

MARS

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OBSERVATIONS

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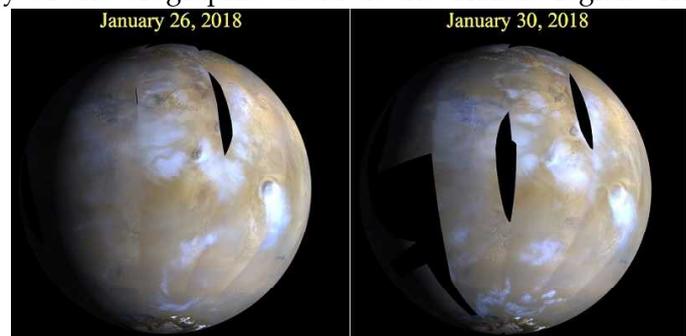
CMO/ISMO 2018 Mars Report #03

**2018 CMO/ISMO Mars Observations Made
in January 2018 ($\lambda=109^\circ\text{Ls}$ ~ $\lambda=123^\circ\text{Ls}$ 2018)**

By
Masatsugu MINAMI and Masami MURAKAMI

♂..... We shall here show the third report of the 2018 CMO/ISMO Mars observations. That is we shall here deal with the observations performed by the ISMO members during January 2018. The planet Mars in January stayed in the Lib constellation and passed near the planet Jupiter on 7 January by 0.2° south, and at the end of January the planet Mars rapidly went inside the Sco constellation. The apparent declination D , though it having been around 15°S at first, further fell down to 20°S below at the end of January. During the month, the apparent diameter of Mars went up from $\delta=4.8''$ to $\delta=5.6''$. The tilt of the north pole of the planet Mars stayed from $\varphi=16^\circ\text{N}$ to $\varphi=08^\circ\text{N}$. The phase angle ι was around 30° to 35° and the defect of illumination was still at the evening terminator. The Martian season indicator λ proceeded from $\lambda=109^\circ\text{Ls}$ to $\lambda=123^\circ\text{Ls}$. This season Hellas looks whitish bright. It should be remarked that the mist along the equatorial zone will show up. Note that after $\lambda=120^\circ\text{Ls}$ there will possibly arise some cyclones at the arctic high latitude area. It should be remembered, furthermore, that after around $\lambda=130^\circ\text{Ls}$ Alba Patera will be about to welcome the second peak of the white clouds, and similarly Pavonis Mons will show a second peak after $\lambda=150^\circ\text{Ls}$. On the other hand Arsia Mons will show a thicker peak during the period from $\lambda=150^\circ\text{Ls}$ to $\lambda=220^\circ\text{Ls}$.

♂..... The MRO MARCI images show the activity of the orographic cloud at the Tharsis region. The cloud at Olympus Mons shows a less activity towards north-western direction. Elysium Mons shows a variable activity of clouds from day to day, and sometimes clouds turned large. The mist at the equatorial zone is often checked on the dark markings of Syrtis Mj; Sometimes it is observed on Aeria continuing to Thymiamata. It was reported that to the north of Tempe and Alba Patera there was seen an ice phase cloud. There seems no report yet of the cyclone at the arctic area.



♂.....The amount of the observations we received in January did not make much difference from the preceding month. From Japan we received 7 observations from T KUMAMORI (Km) and T AKUTSU (Ak), both of whom however are struggling with the severe cold waves with the very poor seeing conditions. Clyde FOSTER (CFs) from South Africa contributed a total of 14 Observations. Australian observer Phil MILES (PMI) sent us one observation (maybe made by the same instrument that Anthony WESLEY (AWs) is using). Damian PEACH (DPc) contributed three observations obtained by a remote control of the 100cm Richey Chretien (with the Chilescope team at Chile). Thus we received a total of 25 observations.

♂.....The following is the list of the observers and the instruments they used. We would like to appreciate their continued cooperation and hope for their future activities.

AKUTSU, Tomio (Ak) Hitach-Oota, Ibaraki, JAPAN

1 IR Image (14 January 2018) 32cm Spec with an ASI 290MM

FOSTER, Clyde (CFs) Centurion, SOUTH AFRICA

12 Sets of RGB + 14 IR Images (2,~6, 12,~ 15, 17, 18, 21, 22, 28 January 2018)
36cm SCT @ f/27 with an ASI 290MM

KUMAMORI, Teruaki (Km) Sakai, Osaka, JAPAN

4 Colour* + 4 R + 4 B Images (15, 20, 26, 30 January 2018)
36cm SCT @ f/35, 40 with an ASI 290MM & ASI 224MC*

MILES, Phil (PMI) Rubyvale, QLD, AUSTRALIA

1 Set of RGB Images (30 January 2018) 51cm Spec with a PGR GS3-U3-32S4M

PEACH, Damian A (DPc) Selsey, WS, the UK, remote controlled the Chilescope Team in CHILE

3 Sets of RGB Images (6, 21, 27 January 2018) Chilescope (100cm Richey Chretien)

♂.....We are now in a position to give some comments to the observations made in January 2008: Please refer to each image recorded in our CMO/ISMO 2018 Mars Gallery:

http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/f_image.html

On 2 January 2018 ($\lambda=109^\circ\text{Ls}$, $\delta=4.8''$), Clyde FOSTER (CFs) gave an IR image at $\omega=261^\circ\text{W}$, $\phi=16^\circ\text{N}$ by the use of a 36cm SCT. The morning Hellas and the part of the north polar cap (npc) are rather bright. The northern part of Syrtis Major (Mj) is considerably dark. Syrtis Minor (Mn) is visible accompanied by a bit of Hesperia. The northern marking around Cassius and Boreosyrtis is dark connected in a U-shaped with the following Nilosyrtis surrounding a light area of Neith Regio. However Nodus Alcyonius is not so clear. The evening Ætheria dark patch is also not definite.

On 3 January ($\lambda=110^\circ\text{Ls}$, $\delta=4.8''$), CFs composed an RGB image at $\omega=243^\circ\text{W}$ (02:21 GMT), $\phi=15^\circ\text{N}$ based on the three colour images made by using a Baader filter set. An IR685 image is accompanied. Hellas is very whitish bright at the morning limb to the south of the shapely visible morning Syrtis Mj. Hellas is distinct due to the G and B images but dull in R and IR. Near the evening terminator Elysium Mons is shown up with a whitish orographic cloud, but maybe not so purely white. The area around of the npc is whitish but the core is not so clear. N Alcyonius is visible and the Ætheria dark patch is weakly checked following Elysium cloud. To the south of Utopia the desert including Cebrenia looks slightly reddish. In RGB there are seen several lighter spots in an ochre tint preceding the shore of Syrtis Mj (including the possible Osiridis Promontrium) which go down to Neith Regio. These details are well suggested in the IR image. The northern part of M Cimmerium is well shown in R and IR as well as in RGB. It is interesting

to check that Hellas is very bright in G while Syrtis Mj is weaker in G and is not visible in B.

On 4 January ($\lambda=110^\circ\text{Ls}$, $\delta=4.9''$), CFs made a tricolour synthesis at $\omega=237^\circ\text{W}$ (02:37 GMT), $\varphi=15^\circ\text{N}$. The RGB composite looks very excellent. The angle is different from the preceding one by only 6°W , and hence it is now apparent that from the place of CFs it could be possible to observe Mars *twice* every morning if the observer would like to observe every 40 minutes. The cloud of Elysium Mons is now further inside the disk, and it is apparent the cloud is separated from the degraded Ætheria shadowy patch (or we should say the Ætheria dark patch is not so definite as the example given by Km on 29 December 2017 ($\lambda=108^\circ\text{Ls}$)). Syrtis Mj is located closer to the morning limb and so weaker in a light bluish tint. The western Part of M Cimmerium became more visible. On the other hand, Utopia is well described rich in light and shadow. To the south of Utopia there is seen a slightly reddish band occupies.

On 5 January ($\lambda=111^\circ\text{Ls}$, $\delta=4.9''$), CFs produced an RGB colour composite at $\omega=223^\circ\text{W}$, $\varphi=15^\circ\text{N}$. This RGB image show several excellent points: Firstly near the morning limb Syrtis Mj shows beautifully a faint tint of a pale greenish blue because it is beneath the morning mist. The R image shows clearly the presence of Syrtis Mj (but not in G and B). Secondly Hellas is already strongly whitish on the morning limb. Thirdly the orographic cloud at Elysium Mons is compactly roundish. Fourthly the Ætheria dark patch looks to have been shrunk. Fifthly the npc shows a bright core. The whiteness of Hellas, Elysium Mons, and the npc is represented on the excellent B image. The expression of Utopia is also good. A detail of the WN part of M Cimmerium is suggested. The long band of Cebrenia shows a reddish tinge.

On 6 January ($\lambda=111^\circ\text{Ls}$, $\delta=4.9''$), CFs obtained an RGB composite at $\omega=224^\circ\text{W}$ whose angle is quite similar to the work on the preceding day. It was observed on 5 January at 02:19 GMT while on 6 January the time 03:03 GMT was employed. It was nearly 40 minutes separated and hence the similar surface was observed for two days (conversely speaking it now possible to observe twice a day). The two images thus obtained are quite similar: Just the R image on 6 January may be said a bit better. The reddish tint of the desert at Cebrenia is also reproduced. The detail of Hesperia may be shown better on 6 January. The whiteness of the npc looks the same.

On the day (6 January ($\lambda=111^\circ\text{Ls}$, $\delta=4.9''$)), Damian PEACH (DPc) remote controlled the Chilescope (100cm Richey Chretien, located at $30^\circ27'\text{S}$, $70^\circ45'\text{W}$) and obtained a nice set of tri-colour elements as well as the final RGB composite of Mars at $\omega=310^\circ\text{W}$, $\varphi=15^\circ\text{N}$. Sinus Sabæus suggests some details so as to show Sigeus Portus, while the eastern coast of Syrtis Mj is not clear. Hellas is whitish in RGB, but its boundary looks blurred. This must be because Hellas is not so definite in R while in B it is the brightest. Does this DPc set imply that in an early season $\sim\lambda=110^\circ\text{Ls}$, the water vapour still thickly float over the evening Hellas? The large area from Ismenius L to the Boreosyrtis suggests a presence of several unstable dark markings. The npc's core looks definite.

On 12 January ($\lambda=114^\circ\text{Ls}$, $\delta=5.0''$), CFs obtained an RGB image at 02:39 GMT ($\omega=160^\circ\text{W}$), $\varphi=13^\circ\text{N}$ as well as an IR685. Cerberus~Phlegra and Propontis I are visible on the morning side. On the evening side the white cloud at Olympus Mons is visible with the preceding cloud over Tharsis. The width of the Olympus cloud is not so wide: On B it looks blurred.

On 13 January ($\lambda=114^\circ\text{Ls}$, $\delta=5.1''$), CFs secured a better RGB image and an IR685 image at $\omega=151^\circ\text{W}$. The angle is younger than the preceding image by 10°W so that Olympus Mons stays more inside, and hence the explicit white cloud is apparently covering the western foothills. To the east of Olympus Mons, The white cloudy Ascræus Mons and Pavonis Mons are visible near the evening terminator. It should be noted that the npc looks explicitly divided into two. It must imply that the snow of the isolated Olympia still has not melted. The colour of the RGB image is dull, but the reddish tint of Cebrenia is shown. Elysium Mons must be on the morning limb.

On 14 January ($\lambda=115^\circ\text{Ls}$, $\delta=5.1''$), CFs shot in the trio-colour windows at $\omega=137^\circ\text{W}$ and stacked an RGB composite (as well as an IR685 image). The colour is subdued, while the distribution of the orographic clouds at Olympus Mons, Ascræus Mons, and Pavonis Mons are quite sharply explicit.

On the same day, Tomio AKUTSU (Ak) obtained an IR685 image at $\omega=054^\circ\text{W}$, $\phi=13^\circ\text{N}$. The afternoon M Acidalium is barely visible. The markings on the southern hemisphere look just quite dark for some reason.

On 15 January ($\lambda=115^\circ\text{Ls}$, $\delta=5.1''$), CFs issued an RGB composite at $\omega=128^\circ\text{W}$, $\phi=12^\circ\text{N}$. Olympus Mons is at the centre of the illuminated surface, and the covering cloud is bright beautiful, looking compact. The evening cloud complex at the lower Tharsis is nicely described.

On the same day (15 January ($\lambda=116^\circ\text{Ls}$, $\delta=5.1''$)), Teruaki KUMAMORI (Km) took an L-colour image at $\omega=041^\circ\text{W}$ by using 10 minutes derotation: The L image is the one stacked from 18,000 frames, and the colour image was taken by ASI 224MC, stacking 20,000 frames. Otherwise Km made B image and R image. The B does not look successful, while the R is stacked of 18,000 frs at $\omega=048^\circ\text{W}$. The large markings in the R are roughly shown up, but do not so help the L-colour image. On the L-colour the colour of the desert on the morning side looks nice, but not so much details are shown. Ganges and Ophir stay side by side but not in contrast. M Acidalium is large but looks blurred. The markings on the southern hemisphere are also not clear without details.

On 17 January ($\lambda=116^\circ\text{Ls}$, $\delta=5.2''$), CFs continued to observe the region of Olympus Mons to the evening Tharsis ridge and made a set of RGB components at $\omega=111^\circ\text{W}$, $\phi=12^\circ\text{N}$. Olympus Mons' cloud looks very white but compact. The preceding cloud area around Ascræus Mons is connected with the vast preceding evening clouds. The npc here also looks split, and so we here show the npc part taken by Damian PEACH (DPc) at the same season $\lambda=116^\circ\text{Ls}$ in 2014 when the apparent diameter is much larger (ϕ is also quite different). However note that the LCM is different by 28 degrees.



On 18 January ($\lambda=117^\circ\text{Ls}$, $\delta=5.2''$), CFs continued to make an RGB composite at $\omega=102^\circ\text{W}$, but the new angle does not show thickly the clouds at Olympus Mons and Ascræus Mons. The npc is clear in G and hence does the weakness of the orographic clouds imply that the morning clouds are still dully undeveloped?

On 20 January ($\lambda=118^\circ\text{Ls}$, $\delta=5.3''$), Km produced quite an excellent L-colour image by the use of six

minutes derotation at $\omega=360^\circ\text{W}$, $\varphi=11^\circ\text{N}$. The L image was made from 20,000frs and the colour part was stacked from 50,000frs. At the upper limb a weak gas is seen around Argyre. The set of evening S Sabæus/S Meridiani emphasises the shape of S Meridiani *à la* ANTONIADI. Margaritifer S is also dark and Oxia Palus is quite evident. The phantom-like Hydaspis Sinus is also visible. M Acidalium appears totally on the morning side. The part of Achillis Pons is a bit faded. Along the east coast of M Acidalium, the Oxus canal runs down. The npc is nicely whitish definite. Additional R image is also good at $\omega=004^\circ\text{W}$ (stacked from 180,000 frms based on 15 minutes derotation). Iaxartes is more evident on the R image (than the L image because of the time difference). Seeing: 3~4/10, Transparency: 2~3/5.

On 21 January ($\lambda=118^\circ\text{Ls}$, $\delta=5.3''$), CFs took an IR685 image at $\omega=073^\circ\text{W}$. Some blurred identifications are possible at around M Acidalium and Solis L. Ganges must be visible.

On the same day, DPc obtained and sent us an RGB composite at $\omega=153^\circ\text{W}$, $\varphi=11^\circ\text{N}$ and an R image at $\omega=156^\circ\text{W}$. All were obtained by remote controlling the Chilescope at Chile. The orographic clouds are not well shaped, but the clouds at Olympus Mons and the preceding Tharsis ridges are checked. The npc looks whitish flat. The morning limb to the west of Cerberus is very whitish.

On 22 January ($\lambda=118^\circ\text{Ls}$, $\delta=5.3''$), CFs sent us an RGB composite image, three decompositions and an IR image at $\omega=066^\circ\text{W}$. The RGB image looks dully (from the view-point of colour), but some details are revealed. To the north of Auroræ S to Tithonius L there seems to exist a mist band (equatorial). In R and IR we can pin down the area of Ophir.

On 26 January ($\lambda=121^\circ\text{Ls}$, $\delta=5.4''$), Km made an L-colour image at $\omega=300^\circ\text{W}$. Seeing: 2~3/10. By three minutes derotation, he stacked 6,000 frms for the L. For colour image he stacked 20,000 frms. To the west of Æria the desert looks nice in ochre colour. The evening side of Syrtis Mj does not constitute the usual form. Hellas is also quite blurred and never whitish. The additional R image at $\omega=306^\circ\text{W}$ rather provides more definite markings. 7 minutes derotation used and 15,000 frms were stacked.

On 27 January ($\lambda=121^\circ\text{Ls}$, $\delta=5.5''$), DPc issued an RGB composite as well as three ingredient images which were all obtained by remote controlling the Chilescope. The RGB image was at $\omega=113^\circ\text{W}$, $\varphi=09^\circ\text{N}$. Olympus Mons is accompanied by a small covering cloud patch. Independently some white clouds at the lower Tharsis ridge look connected with the vast evening clouds which cover largely the equatorial evening zone. The B image at $\omega=114^\circ\text{W}$ shows nicely the series of the cloud patches. (And this pattern is typical - that is - *déjà vu* in this season). There must exist a weak mist near the southern polar area. The R image suggests several interesting distributions of shadowy markings.

On 28 January ($\lambda=121^\circ\text{Ls}$, $\delta=5.5''$), CFs composed an RGB image based on the three colour ingredients at $\omega=011^\circ\text{W}$, $\varphi=09^\circ\text{N}$. An IR 685 image is also shown. In R, S Meridiani and Oxia P are detailed and several minor markings are revealed in Chryse so that Chryse itself looks cramped. In R and G, the npc looks roundish. M Acidalium is totally inside the disk and looks large.

On 30 January ($\lambda=123^\circ\text{Ls}$, $\delta=5.6''$), Phil MILES (PMI) gave a very excellent RGB composite image at $\omega=230^\circ\text{W}$, $\varphi=09^\circ\text{N}$ together with the three colour components. Syrtis Mj has just been inside the disk

with an attractive shape in a bit bluish tint. To the south of it, Hellas is coming with a white colour. Hesperia is clearly cut, and M Cimmerium shows some details of its north-western side. The pair of Gale crater and Knobel crater seems to be caught. The vicinity of Elysium Mons is also whitish, while the Ætheria dark patch looks more shrunk than before. Cebrenia belt shows a bit reddish colour. N Alcyonius is visible and Utopia is nicely described. The area of the npc looks rather flat.

Km also constructed on the same day an L-colour image at $\omega=260^\circ\text{W}$ where the L image is made from 5,000 frms while the colour image is from ASI224MC based on the 20,000 frms stacked. Hellas is well inside the disk but not purely white and the boundary looks blurred. Syrtis Mj is definite but without details. On the other hand Km displays an R image at $\omega=267^\circ\text{W}$ which looks much nicer. Hellas's boundary is not sharp, but Syrtis Mj shows a good shape. N Alcyonius is spotted and the area at Cassius and Boreosyrtis is well described. The Ætheria dark patch is faintly visible near the evening terminator. The R image is a result of the stacking of 25,000 frms (7 minutes derotation). Seeing was 1~3/10. - - -

Forthcoming 2018 Mars (#05)

Ephemeris for the Observations of the 2018 Mars. III

March & April 2018

By

Masami MURAKAMI

AS a sequel to the preceding list of the Ephemeris for the physical observations of Mars, we here list up the necessary elements of the Ephemeris for the period from 1 March 2018 to 30 April 2018. 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 Longitude 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 2018*.

Date (00:00GMT)	ω	ϕ	λ	δ	ι	Π	D
01 March 2018	017.88°W	1.05°N	136.58°Ls	6.68"	38.4°	30.9°	-22°48'
02 March 2018	008.26°W	0.80°N	137.07°Ls	6.73"	38.5°	30.6°	-22°51'
03 March 2018	358.64°W	0.54°N	137.56°Ls	6.77"	38.6°	30.4°	-22°54'
04 March 2018	349.02°W	0.29°N	138.06°Ls	6.82"	38.7°	30.1°	-22°58'
05 March 2018	339.39°W	0.04°N	138.55°Ls	6.87"	38.8°	29.9°	-23°01'
06 March 2018	329.77°W	0.22°S	139.05°Ls	6.92"	38.9°	29.6°	-23°04'
07 March 2018	320.15°W	0.47°S	139.54°Ls	6.97"	39.0°	29.4°	-23°06'
08 March 2018	310.53°W	0.72°S	140.04°Ls	7.02"	39.1°	29.1°	-23°09'
09 March 2018	300.91°W	0.97°S	140.54°Ls	7.07"	39.2°	28.9°	-23°11'
10 March 2018	291.29°W	1.22°S	141.03°Ls	7.12"	39.2°	28.6°	-23°14'
11 March 2018	281.67°W	1.47°S	141.53°Ls	7.17"	39.3°	28.4°	-23°16'
12 March 2018	272.05°W	1.72°S	142.03°Ls	7.23"	39.4°	28.1°	-23°18'
13 March 2018	262.44°W	1.96°S	142.53°Ls	7.28"	39.5°	27.8°	-23°20'
14 March 2018	252.82°W	2.21°S	143.03°Ls	7.34"	39.6°	27.6°	-23°22'
15 March 2018	243.21°W	2.45°S	143.53°Ls	7.39"	39.7°	27.3°	-23°23'

Date (00:00GMT)	ω	ϕ	λ	δ	ι	Π	D
16 March 2018	233.59°W	2.69°S	144.03°Ls	7.45"	39.8°	27.0°	-23°25'
17 March 2018	223.98°W	2.94°S	144.54°Ls	7.51"	39.8°	26.7°	-23°26'
18 March 2018	214.37°W	3.18°S	145.04°Ls	7.56"	39.9°	26.5°	-23°28'
19 March 2018	204.76°W	3.42°S	145.54°Ls	7.62"	39.9°	26.2°	-23°29'
20 March 2018	195.15°W	3.66°S	146.05°Ls	7.68"	40.0°	25.9°	-23°30'
21 March 2018	185.54°W	3.90°S	146.55°Ls	7.74"	40.1°	25.6°	-23°31'
22 March 2018	175.93°W	4.13°S	147.06°Ls	7.80"	40.1°	25.3°	-23°31'
23 March 2018	166.32°W	4.37°S	147.56°Ls	7.86"	40.2°	25.1°	-23°32'
24 March 2018	156.72°W	4.60°S	148.07°Ls	7.92"	40.3°	24.8°	-23°32'
25 March 2018	147.11°W	4.83°S	148.58°Ls	7.99"	40.3°	24.5°	-23°33'
26 March 2018	137.51°W	5.06°S	149.09°Ls	8.05"	40.4°	24.2°	-23°33'
27 March 2018	127.90°W	5.29°S	149.60°Ls	8.11"	40.4°	23.9°	-23°33'
28 March 2018	118.30°W	5.52°S	150.11°Ls	8.18"	40.5°	23.6°	-23°33'
29 March 2018	108.70°W	5.74°S	150.63°Ls	8.25"	40.5°	23.3°	-23°33'
30 March 2018	099.10°W	5.97°S	151.14°Ls	8.31"	40.6°	23.0°	-23°33'
31 March 2018	089.50°W	6.19°S	151.65°Ls	8.38"	40.6°	22.7°	-23°33'
01 April 2018	079.90°W	6.41°S	152.17°Ls	8.45"	40.6°	22.4°	-23°32'
02 April 2018	070.30°W	6.63°S	152.69°Ls	8.53"	40.7°	22.1°	-23°32'
03 April 2018	060.71°W	6.85°S	153.20°Ls	8.60"	40.7°	21.8°	-23°31'
04 April 2018	051.11°W	7.07°S	153.72°Ls	8.67"	40.7°	21.6°	-23°30'
05 April 2018	041.51°W	7.28°S	154.24°Ls	8.75"	40.7°	21.3°	-23°29'
06 April 2018	031.92°W	7.49°S	154.76°Ls	8.82"	40.8°	21.0°	-23°28'
07 April 2018	022.33°W	7.70°S	155.28°Ls	8.90"	40.8°	20.7°	-23°27'
08 April 2018	012.74°W	7.91°S	155.80°Ls	8.97"	40.8°	20.4°	-23°26'
09 April 2018	003.15°W	8.11°S	156.33°Ls	9.05"	40.8°	20.0°	-23°25'
10 April 2018	353.56°W	8.32°S	156.85°Ls	9.13"	40.8°	19.7°	-23°24'
11 April 2018	343.97°W	8.52°S	157.38°Ls	9.21"	40.8°	19.4°	-23°22'
12 April 2018	334.39°W	8.72°S	157.90°Ls	9.29"	40.8°	19.1°	-23°21'
13 April 2018	324.80°W	8.92°S	158.43°Ls	9.37"	40.8°	18.8°	-23°19'
14 April 2018	315.22°W	9.11°S	158.95°Ls	9.46"	40.8°	18.5°	-23°18'
15 April 2018	305.64°W	9.31°S	159.48°Ls	9.54"	40.8°	18.2°	-23°16'
16 April 2018	296.06°W	9.50°S	160.00°Ls	9.62"	40.8°	17.9°	-23°14'
17 April 2018	286.48°W	9.69°S	160.53°Ls	9.71"	40.8°	17.6°	-23°12'
18 April 2018	276.91°W	9.87°S	161.07°Ls	9.80"	40.8°	17.3°	-23°10'
19 April 2018	267.33°W	10.06°S	161.60°Ls	9.89"	40.7°	17.0°	-23°08'
20 April 2018	257.76°W	10.24°S	162.13°Ls	9.98"	40.7°	16.7°	-23°06'
21 April 2018	248.19°W	10.42°S	162.67°Ls	10.08"	40.7°	16.4°	-23°04'
22 April 2018	238.63°W	10.59°S	163.20°Ls	10.17"	40.7°	16.1°	-23°02'
23 April 2018	229.06°W	10.77°S	163.74°Ls	10.27"	40.6°	15.8°	-23°00'
24 April 2018	219.50°W	10.94°S	164.27°Ls	10.36"	40.6°	15.6°	-22°58'
25 April 2018	209.94°W	11.10°S	164.81°Ls	10.46"	40.5°	15.3°	-22°56'
26 April 2018	200.38°W	11.27°S	165.35°Ls	10.56"	40.5°	15.0°	-22°53'
27 April 2018	190.82°W	11.43°S	165.88°Ls	10.66"	40.4°	14.7°	-22°51'
28 April 2018	181.27°W	11.59°S	166.42°Ls	10.76"	40.3°	14.4°	-22°49'
29 April 2018	171.72°W	11.74°S	166.96°Ls	10.87"	40.3°	14.1°	-22°46'
30 April 2018	162.17°W	11.90°S	167.51°Ls	10.98"	40.2°	13.8°	-22°44'
01 May 2018	152.62°W	12.05°S	168.05°Ls	11.08"	40.2°	13.5°	-22°41' - - -

Letters to the Editor

●.....*Subject: Mars 2018/01/20-Kumamori*
Received: 21 January 2018 at 19:57 JST

Dear Masatsugu MINAMI: The cold loosened its grip a bit, and the seeing condition slightly improved. The north polar cap (npc) showed up. Sinus Meridiani, Margaritifer Sinus and some other markings are decently caught. However I cannot cope with the ghost-like line along the morning limb. Best wishes.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180120/Km20Jan18.png>

○.....*Subject: Mars 2018/01/26-Kumamori*
Received: 27 January 2018 at 18:58 JST

Dear MINAMI: Due to the big cold wave, we had no chance to chase Mars for a week, but it just appeared although the seeing condition was poor. Best,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180126/Km26Jan18.png>

○.....*Subject: Mars 2018/01/30-Kumamori*
Received: 31 January 2018 at 18:05 JST

Dear MINAMI: The sky looked clear, but the seeing remained very poor. Especially the B image was never successful. Just before the Sunrise, the condition improved a bit so that I could decently obtain an R image. Best,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180130/Km30Jan18.png>

○.....*Subject: Mars 2018/02/02-Kumamori*
Received: 3 February 2018 at 16:57 JST

Dear MINAMI: Transparency was no good due to a light cloudy condition. Furthermore misty matter covered the correction plate. However I tried to fill the gains with a so-and-so result (whitish Hellas and the coming out of Syrtis Mj). Best,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180202/Km02Feb18.png>

○.....*Subject: Mars 2018/02/05-Kumamori*
Received: 6 February 2018 at 17:47 JST

Dear MINAMI: Suffering from the cold wave, the sky looked clear but the seeing was terrible. It was difficult even to focus. Best,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180205/Km05Feb18.png>

○.....*Subject: Mars 2018/02/13-Kumamori*
Received: 14 February 2018 at 22:15 JST

Dear MINAMI: After a long while we had a clear sky. However the south wind blew at the upper sky and hence the air flow was poorer. Just we are forced to process a bit extensively to gain some markings. Best wishes,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180213/Km13Feb18.png>

Teruaki KUMAMORI (Osaka, JAPAN)

●.....*Subject: RE: Mars 18 January 2018 0239UIT RGB and IR*
Received: 21 January 2018 at 23:28 JST

Hi all, Ongoing hot, unstable conditions prevented any decent RGB data. Submitting the attached low-res IR capture for the record. The Vallis Marineris complex is approaching the CM.

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180121/CFs21Jan18.png>

○.....*Subject: Mars 22 January 2018 0250UIT RGB and IR*
Received: 22 January 2018 at 18:41 JST

Hi all, Mars RGB/IR image set from this morning, with conditions a bit improved. Evening equatorial cloud over Chryse and Xanthe regions. There also appears to be equatorial cloud over northern Vallis Marineris. Possible cloud over Ascræus Mons and Alba Patera. The Tempe region has a brightish spot (IR, R and G) . Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180122/CFs22Jan18.png>

○.....*Subject: Mars 28 January 2018 0303UIT RGB and IR*
Received: 29 January 2018 at 16:47 JST

Hi all, I am going through an extended period of cloudy, wet weather, which looks like it is going to extend well into this week. Thankful for some nice rain, although it is our friends further south in Cape Town that are in desperate need of water (It is projected that they have 72 days before they run out). I had a very small gap yesterday morning, and despite heavy dew, I just managed to sneak one set of Mars RGB and IR avi's in between clouds. Not surprisingly the conditions were poor and the blue data was especially poor. Over and above the well-known albedo features, the small NPC can be seen and it also appears that Argyre is

detected at the top of the image with some cloud or ice. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180128/CFs28Jan18.png>

○ *Subject: Mars 1 February 2018 0253UT R and G*
Received: 1 February 2018 at 15:34 JST

Hi all, Ongoing cloudy weather only allowed a small gap for single R and G captures before closing over. Hellas just coming into view on the evening terminator. Submitting what I managed to get for the record. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180201/CFs01Feb18.png>

○ *Subject: Mars 2 February 2018 0228UT RGB and IR*
Received: 2 February 2018 at 13:07 JST

Hi all, Conditions a bit better this morning, although there was still plenty of cloud and dew to deal with. Sinus Sabæus/Meridiani, Arabia/Æria and Syrtis Major prominent, as well as the small NPC and equatorial cloud on the sunlit limb. Possible light cloud over Syrtis Major, Hellas is coming into view, and there appears to be a marking that is visible in the basin (G image).

Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180202/CFs02Feb18.png>

○ *Subject: Mars 5 February 2018 0241UT RGB and IR*
Received: 5 February 2018 at 19:39 JST

Hi all, Nice to have clear skies this morning after a lengthy period of cloud. I note the rather interesting structure in the Hellas basin, which is most clearly seen in the G image. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180205/CFs05Feb18.png>

○ *Subject: Mars 6 February 2018; Detail in Hellas*
Received: 6 February 2018 at 15:55 JST

Hi all, Mars this morning, showing some interesting features in the Hellas Basin, which I have enlarged and cropped. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180206/CFs06Feb18.png>

○ *Subject: Mars 9 February 2018 0228UT RGB and IR*
Received: 15 February 2018 at 18:01 JST

Hi all, I have been away since the 9 Feb visiting family, and am catching up with some reasonable data that I captured just as I was leaving. Hellas at upper right and some cloud is evident over the Elysium region at left. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180209/CFs09Feb18.png>

Clyde FOSTER (Centurion, SOUTH AFRICA)

● *Subject: Mars images*

Received: 21 January 2018 at 23:35 JST

Hello, Please find below Mars images i have taken so far this apparition.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180121/DPc21Jan18.png>

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180106/DPc06Jan18.png>

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171226/DPc26Dec17.png>

○ *Subject: Mars images (Jan 21st.)*

Received: 21 January 2018 at 23:38 JST

Hi all, Poor seeing but none the less a result was possible. Bright orographic clouds over Olympus Mons/Tharsis.

http://www.damianpeach.com/mars2018/m2018_01_21dp.jpg

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/171223/DPc23Dec17.png>

○ *Subject: Mars images (Jan 27th.)*

Received: 29 January 2018 at 00:18 JST

Hi all, Here are some Mars images from Jan 27th.

http://www.damianpeach.com/mars2018/m2018_01_27dp.jpg

Bright orographics over Olympus and Tharsis.

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180127/DPc27Jan18.png>

○ *Subject: Mars images (Feb 2nd.)*

Received: 3 February 2018 at 19:15 JST

Hi all, Here are some images from Feb 2nd. Fair seeing. Chryse is now coming into view. Bright limb cloud over Tharsis.

http://www.damianpeach.com/mars2018/m2018_02_02dp.jpg

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180202/DPc02Feb18.png>

○ *Subject: Mars in good seeing (Feb 3rd.)*

Received: 4 February 2018 at 07:11 JST

Hi all, Some good seeing for this session, though constant mid-level clouds made things a headache. Lots of clouds and hazes visible across the planet in the blue filter image.

http://www.damianpeach.com/mars2018/m2018_02_03dp.jpg

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180203/DPc03Feb18.png>

○ *Subject: Mars images (Feb 6th.)*

Received: 9 February 2018 at 03:29 JST

Hi all, Some images from Feb 6th. Note the misty cloud in the Argyre basin at bottom. Brilliant

cloud over Tharsis on the p. limb.

http://www.damianpeach.com/mars2018/m2018_02_06dp.jpg

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180206/DPc06Feb18.png>

○.....*Subject: Mars images (Feb 4th.)*

Received: 11 February 2018 at 04:32 JST

Hi all, Here are some images from the 4th. Plenty of clouds visible across the planet, including some brilliant orographics over Tharsis.

http://www.damianpeach.com/mars2018/m2018_02_04dp.jpg

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180206/DPc06Feb18.png>

○.....*Subject: Mars images (Feb 5th.)*

Received: 12 February 2018 at 05:59 JST

Hi all, Some images from Feb 5th. Poor seeing but plenty of cloud details visible in blue light. Brilliant clouds over Tharsis on the limb.

http://www.damianpeach.com/mars2018/m2018_02_05dp.jpg

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180205/DPc05Feb18.png>

○.....*Subject: Mars images (Feb 13th.)*

Received: 15 February 2018 at 02:47 JST

Hi all, Here are some images from Feb 13th. Fair seeing. Hellas is bright at bottom with Syrtis Major now coming into view.

http://www.damianpeach.com/mars2018/m2018_02_13dp.jpg

Best Wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2018/180213/DPc13Feb18.png>

Damian PEACH (Selsey, WS, the UK)

Web: <http://www.damianpeach.com/>

●.....*Subject: Fwd: Dust Storms Linked to Gas Escape*

Received: 24 January 2018 at 05:40 JST

Sent from my iPhone : (Bill SHEEHAN's)

Begin forwarded message:

From: "AAS Press Officer Dr. Rick Fienberg"
<rick.fienberg@as.org>

Date: January 23, 2018 at 12:35:03 PM MST

Subject: **NASA/JPL: Dust Storms Linked to Gas Escape from Mars Atmosphere**

THE FOLLOWING ITEM WAS ISSUED JOINTLY BY THE JET PROPULSION LABORATORY IN PASADENA, CALIFORNIA, AND NASA HEADQUARTERS IN WASHINGTON, DC, AND IS FORWARDED FOR YOUR INFORMATION. FORWARDING DOES NOT IMPLY

ENDORSEMENT BY THE AMERICAN ASTRONOMICAL SOCIETY.

23 January 2018

** Contact details appear below. **

Text & Graphics:

<https://www.jpl.nasa.gov/news/news.php?release=2018-012>
DUST STORMS LINKED TO GAS ESCAPE FROM MARS ATMOSPHERE

Some Mars experts are eager and optimistic for a dust storm this year to grow so grand it darkens skies around the entire Red Planet.

This biggest type of phenomenon in the environment of modern Mars could be examined as never before possible, using the combination of spacecraft now at Mars.

A study published this week based on observations by NASA's Mars Reconnaissance Orbiter (MRO) during the most recent Martian global dust storm -- in 2007 -- suggests such storms play a role in the ongoing process of gas escaping from the top of Mars' atmosphere. That process long ago transformed wetter, warmer ancient Mars into today's arid, frozen planet.

"We found there's an increase in water vapor in the middle atmosphere in connection with dust storms," said Nicholas Heavens of Hampton University, Hampton, Virginia, lead author of the report in Nature Astronomy. "Water vapor is carried up with the same air mass rising with the dust."

A link between the presence of water vapor in Mars' middle atmosphere -- roughly 30 to 60 miles (50 to 100 kilometers) high -- and escape of hydrogen from the top of the atmosphere has been detected by NASA's Hubble Space Telescope and the European Space Agency's Mars Express orbiter, but mainly in years without the dramatic changes produced in a global dust storm. NASA's MAVEN mission arrived at Mars in 2014 to study the process of atmosphere escape.

"It would be great to have a global dust storm we could observe with all the assets now at Mars, and that could happen this year," said David Kass of NASA's Jet Propulsion Laboratory, Pasadena, California. He is a co-author of the new report and deputy principal investigator for the instrument that is the main source of data for it, MRO's Mars Climate Sounder.

Not all Mars watchers are thrilled with the idea of a global dust storm, which can adversely affect ongoing missions. For instance: Opportunity, as a solar powered rover, would have to hunker down to save energy; the upcoming InSight lander's parameters would need to be adjusted for safe entry, descent and landing in November; and all the cameras on rovers and orbiters would need to deal with low visibility.

Decades of Mars observations document a pattern of multiple regional dust storms arising during the northern spring and summer. In most Martian years, which are nearly twice as long as the Earth years, all the regional storms dissipate and none swells into a global dust storm. But such expansion happened in 1977, 1982, 1994, 2001 and 2007. *The next Martian dust storm season is expected to begin this summer and last into early 2019.*

The Mars Climate Sounder on MRO can scan the atmosphere to directly detect dust and ice particles and can indirectly sense water vapor concentrations from effects on temperature. Heavens and co-authors of the new paper report the sounder's data show slight increases in middle-atmosphere water vapor during regional dust storms and reveal a sharp jump in the altitude reached by water vapor during the 2007 global dust storm. Using recently refined analysis methods for the 2007 data, the researchers found an increase in water vapor by more than a hundred-fold in the middle atmosphere during that global storm.

Before MAVEN reached Mars, many scientists expected to see loss of hydrogen from the top of the atmosphere occurring at a rather steady rate, with variation tied to changes in the solar wind's flow of charged particles from the Sun. Data from MAVEN and Mars Express haven't fit that pattern, instead showing a pattern that appears more related to Martian seasons than to solar activity. Heavens and co-authors present the dust storms' hoisting of water vapor to higher altitudes as a likely key to the seasonal pattern in hydrogen escape from the top of the atmosphere. MAVEN observations during the stronger effects of a global dust storm could boost understanding of their possible link to the escape of gas from the atmosphere.

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Reference:

"Hydrogen Escape from Mars Enhanced by Deep Convection in Dust Storms," Nicholas G. Heavens et al., 2018 Jan. 22, Nature Astronomy.

[<https://www.nature.com/articles/s41550-017-0353-4>]

○...**Subject: Mars 2003**

Received: 30 January 2018 at 02:52 JST

Dear Masatsugu, I was sorting through papers etc

and found this roughly done acrylic showing the visual colors as determined using the Munsell color swatches.



Thought it might be of interest.

○...**Subject: Fwd: A Vista from Mars Rover Looks.....**

Received: 31 January 2018 at 10:28 JST

Sent from my iPhone (Bill SHEEHAN's)

Begin forwarded message:

From: "AAS Press Officer Dr. Rick Fienberg" <rick.fienberg@nasa.gov>

Date: January 30, 2018 at 4:46:23 PM MST

Subject: NASA/JPL: A Vista from Mars Rover Looks Back Over Journey So Far

THE FOLLOWING ITEM WAS ISSUED JOINTLY BY THE JET PROPULSION LABORATORY IN PASADENA, CALIFORNIA, AND NASA HEADQUARTERS IN WASHINGTON, DC, AND IS FORWARDED FOR YOUR INFORMATION.

FORWARDING DOES NOT IMPLY ENDORSEMENT BY THE AMERICAN ASTRONOMICAL SOCIETY.

30 January 2018

** Contact details appear below. **

Text & Graphics:

<https://www.jpl.nasa.gov/news/news.php?release=2018-020>

VISTA FROM MARS ROVER LOOKS BACK OVER JOURNEY SO FAR

A panoramic image that NASA's Curiosity Mars rover took from a mountainside ridge provides a sweeping vista of key sites visited since the rover's 2012 landing, and the towering surroundings.

The view from "Vera Rubin Ridge" on the north flank of Mount Sharp encompasses much of the 11-mile (18-kilometer) route the rover has driven from its 2012 landing site, all inside Gale Crater. One hill on the northern horizon is about 50 miles (about 85 kilometers) away, well outside of the crater, though most of the scene's horizon is the crater's northern rim, roughly one-third that distance away and 1.2 miles (2 kilometers) above the rover.

Curiosity's Mast Camera, or Mastcam, took the component images of the panorama three months ago while the rover paused on the northern edge of Vera Rubin Ridge. The mission has subsequently approached the southern edge of the ridge and examined several outcrop locations along the way.

Last week, the Curiosity team on the Earth received copious new images from the rover through a record-setting relay by NASA's MAVEN orbiter -- surpassing a gigabit of data during a single relay session from Mars for the first time in history.

The team is preparing to resume use of Curiosity's drill for acquiring powdered rock samples to be analyzed by laboratory instruments inside the rover, more than a year after the most recent of the 15 times the drill has pulled sample material from Martian rocks.

Inside an Impact Crater

Mount Sharp stands in the middle of Gale Crater, which is 96 miles (154 kilometers) in diameter.

"Even though Curiosity has been steadily climbing for five years, this is the first time we could look back and see the whole mission laid out

below us," said Curiosity Project Scientist Ashwin Vasavada of NASA's Jet Propulsion Laboratory, Pasadena, California. "From our perch on Vera Rubin Ridge, the vast plains of the crater floor stretch out to the spectacular mountain range that forms the northern rim of Gale Crater." The rover photographed the scene shortly before northern Mars' winter solstice, a season of clear skies, gaining a sharp view of distant details.

Curiosity's exact landing spot on the floor of the crater lies out of sight behind a slight rise, but the scene includes "Yellowknife Bay." That's where, in 2013, the mission found evidence of an ancient freshwater-lake environment that offered all of the basic chemical ingredients for microbial life. Farther north are the channel and fan of Peace Vallis, relics of the streams that carried water and sediment into the crater about three billion years ago.

Sites such as "Kimberley" and "Murray Buttes" along the rover's route are marked on an annotated posting of the panorama. The Mastcam recorded both a wider version of the scene (from southwest to northeast) with its left-eye, 34-millimeter-lens camera and a more detailed, narrower version with its right-eye, 100-millimeter-lens camera.

The site from which these images were taken sits 1,073 feet (327 meters) in elevation above Curiosity's landing site. Since leaving that site, the rover has climbed another 85 feet (26 meters) in elevation. In recent days, the Mastcam has recorded component images for a panorama looking uphill southward toward the mission's next major destination area. That is called the "Clay Unit" because observations from orbit detected clay minerals there.

Record Relay

The opportunity for some high-volume relay sessions with the MAVEN orbiter is helping the Curiosity team gain a bounty of images and other data this month.

Most data from Curiosity, through the years, have been relayed to Earth by NASA's Mars Reconnaissance Orbiter (MRO) and Mars Odyssey orbiter, which fly in nearly circular, nearly polar orbits predictably passing over Curiosity at about the same times every day. MAVEN, for Mars At-

mosphere and Volatile Evolution, flies an elliptical orbit varying more than 40-fold from its nearest to farthest point from Mars. This suits MAVEN's science focus on Mars' atmosphere but results in variable coverage for relaying rover data. Usually, MAVEN passes over rover locations when the distance is too large for optimal relays. However, during occasional periods when the low point of its orbit is near Curiosity's location on Mars, the relays can serve exceedingly well.

"MAVEN definitely has the potential to move lots of data for us, and we expect to make even more use of it in the future," said JPL's Roy Gladden, manager of NASA's Mars Relay Network Office. The Jan. 22 relay of 1,006 megabits topped the previous record of 840 megabits, also set by MAVEN, but might in turn be bested by other favorable MAVEN relay opportunities in coming days.

The rover team intends to put Curiosity's drill to work on Vera Rubin Ridge before proceeding to the Clay Unit. Resuming use of the drill requires an enterprising workaround for a mechanical problem that appeared in late 2016 and suspended use of the drill. A motor within the drill that advances the bit relative to stabilizer points no longer operates reliably. The workaround being evaluated thoroughly on a test rover at JPL does not use the stabilizer points. It moves the whole drill forward, with bit extended, by motion of the robotic

arm.

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Bill SHEEHAN (Flagstaff, AZ)

●.....*Subject: RE: CMO #465 uploaded*
Received: 28 January 2018 at 19:11 JST

Dear Masami Murakami, An excellent obituary report on Richard Baum. Best Regards,

Andrew ROBERTSON (BAA, The UK)

●.....*Subject: Mars 2018-01-30*
Received: 31 January 2018 at 11:19 JST

A small window of good seeing as dawn approaches for these Mars captures.

<http://www.astrogem.com.au/Mars/2018-01-30/>

Regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2018/180130/PMI30Jan18.png>

Phil MILES (Rubyvale, QLD, AUSTRALIA)

★ ★ ★

International Society of the Mars Observers (ISMO)

Advisory Board: Donald PARKER † , Christophe PELLIER, William SHEEHAN, and Tadashi ASADA, Reiichi KONNAI, Masatsugu MINAMI

Bulletin: ~~Kasei-Tsushim~~ CMO (<http://www.mars.dti.ne.jp/~cmo/ISMO.html>)

CMO n°466/ ISMO #92 (25 February 2018)

Editorial Board: Tadashi ASADA, Masatsugu MINAMI, Masami MURAKAMI, Takashi NAKAJIMA and Akinori NISHITA



☆ Any e-mail to CMO/ISMO including the image files is acknowledged if addressed to cmo@mars.dti.ne.jp (Masami MURAKAMI in Yokohama, Japan)

vzv03210@nifty.com (Masatsugu MINAMI at Mikuni-Sakai, Fukui, Japan)

☆ Usual mails to the CMO are acknowledged if addressed to

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