

## MARS

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## OBSERVATIONS

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*Published by the International Society of the Mars Observers***On Possibilities of the Glint Phenomena at Edom in 2016. I**

By

**Masami MURAKAMI****50. Introduction**

There have been a lot of reports concerning the glint or flash or flare phenomena on several places on Mars. They include such areas as of Tithonius Lacus, Solis Lacus, Sithonius Lacus, Tempe, the northern end of Hellas, and as the most famous place, the Edom Promontorium. Usually they were all found spontaneously by chance. However the discovery of the Edom glint in 2001 at the Florida Keys by Tom DOBBINS and Don PARKER and others must be the first in the world, which was performed based on a prediction. The project was really based on the prediction and a careful preparation was made. Earlier on, Tom DOBBINS involved Don PARKER and others, to organize the expedition to be timely sent to the Florida Keys. The prediction with a background was expounded in an article published in the *Sky and Telescope* magazine (Tom DOBBINS and Bill SHEEHAN, *The Martian-Flares Mystery*, S&T, May 2001 (vol.101, No.5) p115). The expedition team started to check the area of Edom from 5 June 2001, but two nights were spent in vain. However they were finally blessed with good fortune on 7 June 2001 from 06:40 GMT to 07:20 GMT to observe a

number of pulsations of great glints from exactly Edom:

As to this happy incidence, Don PARKER readily at dawn emailed us in Japan as follows:

● . . . *Date: Thu, 7 Jun 2001 08:54:27 +0100*  
*From: Donald Parker*  
*Subject: Edom Brightening*

*Dear Masatsugu:*

*I am pleased to report that after two uneventful nights of observing our team here in the Florida Keys detected significant brightness fluctuations over Edom between 06:40 and 07:30 UT on 7 June, 2001 UT. Our observing team consisted of Tippy and Patty D'Auria; David Moore; Rick Feinberg, Tom Dobbins, and Gary Seronik of Sky and Telescope Magazine, and me. Instruments included two six-inch Newtonian reflectors and a Meade 12-inch SCT used in conjunction with a monochrome video camera. A perceptible brightening of Edom was noted around 06:35 UT. By 06:40 UT pronounced pulsations in brightness were evident. These events occurred at roughly 10 to 15 second intervals, with brightness maxima of approximately 3 seconds duration that could not be attributed to atmospheric turbulence. These dramatic variations in brightness were simultaneously detected by visual observers at the eyepieces of the 6-inch Newtonians and by those viewing the video monitor. It*

is notable that they could not be seen with an 85mm refractor.

Further details and images extracted from the videotape will be forthcoming in the near future. Meanwhile, I would be grateful if you would alert other observers to the possibility of repeating these observations, as calculations suggest that the optimum Sun-Earth-Mars geometry for specular reflections at Edom will occur on 8 June UT. Best regards,

Don

This email should be said very historical in the world of Mars observations. It well describes how they prepared and how the glint phenomenon went on, and we can also know who and who were active there. To our surprise, as suggested by Don, they also met with another glint phenomenon on the following day:

○ . . . **Date: Fri, 08 Jun 2001 21:49:25 +0100**  
**From: Donald Parker**  
**Subject: Edom**

Hi All,

We again observed Mars from the Florida Keys this morning (8 June 2001 UTD) from 05:40 UT to 08:36 UT. There appeared to be two peaks in brightening phenomena around Edom. The first was a series of short-lived (3-5 second) brightenings observed both visually and via video between 07:00 and 07:20 UT. Mars' altitude was 35 degrees. These were quite pronounced and were similar in frequency to those of 7 June. The second group of events occurred between 07:53 and 08:24 UT (altitude = 26°), when a series of small but frequent brightness variations were detected. In general, the events of this morning displayed the same intensity but less frequency than those of 7 June.

Observers included Dan Troiani, Tippy D'Auria, Scott and Lou Ireland, Carolyn and Mark Peterson, Bob Itzenthaler, and Don Parker. Instruments were a 6-inch f/8 Newtonian for continuous visual observation from 05:51-08:36 UT and a 12-inch Meade SCT used in conjunction with a monochrome video camera, taping from 05:51-08:36 UT. Observational conditions were very favorable, with light ESE wind and high cirrus. Seeing

was 8 initially, deteriorating to 4-5 as the planet's altitude fell below 30 degrees. Clouds interfered with observations less than 20% of the time.

We will attempt to make further observations tomorrow morning (9 June UTD), but the areas of interest will not be favorably presented until Mars' altitude is less than 30 degrees. Best,

Don

The expedition team also tried to observe on 9 June 2001, but Edom was no more than usually bright.

The planet Mars in 2001 was at opposition on 13 June 2001 at 17:40 TD, and hence on 7 June and 8 June the phase angle was 6° to 5°, and so Edom did not exactly face toward us. In fact, we have the LCM as

$\omega=331^\circ\text{W}$  on 7 June at 06:40 GMT

$\omega=341^\circ\text{W}$  on 7 June at 07:20 GMT

and so Edom was somewhat far.

On the following day we also have

$\omega=327^\circ\text{W}$  on 8 June at 07:00 GMT

$\omega=347^\circ\text{W}$  on 8 June at 08:24GMT

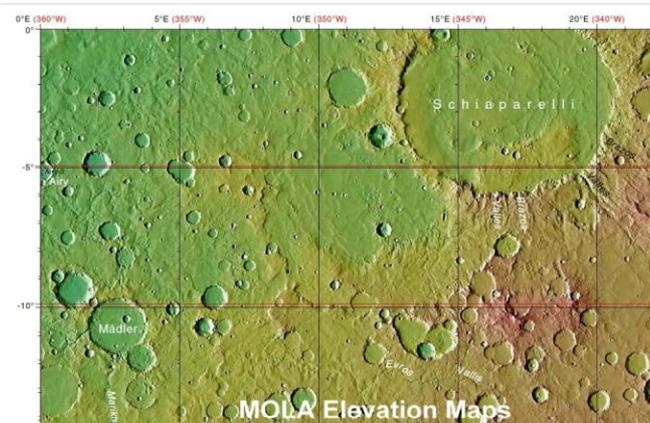
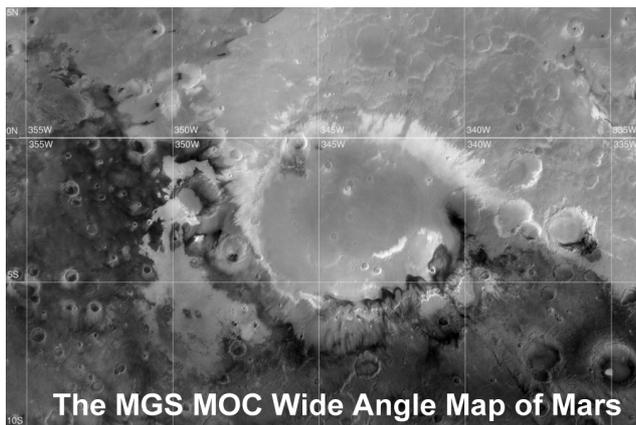
and so here also  $\omega=327^\circ\text{W}$  does not imply Edom.

However, as Don PARKER (DPK) uses the terminology "the optimum Sun-Earth-Mars geometry for specular reflections at Edom", it is most moderate to consider that the glint is a reflection of the Sun beam from the Martian surface.

Let assume that the surface of the planet Mars is covered by a spherical mirror. Then the glint phenomenon is such that the Sun-beam goes down to the spherical mirror and the mirror reflects back the beam to be received by us who just locate ourselves between the Sun and Mars. The bright beam is reflected back to be received by us, and so the bright spot is at the beneath of us. Therefore the bright Martian spot has the latitude which is identified as the latitude  $D_E$  (latitude of sub-Earth point). Thus at  $D_E$ , the reflecting light spot exists, and from the Martian spot the Sun is located at the zenith. And hence the condition on  $D_E$  is now reduced to be identical to  $D_s$

(latitude of sub-Solar point), that is,  $D_E=D_S$  must be a condition.

Note however if  $D_E=D_S$ , the incident optical path  $i$  and the reflected optical path  $r$  are identical. However even when  $i$  and  $r$  are not identical, if the middle path between  $i$  and  $r$  drops on the assumed spot on the spherical mirror, the latitude of the spot is given by  $(D_E+D_S)/2$ . The assumed spot, in our present case, is the spot inside Edom or the inside of the Schiaparelli crater. Recent Martian probes

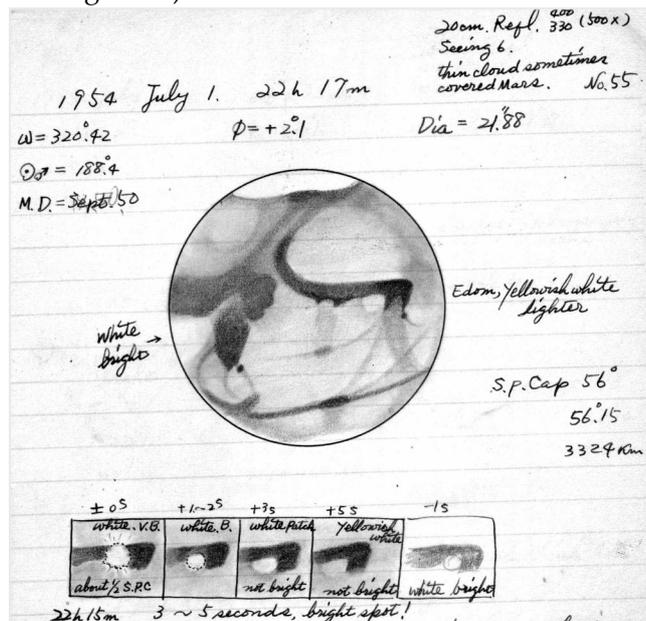


provided us the image of the terrain at Edom Promontrium in relation with the Schiaparelli crater whose width of latitude is  $(01^{\circ}N \sim 06^{\circ}S)$ , and the longitudinal width is  $(339^{\circ}W \sim 347^{\circ}W)$ , and its center is around  $(03^{\circ}S, 343^{\circ}W)$ .

That is, that  $(D_E+D_S)/2$  is dropped inside  $(01^{\circ}N \sim 06^{\circ}S)$  must be the condition. [if  $D_E=D_S$ ,  $(D_E+D_S)/2=D_E=D_S$  holds.]

One of the bases on which DOBBINS and SHEEHAN depended must have been the observation performed by Tsuneo SAHEKI (1916~1996) on 1 July 1954 at 13:15 GMT when Edom sharply gave a flare for about 5 seconds (see his

drawing here ).



The planet was at opposition on 24 June at 17:14GMT. And in this case the condition  $D_E=D_S$  did never hold:

$D_E$	$D_S$	$(D_E+D_S)/2$	
2.10	-3.40	-0.65	Almanac
0.50	-5.20	-2.35	Horizon

The data of the *Astronomical Almanac* was fundamentally revised in the 1980s, and hence here we show also the values from the "Horizon" provided by the NASA.

<http://ssd.jpl.nasa.gov/horizons.cgi>

Note here that both data show  $(D_E+D_S)/2$  being inside  $(01^{\circ}N \sim 06^{\circ}S)$ . On the other hand, as to the longitude, the result of SAHEKI was  $\omega=320^{\circ}W$  (or  $\omega=319^{\circ}W$  by Horizon), and, as easily seen from the position of Edom on the drawing, there is no other way than to say the reflecting body must have been quite declined.

In the case of 2001, we have

	$D_E$	$D_S$	$(D_E+D_S)/2$
7 June	1.78	2.53	2.16
8 June	1.97	2.29	2.13,

and hence we should say  $(D_E+D_S)/2$  is quite near but not inside  $(01^{\circ}N \sim 06^{\circ}S)$ . However this small difference may fall within the admitted range in the natural world. Thus far, we should be convinced that DOBBINS and SHEEHAN were successful in predicting because  $D_E \sim D_S$  and  $D_E$  point was near

Edom.

**§1. The Case  $D_E=D_S$  in 2016**

If we refer to the 2016 Almanac,  $D_E=D_S$  occurs twice in May and December. The case in May, since the opposition occurs on 22 May, may be more preferable since the identification occurs on 20 May when the angular diameter is sufficiently large such that

**On 20 May at 17:20 GMT**

**when  $D_E=D_S=10.2^\circ N$ ,  $\delta=18.3''$ ,  $\iota=2^\circ$**

where 17:20GMT implies 02:20JST in the morning.

The value  $10.2^\circ N$  when  $D_E=D_S$  is very different from the area of Edom, and hence it is supposed that the possibility of the glint phenomenon is very,

very low this time. However at this moment, the planet is in a full-Mars state with minimal  $\iota$  so that it may not be strange if anything happens to happen on the surface. We hope you will continue to gaze the area at around 02:20JST.

In Japan, at the period, Mars will appear from the east at around 19h JST, and it will reach the meridian at around 24h JST, and will disappear to the west at 5.5 h JST. The LCM on 20 May is  $\omega=356^\circ W$  at 20h JST,  $\omega=055^\circ W$  at 24h JST, and  $\omega=084^\circ W$  at 02 h JST and so on. So the range covers from the area of Sinus Meridiani to Solis Lacus (may be similar in Australia).

JST	18:00	18:40	19:20	20:00	20:40	21:20	22:00	22:40	23:20	24:00	24:40	25:20	26:00	26:40
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GMT	09:00	09:40	10:20	11:00	11:40	12:20	13:00	13:40	14:20	15:00	15:40	16:20	17:00	17:40
18 May	345°W	354°W	004°W	014°W	024°W	033°W	043°W	053°W	063°W	072°W	082°W	092°W	102°W	111°W
19 May	336°W	345°W	355°W	005°W	015°W	024°W	034°W	044°W	054°W	063°W	073°W	083°W	093°W	102°W
20 May	327°W	337°W	346°W	356°W	006°W	016°W	025°W	035°W	045°W	055°W	064°W	074°W	084°W	094°W
21 May	318°W	328°W	338°W	347°W	357°W	007°W	017°W	026°W	036°W	046°W	056°W	065°W	075°W	085°W
22 May	309°W	319°W	329°W	339°W	348°W	358°W	008°W	018°W	027°W	037°W	047°W	057°W	066°W	076°W
23 May	300°W	310°W	320°W	330°W	339°W	349°W	359°W	009°W	018°W	028°W	038°W	048°W	058°W	067°W

**§2. Possibility of the Edom’s Glint I (in May)**

As shown above, the possibility to find some glint in May must be low, but in 1954 it was at  $\omega=320^\circ W$ ,  $\iota=6^\circ$  that SAHEKI detected the glint at Edom, and so here we list the possible LCM angles on the days around the day 20 May. The location in

which we may possibly observe the area at around  $\omega=320^\circ W$  will be to the east of Japan. The time the planet is at meridian in Hawaii will be around 10:30 GMT, and at the west coast in the US it will be about 08:00GMT. The following Table may be useful.

GMT	05:00	05:40	06:20	07:00	07:40	08:20	09:00	09:40	10:20	11:00	11:40	12:20	13:00	13:40
18 May	286°W	296°W	305°W	315°W	325°W	335°W	345°W	354°W	004°W	014°W	024°W	033°W	043°W	053°W
19 May	277°W	287°W	297°W	306°W	316°W	326°W	336°W	345°W	355°W	005°W	015°W	024°W	034°W	044°W
20 May	268°W	278°W	288°W	298°W	307°W	317°W	327°W	337°W	346°W	356°W	006°W	016°W	025°W	035°W
21 May	260°W	269°W	279°W	289°W	299°W	308°W	318°W	328°W	338°W	347°W	357°W	007°W	017°W	026°W
22 May	251°W	260°W	270°W	280°W	289°W	299°W	309°W	319°W	329°W	339°W	348°W	358°W	008°W	018°W
23 May	242°W	252°W	261°W	271°W	281°W	291°W	300°W	310°W	320°W	330°W	339°W	349°W	359°W	009°W

The fact that both  $D_E, D_S$  are near  $10^\circ N$  implies we are far from Edom, so another way is to look for

**§3. Possibility of the Edom’s Glint II (in August)**

the cases where  $(D_E+D_S)/2$  drops inside the width ( $01^\circ\text{N}\sim 06^\circ\text{S}$ ). Then we find that such opportunities often would visit in August 2016. In the period, the planet is near the eastern quadrature and it will be already near the meridian when the Sun sets in the west. And the angular diameter will be much

smaller. But the following Table still shows the possibility. So we will mention something more in a sequel before the coming August. It will be also possible for the observers in South Africa, and the US to catch the glint from Edom, we are sure.

*(to be continued)*

Date	Obs. Location	GMT	$\omega$	$D_E$	$D_S$	$(D_E+D_S)/2$	$\iota$
01 Aug	Australia	07h40m	364.10°W	13.13°	- 6.80°	+3.17°	-41.69°
02 Aug	Australia	08h20m	364.34°W	12.31°	- 7.00°	+2.66°	-41.97°
03 Aug	Japan, Aust.	09h00m	364.61°W	12.80°	- 7.30°	+2.75°	-42.18°
04 Aug	Japan, Aust.	09h40m	364.88°W	12.63°	- 7.55°	+2.54°	-42.38°
05 Aug	Japan, Aust.	10h15m	363.91°W	12.45°	- 7.80°	+2.33°	-42.58°
06 Aug	Japan, Aust.	10h55m	364.15°W	12.27°	- 8.05°	+2.11°	-42.75°
07 Aug	Japan, Aust.	11h35m	364.40°W	12.09°	- 8.31°	+1.89°	-42.90°
08 Aug	Japan, Aust.	12h15m	364.64°W	11.90°	- 8.56°	+1.67°	-43.11°
09 Aug	Japan, Aust.	12h55m	364.86°W	11.71°	- 8.80°	+1.46°	-43.31°
10 Aug	Japan	13h35m	365.08°W	11.51°	- 9.05°	+1.23°	-43.46°
15 Aug	South Africa	16h50m	364.88°W	10.48°	-10.29°	+0.10°	-44.17°
20 Aug	Europe	20h05m	364.53°W	9.35°	-11.51°	-1.08°	-44.78°
25 Aug	E America	23h20m	364.07°W	8.14°	-12.70°	-2.28°	-45.30°
31 Aug	W America	02h40m	364.71°W	6.85°	-13.87°	-3.51°	-45.61°

□

#### CMO/ISMO 2016 Mars Report #07

### 2016 CMO/ISMO Mars Observations Made During the Fortnight Period from 16 April ( $\lambda=138^\circ\text{Ls}$ ) to 30 April ( $\lambda=146^\circ\text{Ls}$ ) 2016

♂.....This 7<sup>th</sup> CMO/ISMO Mars Report deals with the Mars observations made by the ISMO members during the latter half of April 2016. During the period, the Mars motion was stationary on 17 April, and since then it retrogrades and thus it will rapidly approach us. The apparent declination  $D$  was around  $21^\circ\text{S}$  and was not so vary for a while. Mars, Saturn and Antares made a triangle at around the claw of the Scorpius constellation. The angular diameter increased from  $\delta=14.0''$  to  $\delta=16.1''$  during the fortnight. The tilt recovered from  $\varphi=06^\circ\text{N}$  to  $07^\circ\text{N}$ . The phase angle decreased from  $\iota=25^\circ$  to  $17^\circ$ . The Martian season proceeded from  $\lambda=138^\circ\text{Ls}$  to  $\lambda=146^\circ\text{Ls}$  when the cloud activity at Ascraeus Mons is about to decrease while the cloud associated with Arsia Mons will soon welcome the peak. Hellas's brightest part was long located at the NW corner, but recently the brightest part moved to the southernmost area, while the northern part became fainter. The mist along the equatorial zone is still visible, related with the activity of Elysium. The south polar region has been gaseous. The residual north polar cap was still caught together with Olympia near the northern limb.

♂.....This fortnight period, we received with thanks a total of 57 observations from 16 members. Among them, from Australia five observers contributed 28 observations. The following list shows the

names of the ISMO observers with instruments:

**AKUTSU, Tomio (Ak)** Tochigi, JAPAN (\*Cebu, the PHILIPPINES)

1 *LRGB + 1 B* Images (24\* April 2016) 36cm SCT with an ASI 174MM

**BUDA, Stefan (SBd)** Melbourne, AUSTRALIA

3 Sets of *RGB* Images (17, 19, 24 April 2016) 41cm Dall-Kirkham with an ASI120MM

**FOSTER, Clyde (CFs)** Centurion, SOUTH AFRICA

8 *Colour + 8 IR* Images (16,~18, 20, 22, ~25 April 2016) 36cm SCT @f/33 with an ASI224MC

**GORCZYNSKI, Peter (PGc)** Oxford, CT, the USA

2 Sets of *RGB + 4 IR* images (18, 21 April 2016) 36cm SCT @f/39 with an ASI120MM

**HERNANDEZ, Carlos E (CHr)** Miami, FL, the USA

1 *Colour* Drawing (23 April 2016) 23cm Maksutov-Cassegrain, 280×,350×

**JUSTICE, Mark (MJs)** Melbourne, AUSTRALIA

7 Sets of *RGB* Images (17, 19, 24, 25 April 2016) 30cm Spec with a DMK21AU618

**KUMAMORI, Teruaki (Km)** Sakai, Osaka, JAPAN

3 *LRGB + 3 B* Images (19, 22, 25 April 2016) 35cm SCT @ f/30 with an ASI120MC & ASI178MM

**MELILLO, Frank J (FMI)** Holtsville, NY, the USA

2 *Colour* Images (17, 24 April 2016) 25cm SCT with a ToUcam pro II

**MORALES RIVERA, Efrain (EMr)** Aguadilla, PUERTO RICO

1 Set of *RGB* Images (18 April 2016) 31cm SCT with a Flea 3

**ROSOLINA, Michael (MRs)** Friars Hill, WV, the USA

2 *Colour* Drawings (18, 25 April 2016) 35cm SCT, 330×, 390×

**VALIMBERTI, Maurice (MVI)** Melbourne, AUSTRALIA

12 *Colour* Images (17, 23, 24 April 2016) 36cm SCT @f/28 with an ASI224MC

**WELDRAKE, David (DWd)** Bungendore, NSW, AUSTRALIA

1 Set of *RGB* Images (23 April 2016) 13cm refractor @f/40 with an ASI120MM

**WESLEY, Anthony (AWs)** NSW, AUSTRALIA

5 *Colour* Images (17, 19, 21, 24, 29 April 2016) (41cm SCT)

**WILSON, Tim (TWI)** Jefferson City, MO, the USA

3 *Colour* Images (22, 23, 28 April 2016) 20cm SCT with an ASI120MM

♂.....We now begin to review the observations received in a chronological order:

**16 April 2016 ( $\lambda=138^\circ\text{Ls}\sim 139^\circ\text{Ls}$ ,  $\delta=13.9''\sim 14.1''$ )**

This time also **Clyde FOSTER (CFs)** started first: It looks like the European region must have been covered by winter. CFs obtained on this day a set of an L-colour image and an IR685 at  $\omega=182^\circ\text{W}$ ,  $\varphi=6^\circ\text{N}$ . The dark markings on the former image are rather depicted perfectly at this season. The area around Atrantidum S is detailed including the west end of M Sirenum, and the description of the body of M Cimmerium together with the Herschel crater and area around the Gale crater looks satisfactory. The shape of the Ætheria dark patch is first detailed. As well, the split at the northern Phlegra and the check-type Propontis I are shown up. The white cloud at the west flank of Olympus Mons near the evening terminator is very bright followed by a vastly flowing roll cloud. This implies that in the afternoon more than the ascending wind at the eastern flank, a descending wind (Katabatic wind) strongly governs the western flank accompanied by the roll cloud. This image looks a bit weaker to depict the mist in gen-

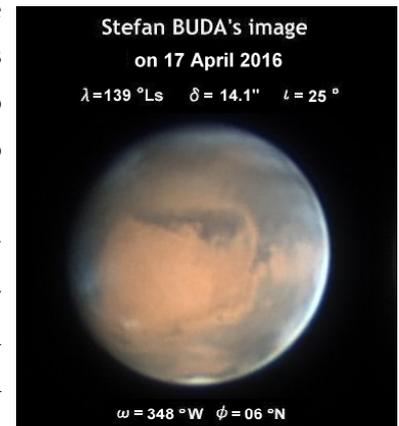
eral. Due to this reason, a tiny white cloud at the summit of Elysium Mons clearly shows up, while the mist band at the central zone to the south of Elysium is seldom apparent except for the mist to the south of Trivium Charontis and near the morning limb. To the SW of the npc (north polar cap), Olympia is visible. The southern canopy is made of a weak mist though the thick white Hellas is approaching the morning limb.

**17 April 2016 ( $\lambda=139^\circ\text{Ls}$ ,  $\delta=14.1''\sim 14.2''$ )**

**CFs** by the same method made a set at  $\omega=173^\circ\text{W}$  younger in the angle than yesterday's by  $10^\circ\text{W}$ . The markings look a bit coarse, but the weak mist is depicted flowing from southern part of Elysium to the morning limb. The clouds at the Tharsis ridges are lighter than yesterday by an oblique illumination.

Our veteran to be respected **Frank MELILLO (FMI)** is on stage with Toucam pro II at  $\omega=238^\circ\text{W}$ . The scene is cool; Syrtis Mj is already inside, and the strongly white Hellas is coming in following the southern hood. The inside of Elysium is well light bounded by Cerberus and the Ætheria dark segment in the evening. Especially the eastern side of the inside is a bit whitish. The resolution of the area of the npc is low, and also Hesperia is not well apparent.

**Stefan BUDA (SBd)** obtained a set of the R, G, B set at  $\omega=348^\circ\text{W}$  by ASI 120MM and produced an excellent RGB composite. The R image is a better one, and detailed the area of S Sabæus and S Meridiani as well as the inside of Edom. The shapes of Oxia P and Aram Chaos are well shown up. Oxus dark segment (Ods) is clearly definite between Oxus and the eastern coast of M Acidalium at ( $36^\circ\text{N}$ ,  $359^\circ\text{W}$ ). Another point to be noticed on the RGB image is a singular white spot which is located to the west of the line which connects Astaboræ Fons and Coloe Palus. According to the check by one of us (Mk), its position must be at ( $300^\circ\text{W}\sim 310^\circ\text{W}$ ,  $36^\circ\text{N}$ ). There is no higher place around there, and so not orographic. It looks to split into two. The white mist also plays at the northern district of Syrtis Mj and at Æria. The npc is shown nicely. The southern polar mist is rather weak. Hellas sank already showing a remnant of mist.



The relation of the northern end of M Acidalium with Hyperboreus L is similar to the aspect shown by Bill FLANAGAN during the period before the last: A few of the arctic layers of ground are visible.

**Maurice VALIMBERTI (MVI)** issued six colour images (by 224MC) at  $\omega=351^\circ\text{W}$ ,  $359^\circ\text{W}$ ,  $004^\circ\text{W}$ ,  $011^\circ\text{W}$ ,  $014^\circ\text{W}$ ,  $016^\circ\text{W}$ . Without some sort of processing as CFs is supposed to apply, the 224MC colour images do not show by themselves a wider range of the light-shade of the dark markings, and hence we should say we have had less satisfactory impression concerning the monotonous colour images. However because of a powerful aperture and his own skill, in every corner several interesting details are found. For instance, at  $\omega=011^\circ\text{W}$ ,  $014^\circ\text{W}$  the following nail of Aryn shows to be split into two, and this reminds us of the cases by G P KUIPER in 1954 and by J H FOCAS in 1960 (before them, the preceding left nail was instead regarded to be split). The twin of Neudrus canals is evident. Aram Chaos is also definitely explicit. Some hanging ornamental miner markings at the southern end of Chryse are well depicted. Note also that the tentatively so-called Ods is definite. The image at  $\omega=014^\circ\text{W}$  shows the detail of the northern part of M Acidalium with some structure of Iaxartes and Hyperboreus L is comparatively dark. M Acidalium,

except for the NW triangular dark corner, looks quite faded, but this appears to us that the reproduction ability of the colour property of the marking. On this image the difference of the light and shade of the Antarctic mist. Note that at  $\omega=351^\circ\text{W}$  the tiny white/bright cloud, which was trapped by SBd at  $\omega=348^\circ\text{W}$ : This is still visible near the evening terminator at  $\omega=016^\circ\text{W}$  at last. As to the small white cloud, the image of the cloud appears slightly more faded and lack punch.

**Mark JUSTICE (MJs)** took a set of R,G,B images at  $\omega=019^\circ\text{W}$  to make an RGB composite. The colours of the RGB are rich, and the basic markings are well expressed. If the dark markings in R were expressed a bit more delicately, the RGB must have been sharper and more perfect, and several minor markings are to be fixed more in a fine configuration. For example, the Ods, which is roughly visible, must have been shown more definitely. Note the pair of Neudrus is quite evident. On the southern hemisphere, M Erythræum is broad in a bluish-dark tint, and the both sides of M Erythræum look slightly misted. Further southwards, Argyre looks covered by a thicker irregular white element of the southern canopy which is made of twofold mist structure (just like at the inside of Hellas). Solis L is coming inside the disk, Tithonius L shows its presence, and Juventæ Fons is definite. Ophir is ground-lit in a pinkish tint, while Candor is followed by the whitish morning mist. This thick mist dispatches otherwise a white streak down to the root of Nilokeras. In B there is a weak mist around Brangæna and suggest a faded mist near Eden. Note also a small bright white cloud recorded by SBd at  $\omega=348^\circ\text{W}$  reached the evening terminator on this surface at  $\omega=019^\circ\text{W}$ . Ground texture of the north of M Acidalium is dynamically shown up in R and RGB: The ground around Iaxartes is reddish in RGB, and in R Hyperboreus L is very dark adjacent to the npc which is white decent.

**Anthony WESLEY (AWs)** puts forward an RGB composite at  $\omega=033^\circ\text{W}$ . The composite Mars shows a detailed surface with a mellow texture. From Meridiani S near at the evening terminator to the west of Tithonius L, the description of the details looks superb. Brangæna and Indus are finely visible. The southern district of M Acidalium is nicely faded, and Nilokeras looks interestingly tangled with a mist. The area of Iaxartes and the dark Hyperboreus L is normal. A smaller white patch is conspicuous near Argyre.

#### 18 April 2016 ( $\lambda=139^\circ\text{Ls}\sim 140^\circ\text{Ls}$ , $\delta=14.2''\sim 14.4''$ )

**CFs**, as usual, gave a similar set of L-colour and IR685 images at  $\omega=162^\circ\text{W}$ . The L-colour is an excellent image. CFs captured the west end of M Sirenum which looks crumbling: There is additionally visible a marking related with Atlantidum Sinus, and Caralis Fons is also checked. The southern polar canopy is made of a weak white mist. The cloud at the western flank of Olympus Mons is pure white. Alba is a small white spot. The shape of Propontis I is different than the case in 1999 (but similar to the case in 2014). Phlegra is depicted sharply. Elysium Mons inside Elysium appears as a small white spot.

**Peter GORCZYNSKI (PGc)** is now on the stage and obtained a set of R, G, B images at  $\omega=225^\circ\text{W}$  and composed an RGB image. Otherwise he took an IR685 at  $\omega=224^\circ\text{W}$ , and an IR742 image at  $\omega=228^\circ\text{W}$ . The RGB image lacks the sharpness and Elysium is shown to be just bright inside, while Syrtis Mj was taken in a good angle and showed that it just came in the disk as the bluish Syrtis Mj beneath the morning mist. Hellas is whitish bright near the morning limb. No special detail of M Cimmerium is shown up in RGB, but the IR images are more suggestive. The image by IR742 looks normal with modest contrast.

**Michael ROSOLINA (MRs)** sent us a colour sketch made at  $\omega=236^\circ\text{W}$ . Elysium is a roundish pure white near the evening limb (used #80A). Syrtis Mj is visible near the morning limb.

**Efrain MORALES (EMr)** obtained a set of R, G, B elements and the RGB composite at  $\omega=237^\circ\text{W}$ . The R image suggests an excessive processing seen from the area of Nodus Alcyonius. The B does not look sharp. However the colour classification inside Elysium is good. The npc is not depicted.

**19 April 2016 ( $\lambda=140^\circ\text{Ls}$ ,  $\delta=14.4''-14.5''$ )**

**SBd** produced a set of R,G,B ingredients by 120MM and the RGB composite at  $\omega=329^\circ\text{W}$ . Each element looks appropriate: In R, the markings from Syrtis Mj to S Meridiani are quite detailed. The rhs nail of Aryn reminds us of the case of FOCAS. Brangæna is perfect, and Oxia P and Indus are clear. R also shows Neudrus I and II, and out of all the Ods is shown most definitely (though it becomes weaker in RGB). The small white spot detected near Astaboræ Fons by SBd on 17 April does not shown up explicitly. However the B image is quite excellent and proves that the evening mist does not only invade the northern district of Syrtis Mj, but also goes to the further north as a collective group of small mist patches, and one of them might have been brighter on 17 April. The npc is nicely shot also in B. The aspect of the evening Hellas is also precious.

**Teruaki KUMAMORI (Km)** gave a set of LRGB single colour image at  $\omega=003^\circ\text{W}$  and a B image at  $\omega=005^\circ\text{W}$ . The L was taken by 178MM and colour image by 224MC. The LRGB image is tempting because it shows a lot of minor markings (for instance, showing Aram Chaos), but this colour image is associated with characteristic blur (Bokeh). The case of SBd above shows that each ingredient of R, G, and B conveys a fine density, and so the acquisition of each colour is by no means negligible. The description of the northern district of M Acidalium and Iaxartes-Hyperboreus L is interesting. The B image by 178MM cannot yet be said better.

**MJs** obtained two sets of R, G, B images to compose two RGB images at  $\omega=003^\circ\text{W}$  and  $\omega=014^\circ\text{W}$ . They all are excellent (due to DMK and 30cm). First of all, notable at  $\omega=003^\circ\text{W}$  is a singular population of several tiny white-misty spots which were related with the evening mist from the northern part of (already hidden) Syrtis Mj (due to the excellent G and B). At  $\omega=014^\circ\text{W}$ , at least two spots remain (and one might be the same as observed on 17 April). The description of the arctic region looks perfect from this angle including the Ods. Note that the north of Juventæ Fons is ground lit.

**AWs** gave an RGB image by a 41cm at  $\omega=009^\circ\text{W}$ . Unfortunately the file does not show other ingredients. The mile-stone Ods is very clearly visible. In addition to the evening small white spots (at least two), a faint mist patch is seen near Eden. The north of Juventæ Fons is lighter (not misted, though still in the morning).

**20 April 2016 ( $\lambda=140^\circ\text{Ls}-141^\circ\text{Ls}$ ,  $\delta=14.5''-14.6''$ )**

**CFs** issued as usual a set of images at  $\omega=146^\circ\text{W}$ . The surrounding of Olympus Mons is typical and the western part of the ring is very whitish. At this angle Tharsis Montes are easily identified with some clouds at the western flanks. Ascræus Cloud still follows the western flank cloud of Ascræus Mons. It looks like there is a faded cloud associated with Arsia Mons. A small cloud patch exists near Alba. The

area around M Sirenum is interesting: Caralis F is visible as a dark spot. The southern polar region is largely covered by a thin haze. The description around Propontis I is quite satisfactory.

### 21 April 2016 ( $\lambda=141^\circ\text{Ls}$ , $\delta=14.6''\sim 14.8''$ )

**PGc** gave a set of R, G, B together with their RGB composite at  $\omega=198^\circ\text{W}$ , as well as an IR685 and an IR742 image at  $\omega=201^\circ\text{W}$  and  $\omega=202^\circ\text{W}$  respectively. On the RGB image, the cloud at the western flank of Olympus Mons is whitish bright on the terminator. The bright area inside Elysium is somewhat detailed, but Mare Cimmerium is not well detailed (though compensated by the IR images).

**AWs** put forward one-piece of RGB composite at  $\omega=348^\circ\text{W}$ . As is expected the so-called Ods is clearly definite (as well as Aram Chasma), and other excellent details can be guessed from this. One remark is that a remnant of the collective distribution of tiny white mist spots is still seen thick and this may be identified with the cloud spot seen on 17 April.

### 22 April 2016 ( $\lambda=141^\circ\text{Ls}\sim 142^\circ\text{Ls}$ , $\delta=14.8''\sim 14.9''$ )

**CFs** took a usual set at  $\omega=123^\circ\text{W}$ : The L-colour is a bit larger and lacks the sharpness. Solis L is now visible near at the evening terminator.

**Tim WILSON (TWI)** gave a colour single image at  $\omega=226^\circ\text{W}$ . Syrtis Major is already inside the disk, but it looks too dark (enhanced by the IR image?). It is necessary for any observer to watch the faint Syrtis Mj beneath the morning mist. The chromatic aberration at the SW limb is annoying.

**Km** gave an (L-colour) image at  $\omega=322^\circ\text{W}$  and a B image at  $\omega=319^\circ\text{W}$ . The LRGB is moderate. The spread of the white mist is depicted, but the description of the north of Syrtis Mj is too rough to catch any detail of the collective group of small mist patches, if not existed.

### 23 April 2016 ( $\lambda=142^\circ\text{Ls}$ , $\delta=14.9''\sim 15.1''$ )

**CFs** gave a set of images at  $\omega=112^\circ\text{W}$ . The L-colour image looks detailed, but the critical defect is that the image lacks the variety of whiteness. The clouds around Ascræus and Olympus Montes are visible but the processing of the area must have been erroneous. The Fortuna double ring is shown up, but the whiteness does not work around there. Note that this angle is very important to see the distribution of the white clouds before opposition.

**Carlos HERNANDEZ (CHR)** sent us an elaborated colour drawing made on 23 April. The Data records (05:30UT, LCM= $097.9^\circ\text{W}$ ) as the observation time. However, since LCM= $097.9^\circ\text{W}$  implies it is earlier than the angle when CFs observed in South Africa, we should like to employ 05:30 GMT as his time. Then LCM must be  $\omega=156^\circ\text{W}$ . Then the white spot on the morning side must be the cloud inside Elysium, and the southern dark marking includes M Sirenum near the CM. Unfortunately the explicit cloud at the western flank of Olympus Mons cannot be identified. We however consider that the southern limb misty hood is nicely drawn. (One example of a similar surface at  $\omega=157^\circ\text{W}$  on 3 April made by Mark JUSTICE (MJs) is found in our CMO/ISMO Gallery.)

**TWI** sent us a 120MC colour single image at  $\omega=209^\circ\text{W}$ . A further detail of Mare Cimmerium is about to be shown up, but the colour composition is poor in general. It may be useless if the IR filter is employed to enhance the contrast.

**David WELDRAKE (DWd)** gave a set of images at  $\omega=259^\circ\text{W}$  by the use of Takahashi's TOA-130NS. The white cloud at the evening Elysium is featured and the blue whitish aspect of Hellas is well shown. On B, the mist distribution along the equatorial zone is felt, but the RGB composite does reflect it? (maybe the northern district is bluish because of the mist).

**MVI** lined up six colour images from  $\omega=290^\circ\text{W}$  to  $\omega=328^\circ\text{W}$ . Every image shows minor details, but looks coarse, and poor in colour graduation.

### 24 April 2016 ( $\lambda=142^\circ\text{Ls}$ ~ $143^\circ\text{Ls}$ , $\delta=15.1''$ ~ $15.2''$ )

**CFs** gave an L-colour and an IR 685 images at  $\omega=075^\circ\text{W}$ . However, the L-colour looks duller, perhaps because the white mists are not well outlined. For example, the mist patch preceding Niliacus L should be whiter near the terminator. Even the npc is not white. Alba and the mist at Nilokeras must be interesting, but we cannot say anything meaningful.

**FMI** took a colour image by Toucam II at  $\omega=177^\circ\text{W}$ . Elysium is located on the morning side, light inside. Phlegra and Propontis are well traced, and we can also see the Ætheria dark patch near the morning limb. Near the evening terminator, some clouds are seen associated with the Tharsis ridges, and the western flank of Olympus Mons (this being the whitest). The southern limb shows a haze canopy. The npc is also shot.

**MVI** gave two colour images at  $\omega=272^\circ\text{W}$  and at  $\omega=280^\circ\text{W}$ . Syrtis Mj is near the CM, and such craters as Huygens and Schröter are visible. As a whole however the markings look coarse, and the area around N Alcyonius suggests that the procedure is too the enhanced one (we can see some ghosts) though the density remains low. Note that the northern part of Hellas is not rigid but gaseous. The first image however proves the colour spectrum inside Elysium.

**Sbd** obtained a set of R,G,B images to compose an RGB image at  $\omega=288^\circ\text{W}$ . The composite gives an impression of really "composed", and good for our mental health. The details of the Huygens and the Schröter crater are enormous and the description of the Baldet crater (+ Antoniadi crater) at the northern end of Syrtis Mj is outstanding (the Baldet crater being most explicit in G). S Meridiani has just been inside the disk, but Edom is already apparent. The Hellas basin shows the white thick/rigid streak on the upper side while the whiteness is now weaker at the northern half of the basin. It is interesting to see some cloud stream inside Utopia and the series of small mist masses dropping down from the western part of M Cimmerium (the latter is apparent in B). Compare this set of images with Sbd's images made on 6 April 2014 ( $\lambda=113^\circ\text{Ls}$ ) at  $\omega=303^\circ\text{W}$  when  $\delta=15''$  to be convinced that the present set of images is highly superb.



**MJs** provided three sets of R, G, B images and obtained three RGB images at  $\omega=307^\circ\text{W}$ ,  $\omega=318^\circ\text{W}$  and at  $\omega=326^\circ\text{W}$ . The former two show a broad distribution of gaseous mist lying in Noachis to the south of Pandoræ Fretum. To the south of Huygens crater, Hellespontus goes southwards in a zigzag way following Yaonis Fr. The latter two sets show the interesting invasion of the evening mist over the northern district of Syrtis Mj, and as well show, since S Meridiani is quite inside the disk, the two Neudrus canals as well as the details around Oxia Palus beneath the thin morning mist. To the north of Oxia P, a mist patch is thick. The cloud streak inside of Utopia remains until the last. The so-called Ods is most visible on the last R. It is a pity and annoying to see some arc ghosts along the morning limb.

**Tomio AKUTSU (Ak)** made a trip to the Philippines (probably to Cebu) to take the present pictures. The RGB composite and B images are shown here; they being made by ASI 174MM. The details are shown (for instance the Ods is visible), but unfortunately the whiteness gradation is not wide enough. Hellas looks blurred and even the npc is dull shade of white. The details should be accompanied by the "edge" (for instance see the right nail of Aryn or the Baldet crater..

**AWs** gave an RGB composite at  $\omega=324^\circ\text{W}$ . The image is moderate with a wide spread of the white mist. The Ods is the best among the images taken on this day.

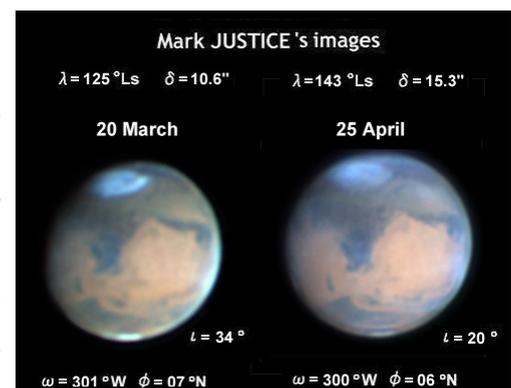
### 25 April 2016 ( $\lambda=143^\circ\text{Ls}$ , $\delta=15.2''\sim 15.4''$ )

**CFs** took a set of an L-colour and an IR685 image at  $\omega=089^\circ\text{W}$ . The dark markings are shown sufficiently. Solis L must be grasped at this angle: Referring to the IR image, the inner structure of the dark brown looks to be caught. At the area of Tithonius L, such dark spots as Noctis L, Phœnicis L and so on are clearly visible. The Fortuna double ring is also checked, but the cloud covering of the Tharsis ridges is not easy because the whiteness is never brightly shown. Alba's white part is blurred and also the western flank of Olympus Mons lacks the brightness. It may be interesting to check the mist patch around Nilokeras and the (maybe whitish) mist to the north of Juventæ Fons, but the recovering the whiteness expression is the first to be done. The south polar gaseous canopy looks to start southward from the latitude ( $50^\circ\text{S}$ ) of the south of Depressio Pontica.

**MRs** gave a colour drawing at  $\omega=178^\circ\text{W}$ . To the north of the south polar canopy, the dark belt of Mare Sirenum and Mare Cimmerium exists. The remnant of the white cloud of Olympus Mons is visible on the evening terminator.

**MJs** secured a set of the R,G,B images to make an RGB composite at  $\omega=300^\circ\text{W}$ . If we refer to MJs's image made on 20 March 2016 ( $\lambda=125^\circ\text{Ls}$ ) at  $\omega=301^\circ\text{W}$ , we will be able to grasp a variation of the white frost inside the Hellas basin during an interval of  $20^\circ\text{Ls}$ . (Refer to the images here.) The western corner which was densely white during March turned out this time to be faded and instead the ES part or the southernmost part of the basin showed a thick whitish streak. The evening mist makes a shape at the northern part of Syrtis Mj (as expressed mostly in B).

There is a broad-band stream of mist at Noachis to the south of S Sabæus. This distribution of the whitish



mists really inspire the colour images. In R, the central sign of the Huygens crater is well dark, and Yaonis Fr is also a thick canal. At the ES corner of Æria, an amorphous shadowy small smudge may attract notice (always these apparitions as the oppositions approached).

**Km** issued an LRGB and a B image at  $\omega=332^\circ\text{W}$  and  $335^\circ\text{W}$  respectively. (Said old-fashioned,) the LRGB image looks coarse-grained. S Sabæus and S Meridiani show an "edge". However the details at the rhs nail of Aryn and at the northernmost area of Syrtis Mj are lacking, while the effect of occupation of the mist complex at the northern district of Syrtis Mj is not common but quite tasty (in this sense the mist is the one which is never reproduced by the associated B image). The southern canopy is thin and spread toward the morning side.

### 28 April 2016 ( $\lambda=144^\circ\text{Ls}$ ~ $145^\circ\text{Ls}$ , $\delta=15.7''$ ~ $15.8''$ )

**TWI** gave a 120 MC colour single image at  $\omega=167^\circ\text{W}$ ,  $\phi=07^\circ\text{N}$ . The surface looks dull-hued, but we can catch a lighter part of Elysium with the preceding Propontis I dark spot. On the evening area, the cloud associated with Olympus Mons et al is vaguely.

### 29 April 2016 ( $\lambda=145^\circ\text{Ls}$ , $\delta=15.8''$ ~ $16.0''$ )

**AWs** sent us a single colour image at  $\omega=285^\circ\text{W}$ ,  $\phi=07^\circ\text{N}$ . This is superb and may be one of the best images captured this period. The dark markings are subdued in colour but very detailed, and above all the description of the configuration of gaseous mist all over the surface is distinguished. The area of Antoniadi crater is clearly depicted with the Baldet crater spot (since 24 April by SBd). The details around the Huygens and Schröter craters are also definite. The distribution of the white matters inside the Hellas basin should be recorded by us as the typical at the season  $\lambda=145^\circ\text{Ls}$ . The evening mist explicitly floats to the south of Elysium and we can easily see it invades first Crocea (and goes finally to the northern



Æria). Utopia also show several minor markings and mist occupations. To the east of the npc, Olympia is a bit visible.

♂.....**We Further Received** some other work made earlier in the previous periods:

**PEACH, Damian A (DPc)** Barbados Island (←Selsey, West Sussex, the UK)

1 Set of RGB + 3 Colour + 3 B Images (18, 19 March 2016) (36cm SCT)

**ROSOLINA, Michael (MRs)** Friars Hill, WV, the USA

1 Colour Drawing (13 April 2016) 35cm SCT, 230×

**TRIANA, Charles (CTr)** Bogota, COLOMBIA

1 Colour Image (26 March 2016) 25cm SCT @f/27 with an ASI120MM

**Damian PEACH (DPc)** produced three sets of (RGB, B) images on 18 March 2016 ( $\lambda=124^\circ\text{Ls}$ ) at  $\omega=136^\circ\text{W}$ ,  $148^\circ\text{W}$ ,  $170^\circ\text{W}$ , when  $\delta=10.3''$ ,  $\phi=8^\circ\text{N}$ ,  $\iota=35^\circ$ . These images must be a series that chased the clouds associated with Tharsis Montes and Olympus Mons. The clouds at the western flanks are rigid,

and then the roll clouds trail gradually longer to NW direction. At  $\omega=136^\circ\text{W}$ , the summits of Tharsis ridges are shown up. Ascræus Mons show other cloud on its eastern side in addition to the usual western flank cloud associated with the Katabatic wind. It is not clear at present whether the eastern cloud is related with Tharsis Tholus or the Fortuna double ring or located near Ascræus Mons. On the other hand the Ascræus Cloud is separated from the western flank cloud and goes down to the W direction. To compare, we should refer to the work by CFs on 22 April at  $\omega=123^\circ\text{W}$  ( $t=22^\circ$ ), and as well to the images from Hawaii by As on 2 April at  $\omega=123^\circ\text{W}$ ,  $133^\circ\text{W}$ . However the CFs image is slightly blurred and the B images of As lack some edges. As's images prove that the western flank cloud of Ascræus Mons is separated from the roll clouds and suggests that Ascræus Mons is not isolated but its ridge is connected to Pavonis Mons and these are supported by the images of DPc: In this sense the DPc plays a suggestive role here.

**DPc** also gave a set of R, G, B ingredients and the RGB composite on the following 19 March 2016 ( $\lambda=125^\circ\text{Ls}$ ) at  $\omega=158^\circ\text{W}$ . The lower split of Phlegra, Trivium Charontis and Cerberus are brownish, while Propontis I rather greenish. The Ætheria dark patch is also bluish (quite dark in R). The summit of Olympus Mons shows up as a dark spot. The western flank thick cloud of Olympus Mons is separated from the roll cloud. The shape of Propontis I may look a bit different than the case of CFs on 18 April at  $\omega=162^\circ\text{W}$  (one month different).

**Michael ROSOLINA (MRs)** took a colour drawing on 13 April 2016 at  $\omega=306^\circ\text{W}$ : Hellas is depicted large near the evening terminator without details inside. S Meridiani is now inside the disk.

**Charles TRIANA (CTr)** gave a single colour image of LRGB composite: This looks excellent with several collective seasonal clouds, but the image looks smaller and it is difficult to decipher the minute cloud distribution.

*Masatsugu MINAMI and Masami MURAKAMI*

## Letters to the Editor

●.....**Subject: Mars 2016/04/15**

**Received: 15 April 2016 at 19:45 JST**

Hello, Here is Mars on 2016/05/15. The seeing was very bad and the transparency was average. The planet was only  $20^\circ$  elevation.  $T = +7.8^\circ\text{C}$ . Regards

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2016/160415/JPp15Apr16.jpg>

**Jean-Jacques POUPEAU** (Essonne, FRANCE)

●.....**Subject: Mars Image April 15, 2016**

**Received: 16 April 2016 at 01:21 JST**

Date: April 015, 2016

Time: 09:20 GMT, CM:  $288^\circ$ , Ls:  $138^\circ$

Telescope: 20CM SCT, Camera: ASI 120MM,

Filters: RGB+IR

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2016/160415/TW115Apr16.jpg>

○.....**Subject: Mars April 22, 2016**

**Received: 24 April 2016 at 04:05 JST**

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2016/160422/TW122Apr16.jpg>

○.....**Subject: Mars April 23, 2016**

**Received: 24 April 2016 at 04:07 JST**

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2016/160423/TW123Apr16.jpg>

○.....**Subject: Mars Image April 28, 2016**

**Received: 29 April 2016 at 08:36 JST**

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2016/160428/TW128Apr16.jpg>

**Tim WILSON** (Jefferson City, Mo)

●.....**Subject: Mars Image 2016/03/25**

**Received: 16 April 2016 at 10:04 JST**

Dear Masatsugu, Dear Masami,

I send you one image. Best regards,

Comments:

This is an image of Mars on the 25-Mar-2016, under poor seeing conditions.

In foreground, Tharsis Region and Arcadia Region, with few clouds on Olympus Mons and Tharsis Montes.

In Chryse Planitia cloudiness abundant is observed.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmoms/2016/160325/CTr25Mar16.jpg>

○…*Subject: Mars Image 2016/03/26*  
*Received: 25 April 2016 at 13:07 JST*

Comments:

Image of Mars in the early hours of 26-Mar-2016. The image was obtained near the same time as the day before, and therefore it is observed approximately the same region. Although the observation conditions were not the best, some superficial and atmospheric details are observed in the region of Tharsis and Arcadia, Olympus Mons and Tharsis Montes, with quite cloudiness in Chryse Planitia, a little higher than the previous day and with a displacement westward.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160326/CTr26Mar16.jpg>

**Charles TRIANA** (Bogotá, COLOMBIA)  
[www.astroexplor.org](http://www.astroexplor.org)

●…*Subject: Mars 2016/04/16 0254UT*  
*Received: 16 April 2016 at 18:25 JST*

Mars this morning, in a bit better seeing.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160416/CFs16Apr16.jpg>

○…*Subject: Mars 2016/04/17 0255UT*  
*Received: 17 April 2016 at 15:39 JST*

Hi all, Mars this morning. It was almost totally overcast when I got up, but was rewarded as the clouds started breaking up, and I was pleasantly surprised that the seeing was reasonable. Possibly the "blandest" view of Mars, centred on the Amazonis region. In processing a few of the images that I took over a number of minutes, some of what I originally considered to be noise in the Amazonis region, turned out to be subtle albedo features. I will have a go at trying to put a GIF together. The two brightish features just south west of Olympus Mons (Gordii Dorsum?) are quite clear. I am a bit intrigued by the row of dark dots just below the south polar hood. They aren't shown prominently on my globe or maps. Also by the darkening of the south polar limb. Is this purely due to the angle of Mars relative to the sun? I assume the dark feature cutting across the north polar region is Olympia Planitia? Looking forward to a bit more detail coming into view in the next week.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160417/CFs17Apr16.jpg>

○…*Subject: Mars 2016/04/18 0246UT*  
*Received: 18 April 2016 at 12:53 JST*

Mars this morning under average seeing. Some intricate cloud detail over Tharsis region coming into view.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160418/CFs18Apr16.jpg>

○…*Subject: Mars 2016/04/20 0254UT*  
*Received: 20 April 2016 at 14:18 JST*

Mars this morning under reasonable seeing. The light markings around Olympus Mons are evident.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160420/CFs20Apr16.jpg>

○…*Subject: Mars 2016/04/22 0236UT*  
*Received: 22 April 2016 at 12:46 JST*

Mars this morning under poor seeing and (very!) heavy dew after rain yesterday, so I was only able to capture 1 colour avi and one IR before I was totally dewed over. Submitting for the record nonetheless. I am also working on colour balance. This result is from much less adjustment than I have been doing recently.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160422/CFs22Apr16.jpg>

○…*Subject: Mars 2016/04/23 0230UT*  
*Received: 24 April 2016 at 03:09 JST*

Mars this morning under average seeing conditions.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160423/CFs23Apr16.jpg>

○…*Subject: Mars 2016/04/24 0355UT*  
*Received: 24 April 2016 at 22:40 JST*

Mars this morning under less than average seeing conditions. I was also up earlier to see if I could get some better seeing, but it was actually worse as dawn approached.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160424/CFs24Apr16.jpg>

○…*Subject: Mars 2016/04/25 0207UT*  
*Received: 28 April 2016 at 02:26 JST*

Mars on the 25th April. Reasonable seeing conditions. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160425/CFs25Apr16.jpg>

**Clyde FOSTER** (Centurion, SOUTH AFRICA)

●…*Subject: hi*  
*Received: 16 April 2016 at 07:41 JST*

Dear Masatsugu, We are thinking about you and your country tonight, hoping the earthquake missed you. Sam and his family

**Samuel WHITBY** (Hopewell, VA)

●…*Subject: Mars - April 14th*  
*Received: 17 April 2016 at 01:14 JST*

Hi Mr. Minami and All!, First I hope all is well from the most recent earthquakes, Take care my friends. My latest session on April 14th and on the same day of Saturn.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160414/EMr14Apr16.jpg>



○...**Subject: Mars - April 18th**  
**Received: 23 April 2016 at 03:22 JST**

Hi Mr. Minami and All!, Here I submit my latest session of Mars on April 18th.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160418/EMr18Apr16.jpg>

**Efrain MORALES** (Aguadilla, Puerto Rico)

●...**Subject: RE: Mars 2016/04/17 0255UT**  
**Received: 17 April 2016 at 18:51 JST**

Very nice Clyde - lots of interesting detail in the boring face! I often find pretty good seeing after the cloud has just cleared. The cloud will act as a radiative equalising blanket keeping the ground and air at similar temperatures. Take that away and the ground and scope then 'see' the cold night sky above which can be -20°C to -50°C. This when convection currents start to kick in and the local seeing then deteriorates.

Keep up the good work,

**Martin LEWIS** (Hertfordshire, the UK)

●...**Subject: Mars, 17th April**  
**Received: 18 April 2016 at 12:41 JST**

Hi all, here's a colour image of Mars from this morning. The north pole is visible at top left and clouds can be seen across the disk. The colours are better today, no terrestrial clouds interfered today so a good colour balance was easier to achieve than last time. cheers,

<http://www.acquerra.com.au/astro/gallery/mars/20160417-175548/m20160417-175548utc.png>  
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160417/AWs17Apr16.jpg>

○...**Subject: Mars 19th April**  
**Received: 20 April 2016 at 10:17 JST**

Hi all, here's a colour image of Mars from this morn-

ing. Seeing was pretty good for this, you can see the north pole at top left, and terminator clouds at top right. There is a lot of cloud/haze right across the disk, contributing to a very bright rising limb at lower left. Argyre basin is bright at lower right, filled with cloud or frost. regards,

<http://www.acquerra.com.au/astro/gallery/mars/20160419-173412/m20160419-173412utc.png>  
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160419/AWs19Apr16.jpg>

○...**Subject: mars, April 21**  
**Received: 22 April 2016 at 16:14 JST**

Here's an image of Mars from this morning in good seeing. Mars is now 14.8" in diameter, larger than it was in the 2014 apparition, and larger than it's been at any time since 2005. It will reach 18.6" in late May. In this image the north pole is visible at top left, the bright orange plains of Arabia at centre and dark Sinus Meridiani just below. Syrtis Major is just visible as it sets at right. Clouds are visible across the disk.

regards,

<http://www.acquerra.com.au/astro/gallery/mars/20160421-172130/m20160421-172130utc.png>  
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160421/AWs21Apr16.jpg>

○...**Subject: Mars, April 24**  
**Received: 25 April 2016 at 09:17 JST**

Hi all, here's a colour image of Mars from this morning. Syrtis Major can be seen on the right, with Hellas Basin below it still containing some clouds. There are still some clouds across the disk, although perhaps less than in previous weeks. regards,

<http://www.acquerra.com.au/astro/gallery/mars/20160424-173236/m20160424-173236utc.png>  
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160424/AWs24Apr16.jpg>

○...**Subject: Mars + phobos + deimos + interloper**  
**Received: 27 April 2016 at 08:21 JST**

There was a transit of Phobos this morning, so I grabbed some images of it just before it crossed in front of Mars. Deimos was also in the frame and - to my surprise - so was another faint object on the opposite side of Mars which was approximately the same brightness as Deimos.

Here's an image showing Phobos just before it enters transit in front of Mars - you can see it at lower left very close to Mars, and also Deimos further out on approximately the same path. The unidentified object is at upper right.

I've also included a 2-frame animation showing a timelapse of 17 minutes, the interloper moves quite

some distance relative to Mars over this time - at a guess I'd say it's moved about 5 arc seconds on a track almost perpendicular to the orbital plane of the moons.

Note: Phobos is not visible in the second frame of the animation as it's too close to Mars to see and lost in the glare.

Mars' proper motion over this timelapse is very small, much less than 1 arc second, I'm not sure the interloper could be a background star - anybody have any ideas? My guess is that it must be an asteroid but I'm happy to be corrected.

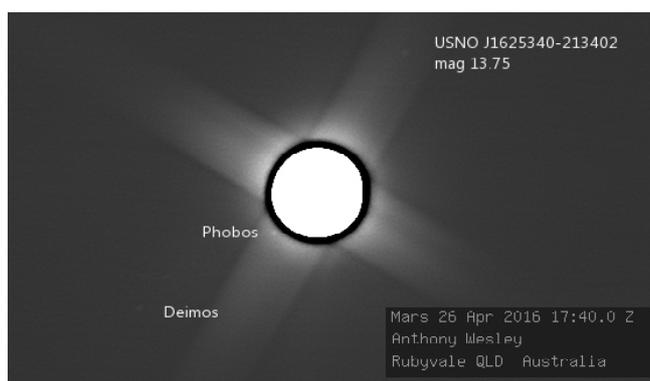
To be sure there were no hot pixels or camera artifacts present, Mars was moved constantly left->right across the frame at slow speed during the captures. You can see the residual noise is spread out in this way, so anything that stays put must be signal and not noise.

<http://www.acquerra.com.au/astro/gallery/mars/20160426-174000/m20160426-174000utc.png>  
<http://www.acquerra.com.au/astro/gallery/mars/20160426-174000/m20160426-1740-1757-anim.gif>

○.....*Subject: Mars + star*  
*Received: 27 April 2016 at 09:26 JST*

A quick update to my previous email - the interloper is indeed a star (thanks Phil). USNO J1625340-213402 with magnitude approximately the same as Deimos.

Annotated image attached. cheers,



<http://www.acquerra.com.au/astro/gallery/mars/20160426-174000/m20160426-174000utc.png>

**Anthony WESLEY** (NSW, AUSTRALIA)

●.....*Subject: Mars images 17 April 2016*  
*Received: 18 April 2016 at 20:43 JST*

Hello everyone, Please find attached my latest Mars images from this morning. The seeing was very jittery but Autostakkert did a very good job of sorting that

out.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160417/SBd17Apr16.jpg>

○.....*Subject: Mars images 19 April 2016*  
*Received: 20 April 2016 at 20:02 JST*

Please find attached my Mars RGB set from this morning, captured in jittery seeing yet again.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160419/SBd19Apr16.jpg>

○.....*Subject: Mars RGB from 24 April 2016*  
*Received: 26 April 2016 at 08:36 JST*

Please find attached another image set captured in flickery seeing. Autostakkert saved the day yet again.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160424/SBd24Apr16.jpg>

**Stefan BUDA** (Melbourne, AUSTRALIA)

●.....*Subject: Frosty Argyre and Galle*  
*Received: 18 April 2016 at 23:47 JST*

Dear All, Anthony WESLEY's excellent image on 17 April 2016, I believe, clearly resolved the frosty Argyre and the adjoining frost-filled crater Galle, collectively looks like "an easterly lying snowman" or "a frosty turtle heading eastward". Please find an attached montage comparing with the 1995 HST image. Please also read my LtE titled "Frosty Argyre and Galle" dated 02 Feb. 2012 in the Solar & Planetary LtE for #395 :

[http://www.kwasan.kyoto-u.ac.jp/~cmo/cmo/ISMO\\_LtE395.htm](http://www.kwasan.kyoto-u.ac.jp/~cmo/cmo/ISMO_LtE395.htm)



Best Regards,

○.....*Subject: Frosty Argyre and Galle*  
*Received: 20 April 2016 at 19:18 JST*

Dear all, You can also see in the Maurice VALIMBERTI's beautiful animation on 17 April that the over 600km super crater Argyre Planitia and the easterly adjoining 230km "Happy Face Crater" Galle both frost-filled. In the latter part of the animation, along the southern limb of the red planet, this incongruous duo seems just like a blue-whitish frosty turtle

moving east as Mars rotates! Both objects are quite well defined, that's the indication of the frost filled crater floors. Best Regards,

**Reiichi KONNAI** (Fukushima, JAPAN)

●.....*Subject: Mars: April 17th, 2016*  
*Received: 19 April 2016 at 11:55 JST*

Hi, I have attached my latest image of Mars April 17, 2016 at 7:20 UT. Thanks,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160417/FM117Apr16.jpg>

○.....*Subject: Mars: April 24, 2016*  
*Received: 26 April 2016 at 13:38 JST*

Hi, I attached my latest image of Mars April 24, 2016 at 7:31 UT. Thanks,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160424/FM124Apr16.jpg>

**Frank J MELILLO** (Holtsville, NY)

●.....*Subject: Mars images*  
*Received: 19 April 2016 at 21:02 JST*

Dear Sirs, Please find an attached Mars image set from the 17th April 2016. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160417/MJs17Apr16.jpg>

○.....*Subject: Mars images*  
*Received: 22 April 2016 at 12:57 JST*

Dear Sirs, Please find attached a Mars image set from the 8th April 2016. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160408/MJs08Apr16.jpg>

○.....*Subject: Mars Images*  
*Received: 25 April 2016 at 18:16 JST*

Dear Sirs, Please find attached a Mars image set from the 24th April 2016. Note that the effects of my secondary dewing over can be seen in the 16:32 green image and in particular in the 16:35 blue image. Eventually, the warm hat from my head was wrapped around the secondary for about 5 minutes to clear the dew. I was glad that I persisted

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160424/MJs24Apr16.jpg>

○.....*Subject: Mars images*  
*Received: 27 April 2016 at 20:41 JST*

Dear Sirs, Please find attached a Mars image set from the 19th April 2016. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160419/MJs19Apr16.jpg>

○.....*Subject: Mars images*  
*Received: 29 April 2016 at 20:08 JST*

Dear Sirs, Please find attached a Mars image set from the 25th April 2016. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160425/MJs25Apr16.jpg>

**Mark JUSTICE** (Melbourne, AUSTRALIA)

●.....*Subject: Mars animated GIF 17th April 2016*  
*Received: 20 April 2016 at 00:26 JST*

Hello all, Attached is a short animated GIF of two hours of Mars' rotation on the 17th April UT from 1457 to 1700 hrs UT. Seeing was quite good & improved later in the session. Due to the volume of data to process (nearly 100GB!), I have been unable to compile an image set for the session at this stage. This will follow in the next day or so; I do apologize for the delay. Best wishes,

○.....*Subject: Mars images 17th April UT*  
*Received: 20 April 2016 at 21:12 JST*

Hello all, please find attached a selection of Mars images taken on the 17th April UT in fair to good seeing, Best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160417/MV117Apr16.jpg>

○.....*Subject: Mars animated GIF 23rd April*  
*Received: 24 April 2016 at 17:26 JST*

Attached is an animated GIF showing Mars' rotation from 1434UT to 1713UT on 23rd April. Seeing was quite good. Note the striated effect on the cloud in south eastern Hellas and the two small clouds near the NPC developing toward the evening terminator near the end of the GIF. Lots of detail & albedo of features present on the disc. Regards

○.....*Subject: Mars images 23rd April UT*  
*Received: 24 April 2016 at 22:34 JST*

Hello all, Here are some images of Mars from the 23rd April as marked. Best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160423/MV123Apr16.jpg>

○.....*Subject: Mars 24th April UT*  
*Received: 25 April 2016 at 09:57 JST*

Hello all, Attached are a couple of images taken in average seeing of Mars on the 24th April as marked. Note that there appears to be a small (narrow) hazy cloud just S of the NPC E to W. Best wishes

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160424/MV124Apr16.jpg>

**Maurice VALIMBERTI**  
 (Melbourne, AUSTRALIA)

●.....*Subject: Mars Sketches*  
*Received: 23 April 2016 at 20:47 JST*

Dear Sirs, Please find attached my first Mars sketches for this apparition. The information for the sketches is below. Thank you,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160418/MRs18Apr16.jpg>  
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160413/MRs13Apr16.jpg>

○.....*Subject: Mars Sketch 25 April 2016*  
*Received: 26 April 2016 at 03:33 JST*

Dear Sirs, Please find attached an observational sketch of Mars. Best regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160425/MRs25Apr16.jpg>

**Michael ROSOLINA** (Friars Hill, WV)

●.....*Subject: Mars Observation April 23rd 2016*  
*Received: 24 April 2016 at 14:44 JST*

Dear Mr. Minami and Mr. Murakami, I hope all is going well for you both. Please find attached an observation of Mars I took last night (23rd April) for the CMO. This is my first observation for this apparition, I am glad to be back at it again.

I have attached each B, G, R image separately as well as the RGB image and have also attached a textfile with details of the observation. I am unsure of how you prefer to receive the images, if you have a particular way you would like me to send them please let me know.

The conditions were poor to moderate, but I still managed to achieve some detail. Note that as I have a 5" telescope I have to use eyepiece projection to

achieve a good image scale. There was a very bright cloud over Elysium Mons and the Syrtis Major was well seen. Despite the conditions I hope you find the attached imagery useful. I look forward to better conditions and more images for the CMO. All the best.

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160423/DWd23Apr16.jpg>

**David WELDRAKE** (NSW, AUSTRALIA)

●.....*Subject: Mars images - April 18 & 21*  
*Received: 24 April 2016 at 23:54 JST*

Gentlemen, Attached are images from April 18 and 21. The quality of these images is not very good due to the low (27 degree) elevation of Mars at my location. Regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160421/PGc21Apr16.jpg>  
<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160418/PGc18Apr16.jpg>

**Peter GORCZYNSKI** (Oxford, CT)

●.....*Subject: Mars Observation (April 23, 2016)*  
*Received: 25 April 2016 at 21:00 JST*

Dear Minami-san, I hope that you, your fellow recorders, and all CMO members are well. I am happy to be observing Mars once again. I plan on making regular observations of Mars as the weather permits. The best of luck. Regards,

<http://www.kwasan.kyoto-u.ac.jp/~cmo/cmons/2016/160423/CHR23Apr16.jpg>

**Carlos E. HERNANDEZ** (Miami, FL)



## **International Society of the Mars Observers (ISMO)**

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**CMO n°447/ ISMO #73 (10 May 2016)**

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