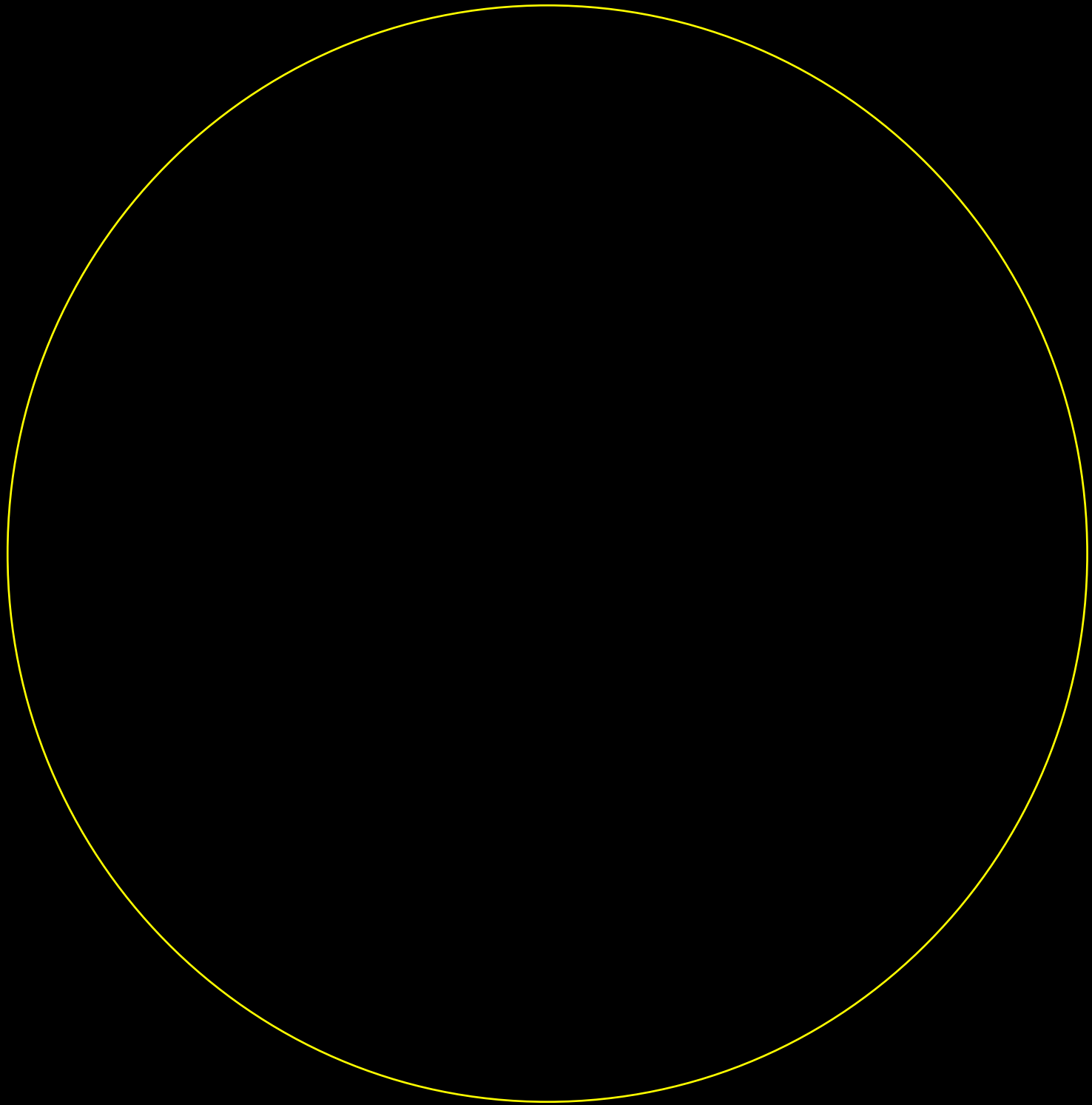
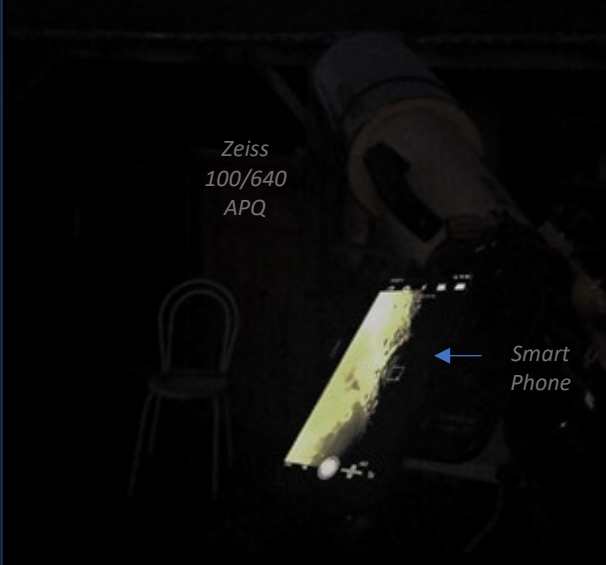


*17-Day
MOON*



18-Day MOON



18 DY MOON

Main Image:

Moon 2016-05-25, 01:00 UT+2
18day / 91% illumination

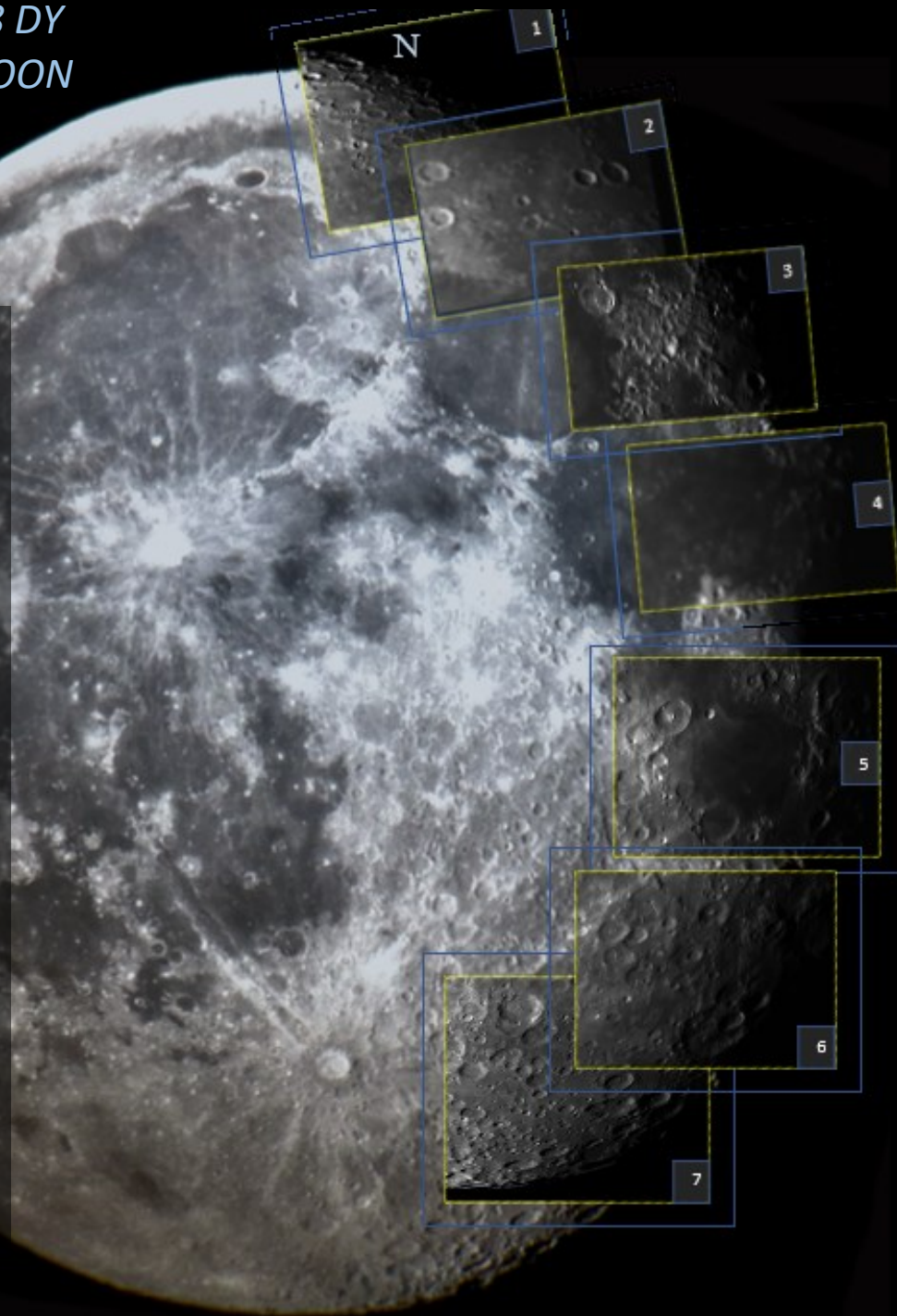
4" Vixen FL102S/840mm
2.6xGPC + CZJ Amici Turret +
ATC M44 K40mm EP
iPhone4 handheld snap.

It's an early morning in **mid-January** (2020-01-13, 07:30 AM, CEST UT+1), and my wife has alerted me that the Moon is shining bright outside in our backyard. After another week of overcast and rainy weather, that is good news, so even though we're right now transiting from nautical to civil twilight and there are strands of high cirrus drifting by, I seize the opportunity to set up my 4" refractor for a **quick study of the 18-day (91% waning Moon)**, which is now dangling like a ripe fruit up at 12° towards the W, ready to be harvested by the sickle of Leo right above.

The moon in this phase has an uncanny resemblance to a not quite finished Star Wars *Death Star*, with its super laser presumably already able to shoot out from the Crisium basin, ready to pulverize any rebellion planet... Undeterred I direct my own small Z-BOLT laser at the Moon, and immediately lock onto it in the FOV of my 4" refractor! Even at low magnification (30x), the most striking feature is the western inner blocky ring (#2) of the **Nectarian Crisium basin**, composed of up to 5 km high, elongated mountain massifs, that cast long serrated shadows into the basin, which is now covered by mare lavas from the Upper Imbrian lava flooding (1m2). At higher magnification (80x), I can see the mare ridge (*Dorsum Opperl*) at the inner shelf / bench after the central lava subsidence, and several Eratosthenian mare craters (*Swift, Pierce, Picard*) can be studied in nice "profile" on the mare plain.

S of Crisium in the now mare-filled, old pre-Nectarian **Fecunditatis basin**, the Copernican *Messier*-crater pair catches the eye, -- the result of a low grazing impact coming in from the E (~3° altitude), ricocheting downrange and ejecting a long bright ray across *Mare Fecunditatis*. Prominent also in Fecunditatis at this low illumination are the two mare ridges: *Geikie* and *Mawson*.

Full image:
55x mag., 40' FOV



Insert images:

Moon 2020-07-09, 01:00 UT+2, Twilight
18.3day / 84% illumination
SQM 18.6 / NELM 5.4 City Sky
Temp 10°C, DewPt. 6°C, Hum. 75%

4" Zeiss APQ 100/640mm, 4x FFC
CM3-U3-13S2M + UV/IR Cut Filter
Exp. 15s @ 0.33 ms. (30 FPS)
5-10% ASI2 stack

1 North Polarregion, West

2 Lacus Mortis

3 Serenitatis East

4 Tranquillitatis East

5 Nectaris

6 Piccolomini, Janssen

7 Macrolytus, Vlacq

Each insert:
300x mag., 6' FOV

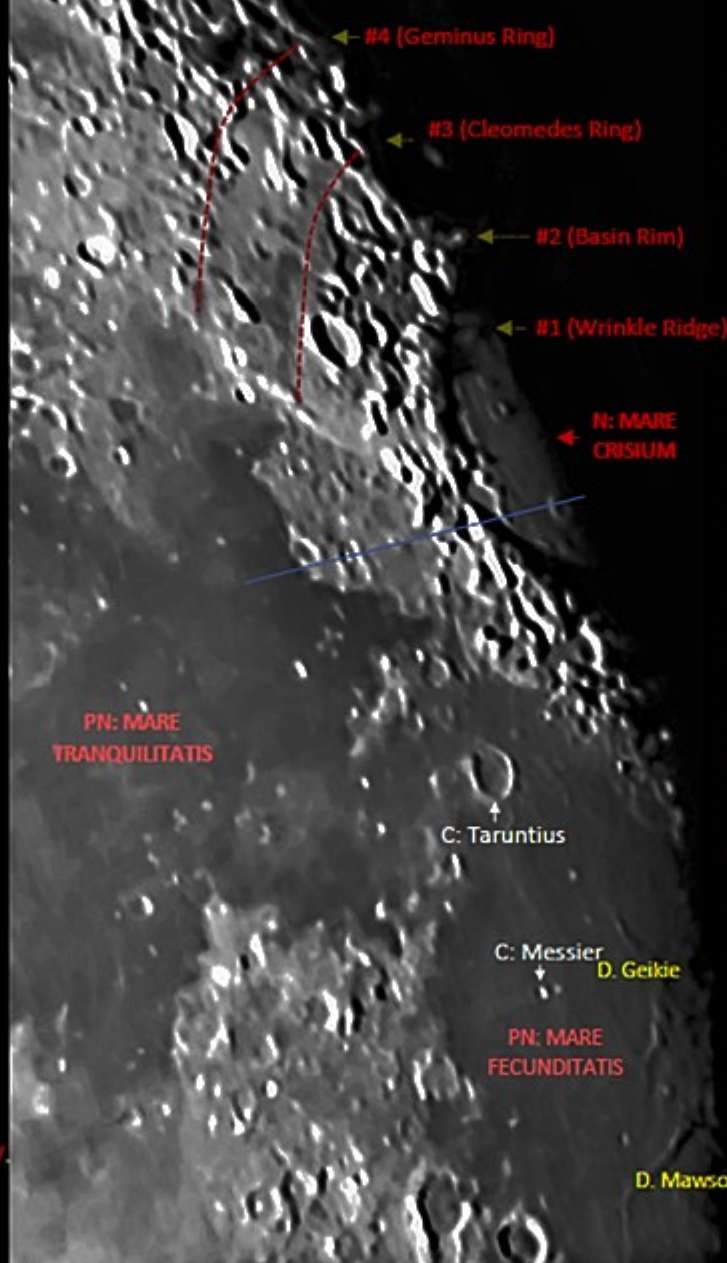
49x Magnification, 2° TFOV

Zeiss 100/640 APQ refractor, 21mm ETH
iPhone XS, NightCap v 9.7 App

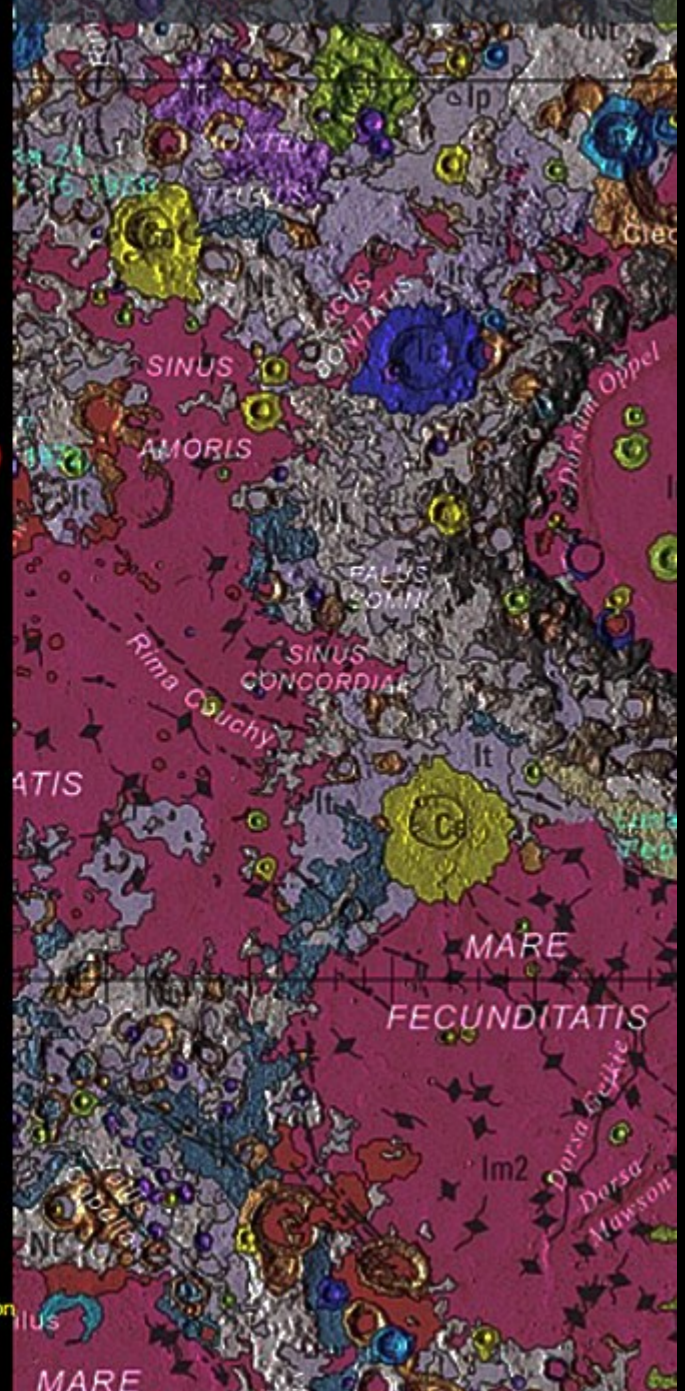


80x Magnification, 1.2° TFOV

Zeiss 100/640 APQ refractor, 21mm ETH
iPhone XS, NightCap v 9.7 App



USGS Unified Geo Moon Map 1: 5M, Dec. 2019



The 18 day (84%) waning gibbous moon.

It's the start of July, just past midnight local time (2020-07-09 01:30 CEST, UT+2). I'm out in my suburban backyard on the northern outskirts of Copenhagen, Denmark. I'm located at 56° N latitude and currently in astronomical dawn with a "city sky" of SQM ~18.6 (NELM 5.4). The temperature is a cool 10°C, the dew pt. is down at 6°C, the humidity is 75% and the Moon is on the rise, but still low at ~10° altitude in *Aquarius* towards the SE.

The lunar libration is [+7° Lat, +3½° Long], so the **NE limb of the Moon is well exposed** tonight. The transparency and seeing are both hampered quite a lot by the low altitude and the atmospheric humidity, so the views are definitely soft, but I decide to take a sweep down the terminator anyway, and see what I can catch. I'm pressing my 4" refractor to the limit with a Baader FFC @ 4x barlow, for ~300x magnification in a ~6 arc' FOV.

1. N. Polar region (West)

In the north polar region, **the large, old (Pre-Nectarian/Nectarian) walled plains: Pascal, Anaximenes and Goldschmidt** are conspicuous, as are the young Copernican craters **Carpenter, Philolaus** and not the least **Anaxagoras** with its long bright ejecta rays cast out west and south across *Mare Frigoris*.

The "King in the North" must however be the large **walled plain Hermite**, with part of its floor in permanent shadow, where LROC has recorded the coldest temperature in the solar system of 26°K (the coldest spot recorded on Pluto is 43°K). The triplet of craters just W of Hermite can also be glimpsed: **Sylvester, Haber** and even **Lovelace**, which I have not seen before. The North Pole itself is to the E, just outside my image on the back rim of the crater Peary.

2. Lacus Mortis

Between the two young (Eratosthenian-Copernican) crater pairs of **Aristoteles-Eudoxus** and **Hercules-Atlas**, the most conspicuous feature is the large ancient (pre-Nectarian) complex crater: **Lacus Mortis**. The crater floor and the eastern rim were lava flooded in Upper Imbrium, as were the floors of the younger (Nectarian), partly overlapping pair of craters **Plana-Mason** that impacted right on the SE crater wall of Lacus Mortis.

Much younger of course (Copernican) is the crater **Bürg** with a central peak and terraced walls and an ejecta carpet with highland rocks excavated from below the dark lava cover. Also seen is the **Shannen Ridge**, which was described as late as 2009 by Maurice Collins based on Kaguya laser altimeter (LALT) data; Its a 630 km long and 430 m elevated ejecta ridge radial to the Imbrium basin.

3. Serenitatis E

4. Tranquilitatis E

5. Nectaris

Here I'm looking down at the central part of the **Nectaris Basin** that has a thin cover of upper-Imbrian mare lava, which has also flooded the large **Fracastorius** crater at the S end. The view is fully inside the basin ring #4 marked by the prominent **Altai Scarp** (not seen here), but the three inner rings can be glimpsed: from **Santbech to Cyrillus**, the **Pyrenees Mts.** and (faintly) the mare wrinkle ridges.

Besides Fracastorius is seen several other large **Nectarian craters** surrounding Mare Nectaris, notably: **Cyrillus, Catharina and Santbech**, and on top of that: the younger impacts of **Theophilus** and **Colombo**, both with well-preserved terraced walls and ejecta carpets.

A couple of interesting formations are seen above M. Nectaris: the large promontorium **Mons Peck** W of Theophilus, and the Imbrian-sculpture feature **Vallis Capella** through the Capella crater N of Nectaris and down towards the **Gaudibert** crater cluster.

6. Piccolomini, Janssen

Here I'm looking down at an old, mostly pre-Nectarian area of the lunar surface **just S of the Nectaris basin**, delimited by the **Altai Scarp** and younger **Piccolomini** and **Neander** craters.

Towards the west is a semi-circle of **big battered PN-craters** (**Zagut, Rabbi Levi, Riccius**), and in the south is seen the large complex landscape of the old **Janssen-Brenner-Metius** craters with young Eratosthenian **Fabricius** on top. Inside Fabricius can be glimpsed its characteristic horseshoe shaped down-slide terrace towards the NE.

S of Neander can be seen a ridge, that continues in the **Rheita Valley** (a radial Imbrium feature). N of the Janssen complex I noticed a couple of **arcuate surface features** that could be interpreted as signs of an old basin rim (?), but more likely are just random alignments; -- our brain is geared to try "connecting the dots" in nature.

8. Tycho, S. Pole

And here's the big "splash" of the **Copernican Tycho impact** into the cratered southern highlands. The dark doughnut halo of impact melt splashed out around the Tycho crater wall is well seen at the center of radial spokes formed by light-hued excavated highland rock; The two main ejecta rays are located in a butterfly pattern: one up NW and the other down SW, indicating that the impactor came down in an oblique path from the W. I've looked at transects of the Tycho ejecta rays, clearly visible in W Nubium, -- but the material is so pulverized that it is hard to discern on a transect profile.

A couple of other noteworthy surface details in this observation are the wedge of surface deposits in central Schickard (an ejecta ray from the Orientale impact), and the two "white spots" most prominent near full moon: Cassini's white spot in central Deslandres ("Hell Plain") plus the bright spot-on top of the N crater rim in Werner; The first is the bright halo surrounding the young crater Hell Q, while the latter is ejecta from the high-albedo craterlet Werner D.

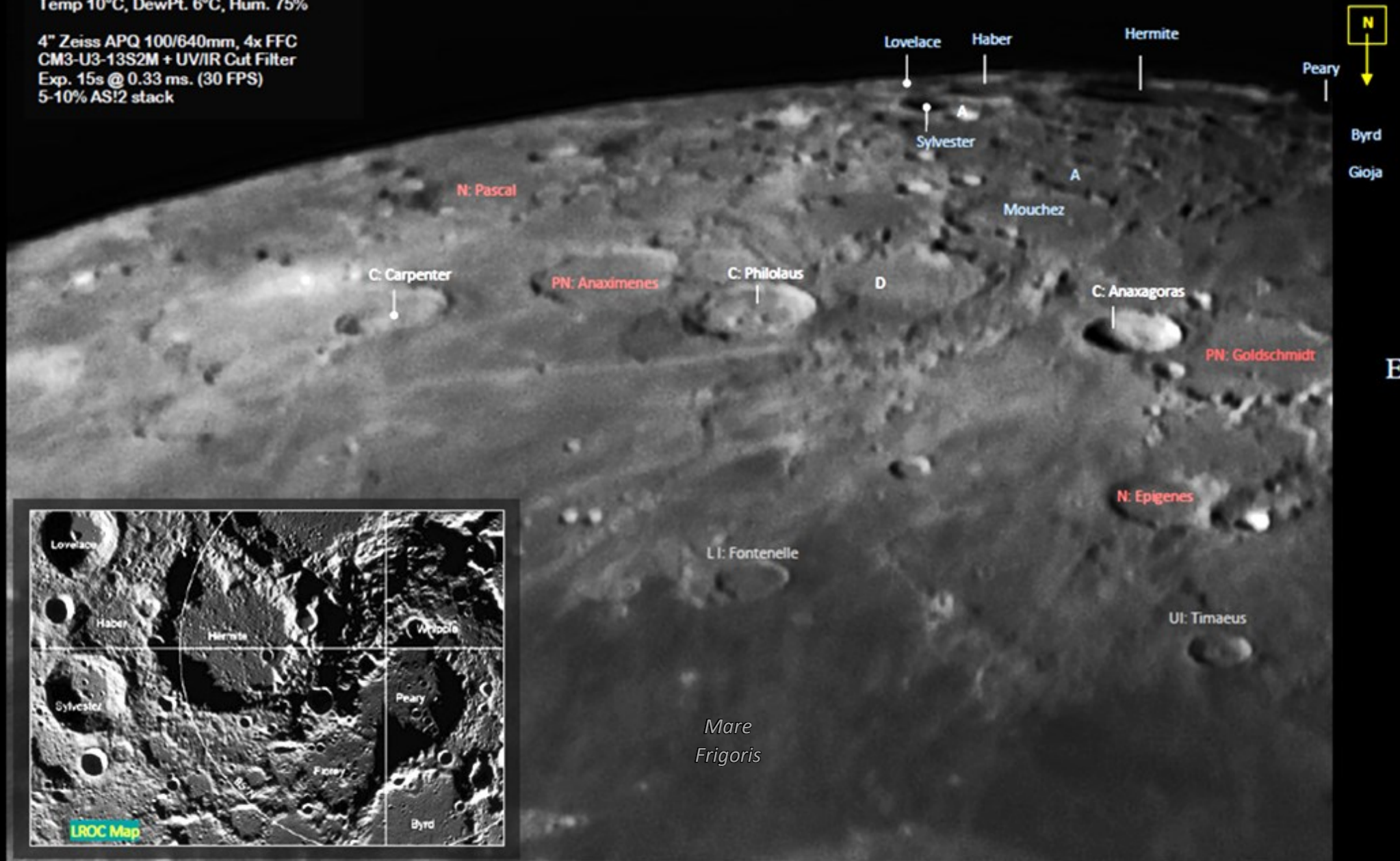
There's also a bright region where the SW main "butterfly-ray" from Tycho (stretching down S between Longomontanus and Clavius) has coated the mountainous region at the SSW horizon around the Le Gentil crater. The jumbled mountains in this region rise up 4-6 km above the crater floors.

1 North Polar region, West

N

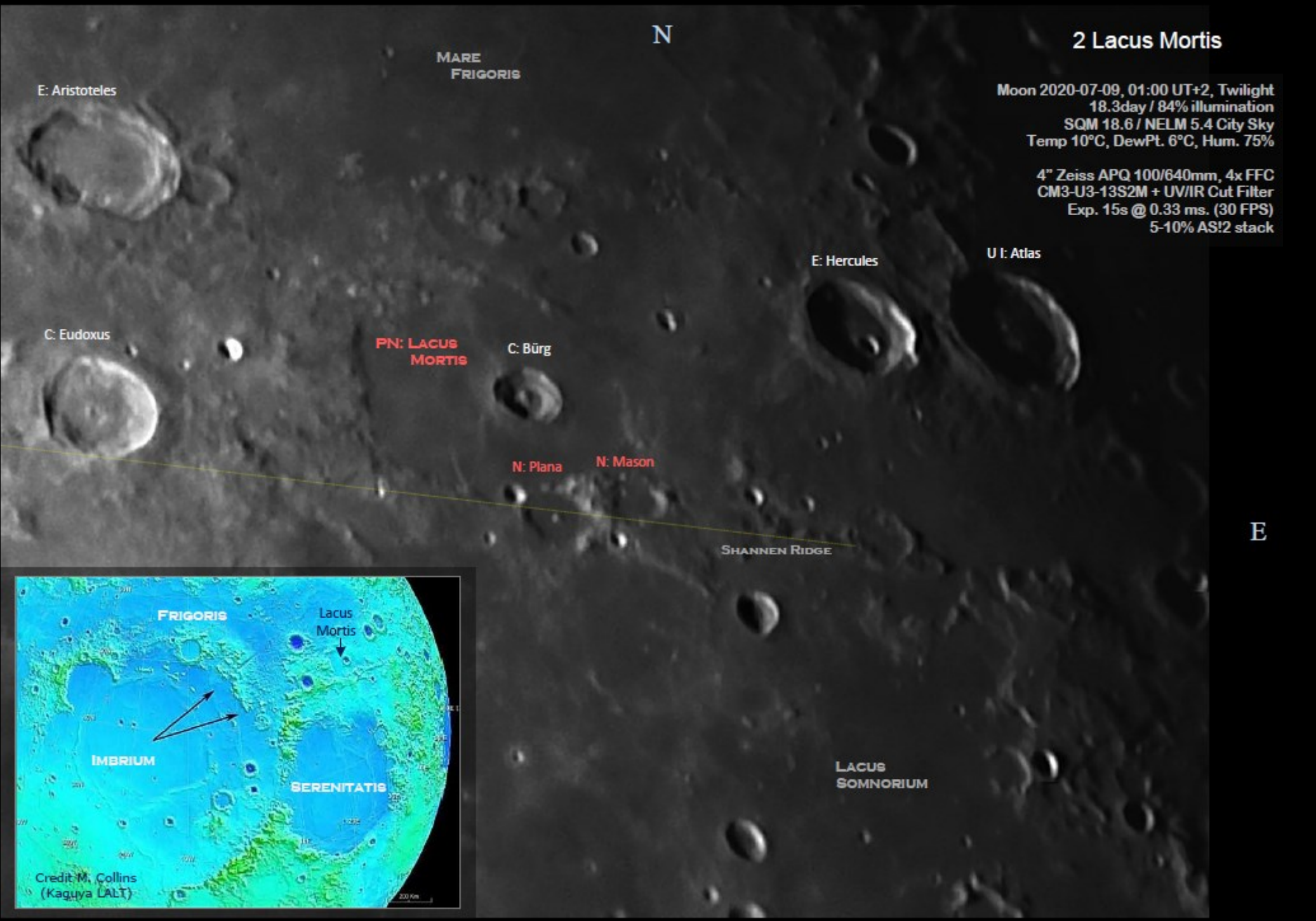
Moon 2020-07-09, 01:00 UT+2, Twilight
18.3day / 84% illumination
SQM 18.6 / NELM 5.4 City Sky
Temp 10°C, DewPt. 6°C, Hum. 75%

4" Zeiss APQ 100/640mm, 4x FFC
CM3-U3-13S2M + UV/IR Cut Filter
Exp. 15s @ 0.33 ms. (30 FPS)
5-10% ASI2 stack



E

Mare
Frigoris



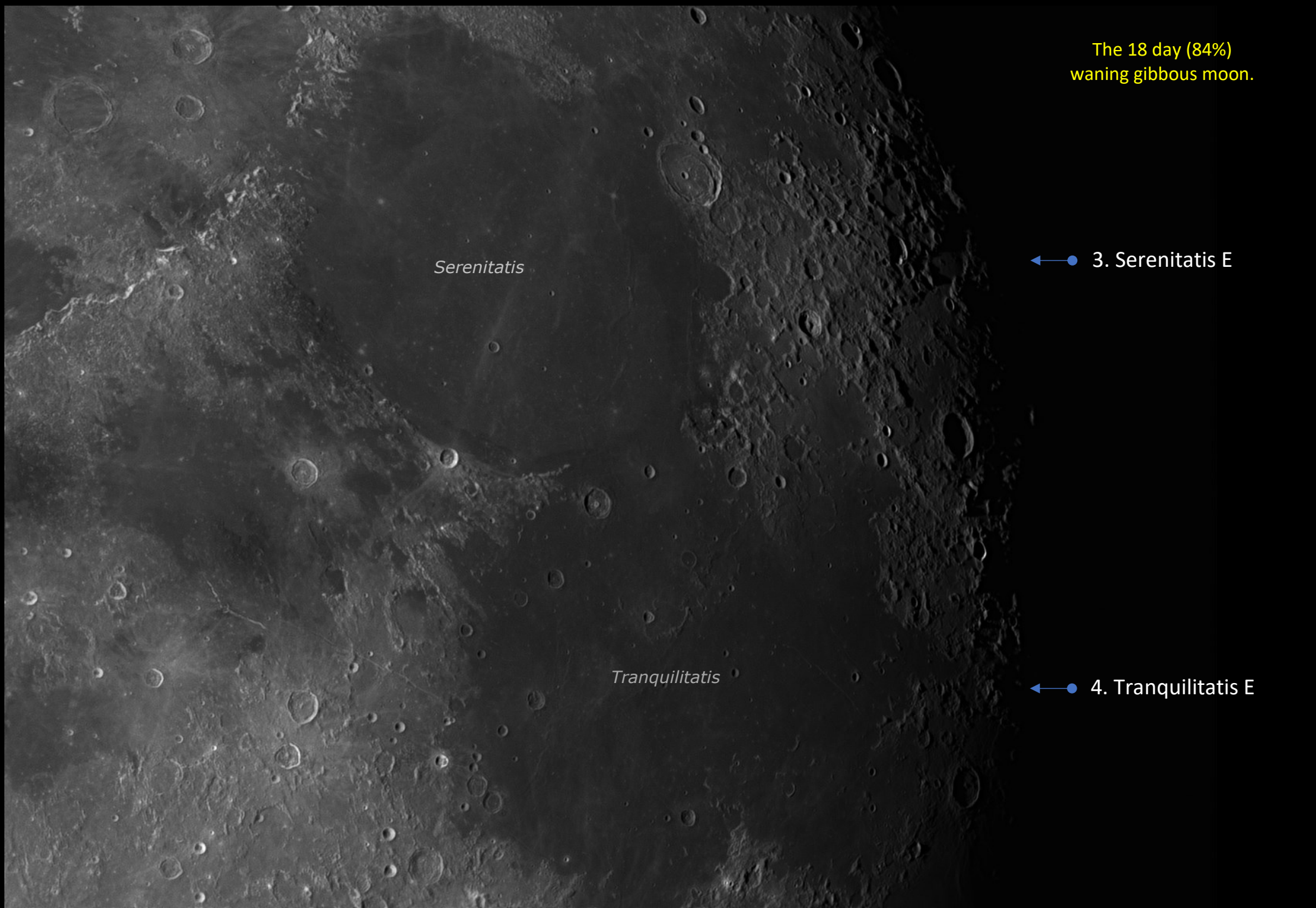
The 18 day (84%)
waning gibbous moon.

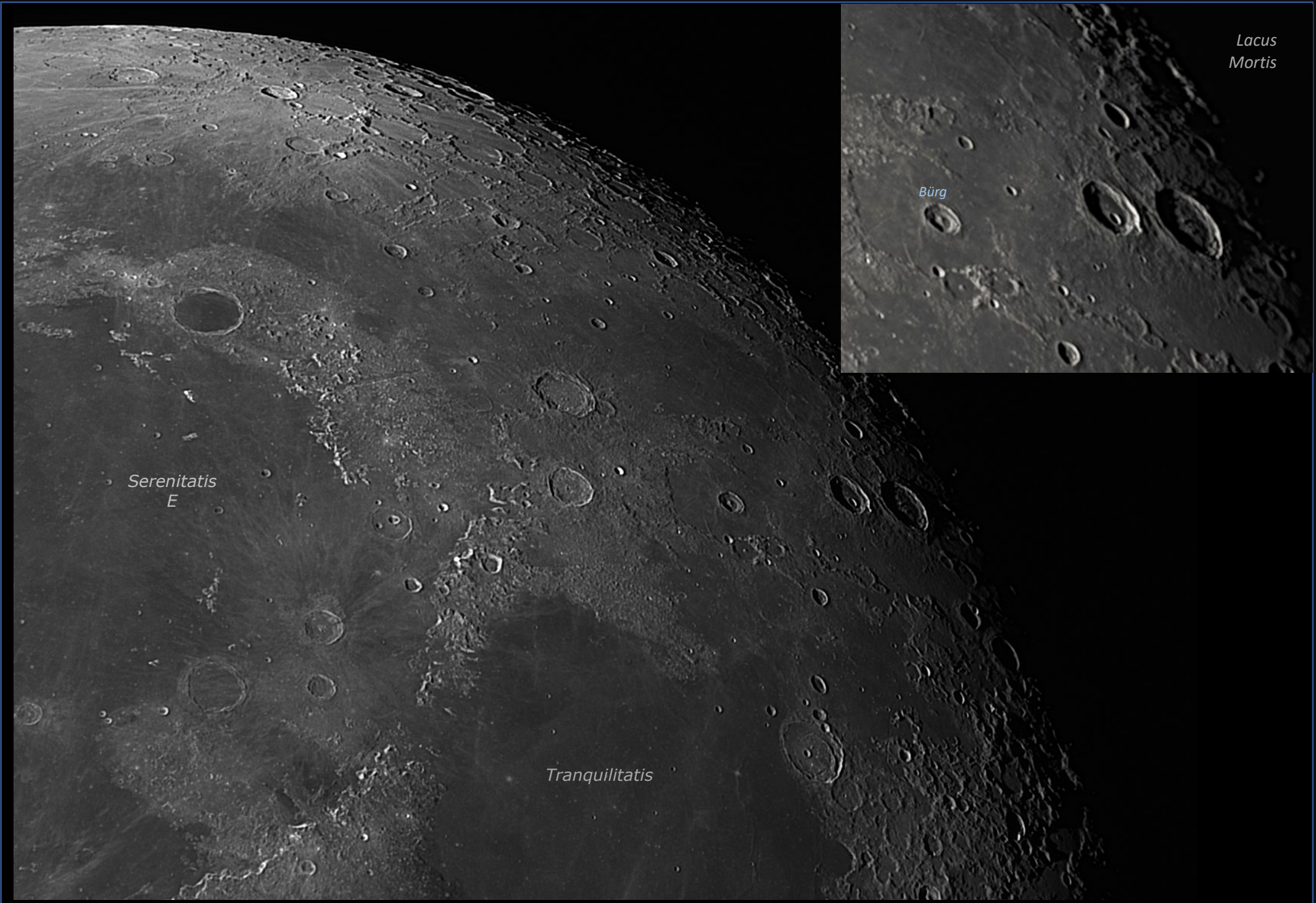
Serenitatis

← 3. Serenitatis E

Tranquilitatis

← 4. Tranquilitatis E





Serenitatis
E

Tranquilitatis

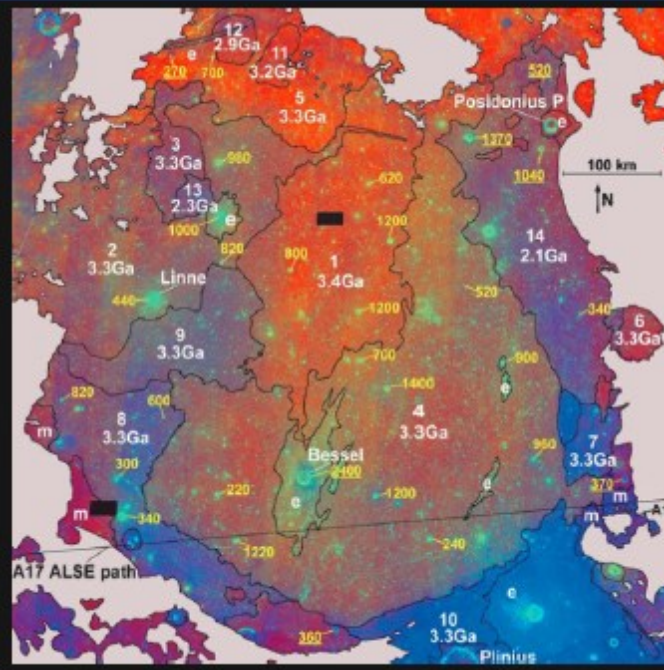
Lacus
Mortis

Bürg



Unit III, Im2: Mid-imbrian basalt lava 3.4-3.3 Gyr
 DMD, id, m: Late Imbrian Dark Mantle pyroclastics
 Unit II, Em : Eratosthenian basalt lava 2.1 Gyr

Unified Geologic Map Of The Moon, Fortezzo, Spudis & Harrel, USGS 2020



False color image of Mare Serenitatis lava units (5°E – 35°E, 15°N – 40°N).
 Age of surface units based on crater counting. White areas are highlands.
 "e" indicates ejecta and "m" are areas with dark mantling deposits.

Estimated min. thicknesses (in meters) of basalt inside craters that do not expose the underlying highland are shown in yellow. Estimated thicknesses (in meters) of basalt inside craters where the impact has exposed the underlying highland are shown in yellow and are underlined.

It's an early morning in the start of October (2020-10-05, 04:30 Local DST, CEST UT+2), and I have been out in my suburban backyard a good hour observing Mars with Syrtis Major at display, right at the central meridian. The waning 17.8 day (91% illuminated) gibbous Moon is now sailing up at 45° altitude in Taurus towards the south, just past the meridian, so I chose to close the night with a quick scan of the lunar surface.

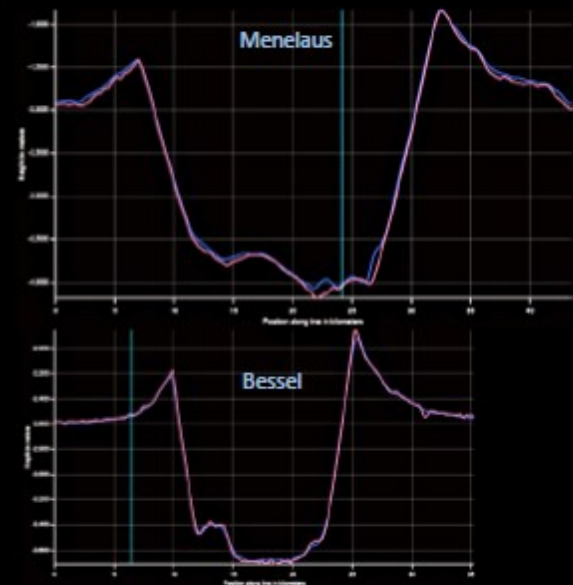
The two most striking features at this illumination are: the W basin rim of Crisium, which looks like a space monster has taken a bite out of the "crumbling celestial cookie" ..., plus the many light-hued ejecta rays from young Copernican cratering impacts, crisscrossing the highlands and dark mares: from Anaxagoras in the N, past the slosh of Aristillus in E Imbrium and down to the big splash of Tycho in the S cratered highland.

Also well illuminated on the 18-day Moon are the lava fills in the Nectarian epoch Serenitatis Basin, with the oldest lava fill seen as a broad light-hued patch at the center of the basin (Unit III, mid-Imbrian ~3.4-3.3 Gyr), and the younger, darker and smoother lava plains (Unit II, early Eratosthenian 3.2-3.1 Gyr) located along the N and E shore. A couple of local regions show up with Dark Mantle Deposits (DMD) of ash from fire fountains, notably in the Taurus-Littrow area and along the SW shore from Sulpicius Gallus and up.

The bright ejecta ray across Mare Serenitatis, from Menelaus past Bessel, is obvious; Looking at a cross section of the Menelaus crater, it does seem like it could be created by an oblique impact coming in from the W and creating a non-symmetrical crater interior with a roughly N-S butterfly ejecta pattern (like that seen around Proclus W of Crisium). On the other hand, the N "Bessel-ray" also seems to align well with an origin from in Tycho crater impact, so I guess the votes are still out on this lunar feature...

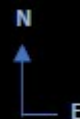
LROC:
 QuickMap

3 Serenitatis



Anaxagoras

~80X



De La Rue

FRIGORIS

IMBRIUM

Aristillus

L. SOMNORIJM

Posidonius

SERENITATIS

CRISIUM

DMD Sulpicius Gallus

DMD

Menelaus

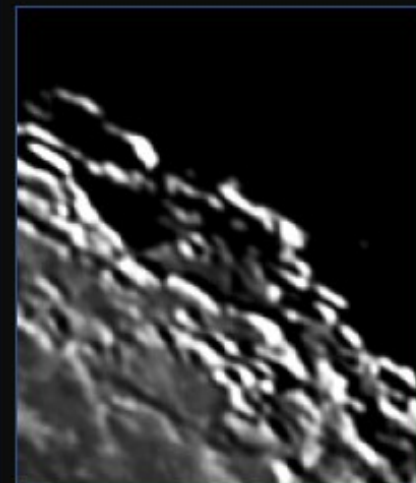
S. AMORIS

Cauchy Fault & Rille

TRANQUILITATIS

18DY MOON

De La Rue



Moon 17.8 Days, 91% Waning Gibbous,
Alt. 40° in Taurus
Temp. 10°C, Hum. 79%, DewPt. 7°C

Zeiss 100/640mm APQ
Zeiss 2x Barlow
FLIR CM3-U3-1352M machine cam
2x Composite, each image:
60s @ 30 FPS, 8% AS!3 stack

SERENITATIS

HITS Observatory,
Allan Dystrup

56N 12E,
Copenhagen
DENMARK.

2020-10-05, 04:30
Local DST
(CEST, UT+2)

Lacus
Somonrium

The 18 day (84%)
waning gibbous moon.

G Bond

3. Serenitatis E

Posidonius

Taurus
Mountains

Le
Monnier

Römer

Littrow

Sinus
Amoris

Macrobius

Taurus-
Littrow
Valley

Maraldi

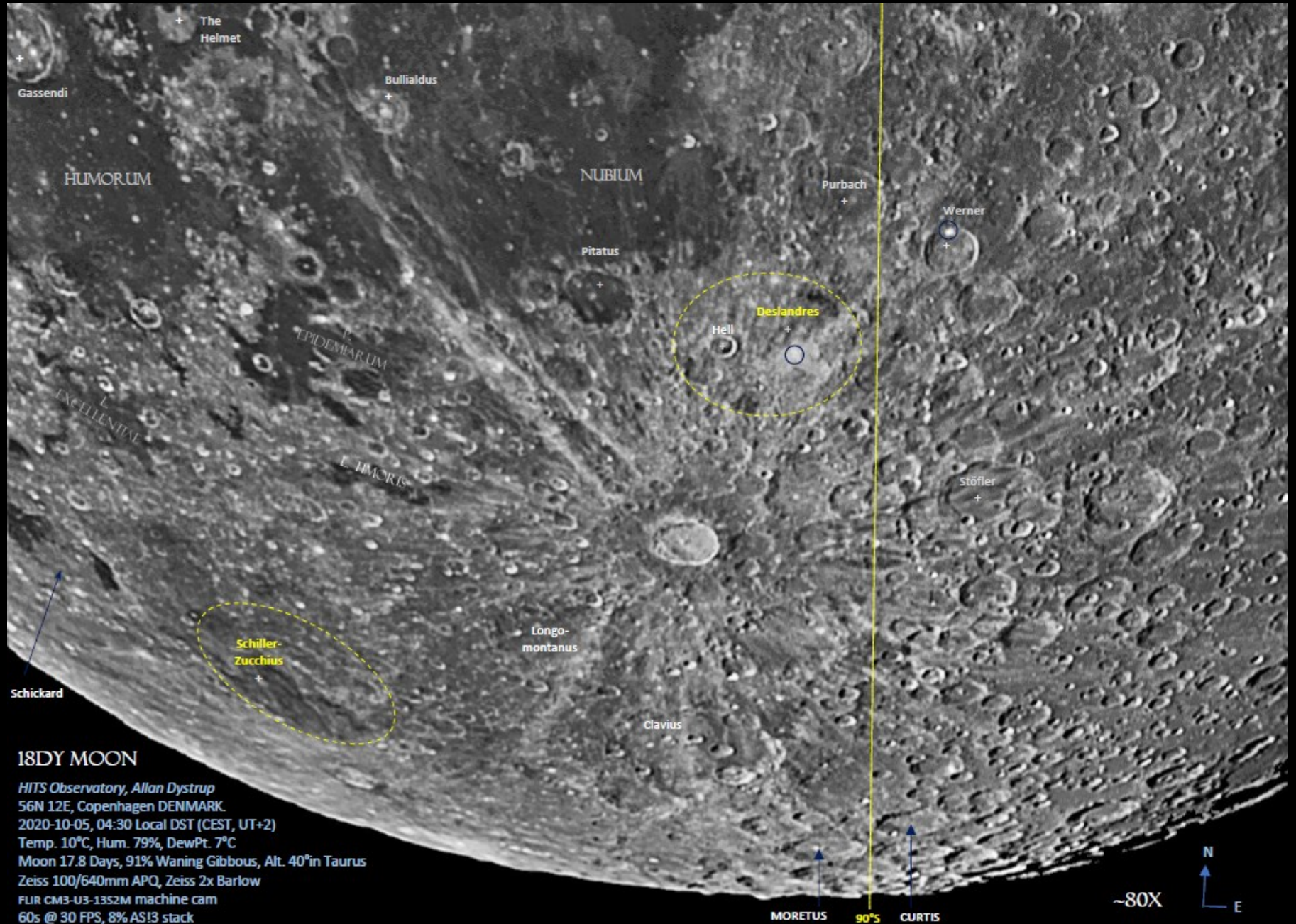


8. Tycho, S. Pole

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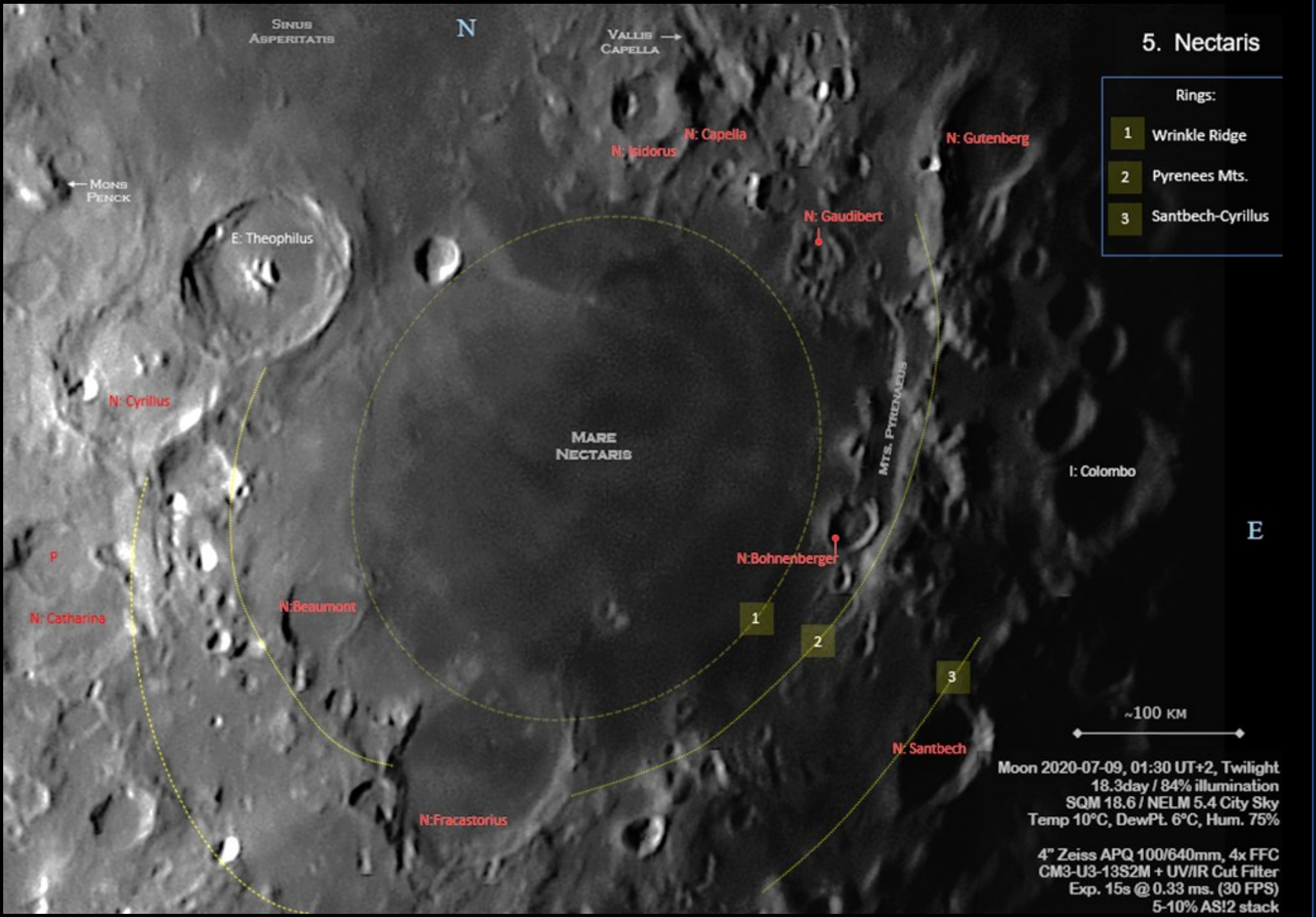
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18DY MOON

HITS Observatory, Allan Dystrup
56N 12E, Copenhagen DENMARK
2020-10-05, 04:30 Local DST (CEST, UT+2)
Temp. 10°C, Hum. 79%, DewPt. 7°C
Moon 17.8 Days, 91% Waning Gibbous, Alt. 40° in Taurus
Zeiss 100/640mm APQ, Zeiss 2x Barlow
FLIR CM3-U3-1352M machine cam
60s @ 30 FPS, 8% ASI3 stack



5. Nectaris

- Rings:
- 1 Wrinkle Ridge
 - 2 Pyrenees Mts.
 - 3 Santbech-Cyrrillus

~100 KM

Moon 2020-07-09, 01:30 UT+2, Twilight
 18.3day / 84% illumination
 SQM 18.6 / NELM 5.4 City Sky
 Temp 10°C, DewPt. 6°C, Hum. 75%

4" Zeiss APQ 100/640mm, 4x FFC
 CM3-U3-13S2M + UV/IR Cut Filter
 Exp. 15s @ 0.33 ms. (30 FPS)
 5-10% ASI2 stack

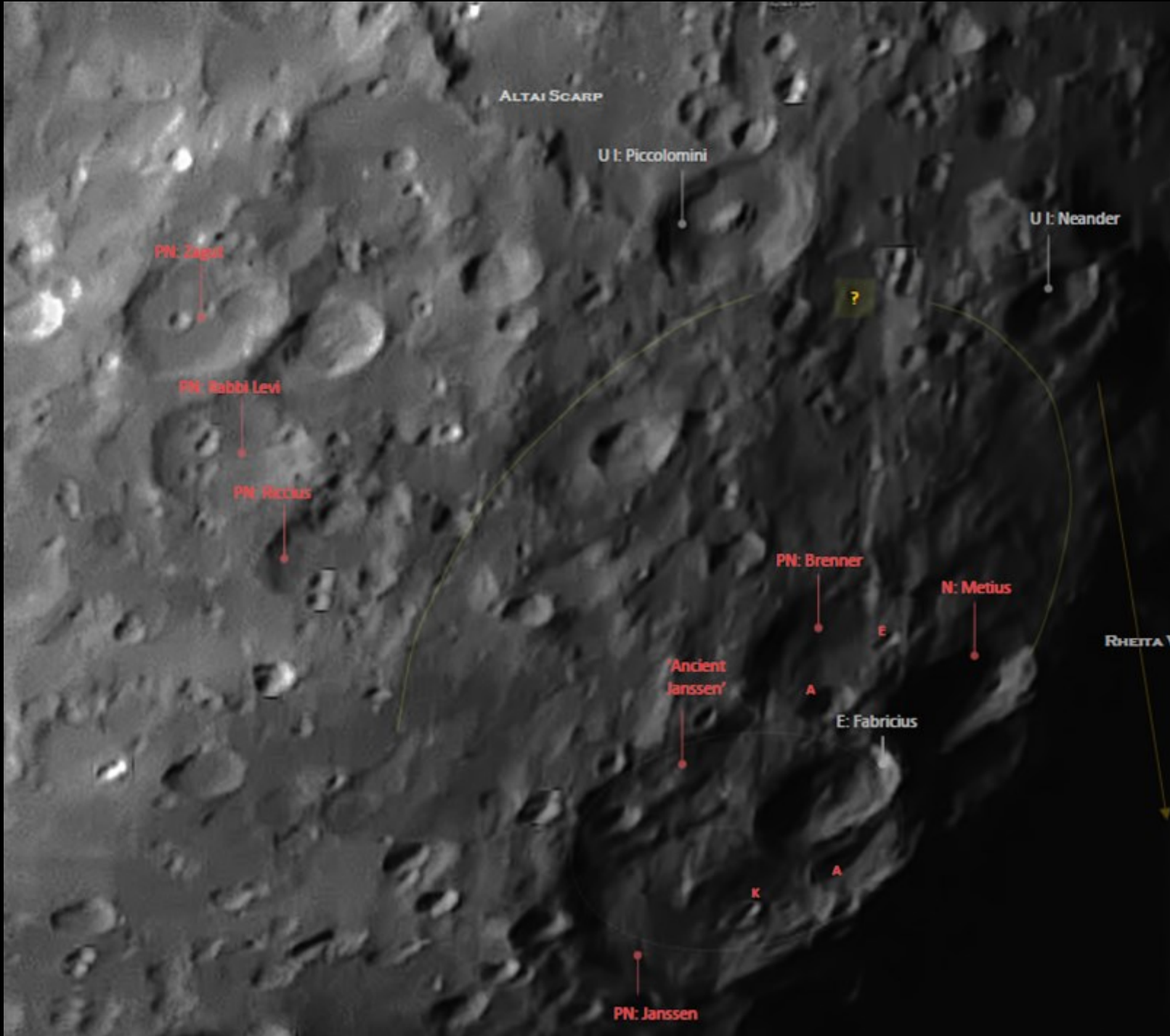


Tranquilitatis

*Sinus
Asperitatis*

Nectaris

6. Piccolomini,
Janssen



RHEITA VALLEY

~100 KM

Moon 2020-07-09, 01:30 UT+2, Twilight
18.3day / 84% illumination
SQM 18.6 / NELM 5.4 City Sky
Temp 10°C, DewPt. 6°C, Hum. 75%

4" Zeiss APQ 100/640mm, 4x FFC
CM3-U3-13S2M + UV/IR Cut Filter
Exp. 15s @ 0.33 ms. (30 FPS)
5-10% AS!2 stack

PN: Janssen