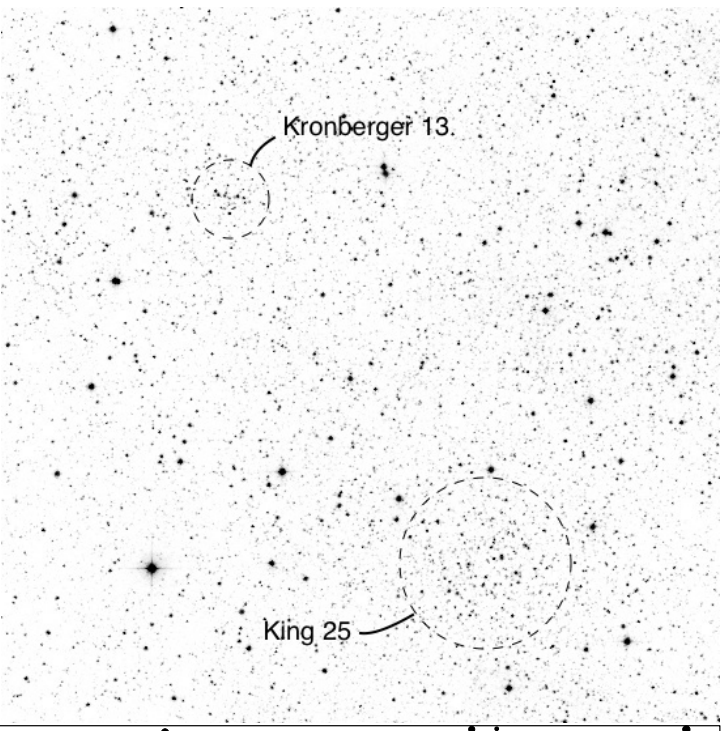


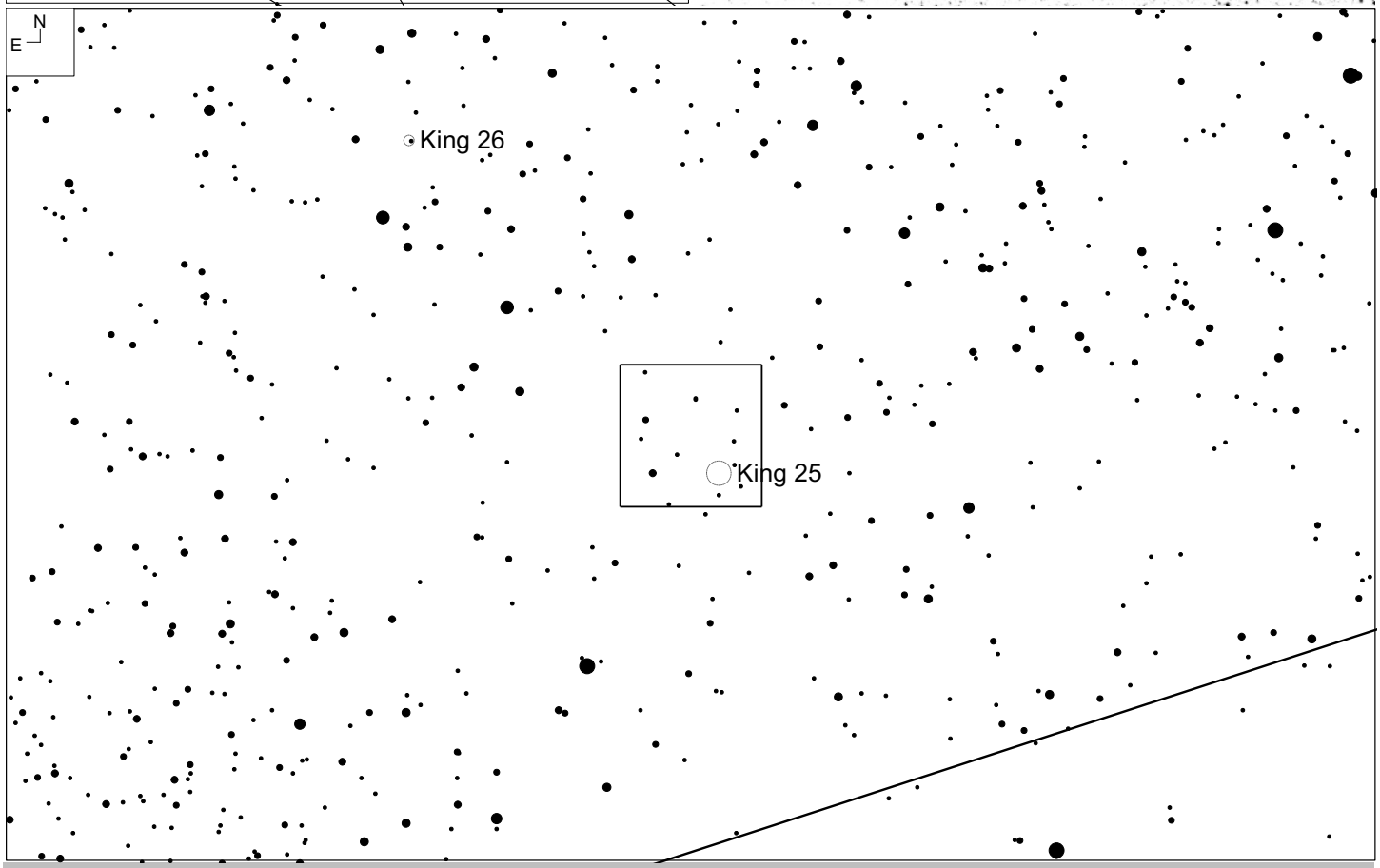


Other ID	RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
NGC 6791	19 20 53.0	+37 46 18	10.0’	9.5	321	15.0	I2r	48	30

King 25 and Kronberger 13 (Aquila)

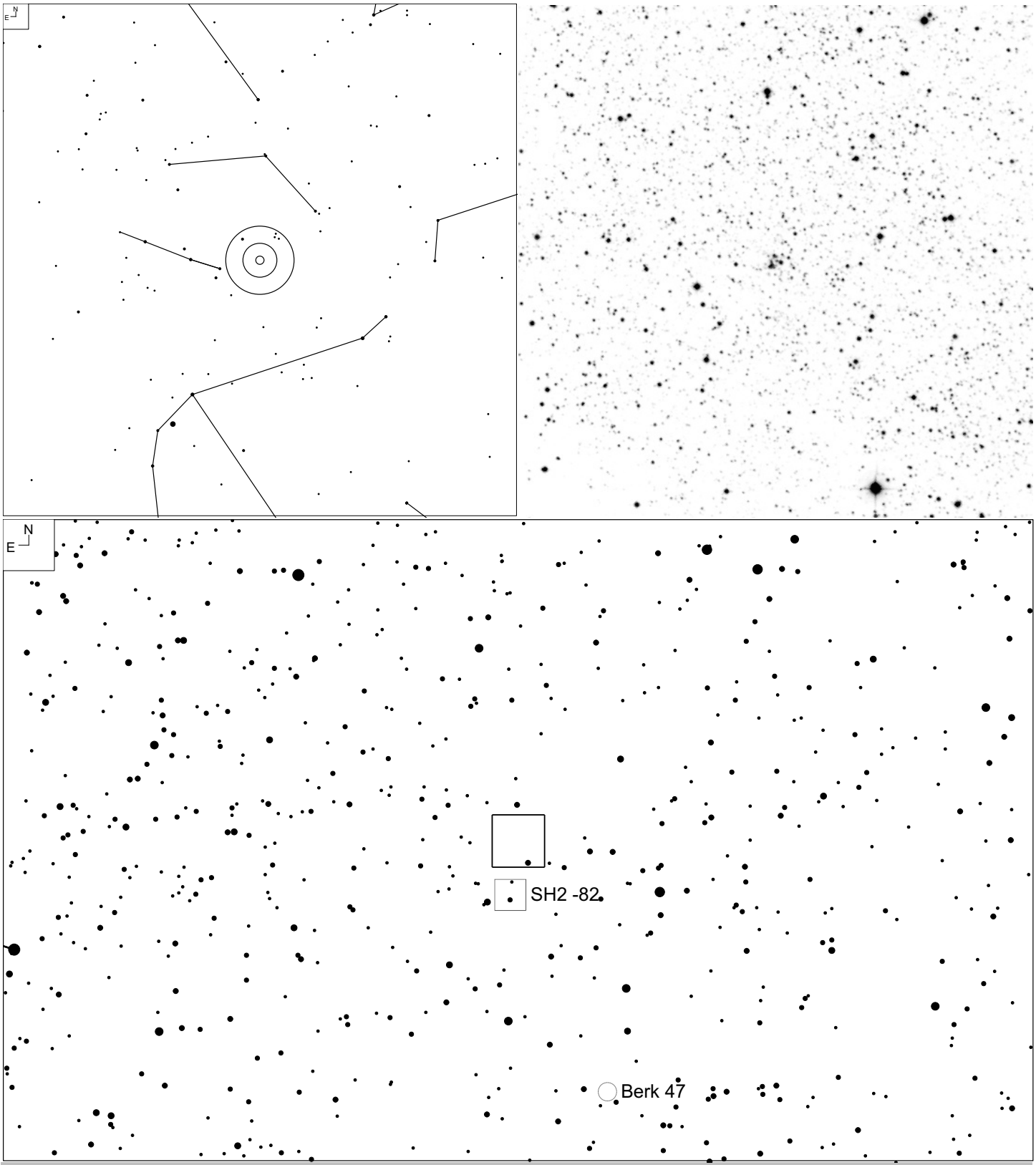






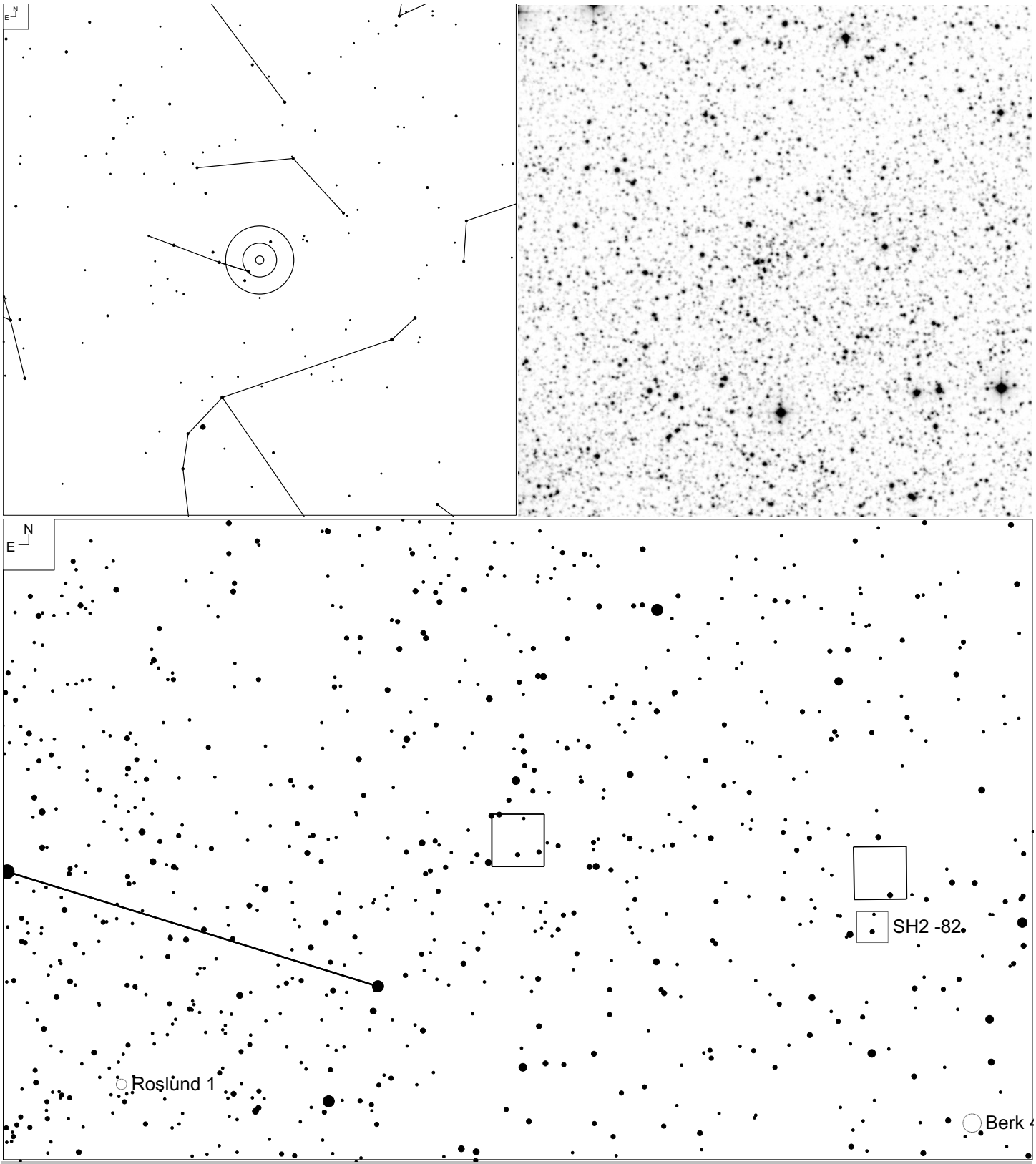
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 24 34.1	+13 42 14	5.0’	-	40	14.0	III2m	85	42
19 25 15.0	+13 56 42	1.2’	-	28	-	-		

Teutsch 42 (Aquila)



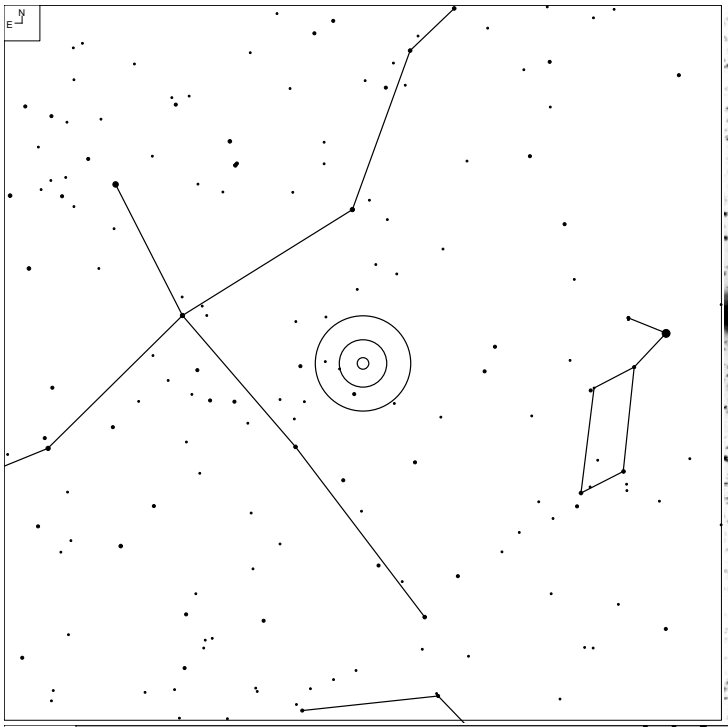
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 30 13.1	+18 32 09	1.1’	-	28	13.3	-	66	42

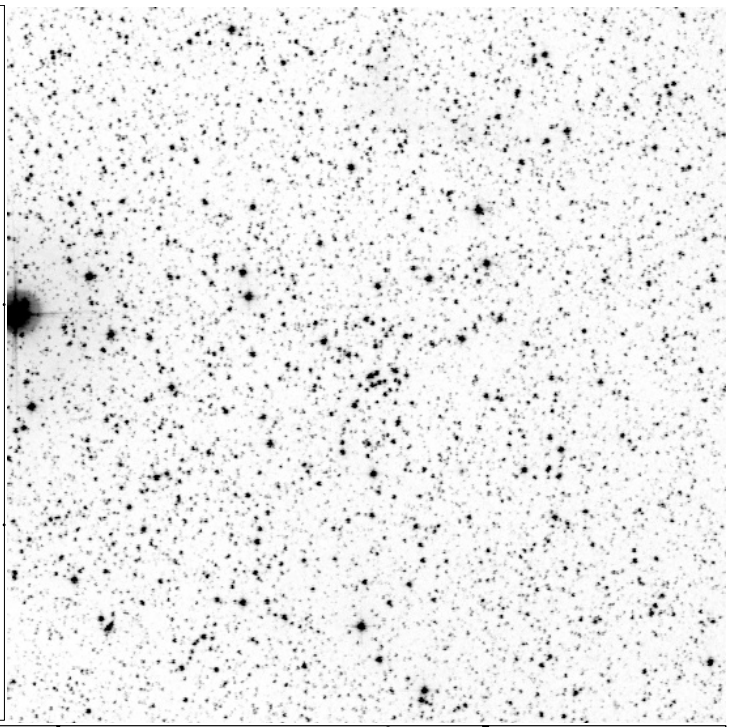
Teutsch 27 (Aquila)

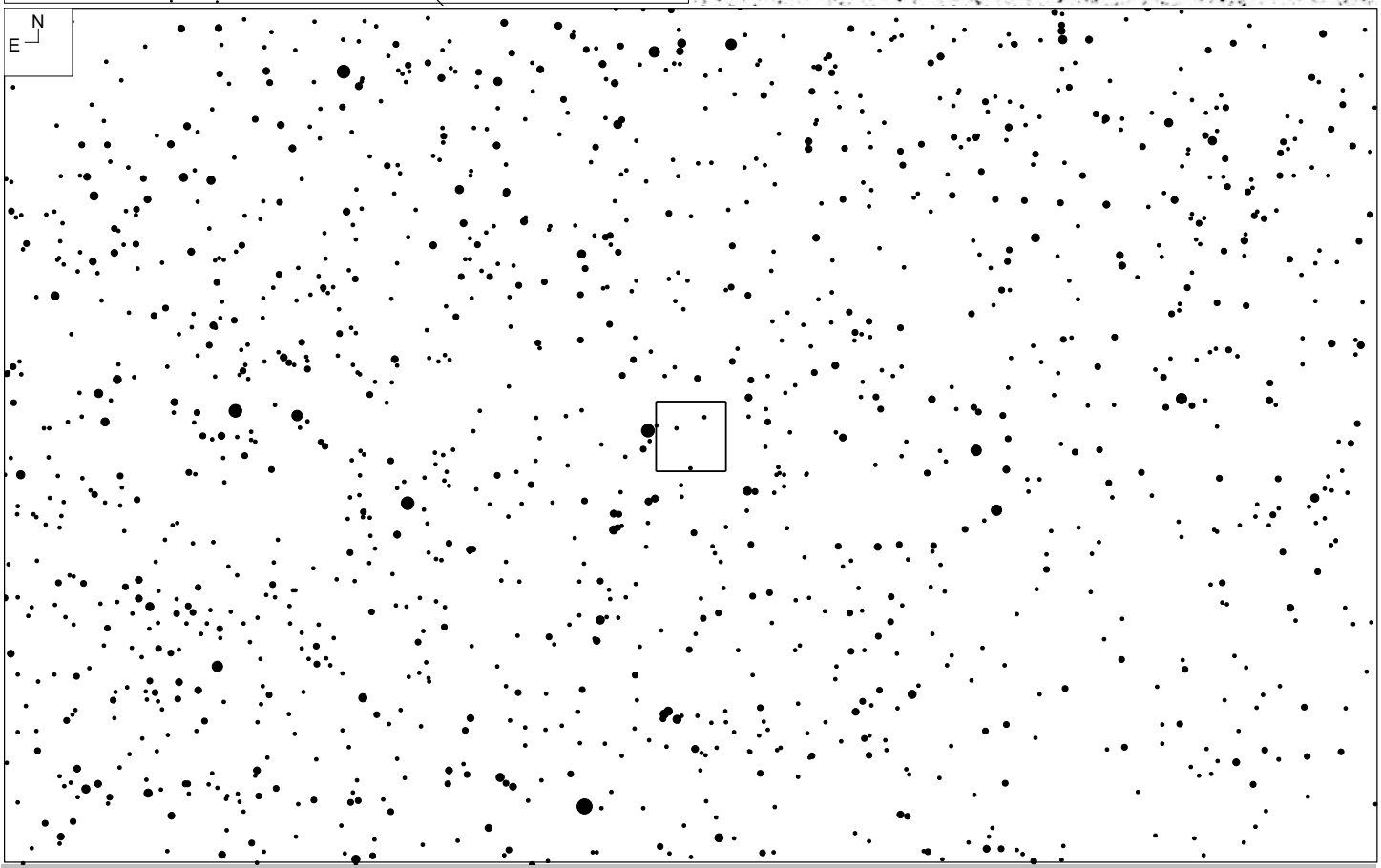


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 37 20.6	+18 41 51	3.6’	-	65	-	-	66	42

Skiff J1942+38.6 (Cygnus)

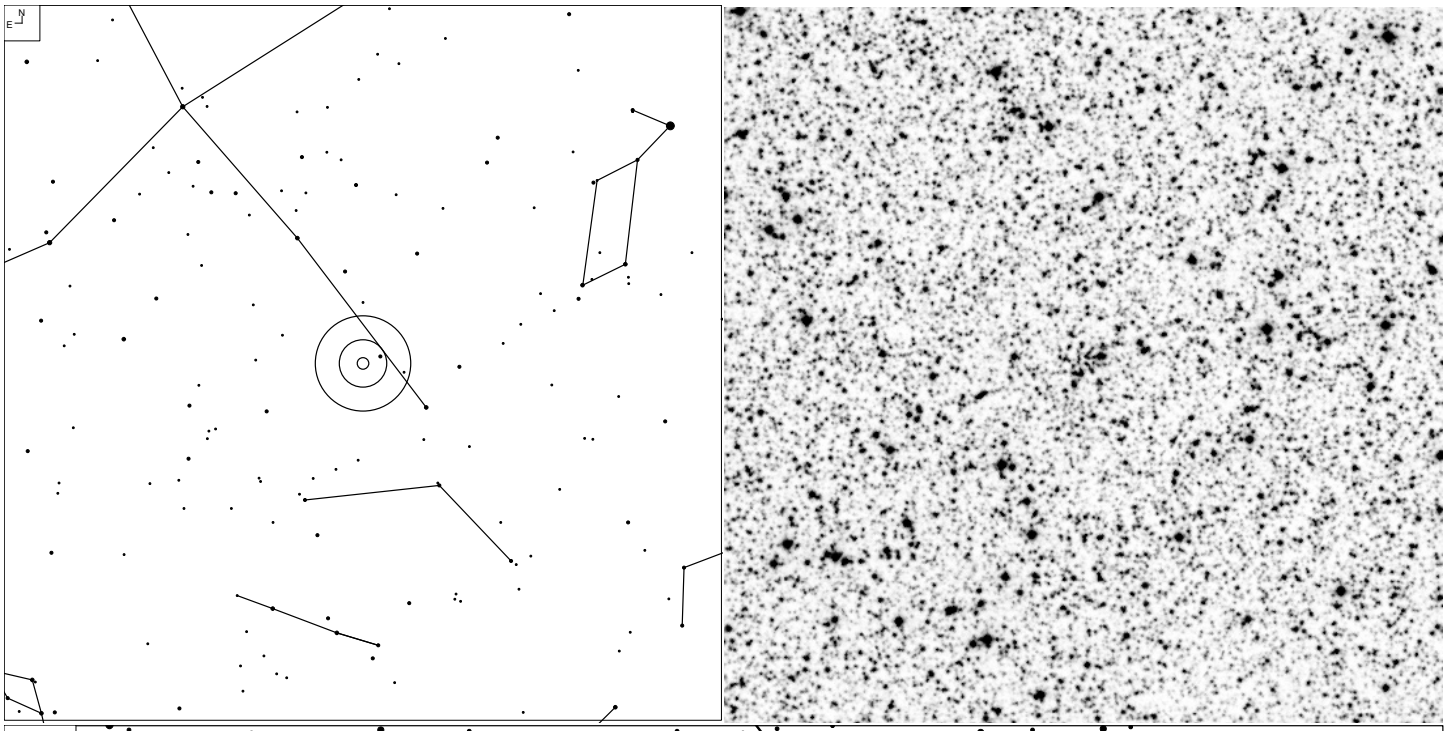


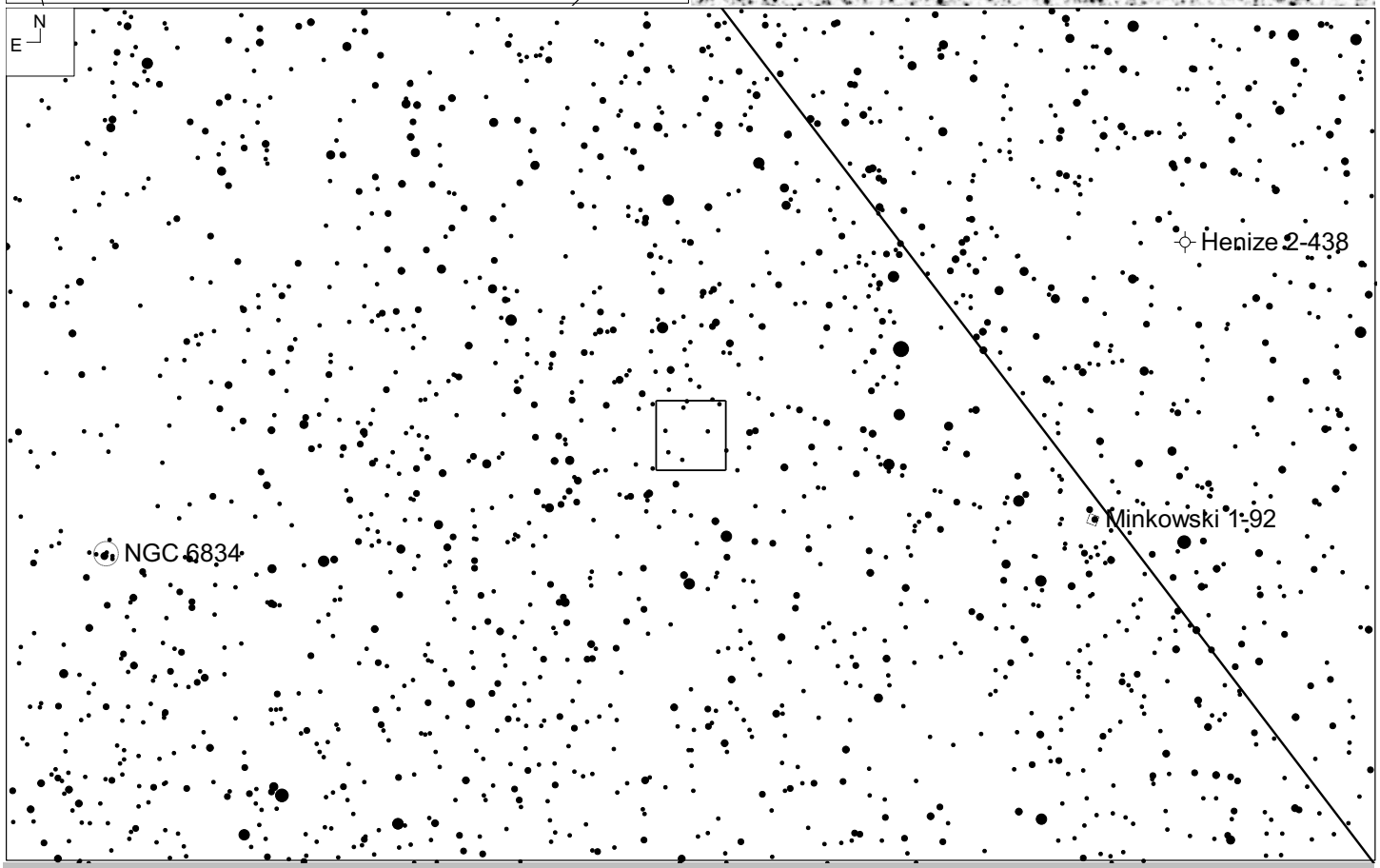




RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 42 24.0	+38 39 00	10.0’	-	285	11.3	II1p	48	30

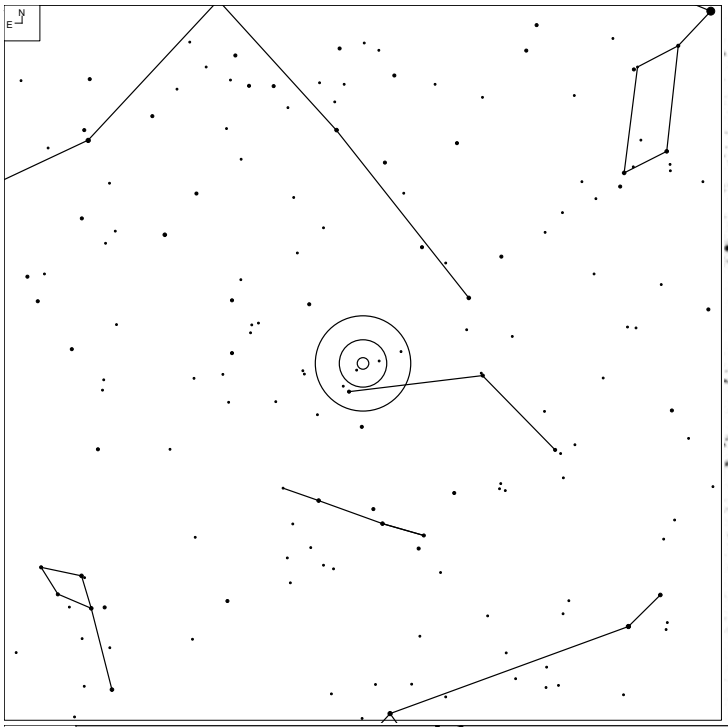
Teutsch 43 (Cygnus)

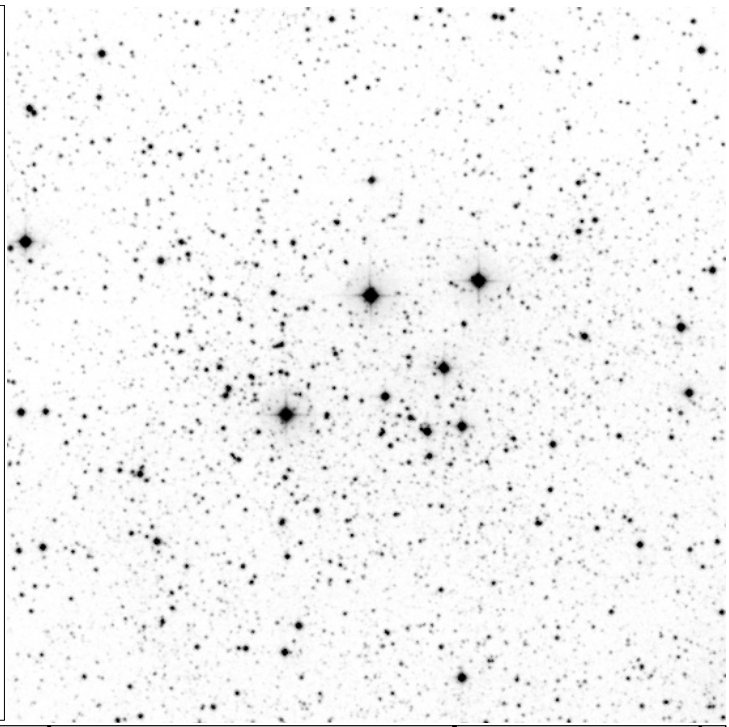


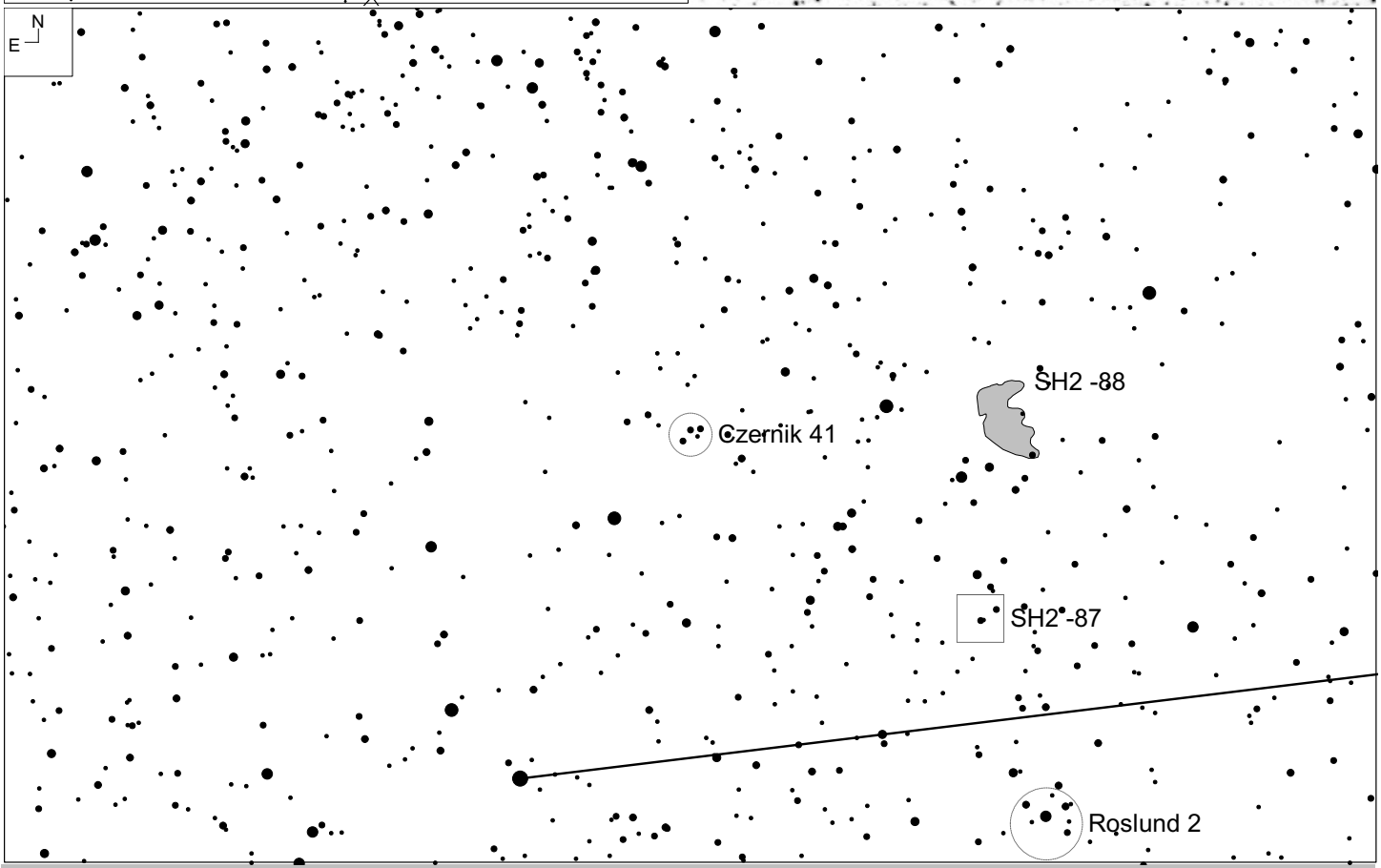


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 42 47.3	+29 51 10	2.6’	-	59	11.9	-	66	30

Czernik 41 (Vulpecula)

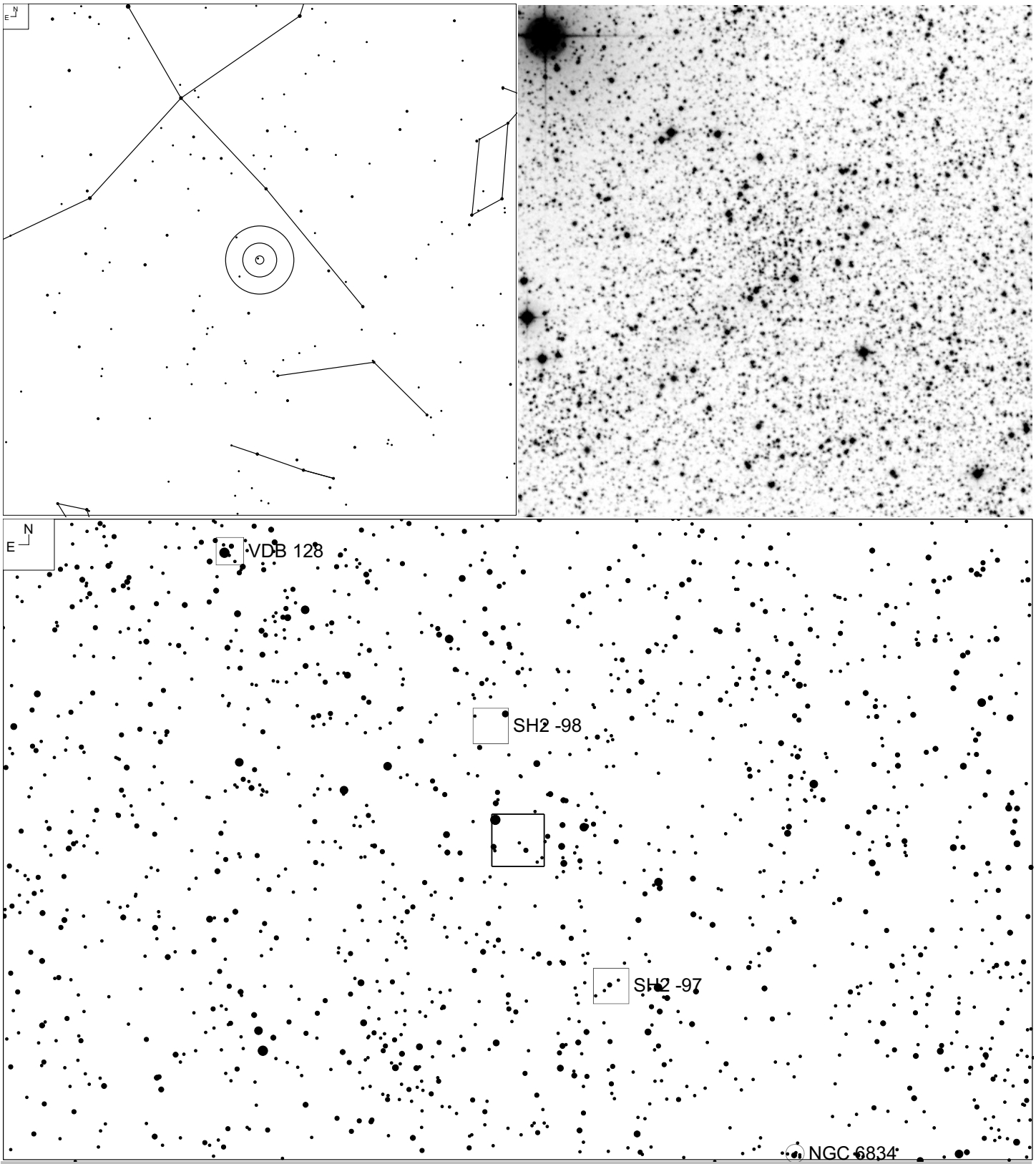






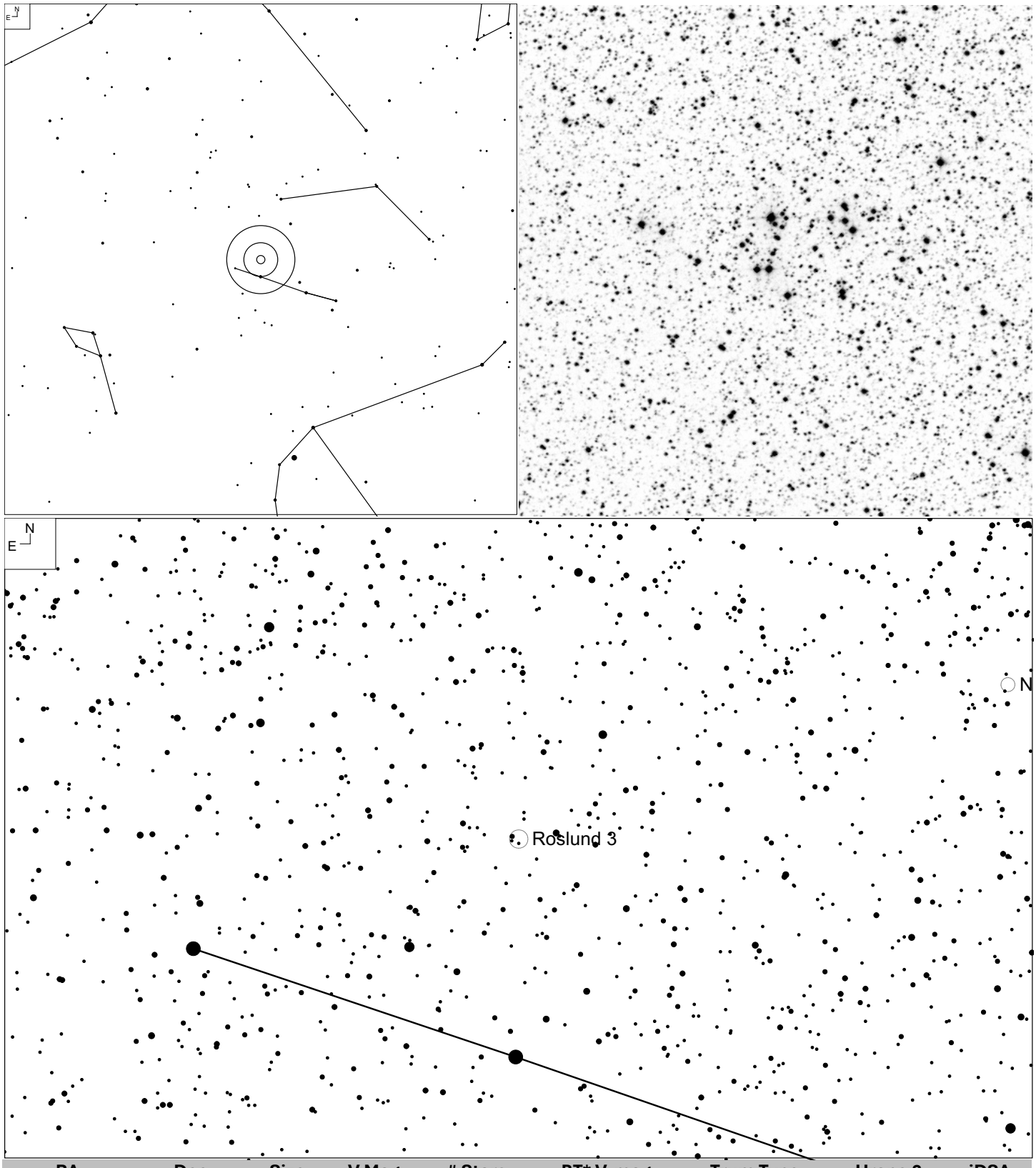
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 50 50.8	+25 16 47	8.0’	-	68	9.2	III2m	66	30

Kronberger 52 (Cygnus)



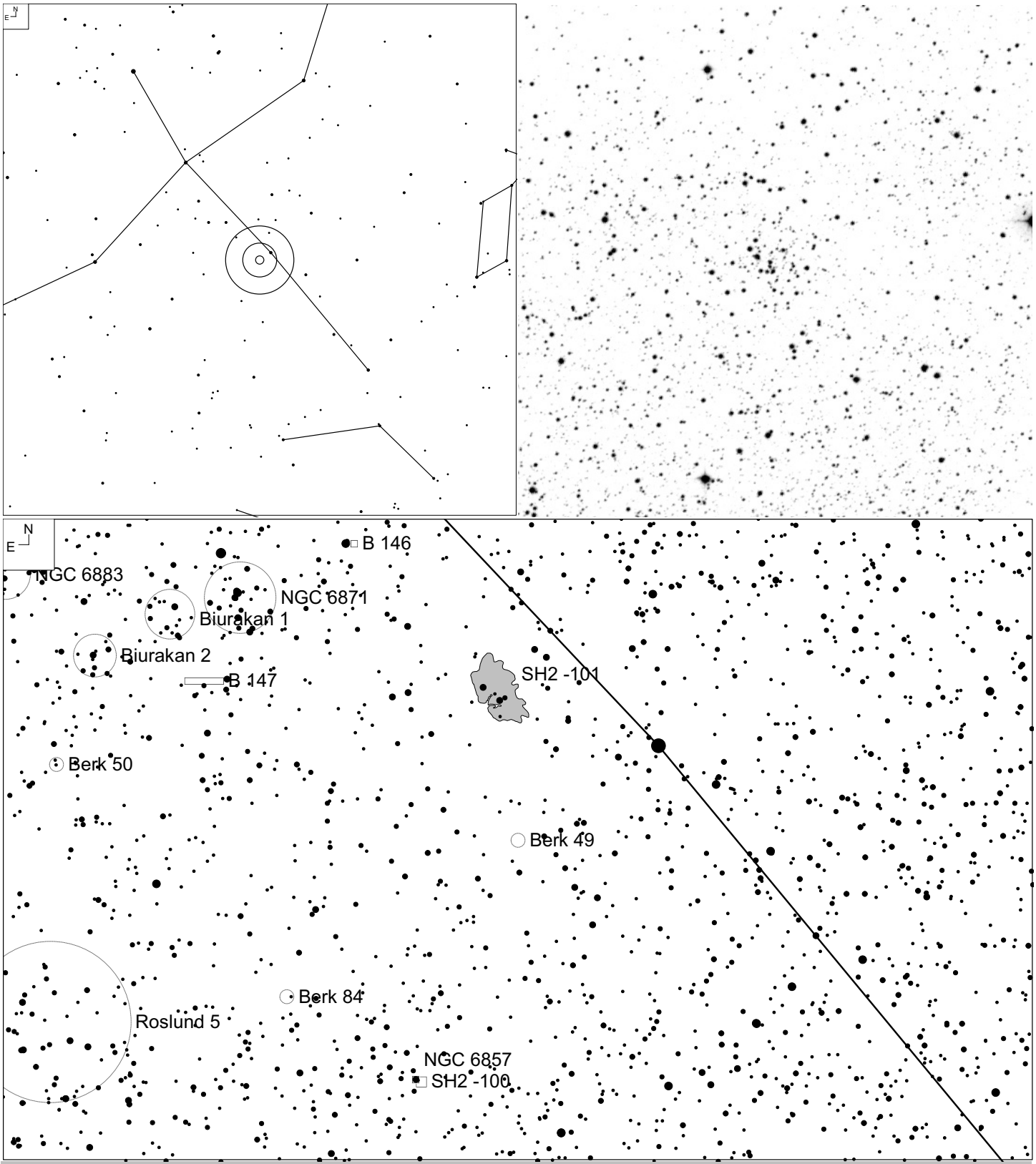
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 58 08.0	+30 53 12	1.2’	-	39	14.6	-	48	30

Roslund 3 (Sagitta)



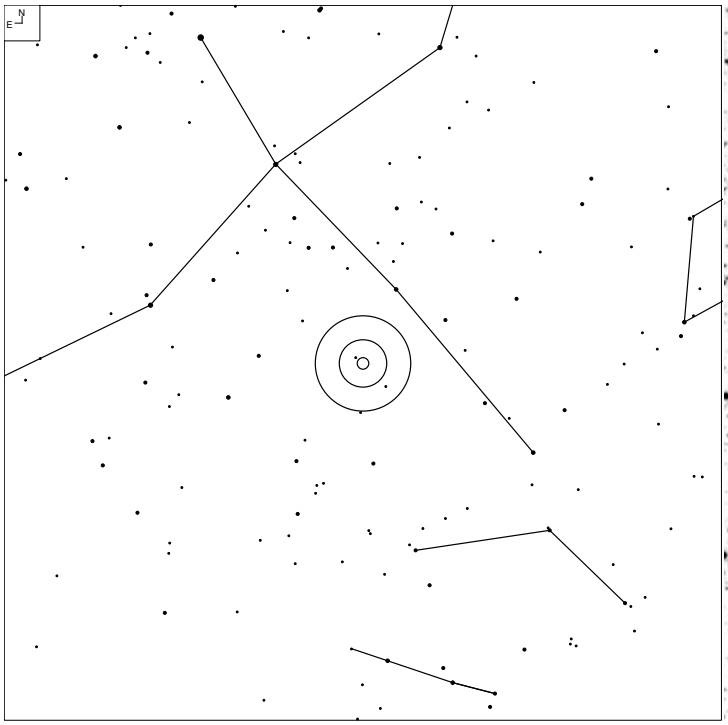
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 58 41.6	+20 30 39	5.0’	-	153	9.9	IV1p	66	42

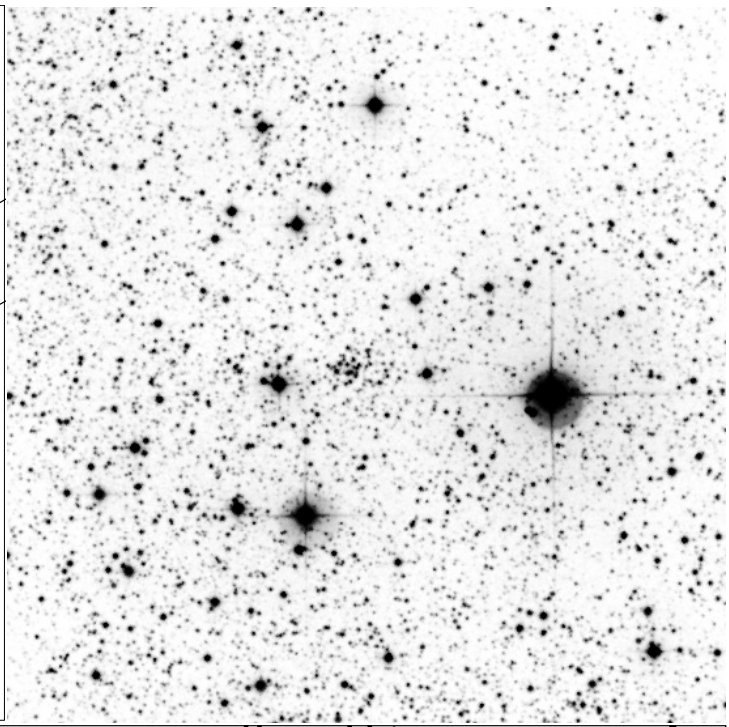
Berkeley 49 (Cygnus)

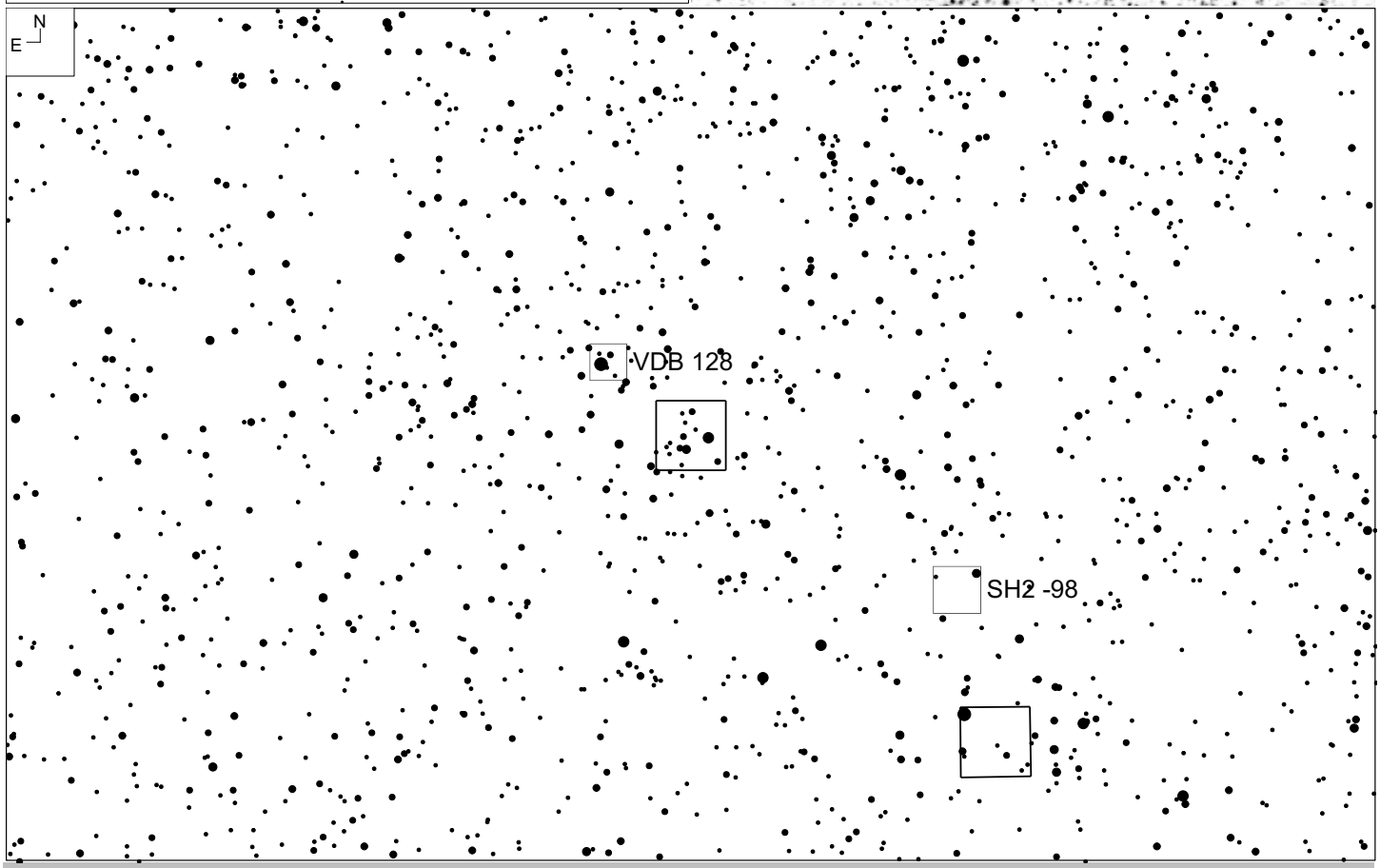


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
19 59 31.0	+34 38 48	2.5’	13.0	43	16.0	I1p	48	42

Kronberger 54 (Cygnus)

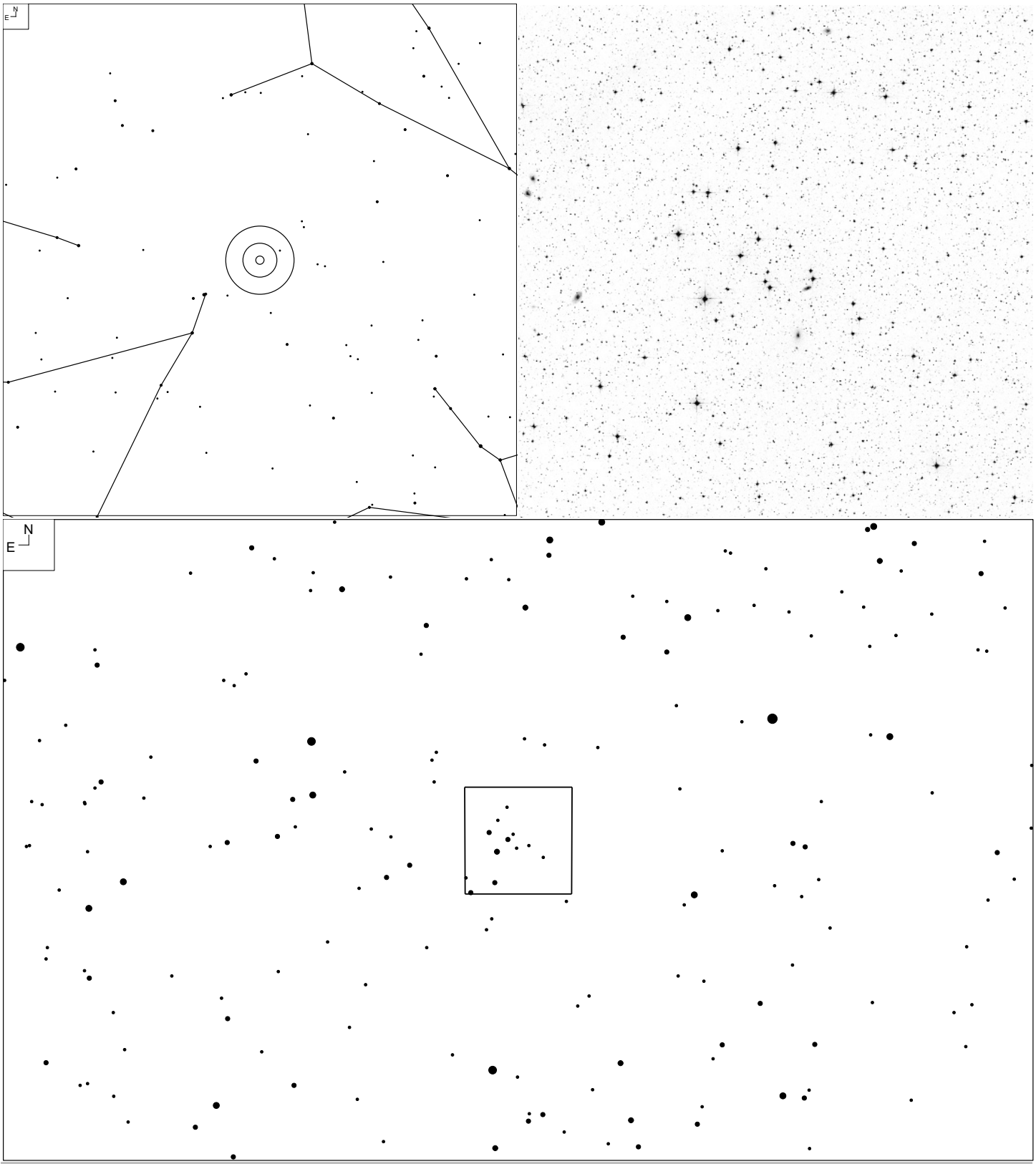






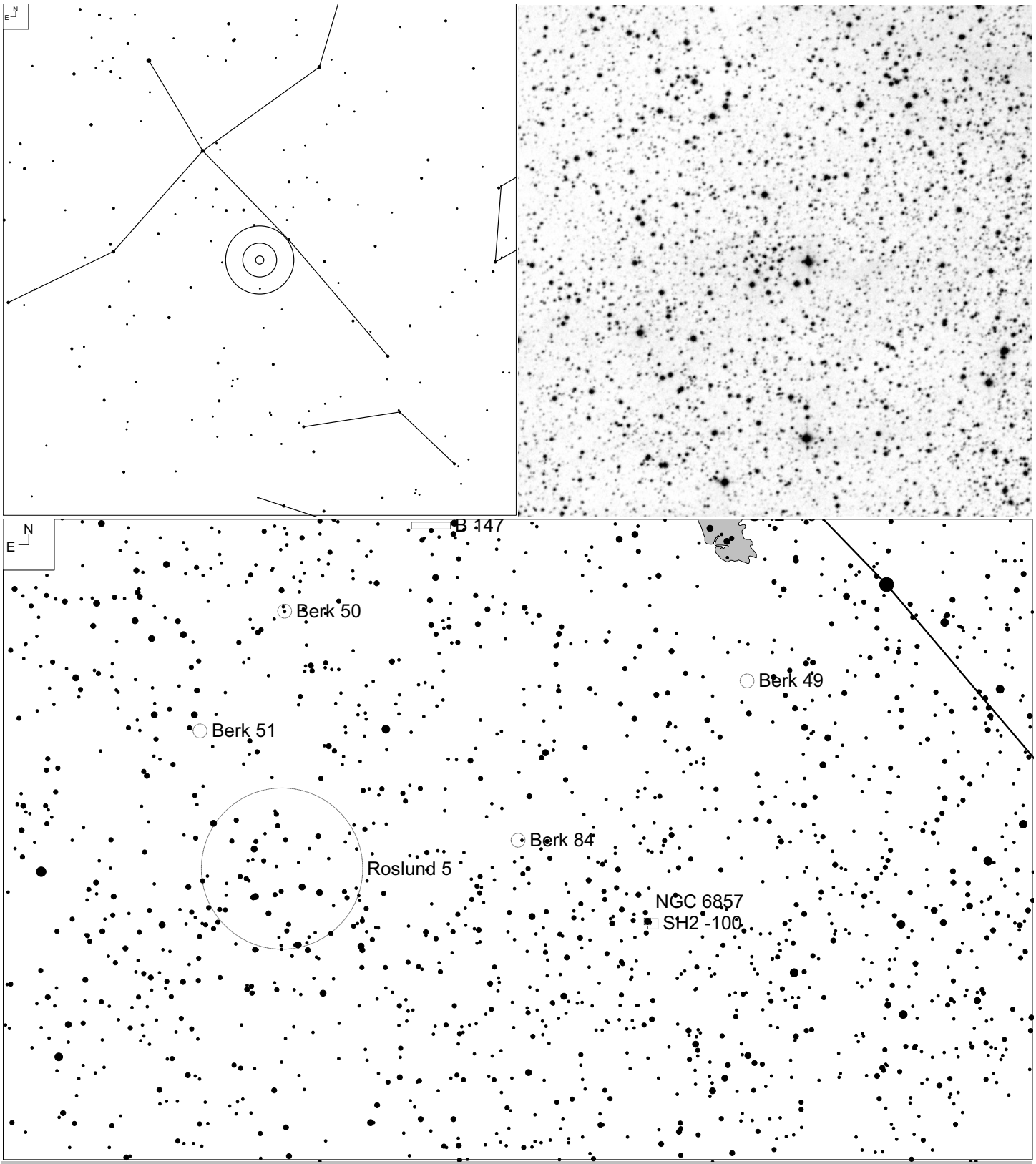
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 03 06.5	+31 58 05	0.8’	-	46	13.9	-	48	29

Alessi-J20046 (Aquila)



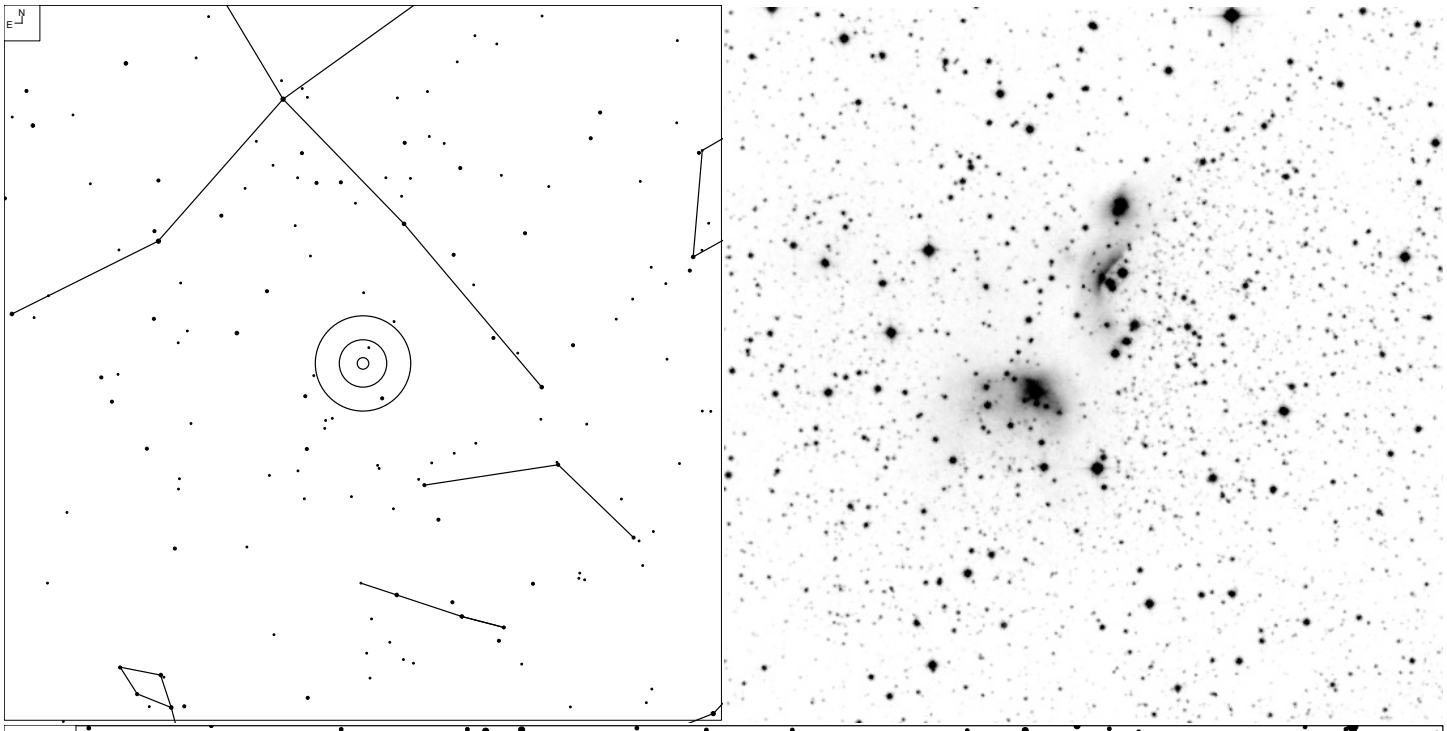
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 04 36.0	-10 31 46	20.0’	7.5	20	8.9	-	124	65

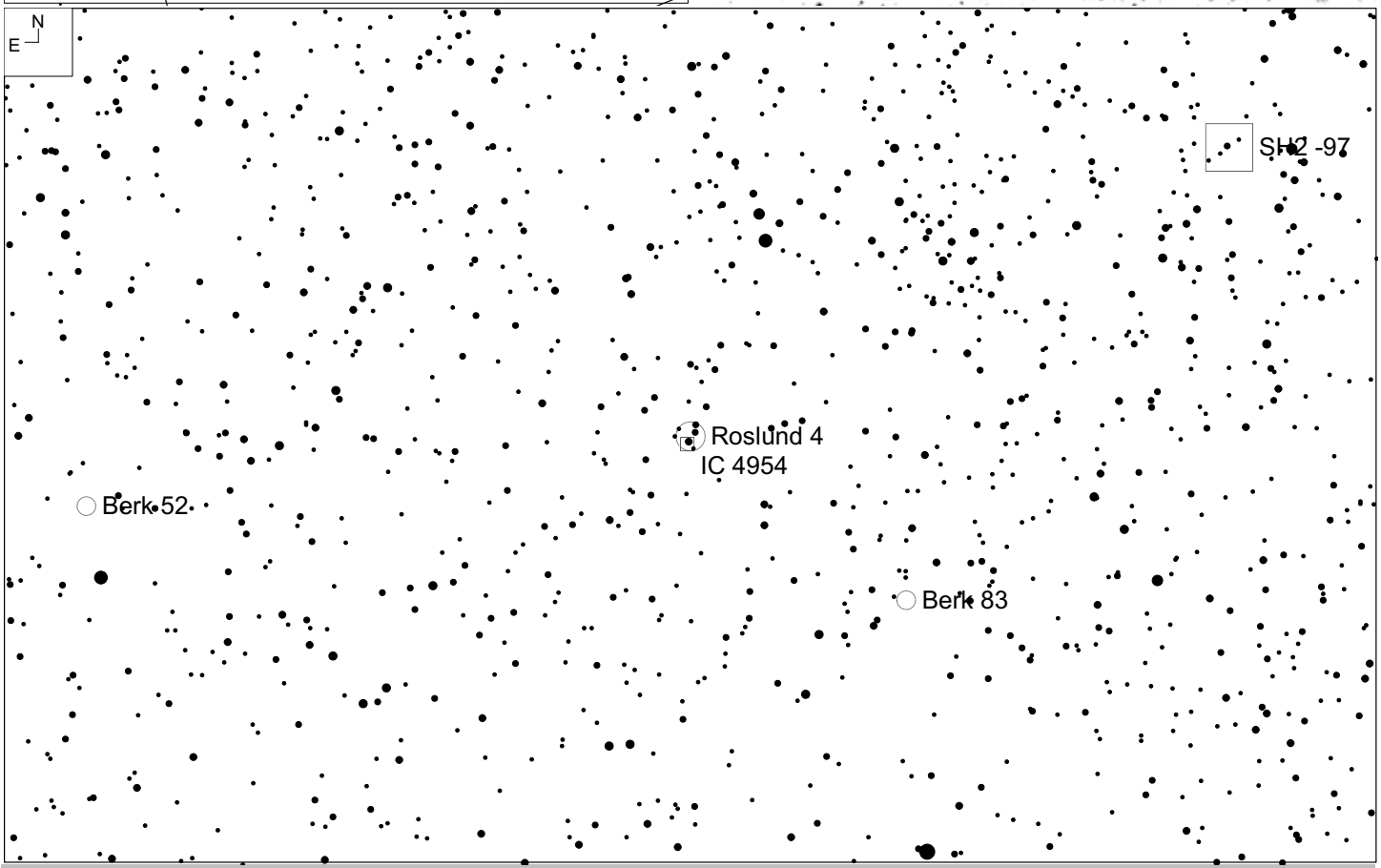
Berkeley 84 (Cygnus)



RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 04 43.0	+33 54 18	2.5’	-	57	16.0	II1p n	48	29

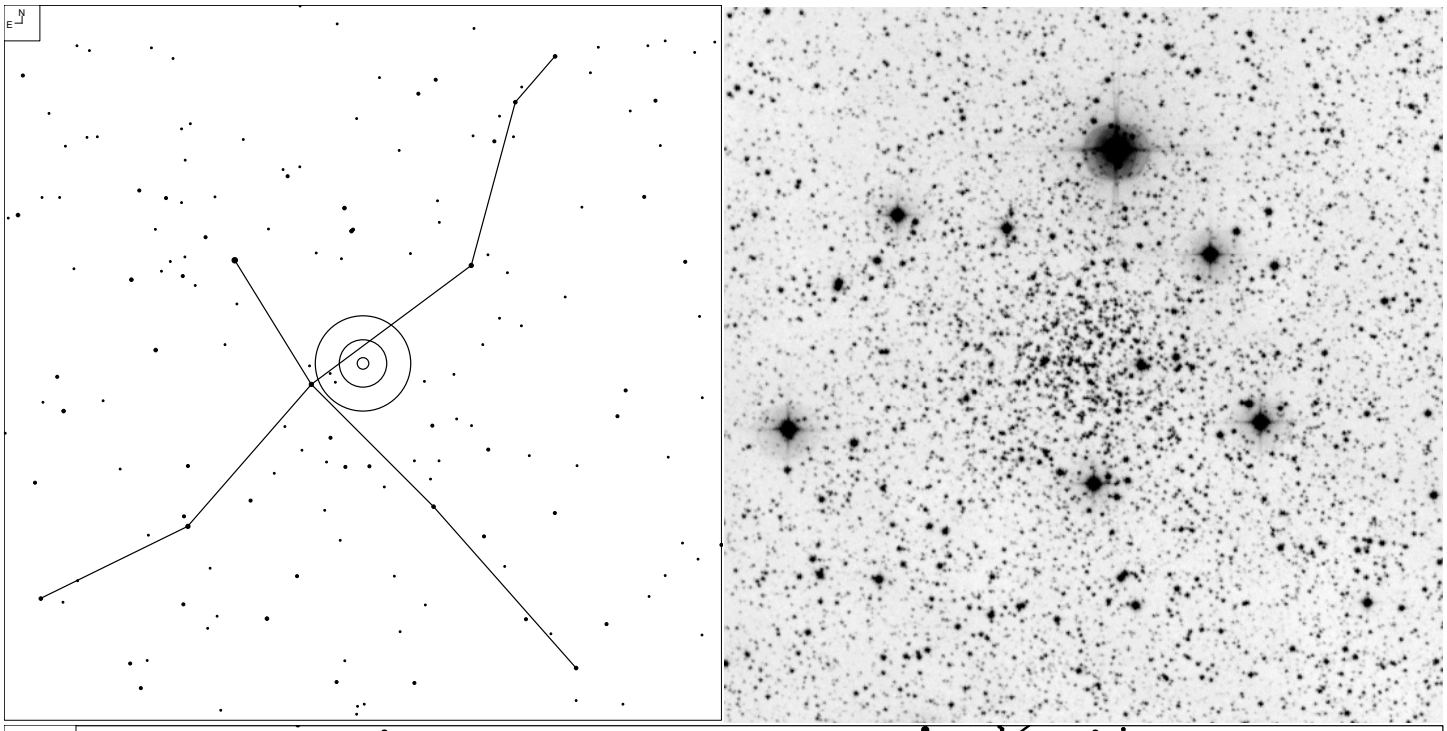
Roslund 4 (Sagitta)

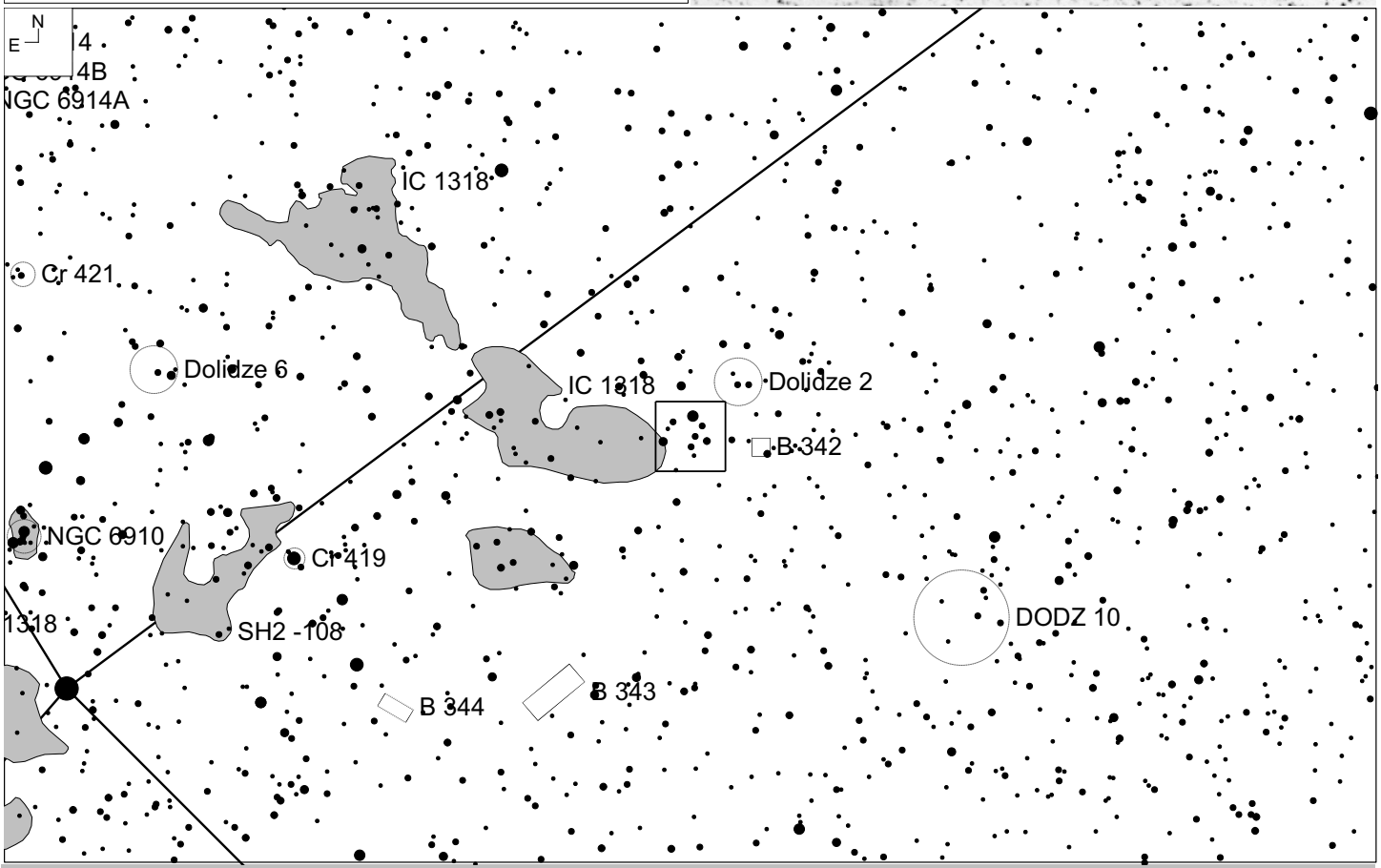




RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 04 45.8	+29 13 44	5.0’	10.0	80	9.5	II3m n	66	29

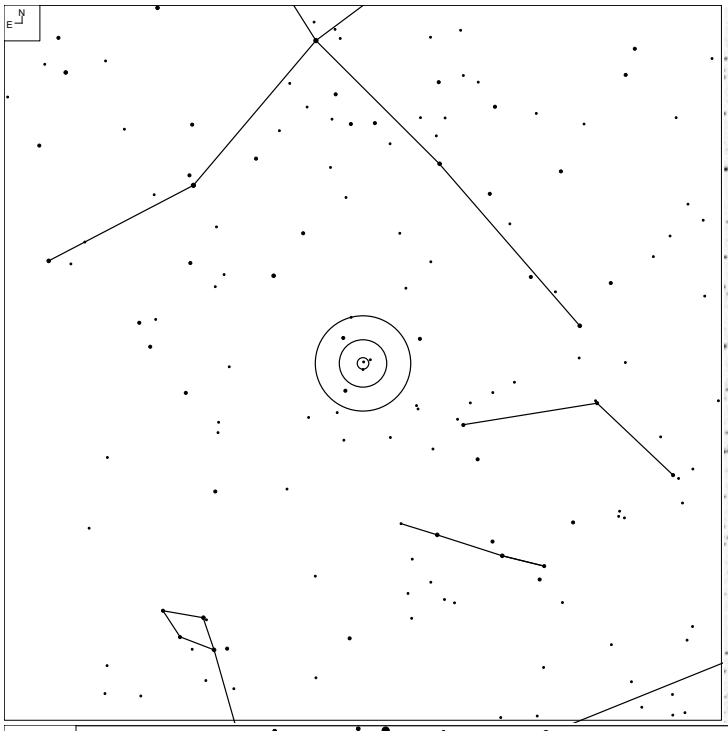
IC 1311 (Cygnus)

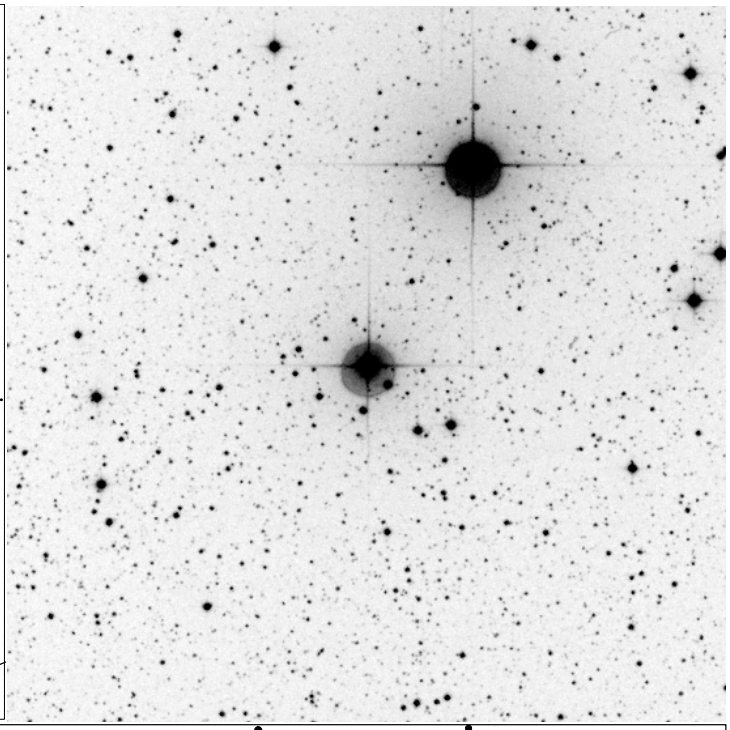


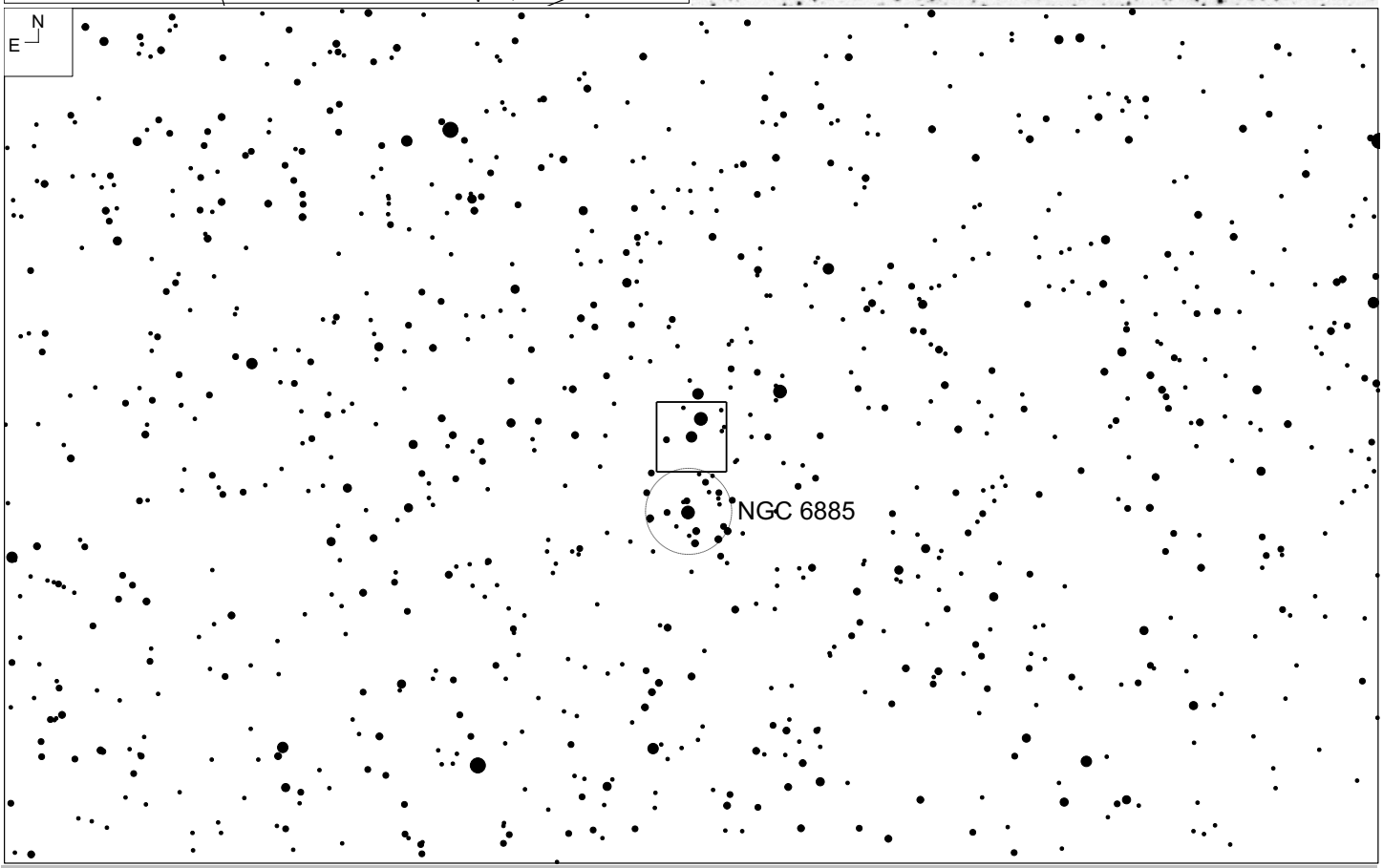


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 10 47.4	+41 13 00	5.0’	13.1	91	17.0	I1rm n	32	29

AH03-J2011.9 (Vulpecula)

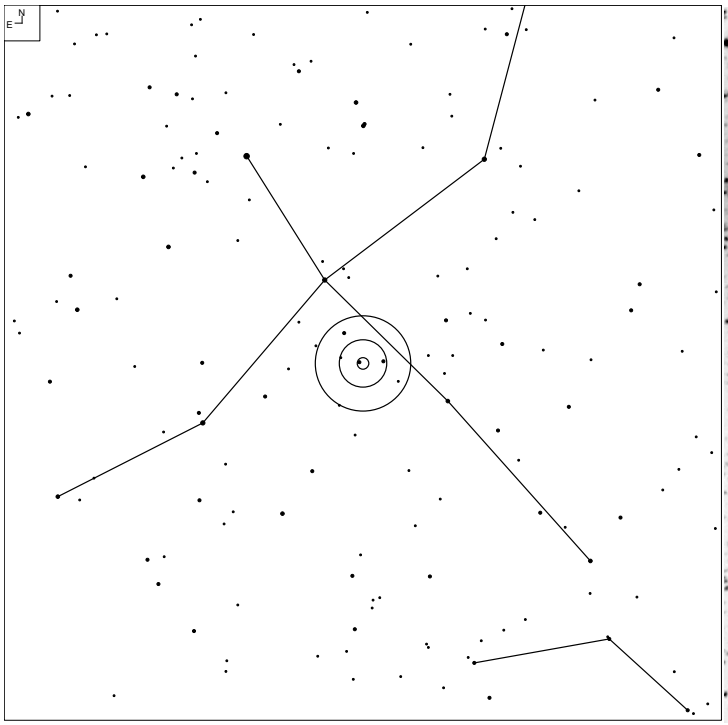


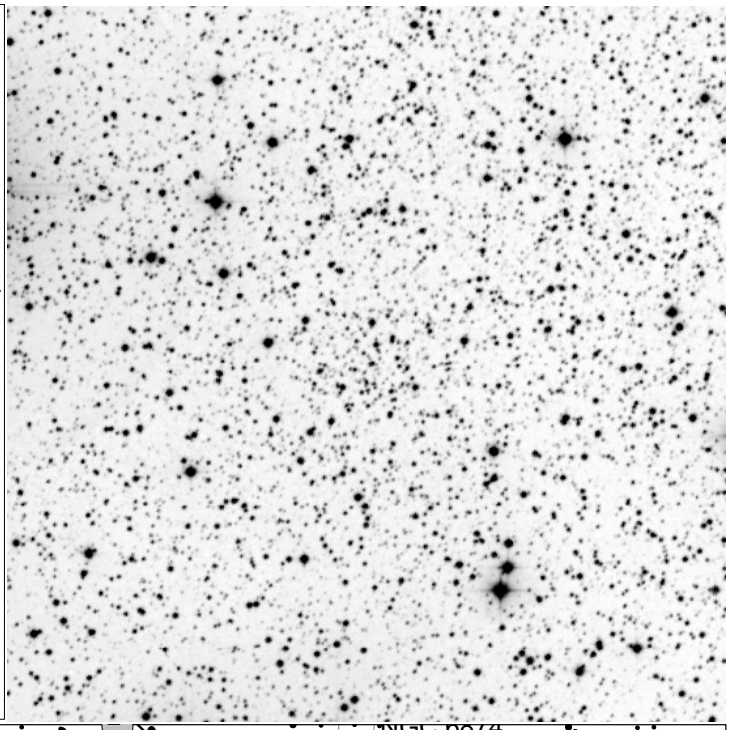


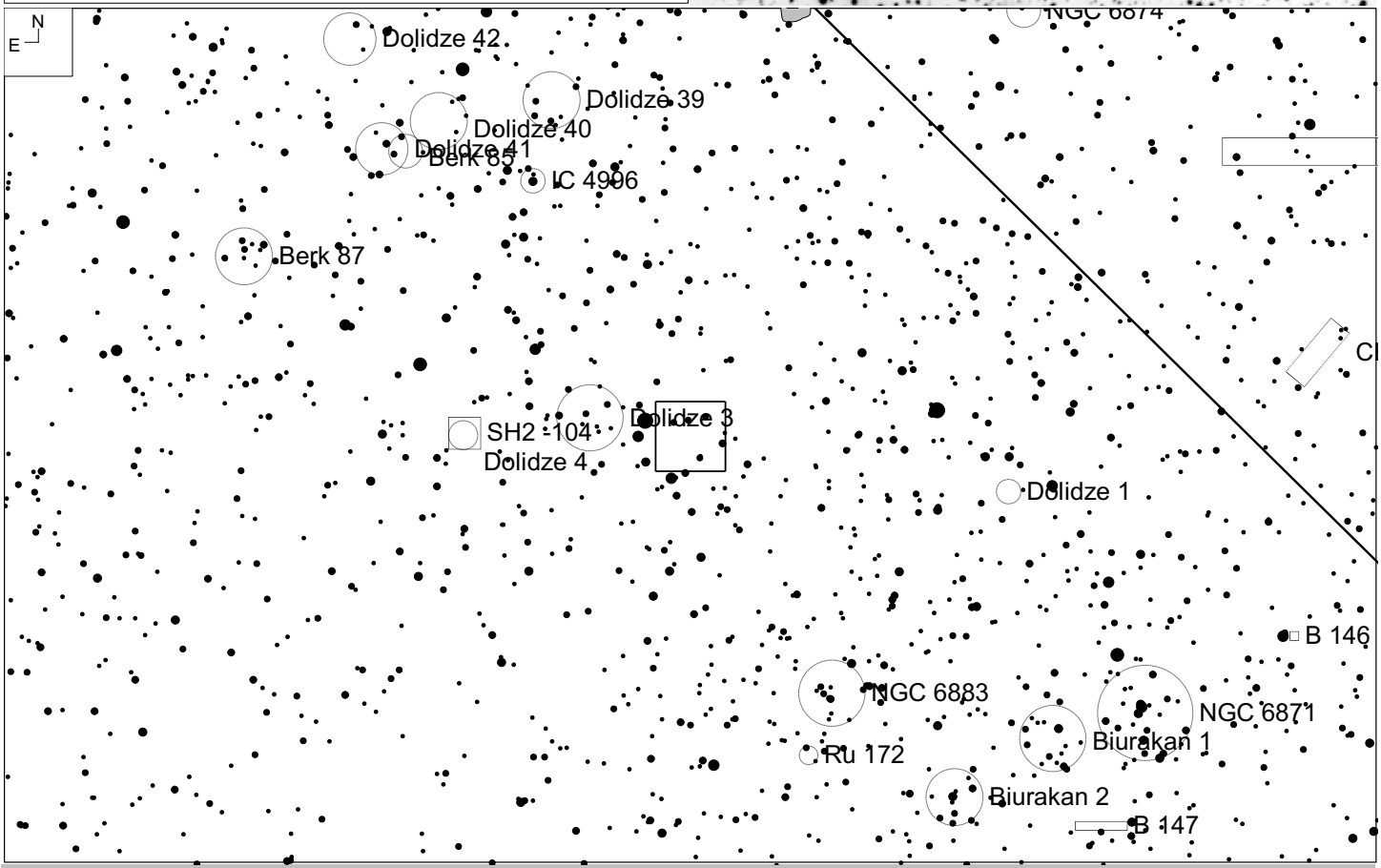


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 11 57.2	+26 44 38	4.5’		9	7.6	-	66	29

Kronberger 73 (Cygnus)

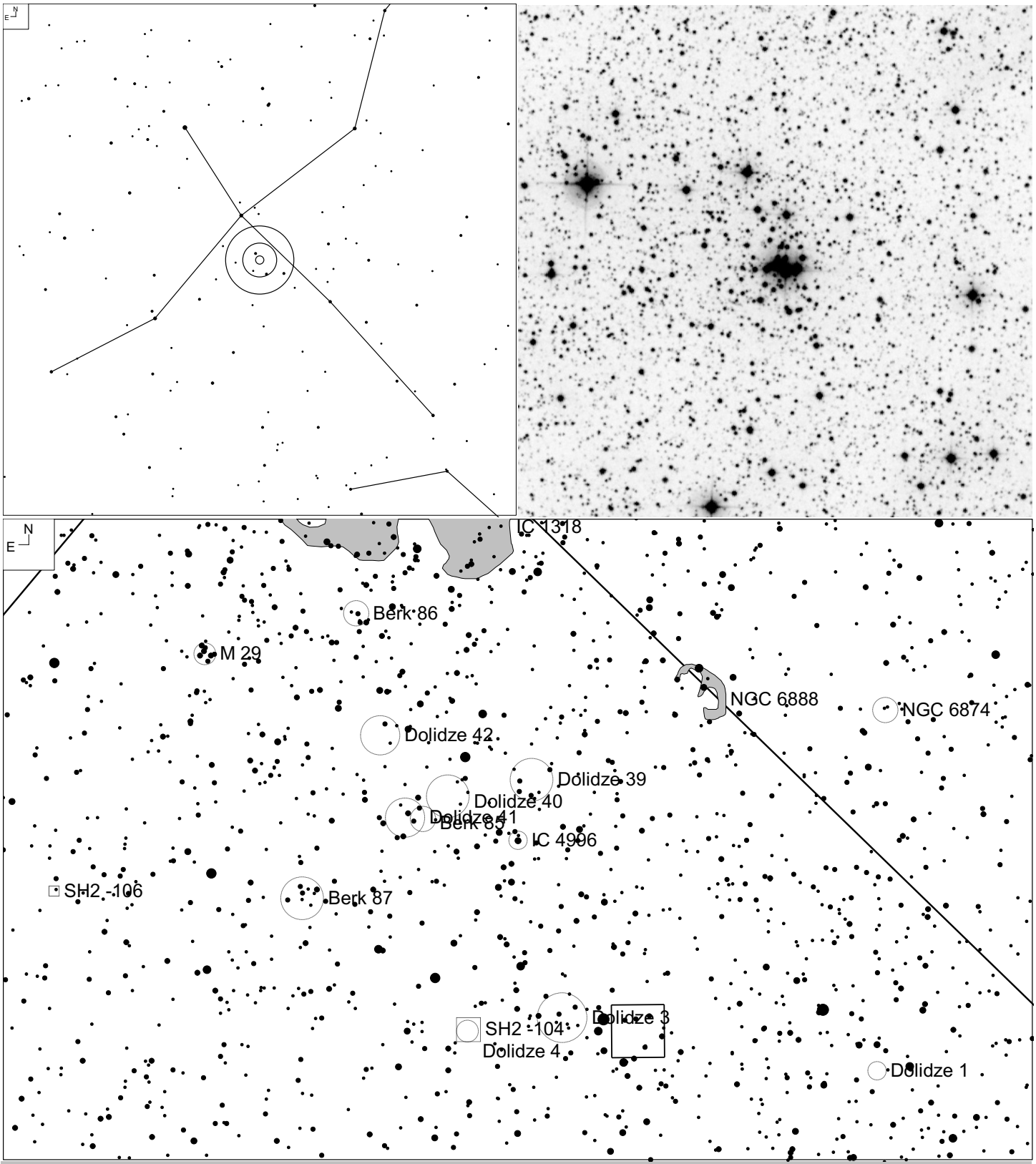






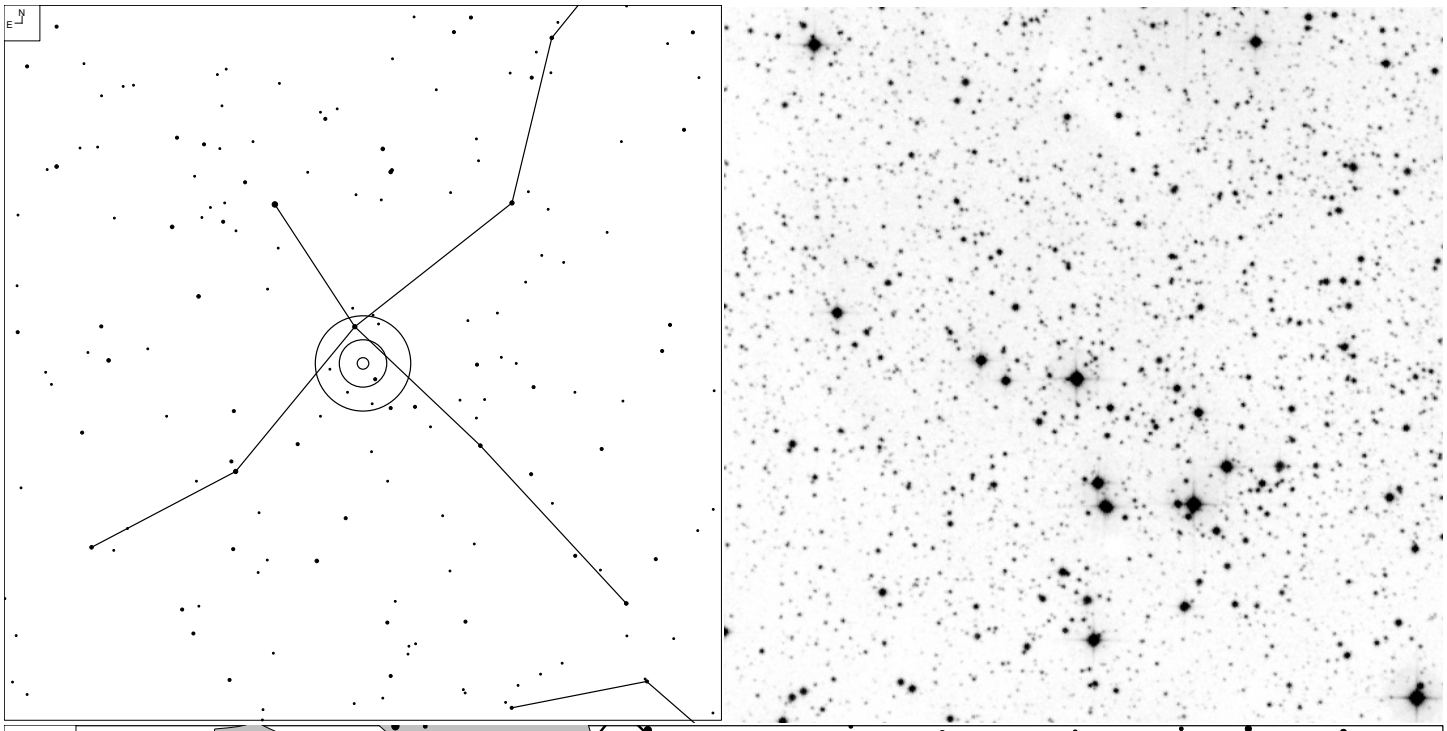
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 13 44.4	+36 45 05	1.2’	-	60	17.0	-	48	17, 29

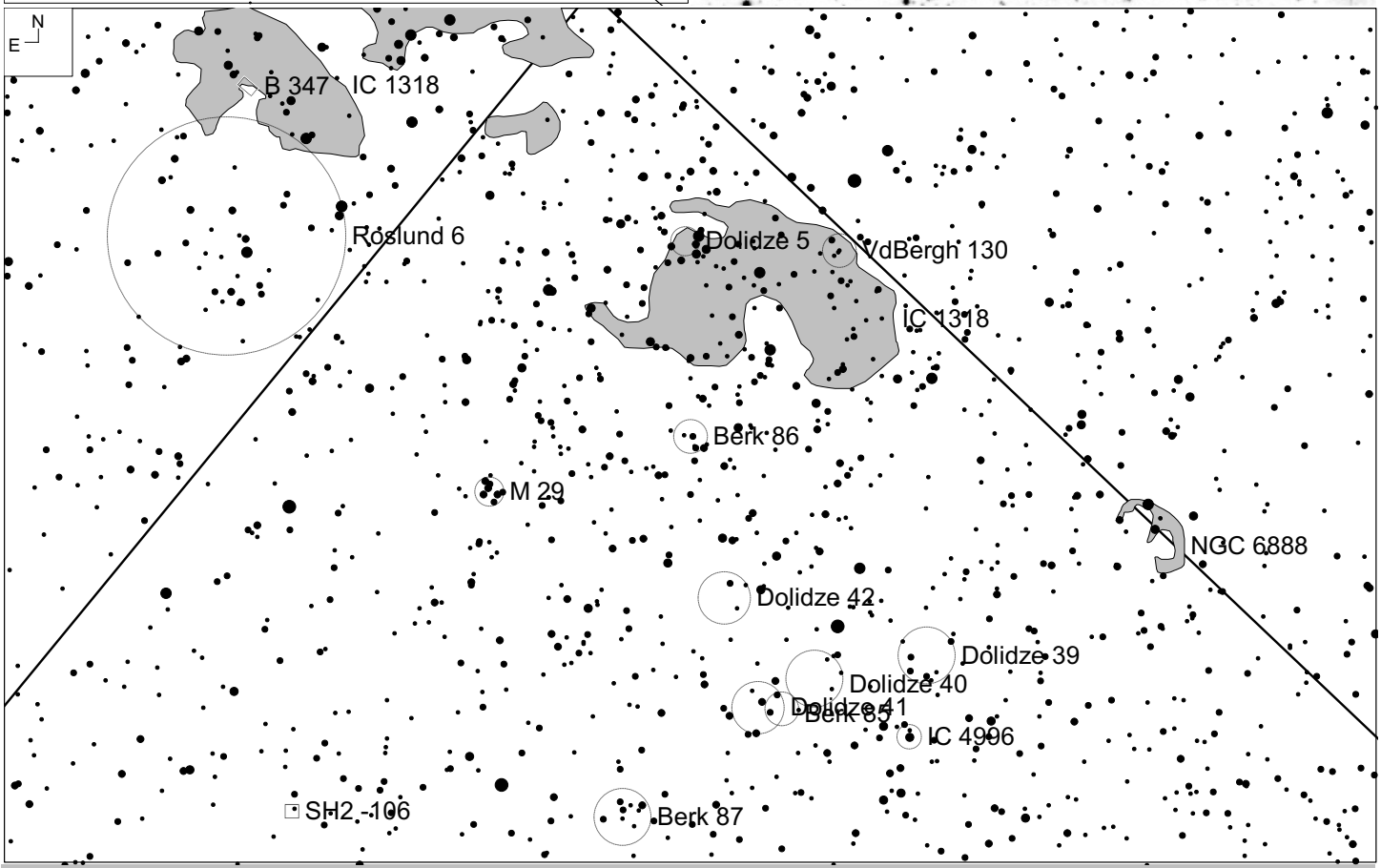
IC 4996 (Cygnus)



RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 16 30.0	+37 38 00	2.2’	7.3	65	8.0	II3p n	48	17

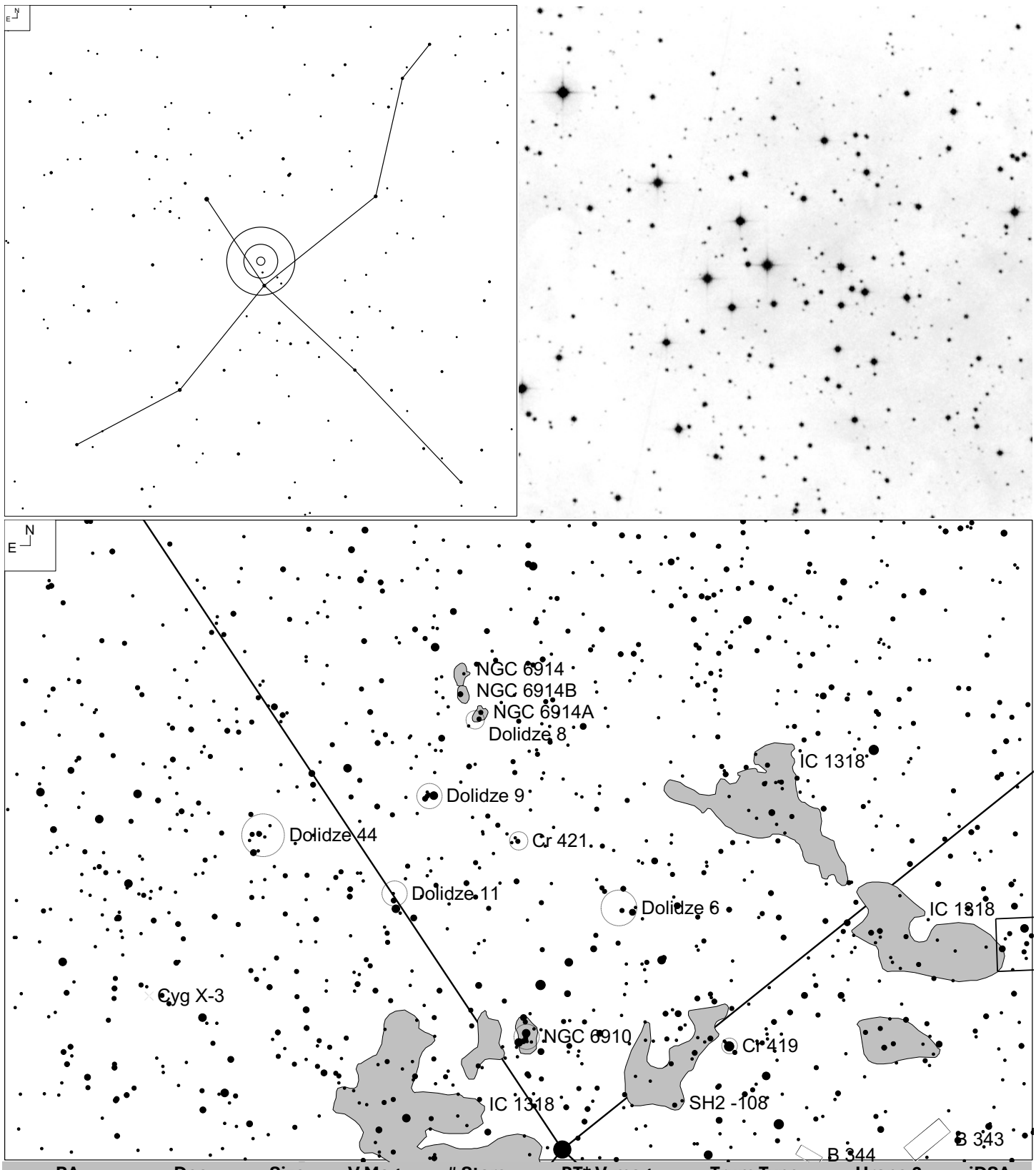
Berkeley 86 (Cygnus)





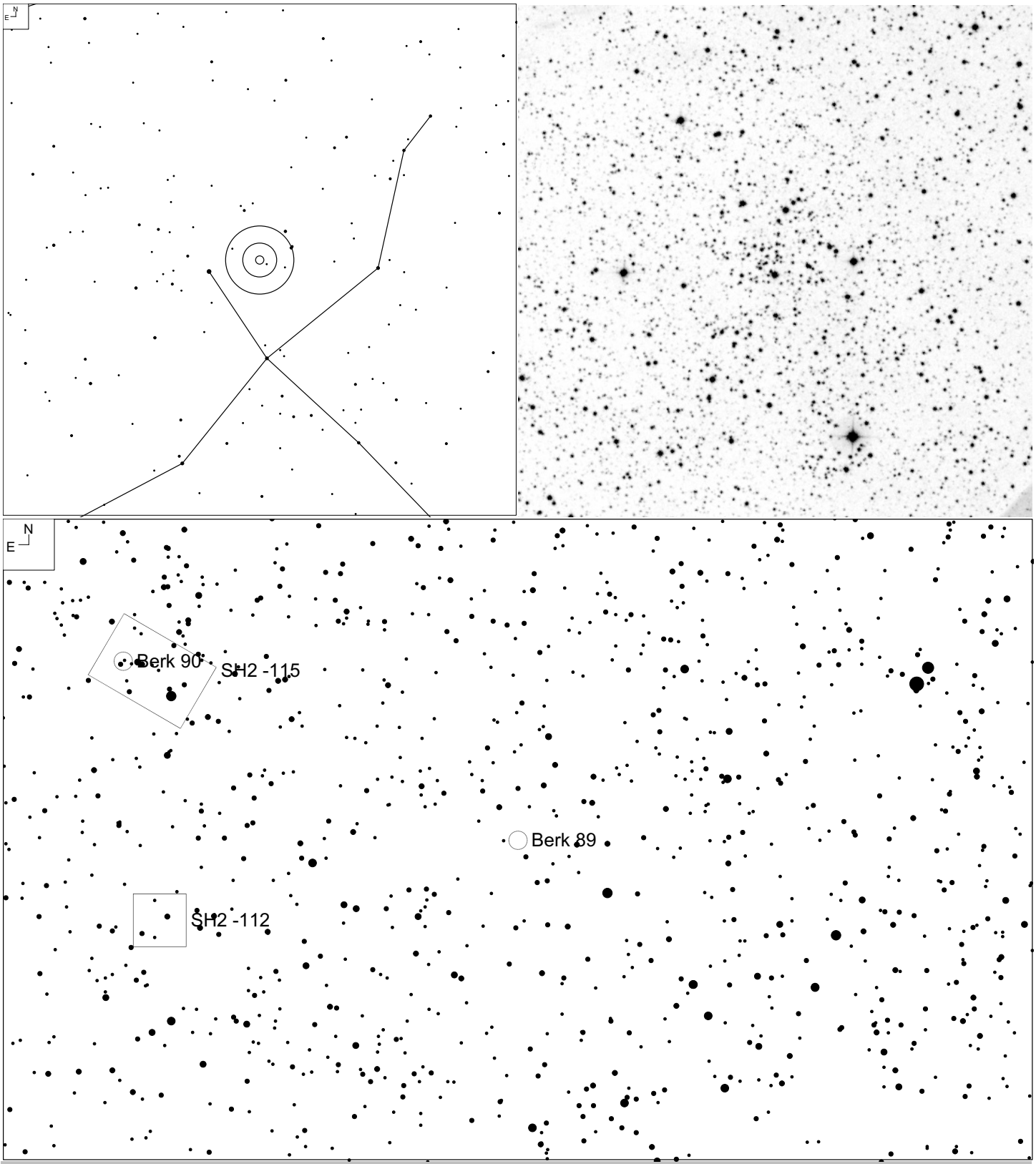
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 20 12.0	+38 41 24	6.0’	7.9	73	9.2	IV2m n	48	17

Collinder 421 (Cygnus)



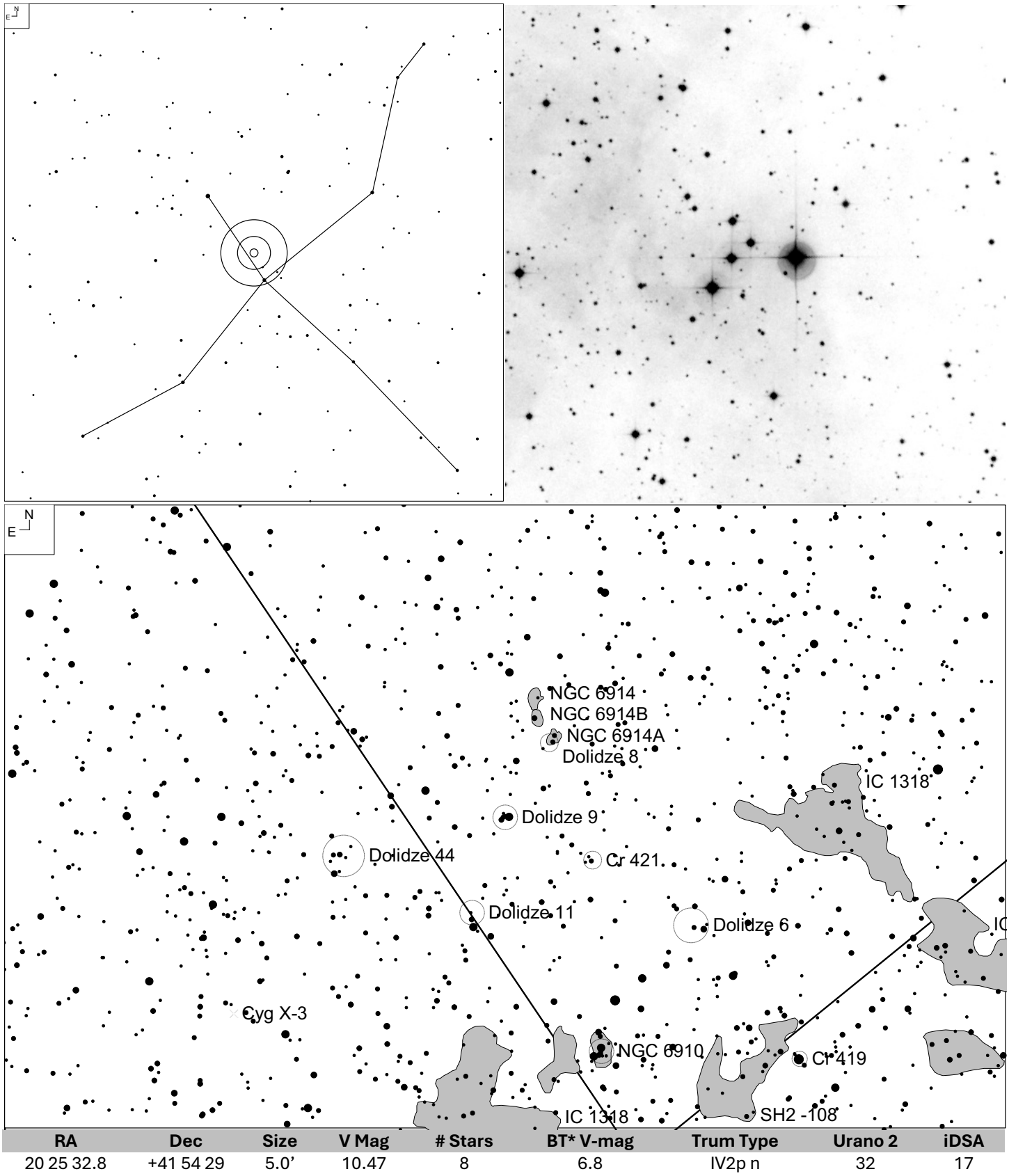
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 23 18.0	+41 42 00	3.6’	10.1	22	9.8	III1p n	32	17

Berkeley 89 (Cygnus)



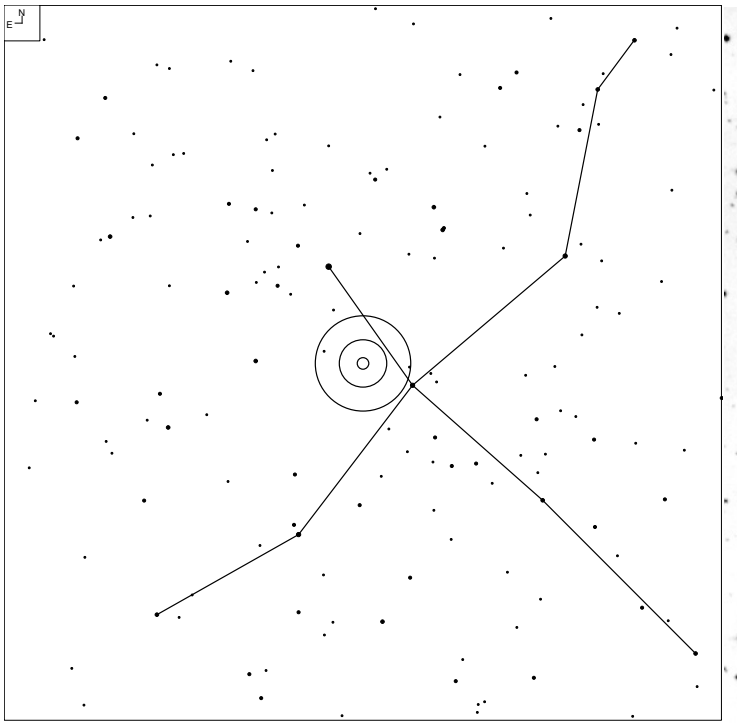
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 24 28.8	+46 02 36	3.0’	-	66	15.0	III1p	32	17

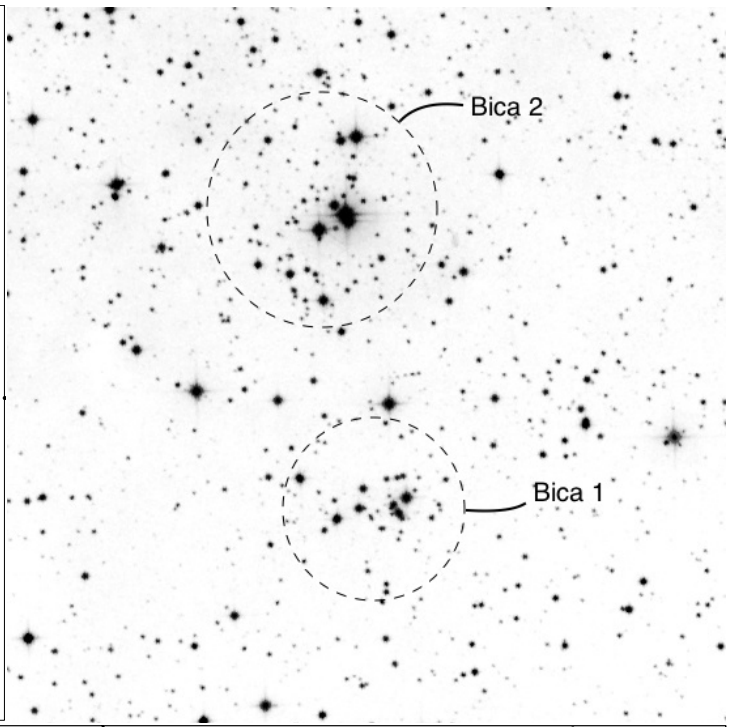
Dolidze 9 (Cygnus)

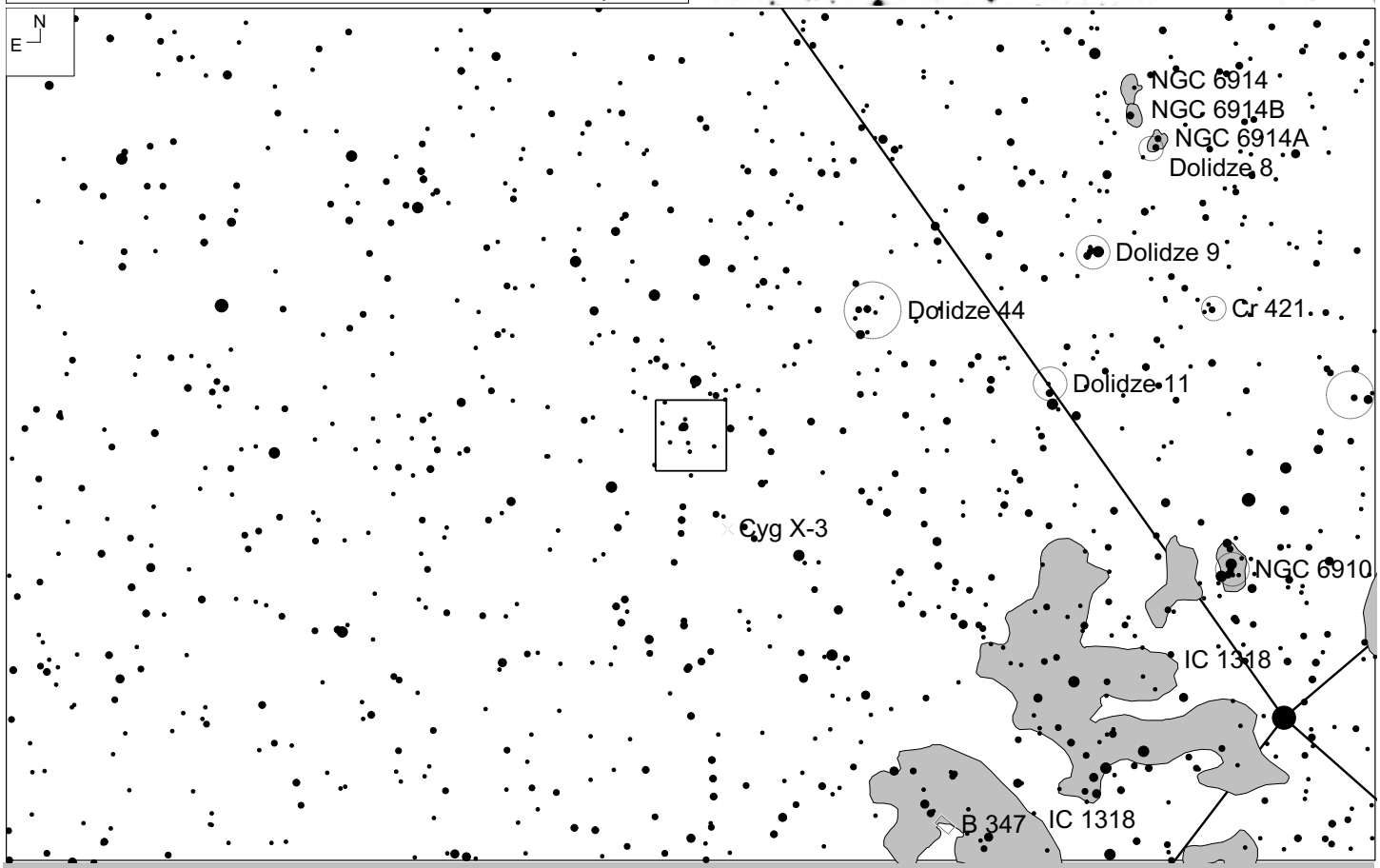


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 25 32.8	+41 54 29	5.0’	10.47	8	6.8	IV2p n	32	17

Bica 1 and Bica 2 (Cygnus)

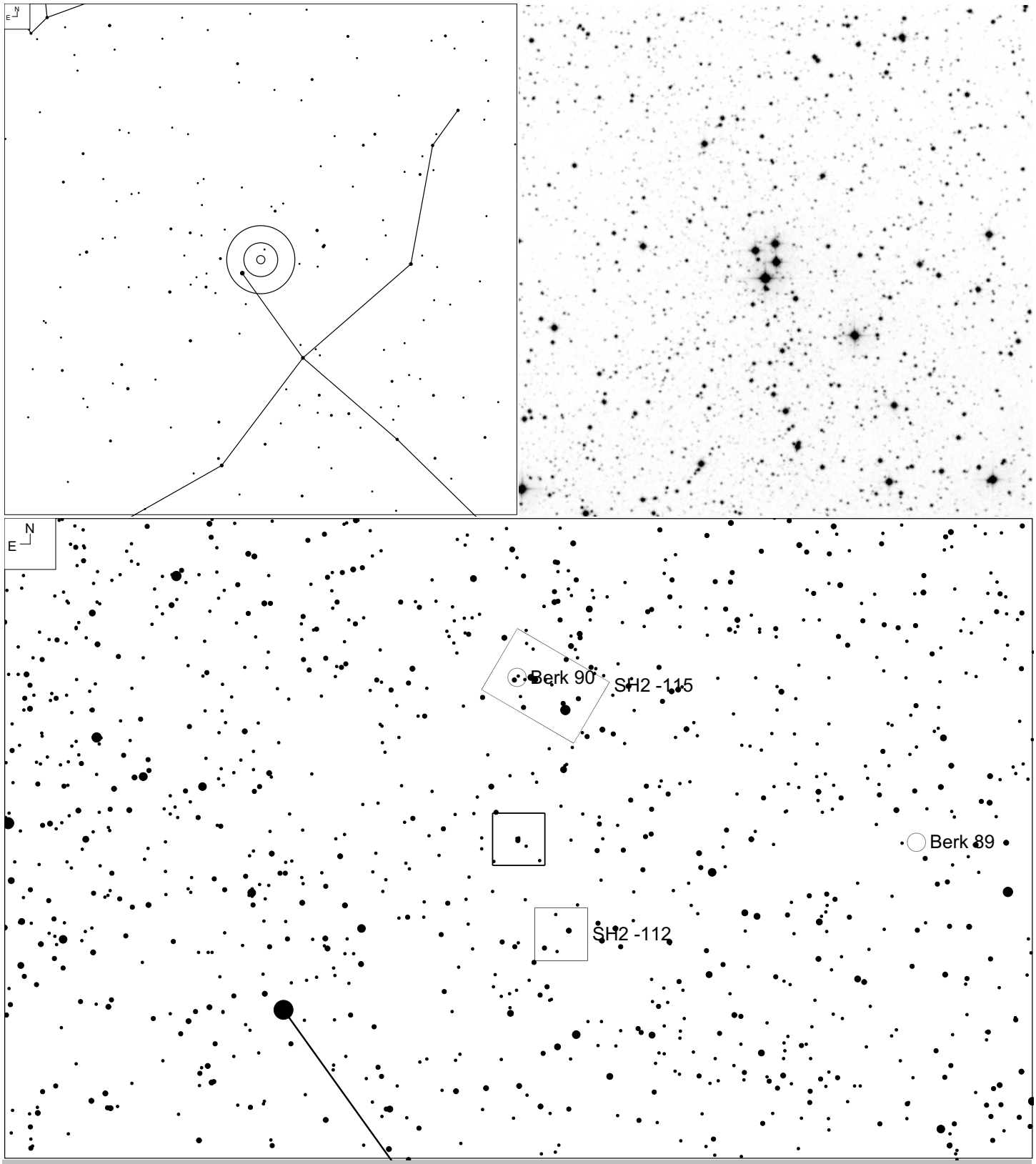






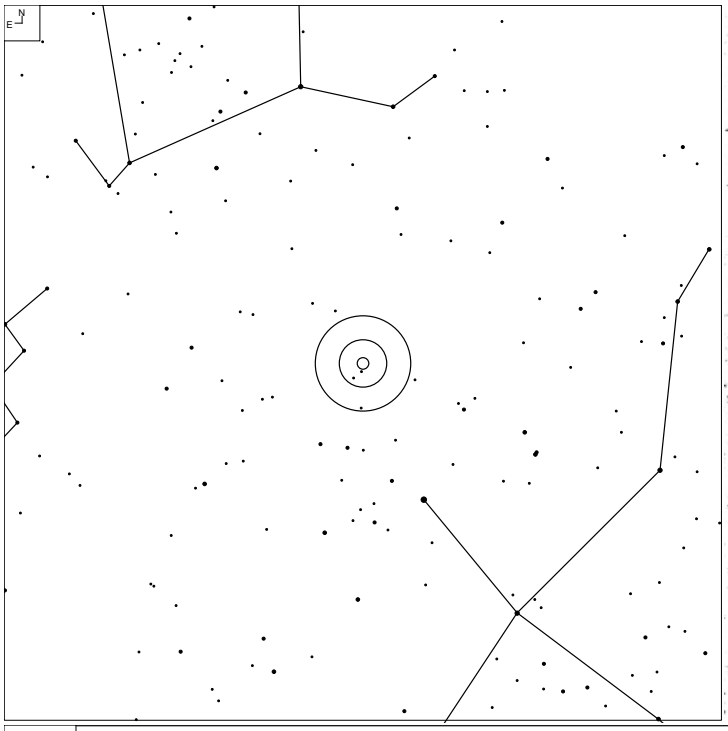
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 33 10.0	+41 13 07	3.0’	-	27	11.0	-	32	17
20 33 15.0	+41 18 42	4.0	-	55	7.5	-		

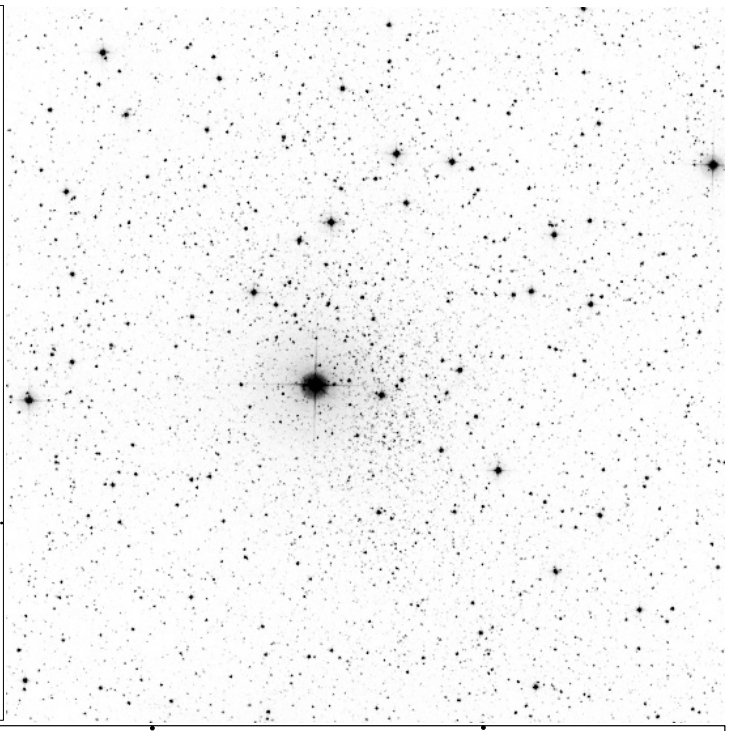
Stein 1 (Cygnus)

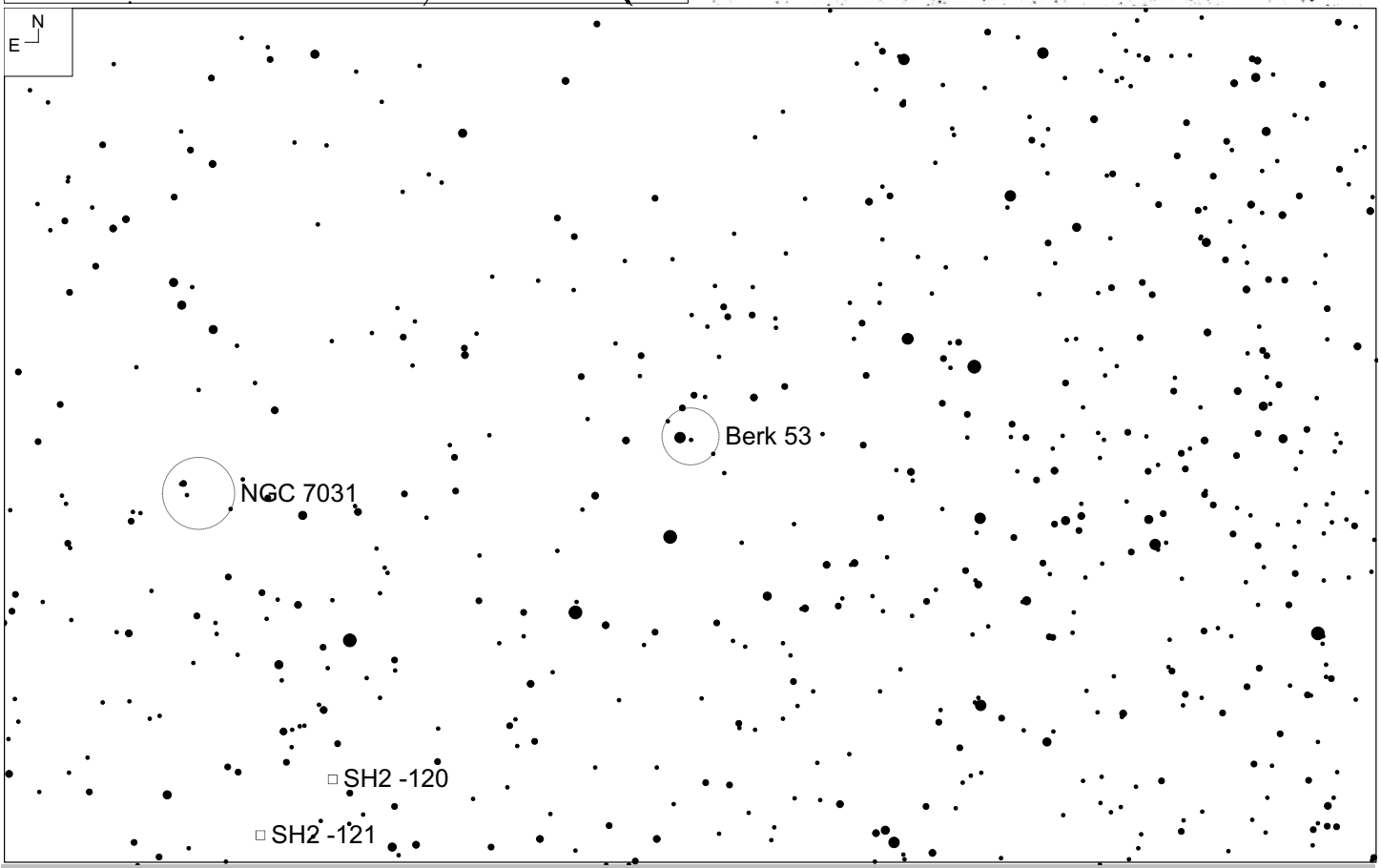


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 35 11.2	+46 05 23	1.5’	-	6	9.5	-	32	17

Berkeley 53 (Cygnus)

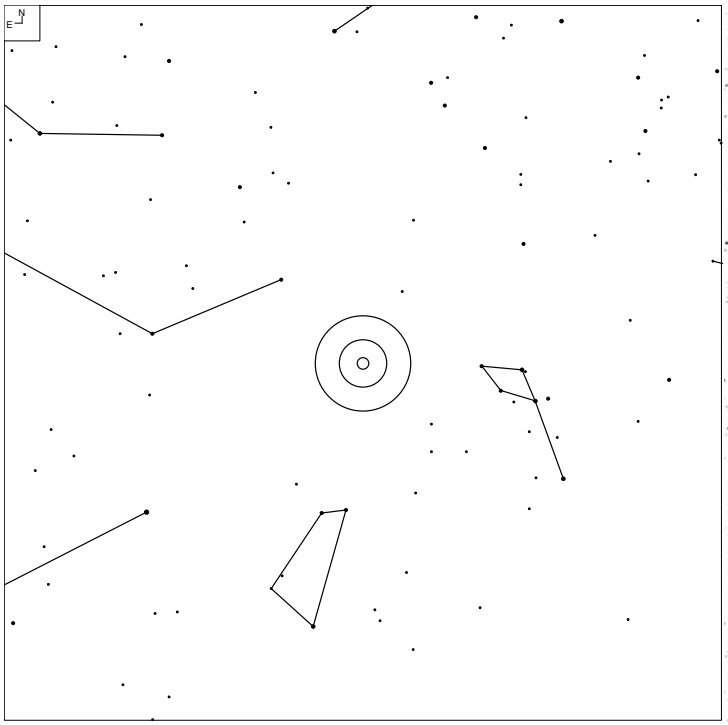


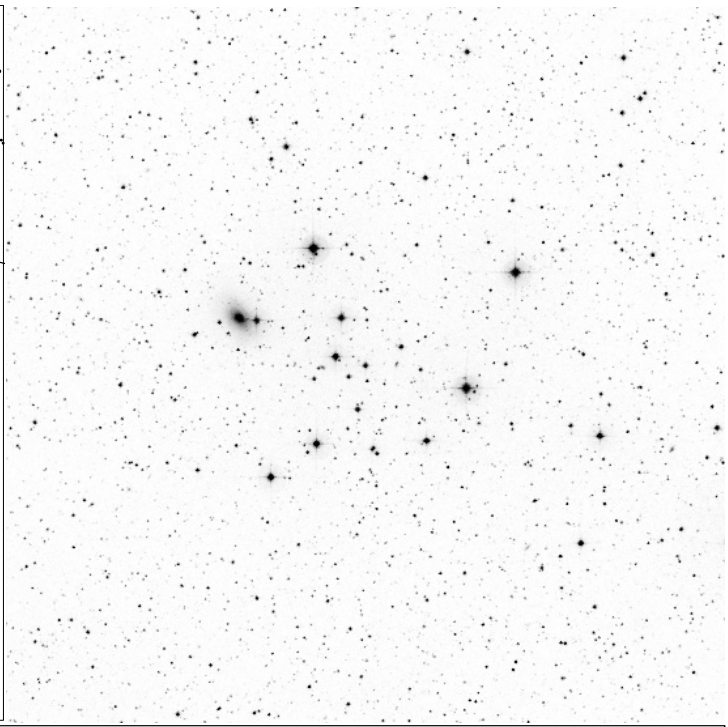


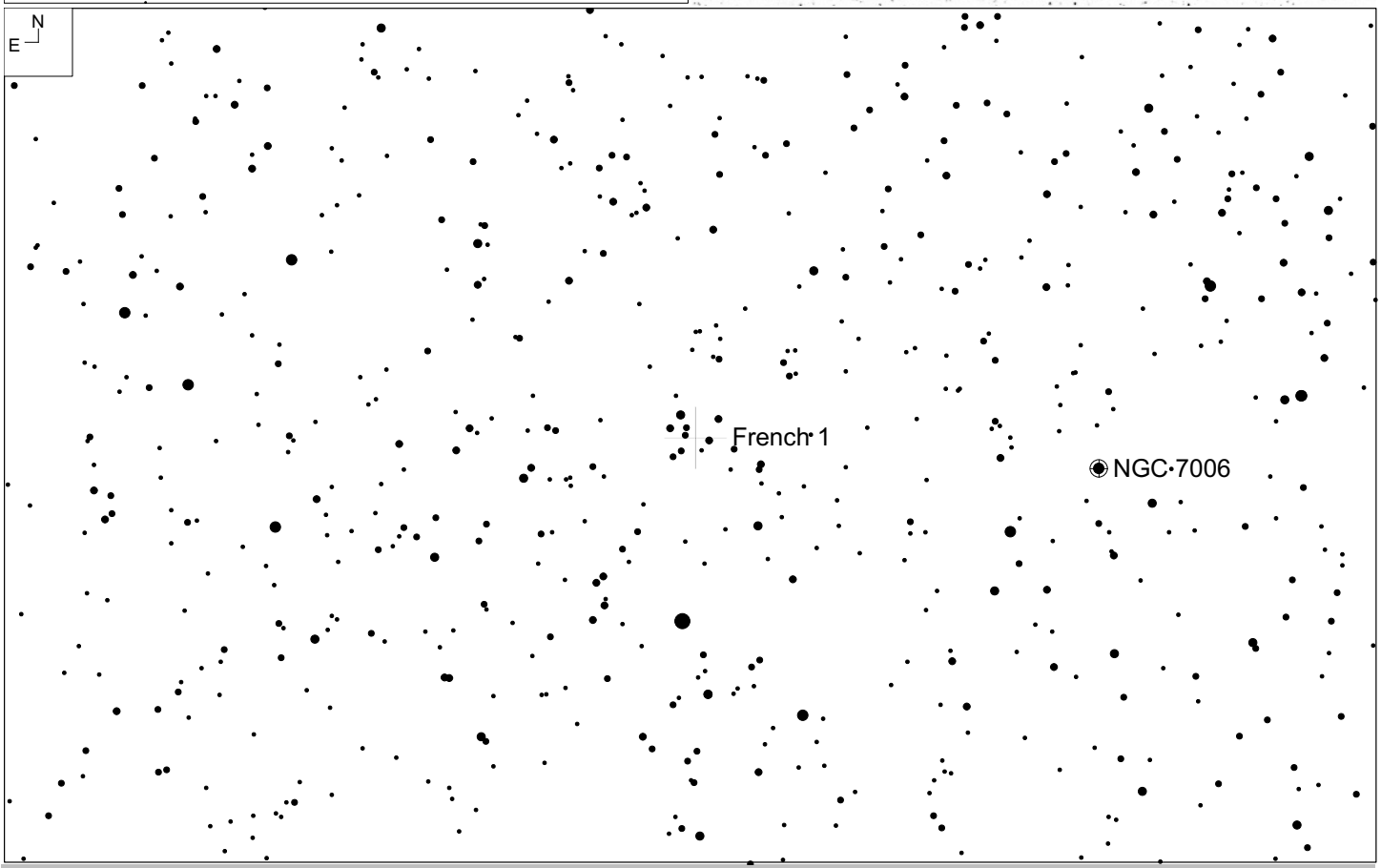


RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
20 55 57.9	+51 04 52	22.0’	-	393	16.0	III2m	32	17

French 1 (Delphinus)

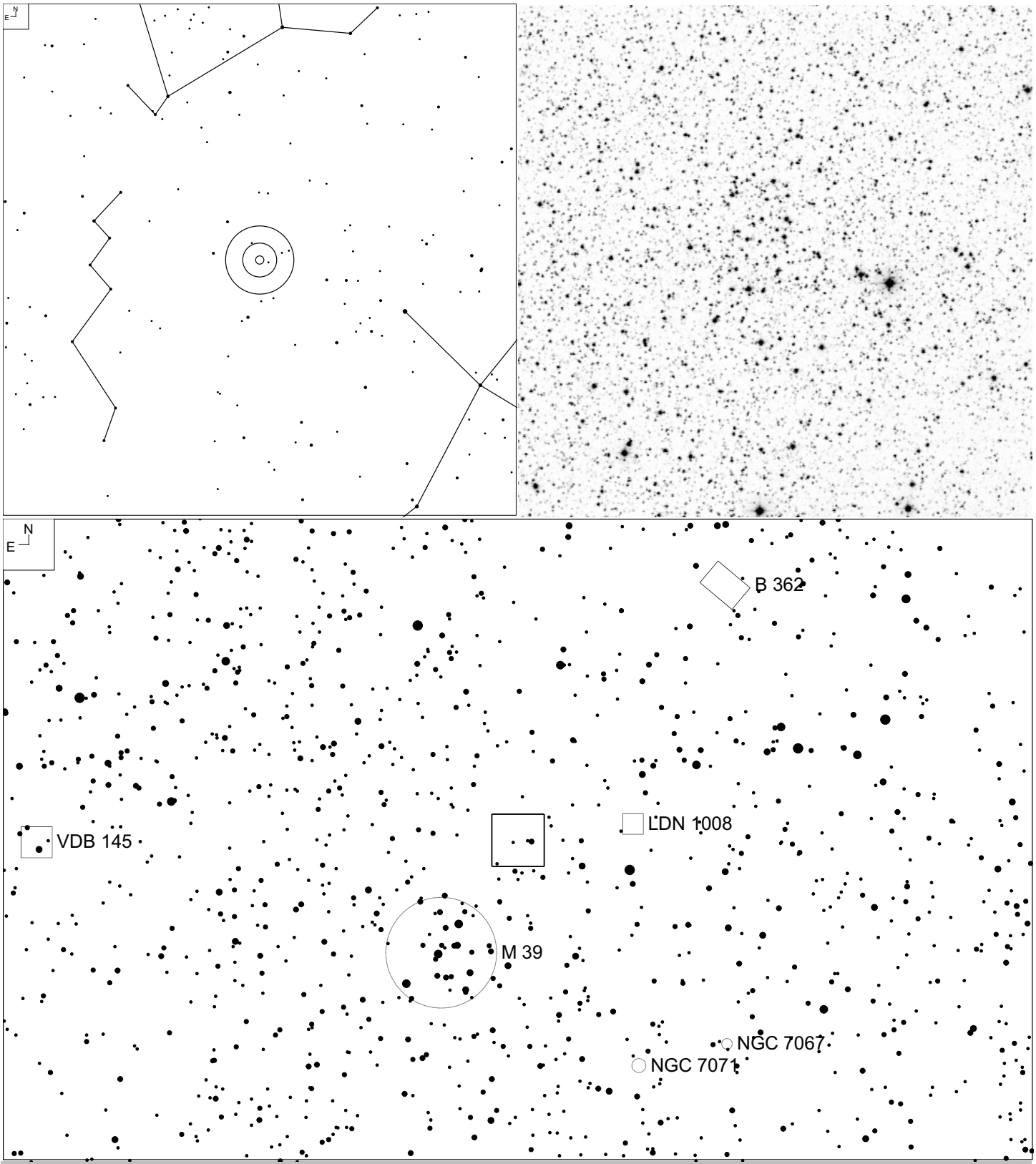






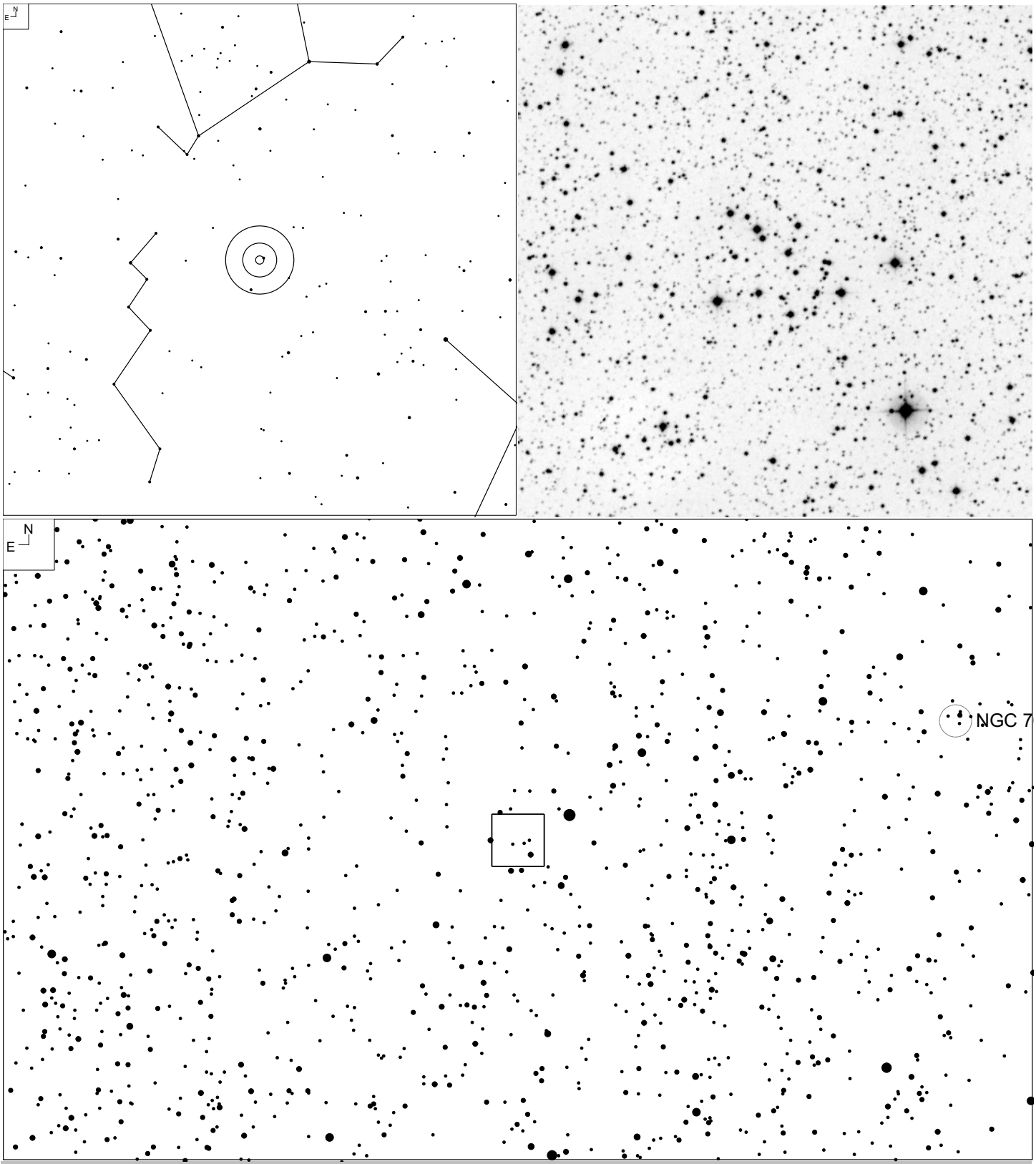
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
21 07 26.4	+16 18 17	13.0	-	-	8.8	III2m	83	41

Platais 1 (Cygnus)



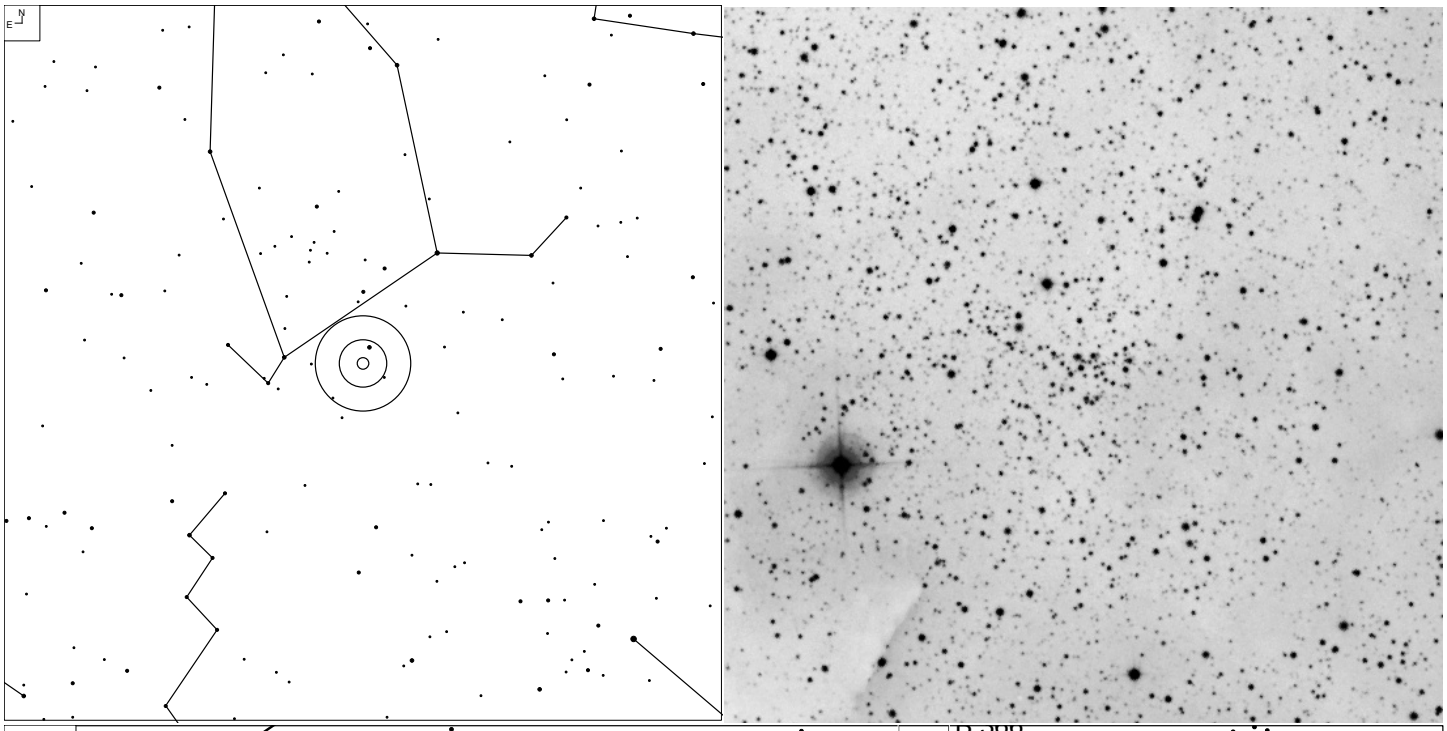
RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
21 30 02.0	+48 58 36	10.0	-	414	8.9	-	32	17

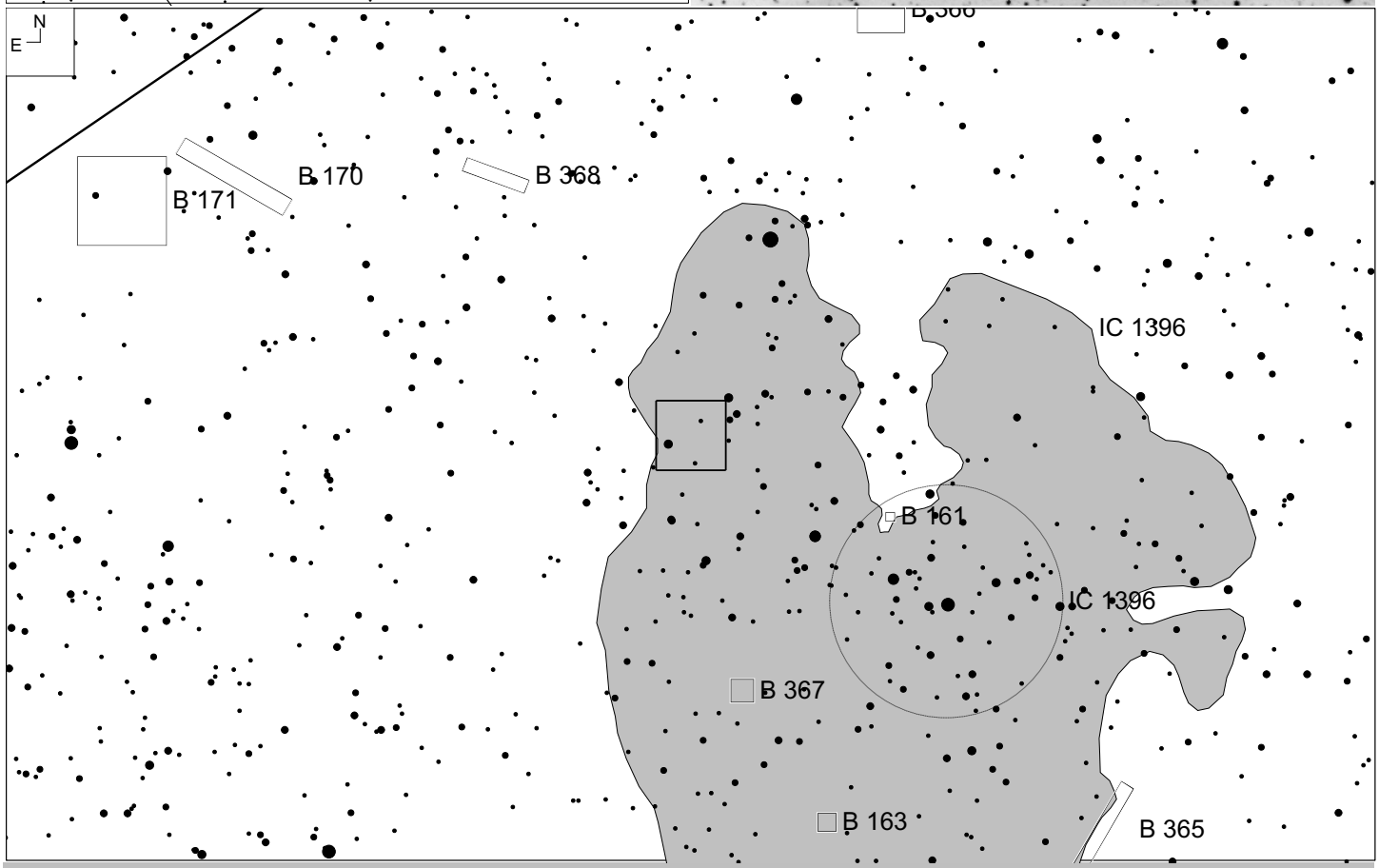
Barkhatova 2 (Cygnus)



RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
21 43 38.0	+51 04 17	5.0’	8.4	69	10.0	III1p	31	17

Teutsch 74 (Cepheus)





RA	Dec	Size	V Mag	# Stars	BT* V-mag	Trum Type	Urano 2	iDSA
21 45 40.0	+58 05 37	4.0’	-	39	14.0	-	19	8

2018: Edward Emerson Barnard

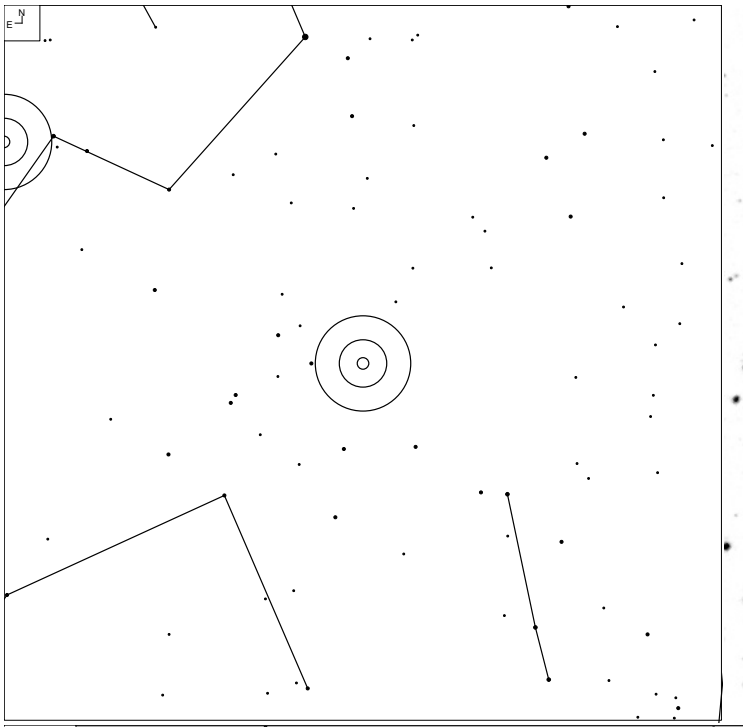
Texas Star Party (TSP) – Advanced Observing Program – 2018

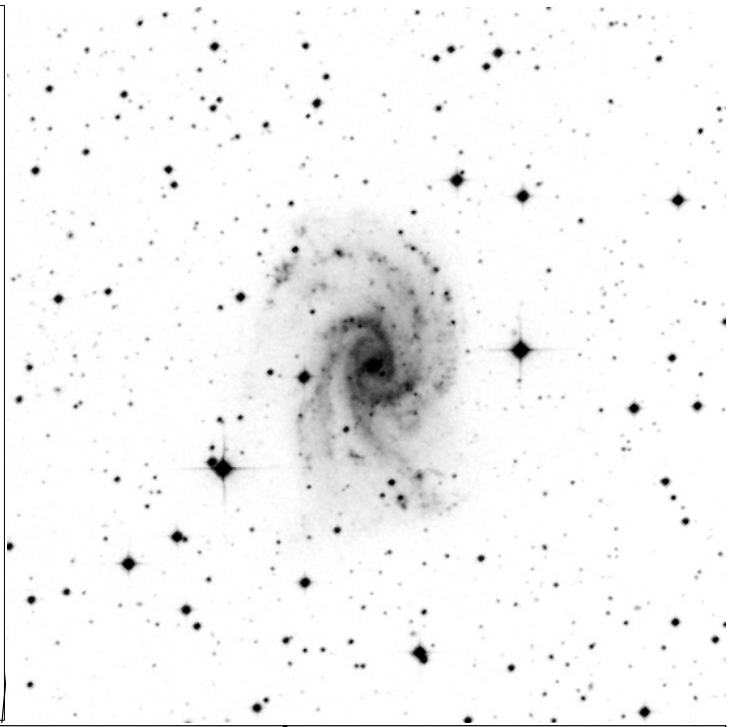
Edward Emerson Barnard

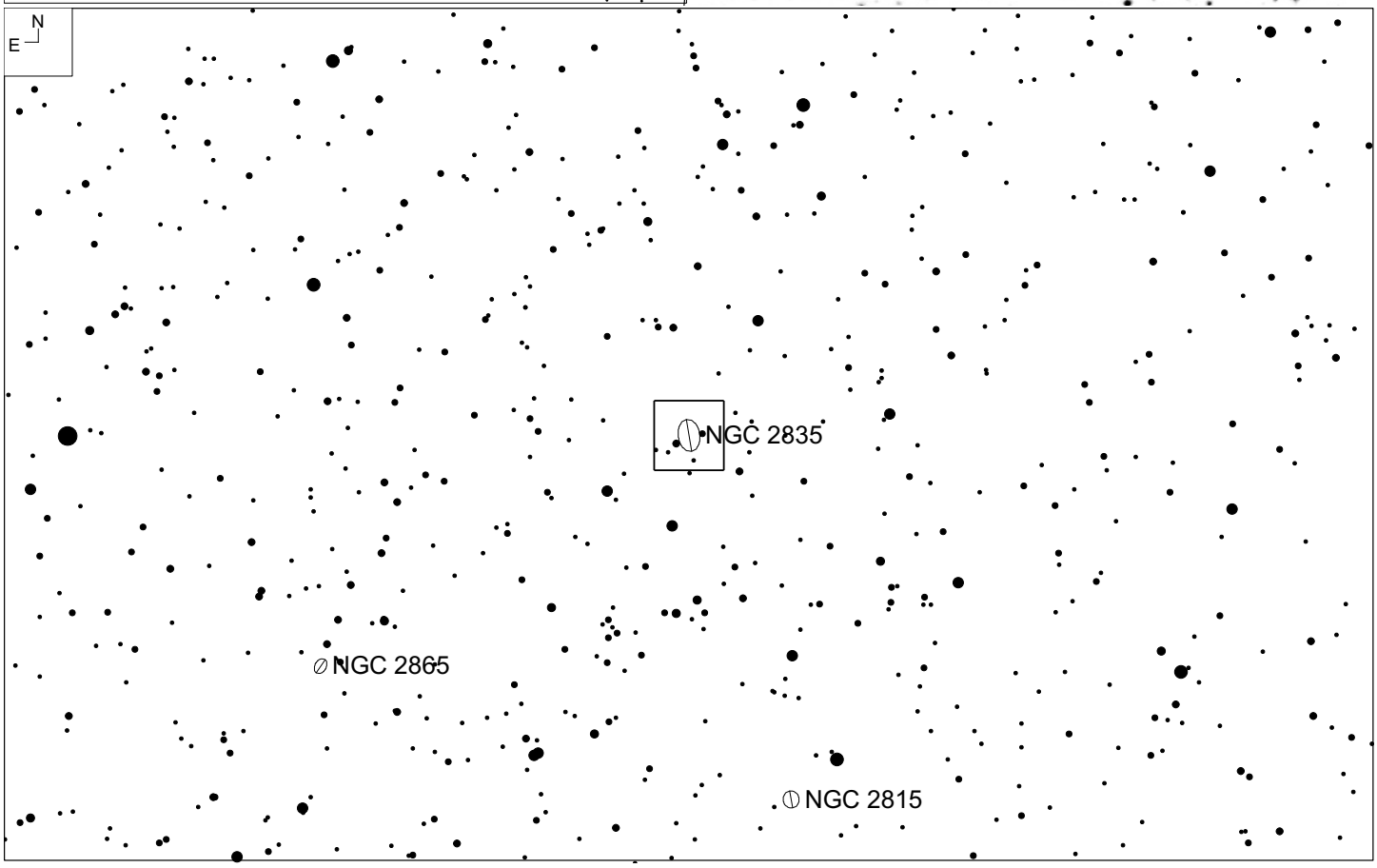
Sat. May 5 – Sun. May 13, 2018 / Observe any 20 Objects – Receive a Pin

Description	Coordinates (J2000)	Type	Const.	Mag.	Size	Class	D. LY	Urano 1
□NGC2835	09 17 53.4 – 22 21 26	Gal	Hya	11.0(B)	6.6 x 4.3	SB(rs)c	40.8	322
□NGC5584	14 22 23.8 – 00 23 14	Gal	Vir	12.1(P)	3.4' x 2.4'	SAB(rs)cd	74.6	242
□NGC5824	15 03 58.5 – 33 04 04	G.C.	Lup	9.1	7.4'	--		373
□IC4536	15 13 17.3 – 18 08 12	Gal	Lib	13.7(P)	2.1' x 1.7'	SB(s)dm	101.3	334
□IC4537	15 17 32.4 + 02 05 50	Gal	Ser	15.6	0.8' x 0.3'	--	--	244
□NGC5931, IC1122	15 29 29.6 + 07 34 23	Gal	Ser	15.0	0.9' x 0.5'	SO	--	199
□IC4562 Group	15 35 57.0 + 43 29 39	Gal	Boo	13.6(P)	1.1'	E?	265.6	78
□IC4603	16 25 15.0 – 24 26 00	Neb	Oph	--	28.0' x 20.0'	R	--	336
□Rho Ophiuchus	16 25 35.2 – 23 26 50	Neb	Oph	--	80' x 72'	Triple	425	336
□IC4617	16 42 08.1 + 36 40 59	Gal	Her	15.5	1.2' x 0.4'	--	--	114
□NGC6240, IC4625	16 52 58.9 + 02 24 02	Gal	Oph	12.9(V)	2.5' x 1.2'	IO pec	342.3	247
□IC4627	16 54 08.5 – 07 38 08	Gal?	Oph	14.3	48" x 22"	Unknown	--	292
□NGC6293-N6294	17 10 10.4 – 26 34 54	G.C.	Oph	8.3	8.2'	--	--	337
□NGC6302	17 13 44.3 – 37 06 13	P.N.	Sco	12.8(P)	85.0" x 44.0"	6	--	376
□Barnard 68	17 22 38.0 – 23 50 12	Dk Neb	Oph	--	4.0'			338
□NGC6354	17 24 34.7 – 38 32 30	Asterism	Sco	--	20.0"	--	--	376
□NGC6352	17 25 29.2 – 48 25 22	G.C.	Ara	7.8	9.0'	--		408
□NGC6383	17 34 39.7 – 32 34 30	O.C.	Sco	5.5	5.0'	II 3 m n	--	376
□Barnard's Star	~17 57 47 + 04 43 05	Star	Oph	9.51(V)	Stellar	M4.0v	6.0	249
□IC4677 (NGC6543)	17 58 15.3 + 66 38 05	PN (part)	Dra	15.7	1.0' x 0.4'		--	30
□Barnard 86/N6522	18 02 58.6 – 27 52 00	Dk Neb	Sgr	--	5.0'	Ir G		339
□IC4673	18 03 18.5 – 27 06 22	P.N.	Sgr	12.9(P)	15.0"	4	--	339
□NGC6522	18 03 35.0 – 30 02 02	G.C.	Sgr	9.9	9.4'	--	--	377
□IC4688	18 08 11.8 + 11 42 43	Gal	Oph	13.8(P)	1.4' x 1.0'	Scd	--	204
□Barnard 90	18 10 17.4 – 28 18 00	Dk Neb	Sgr	--	3.0' x 2.0'	Ir G	--	377
□Barnard 92	18 15 27.9 – 18 13 19	Dk Neb	Sgr	--	15.0' x 9.0'	R	--	339
□Barnard 93	18 16 53.7 – 18 03 58	Dk Neb	Sgr	--	8.0' x 3.0'	Co G	--	339
□NGC6590, IC4700	18 17 02.0 – 19 51 47	NEB	Sgr	--	5.6' x 3.3'	R	--	339
□Barnard 98	18 33 18.5 – 26 01 36	Dk Neb	Sgr	--	3.0'	--	--	340
□IC1296, Near M57	18 53 18.8 + 33 03 57	Gal	Lyr	14.8(P)	0.9' x 0.5'	SBbc	--	117
□Barnard 133	19 06 11.1 – 06 52 30	Dk Neb	Aql	--	9.0' x 4.0'	Co G	--	296
□NGC6818	19 43 57.8 – 14 09 10	P.N.	Sgr	9.9(P)	48.0"	4	--	297
□NGC6822	19 44 56.5 – 14 48 11	Gal	Sgr	9.3(B)	15.6' x 13.5'	IB(s)m	1.2	297
□Sc 6 (NGC6822)	19 45 37.0 – 14 41 10.8	G.C.		15.4v				297
□Sc 7 (NGC6822)	19 46 00.7 – 14 32 35.0	G.C.		15.9v	7"			297
□IC4954	20 04 54.0 + 29 11 00	Neb	Vul	--	3.0"	R	--	119
□Beta^2 Capricorni	20 20 46.5 – 14 47 06	Dbl Star	Cap	6.10	Stellar	Triple		298
□IC4999	20 23 56.2 – 26 00 51	Gal	Cap	13.5	1.8' x 1.0'	SB(rs)c?	144.7	343
□IC5005	20 25 20.1 – 25 49 42	Gal	Cap	13.6 (P)	2.5' x 1.8'	SB(s)cd	143.0	343
□Barnard 352	20 57 11.5 + 45 50 30	Dk Neb	Cyg	--	--	--	--	85

NGC 2835 (Hydra)

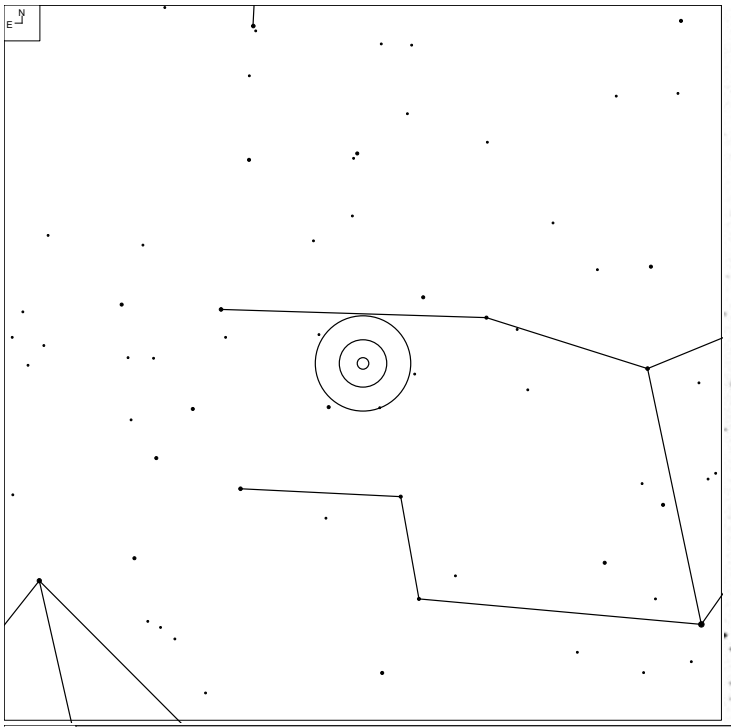


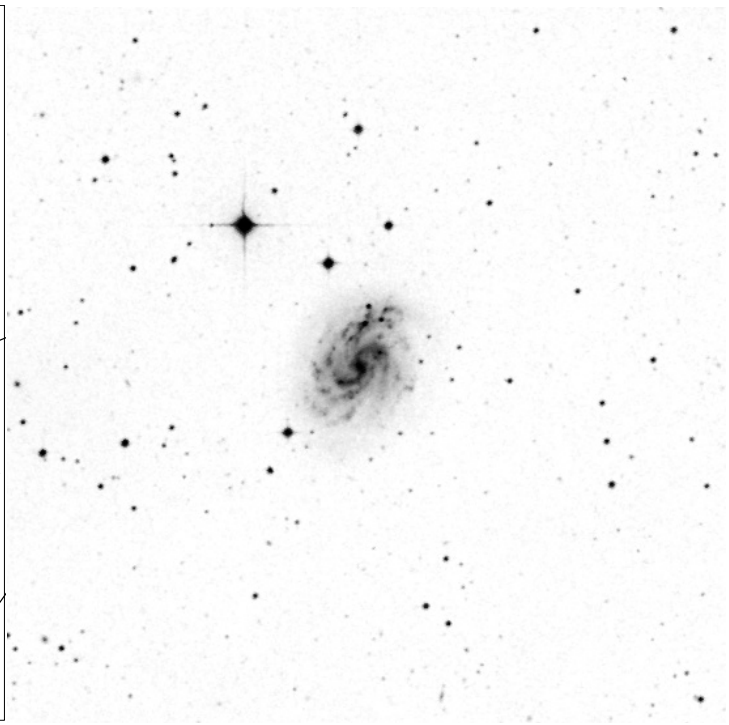


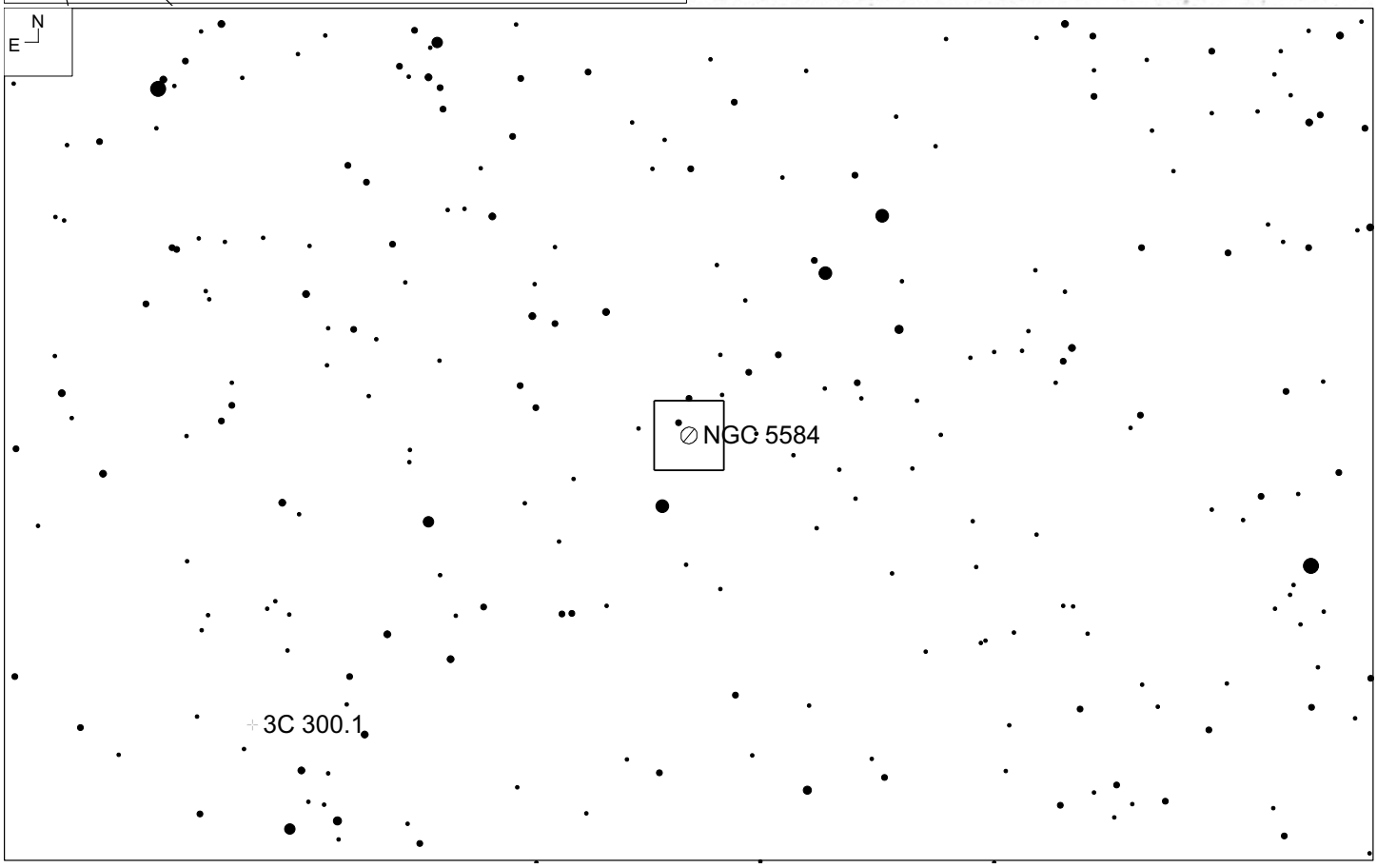


RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
09 17 53.4	-22 21 26	Gal	11.0b	6.6 x 4.3’	SB(rs)c	152	71, 83

NGC 5584 (Virgo)

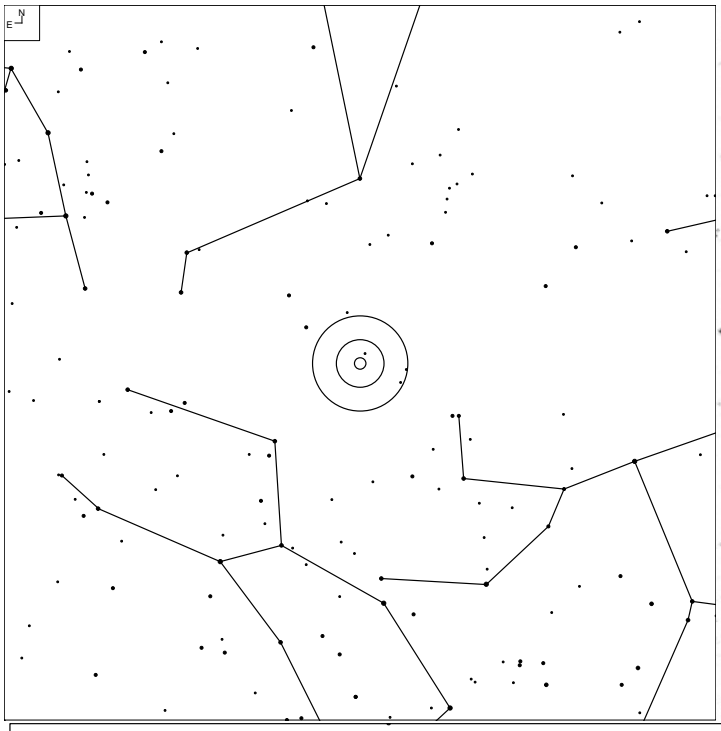


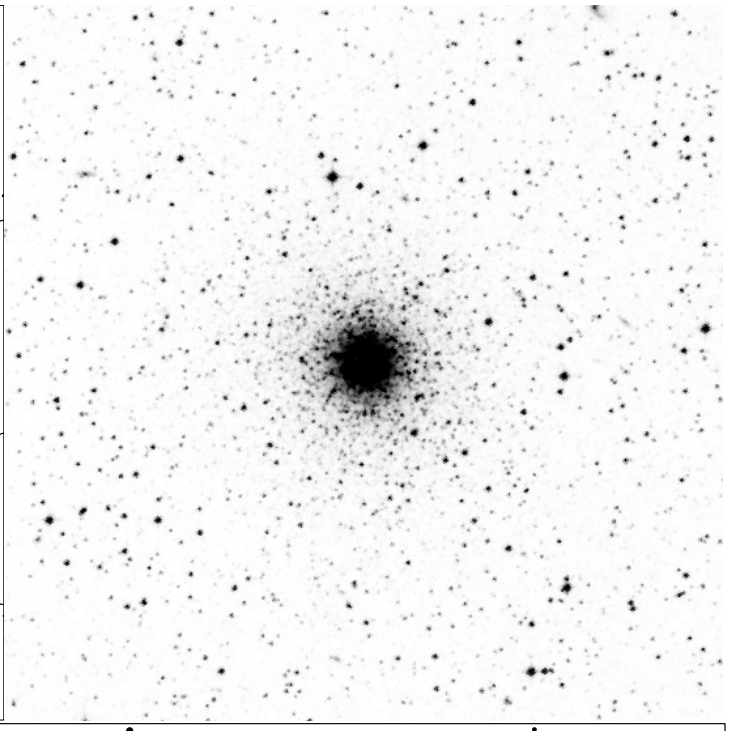


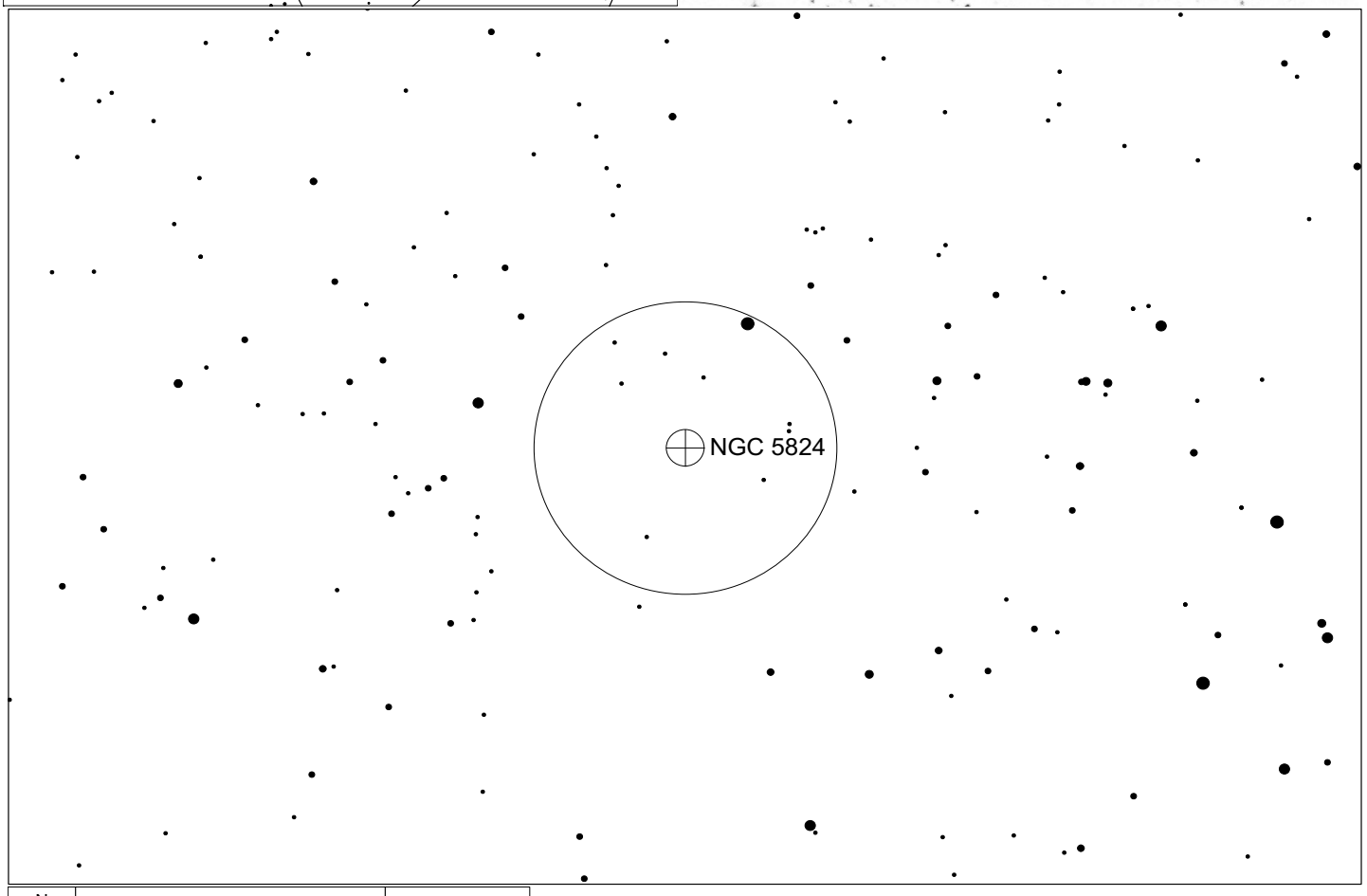


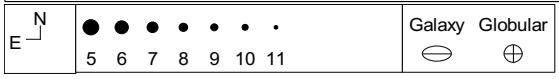
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
14 22 23.8	-00 23 14	Gal	12.1p	3.4 x 2.4’	SAB(rs)cd	109	56

NGC 5824 (Lupus)



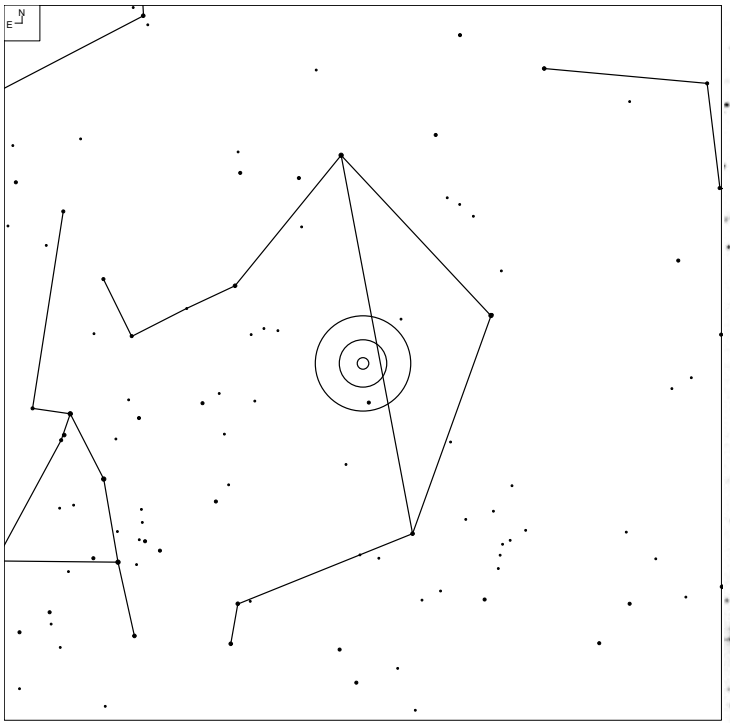


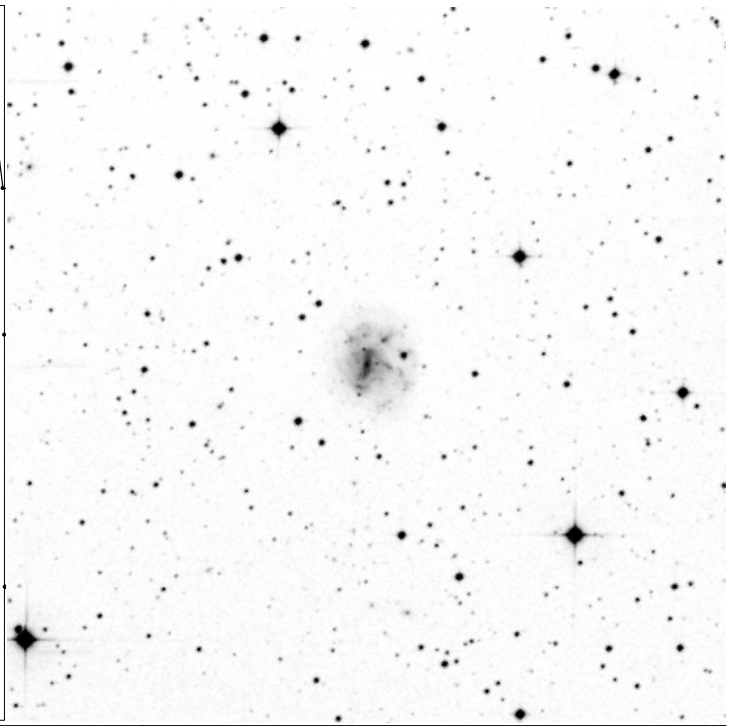


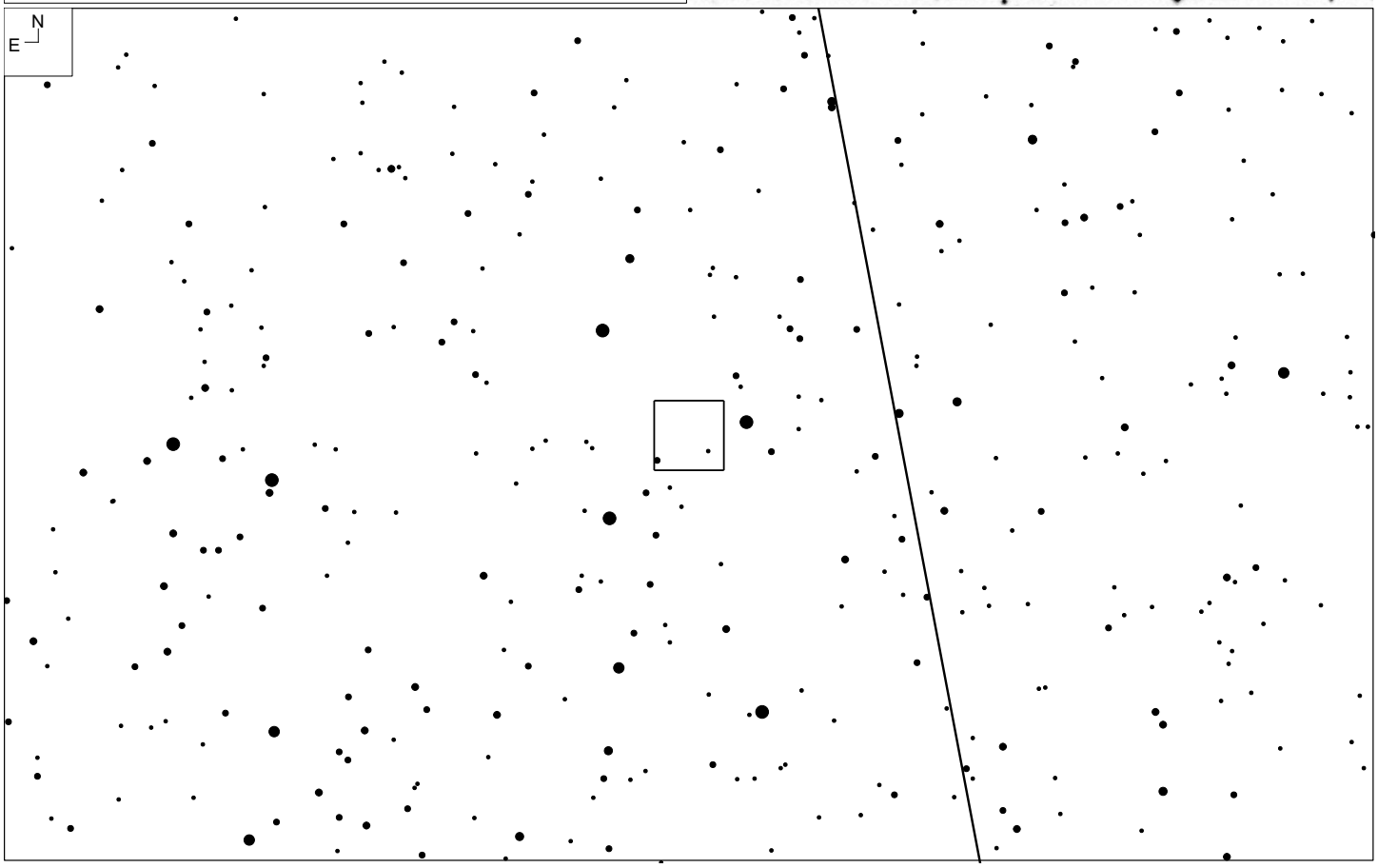


RA	Dec	V_{mag}	HB_{Mag}	$Bt*_{Mag}$	SB	Size	Urano 2	iDSA
15 03 58.5	-33 04 04	9.1	18.5	15.5	13.4	7.4’	166	80

IC 4536 (Libra)

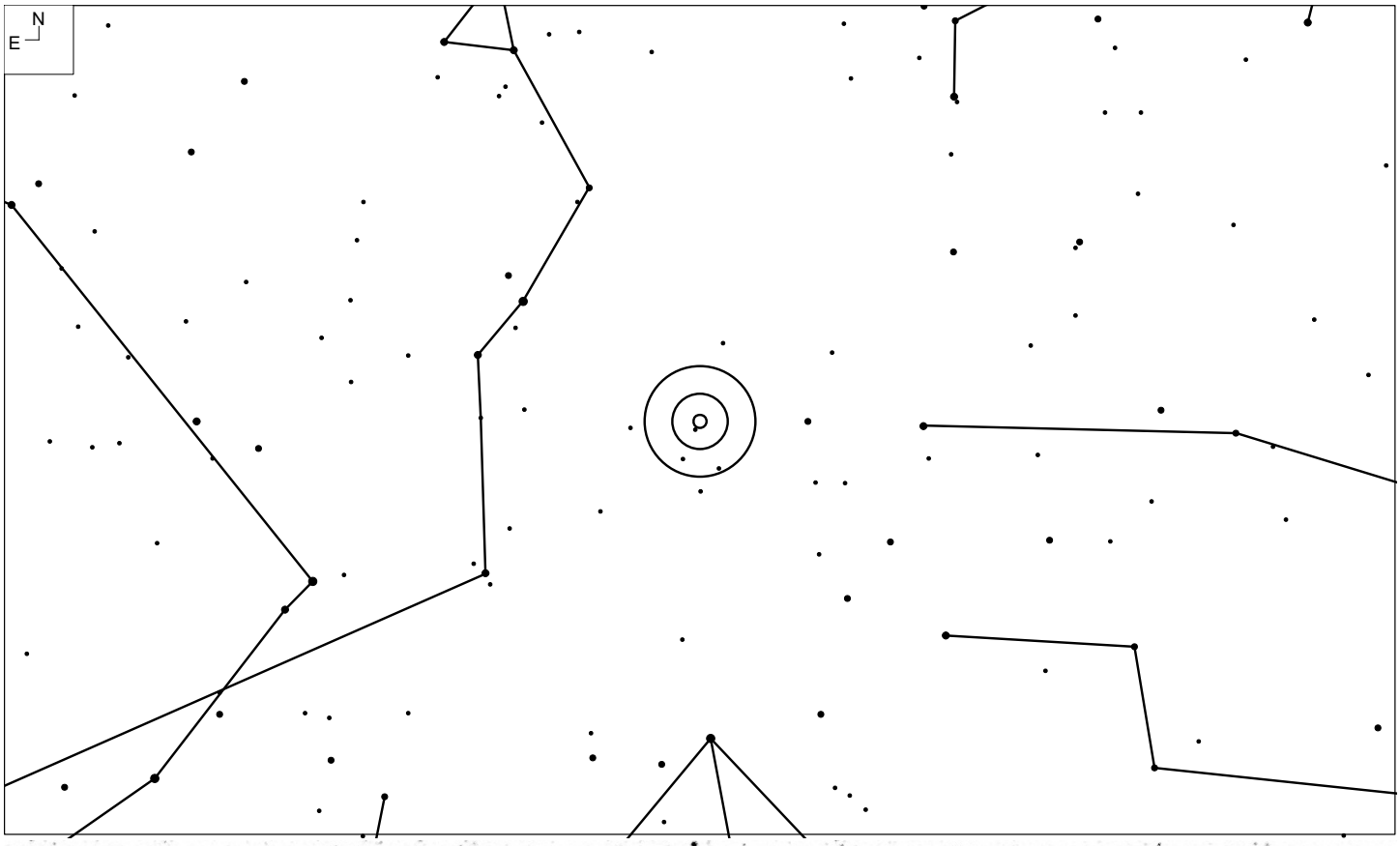


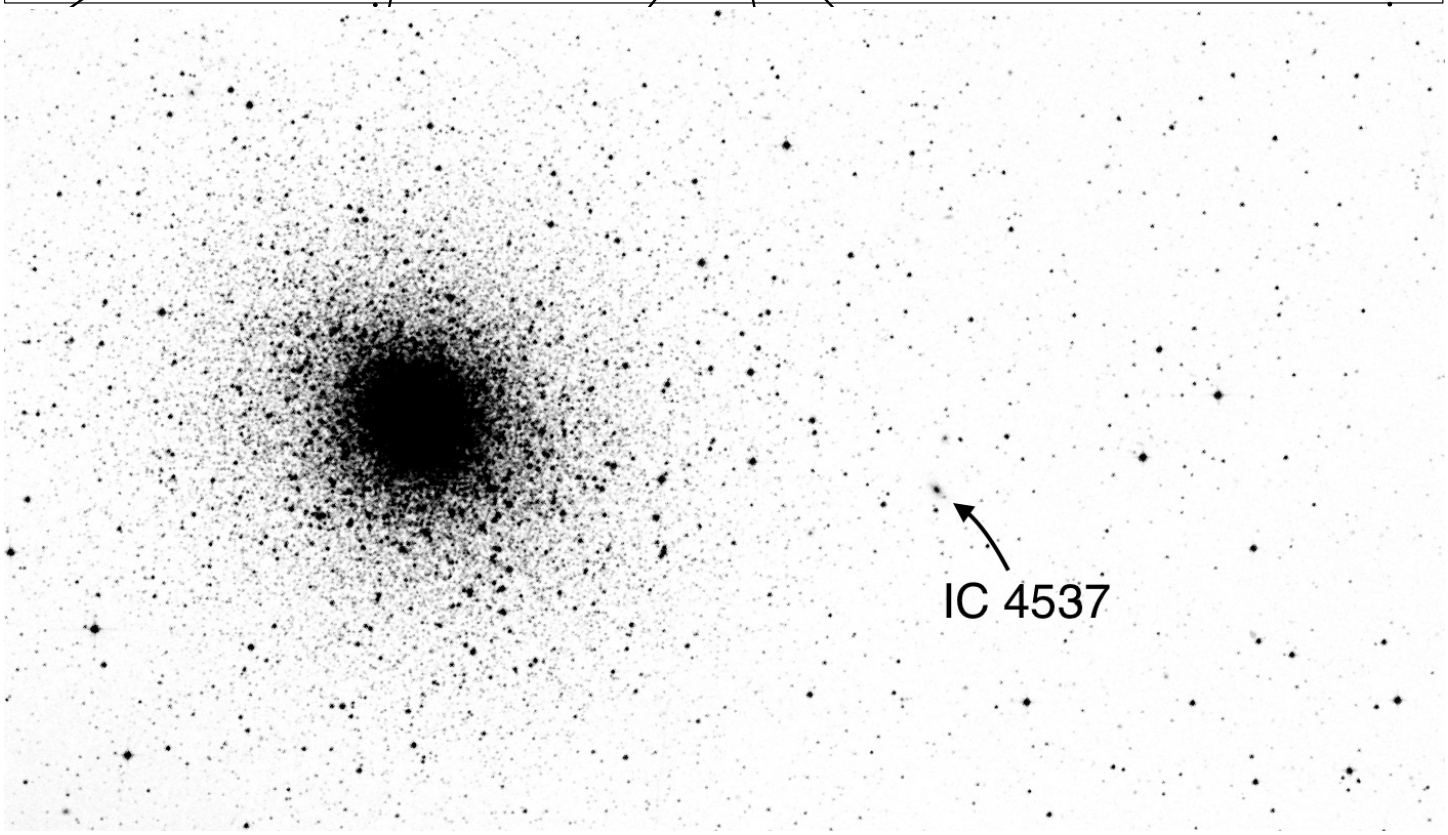




RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
15 13 17.3	-18 08 12	Gal	13.7p	2.1 x 1.7’	SB(s)dm	148	68

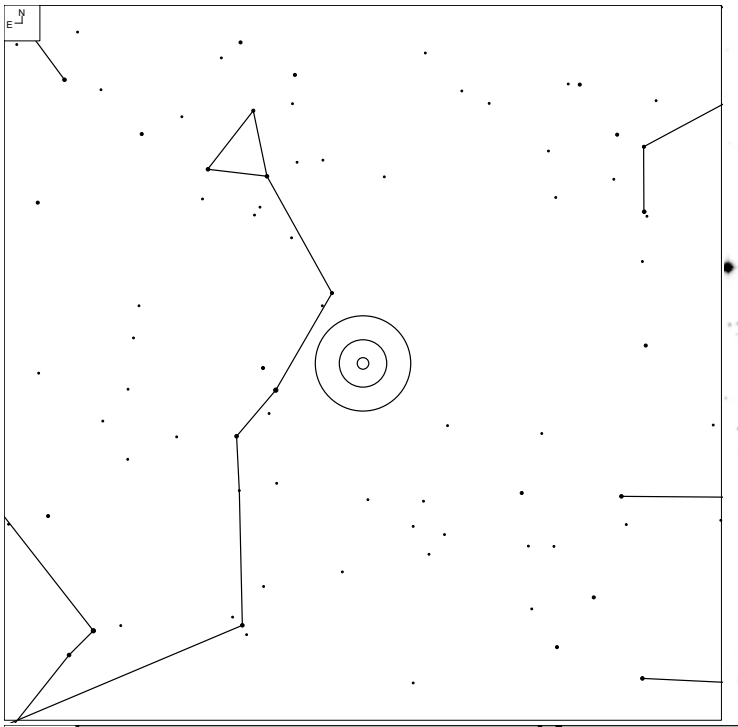
IC 4537 (Serpens)

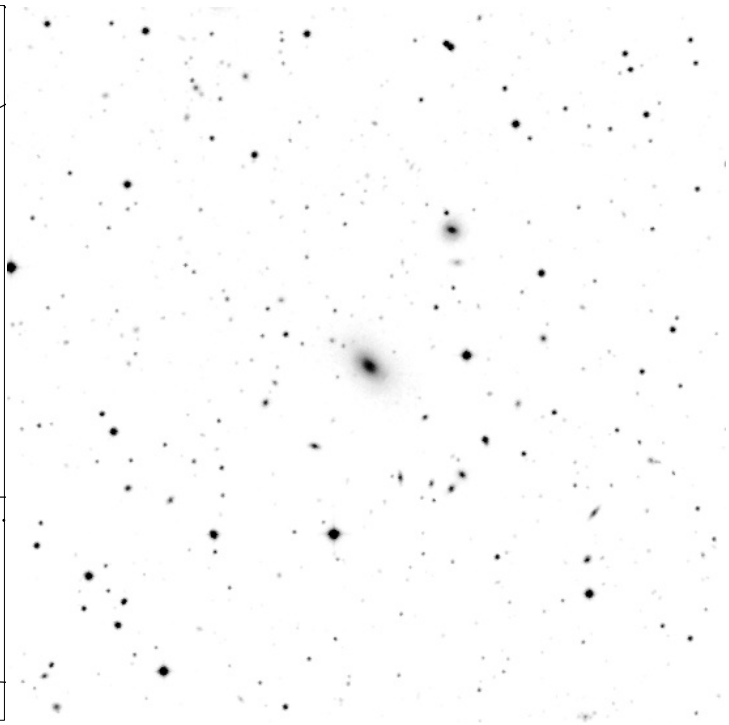


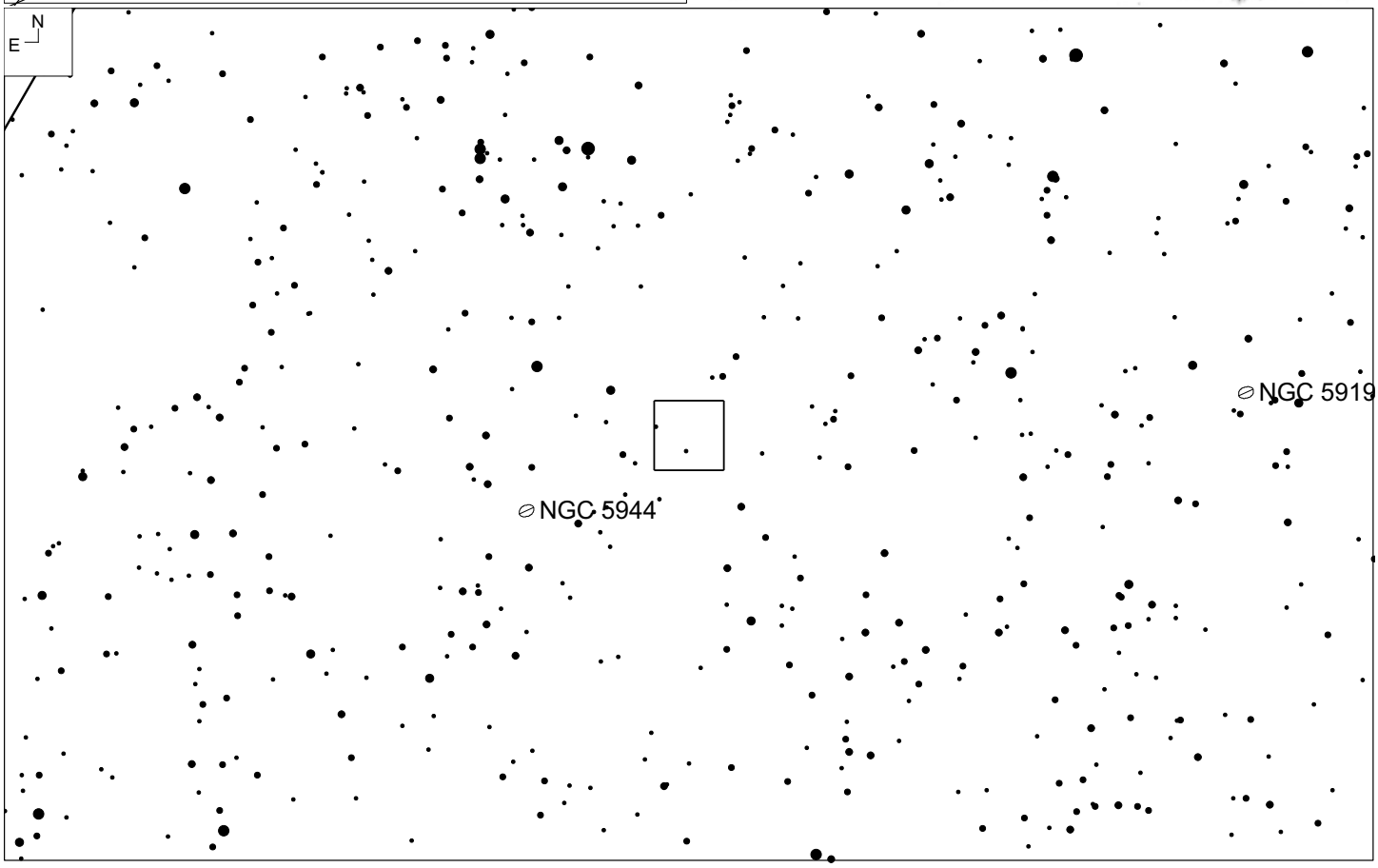


Object	RA	Dec	Mag	Size	Type	Urano	iDSA
IC 4537	15 17 32.4	+02 02 50	15.6	0.8’ x 0.3’	Galaxy	108	56

NGC 5931, IC 1122 (Serpens)

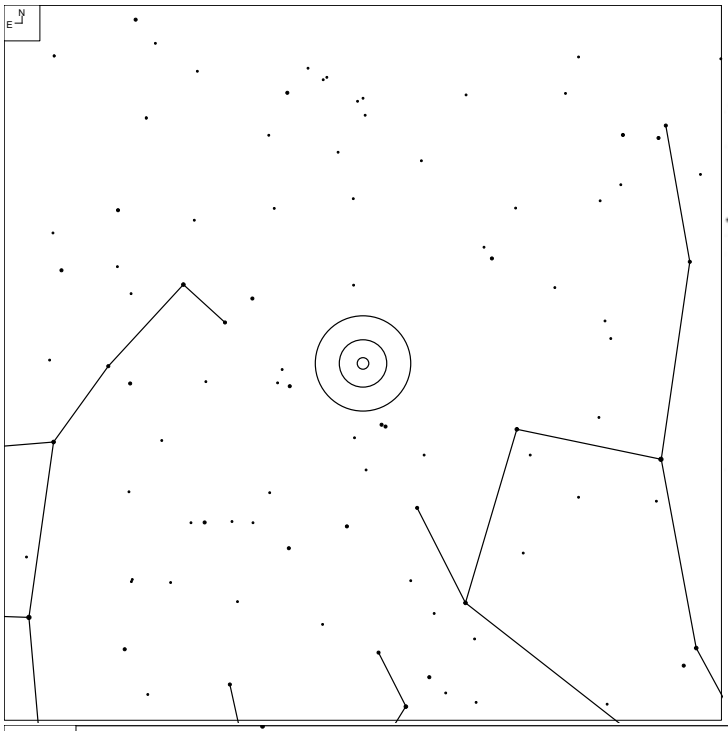


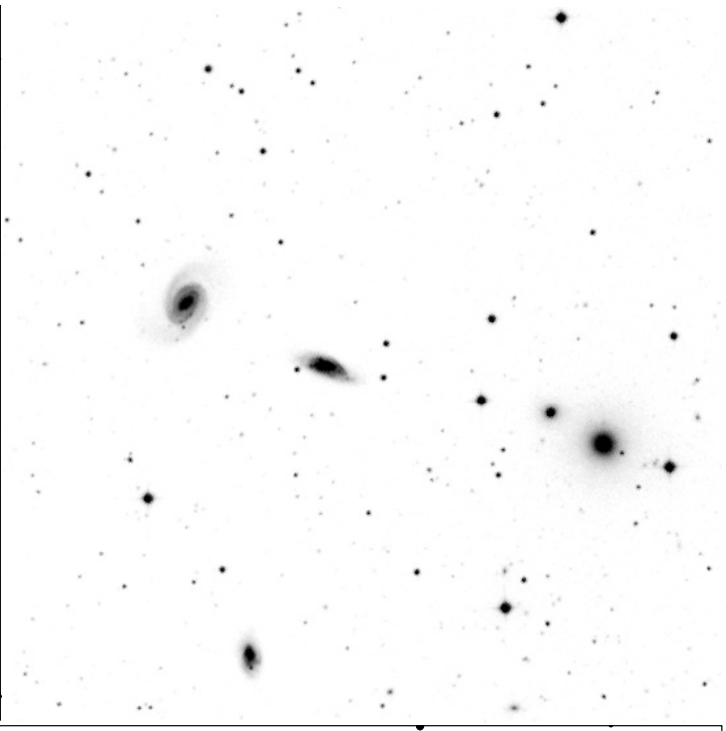


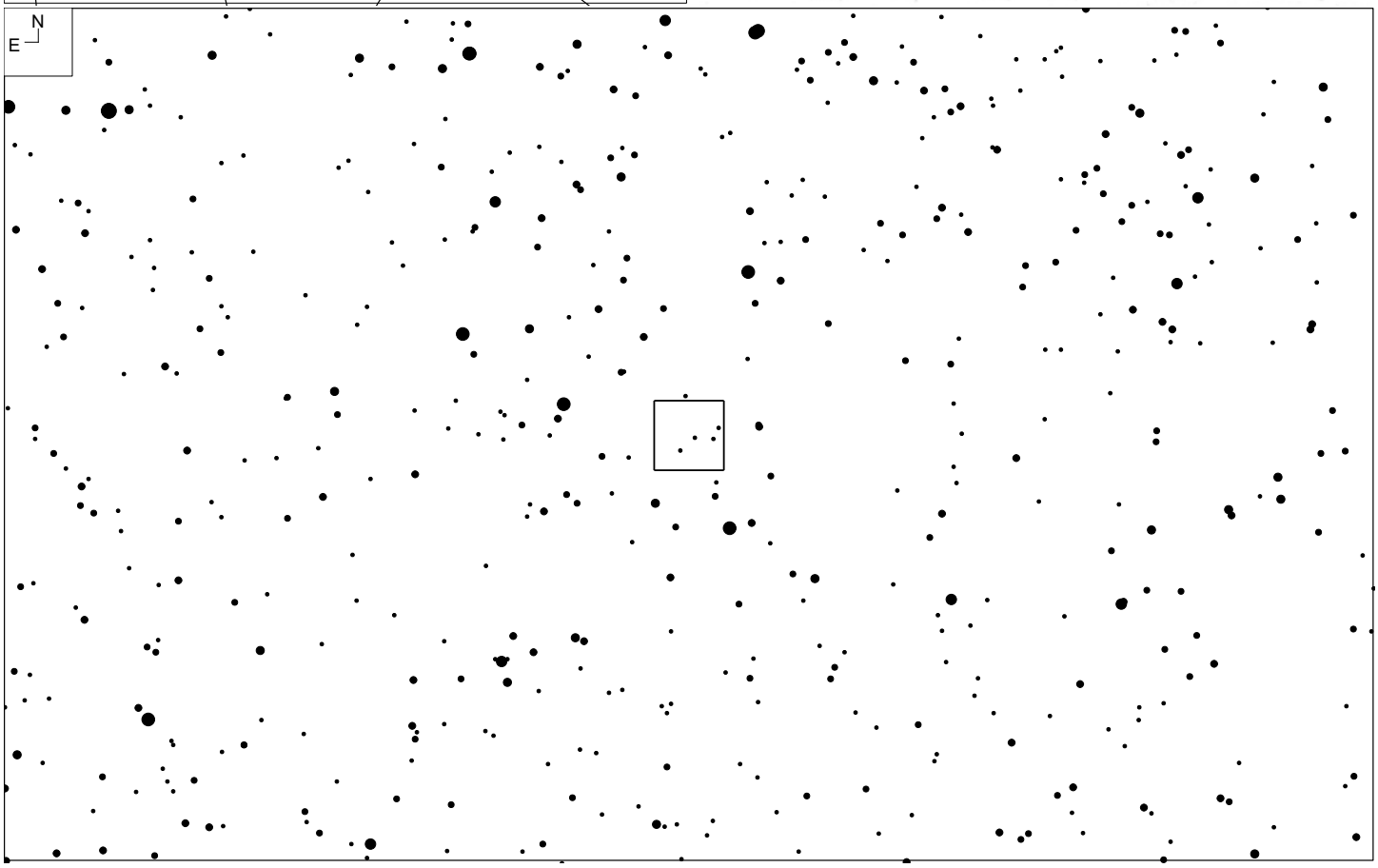


RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
15 29 29.6	+07 34 23	Gal	15.0	0.9 x 0.5’	SO	88	56

IC 4562 Group (Boötes)

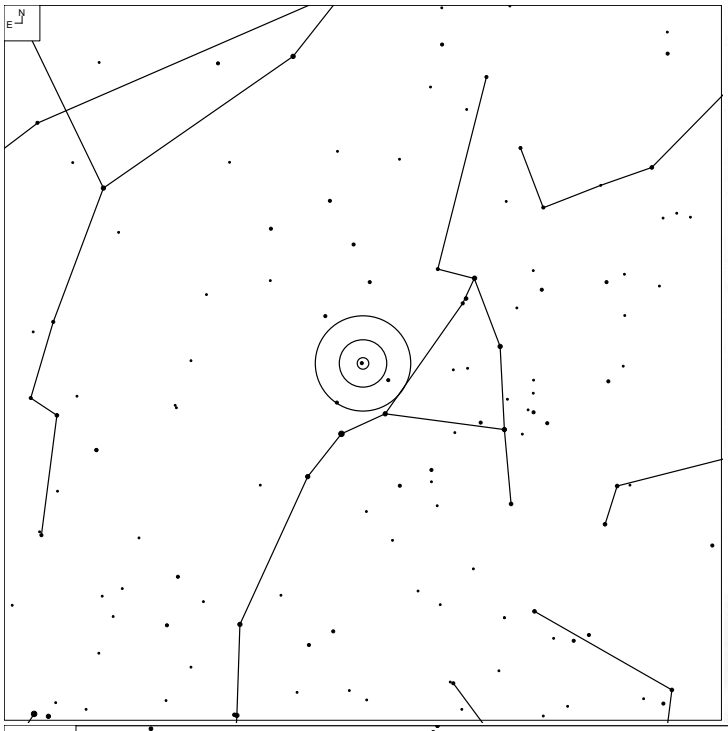


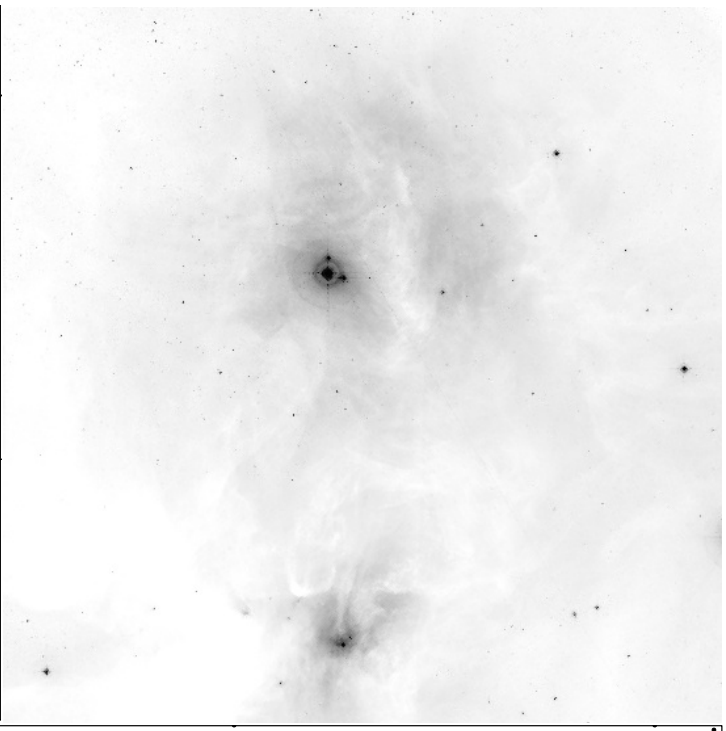


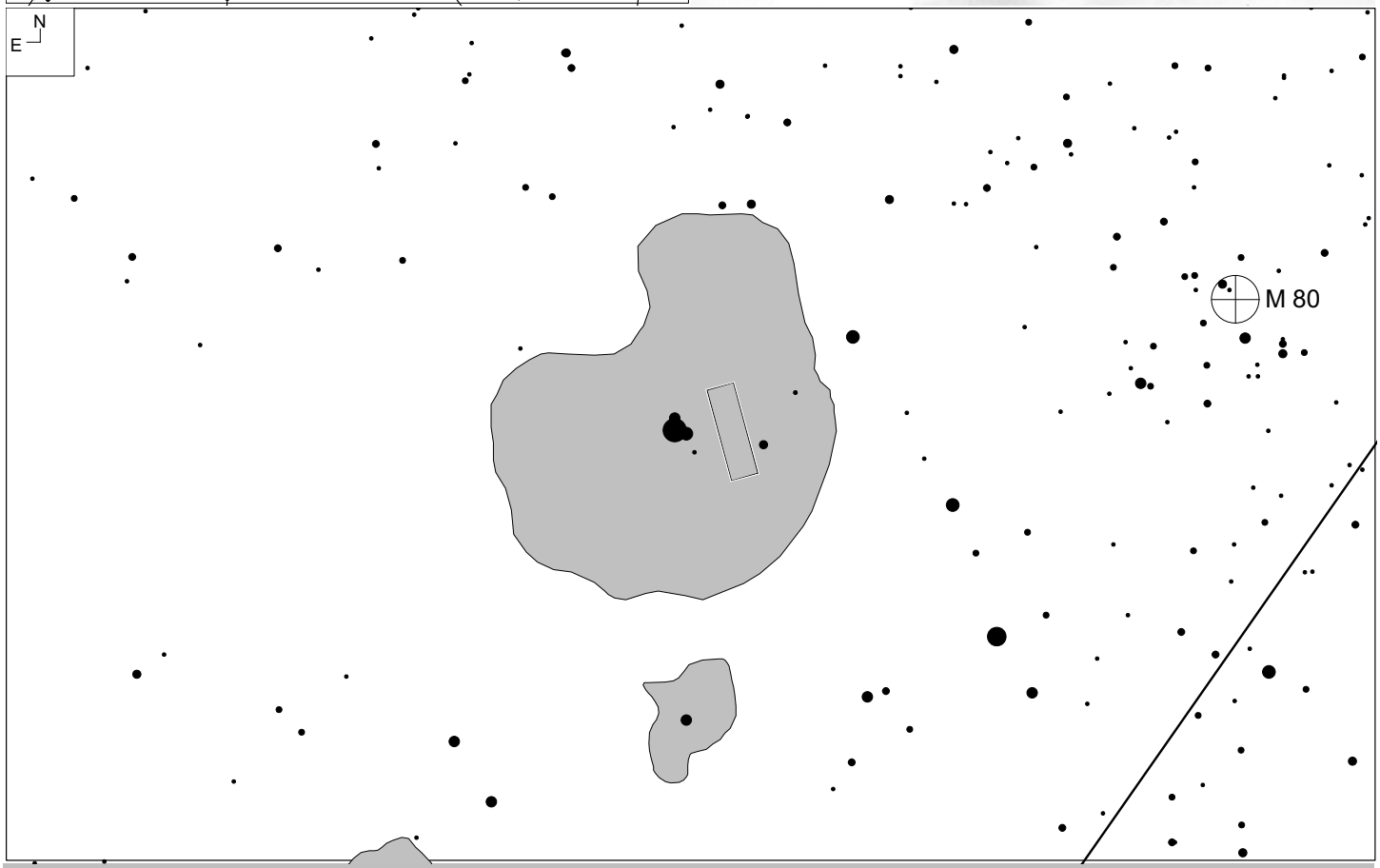


RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
15 35 57.0	+43 29 39	Gal	13.6p	1.1’	E?	35	19, 20

IC 4603 and Rho Ophiuchus

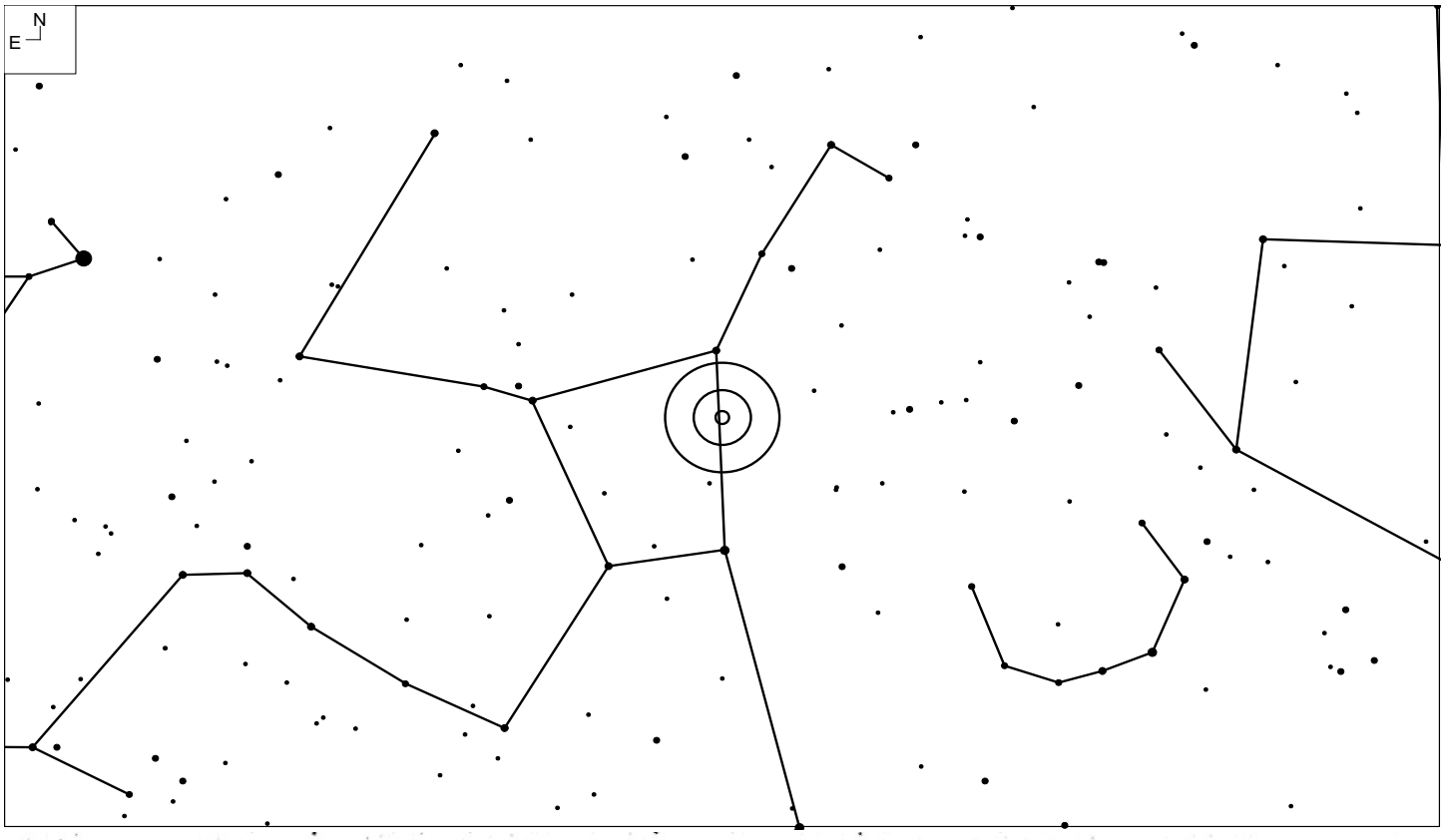


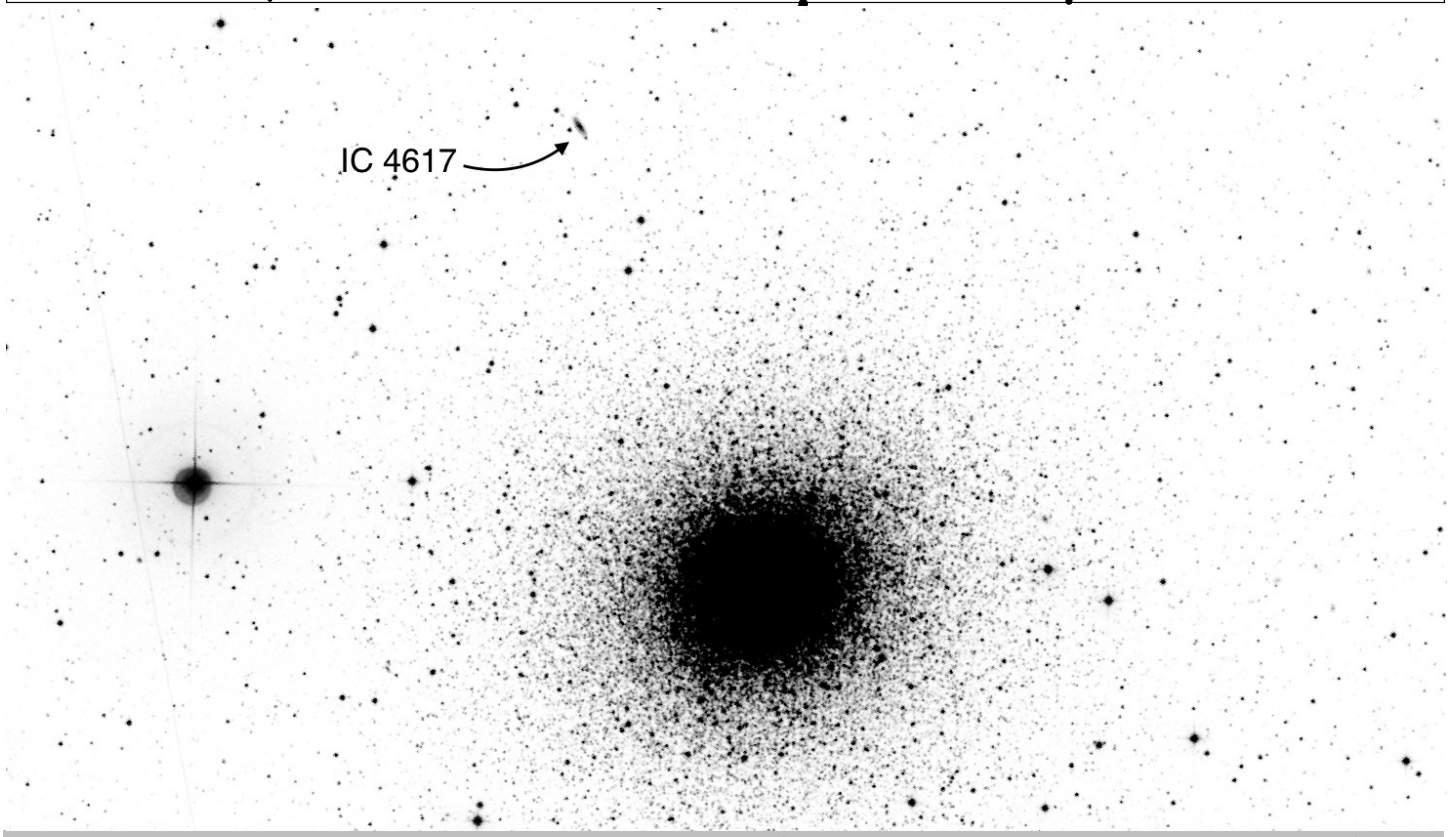




RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
16 25 15.0	-24 26 00	Nebula	-	28 x 20’	R	147	79
16 25 35.2	-23 26 50	Nebula	-	80 x 70’	R		

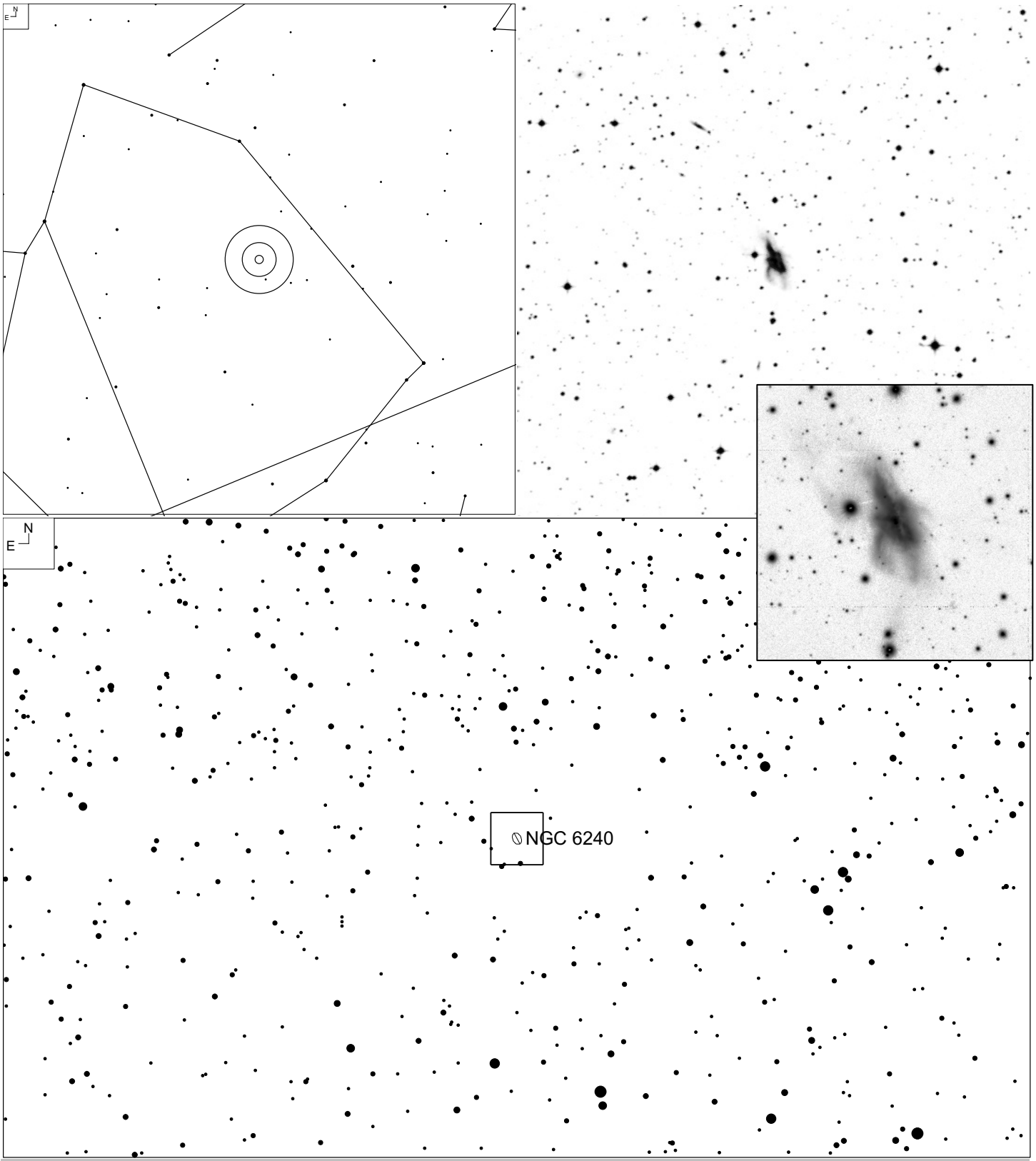
IC 4617 (Hercules)





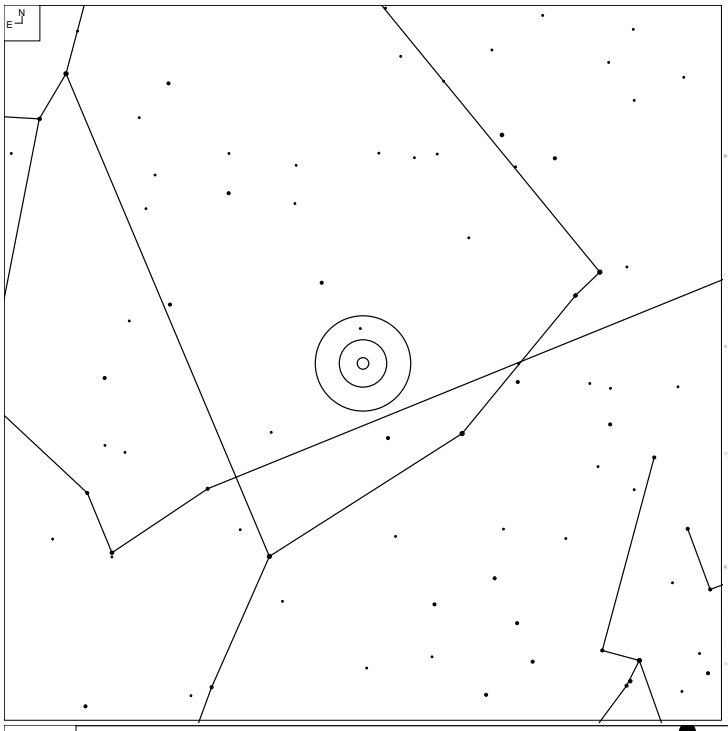
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
16 42 08.1	+36 40 59	Gal	15.5	1.2 x 0.4’	-	50	19, 31

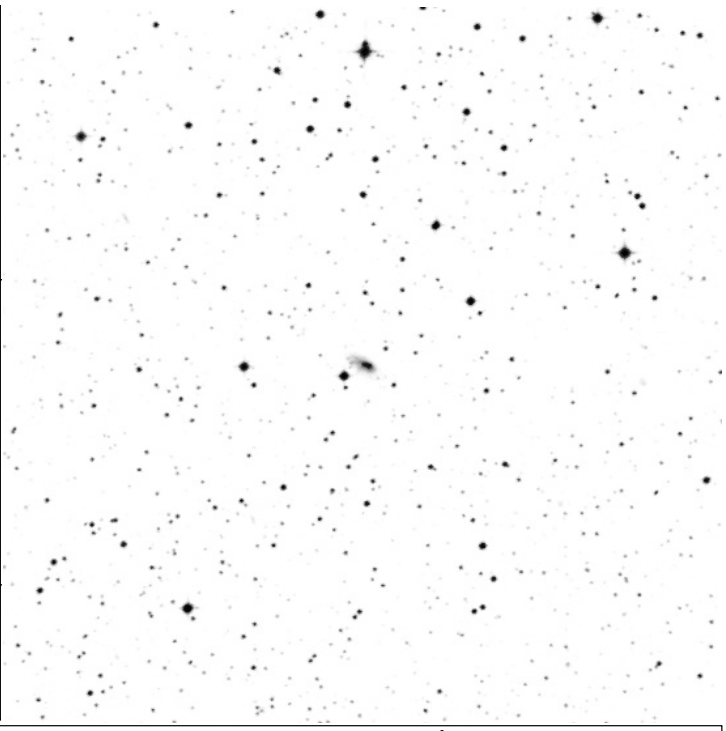
NGC 6240, IC 4625 (Ophiuchus)

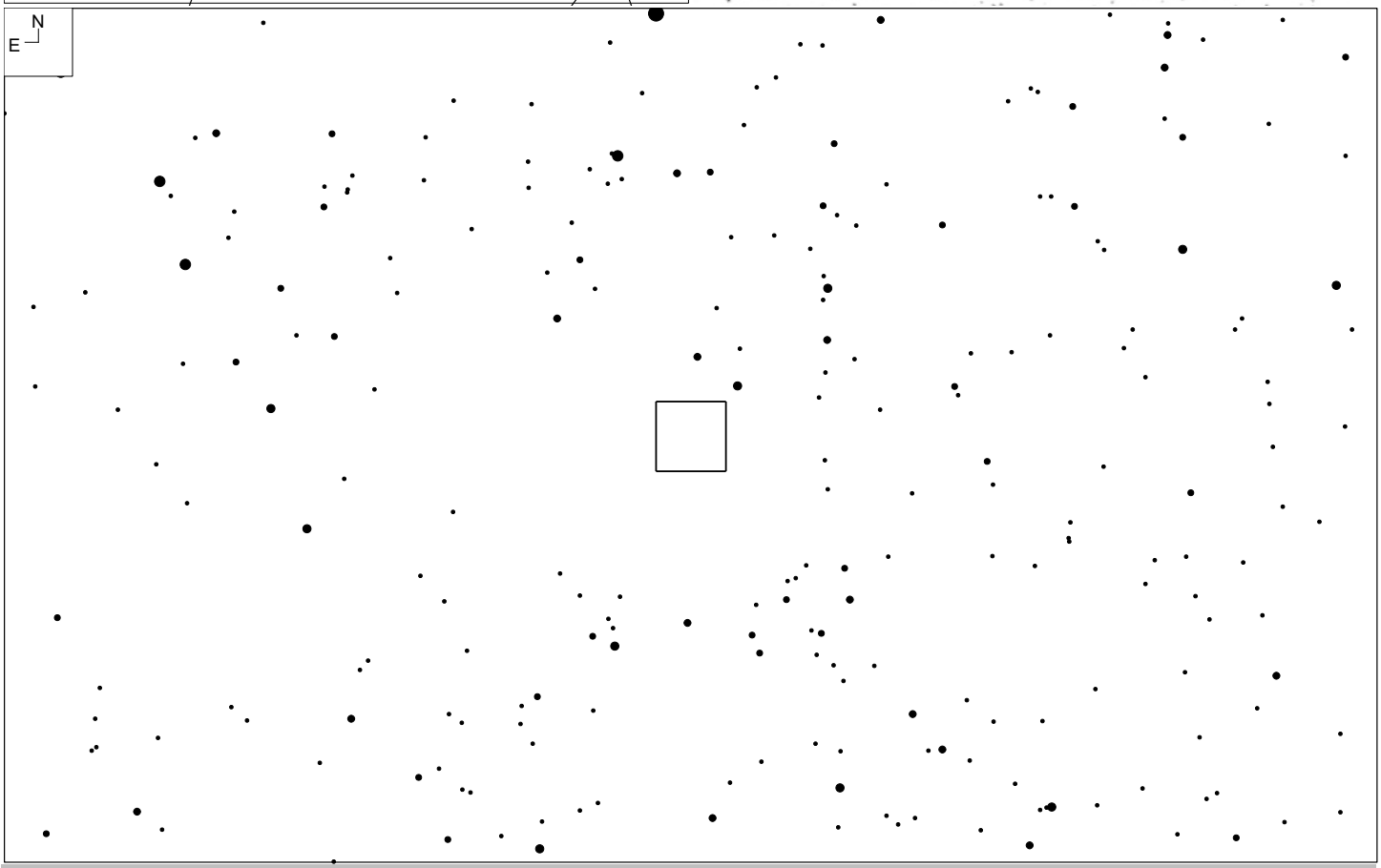


RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
16 52 58.9	+02 24 02	Gal	129.v	2.5 x 1.2’	IO pec	107	55

IC 4627 (Ophiuchus)

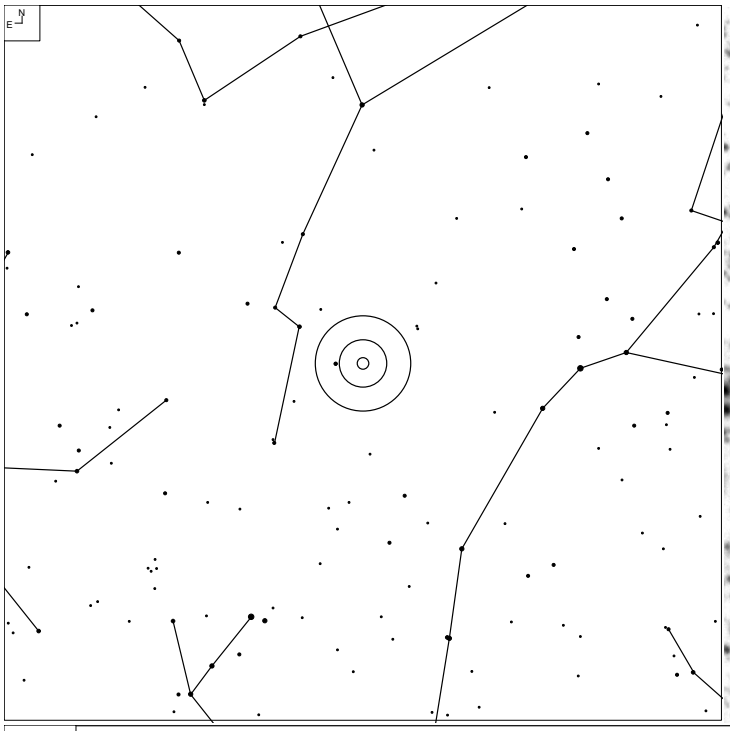


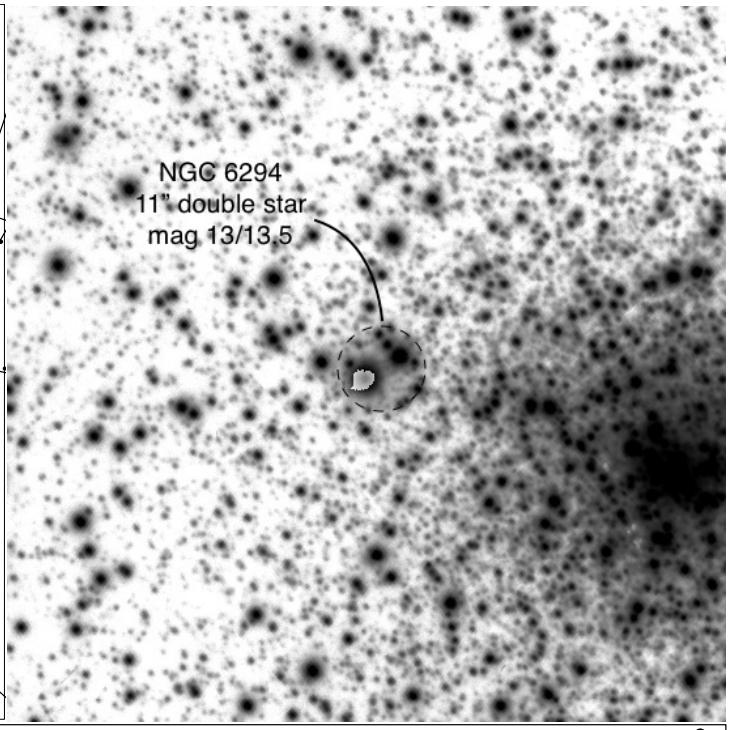


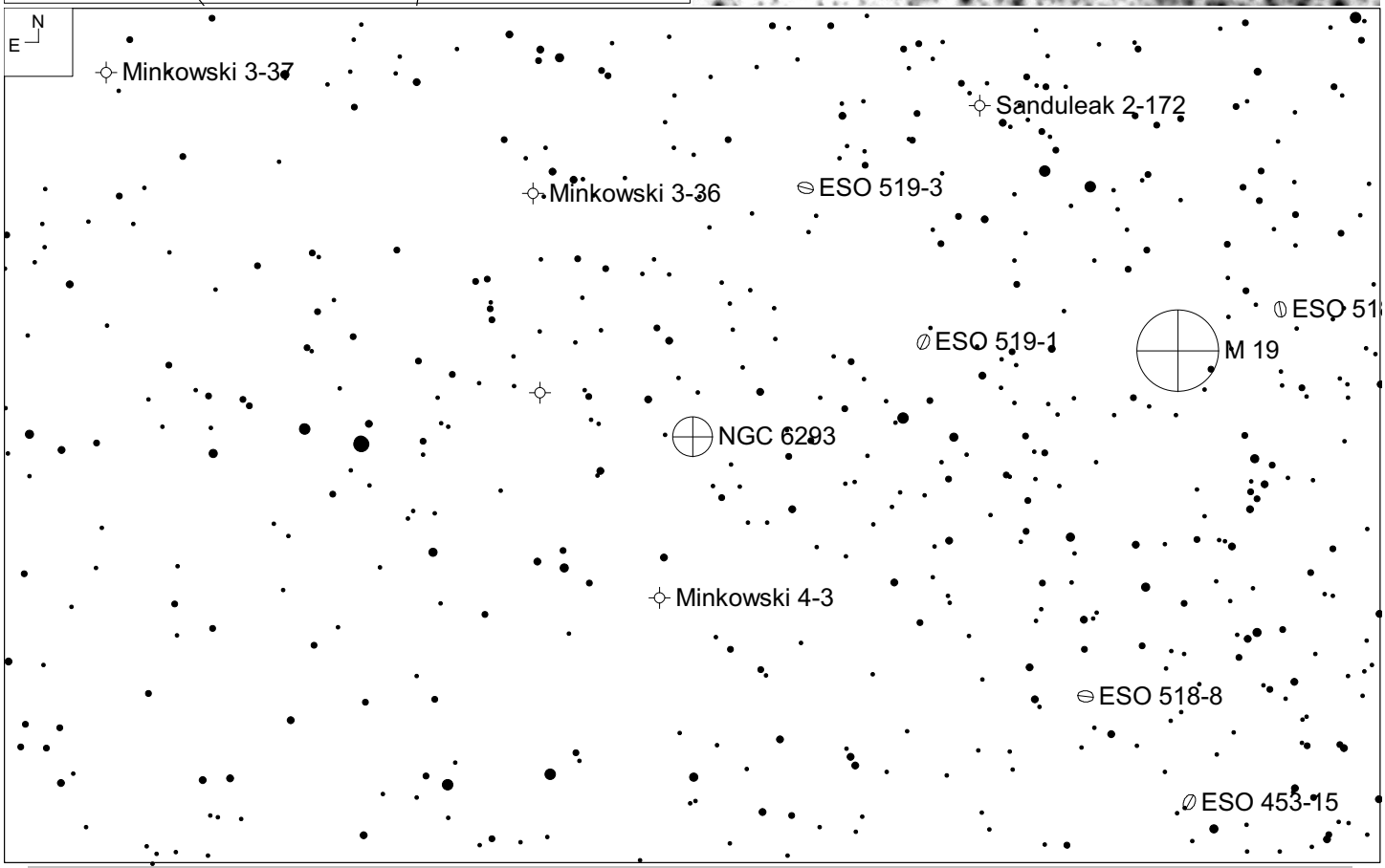


RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
16 54 08.5	-07 38 08	Gal?	14.3	48 x 22”	?	127	55

NGC 6293 and NGC 6294 (Ophiuchus)

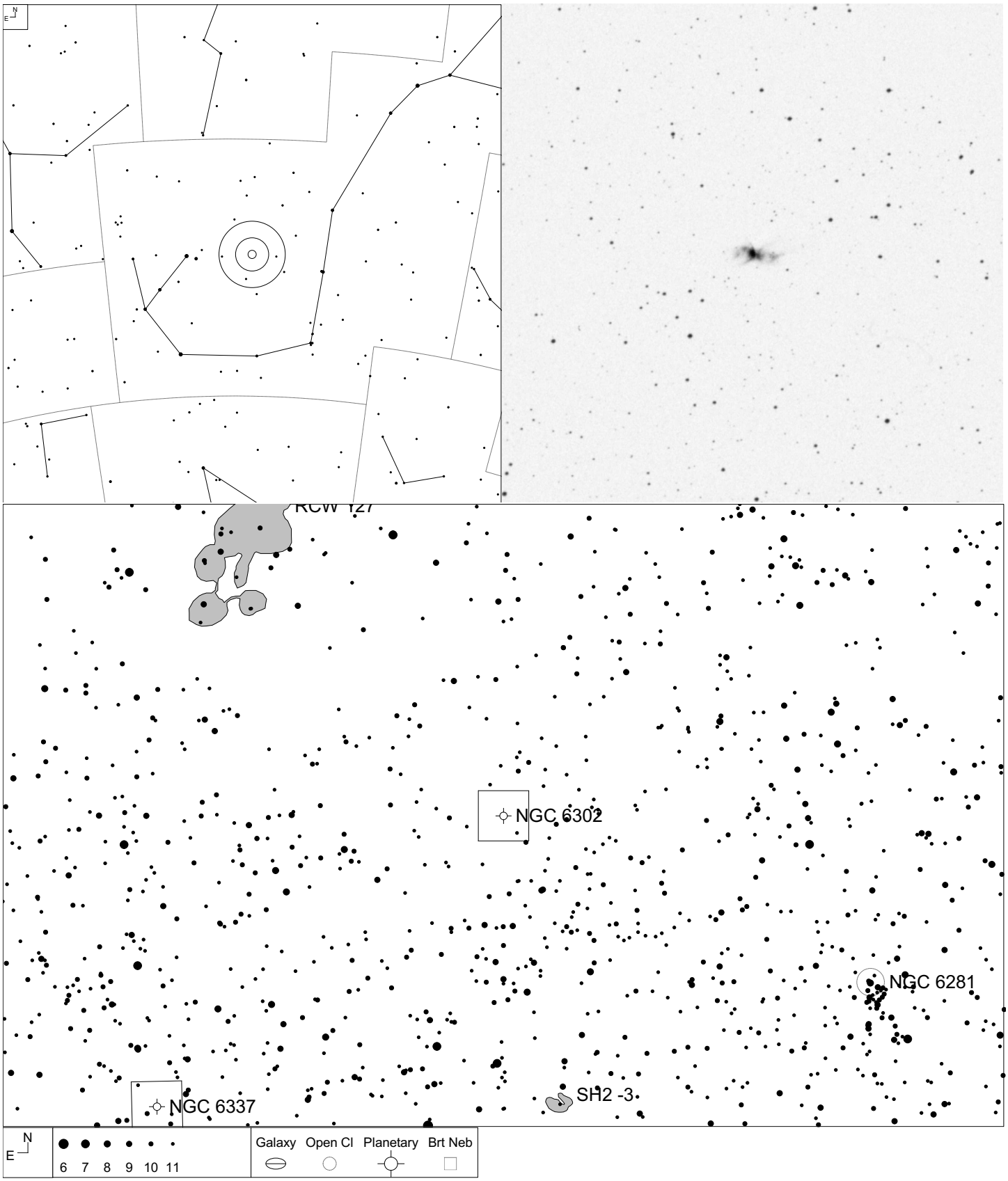






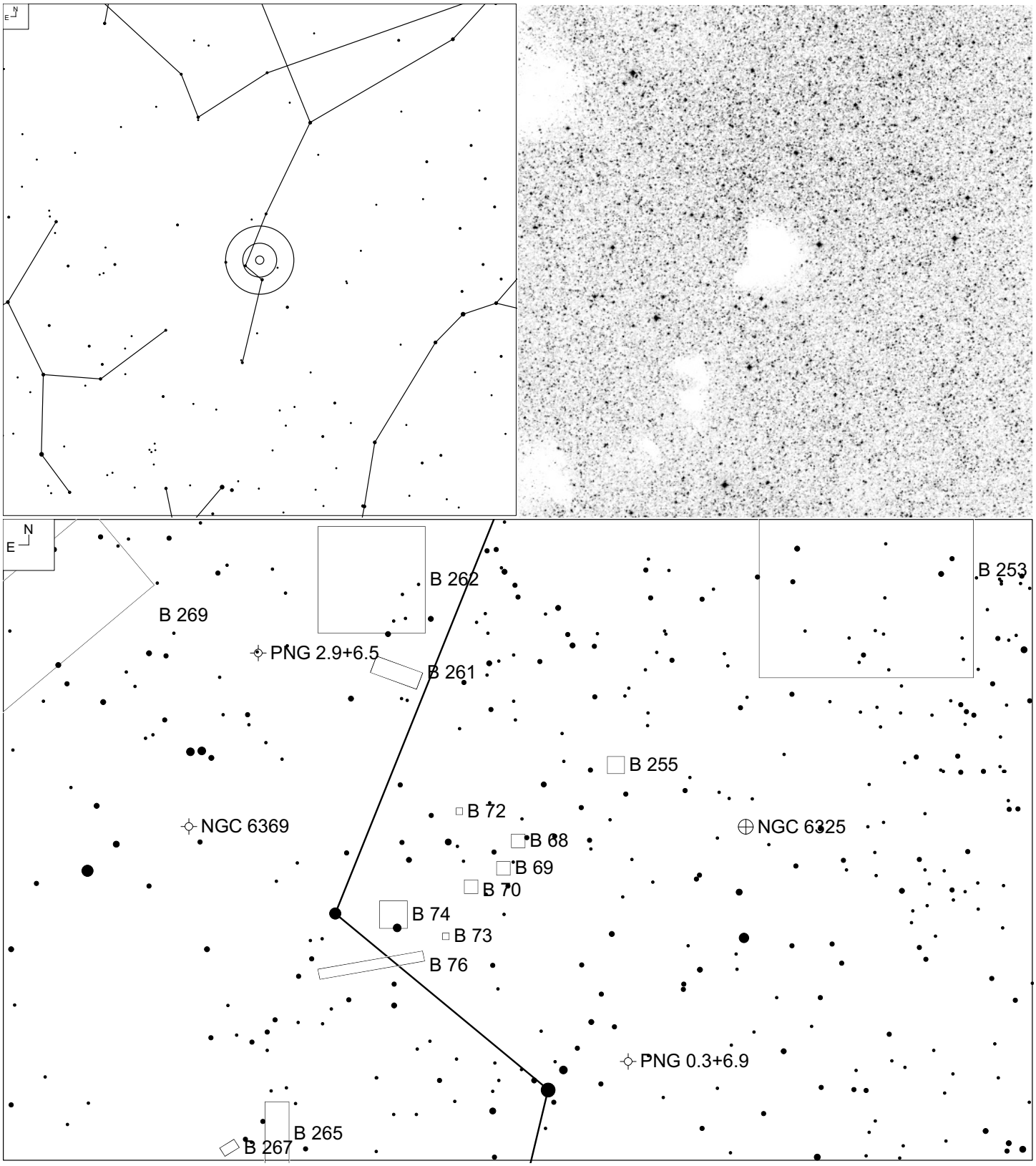
ID	RA	Dec	Type	Mag	Size	Urano 2	iDSA
NGC 6293	17 10 10.4	-26 34 54	GC	8.3	8.2'	127	67
NGC 6294	17 10 16.2	-26 34 29	Dbl Star				

NGC 6302 (Scorpius)



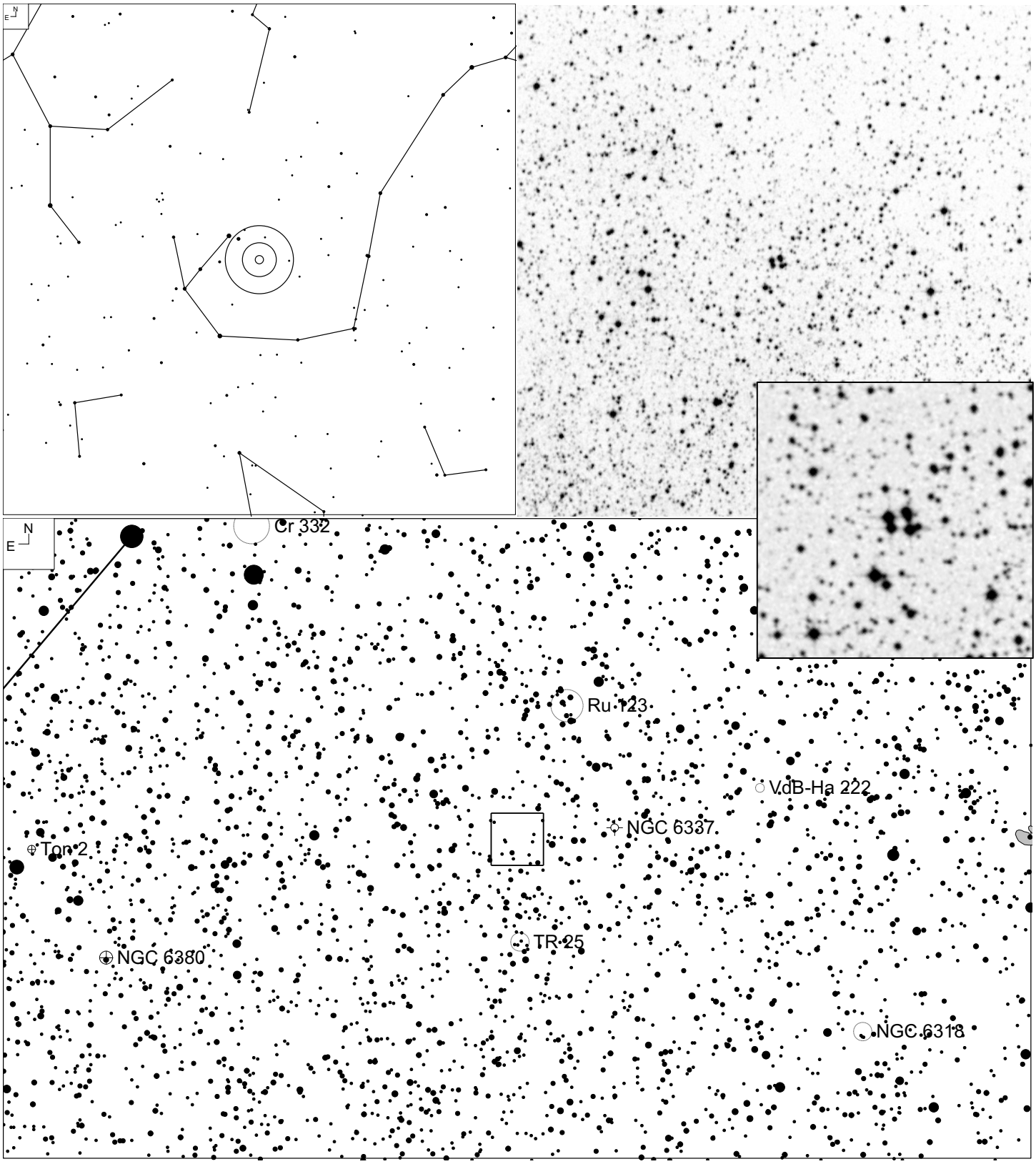
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
17 13 44.3	–37 06 13	PN	12.8p	85 x 44”	-	164	79

Barnard 68 (Ophiuchus)



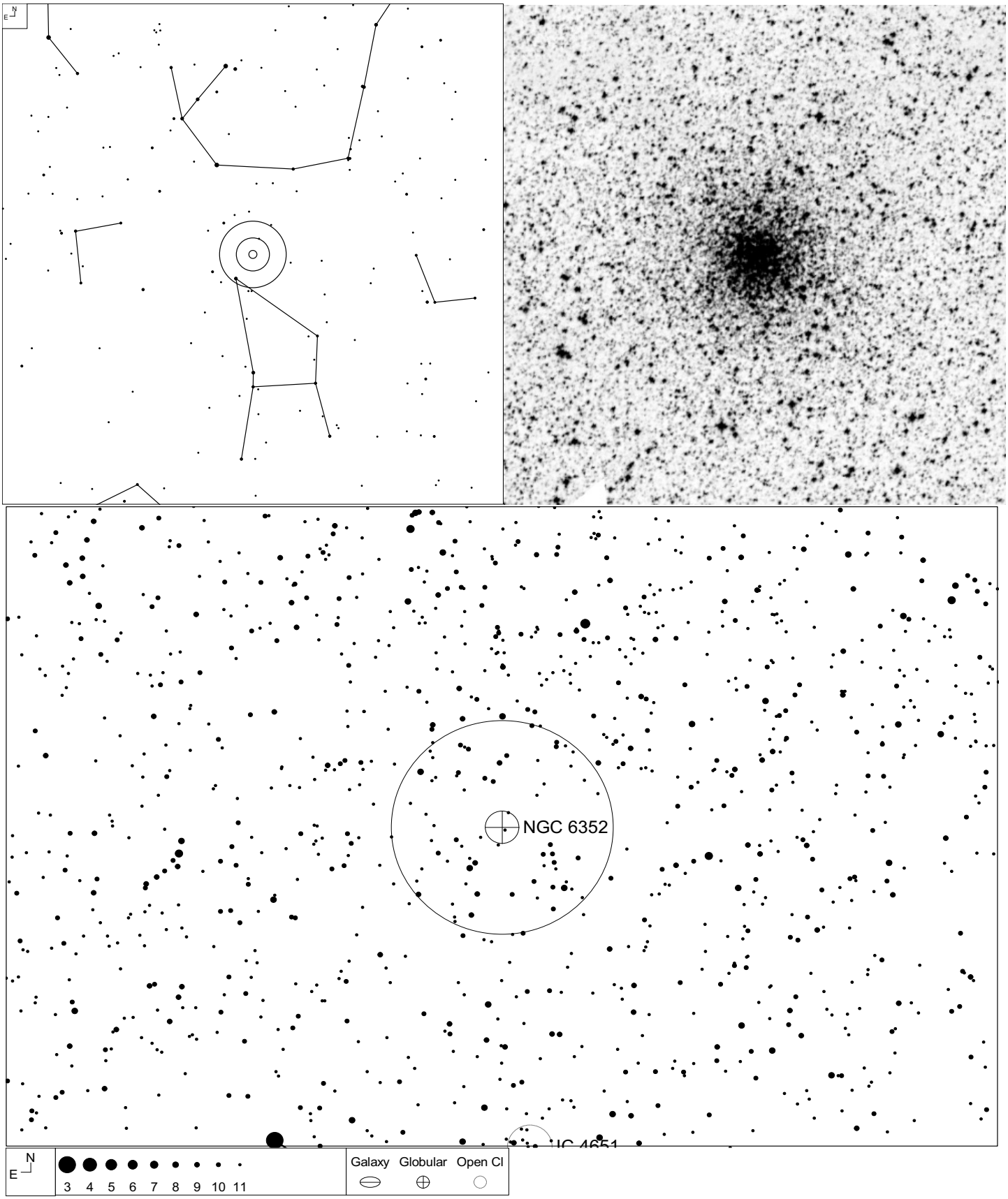
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
17 22 38.0	-23 50 12	DN		4.0’		146	79

NGC 6354 (Scorpius)



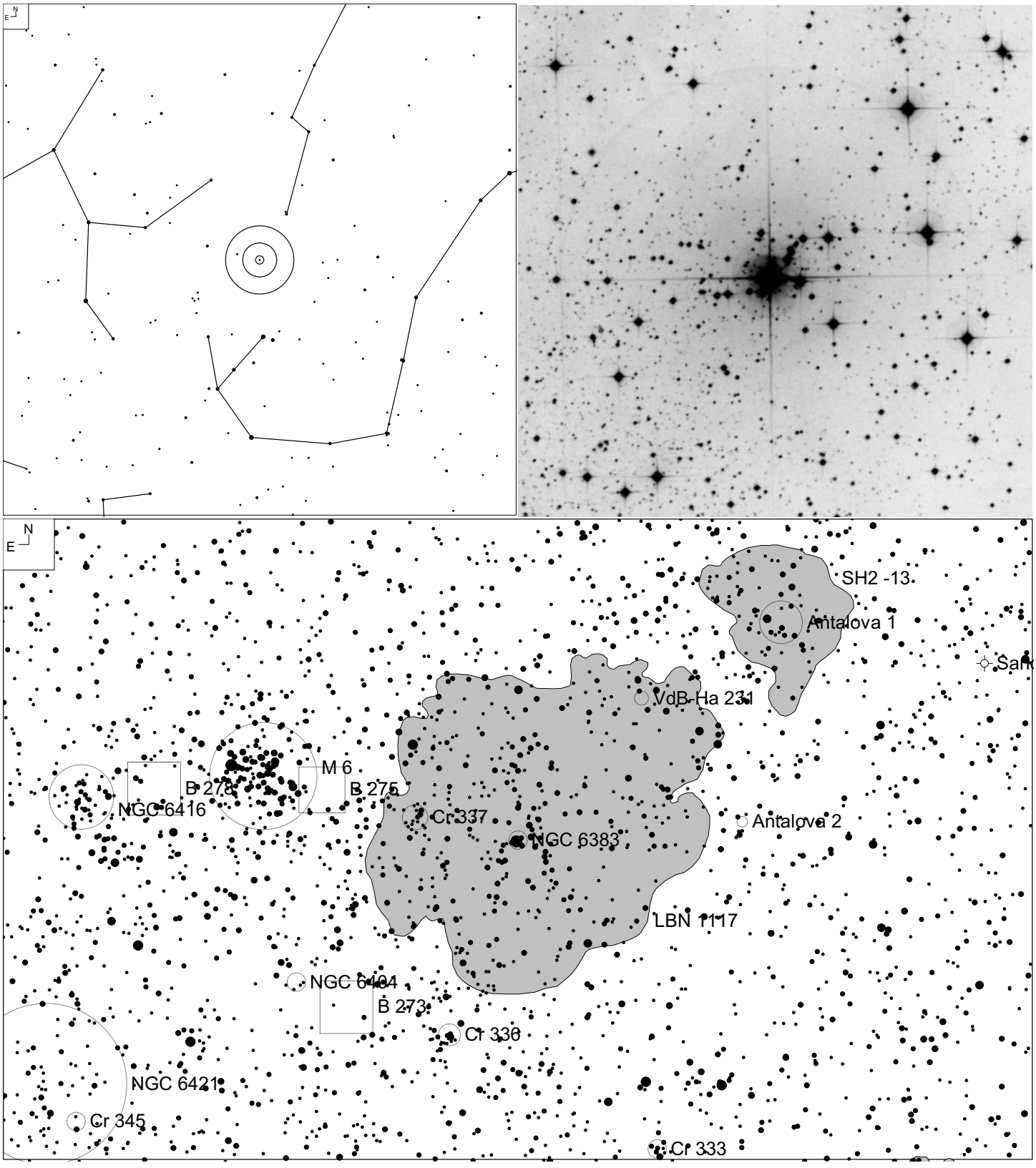
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
17 24 34.7	-38 32 30	Asterism	-	20”	-	164	79, 91

NGC 6352 (Ara)



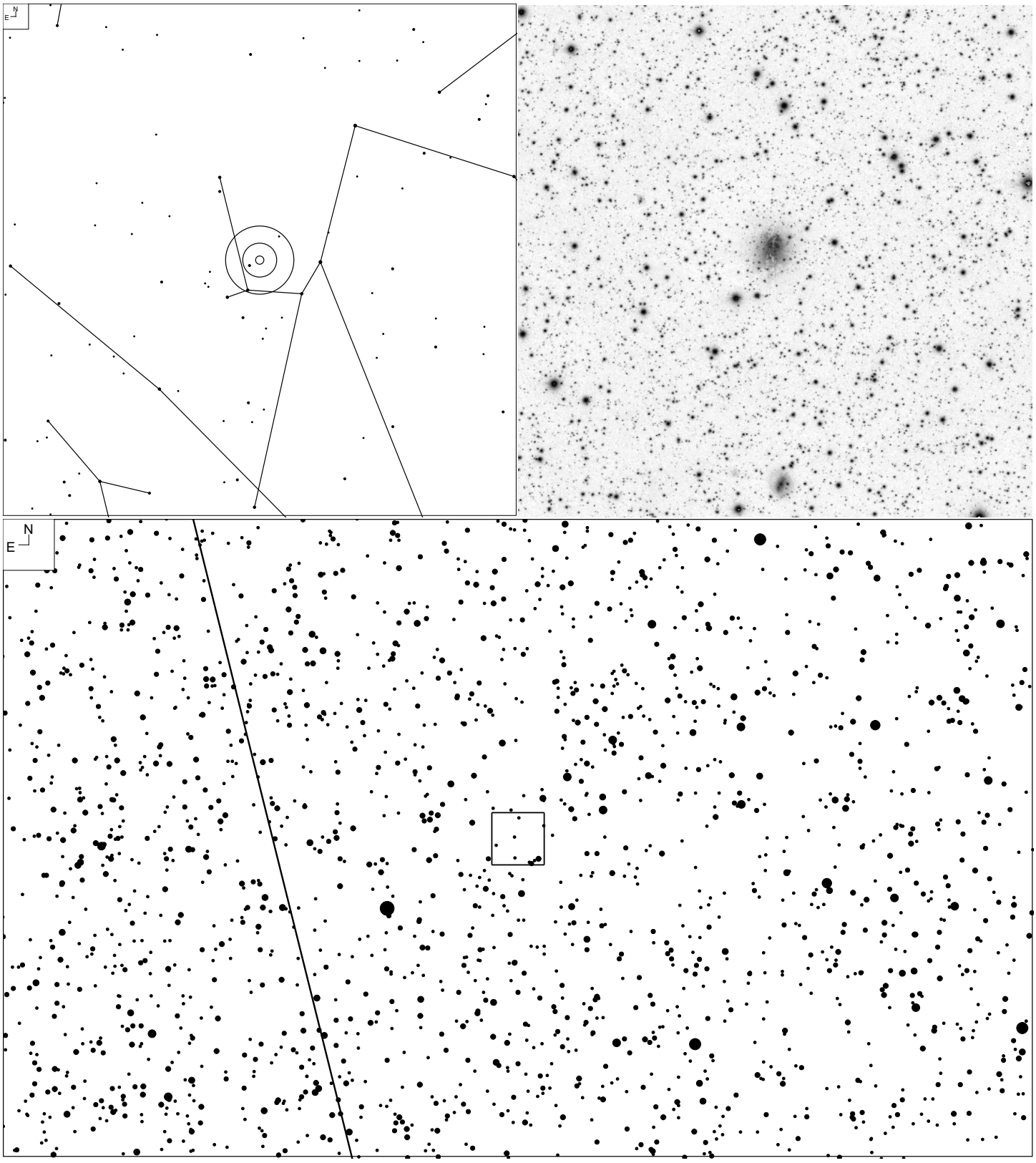
RA	Dec	V_{mag}	HB_{Mag}	Bt^*_{Mag}	SB	Size	Urano 2	iDSA
17 25 29	-48 25 20	7.96	15.1	13.4	12.6	9	181	91

NGC 6383 (Scorpius)



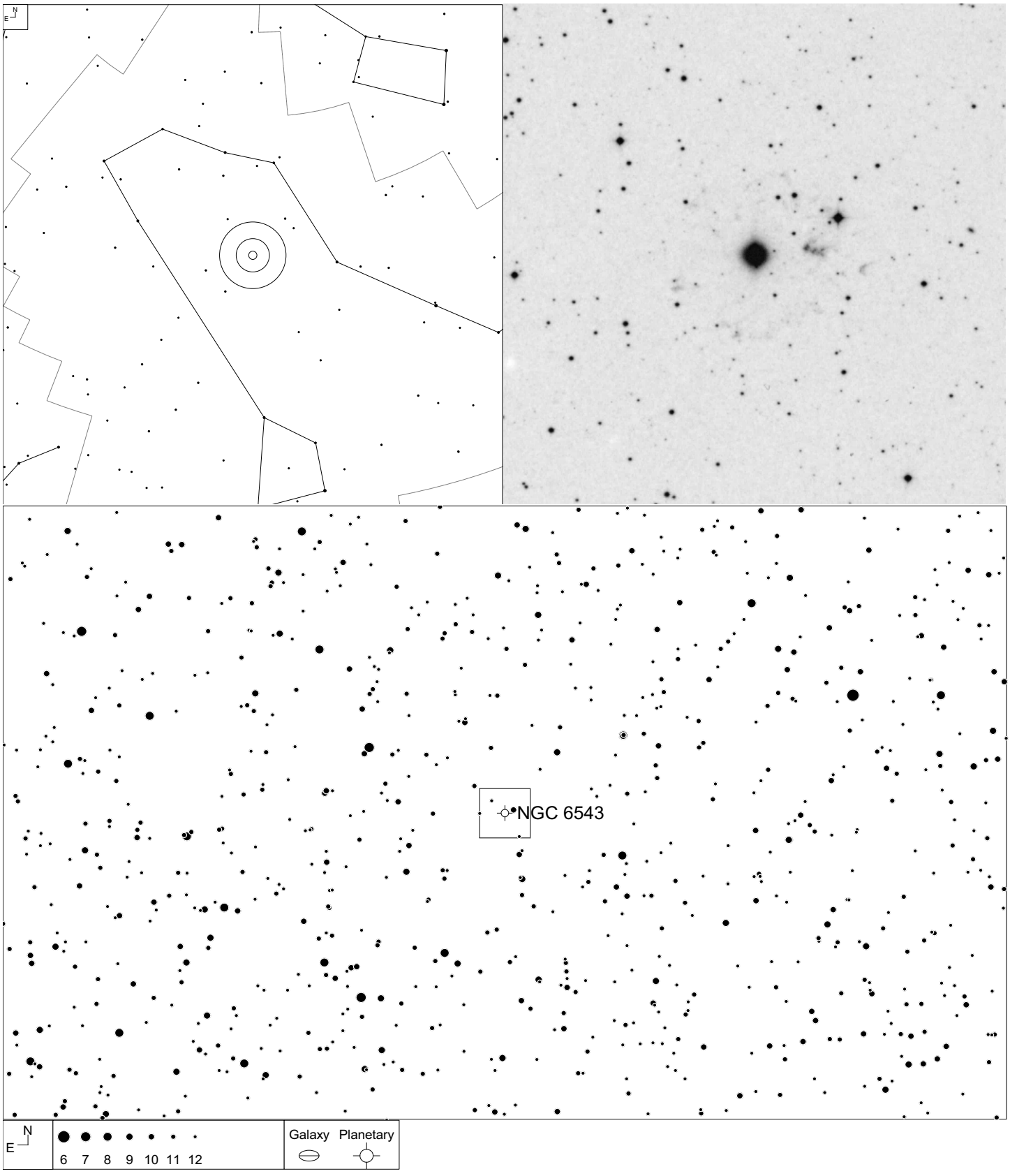
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
17 34 39.7	-32 34 30	OC	5.5	5.0’	II3m n	164	79

Barnard's Star (Ophiuchus)



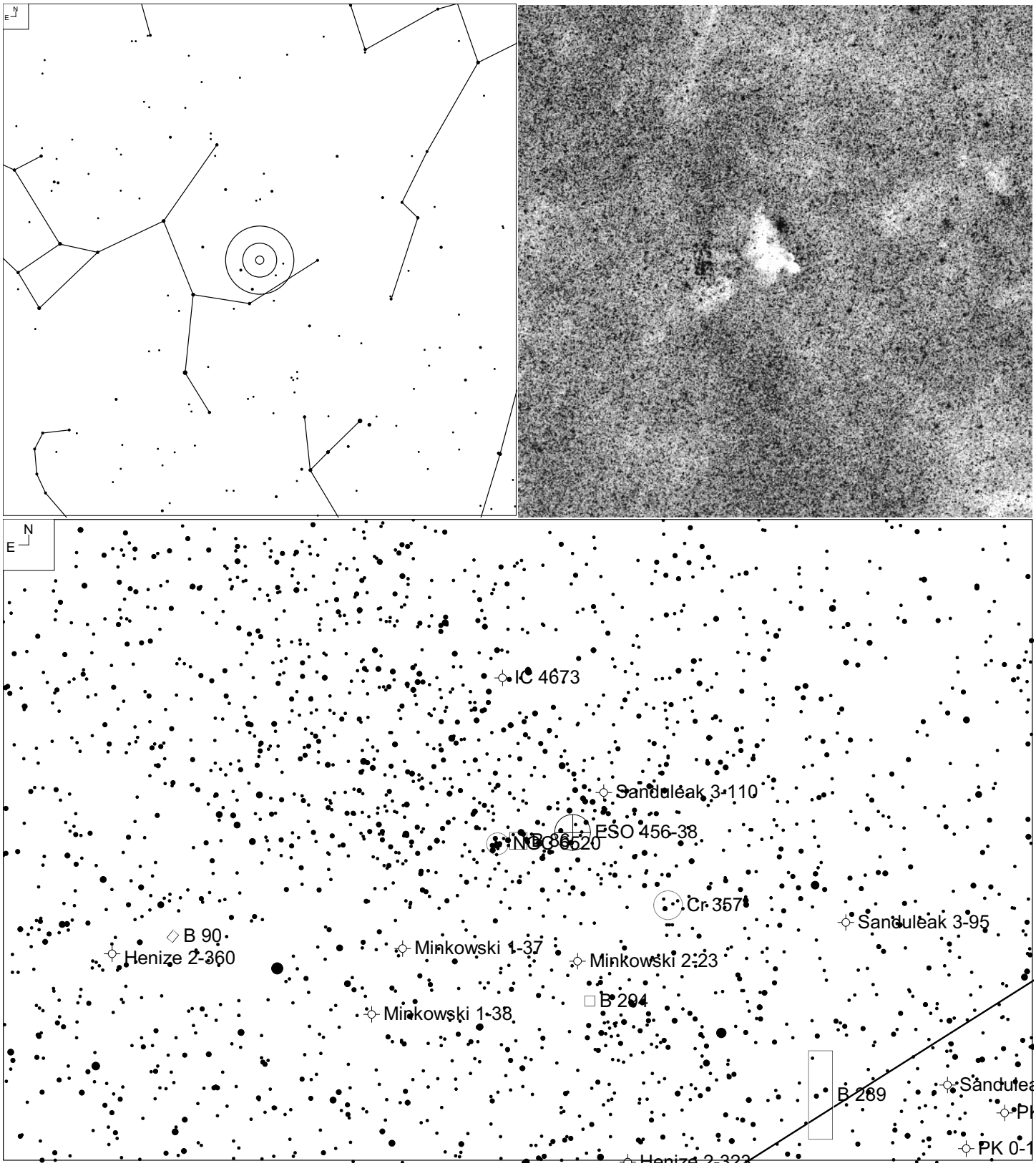
RA	Dec	Type	Mag	Size	Urano 2	iDSA
~17 57 48	~ +04 41 49	Star	9.5	Stellar	106	55

IC 4677 (NGC 6543)



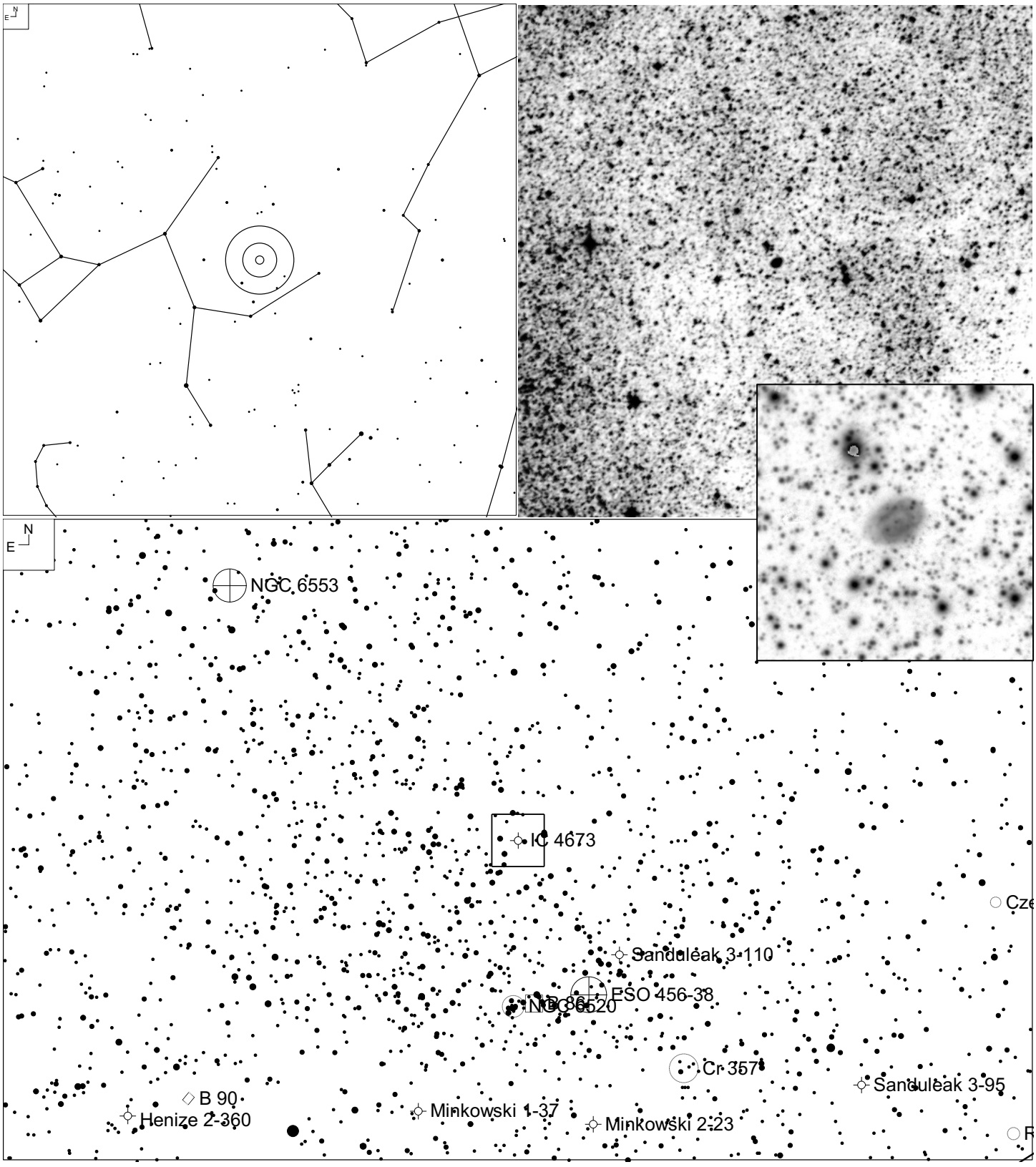
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
17 58 15.3	+66 38 05	Part of PNe	15.7	1.0 x 0.4’	-	10	9, 10

Barnard 86 and NGC 6520 (Sagittarius)



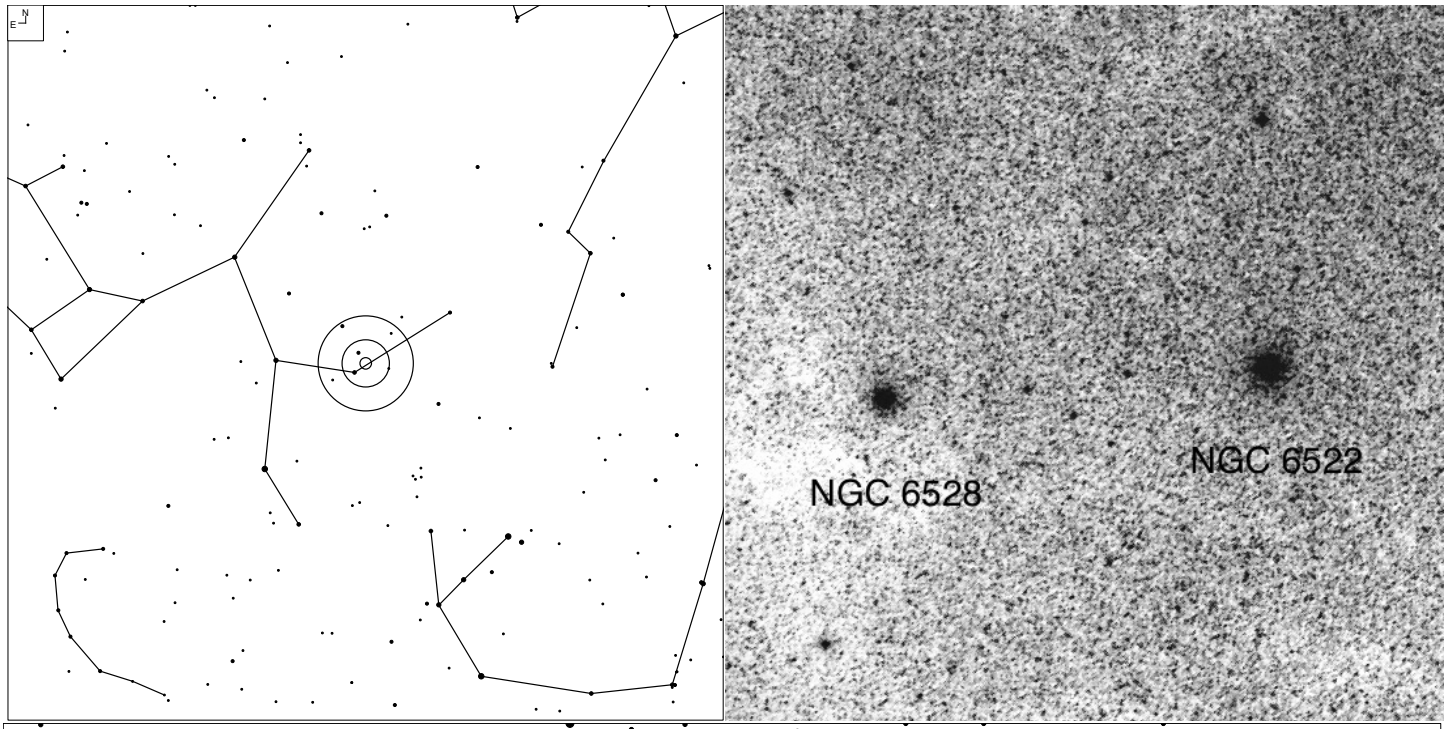
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
18 02 58.6	-27 52 00			5.0’		145	78

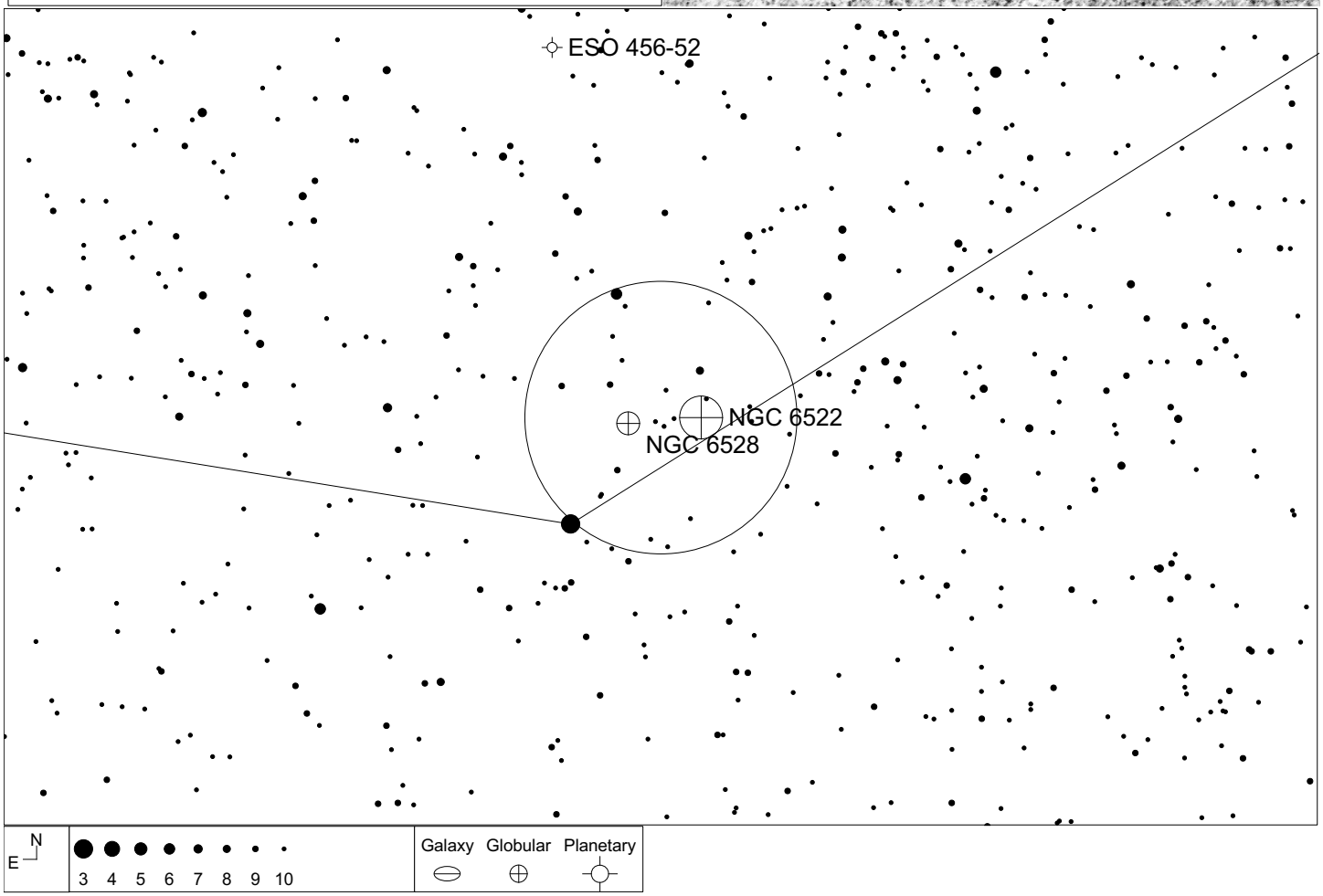
IC 4673 (Sagittarius)



RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
18 03 18.5	–27 06 22	PN	12.9p	15”	4	145	78

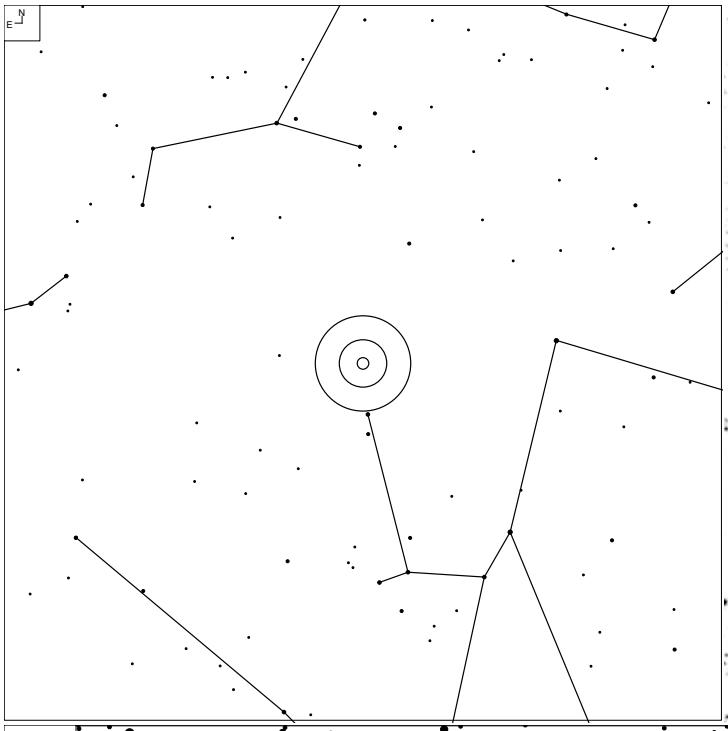
NGC 6522 (Sagittarius)

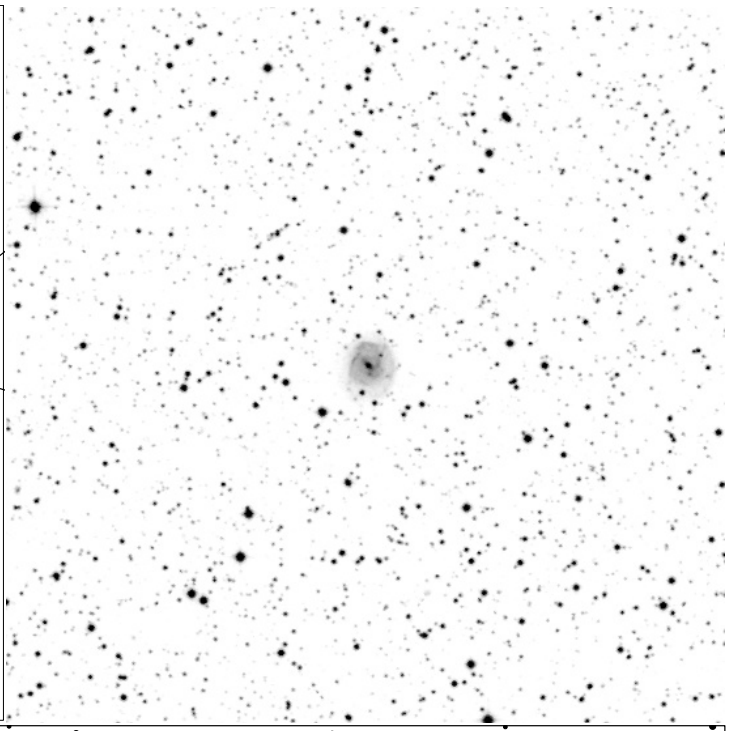


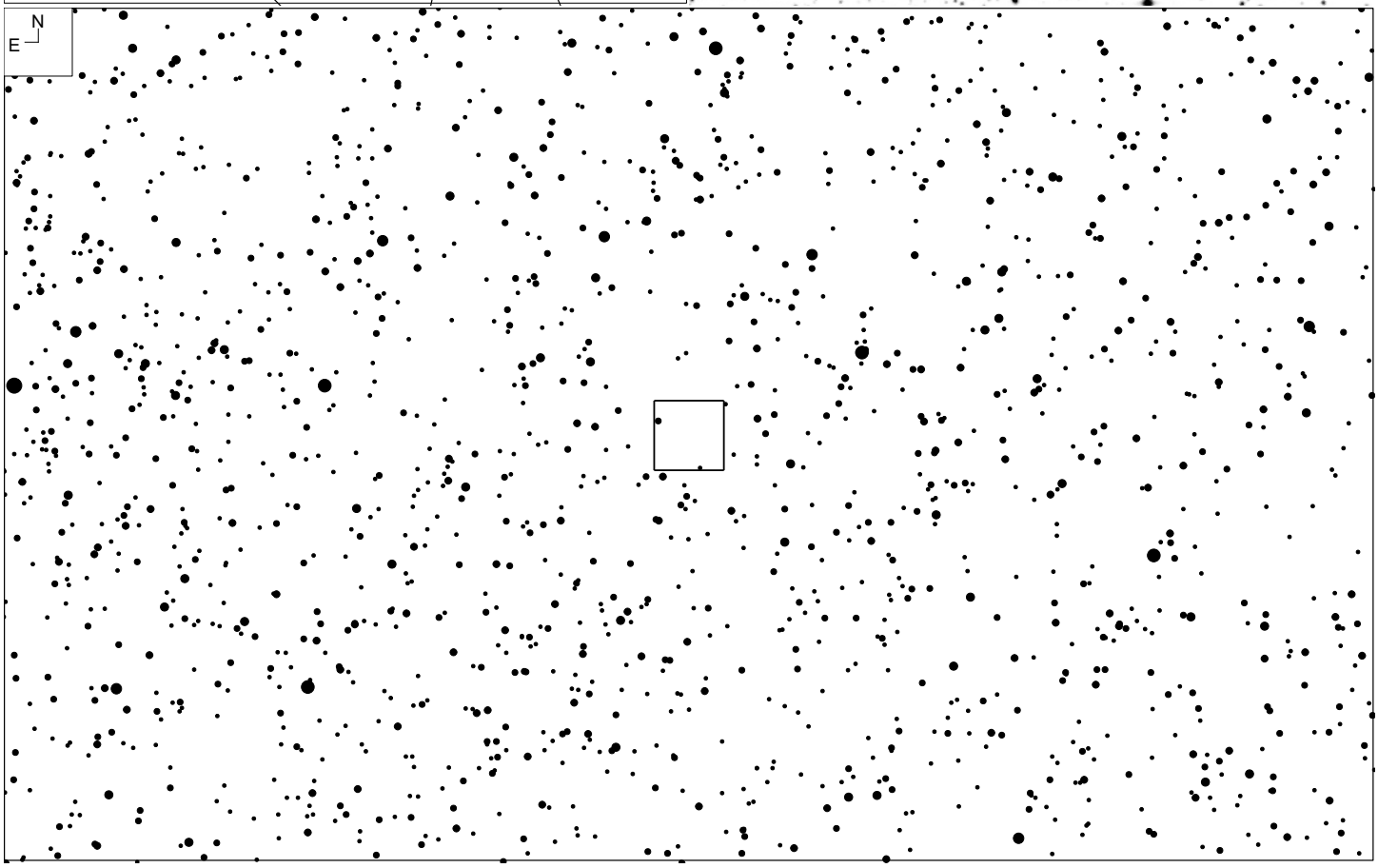


Object	RA	Dec	V_{mag}	HB_{Mag}	Bt^*_{Mag}	SB	Size	Urano 2	iDSA
NGC 6522	18 03 35.0	-30 02 02	9.9	16.9	14.1	14.8	9.4’	163	78

IC 4688 (Ophiuchus)

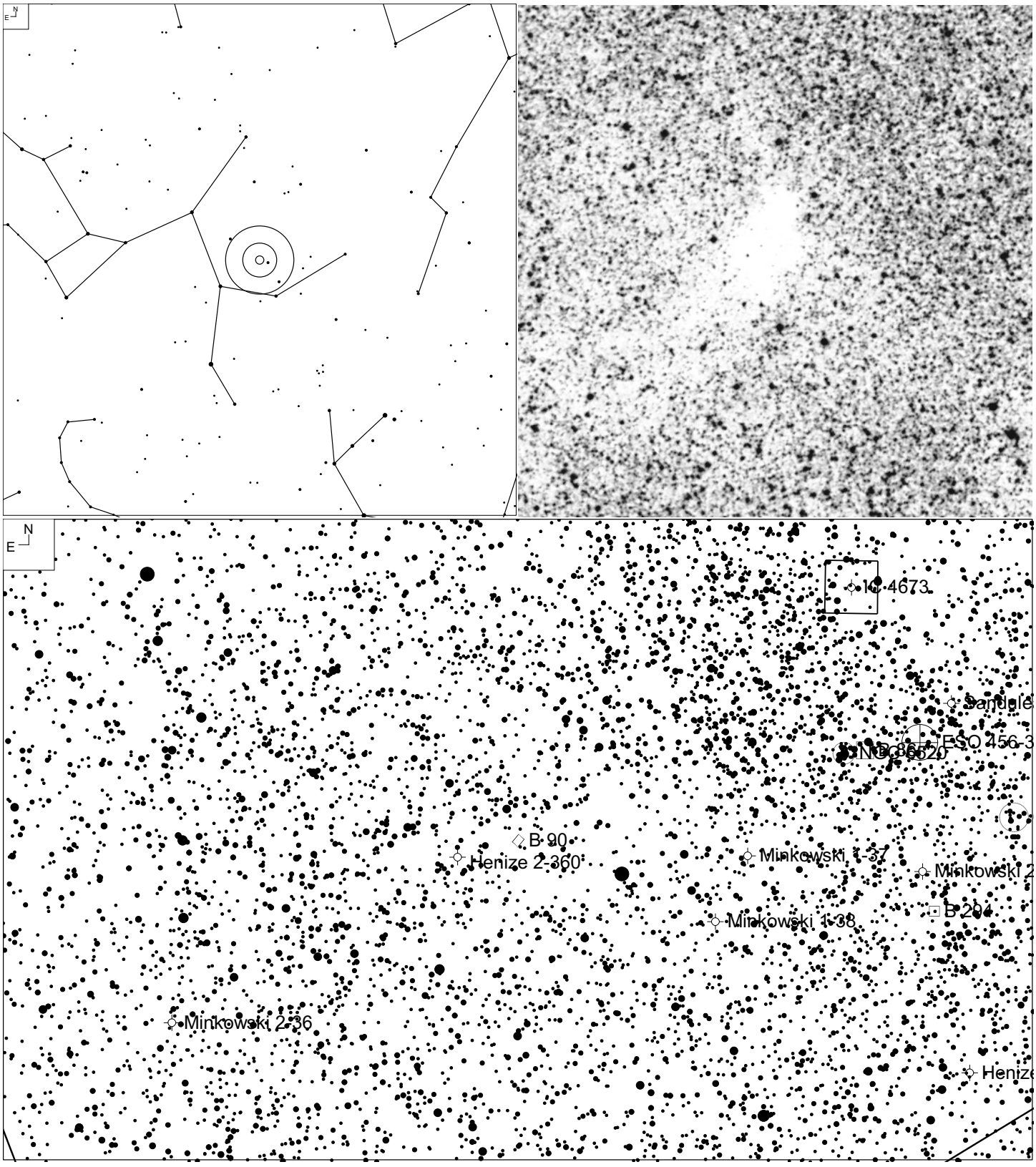






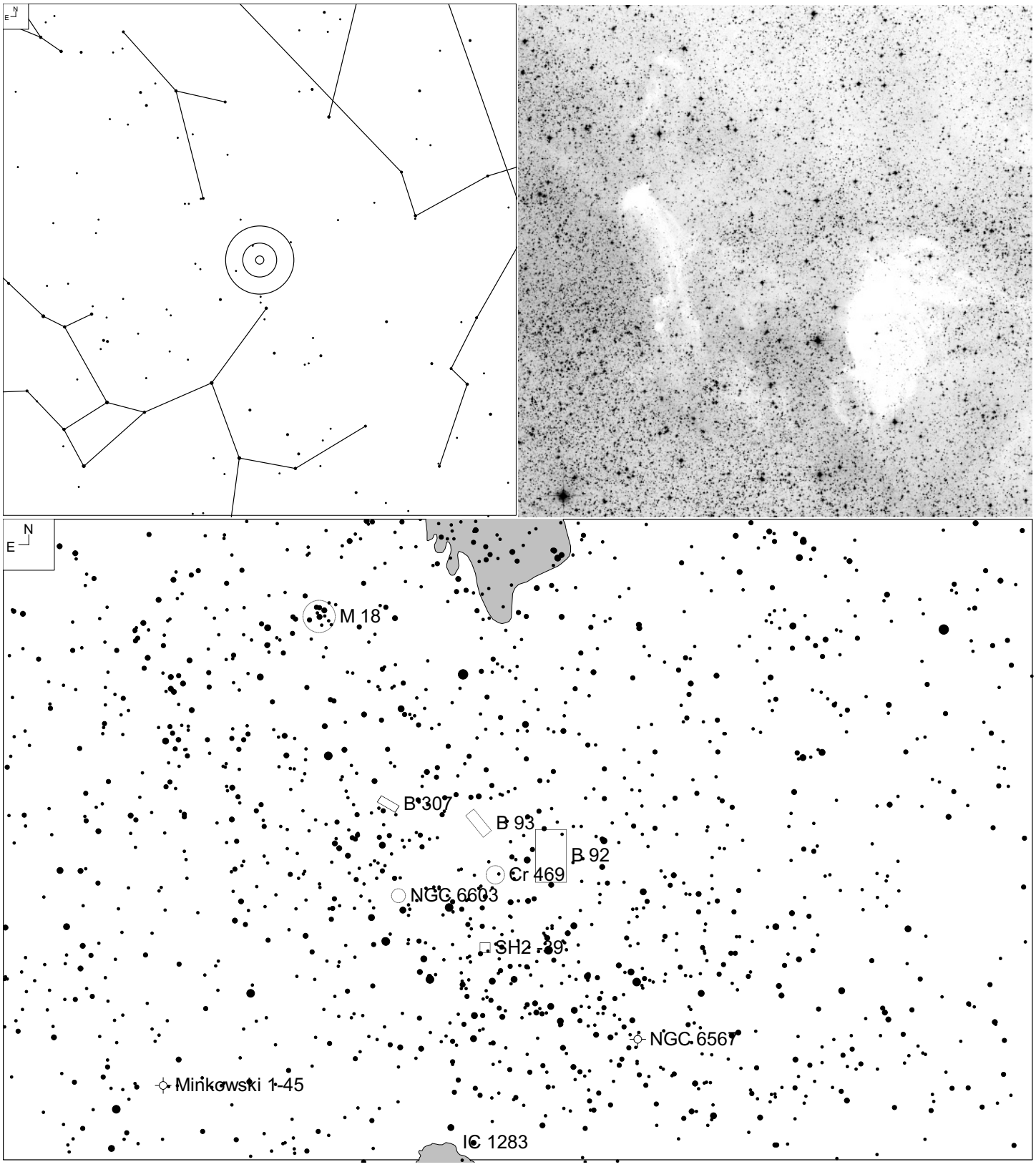
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
18 08 11.8	+11 42 43	Gal	13.8p	1.4 x 1.0’	Scd	86	42

Barnard 90 (Sagittarius)



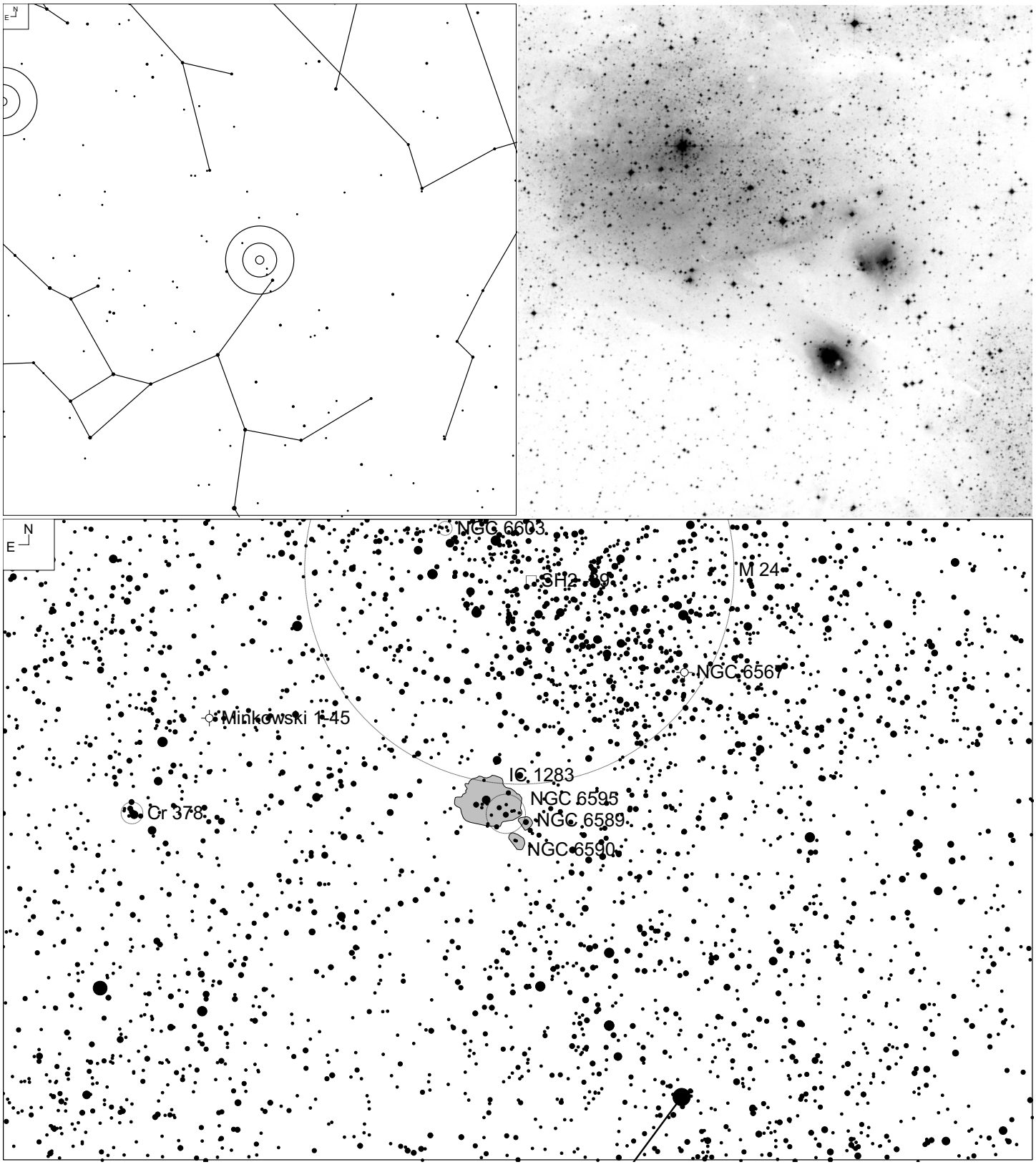
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
18 10 17.4	–28 18 00	DN	-	3.0 x 2.0’	Ir G	145	78

Barnard 92 (Sagittarius)



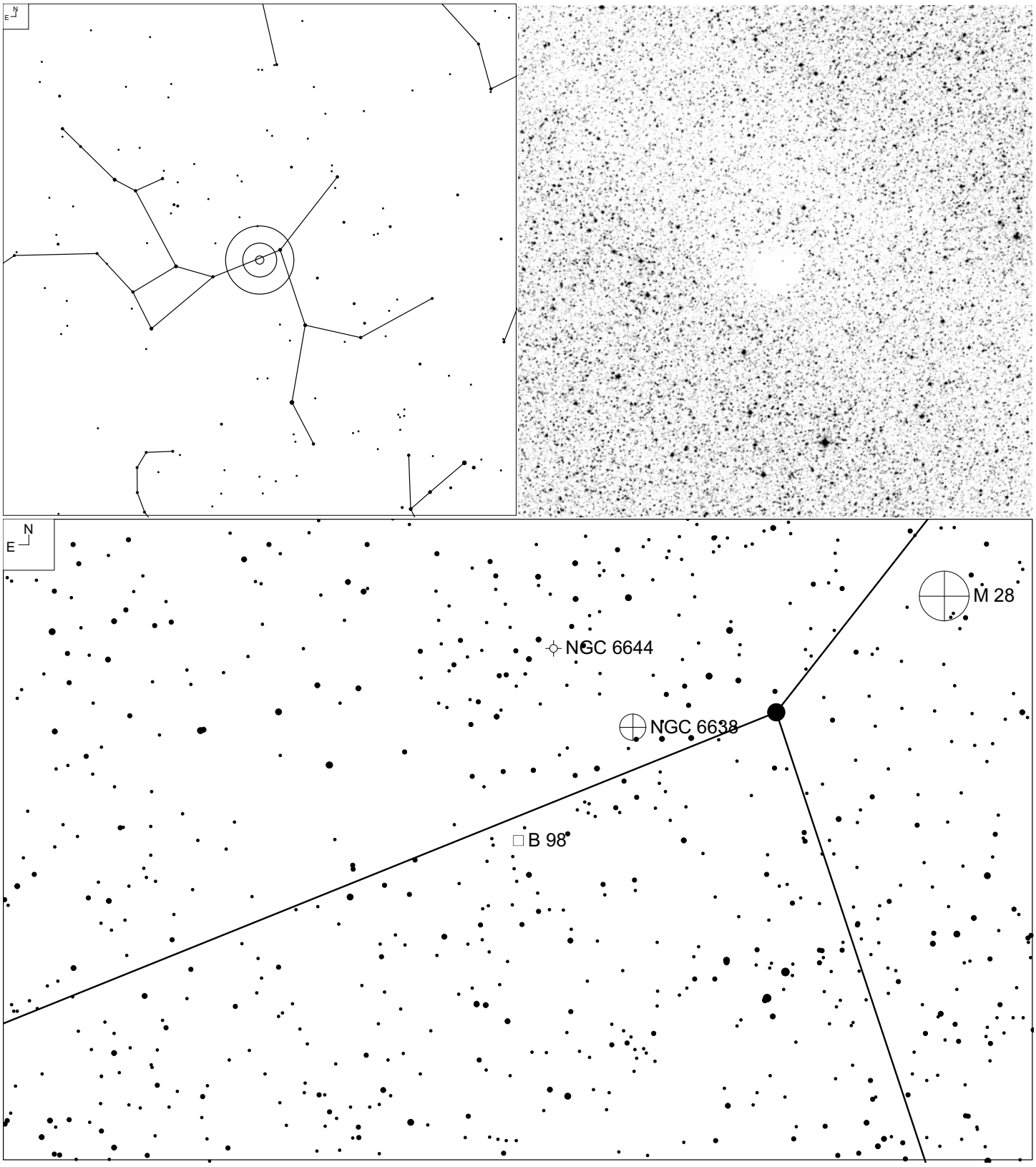
Other ID	RA	Dec	Size	Urano 2	iDSA
LDN 323	18 15 27.9	-18 13 19	15.0 x 9.0’		
LDN 327	18 16 53.7	-18 03 58	8.0 x 3.0’	145	66
Cometary Globule					

NGC 6590, IC 4700 (Sagittarius)



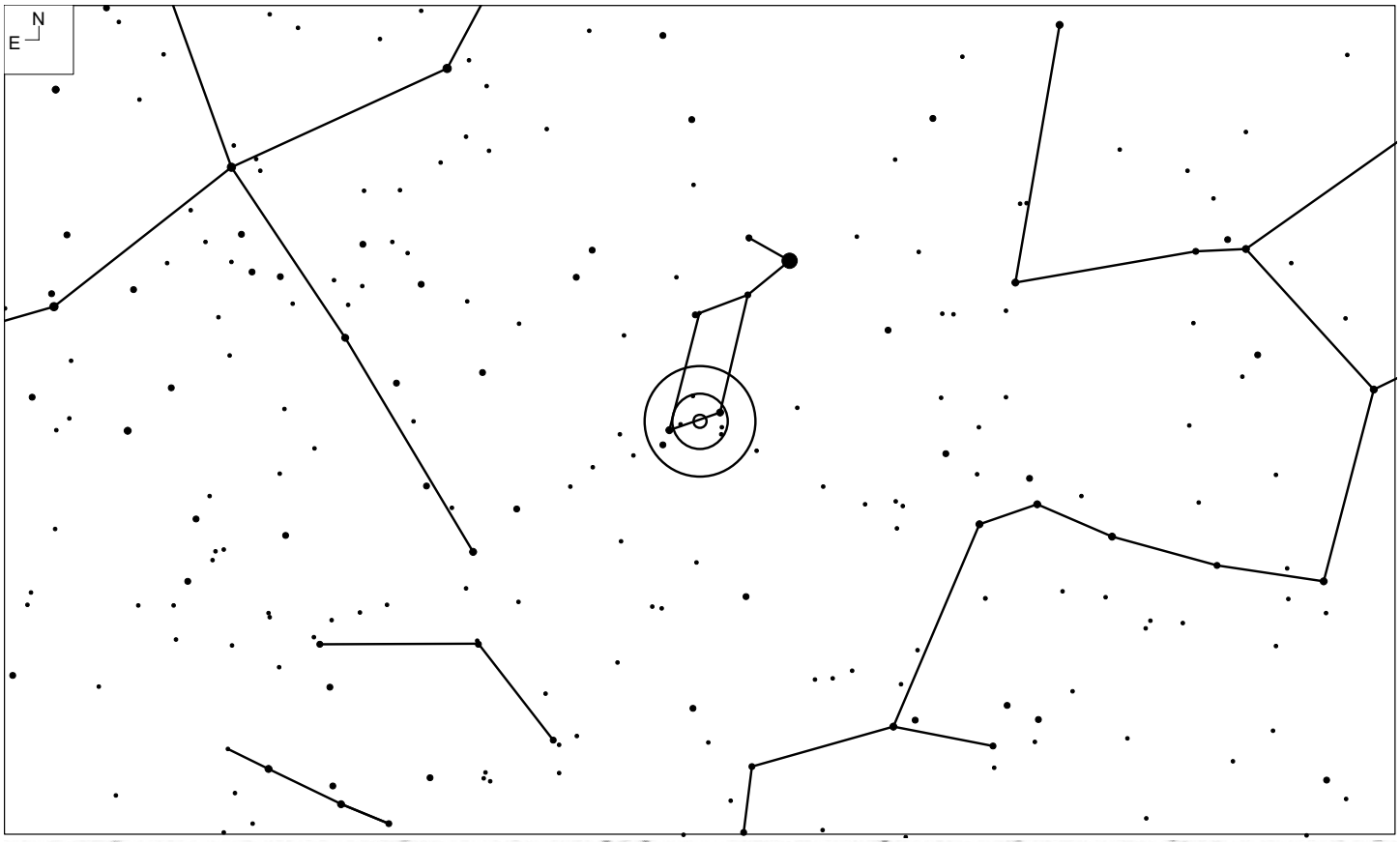
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
18 17 02.0	-19 51 47	Neb		5.6 x 3.3’	R	145	9

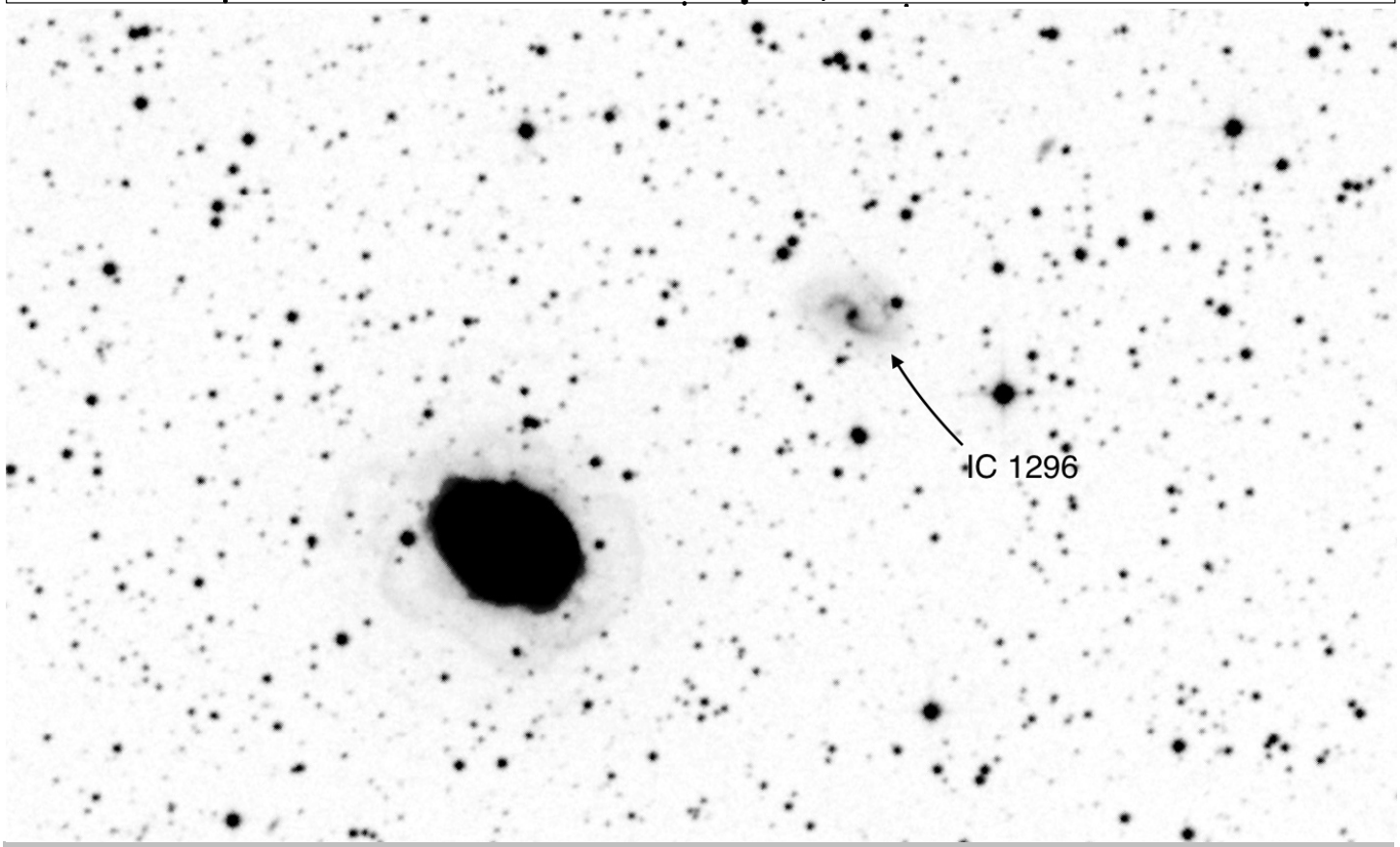
Barnard 98 (Sagittarius)



RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
18 33 18. 5	–26 01 36	DN	-	3.0’		145	78

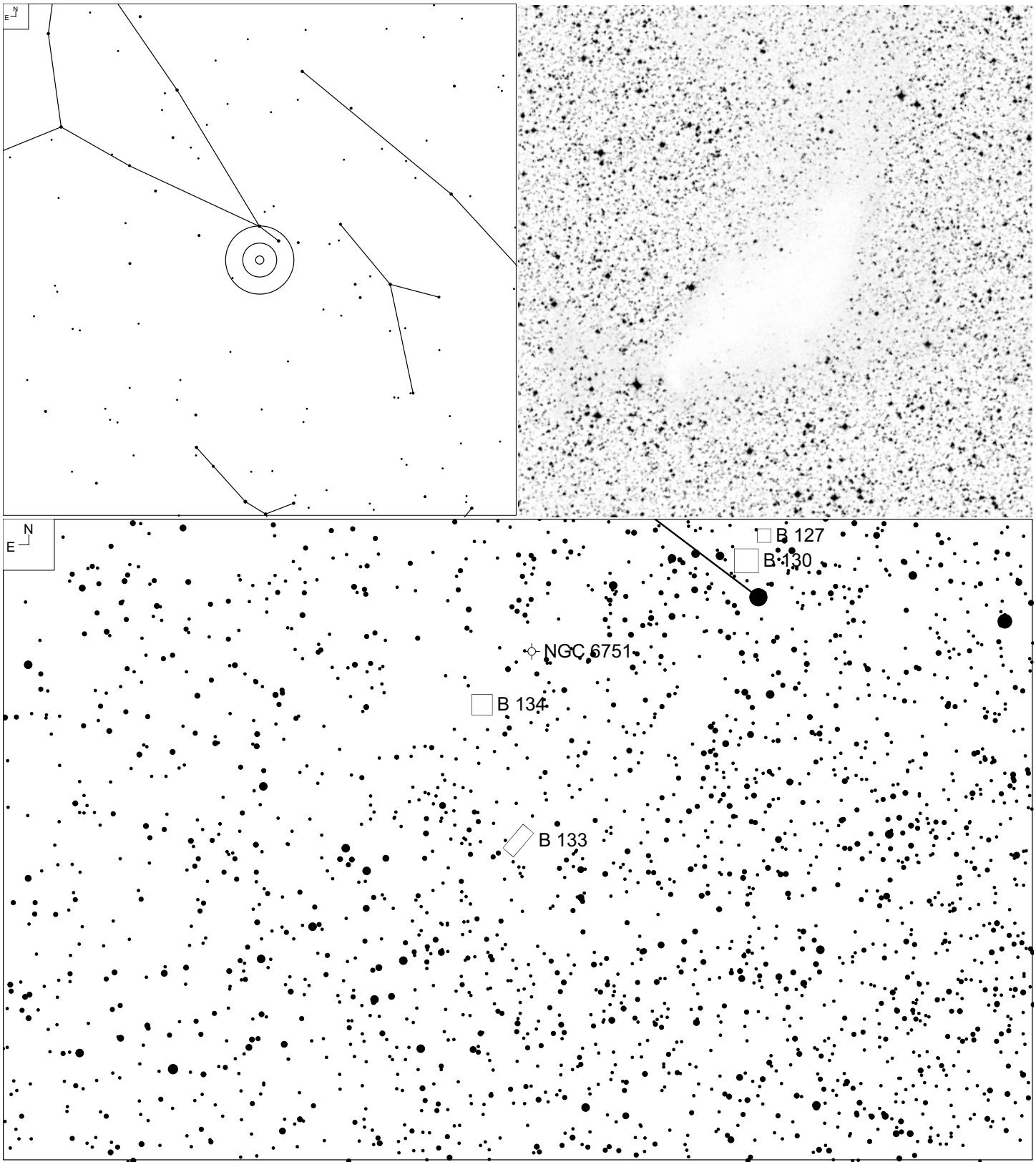
IC 1296





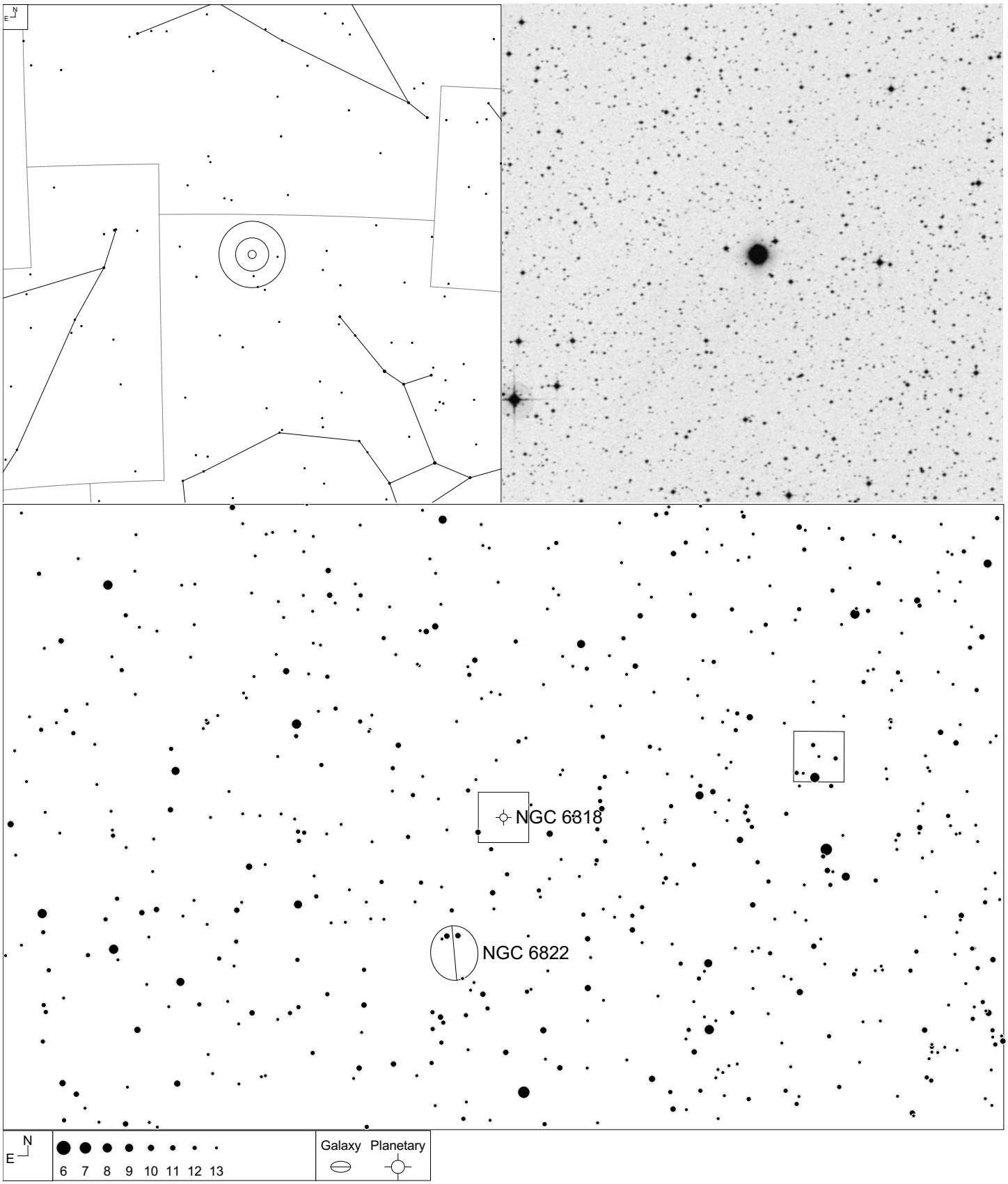
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
18 53 18.8	+33 03 57	Galaxy	14.8p	0.9 x 0.5’		49	30

Barnard 133 (Aquila)



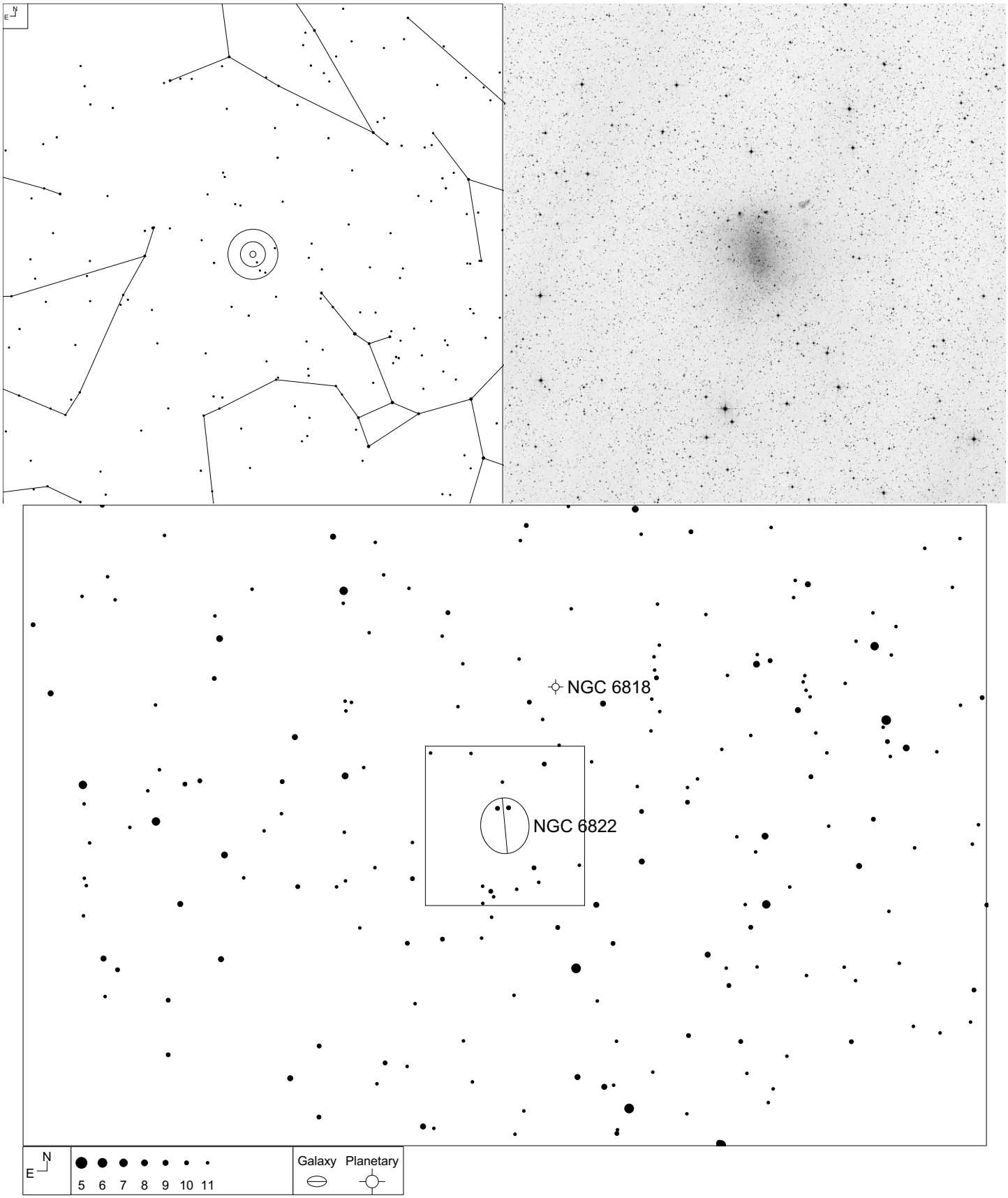
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
19 06 11.1	–06 52 30	DN		9 x 4’		125	54

NGC 6818 (Sagittarius)



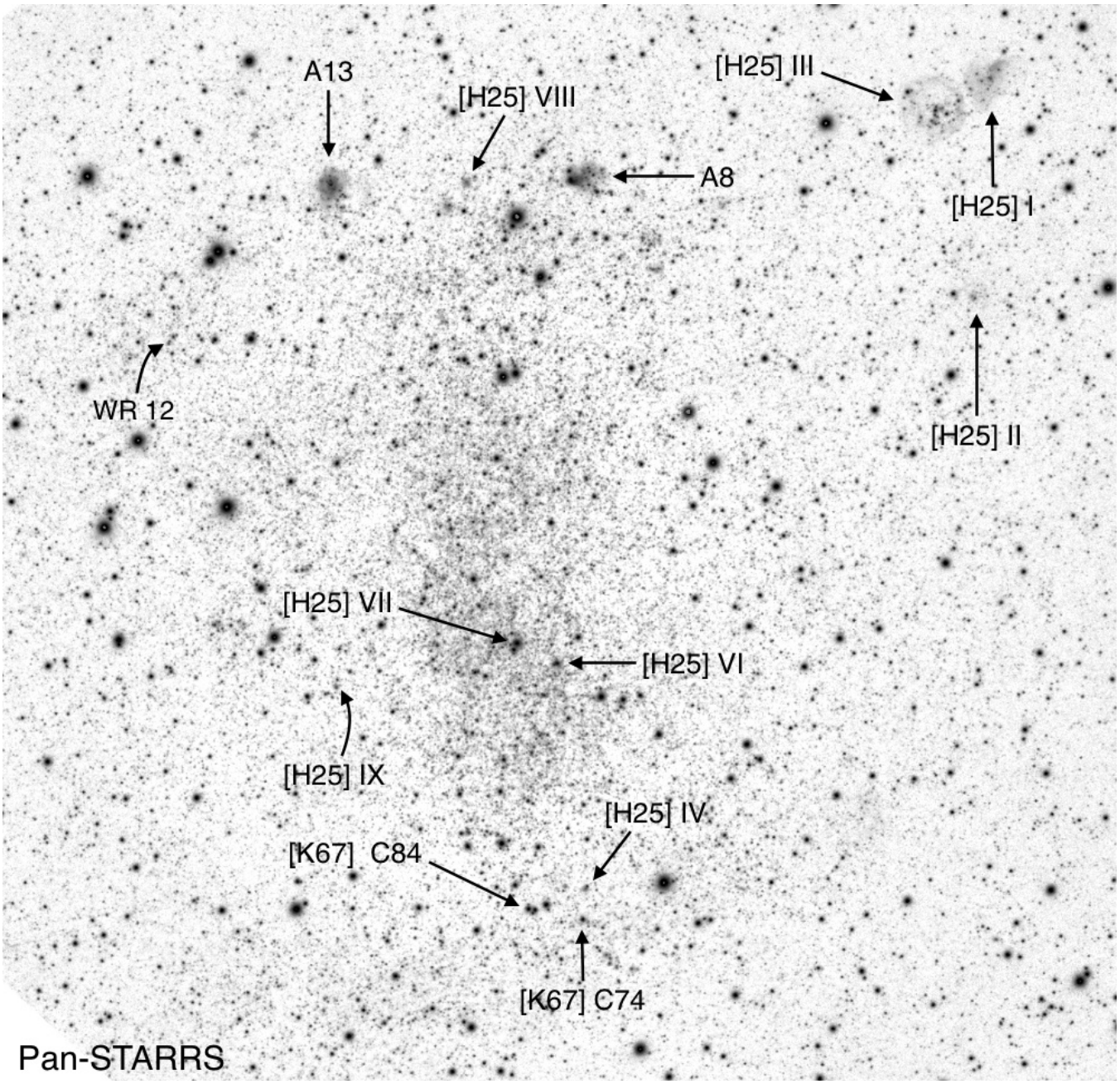
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
19 43 57.8	-14 09 10	PN	8.8v	48”	4	125	66

NGC 6822 (Sagittarius)



RA	Dec	Type	Mag	Size	Distance	Urano 2	iDSA
19 44 56	-14 48 11	IB(s)m	8.1v	15.6 x 13.5’	1.8 mly	125	66

NGC 6822's Extragalactic Objects



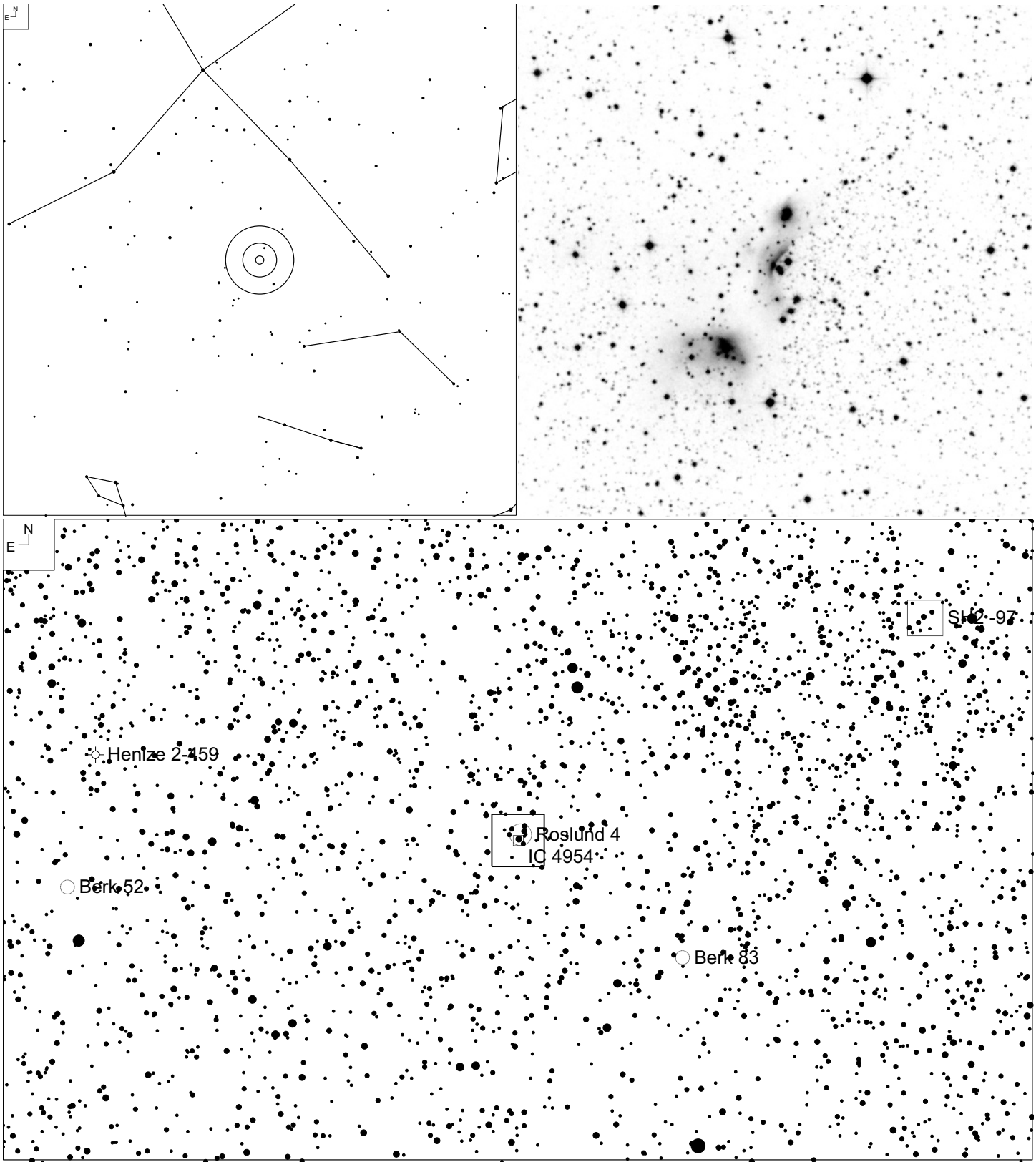
Object	Type	RA	Dec	Mag	Object	Type	RA	Dec	Mag
[H25] I[1]	H II	19 44 31.4	-14 41 56	15.0b	[K67] C84	Star	19 44 55.1	-14 52 13	16.0v
[H25] II	H II	19 44 32.0	-14 44 38	-	[H25] VII	GC	19 44 55.8	-14 48 56	15.9v
[H25] III	H II	19 44 34.3	-14 42 19	14.2	[H25] VIII	GC	19 44 58.3	-14 43 14	17.9v
[H25] IV	H II	19 44 52.2	-14 51 58	-	[H25] IX	GC	19 45 05.0	-14 49 29	18.6
[K67] C74[2]	Star	19 44 52.3	-14 52 21	16.5v	A13 = [H25] X	OB	19 45 05.2	-14 43 15	-
A8 = [H25] V	OB	19 44 52.4	-14 43 10	-	WR 12[3]	WR	19 45 13.5	-14 45 13	19.0v
[H25] VI	GC	19 44 53.6	-14 49 11	16.3v					

[1] For [H25] designation, see Edwin P. Hubble, "NGC 6822, A Remote Stellar System," Astrophysical Journal Vol 62 (1925): 409-433

[2] For [K67] designation of NGC 6822's stars, see S.E. Kayser, "Photometry of the Nearby Irregular Galaxy NGC 6822," *Astronomical Journal* Vol 72 (1967): 134-148

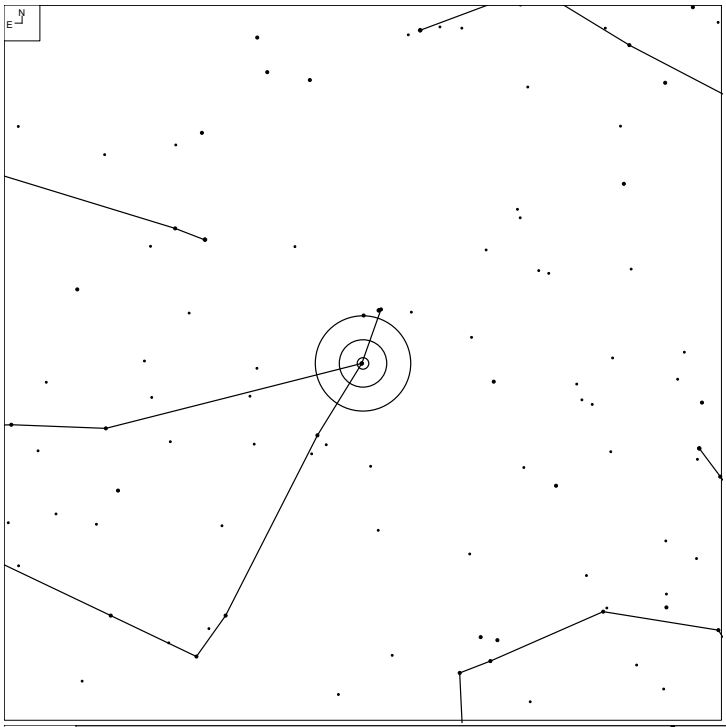
[3] WR 12 is the brightest Wolf-Rayet star of NGC 6822. The full name is [AM85] NGC 6822 12. See T.E. Armandroff and P. Massey, "Wolf-Rayet Stars in NG 6822 and IC 1613," *Astrophysical Journal* Vol 291 (1985): 685-692

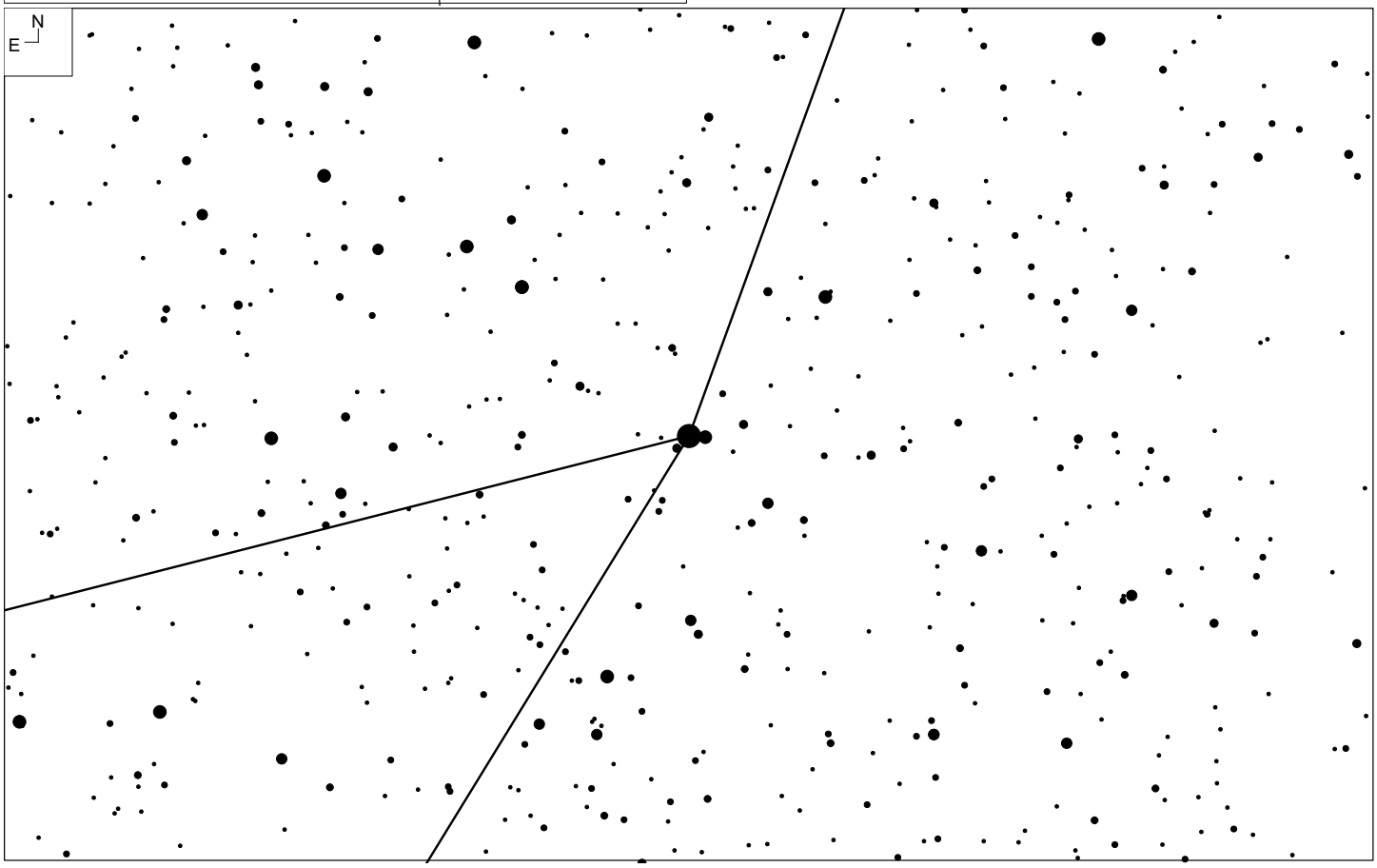
IC 4954 (Vulpecula)



RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
20 04 54.0	+29 11 00	Neb	-	3.0”		66	29

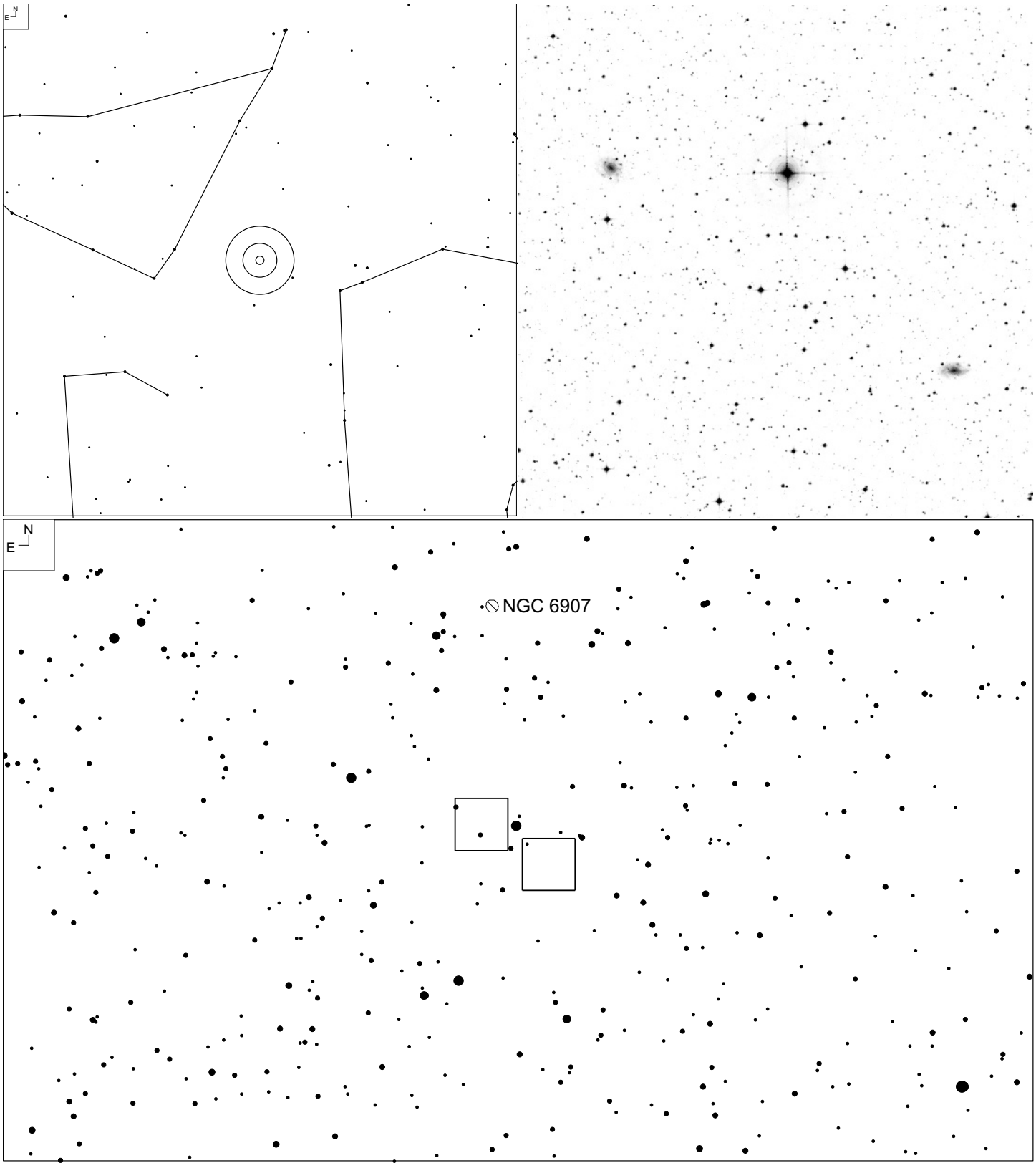
Beta Capricorni (Capricornus)





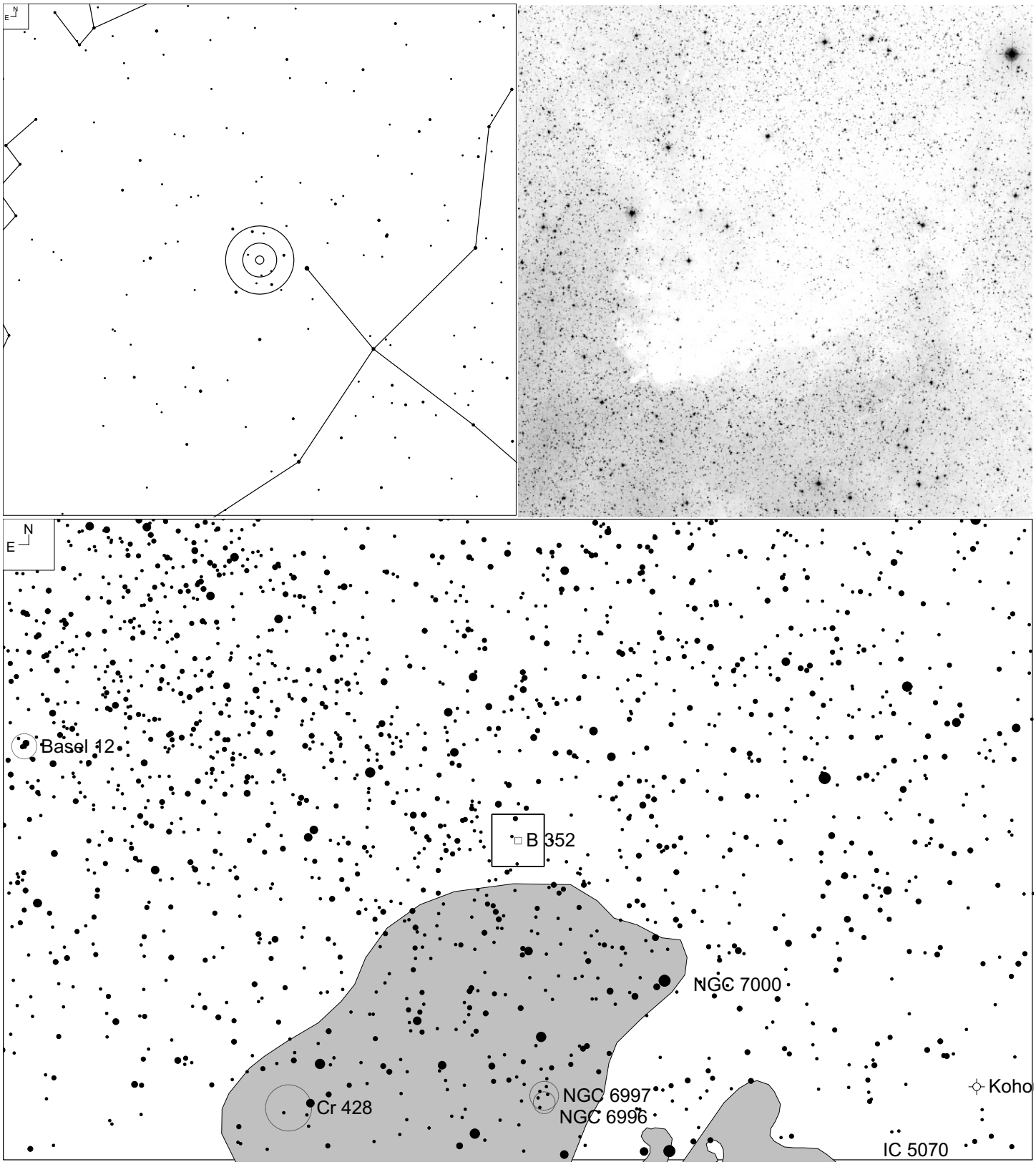
RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
20 20 46.5	-14 47 06	Dbl star	6.10	Stellar	Triple	124	65

IC 4999 and 5005 (Capricornus)



RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
20 23 56.2	–26 00 51	Gal	13.5	1.8 x 1.0’	SB(rs)c?	144	77
20 25 20.1	–25 49 42	Gal	13.6p	2.5 x 1.8’	SB(s)cd		

Barnard 352 (Cygnus)



RA	Dec	Type	Mag	Size	Class	Urano 2	iDSA
20 57 11.5	+45 50 30	DN	-	-	-	32	17