

MARS

No. **444**

25 February 2016

OBSERVATIONS

No.70

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CMO/ISMO 2016 Mars Report #04

**2016 CMO/ISMO Mars Observations Made During the Period
from 16 January ($\lambda=096^\circ\text{Ls}$) to 15 February ($\lambda=110^\circ\text{Ls}$) 2016**

♂.....In this one-month period, the planet Mars proceeded from the Virgo constellation to the Lib one and the apparent declination D went down from 12°S to 17°S . The apparent diameter δ of Mars went up from $\delta=6.1''$ to $7.7''$ and the resolution of the digital images has slightly increased. The Martian season proceeded from $\lambda=096^\circ\text{Ls}$ to 110°Ls during the period. Thus the Martian northern hemisphere was governed by the mid-summer. The tilt went down from $\phi=17^\circ\text{N}$ to 12°N . The residual north polar cap (npc) was still visible together with the remaining Olympia. The phase angle ι was $\iota=36^\circ\sim 37^\circ$, attaining the maximal value $\iota=37.2^\circ$ on 14~18 February.

♂.....This period, we have received with thanks a total of 26 observations from 8 observers including the addendum reports made before 15 January as follows. Notably the reports were much received from the observers in the Southern Hemisphere, i.e. from Australia, South Africa and Colombia.

BUDA, Stefan (SBd) Melbourne, AUSTRALIA

1 Set of *RGB* Images (4 February 2016) 41cm Dall-Kirkham with a ASI120MM

FELL, Denis (DFI) Kennedy, SK, CANADA

1 *Colour* Drawing (31 January 2016) 15cm Maksutov-Cassegrain, 120 \times , 240 \times

FOSTER, Clyde (CFs) Centurion, SOUTH AFRICA

10 *Colour* + 10 *IR* Images (27, 28, 30, 31 January; 2, 7, 8, 11, 12, 15 February 2016)
36cm SCT @f/22, 33 with an ASI224MC

JUSTICE, Mark (MJs) Melbourne, AUSTRALIA

4 Sets of *RGB* Images (16 January; 5 February 2016) 30cm Spec with a DMK21AU618

MORALES RIVERA, Efrain (EMr) Aguadilla, PUERTO RICO

4 Sets of *RGB* Images (23, 29 January; 4, 9 February 2016) 31cm SCT with a Flea 3

MORITA, Yukio (Mo) Hatsuka-ichi, Hiroshima, JAPAN

3 Sets of *LRGB* Images (10 February 2016) 36cm SCT with a Flea 3

VALIMBERTI, Maurice (MVI) Melbourne, AUSTRALIA

1 Set of *RGB* + 1 *IR* Images (5 February 2016) 36cm SCT @f/20 with an ASI120MM

♂..... We further received some observations made before 15 January from

FELL, Denis (DFI) Kennedy, SK, CANADA

1 Colour Drawing (3 January 2016) 15cm Maksutov-Cassegrain, 120×, 240×

TRIANA, Charles (CTr) Bogota, COLOMBIA

1 Colour Image (27 December 2015) 25cm SCT @f/27 with an ASI120MM

♂..... We now begin to review each observation in a chronological order:

16 January 2016 ($\lambda=096^\circ\text{Ls}$, $\delta=6.1''$)

Mark JUSTICE (MJs) obtained one set of R, G, B images at $\omega=192^\circ\text{W}$, $\phi=18^\circ\text{N}$. Near the evening terminator the white cloud covering Olympus Mons attracts our eyes. Elysium is also light in R, G, B images, while it looks subdued on the composite RGB image. In R, Propontis I and the Ætheria dark patch are obvious. M Cimmerium on the upper side is dark but its configuration is obscure. Utopia looks fainter than M Cimmerium. The npc is checked, but is not so distinct.

23 January 2016 ($\lambda=099^\circ\text{Ls}$, $\delta=6.4''\text{--}6.5''$)

Efrain MORALES (EMr) made a set of R, G, B images at $\omega=352^\circ\text{W}$, $\phi=16^\circ\text{N}$. In R, S Sabæus is dark and broad to the evening terminator. S Meridiani is about to show the two nails near the CM. Aram is clearly shown up and continues to Deucalionis Regio. Margaritifer S is dark. From the southern end of Chryse a dark segment is visible to go down. Oxia Palus is checked though not so clear, and it is suggested the canal Oxus bounds a light streak with the preceding boundary of M Acidalium which is visible totally inside the disk. The NW part of M Acidalium is darker and sends the canal Iaxartes to the npc which is shown bright in G and B. The B image suggests a weak mist band from the evening Æria to the morning side. The morning mist along the following limb is obvious.

27 January 2016 ($\lambda=101^\circ\text{Ls}$, $\delta=6.6''$)

Clyde FOSTER (CFs) observed at $\omega=202^\circ\text{W}$, $\phi=16^\circ\text{N}$, and obtained a set of L-colour and IR685 images. The camera is an ASI 224MC with Baader's L. The L colour image looks better because the markings are less loudly processed in a milder way. M Cimmerium and M Tyrrhenum are described in a parallel way on both sides of Hesperia. The western part of M Cimmerium is darker and its northern coast shows a jagged pattern. Elysium has a rather roundish lighter area bounded by Cerberus-Phlegra on one hand and the Ætheria dark patch on the other. Propontis I is a roundish shadowy speck. Utopia looks fainter, while to the morning side a ghost-like arc might be annoying. The npc shows a core (however blurred in the B decomposition). To the south of the npc, Olympia is faintly visible though Rima Borealis is not explicitly evident. The IR685 image itself is not too lurid and gives a nice impression. In L-colour, a morning mist is depicted following Elysium, and a faint mist after the sinking of Olympus Mons is shown.

28 January 2016 ($\lambda=101^\circ\text{Ls}\text{--}102^\circ\text{Ls}$, $\delta=6.6''\text{--}6.7''$)

CFs shot similarly to the preceding one at $\omega=213^\circ\text{W}$. On L-colour, Elysium is roundish light near the CM. If it is light in a "true" B, we may regard it as due to a whitish mist, but if it depends much on the B decomposition, it may be dubious. The description of M Cimmerium is better than before, somewhat more detailed. The ghost near Utopia has been nicely processed. We may consider that the morning limb side shows a trace of a greenish Syrtis Mj which just has come in. Propontis I, the Ætheria dark patch and N Alcyonius are well depicted in a modest way. The npc is now shown more definitely.

29 January 2016 ($\lambda=102^\circ\text{Ls}$, $\delta=6.7''$)

EMr obtained a set of R, G, B images at $\omega=286^\circ\text{W}$, $\phi=15^\circ\text{N}$. The composite RGB shows Syrtis Mj near the CM, and the whitish Hellas. Hellas is light in G, B, but not in R so that we may suggest Hellas (maybe icy at bottom) is covered by the white condensate cloud. The shape of the npc is not definite.

30 January 2016 ($\lambda=102^\circ\text{Ls}$, $\delta=6.7''-6.8''$)

CFs produced an L-colour image at $\omega=184^\circ\text{W}$, $\phi=15^\circ\text{N}$. The configuration is similar to the MJs image on 16 January, while Olympus Mons is more inside by about 10° , and the white cloud patch on Olympus Mons looks as if raised. Inside the light part of Elysium, the core (or the summit of Elysium Mons) looks to stay rather near the \AEtheria dark patch. The area of Phlegra is shadowy and looks broader. Trivium Charontis looks somewhat protruding into Elysium. Inside Utopia and to the east of Utopia, several shadowy specks seem to exist. One of the shadowy specks near the npc must be a part of Rima Borealis, suggesting an existing Olympia to the south of Rima. Note that the configuration of the present case does not show M Tyrrhenum.

31 January 2016 ($\lambda=102^\circ\text{Ls}-103^\circ\text{Ls}$, $\delta=6.8''$)

CFs aimed at $\omega=175^\circ\text{W}$. The white cloud at Olympus Mons is beautiful more inside the disk. On the southern hemisphere, M Cimberium is pronounced following a shadowy evening marking at M Sirenum. Elysium is located on the morning side, where a white mist occupies the area of Elysium Mons. Phlegra looks very broad. The \AEtheria dark patch makes sharply an explicit segment. The description of Utopia and its east is interesting, and the dark spot adjacent to the npc must be Rima Borealis. However Olympia is not well identified because the white area is not well distinct. It should be compared with the images made by Bill FLANAGAN (WFL) on 25 April 2012 at $\omega=180^\circ\text{W}$ though ϕ differs. On the IR685 image the white part is weak so that the npc is indefinite and as well the minute light and shadow nuance at the Utopia area is indefinite.

Denis FELL (DFI) gave a drawing at $\omega=313^\circ\text{W}$. Syrtis Mj broadly is reaching the evening terminator. Hellas is near the evening terminator but not bright. S Sabæus looks faint though S Meridiani is dark. M Acidalium is seen slimly near the morning limb. The npc is white distinct.

2 February 2016 ($\lambda=103^\circ\text{Ls}-104^\circ\text{Ls}$, $\delta=6.9''$)

CFs took one set at $\omega=138^\circ\text{W}$. The longitude moved younger, and the clouds at the evening Tharsis ridges appeared nicely scattered. The clouds look to stay at the western flanks and hence it is suggested the summits of Ascræus and Pavonis Montes prove to be dark spots. The flank cloud at Olympus Mons is isolated and the whitest near the CM. Propontis I is already evident but Elysium is not, maybe on the limb. Utopia and its east look normal. The npc is clearly described and Olympia is now whitish evident following the npc. The IR image is suffered from an arc ghost.

4 February 2016 ($\lambda=104^\circ\text{Ls}-105^\circ\text{Ls}$, $\delta=7.0''$)

EMr imaged one set at $\omega=219^\circ\text{W}$, $\phi=14^\circ\text{N}$. Elysium is light just after the CM. In R, Cebrenia is impressively broad and light. Near the morning limb it is suggested Syrtis Mj is coming in (nice moment), but the image is blurred.

Stefan BUDA (SBd) put forward a nice set of images at $\omega=012^\circ\text{W}$: The R image is excellent in showing the two nails of S Meridiani as well as the total expression of M Acidalium. Especially the area of

Iaxartes and Hyperboreus L is described perfectly for the angular diameter. Indus is shown as was the case in 2014. The B image shows a white small condensate patch at the southern limb.

5 February 2016 ($\lambda=105^\circ\text{Ls}$, $\delta=7.0''\text{-}7.1''$)

MJs constructed *three* sets of images at $\omega=341^\circ\text{W}$, $\omega=354^\circ\text{W}$ and at $\omega=008^\circ\text{W}$. Every set is excellent, while the first one is the most. Syrtis Mj stays at the evening terminator and its northern part is covered by the evening white mist. S Sabæus extends to the foregoing area of Syrtis Mj, and S Meridiani makes a nice shape with two Aryn nails. Edom is light. Oxia Palus is also dark evident roughly connected with Oxus (having a dark spot on the way). The relation of the area with M Acidalium looks nearly perfect (for $\delta=7''$). From the northern part of M Acidalium, Iaxartes runs towards the npc. The npc is definite on every colour and so it is very white definite in RGB. The RGB image of the second set looks slightly fainter, but Iaxartes has become more distinct. The second R image compares favourably with the first one, while Nilokeras is now recognisable. The third set shows completely the area of Chryse: The shadowy downward projection from the southern end of Chryse is conspicuous as seen especially on the R image. The area of Iaxartes looks interesting, but may look somewhat disturbed by an arcking ghost. The third RGB image slightly shows a global misty aspect, though the misty band from Æria to the morning limb is mainly effective. The B images are not quite of the same quality and hence the trio gives us an impression of instability. However as far as we see through R, these sets are quite excellent.

These sets were taken about every one-hour, but if any observer also has an intention of shooting on the following days, we recommend every observer to shoot every *forty minutes* at the same sequence of times. As to this rule, see the MURAKAMI and MORITA article in CMO n°387 (25 July 2011 issue):

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmomn4/CMO387.pdf>

Maurice VALIMVERTI (MVI) gave a set of nice images at $\omega=355^\circ\text{W}$ (plus IR image at $\omega=350^\circ\text{W}$): The angle is quite the same as the second images of the preceding MJs' case, but MVI's may be slightly better because this more suggests a presence of Brangæna at Aram. The proof of a white patch at the southern limb is more definitely shown here. However the description of the equatorial misty band at the area of Æria is weaker than the MJs cases due to a difference of quality of the B image.

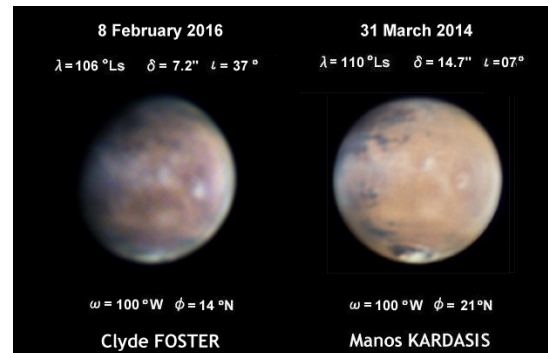
7 February 2016 ($\lambda=106^\circ\text{Ls}$, $\delta=7.2''$)

CFs made an L-colour image at $\omega=107^\circ\text{W}$. It grasps the Tharsis serial ridges as chains of white clouds (the Ascræus Cloud may be thicker), and shows the light part of Olympus Mons. However as seen from the unclearness of the B decomposition, the cloud at the west flank of Olympus Mons is not well white. The npc is also not distinct, while the evening mist at Xanthe is shown thick to be whitish in L-colour. In these cases, it would be better to show us, instead of the decomposed images, the original Colour image and the L image separately in addition to the L-colour image.

8 February 2016 ($\lambda=106^\circ\text{Ls}$, $\delta=7.2''\text{-}7.3''$)

On the following day, **CFs** obtained a better set of images at $\omega=100^\circ\text{W}$, $\phi=14^\circ\text{N}$. The cloud at the western flank of Olympus Mons is described to be very white. The Ascræus Cloud and the cloud at Pavonis Mons are separately conspicuous. Arsia Mons looks rather free from the white cloud and the summit is rather shadowy. The preceding area in the evening shows a configuration of cloud patches. Solis L and Tithonius L are definite. Alba Patera is also faintly seen. The npc is dull whitish together with the upcoming Olympia. At the very southern limb, a morning cloud is visible faintly near at Phaethontis.

For comparison's sake, we here show another image by Manos KARDASIS (MKd) who made it on 31 March 2014 at $\omega=100^\circ\text{W}$. We should note, however, the tilt of $\phi=21^\circ\text{N}$ is quite different as well as the phase angle. The difference of the cloud configuration is mostly caused by the difference of the phase angle (that is, the Local Martian Time of each cloud is different). We additionally note that a slow start of the cloud of Arsia Mons is well known and its cloud activity will reach a peak around at $\lambda=150^\circ\text{Ls}$. Alba Patera also will increase its intensity presently.



9 February 2016 ($\lambda=106^\circ\text{Ls}$ - 107°Ls , $\delta=7.3''$)

EMr obtained one set of images at $\omega=167^\circ\text{W}$, $\phi=13^\circ\text{N}$: The white cloud associated with Olympus Mons is outstanding near the terminator. This is conspicuous in G and B. On the morning side, Cerberus and Phlegra are marked in a wine-colour. Propontis I is a dark blurred speck. Elysium is a bit light bounded by the Ætheria dark patch which is quite near the limb. Below the Cebrenia light zone, there lies a darker area of Utopia and its east. The southern marking shows a slightly bluish tinge, though its configuration looks blurred. The npc is very off-white in RGB.

10 February 2016 ($\lambda=107^\circ\text{Ls}$, $\delta=7.3''$ - $7.4''$)

Yukio MORITA (Mo) must have lost much time in the optical axis adjustment, but finally completed to obtain three sets of images on this day at $\omega=328^\circ\text{W}$, $\omega=334^\circ\text{W}$ and at $\omega=338^\circ\text{W}$. The first LRGB image shows S Sabæus and the sinking Syrtis Mj rather in a black tint (misty blue in RGB). M Acidalium is described in a slim triangular shape near the morning limb, and Oxus is traced starting from the morning S Margaritifer. The R and L images look rough. The second group may be said milder and hence the LRGB image shows a rather misty surface, though the misty band from Æria to the morning limb is more nicely shot on the B image of the first group. The second RGB looks more natural where the northern end of M Acidalium is darker. The third R image at $\omega=338^\circ\text{W}$ shows a better finish with a better description of Oxia P, though it does not yet show well Iaxartes. Note that every L image looks rough.

11 February 2016 ($\lambda=107^\circ\text{Ls}$ - 108°Ls , $\delta=7.4''$)

CFs obtained images at $\omega=071^\circ\text{W}$. The L-colour image shows the area of Solis L and Tithonius L. Ophir-Candor is lighter. A remarkable point is that the Ascræus Cloud is described very bright/white. The npc is well described in colour. M Acidalium still lies down, but Hyperboreus L is dark visible adjacent to the npc. To compare, see Maurice VALIMBERTI (MVI)'s image on 23 March 2014 ($\lambda=106^\circ\text{Ls}$) at $\omega=074^\circ\text{W}$ where ι is considerably different. On MVI's image, the Ascræus Cloud is also obvious. Tomio AKUTSU (Ak) on 19 May 2012 ($\lambda=113^\circ\text{Ls}$) at $\omega=073^\circ\text{W}$ however shows the situation after opposition, and hence the very morning terminator faced to us and whole of the Tharsis area is under the morning mist while Ascræus Mons's summit looks poked out from the morning mist as if a dark spot.

12 February 2016 ($\lambda=108^\circ\text{Ls}$, $\delta=7.4''$ - $7.5''$)

Succeedingly, **CFs** took a set of images at $\omega=058^\circ\text{W}$. The area around Agathodæmon and Ophir has been easier to survey. The shadow of Ascræus Mons and the cloud at the western flank of Ascræus Mons are evident. Ganges and Nilokeras make an interesting complex. However the arcking ghost is annoying.

15 February 2016 ($\lambda=109^\circ\text{Ls}$ - 110°Ls , $\delta=7.6''$ - $7.7''$)

CFs furthermore took a set of images at $\omega=032^\circ\text{W}$, $\phi=12^\circ\text{N}$. M Acidalium largely stays near the CM. In IR685, Hyperboreus L is quite dark adjacent to the npc.

♂..... **We Further Received:** First a drawing from **DFI** which was made on 3 January 2016 ($\lambda=090^\circ\text{Ls}$) at $\omega=207^\circ\text{W}$ showing Elysium near the CM. Note that Syrtis Mj is coming in from the morning limb.

Secondly an ASI 120MM image from **Charles TRIANA (CTr)** who made it on 27 December 2015 ($\lambda=087^\circ\text{Ls}$) at $\omega=266^\circ\text{W}$. The image looks smaller, while the pure white Hellas and the dark Syrtis Mj are very explicit, and the area of Utopia described gives a good impression. Elysium is going out to the rear side followed by the Ætheria dark patch. The npc looks a bit larger and quite clear. We highly expect that **CTr** from the South American Continent will constantly continue the observation in this apparition which is favourable for the Southern Hemisphere observers: He sent us about eight good images during the preceding 2013|2014 apparition.

(Masatsugu MINAMI and Masami MURAKAMI)

Forthcoming 2016 Mars (#07)

Ephemeris for the Observations of the 2016 Mars. III March & April 2016

By

Masami MURAKAMI

AS a sequel to the preceding list (in CMO n°441) of the Ephemeris for the physical observations of Mars, we here list up the necessary elements of the Ephemeris for the period from 01 March 2016 to 30 April 2016: The data are listed for every day at 00:00 GMT (not TDT). The symbols ω and ϕ denote the Longitude and Latitude of the sub-Earth point respectively. The symbols λ , δ and ι stand for the Areocentric Lon-

gitude of the Sun, the Apparent Diameter and the Phase Angle respectively. We also add the column of the Position Angle Π of the axis rotation, measured eastwards from the north point: This is useful when we try to determine the north pole direction from the $p \leftarrow \rightarrow f$. The Apparent Declination of the planet is also given at the final column (denoted D). The data here are basically based on *The Astronomical Almanac for the Year 2016*.

Date (00:00GMT)	ω	ϕ	λ	δ	ι	Π	D
01 March 2016	207.90°W	9.89°N	116.09°Ls	8.69"	36.7°	37.2°	-18°26'
02 March 2016	198.44°W	9.74°N	116.56°Ls	8.77"	36.6°	37.2°	-18°32'
03 March 2016	188.99°W	9.58°N	117.02°Ls	8.86"	36.6°	37.1°	-18°38'
04 March 2016	179.55°W	9.43°N	117.49°Ls	8.94"	36.5°	37.0°	-18°43'
05 March 2016	170.11°W	9.27°N	117.95°Ls	9.02"	36.4°	37.0°	-18°48'
06 March 2016	160.67°W	9.13°N	118.42°Ls	9.11"	36.3°	36.9°	-18°54'
07 March 2016	151.25°W	8.98°N	118.89°Ls	9.20"	36.2°	36.8°	-18°59'
08 March 2016	141.82°W	8.84°N	119.35°Ls	9.28"	36.1°	36.8°	-19°04'
09 March 2016	132.40°W	8.69°N	119.82°Ls	9.37"	36.0°	36.7°	-19°09'
10 March 2016	122.99°W	8.56°N	120.29°Ls	9.47"	35.9°	36.6°	-19°14'
11 March 2016	113.58°W	8.42°N	120.76°Ls	9.56"	35.8°	36.6°	-19°19'
12 March 2016	104.18°W	8.29°N	121.22°Ls	9.66"	35.6°	36.5°	-19°23'
13 March 2016	094.78°W	8.15°N	121.69°Ls	9.75"	35.5°	36.4°	-19°28'
14 March 2016	085.39°W	8.03°N	122.16°Ls	9.85"	35.3°	36.3°	-19°33'
15 March 2016	076.00°W	7.91°N	122.63°Ls	9.95"	35.2°	36.3°	-19°37'

Date (00:00GMT)	ω	ϕ	λ	δ	ι	Π	D
16 March 2016	066.62°W	7.78°N	123.10°Ls	10.04"	35.0°	36.2°	-19°41'
17 March 2016	057.25°W	7.66°N	123.57°Ls	10.14"	34.8°	36.1°	-19°46'
18 March 2016	047.88°W	7.55°N	124.05°Ls	10.25"	34.6°	36.1°	-19°50'
19 March 2016	038.52°W	7.44°N	124.52°Ls	10.36"	34.5°	36.0°	-19°54'
20 March 2016	029.17°W	7.32°N	125.00°Ls	10.46"	34.3°	35.9°	-19°58'
21 March 2016	019.82°W	7.21°N	125.47°Ls	10.57"	34.1°	35.9°	-20°02'
22 March 2016	010.47°W	7.11°N	125.95°Ls	10.68"	33.9°	35.8°	-20°06'
23 March 2016	001.14°W	7.02°N	126.42°Ls	10.79"	33.7°	35.7°	-20°09'
24 March 2016	351.81°W	6.92°N	126.90°Ls	10.90"	33.4°	35.7°	-20°13'
25 March 2016	342.49°W	6.82°N	127.37°Ls	11.01"	33.2°	35.6°	-20°17'
26 March 2016	333.17°W	6.74°N	127.85°Ls	11.13"	33.0°	35.6°	-20°20'
27 March 2016	323.87°W	6.66°N	128.33°Ls	11.25"	32.7°	35.5°	-20°24'
28 March 2016	314.57°W	6.57°N	128.81°Ls	11.36"	32.5°	35.4°	-20°27'
29 March 2016	305.27°W	6.49°N	129.29°Ls	11.48"	32.2°	35.4°	-20°30'
30 March 2016	295.99°W	6.43°N	129.77°Ls	11.61"	31.9°	35.3°	-20°34'
31 March 2016	286.71°W	6.36°N	130.25°Ls	11.73"	31.7°	35.3°	-20°37'
01 April 2016	277.45°W	6.30°N	130.73°Ls	11.86"	31.4°	35.2°	-20°40'
02 April 2016	268.18°W	6.23°N	131.21°Ls	11.98"	31.1°	35.2°	-20°43'
03 April 2016	258.93°W	6.19°N	131.70°Ls	12.11"	30.8°	35.1°	-20°46'
04 April 2016	249.69°W	6.14°N	132.18°Ls	12.25"	30.4°	35.1°	-20°49'
05 April 2016	240.45°W	6.10°N	132.67°Ls	12.38"	30.1°	35.1°	-20°52'
06 April 2016	231.23°W	6.05°N	133.15°Ls	12.51"	29.7°	35.0°	-20°54'
07 April 2016	222.01°W	6.03°N	133.64°Ls	12.65"	29.3°	35.0°	-20°57'
08 April 2016	212.81°W	6.00°N	134.13°Ls	12.78"	29.0°	35.0°	-21°00'
09 April 2016	203.61°W	5.98°N	134.61°Ls	12.92"	28.6°	34.9°	-21°02'
10 April 2016	194.42°W	5.95°N	135.10°Ls	13.05"	28.2°	34.9°	-21°05'
11 April 2016	185.24°W	5.95°N	135.59°Ls	13.19"	27.8°	34.9°	-21°07'
12 April 2016	176.07°W	5.95°N	136.08°Ls	13.34"	27.4°	34.9°	-21°09'
13 April 2016	166.91°W	5.95°N	136.56°Ls	13.48"	26.9°	34.9°	-21°12'
14 April 2016	157.76°W	5.95°N	137.05°Ls	13.62"	26.5°	34.8°	-21°14'
15 April 2016	148.62°W	5.97°N	137.55°Ls	13.77"	26.0°	34.8°	-21°16'
16 April 2016	139.49°W	5.99°N	138.04°Ls	13.91"	25.6°	34.8°	-21°18'
17 April 2016	130.37°W	6.01°N	138.54°Ls	14.06"	25.1°	34.8°	-21°20'
18 April 2016	121.26°W	6.03°N	139.03°Ls	14.20"	24.6°	34.8°	-21°22'
19 April 2016	112.17°W	6.08°N	139.53°Ls	14.35"	24.1°	34.9°	-21°24'
20 April 2016	103.08°W	6.12°N	140.02°Ls	14.50"	23.6°	34.9°	-21°26'
21 April 2016	094.00°W	6.17°N	140.52°Ls	14.64"	23.0°	34.9°	-21°28'
22 April 2016	084.93°W	6.21°N	141.01°Ls	14.79"	22.5°	34.9°	-21°30'
23 April 2016	075.88°W	6.28°N	141.51°Ls	14.94"	21.9°	34.9°	-21°31'
24 April 2016	066.83°W	6.36°N	142.01°Ls	15.09"	21.4°	34.9°	-21°33'
25 April 2016	057.80°W	6.43°N	142.50°Ls	15.23"	20.8°	35.0°	-21°34'
26 April 2016	048.78°W	6.50°N	143.00°Ls	15.38"	20.2°	35.0°	-21°36'
27 April 2016	039.76°W	6.60°N	143.50°Ls	15.53"	19.6°	35.0°	-21°37'
28 April 2016	030.76°W	6.69°N	144.01°Ls	15.67"	19.0°	35.1°	-21°38'
29 April 2016	021.77°W	6.79°N	144.51°Ls	15.82"	18.3°	35.1°	-21°39'
30 April 2016	012.79°W	6.88°N	145.01°Ls	15.96"	17.7°	35.2°	-21°41'
01 May 2016	003.82°W	7.00°N	145.52°Ls	16.10"	17.0°	35.2°	-21°42'

Letters to the Editor

Messages to the 30th Anniversary of the CMO

●.....*Subject: Re: CMO #443 uploaded*
Received: 28 January 2016 at 02:35 JST

Dear Masatsugu and colleagues, I greatly appreciated the beautiful opening essay by Sam Whitby -- I too remember seeing the Comet of the Century in 1965; in my case I was prompted by instructions sent to me by Robert Burnham, Jr., who took time to answer a query I put to him -- and his poem about Mars.

I also enjoyed the lovely reminiscences by my friend ASADA-san about the early days of the CMO, and the importance of the initiative -- much more difficult in those days, before CCD and the internet -- to monitor Mars at all times through an international effort. The opposition of 1986 was poorly observed by me, partly because at the time I did not have an adequate telescope, it was far south -- barely rising out of the treetops over the married student housing I was living in at the time, as a medical student, and was of course kept busy at night rounding on patients. By 1988, I had moved into the small Dutch colonial house that my wife and I shared and where our first son was born that same year, and had a 6-inch Christen apochromat that I used to observe Mars. Names like those of Masatsugu Minami, Tsuneo Saheki, and Don Parker were those of legends -- I never would have believed that I would meet two of them, and the family of the third.

At present, my main occupation is moving from Willmar, Minnesota, which is unpleas-

ant for the winter and shriveled as a place for my professional interests, to Flagstaff, and I hope to be permanently away from here and settled there by April, with my wife to follow as soon as we can unload our Minnesota real estate holdings.

That means that I will be able to regularly visit the Collections Center at Lowell Observatory which holds the Planetary Patrol collection. I am wondering if it would be possible to archive there a complete collection of the CMO bulletins?

I would also like to write, perhaps for *Sky & Telescope*, an account of the glorious achievements of the CMO, perhaps in time for the centenary of Percival Lowell's death. I would like to at least make a few comments on that occasion about the inspired group who has studied Mars from the land that Lowell loved so well.

Meanwhile, I am wondering if Minami-san would be so kind as to write up an ephemeris and suggestions for observing the Edom Flares this year -- it appears that the circumstances will favor the Far East rather than the West as was the case in 2001.

With kind regards, and taking great pride in an association with the CMO on the occasion of its 30th birthday,

Bill SHEEHAN (Willmar, MN)

●.....*Subject: Re: CMO #443 uploaded*
Received: 28 January 2016 at 20:26 JST

My thanks for continuing to produce and distribute the CMO. It is 30 years since Masatsugu Minami and I first corresponded, but the time seems to have passed all too quickly! With best wishes.

Richard McKIM (Peterborough, the UK)
 Director, the BAA Mars Section

●...*Subject: Congratulations!*
Received: 30 January 2016 at 18:23 JST

Dear Masatsugu, Masami and all at CMO. It is a little late, but may I wish you hearty congratulations on the 30th Anniversary of the CMO. As you are aware, I am a recent "Martian" contributor, but am excited to continue to make further contributions to earth based observations and imaging of the red planet. It is very clear to me that you have made a exceptional contribution to the capturing, recording and commentary on Mars observations over the years. May I thank you for that. It has been a pleasure and a privilege to interact with you over the last year and a half or so since I started sending images. May I wish you all of the very best for the future. Best regards,

Clyde FOSTER (Centurion, SOUTH AFRICA)

●...*Subject: Re. CMO*
Received: 16 February 2016 at 23:59 JST

Dear Sam (if I may!),

Great to hear from you. Of course, I've often seen your communications to the CMO, and enjoyed picturing to myself your activities.

You grew up in the same era I did -- in fact, as you know, seeing the Great Comet of 1965 was a landmark of my early interest (I was ten). The still unvisited terrain of the Moon and the distant orbs of the planets still evoked realms of mystery -- and it was exciting to participate, even in a small way (as through ALPO) to elucidating them. (Regarding Phil Budine: I still remember the excitement with which I received a communication from him in March 1978, when I was briefly home from grad school, that I was an independent discoverer of the SEB disturb-

ance that year; though my bubble was burst a bit when in the *Strolling Astronomer* my name was misspelled! Such is fame....)

I have great admiration for what Masatsugu Minami has done over the years, and as currently *Sky & Telescope* -- after a rather fallow period -- seems interested in reviving the regular Solar System series Tom Dobbins and I did for a number of years, I am hoping to sell them on the idea of doing a feature on the CMO, in connection with its 30th anniversary (and perhaps in connection with the Edom flares, which will only be visible this time around from the Far East).

Hope we meet up some time!

Best,

Bill SHEEHAN

On 15 February 2016, Samuel Whitby wrote:

Dear Dr Sheehan,

I want to thank you for the kind words in regard to my recent contribution to the CMO. When our friend Dr Minami asked me to write a piece for him which would include a poem, I at first hesitated. Years of Parkinson's have made observing of any kind a rarity for me, and I have not sent observations to Minami in a long time. It would have been better, I thought, for some of the younger people to step up and write something appreciative. Then I thought of how his culture seems to value age and experience, and I decided to send him something that might have special meaning for him.

Years ago I used to draw Jupiter for ALPO. Phil Budine put my name on a list of good planetary artists near Alike K Herring's name. I was not young, nor was I fooled in regard to Phil's objectivity. I had, however,

admired Herring immensely since childhood. Seeing my name near Herring's, even as often happened mis-spelled, was thrilling. I will not forget it.

I have admired your books for years and have bought several of them. My favorites

are Planets and Perception and Epic Moon. Now, when I tell my story of Phil Budine's list, I will at least think and may say that a similar thrill occurred when you mentioned me in a Letter to the Editor.

Sincerely,

Sam WHITBY (VA, the USA)

Now Usual LtE emails to the Editor

●.....*Subject: Mars - January 23rd, 09:42ut*
Received: 24 January 2016 at 23:43 JST

Hi Mr. Masatsugu and All!, Here is my latest session of Mars on January 23rd, 09:42ut. Also my recent session with Jupiter January 19th.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160123/EMr23Jan16.jpg>

○.....*Subject: Mars - January 29th*
Received: 2 February 2016 at 09:33 JST

Hi Mr. Minami!, Here are my latest sessions from Mars and Jupiter on 29 January and on 30 January:

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160129/EMr29Jan16.jpg>

○.....*Subject: Mars - February 4th, 9th*
Received: 11 February 2016 at 07:09 JST

Hi Mr. Minami and All !, Here are my latest sessions from February 4th, 9th of Mars and my latest on Jupiter from February 8th.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160204/EMr04Feb16.jpg>

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160209/EMr09Feb16.jpg>

Efrain MORALES (Aguadilla, PUERTO RICO)

●.....*Subject: Mars 2016/01/27 0206UT*
Received: 27 January 2016 at 13:15 JST

Hi all, A Mars capture from this morning with Elysium region prominent. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160127/CFs27Jan16.jpg>

○.....*Subject: Mars 2016/01/28 0206UT*
Received: 28 January 2016 at 13:43 JST

Hi all, Mars image from this morning. Best,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160128/CFs28Jan16.jpg>

○.....*Subject: Mars 2016/01/30 0247UT*
Received: 30 January 2016 at 16:02 JST

Hi all, Mars capture from this morning, with Olympus Mons on the preceding limb.

A couple of comments:

a) I have adjusted my template sizing so that I can start standardising on my resizing during proc-

essing. I have been a bit "all over the show" up until now, so I want to get that right. Any comments, positive or negative, would be welcome.

b) As you will note, I am still struggling with the "contrast arc" on the bright limb. I have read Martin Lewis' report on this on his website, which is highly informative. I have also tried (this morning) Jim's suggestion of reducing the contrast setting in Firecapture, although I found that although it did reduce the effect somewhat, it also seemed to reduce the detail (similar in effect to reducing the sharpening in Registax), so my personal suspicion is that it goes beyond the contrast setting. However, I will still explore this option further. I have had a rather unstructured look at different settings in terms of histogram, gain, fps/exposure and contrast, but also think that I should have a look at collimation and possibly focal length as well? I think a structured investigation is in order. Although I covered the 2nd half of the last apparition fairly extensively, this is my first "full" Mars apparition, and still very much on the learning curve (don't think that will ever stop....!!). Please bear with me on this, and I at least hope that the data on the rest of the planet is of some value. Needless to say, any comment, suggestions or recommendations would be more than welcome. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160130/CFs30Jan16.jpg>

○.....*Subject: Mars 2016/01/31 0253UT*
Received: 31 January 2016 at 17:33 JST

Hi all, Capture of Mars from this morning. (For those that are interested, I took a number of captures at different gain and histogram settings. This came out the best from both a detail and "contrast arc/ rind" perspective. It was taken at quite a low

histogram setting. The contrast arc was significantly more evident when I tried to capture at a +-70% histogram setting- my natural instinct was that a higher dynamic range may make things better.....)

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160131/CFs31Jan16.jpg>

○.....*Subject: Mars 2016/02/02 01:38UT*
Received: 2 February 2016 at 16:44 JST

Hi all, Capture of Mars from this morning. Despite fairly poor seeing conditions, cloud is seen over all the Tharsis Volcanos. Suspect that Alba Patera is visible, possibly with very light cloud?

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160202/CFs02Feb16.jpg>

○.....*Subject: Mars 2016/02/07 0247UT*
Received: 7 February 2016 at 13:28 JST

Hi all, A capture of Mars from this morning. Unfortunately after being clouded out for a number of days, and storms overnight with broken cloud, seeing conditions were exceptionally poor, but I am submitting "for the record", nonetheless. I am hoping the weather will settle going forwards.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160207/CFs07Feb16.jpg>

○.....*Subject: Mars 2016/02/08 0255UT*
Received: 8 February 2016 at 13:06 JST

Hi all, A bit better conditions this morning and some nice detail starting to show. Alba Patera very prominent in the lower centre of the image, but quite a few other features to note. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160208/CFs08Feb16.jpg>

○.....*Subject: Mars 2016/02/11 0254UT*
Received: 11 February 2016 at 13:17 JST

Hi all, Mars capture from this morning. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160211/CFs11Feb16.jpg>

○.....*Subject: Mars 2016/02/12 0239UT*
Received: 15 February 2016 at 04:17 JST

Hi all, Mars capture from 12 February. The capture was a bit rushed as it was between clouds and I was also rushing to leave home for the weekend, so I did not have the opportunity to adjust or try various settings. Unfortunately the bright limb artefact is evident. However, as always, I am hoping the data on the rest of the planet is of value.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160212/CFs12Feb16.jpg>

○.....*Subject: Mars 2016/02/15 0253UT*
Received: 15 February 2016 at 14:42 JST

Hi all, Mars capture from this morning. Conditions were poor. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160215/CFs15Feb16.jpg>

Clyde FOSTER (Centurion, SOUTH AFRICA)

●.....*Subject: Mars Image 2015/12/27*
Received: 28 January 2016 at 11:21 JST

Dear Sirs, I send you one image.

Mars 2015/12/27 UT 10:41:10 at $\omega=266^\circ\text{W}$
SCT LX200UHTC 254mm + Barlow AP BARADV 2x + RGB
Astronomik Type IIc Filters + ASI120MM @ 0.11"/pixel (f/27)
LRGB: 4250/2600/1735/724 frames @ 47/28/19/8 fps @ 6 min
S: 6/10 - T: 5/5 - Alt: 63°

Comments: This is an image of Mars at dawn on 27 December 2015. Seeing conditions were good, but the size of the planet was just 5.4", since it is still far from its opposition in May, when it will reach about 18". As a result, the image of the planetary disk is very small.

However, the surface details are well observed, the Syrtis Major region in south, Utopia in north, near the central meridian. South of Syrtis Major the bright region of Hellas is observed. Cloudiness in the east limb is observed near the Elysium region.

Clear Skies,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/151227/CTr27Dec15.jpg>

Charles TRIANA Ortiz (Bogotá, COLOMBIA)
AstroExplor Observatory
www.astroexplor.org

●.....*Subject: test post*
Received: 2 February 2016 at 11:08 JST

Just a test to see if this works, attached previous Mars image.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160103/DFI03Jan16.jpg>

Denis FELL (Kennedy, SK, CANADA)

●.....*Subject: Mars RGB from 04 Feb. 2016*
Received: 5 February 2016 at 17:46 JST

Dear CMO, Please find attached my first Mars image set for this apparition. The seeing was slightly better than average for the location.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160204/SBd04Feb16.jpg>

Stefan BUDA (Melbourne, AUSTRALIA)

●.....*Subject: Mars 5th Feb 2015*

Received: 9 February 2016 at 19:10 JST

Hello all, I have attached an image set of Mars taken on 5 February in good seeing. best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160205/MV105Feb16.jpg>

Maurice VALIMBERTI (Melbourne, AUSTRALIA)

●.....*Subject: Mars - Mo10Feb_16*

Received: 14 February 2016 at 21:22 JST

Dear Masatsugu MINAMI-sama: Due to a series of dismal weather here, and otherwise because I have been forced to spend some time to adjust the optical axis of my SCT, I was absent a while from the Mars observation. I hope from now on since the weather will gradually restore, I will try my best in shooting Mars. With best regards

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160210/Mo10Feb16.jpg>

Yukio MORITA (Hiroshima, JAPAN)

●.....*Subject: Mars images*

Received: 15 February 2016 at 10:39 JST

Dear Sirs, Please find the attached Mars image set from the 5th February 2016. Taken in varied seeing that at times was very good. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160205/MJs05Feb16.jpg>

Mark JUSTICE (Melbourne, AUSTRALIA)

●.....*Subject: A drawing of Mars*

Received: 21 February 2016 at 21:43 JST

Dear all, I am back at the red planet again! Mars is still fantastic, pleasing to my eyes. Attached here is my first drawing of Mars in this apparition.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160218/Kn18Feb16.jpg>



My new weapon, Mead's 40cm SCT seems to be great in optical performance.

Good Seeing, with excellent telescopes!

PS: Also attaching a snap of my new 40cm SCT ("A Wiring Inferno" with the anti-fog heaters, etc.)

Reiichi KONNAI (Fukushima, JAPAN)

☆☆☆

International Society of the Mars Observers (ISMO)

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CMO n°444/ ISMO n°70 (25 February 2016)

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