

Camelopardalis

√	NGC	RASC	SAC	CALD	HER-400	O-HT	O-SD	Season	Con	Type	R.A. H:m:s	DEC °,'	m_v	Size "	Comment
	I-3568					T064		Sp	Cam	PN	12:33.1	82.34	10.6	0.3	Lemon Slice PN
	2655	R038	S011		H119 (1,288)	T048		W	Cam	G-SAB	08:55.6	78.13	10.1	5.1x4.4	Mixed lenticular/spiral, 4'x2' mottled glow, central brightening
	I-0342			C005				W	Cam	G-SAB	03:46.8	68.06	7.9	16x15	"Hidden Galaxy"; SB:15.0; Dist 13 MLY
	2403	R037	S010	C007	H099 (5,44)			W	Cam	G-Sc	07:36.9	65.36	8.4	17.8x11	Fireworks Galaxy ; Very large & bright; visible in binocs
	K-1					T021		W	Cam	Ast	04:00.0	63.00	5	150	Kemble's Cascade
	1502				H050 (7,47)	T023		W	Cam	OC	04:07.8	62.20	6	20	Jolly Roger OC , At end of Kemble's Cascade
	1501	R020	S009		H049 (4,53)	T022		F	Cam	PN	04:07.0	60.55	12	0.9	Oyster PN aka Camel's Eye; Faint, dark center; look for NGC 1502;



Being at a relatively **high declination** (~80° N) and thus close to the north celestial pole (NCP), the planetary nebula IC 3568 and the lenticular galaxy NGC 2566 are both a bit of a challenge to locate, if you (like me) have your telescope on a **GEM mount**.

Of course, you can use the setting circles on the GEM to dial in their location, but personally I prefer to use **star hopping** instead of RA/DEC setting (with the exception of locating the planets in daylight).

For IC-3568 you can star hop from *Epsilon UMi*, and just sweep West, but for NGC-2655, I found it difficult to find a good starting point for the star hop; I ended up starting from **the Diamond Ring asterism** at Polaris, where I could use the stars in the ring to set off the sweep in the general direction of the object, and then, using a good star map (like the *Oculum Interstellarum Deep Sky Atlas*), to navigate step-by-step until I reached the object.

In a Bortle 5 Suburban environment, this method has worked for me, but from a darker site, finding a start point for your star hop closer to the objects might be preferable.

56N 12E, Copenhagen DENMARK
2023-04-21, 00:30 Local CEST (UT+2)
Temp.: 7°C, Hum.: 62%, DewPt.: 0°C
New Moon (0.7% at -19° Alt)
Trsp.: great 6/7, Seeing: OK 6-7/10
LP:SQM 20.7 (NELM 6.4) Suburban/Rural

NCP
90°

POLARIS
'Diamond Ring'

To IC
3568

~12^h 30^m

Polaris

To NGC
2655

~9^h 00^m

Using the Polaris *'Diamond Ring'* asterism to set the general direction in R.A., before sweeping south in DEC until hitting the northern targets of IC 3568 PN and NGC 2655 mixed lenticular galaxy.

A method useable in a light polluted environment, such as my currently B5 suburban (~NELM 6) backyard.

~21^h 30^m

~0^h 30^m

Mag. ~16x
FOV ~2°

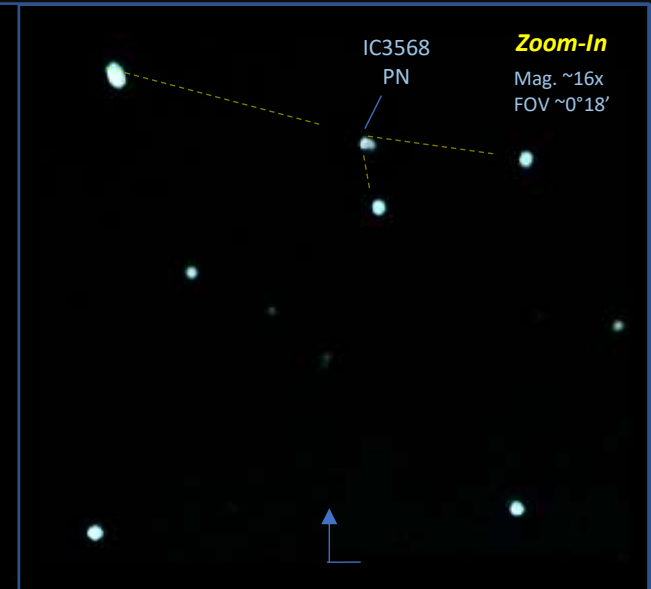
Zeiss 100/640 APQ
TV 41mm PAN + CLS filter
Photonis 4G Intens PVS14 NVD
iPhone Xs, NightCap app,
Exp.: 1s, Ave. 30s, ISO-640, Gain Med.

56N 12E, Copenhagen DENMARK
 2023-04-21, 01:30 Local CEST (UT+2)
 Temp.: 7°C, Hum.: 62%, DewPt.: 0°C
 New Moon (0.7% at -19° Alt)
 Trsp.: great 6/7, Seeing: OK 6-7/10
 LP:SQM 20.7 (NELM 6.4) Suburban/Rural



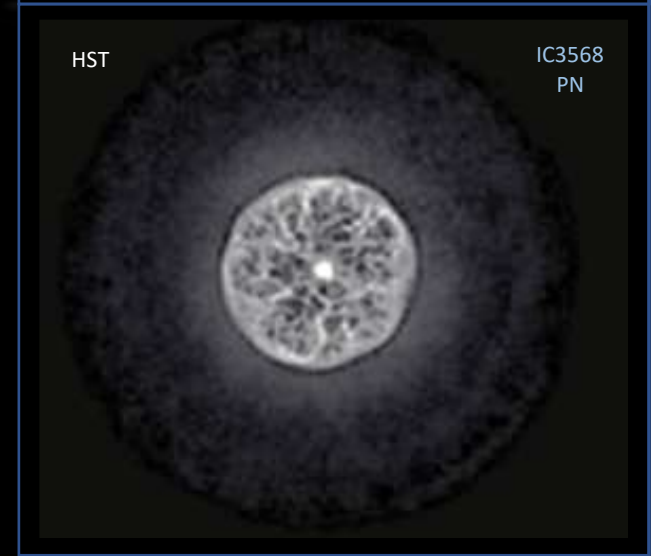
IC 3568
Lemon Slice PN

Mag. ~16x
 FOV ~2°



Zoom-In

Mag. ~16x
 FOV ~0°18'



HST

IC3568
 PN

HD 105943
 K5 III + F5
 Double Star

Zeiss 100/640 APQ
 TV 41mm PAN + 610nm Red Longpass
 Photonis 4G Intens PVS14 NVD
 iPhone Xs, NightCap app,
 Exp.: 1s, Ave. 30s, ISO-40, Gain High

IC 3568 is a young (~78 Kyr) PN with a central 12.3^m type-O star, which is currently heating up while shrinking from a red giant towards the white dwarf stage. The PN star is surrounded by a perfect inner sphere/shell of bright ionized Helium, which at very high magnifications (HST) show a radial spongy structure resembling the face of a sliced lemon, inside a faint smooth outer halo. The PN is located at 1.3 Kpc distance, out towards the *Perseus* spiral arm.

IC 3568 was discovered by *Rob Aitken* in 1900, using the *Lick Observatory* 12" Clark refractor. Photographically it was described as a "perfectly round disk, fading out a little at the edges". At low magnification (16x) using my 4" refractor, IC 3568 is seen as just a faint star, which - when zooming in - reveals itself as a close ~10^m double star, where the PN is the NE 'component' (BD +83°357').

It takes high magnification (~200x) to catch a hint of the inner ionized shell surrounding the central star, and very high mag. (~500x) to glimpse the diffuse outer halo.

NGC 2655

G-Sa

Mag. ~16x
FOV ~1½°



E

W

S

N2655 is a mixed lenticular (type Sa) member of the UMa Cloud of galaxies, located at ~18 Mpc distance from our Milky Way (another member of this group is the close by, intermediate spiral N2715, of type AB). On the night sky, N2655 is found between the ~7^m red giant star HD74225 and the faint glow of the NGC 2715 galaxy towards the east

At low magnification in my 4" refractor, N2655 shows up as a soft fuzzy E-W elongated glow; At higher magnifications, the central star (a Seyfert core) is seen inside a bright elliptical lens-shaped / lenticular nucleus, which is surrounded by a very faint halo formed by the outer part of the spiral arms.

Ultra-high mag. photos (HST) reveal a peculiar galaxy (Arp 225) with a probable black hole inside a hot, fast-moving disk of gas at the centre, which is ejecting a strong jet towards the SE; The outer disk shows ripples of faint diffuse spiral arms, dappled by broken loops of dark dust lanes.



KG Observatory, CA
Planewave CDK24

Zoom-In

Mag. ~16x
FOV ~0°18'



— N2715

— N2655

HD74225
M5 III

HD74110
M4 III

N2655

56N 12E, Copenhagen DENMARK
2023-04-21, 02:00 Local CEST (UT+2)
Temp.: 7°C, Hum.: 62%, DewPt.: 0°C
New Moon (0.7% at -19° Alt)
Trsp.: great 6/7, Seeing: OK 6-7/10
LP:SQM 20.7 (NELM 6.4) Suburban/Rural

Zeiss 100/640 APQ
TV 41mm PAN + 610nm Red Longpass
Photonis 4G Intens PVS14 NVD
iPhone Xs, NightCap app,
Exp.: 1s, Ave. 75s, ISO-160, Gain High

IC 342 G-S
'Hidden Galaxy'

Mag. ~16x
FOV ~2°



B9 IV

IC342
nucleus

S

F1 IV

W

IC 342 is a spiral galaxy of intermediate type (SAB); It is a member of the *Maffei-1 Group* of galaxies located close to the *Local Group* with our own Milky Way (at only ~3 Mpc distance).

IC 342 is a **big, face-on starburst galaxy**, but it is rather dimmed (~3^m) by dust in the plane of the *Milky Way*. At the centre of the galaxy is a young (~5 Myr) supercluster of massive, hot OB-stars inside a rotating stellar bar, which triggers other star forming regions in a ring around the galactic bulge.

In my 4" refractor, IC342 is easily detected at low power as a slightly **fuzzy 12^m star** in a rich field of similarly bright stars.

Zooming in on IC342, I can discern **the bright core at the centre** of the galactic bar, and also (with some effort) **catch glimpses of spiral structure** in the outer galactic disc.



Wikipedia

Zoom-In

Mag. ~16x
FOV ~0°18'



IC342

56N 12E, Copenhagen DENMARK
2023-04-20, 02:00 Local CEST (UT+1)
Temp.: 4°C, Hum.: 60%, DewPt.: -3°C
New Moon (0.1% at -25° Alt)
Trsp.: great 6/7, Seeing: good 8/10, Calm
LP:SQM 20.4 (NELM 6.3) Suburban

Zeiss 100/640 APQ
TV 41mm PAN + 610nm Red Longpass
Photonis 4G Intens PVS14 NVD
iPhone Xs, NightCap app,
Exp.: 1s, Ave. 75s, ISO-160, Gain Med.

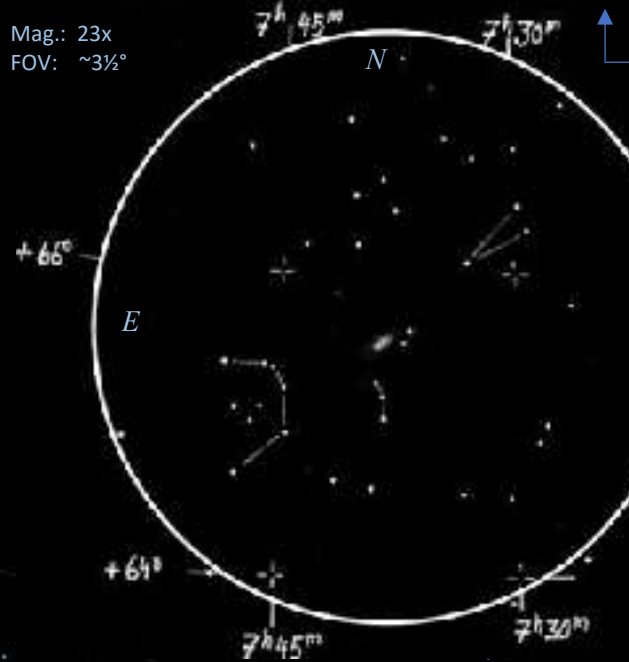
Zeiss 100/640 APQ
TV 41mm PAN + 610nm Red Longpass
Photonis 4G Intens PVS14 NVD
iPhone Xs, NightCap app,
Exp.: 1s, Ave. 30s, ISO-65, Gain High


N4414 **NGC 2403 G-Sc**
Zoom-In **"Fireworks Galaxy"**

It's an early evening in mid-March (2018-03-18, 20:30 Local, UT+1). The chill wind from last night has abated, so it almost feels like spring, even though the temperature is down at -5°C. The NELM is quite good at 5.8^m, the seeing is a steady 7/10 and the transparency is fine at 5/7 with no haze or clouds or moon, -- so all is go **for the Fireworks** tonight.

I locate this galaxy by panning from the "star gate" of Pi1-Pi2-UMa2 directly West 6° in R.A. The "Fireworks galaxy" is glimpsed in my 10x56mm Bino as a faint hazy spot, and in my 60mm finder (6.3x), I can detect a SE-NW elongation plus what looks like a stellar core. In my Vixen FL-55S/440mm scope (23x @ 3.6° FOV, Mas 32mm) the galaxy shows up as a faint halo with a brighter nucleus, on which is superimposed a pair of foreground stars.

56N 12E, Copenhagen DENMARK
 2023-04-20, 01:30 Local CEST (UT+2)
 Temp.: 4°C, Hum.: 60%, DewPt.: -3°C
 New Moon (0.1% at -25° Alt)
 Trsp.: great 6/7, Seeing: good 8/10, Calm
 LP:SQM 20.4 (NELM 6.3) Suburban



Subject: <i>M81 G5 NGC 2403 "Fireworks" Gxg</i>	
<i>SE/NW Elong., faint halo - Nucleus with 2 foreground *</i>	
Date: <i>2018-03-18</i>	Time: <i>20:30 Loc (UT+1)</i>
Observing Location: <i>56N 12E, Allerød, DENMARK</i>	
Instrument: <i>VIXEN FL-55S/440mm Aperture: 55mm F18</i>	
EP/Mag: <i>Mas 32mm/23x</i> FOV: <i>3.6°</i> Focal Length: <i>+1.7x GPC =</i>	
Conditions: <i>SQM 19.4/NELM 5.8m, No Moon, 748mm FL</i>	
	Seeing: <i>7/10, Calm</i> Transparency: <i>5/7</i>
	Notes: <i>Calm, -5°C</i>



Mag. ~16x
 FOV ~2½°

The smartphone snapshots here were taken during an observation on April 20., 2023, using my 4" refractor with a 41mm Panoptic plus an NVD;

More details on next slide.

Zeiss 100/640 APQ
 TV 41mm PAN + **Red longpass** filter
 Photonis 4G Intens PVS14 NVD
 iPhone Xs, NightCap app,
 Exp.: 1s, Ave. 30s, ISO-500, Gain High



Zoom-In
 Mag. ~16x
 FOV ~1°15'

Zeiss 100/640 APQ
 TV 41mm PAN + **Red longpass** filter
 Photonis 4G Intens PVS14 NVD
 iPhone Xs, NightCap app,
 Exp.: 1s, Ave. 30s, ISO-500, Gain High

56N 12E, Copenhagen DENMARK
2023-04-20, 01:30 Local CEST (UT+2)
Temp.: 4°C, Hum.: 60%, DewPt.: -3°C
New Moon (0.1% at -25° Alt)
Trsp.: great 6/7, Seeing: good 8/10, Calm
LP:SQM 20.4 (NELM 6.3) Suburban



NGC 2403 G-Sc "Fireworks Galaxy"

CLOSE UP

N2403 is a spiral galaxy of mixed type SAB, belonging to the M81 Galaxy Group, which is very close by at 3.6 Mpc in the direction of *Ursa Major*. The star hop to this galaxy is relatively easy, from the 'nose' of the *Great Bear* (Omi Uma), a bit up north to π Uma, and then straight W a good 6° to 51 Cam.

From our vantage point in the *Milky Way*, N2403 is seen inclined $\sim 30^\circ$ from edge on, and thereby elongated in the SE-NW direction. There is a pair of $\sim 11^m$ foreground stars bracketing the elliptical galaxy bulge, and a fainter ($\sim 13^m$) star just below the galaxy core.

At low magnification in my 4" refractor, the central part of N2403 is seen as an obvious **bright fuzzy ellipse (the nucleus plus the tightly wound inner part of the two spiral arms)**, while faint widening outer part of the arms is hard to detect.

Zooming in on the central region of N2403 reveals a grainy / clumpy structure in the inner part of the galaxy, which is caused by many giant **massive OB-associations with HII-emission lining the spiral arms**; Several of these have received their own catalogue designations, such as NGC2404 and SP224.

E

W

51 Uma
K2 III
Red Giant

M4 III
Red Giant
*LP Var

K0

K0

K0

S

Mag. $\sim 16x$
FOV $\sim 2\frac{1}{2}^\circ$

Zoom-In

Mag. $\sim 16x$
FOV $\sim 1''$



HII
NGC 2404

HII
SP 224

Zeiss 100/640 APQ
TV 41mm PAN + Red longpass filter
Photonis 4G Intens PVS14 NVD
iPhone Xs, NightCap app,
Exp.: 1s, Ave. 30s, ISO-500, Gain High

Observation Record

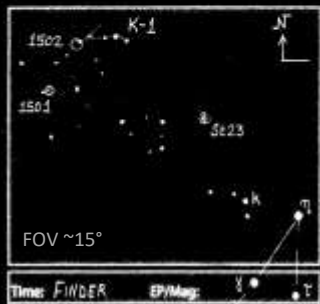
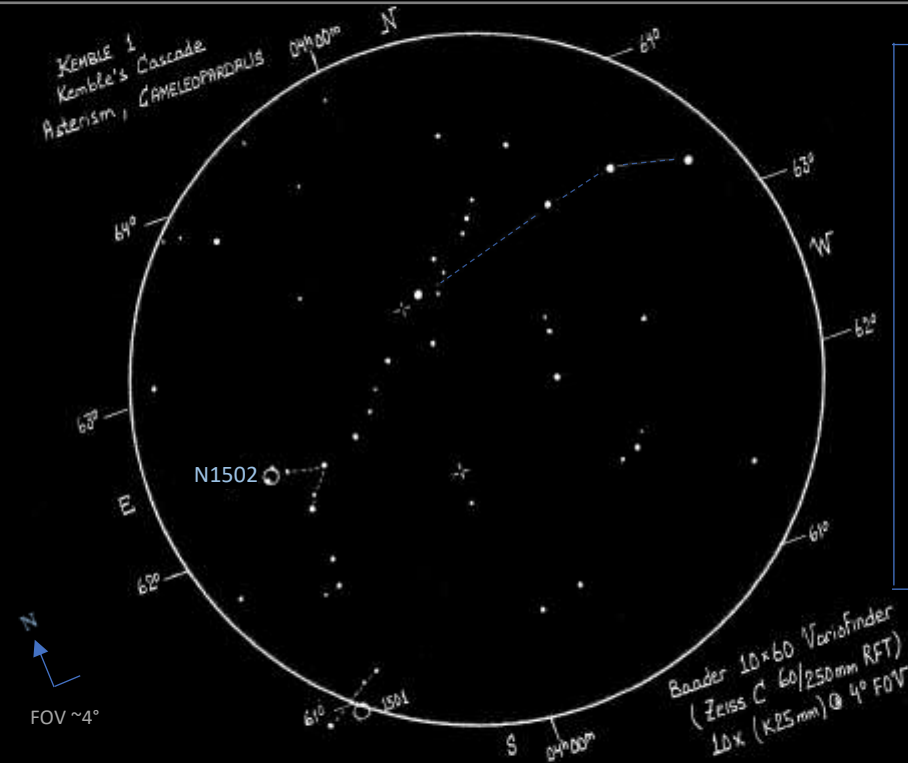
KEMBLE 1 Asterism

K-1; OHT-21
Index: KEMBLE'S CASCADE

Features: KEMBLE-1; "Cascade" AST. Date: 2016-12-27 Time: 19:30 UT Location: 56°N 12°E, DENMARK
 Conditions: Trsp. 4-5/7; High Humidity Seeing: 8/10, Calm Instrument: (Vixen FL-803/640mm Refractor)
 Aperture: 80mm f/8 Focal Length: 1,568mm @ 960mm f/12 EP/Filter/Mag: Baader Variofinder; 10x60mm
 Notes: Baader "VARIO", Zeiss C60/250mm f/4 RFT, K-25mm 10x in 4° FOV
 38M 18.0, NEM 5.0, Temp. 4°C/39°F, Humidity 83%.

It's an early evening (18:30 Loc) in late December 2016; It's calm and relatively mild for the season (temperature hovering around 4°C/39°F), resulting in a high humidity, which is lowering the transparency somewhat; The seeing however is stable above medium, so all-in-all an acceptable evening for a DSO hunt.

My target for tonight is **Kemble-1**, including the two NGCs at the end of The Cascade: **NGC 1502** (the "Jolly Roger" OC) and **NGC 1501** (the "Oyster" PN).



My star hop to **Kemble's Cascade** takes off from **Eta PER** (the crown chakra of Perseus), up NE ca. 5° to **Stock 23** (*Pazmino's OC*), and further up another 5° to a line of three ~5^m stars, just to the W of Kemble-1. Using my Baader/Ziess C60/250mm f/4 finder (10x @ 4° FOV), I just pan the field from Eta PER 2x up NE, and now have *The Cascade* centered in the view.

In fact, the finder acts as a small RFT, that nicely frames **Kemble-1**, so I decide to sketch the object as is, at 4° FOV and 10x magnification. Already in the finder, there's a 2½° long line of 8-9^m stars, "splashing down" from the NW to the SE, then forking like an inverted "Y" into a short branch bending NE, and another, longer creek running SE.

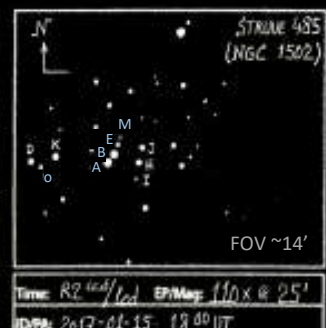
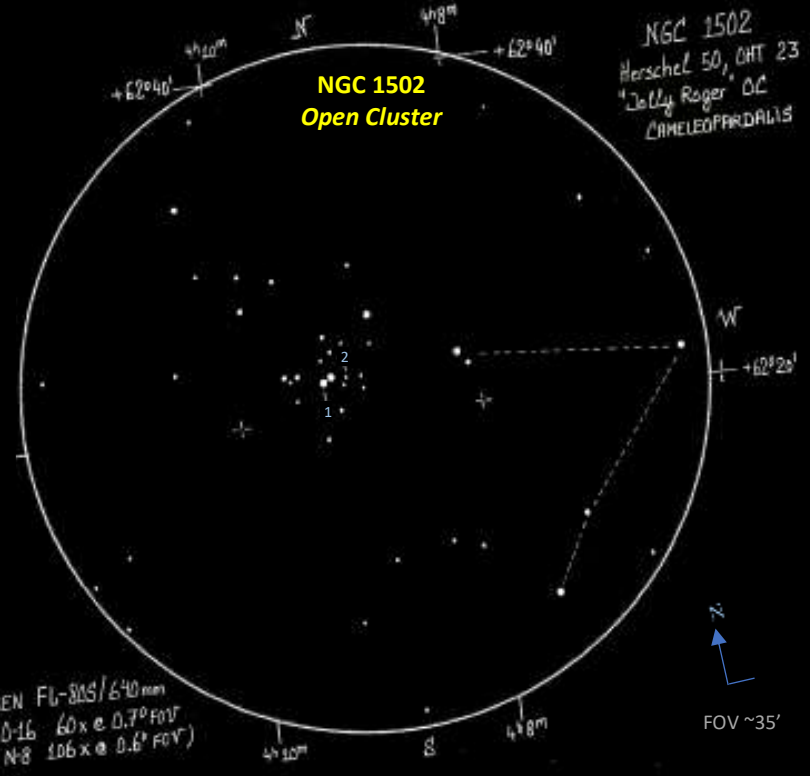
At the end of the NE branch, just 20' downstream, is a pool of starlight: the **NGC 1502 OC**. Following the SE creek 1½° south takes me to a ~7^m star, and to the W of this: the position of the **planetary nebula NGC 1501**. To frame the open cluster NGC 1502, I use my CZI O-16mm yielding 60x @ 0.7° FOV, and for a more detailed view, I swap in an ATC N-8mm, giving me 106x @ 0.6° FOV.

The cluster is dominated by the brilliant visual **double STF 485-AB (ADS 2984 AB)**. Both stars are ~7^m hot white type-B0 suns separated by 18" in PA 305°. **STF 485-AB** are both spectroscopic binaries, and the northern component (B: *SZ Cam*) is an eclipsing Algol variable by 0.3^m in 2.7 days, which is furthermore bound to a fainter close binary. Less than 1' to the W of STF 485-AB is another **multiple system STF 484-HIJ (ADS 2982)**, consisting of a pair of ~10^m stars with a fainter 10.5^m companion to the south.

At **106x magnification with my ATC N-8mm**, I can easily see the main components of STF 485 (A-B) and 484 (J-H). The CCDM however (the *Catalogue of Components of Double and Multiple Stars*) lists all-in-all 16 members for the STF 485-484 complex, with magnitudes down to 14^m, so to see deeper, I must switch to the R2 ccd/lcd live view.

At **110x with live video**, I can now discern 4 components of the central STF-485 system (A-B-E-M), 3 components of the STF 484 subgroup (J-H-I) plus three components in a triangular group ~2' to the east of the A-B pair (D-K-O, -- which btw. were also seen visually at 106x).

Around the tight core of the 16-member multiple star system NGC 1502 shows a looser pattern of a dozen stars in a roughly X-shaped figure, -- what *O'Meara* has likened to a *Jolly Roger skull-and-cross-bones*, with **STF 485-AB** seen as the empty eye sockets.



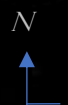
56N 12E, Copenhagen DENMARK
2023-03-05, 20:00 Local CEST (UT+1)
Temp.: -2°C, Hum.: 68%, DewPt.: -7°C
Moon 97% Illum. at 42° Alt. in Leo
Trsp.: 5/7, Seeing: 7/10, Calm
LP:SQM 19.3 (NELM 5.7) Suburban

**KEMBLE 1 Asterism
with NGC 1502 OC**

N1502 is a tight (~20' diameter) and young (~5 Myr) open cluster with ~60 members, one of which is type late-O while many are of type early-B. The OB-cluster is located close by, at a distance of ~1Kpc at the outskirts of the Cam OB1 association, up our Local Ori-Cyg spiral arm.

At the center of N1502 is seen a "Trapezium" formed by the **two Struve double stars: 485 + 484.**

E



Kemble's Cascade

W

N1502

Zeiss 100/640 APQ
TV 41mm PAN + Red longpass filter
Photonis 4G Intens PVS14 NVD
iPhone Xs, NightCap app,
Exp.: 1s, Ave. 30s, ISO-40, Gain High

Mag. ~16x
FOV ~2°

Close-Up
FOV ~ 1/2°

1 2

1: Sigma 485
ADS 2984AB
A: B0 II
B: O9IV + B0V
SZ Cam eclipsing binary

2: Struve 484
J: B8V

56N 12E, Copenhagen DENMARK
2023-03-05, 20:30 Local CEST (UT+1)
Temp.: -2°C, Hum.: 68%, DewPt.: -7°C
Moon 97% Illum. at 42° Alt. in Leo
Trsp.: 5/7, Seeing: 7/10, Calm
LP:SQM 19.3 (NELM 5.7) Suburban

NGC 1501 PN

N1502

Kemble 1



N1501

E

W

Zeiss 100/640 APQ
TV 41mm PAN + Red longpass filter
Photonis 4G Intens PVS14 NVD
iPhone Xs, NightCap app,
Exp.: 1s, Ave. 30s, ISO-40, Gain High

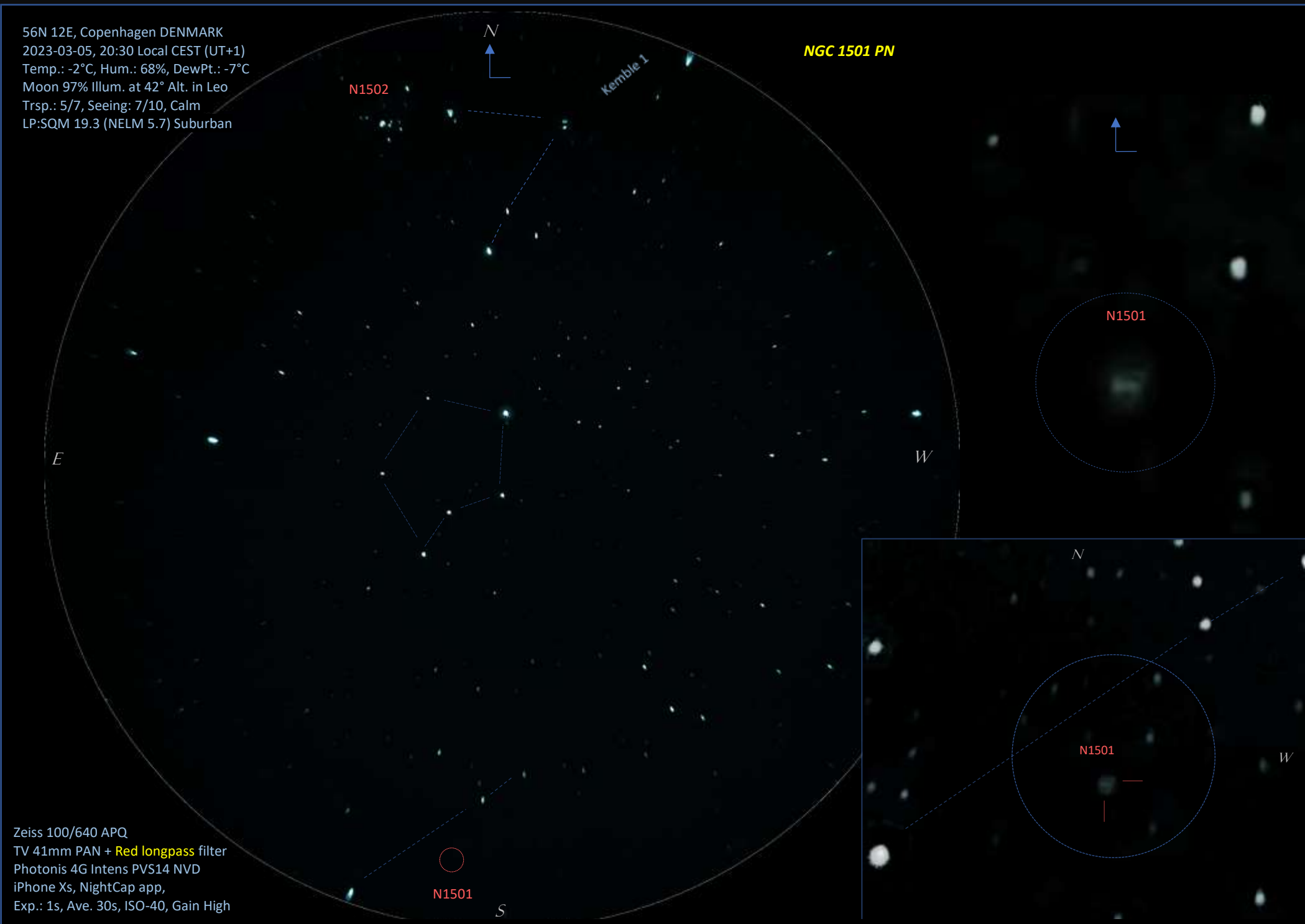
N1501

S

N

N1501

W



Observation Record

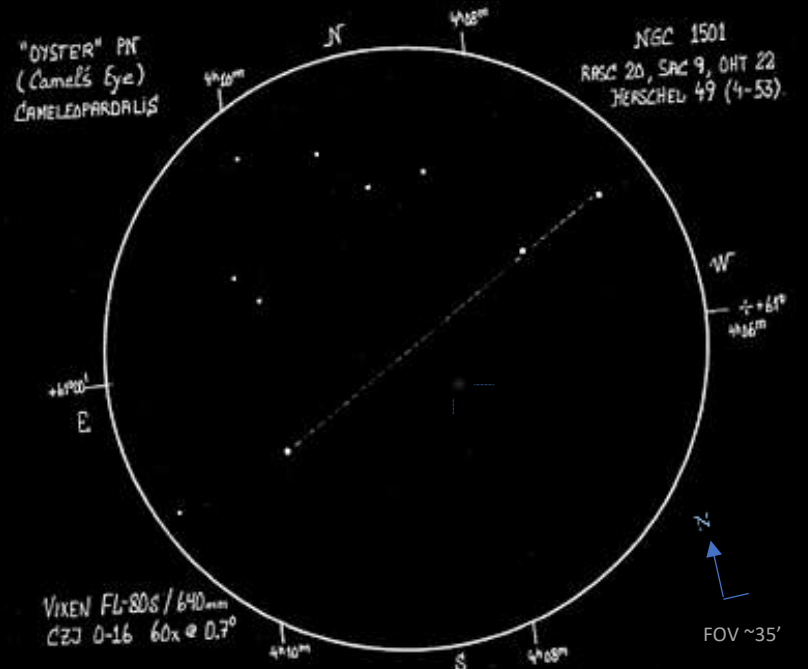
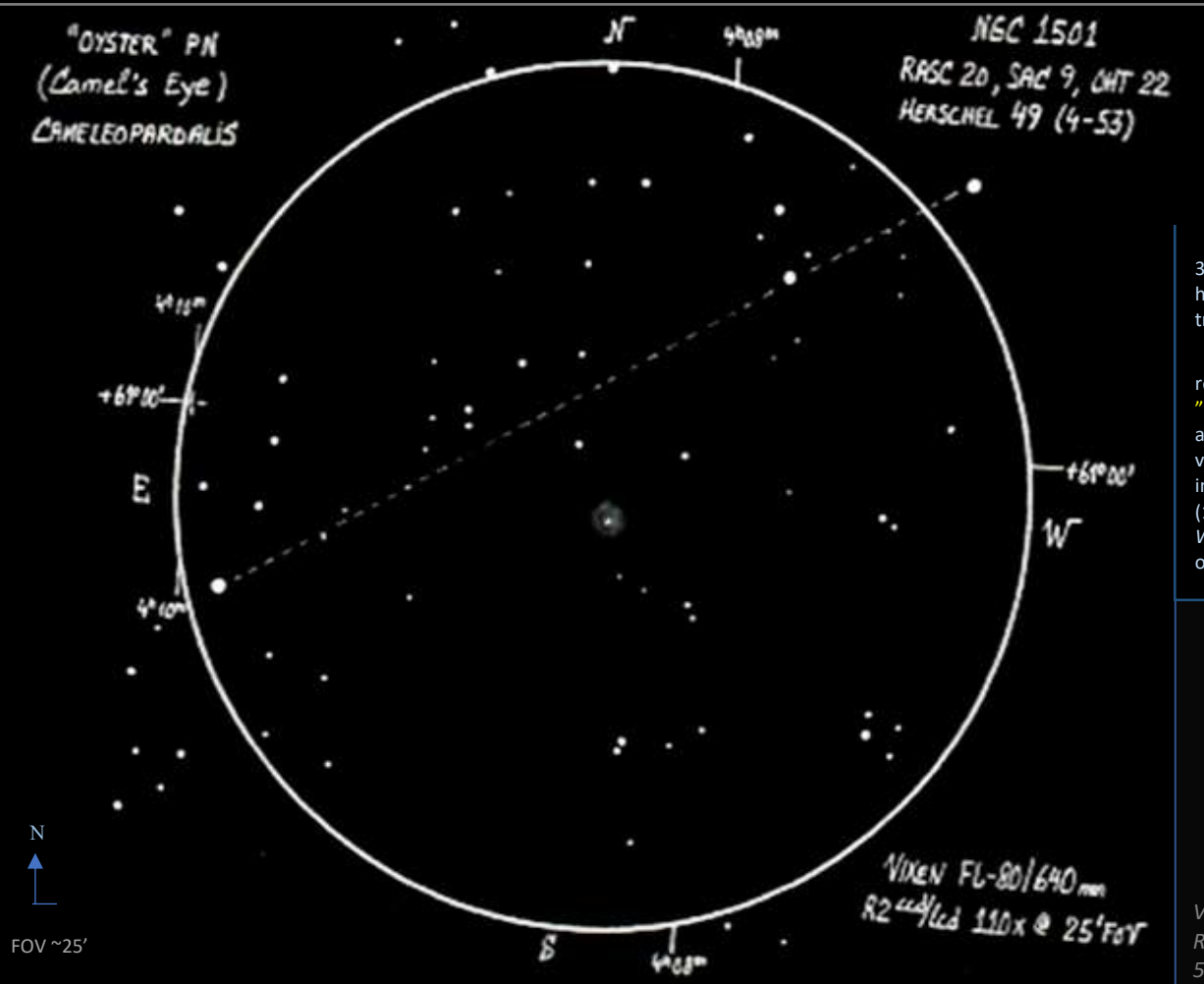
NGC 1501 – Oyster PN

RASC 20
Index: NGC 1501

Equipment: NGC 1501; "Oyster PN", CAM. Date: 2016-12-27 Time: 21:00 UT Location: 56N 12E, DENMARK.
 Conditions: Trsp. 5/7, NEM 5.0, Humid Sat: 8/10, Calm Instrument: VIXEN FL-80S/640mm Refractor.
 Aperture: 80mm f/8 Focal Length: +1.5GPC ~ 960mm f/12 Effective Mag: +0.5x RED; R2 ccd/lcd 110x @ 25' FOV
 Filter: R2 live video. Fov: 5x(25x) Gain: 3008 Duration: 5-6 min. Operating @ F11

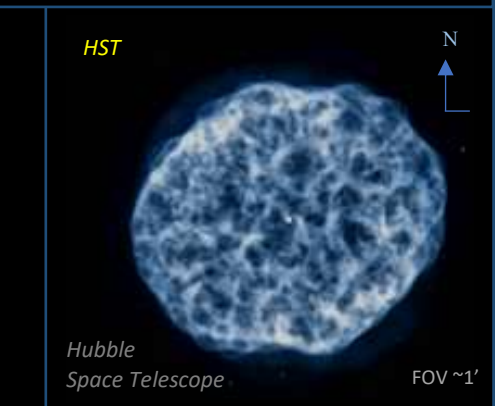
Having observed and sketched NGC 1502 at the end of Kemble's Cascade, I now switch to my finder eyepiece (ATC K-40mm, 24x @ 1.7° FOV) and use this to sail down the S creek from the fork in the Cascade, ca. 1½° past a small triangle of ~8^m stars, until I hit on a bright 7.5^m star (HD 25734). This star is at the end of a line with two fainter (10^m) stars ~20' to the NW, and the **fine planetary nebula NGC 1501** is located roughly midway between HD 25734 and the two fainter stars.

I start my sketch by plotting the **star field at 60x magnification in a 0.7° FOV** (CZJ O-16mm). Then I concentrate on identifying the glow of the PN. The integrated magnitude is 11.6^m with the mean SB down at 21.6^m/as², and the central star is also faint at 14.4^m, so even in favourable conditions this PN is borderline visually using my small 80mm refractor.



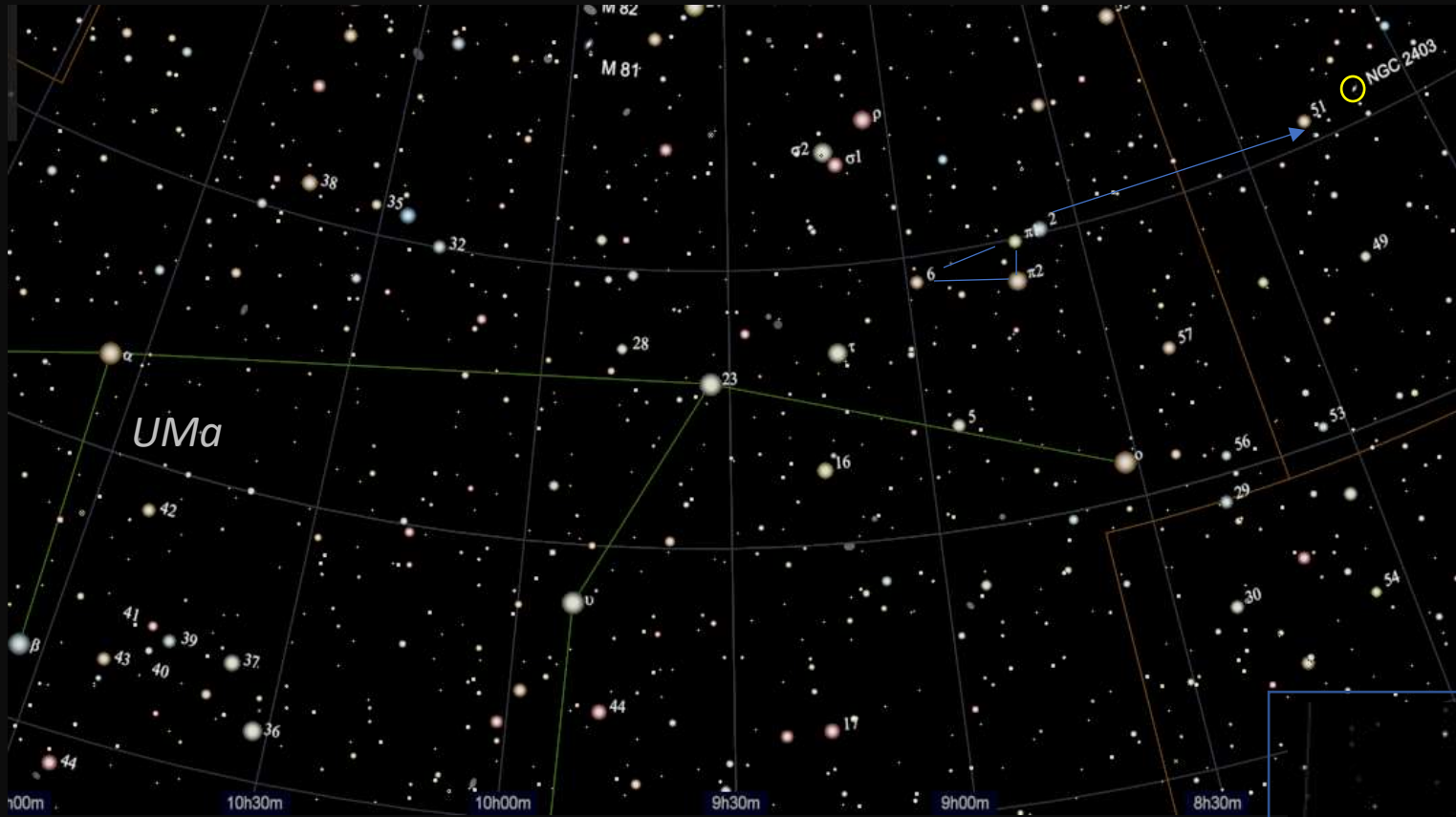
There's nothing to see at 60x, so I try pumping up the magnification to 110x (using a Baader 3.5xFFC + a 1.5x GPC). Trying very hard, I think I *may* perhaps **glimpse a very faint shadow** of a hazy spot at the right position, but I can't with certainty say, that I've seen the PN. Next time I'll try to see if a UHC or O-III filter can improve the chance of catching this elusive object.

But even though pure visual cannot nail this pale ghost, I still have a silver bullet in my eyepiece revolver: the **R2 live video** ccd/lcd. Switching to this weapon, I immediately see the PN **as nebulous "donut": a broad ring with a darker center around a relatively bright central star** – like a pearl in a clam shell (which of course is what has earned it the nickname "The Oyster Nebula"). In the live video, the ring of NGC 1501 shows up as considerably broader than that of M57 (the *Ring Nebula* in Lyra), obviously mottled/textured and slightly elliptical in the NE-SW direction. The central star (14.4^m) is also significantly hotter and more luminous than that of M57 (15.8^m). It is a type WC / Wolf-Rayet star with strong emission in C, O and He, pulsating ~0.1^m in brightness over a timescale of just half an hour. NGC 1504 is a fine delicate view with EAA in a small telescope!

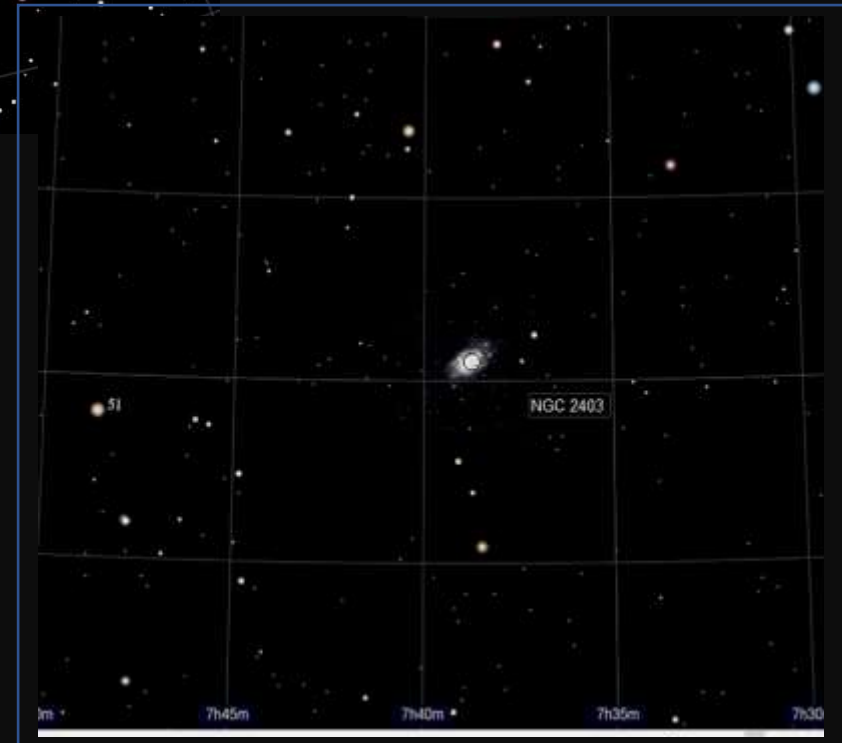




NGC 2655
G-Sc



NGC 3403
G-Sc



IC 342
SG 'Hidden Gxy'

