Analysis of the MGS and MRO Images of the Syria Planum Profile Face on Planet Mars

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ABSTRACT: Imaged by both the Mars Global Surveyor (MGS) and Mars Reconnaissance Orbiter (MRO) space probes, a particular arrangement of Martian surface features appearing as an unusually clear and detailed rendering of a human face, in profile, is examined. Could the features in the “Profile Face” be artificial, archaeology? The claim of intelligent design on our neighboring planet is seldom taken seriously, and while other Martian surface features have gained considerable attention with regard to their possible artificiality, sparse attention has been given the Profile Face. The probability that this formation may be of artificial origins is investigated. Further study, even “ground truth”, is encouraged as a worthwhile endeavor. Common arguments dismissing claims that such Martian features could have been artificially created are addressed through analysis of the features. Methods include a topographical analysis of the area, analysis of the MGS image ancillary data, anatomical measurements of the Profile Face, examining the particular details and cultural references in the images, reviewing terrestrial remote sensing methods used in archaeology, and comparing it to analogous terrestrial surface features.

KEYWORDS: Mars; anomaly, face, artificial; extraterrestrial; archaeology; Nefertiti; MGS; MRO

1. BACKGROUND

It was Carl Sagan who first brought up the idea that there might be artificial objects on Mars. He noticed pyramidal features in the grainy images returned by Mars Mariner 9.[1] Later, in the late seventies, the enormously successful Viking I and Viking II orbiter/landers returned images and data from Mars. Two of the surface images returned by the orbiters were of the now famous Face on Mars, an approximately 2.5 kilometer long mesa containing all the features of a humanoid head (Fig. 1). Remaining controversial to this day, researchers continue to suspect the mesa to be artificial in origin.[2-6]

Other features in the Cydonia region were noted, including the nearly three kilometer long, one kilometer high D&M Pyramid, named after researchers Vince DiPietro and Greg Molenaar (Fig. 2). Cartographer Erol Torun’s analyses of the object seems to preclude natural forces and processes.[4] Other researchers found unusual alignments and proportions among over twenty unusual objects and formations in this region.[2,6] Fractal software analysis strongly suggested artificiality.[2]

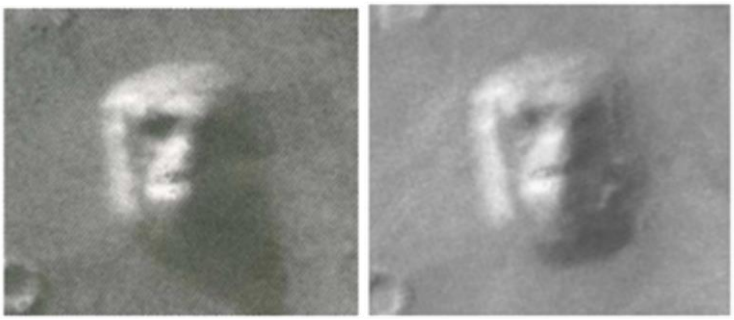


Figure 1. Viking frames 35A72 (left) and 70A13 (right).
Image courtesy NASA/JPL

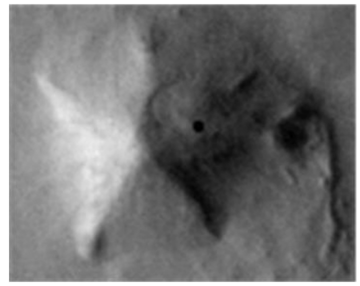


Figure 2. Viking. The D&M Pyramid.
Image courtesy NASA/JPL

These researchers have been using the satellite images in much the same way archeologists use remote sensing while searching for promising digs, or further developing known digs, here on Earth. But the very idea that there might be artificial objects on Mars, a planet presumably never having had any intelligent life upon it, is a leap many have difficulty taking, hence the quite understandable controversy.

Then in 2001, Mars Global Surveyor (MGS) imaged the Face on Mars massif at higher resolutions (Fig. 3) as well as other unusual objects all over the planet. Far outlasting its predicted lifespan, the intrepid Mars Orbiter Cameras (MOC) on their MGS platform succeeded in returning many thousands of images. The highest resolution images were taken by the “narrow angle” camera which returned image “swaths” roughly a few kilometers wide and as much as 60 kilometers long with resolution in the range of five to six meters per pixel. (Digital images are composed of many individual dots that combine to form a complete picture. Each of these dots is a “pixel”, or picture element. The more dense the pixels, the better the image quality and available detail.) Malin Space Science Systems (MSSS), operator of the cameras, provides a very user friendly, educational website from which the images and their ancillary data may be accessed and studied. It is among these narrow angle swaths that the “Profile Face”, or “Profile Image” (PI) was found.

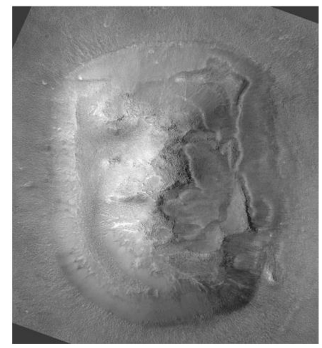


Figure 3. MGS E0300842 of the Face on Mars
Image courtesy NASA/JPL/MSSS

2. THE PROFILE FACE

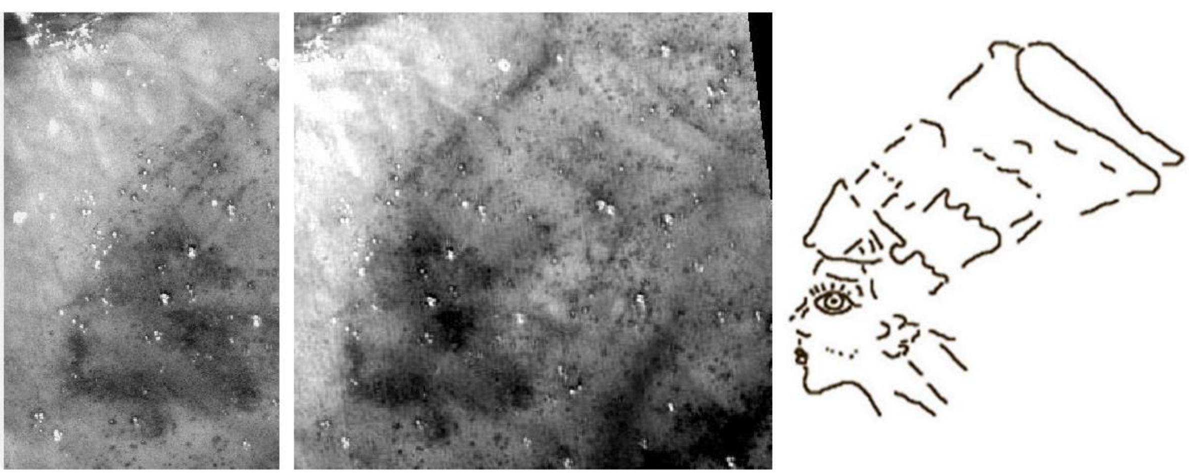


Figure 4. MGS MOC images E0501429 (left) taken in 2001 at resolution of 5.71 m/pxl, M0305549 (middle) taken in 1999 at resolution of 5.65 m/pxl, and tracing.
Images courtesy NASA/JPL/MSSS

2.1 Two MGS MOC Images of the Face Formation

The MGS MOC returned two usable images of the area. Figure 4 contains croppings of the image swaths together with an illustrative tracing, traced directly from the M03 image. The images were processed by increasing contrast to make the patterns more distinct (the bright pixels made slightly brighter and the dark pixels made slightly darker) and brightness (all pixels increased in brightness). The images contain an arrangement of surface features that organize to produce a highly detailed human face in left-facing profile. The face contains a forehead, nose, lips, chin, neck, ear, and whole detailed eye. In addition, there appears to be a tall cylindrical headdress or crown. The image contains numerous other less distinct details not illustrated here.

An "analytical" drawing is based on an old drawing exercise where the observer attempts to draw a figure or object by following its shape with the eye, and without looking at the paper. It forces the observer to focus on the subject and follow its shape and contours. The pencil continually acts in accordance with the eye. This is to counter the tendency to idealize the subject and draw what one thinks a figure or object looks like, as opposed to what it is. Coauthor and artist George Hass used this method to produce Figure 5. The drawing contains eight points of anatomical correctness he observed in the Profiled Face and its detailed headdress (labeled a-g and n).

Neck……………a
Chin b
Lower lip……….c
Upper lip d
Nose/ nostril……e
Forehead g
Eye……………..f
Headband h
Hair……………..n
Headdress m
Piled head wrap.. j, k, i

Figure 5. Analytical drawing of the Profile Face. Drawing by George J. Haas

2.2 MGS MOC Ancillary Data – Sun and Camera Angles

Each of the images posted to the MSSS web site has accompanying ancillary data, information about the image such as the time it was taken, spacecraft altitude, resolution, and other information. One must study these data to better understand what is seen. To understand the action of lighting conditions in an image, three data are useful; the emission angle, the incidence angle, and the sun azimuth.

The internet links to the two MGSMOC MSSS images and accompanying ancillary data are:
http://www.msss.com/moc_gallery/ab1_m04/images/M0305549.html
http://www.msss.com/moc_gallery/e01_e06/images/E05/E0501429.html

The emission angle is the camera angle (or angle from which light reflects from the surface into the camera, "emission"). Measured from the center of the image, this is the angle between the camera and a line drawn straight down, "normal", to the surface. The E05 emission angle is 0° and the M03 emission angle is 0.21°. The target is nearly in the center of the image swaths. In other words, the camera is aiming straight down in E05 and nearly straight down in M03.

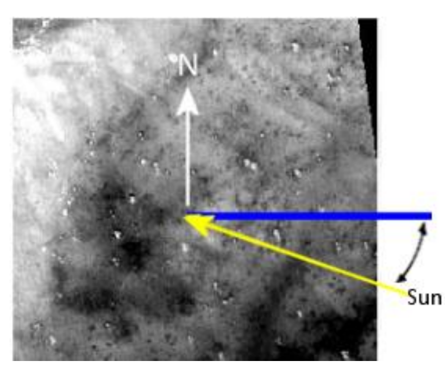


Figure 6. Sun azimuth angle
Image courtesy NASA/JPL/MSSS

The incidence angle is how high above the horizon the sun is in the sky. Measured from the center of the image, this is the angle between the sun and a line drawn perpendicular, normal, to the surface. Both MGS MOC images have an incidence angle of 43°, so the sun is about half way between the horizon and zenith (zenith is straight up).

The sun azimuth is an angle measured clockwise from a line drawn from the center to the right edge of the image to the direction of the sun. The E05 sun azimuth angle is 19.26° and the M03 sun azimuth angle is 19.81°. So if one were on Mars looking to the south, the sun would be to one's left. The sun is shining toward the northwest.

The two MOC images have almost identical camera and sun angles. With the MOC pointed straight down, sunlight hits the surface from the southeast at approximately 19° to 20° clockwise from the horizontal and 47° above the horizon. Figure 6 is an attempt to illustrate the direction at which the sun strikes the surface. North is at the top. The sun azimuth angle is significant enough to cast visible shadows as long as there are radical enough elevation changes that could caste them, but when keeping sun azimuth in mind, the dark areas do not appear to be shadows cast northwestward by elevated features.

2.3 The Dark Areas and the Ejection Fault

The Profile Face formation was first spotted while studying the proposed "streaks and stains" that appear to be dark point sources of outflowing fluid. Some of these are very long. They appear black when new, then evaporate and/or sublime leaving a stain (Fig. 7). The fluid might be a type of brine that leaves minerals behind.

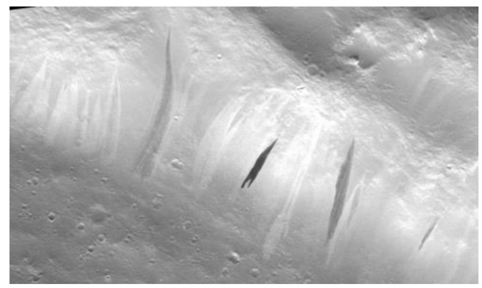


Figure 7. MSG MOC M0203243 Streaks & Stains
Image courtesy NASA/JPL/MSSSS

While studying these phenomena, interest in the M03 image initially began with what appears to be a long fault from which dark fluid is ejected, geyser-like. Figure 8 contains croppings of the M03 and E05 swaths. The M03 ejection fault is at the top and the Profile Face is at the bottom. The cascading fluid seems to collect on the surface and drains off toward the southwest in what appears to be a dark river. Mars Orbiter Laser Altimeter data (MOLA) confirms there is a deep ravine in this drainage area (I, K, and F, Fig. 35, Appendix A).

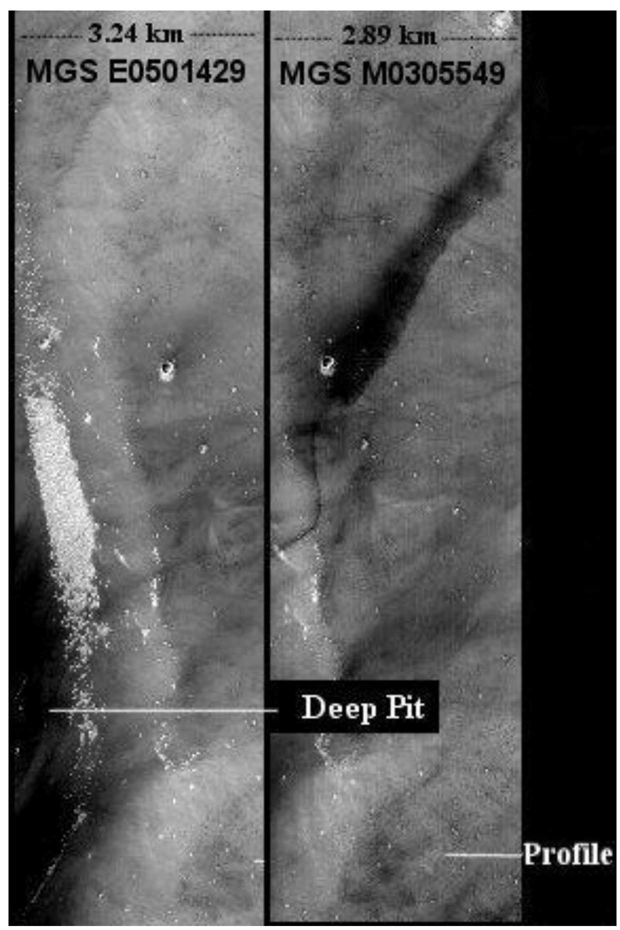


Figure 8. Ejection fault north of Profile
Image courtesy NASA/JPL/MSSS

At first it was thought that this ejection fault was a seasonal phenomenon, maybe ice plugs melting in summer, because the ejecting fluid does not appear in the E05 image taken twenty-three and a half Earth months later (universal time). But this means that on Mars, with a Martian "year" about twice as long as Earth's, the images were taken at roughly the same time of year, the same season, on Mars. The intriguing question here is why the dark material is so prominent in one of the images and not the other. The seasons on Mars are somewhat more complicated to understand than Earth because although the tilt of both planets' rotational axes causes their seasons, Mars' more eccentric orbit causes the seasons to vary more extremely than Earth's. This is a line of research that might yield some interesting results.

Not only does this fluid appear to flow southwest off frame into the ravine, but also seems to spill into the area toward the south where the Profile Face is located. Other than the deep pit, elevations of these different areas do not appear to be especially radical. Sun azimuth does not appear to be significant enough to create shadows that would cause the dark areas because any shadows must be expected to lie northwest, about 19° from horizontal. Of course the shadow must be attached to an elevated object casting it. This does not appear to be the case. Although there must be some shadows caused by the sun azimuth, the sun azimuth data together with the MOLA analysis (Appendix A) shows that the dark colorations that help form the face are not primarily shadows but instead stained, or maybe wet, low regions, while the lighter colored areas are of slightly higher elevations.

2.4 The Shiny Mounds

Spread out over the Profile Face area are numerous "shiny mounds", or bright dots. These range in size from 15 meters to over 50 meters in diameter. Toward the southern end of the MOC image swaths, the mounds get more and more numerous, eventually converging into one great bright area. The bright mounds are a different type of feature than the dark regions forming the Profile Face and appear to be part of the higher elevations that remain light in color where they would be unaffected by darkening fluid.

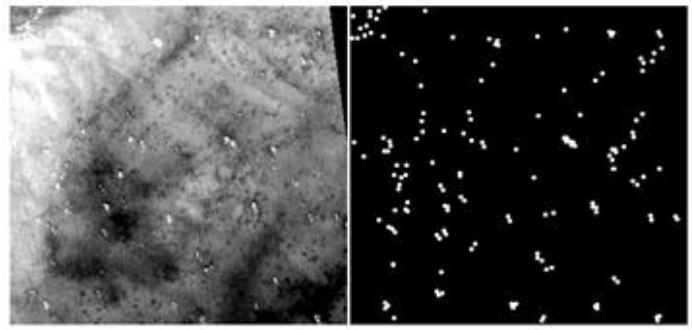


Figure 9. The Shiny Mounds Detail.
MOC image M0305549 courtesy NASA/JPL/MSSS

The shiny mounds are plotted in Figure 9. Equally sized dots were painted over each of the mounds on a separate graphics layer. Only the largest and brightest mounds were dotted. When the underlying image layer was removed, an image of just the dots remained.

Inspecting the mounds map, sections of the mounds do appear to align with the face in a superficial way, but aside from the weak impression of a nose there is no recognizable face. The mounds of course help complete the impression of a face while working with other features in the original image because the shiny mounds are atop the highest, lighter colored elevations that produce the light-verses-dark regions. It seems the mounds are the result of a random splattering effect, like droplets flung from a wet paint brush. The shiny mounds may be the result of a later phenomenon than the darker lower elevations comprising the face, a splatter of debris flung into the area during a cataclysmic impact or combination of impacts. There are indeed large, relatively fresh looking craters to the southeast labeled G and H in the MOLA analysis maps (Appendix A). These and other relatively nearby craters are surrounded for many kilometers with other large, bright mounds, all apparently within their splash radii. If the dark lower elevations are indeed colorized by fluid, the ones that landed in the lower elevations would be darkened while those landing in higher places would remain bright. Any particularly large projectiles landing in the pits would remain bright at their tips. As a result, the shiny mounds roughly align with the contours of the elevated areas forming the face.

2.5 MGS MOC Scale and Metrology

The location of the first M0305549 image swath is depicted by MSSS in context image M0305550 (Fig. 10). The image swath is of an area named Syria Planum which is southwest of the three thousand mile long chasm Vallis Marineris. The Profile Face is approximately in the center of the swath in between two channels running diagonally northeast to southwest. As noted earlier, there is a deep ravine southwest of the target.

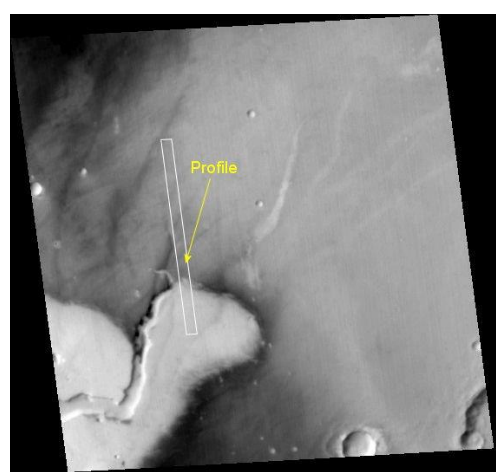


Figure 10. MGS context image M0305550 with location of the Profile Face indicated.
Image courtesy NASA/JPL/MSSS

Since the image size and resolution of each MOC image is given in its ancillary data, the size of various surface features in the image can be determined. A convenient method of sizing objects in the images is to crop the area of interest in a graphics program then read the vertical and horizontal pixel dimensions in the image information window. This pixel count (width or height) is multiplied to the meter per pixel resolution provided in the image ancillary data. This process was applied to the Profile Face in M0305549 and illustrated in Figure 11. More detailed measurements are illustrated in Figure 37, Appendix B.

The “eye” is about 115 meters across, or a bit bigger than a football field.

Metrology of the human head is well developed and extremely useful in the design of clothing, machinery, and safety equipment, but any basic art lesson book provides the simple proportions portrait artists use to draw realistic faces. It has been the experience of the authors that those who see the Profile Face agree there is very good facial detail and proportion and that it is not necessary to prove the obvious. Nevertheless, an attempt was made to show how major facial dimensions fall within basic known artistic proportions (Appendix B). The authors challenge the reader to draw a better face, complete with shading, than the Mars Profile Face.

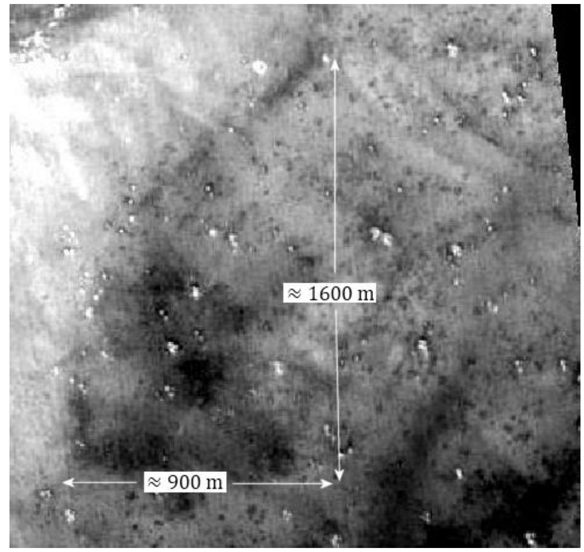


Figure 11. Approximate scale of the Profile Face Detail MOC image M0305549 Courtesy NASA/JPL/MSSS

As noted above, it appears the dark areas are lower regions while the lighter colored areas are the higher elevations. The “figure-ground” assumption we visually make is usually correct in our light-from-the top world, where we tend to put dark areas in the background and the lighter colored figures in the foreground. This learned tendency can cause misinterpretations of two dimension images. Here though, the MOLA analysis supports the visual interpretation that the dark ravine southwest of the target is indeed a significant depression. This then means it is safe to assume that the other dark regions must also be lower elevations.

A trial version of a shape-from-shading software program was used to create different perspectives of the Profile Face (Fig. 12). The program interpreted the dark areas as lower elevations. This supports our visual interpretation. The surface features that form the Profile Face appear to be excavated or etched into the surface. Looking again at Figure 12, there seems to be a “plowed” appearance just behind the ear and above the forehead, an arc shape of pushed up material that helps form parts of the crown. The raised arc does not appear to be an impact crater rim. Working against gravity, what natural forces could have pushed this significant amount of material upward?

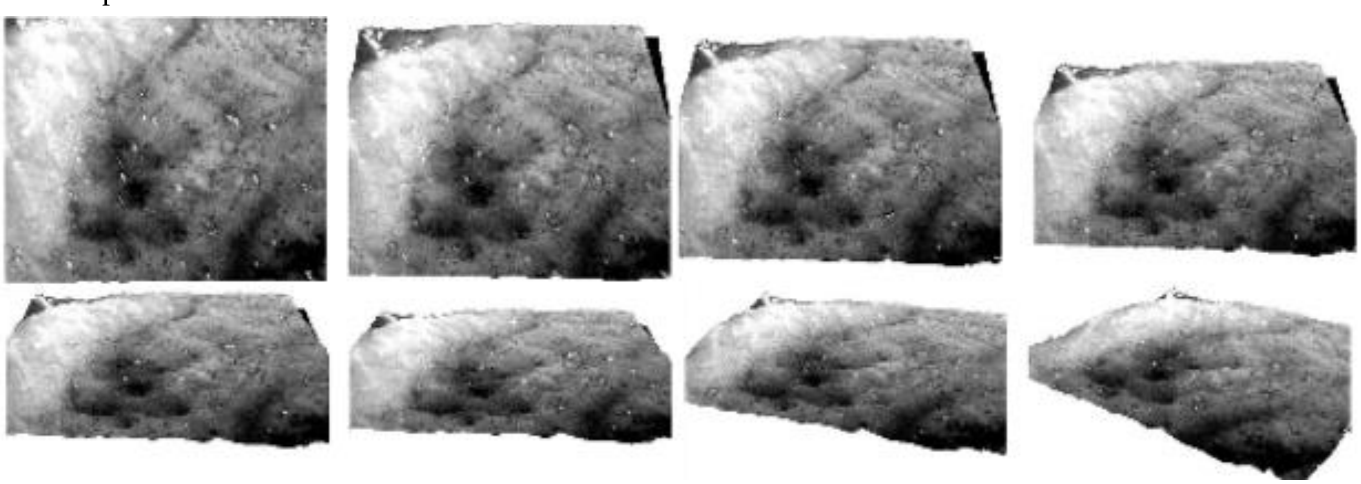


Figure 12. Perspectives of the target produced with shape from shading software.

2.6 Cultural References

The Profile Face appears to have a tall cylindrical crown or headdress reminiscent of Egypt or Mesoamerica. For example, on a small stele from El Chicozapote there is a pair of seated Maya lords. One wears a tall cylinder-shaped headdress (Fig. 13).[7]

From Ecuador, a small clay figurine depicts a young girl with a high headdress (Fig. 14).

In more recent times, cylindrical hats were popular in the early 20th century. A famous personality of New York's art, nightclub, and fashion world, Zelda Kaplan was well known for her trademark outfit that included a tall cloth cylindrical hat (Fig. 15).[8]

Figure 13. Mayan lord,
El Chiozapote stele.
Drawing by George J. Haas

Figure 14. Young women
Clay sculpture (100BC)
Esmeraldas Peninsula, Ecuador.
Drawing by George J. Haas

Figure 15. Zelda Kaplan
Drawing by George J. Haas

Figure 16. Nefertiti Bust.
Drawing by George J. Haas

Figure 17. Queen Nefertari
tomb painting (Detail).
Valley of the Queens, Thebes, Egypt.
Drawing by George J. Haas

It may be because of the popularity, fame, and cultural importance of the Nefertiti bust, now on display in German museums, that the Profile Face has reminded observers of the most famous woman of the ancient world (Fig. 16). Nefertiti was known for her characteristic elongated crown.[9] Because of these often noted cultural references, "Nefertiti" is the name by which the MGS images are commonly known. Researchers don't tend to like names that invoke undesirable or misleading connotations so prefer more neutral names, hence the "Profile Face" or "Profile Image" (PI).

The crown is not the only cultural reference in the images. A whole eye while in profile, complete with nasal point, is common in the old Egyptian styles (Fig. 17). The Eye of Horus or the *wedjat* eye is an ancient Egyptian hieroglyph and symbol.[10,11] The eye is particularly impressive, having pupil, iris, sclera, pointed oval lid aperture, tarsal sections, and lashes (Fig. 18). The lashes are at the top. The eye is oriented "correctly" with respect to other facial features. There are many Mars-Egypt connections. For example, Cairo was originally named El-Kahira, from the Arabic, El Kahir, which means Mars.[12]

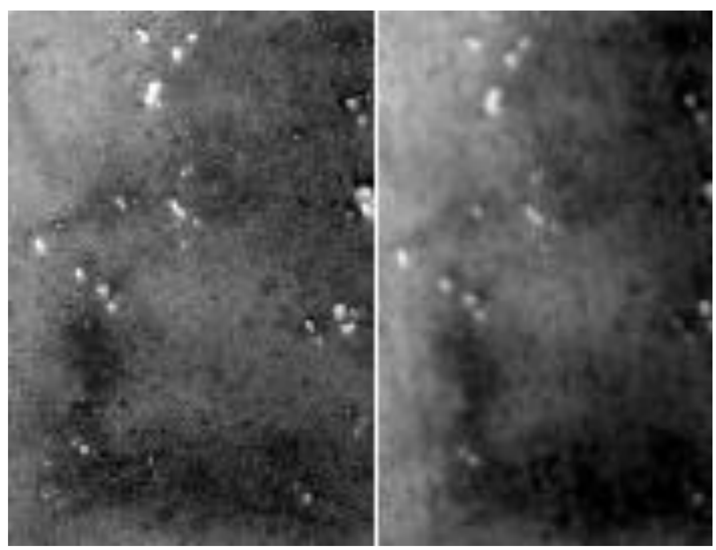


Figure 18. Enlargement of the detailed Profile eye, MGS E05 and MGS M03
Images courtesy NASA/JPL/MSSS

The Maya also presented human profiles with a frontal view of an eye on vases, mural paintings, and wall sculptures.

2.7 Two Mars Reconnaissance Orbiter Images of the Profile Face

Seven months after blasting off from Cape Canaveral in 2005, the Mars Reconnaissance Orbiter (MRO) arrived at Mars. The High Resolution Imaging Science Experiment (HiRISE) camera is among the several instruments mounted on the MRO platform. The MRO HiRISE CTX camera captured two good images of the Profile Face area (Figs. 19 and 20). It is obvious that the two MRO context images are not of the same magnification and resolution as the two MGS narrow angle image swaths. Nevertheless, the Profile Face clearly persists. The two additional MRO images were taken one year apart and a decade after the two MGS images were taken. This means the Profile Face is not transient or illusionary. The Martian surface features producing the impression of the face are really there.

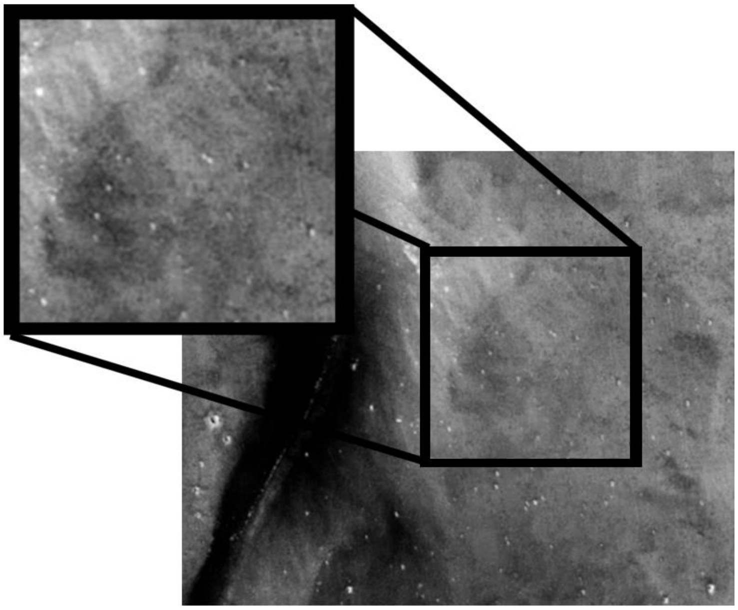


Figure 19. Profile Face MRO context image
CTX B08_012560_1661_XI_13S107W (2009).
Image courtesy NASA/JPL/MSSS

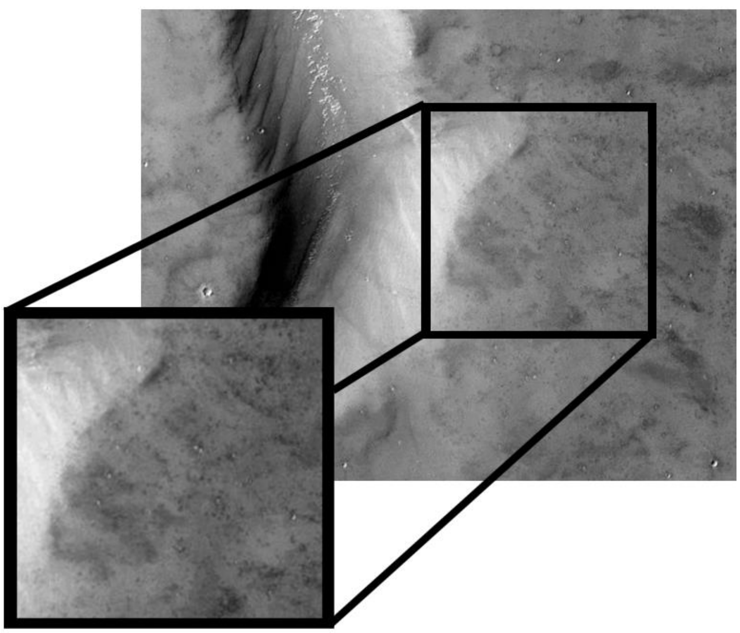


Figure 20. Profile Face MRO context image
CTX G02_019074_1644_XI_15S107W (2010).
Image courtesy NASA/JPL/MSSS

3. PROBABILITY

In "Face-Like Feature at West Candor Chasma, Mars - MGS Image AB108403", Crater and Levasseur numerically estimated the probability of facial features coming together randomly to form a face. The focus of this paper was on a different Martian face-like feature that has come to be known as the "Skullface Scarp".[13]

Found by Mr. Paul McLeod in MGS image AB108403, the Skullface lies on the side of a cliff near the bottom of the north wall of West Candor Chasma. Unlike the Profile Face, the Skullface is three dimensional, "proud" of the surface. It contains two matching detailed eyes, a nose with nostrils, lips, and chin (Fig. 21).

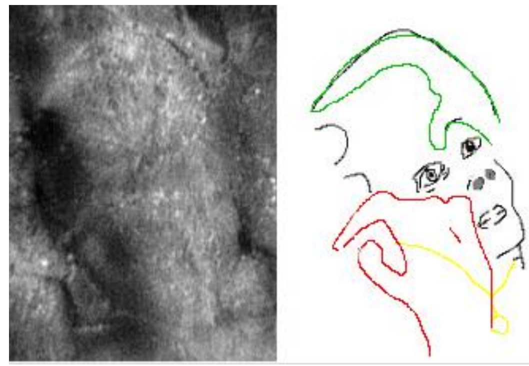


Figure 21. Skullface (detail)
Cropping of MGS image AB108403
Image courtesy NASA/JPL/MSSS

The whole Skullface "scene" appears to be incredibly detailed, with two additional characters, one with a hand atop the skull, and another apparently placing a medallion about the central character's neck. One cannot help but introspectively doubt one's judgment and imagination when a scene appears so intricately detailed. Levasseur and Crater limited discussion to the main, central Skullface head.

While preparing their paper Crater suggested that by surveying enough MGS imagery, a frequency estimate could be determined for the appearance of sufficiently detailed eye-like features. Establishing eye criteria, the authors found eight satisfactory eyes in 184,000 square kilometers of imagery yielding a rate of 23,000 km^2 per eye. This rate then served as the basis of a probability estimate.

The Skullface is relevant to this analysis in that it was during this eye frequency survey (along with the "stains") that the Profile Face was noticed. Overtly looking for eyes, the highly detailed eye of the Profile Face stood out conspicuously, with other details later, but almost immediately, completing the face. The eye of the Profile Face was one of the eyes used in the Skullface probability eyes-per-area rate.

The same method of estimating probability is applied here to the Profile Face. The eye rate is valid because the eye rate serves for both, the Profile Face eye in the Skullface calculation and the Skullface eye (there are actually two) for the Profile Face calculation.

Since the Profile face is approximately 500 x 500 meters, its area can be approximated to 0.250 km^2.

- The eye falls within the area of the face: 0.250/23,000≈1/92,000 or one chance in 92,000.

The eye is also oriented in a rotational sense, with the points of the lid horizontal. Also, its upper lid, complete with its "lashes", are oriented to the top (Fig. 22). Crater noted that, conservatively, an eye must be oriented rotationally to within thirty degrees. This makes for twelve possible rotational positions.

Figure 22. The eye is oriented rotationally in the face area

- The eye is rotationally oriented: 30/360=1/12, or one chance in 12.

The eye is also "correctly" positioned vertically (Fig. 23). Since any face is approximately six times bigger vertically than the vertical size of the eye, there are at least six possible vertical positions.

Figure 23. The eye is positioned vertically in the face area

- The eye is positioned vertically: 1/6, or one chance in 6.

Horizontal eye placement, relative eye-to-face size (the eye is rather large, as in old Egyptian art), individual parts and shapes of the eye occurring, and other required placements and proportions are neglected for the sake of conservatism and/or having negligible total influence on the probability result.

When independent phenomena appear conjointly or consecutively, their probabilities are multiplied. Here three fractions combine to yield the probability that there would be such a quality eye within this area, and that the eye would be correctly oriented with respect to the other facial features:

- 1/92,000×1/12×1/6≈1/6,620,000, or roughly one chance in six and one half million.

One chance in six and one half million, conservatively.

The view that the Profile Face must be a geological fluke is a six million-to-one longshot.

It has been the experience of the authors that once the image of the detailed Profile Face registers in the observers' minds, the improbability of the combined features is immediately appreciated. But somehow this improbability continues to be explained away as just a "fortuitous" occurrence, a strong assumption based on preconceived ideas about what can and cannot be found on that planet. Visual perception is an expectation driven experience, one that satisfies ones' values and beliefs, one where the actual "seeing" is accomplished by our minds, not our eyes.[14] It is also intriguing how some otherwise highly intelligent individuals are unable to see anything at all in the images, even with accompanying illustrations such as in Figure 4. As a result, even the most astronomically large probability ratios do not impress.

Conservatively, only the probability of the eye has been estimated, not the combination of all the facial details. The purpose of this exercise is to emphasize just what kind of improbability is involved, that the combination of features by random processes is a most significant improbability, and that the Profile Face is therefore a genuine anomaly.

4. TERRESTRIAL COMPARISONS OF FACES IN THE LANDSCAPE

4.1 Artificial Faces

It might be incredulously asked, "Why would anyone bother to make a huge face in the landscape?" This question can be answered seriously by studying the many analogous landscape art creations here on Earth. Humans have a long history of artistically altering the landscape in a variety of ways and for different reasons. Earthworks created by both ancient and modern cultures throughout the world are shaped like animals and human figures, while others take the form of geometric symbols. It is estimated that the number of such earthworks in North America alone number in the hundreds of thousands. However, over time almost all of these monuments have been either degraded by natural forces or destroyed by the rapid expansion of rural and urban development. Mars of course presently has a very different climate with much slower and different weathering patterns than Earth, but it is also punctuated with more numerous catastrophic asteroid and comet impacts.

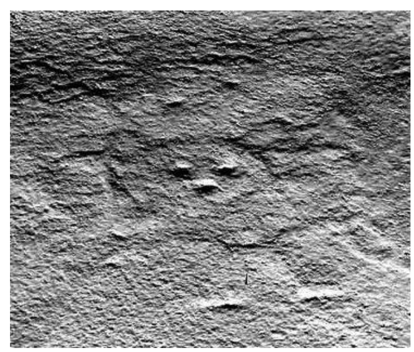


Figure 24. Round Humanoid Face, Nazca Peru (400 BCE)

Few of the limited number of terrestrial examples of profiled heads have the same level of detail and content of the superior Profile Face. The best faces are modern ones, like the Crazy Horse Memorial and Mount Rushmore of South Dakota and Stone Mountain in Georgia. Other examples that might not include faces are the many stylistic "Hillfigures" of Britain, the Serpent Mound of Ohio, the Battle of Britain Memorial, the Keyhole tombs of Kofun, Japan, and many others. These provide hints as to motivations to create such things. Shown below are only a few examples of thousands of such large-scaled artistic creations around the world, both modern and ancient, where surface material is excavated to create forms that often can only be fully appreciated from high above.

Figure 25. Grotesque Face, Caral, Peru (2500 BC). Courtesy Smithsonian, August 2002, Vol.33. No 5, page 64.

An ancient example is a humanoid face etched in the surface of the Nazca plains of Peru (Fig. 24). Note its simplicity, which consists of two round mounds forming eyes, a rectangular nose shape, and an oval impression forming a mouth. The circular head measures about 9 meters by 8.5 meters. It has an arrangement of radial lines around the left and right sides.[15]

Located just beyond an ancient complex of mounds and half-buried pyramids found within the ruins of Caral, Peru is a rendering of an immense human head (Fig. 25). Discovered in early 2000, the site has been dated to well before 2600 BCE.[16] Created by precisely placing stones, the face has a D-shaped head with sweeping raked hair and a large gaping mouth. The forehead is incomplete and it has no neck or ear. Its facial features include a large nose and a small undefined football-shaped eye.

Figure 26. Figure 26. Human figure (1400) The Blythe Intaglios Image courtesy James Q. Jacobs, Bureau of Land Management

In North America hundreds of large “intaglios” of human and animal figures have been scratched into the western deserts. The best known of these are the Blythe Intaglios. These are located west of the Colorado River about 15 miles north of Blythe, California. The largest human figure measures 171 feet from head to toe (Fig. 26). Note the head of the elongated figure has no facial features. For protection from vandals, it has been fenced off.

Figure 27 is a modern example, a 455-foot portrait of the founder of the Mongol empire, Genghis Khan in the south of Ulaanbaatar, Mongolia. Chinese artists created this gigantic face on a Mongolian hillside in 2006 to mark the summer festival celebration of Naadam.[17]

Back in North America, in Atchison, Kansas, land artist Stan Herd created a large earthwork portrait of Amelia Earhart (Fig. 28). The 42,000 square foot image made from stone, earth, and evergreens was created in 1997 to mark her hundredth birthday.[18] The scarf is made of native grasses and when the wind blows through it, the scarf appears to move.

Each year many farms across the United States participate in a newly created experiment in agro-tourism by cutting a corn maze they open to the public in the fall season. The owners of Schnepf Farms in Arizona carved a maze into their 10-acre corn field to acknowledge the talk show hostess Oprah Winfrey (Fig. 29).[19]

Figure 27. Genghis Khan, Mongolia (2006). Image courtesy Wikimedia

Figure28. Amelia Earhart, Kansas (1997) Photo by Scott Haefner.

Figure 29. Oprah Winfrey (2004) Arizona, Google Earth photo.

Although people all over the world have always artistically manipulated the surface of the Earth with large-scaled art for various reasons, certain particular reasons tend to be the most common. They build them to commemorate, to remember, to memorialize, and to honor the achievements of those who’ve come before.

Only the newer, more modern faces tend to have good detail. The more ancient examples are not as aesthetically sophisticated in their detail and proportion as the Profile Face (Fig. 5). When comparing the Profile Face to terrestrial examples like those above, most are notably inferior to the Martian Profile Face, especially in its eye.

4.2 Naturally Formed Faces - Sleeping Giants and Boulder Outcrops

It is commonly claimed that faces are ubiquitous in natural landscapes, that they can be seen almost anywhere and everywhere, and that because of this, profiles such as the Profile Face must be categorically discarded as potential artifacts. Natural landscape faces are indeed common and relevant to the discussion here, so how should these influence our conclusions as to the Profile's possible artificiality?

There are various classifications of landscape profiles, two of the most common are Sleeping Giants and Boulder Outcrops.

Sleeping Giants are large in scale. They are mountains or hills forming a recognizable facial profile in silhouette. They usually form the horizon with the sky as a backdrop. They are considered "sleeping" because the "giant" appears to be lying on its back. These require a particular viewing angle and special lighting conditions. Two examples are shown here, one of Ute Mountain in Colorado and another of the Absaroka Range in Montana (Fig. 30).

Figure 30. Sleeping Giants Ute Mountain in Colorado (left) courtesy John Anderson and Absaroka Range in Montana (right)

The Old Man of the Mountain of New Hampshire (now collapsed) is a commonly invoked example of how faces are ubiquitous in the natural landscape (Fig. 31). It is an example of a classification of natural faces called Boulder Outcrops. These are also silhouettes but are smaller in scale and don't always face upward. They are eroded strata on sides of cliffs that form the outline of a profile. The Winking Eye (Fig. 32), or Winking Man, of the Ramshaw Rocks in Staffordshire, UK, is another example of a Boulder Outcrop.

Figure 31. Old Man in the Mountain, New Hampshire

Note how the profiles in both categories are crude, and generally provide only a silhouette with little or no facial detail. The faces are grotesque and are seriously flawed in their details and proportions. Some, like Ute Mountain, are very simple, with only the slightest hint of a chin, nose, and forehead. It can be argued that only a series of three, crudely proportional "bumps" can provide the impression of a face in silhouette if one is imaginative enough. Others are known mostly for an interesting effect or characteristic, such as Winking Man's "eye", nothing more than an irregular hole that appears to "wink" as clouds pass behind. Many are popular rock climbing sites. Their "wrinkled" crudeness has prompted their being named variations of an "Old Man" theme. These are seldom suspected of being artificial. Compare these crude natural formations to the far superior detail of the Profile Face, especially in the eye.

Figure 32. The Winking Eye, Boulder Outcrop, Staffordshire, UK

Cliff faces and distant horizons can provide an infinite number of silhouettes produced by simply moving oneself around and changing perspective, thereby producing most any profile at will. They are generally two dimensional. The back of the head is missing. But the Profile Face is nothing like this. It persists in shifts in perspective, as shown in the shape-from-shading analysis above (Fig. 12). The back of the head is complete. The image is a top-down view of what appears to be a geoglyph excavated into the surface.

Interpretations of art in the Martian landscape are often dismissed based on human tendencies to see faces, the commonness of faces in landscapes, pareidolia, and other illusion-based contentions. (Artificial Martian faces are but one class of claimed artifact; there are also pyramids, etc.) Because of the quality of the Profile Face, it cannot be dismissed so casually on this basis.

Infinitely superior to any Boulder Outcrop or Sleeping Giant, the Syria Planum Profile Face of Mars stands apart from analogous landscape faces, both natural and artificial, a unique and extraordinary surface formation.

5. REMOTE SENSING IN ARCHAEOLOGY AND THE PAREIDOLIA "EXPLANATION"

Since the advent of aircraft and film cameras archeologists have successfully utilized aerial photography to search for promising new archaeological digs and to also further develop known sites. This resource is called remote sensing. But images acquired by orbiting satellites is a technology archaeologists have only significantly developed in the past decade or so. Large-scale surveys to locate previously unknown archaeological sites was not a significant part of archeology until about 2008 through the work of archaeologists such as Sarah Parcak (Professor, University of Alabama and Director of the Middle Egypt Survey Project). Mars researchers, most having little expertise in remote sensing, are entering a field that is only in its infancy, and are applying it in a context outside normal archaeological practices. Planetary artifacts are unexpected. The lack of respectability of this Mars research might partly be explained in this respect. The new Mars work, should the features turn out to indeed be artificial, must ultimately become a multi-disciplinary field of research blending archaeology, space science, anthropology, social science, and astronomy, much like how archeo-astronomy was finally legitimized.

We must acknowledge how important the planetary context within which the images are acquired and analyzed applies here. An image taken of the surface of Mars is certainly not a context within which archaeologists are familiar. Scientists with the expertise of Parcak would be a great resource in this unusual Mars remote sensing research, but since she already expresses discontent when approached with unorthodox archaeological projects, work she calls "psuedoarchaeology"[19] (such as the search for "lost cities", Atlantis, etc.) there is no doubt she and other Kuhn-ian "normal science" archaeologists would not be interested in Mars anomaly research. Their reaction is to be expected.

But Parcak's work is still relevant here. In Satellite Remote Sensing for Archaeology, Parcak is very clear about how images must be interpreted visually and that automated computer programs, or even standard pre-established site detection criteria, cannot replace the power of the human eye in different situations. She writes,

> "Computers simply do not have the same ability as human eyes have to pick out subtleties in remotely sensed images. Only the viewer will know what he or she is looking for, based on their background and understanding of the archaeological situation. One cannot input the thousands of minor variables into computers that influence archaeologists when making choices about archaeological data. How will a computer be able to assess similar broad issues for ground surveying? As archaeologists, we can make choices regarding what information we want displayed on satellite imagery, and how we use that information to plan survey seasons. Computers cannot tell if a site or feature is present or not; they just facilitate the display of pixels. It is up to us to determine what those pixels mean."[20]

Parcak strongly emphasizes the importance and power of researchers' ability to interpret imagery by eye and that this power of the human eye cannot presently be equaled with computer programs. Determining the artificial from the natural in the images is something the observer does, and apparently to a large extent subjectively, but also based on the researchers' past experience and training.

Doubters, taking a psychological angle, will dismiss an entire body of Mars satellite remote sensing research simply by invoking one word: "pareidolia". Dubbed "anomalistic psychology", pareidolia is the tendency people have to see all manner of things in clouds, wood grain patterns, or the man in the moon. In remote sensing image analysis, "pareidolia" is fallaciously invoked, because pareidolia usually applies only when the recognized patterns are attributed to the religious or supernatural.[21] This "explanation" (labeling explains nothing) is irrelevant here because nothing supernatural is being attributed to the perceived Profile Face, "only" that it is likely artificial. Indeed, discarding observations of phenomena in this manner is a violation of scientific method; faith in the reliability of sensory perception is a fundamental presupposition of scientific method.[22] All scientific evidence are observations of one sort or another. Evidence cannot be discarded on the accusation they are illusions. Interpretations may be debated, but not the reality of the observations themselves. Of course there does not appear to be any mention of pareidolia in any of the archaeologists' remote sensing literature, for dismissing what is seen in the images in this manner would seem ludicrously useless.

While extoling the power of human visual abilities, Parcak also cautions us:

> "Without prior training and ground experience, it becomes easy to misinterpret…'see' something that does not exist. Experienced remote sensors and aerial photography specialists will rely on previous studies and maps to determine potential features, especially if an anomaly occurs outside a known archaeological landscape."[20]

Most certainly, the potential Martian artifacts are anomalous and occur outside known archaeological landscapes. Of course, other than the Mars anomaly researchers', there are no Martian archaeological studies Parcak would refer.

6. CAUSAL MECHANISMS

An obvious question, assuming for discussion that the Profile Face is indeed artificially made, is how and when it could have been made and by whom. This speculation is interesting and entertaining, even educational, but can be an unfair trap when arguing in favor of artificiality.

What origins scenario could be suggested to a contrarian that he would find acceptable? Would he accept the possibility that an ancient indigenous Martian civilization made it? Would he seriously consider the notion that an ancient, long forgotten, space faring civilization from Earth traveled to Mars and built it? How about the idea that extraterrestrials visited our solar system ages ago, leaving their mark? Of course all of these ideas have their problems and can be argued against, even ridiculed.

When unusual, unexplained phenomena are observed, the casual mechanisms are worked out after the phenomena are first observed, the result of the investigation, not criteria for the investigation. We otherwise undermine a sincere quest for truth. The absence of an "acceptable" origins scenario that would put the Profile Face on the surface of Mars is not a reason to dismiss it. It is in the anomalous that new things are learned.

The oft-cited platitude "extraordinary claims require extraordinary proof" is an example of how we filter unwanted ideas. The double-standard is fallacious because all ideas must be judged by the same scientific criteria. It also assumes that the older competing ideas were established on the same high orders of proof to begin with, which often were not. What one deems "extraordinary" is purely a value laden "measure".

There are phenomena today which continue to be controversial and mysterious, their origins unknown. Places such as the Nazca Lines of Peru and the ruins of Puma Punku may forever remain a mystery. That their origins remain mysterious does not render them less real.

7. SOCIAL IMPACT

The unusual features we see in the imagery can be as disturbing as they are exciting. The objects can be powerful symbols. Should these objects indeed be confirmed artifacts, then this means a civilization, indeed an entire planet, was destroyed, one probably known by people on Earth but then long forgotten. The Profile Face is a human face with cultural references potentially tying Mars to Earth. These discoveries have far-reaching consequences affecting our world view, who we believe we are as humans, our values and belief systems, and our history.

In "The Face On Mars – Evidence of a Lost Civilization", anthropologist Dr. Randolpho Pozos investigates the challenge the Martian objects present us.[23] Let us read what he has to say.

> "The greatest difficulty posed by these curious landforms on Mars occurs at the upper levels of consciousness, at levels of beliefs and fundamental values. If the challenge were experienced as a neutral scientific one, such as gravity or electromagnetism or the need for a grand unified theory of physics – all of which can be handled without a serious reconstructing of our concept of knowledge, science, and ourselves – the reaction and resistance to investigating these landforms would not be so intense. In essence these landforms on Mars are intellectual landmines."
>
> "The social and cultural consequences of surprising or perplexing information from Space (sic) exploration, such as the 'Face' on Mars, will be influenced more by peoples' religious beliefs than by their scientific education. To a great extent this has already been borne out by those involved in the inquiry, and perhaps more importantly, by those, whether religious or not, who dismissed the topic as not worthy of further inquiry. Contrary to the American cultural notion that facts are evaluated objectively and then accepted or rejected, there is every indication that our beliefs and values censor what we perceive and how we react to it."

Here we encourage, even challenge the reader to have the intellectual courage to sincerely consider the evidence supporting the falsifiable Mars Artificial Origins Hypothesis with the emotionally detached, objective, yet critical approach any scientist, or indeed any rational thinker, should employ regardless of its implications.

8. CONCLUSIONS AND RECOMMENDATIONS

MGSMOC images M03-05549 and E05-01429 together with MRO images B08_012560_1661_XI_13S107W and G02_019074_1644_XI_15S107W accurately depict the Martian surface features called the "Profile Face" in the Syria Planum region of Mars. This face persists in four images taken by two different spacecraft at four different times over a period greater than a decade. These surface features come together to produce a well-proportioned and highly detailed face complete with cultural references to Earth.

The history of the study of potential artifacts on Mars was briefly covered. The Profile Face is not alone; it is but one line of evidence supporting the Artificial Origins Hypothesis, that there are artifacts on our neighboring planet. These objects are not all faces, but also appear to be pyramids and other rectilinear formations.

A fault north of the target appears to be ejecting a fluid, geyser-like. Analysis of this fault suggests the lower elevations of the target area are darkened by southward flowing surface fluid from this fault, creating the grey-scale variations producing the face. It appears the dark lower elevations may have been excavated and are darkened by this surface fluid.

Examples of analogous large-scaled landscape art on Earth were examined, particularly faces, and their reasons for having been made were investigated. We found that these are most often created for the purpose of commemoration. They are monuments honoring those who came before.

Naturally formed faces were studied. The Profile Face was eliminated as either a Boulder Outcrop or Sleeping Giant, two of the most common classes of faces found in nature. The Profile Face was found to be far superior in form and detail than any of the natural faces and many of the artificial faces examined, especially in the eye.

Special attention was given the eye of the Profile Face which contains an especially high level of detail and proportion. A simple probability analysis applied to the eye shows how the face is not likely to have been created by random forces of nature.

The multidisciplinary field of remote sensing in archaeology was studied. Because these scientists successfully place considerable faith in the power of the trained human eye in site detection and overall image interpretation, pareidolia was dismissed as an explanation for perception of the Profile Face. We conclude the perception of the face in the Martian landscape in not a mental confabulation, but real. Archaeologists typically do not take Mars anomaly research seriously because is it inherently anomalous and is a line of research outside known “archaeological landscapes”. Archaeologists also refer to previous studies of an area when anomalous objects appear in their imagery. Although much has been written of the anomalous Martian features for three decades, none of this work has been recognized or reviewed by mainstream archaeologists and/or remote sensing specialists. Here is an open invitation.

The discovery of these unusual features are potentially revolutionary. They challenge current paradigms. Conclusions about the Martian landforms are largely determined by peoples’ values and beliefs rather than their science education or ability to think critically. Confirmation of the objects’ artificiality would have a significant impact our cultures’ fundamental beliefs and values, essentially culture shock. Confirmation might also require fundamental changes in the accepted chronologies and events of human history.

We conclude that the reality of the surface features producing the Profile Face is not in question. The relevant question is whether the formation is unusual enough to at least suspect that the Profile Face is artificial in origin. We conclude here that once the artistic quality of the formation is appreciated, the probability of artificiality is significantly high. We recommend that an appropriate level of future mission priority be given the Syria Planum Profile Face and other anomalous Martian landforms to study these as potential archaeological artifacts.

APPENDIX A. MOLA Elevations Analysis

Since initially achieving orbit the Mars Orbiter Laser Altimeter (MOLA), mounted on the MGS platform, has been sending laser pulses to the surface of the planet, and by timing the returns much like a sonar device, has been recording topographical elevations over the entire planet. Millions of "shots" have been accumulated, one approximately every 340 meters along the spacecraft's various orbital paths. Data is organized by latitude, longitude, orbit number, and other information.

With shots so far apart in so few orbital traces, it is important to appreciate the limits of such a study with regard to the Profile Face; only a few shots could have been taken inside the target area. This study is of a wide area surrounding and including the Profile area, so we can only make general topological conclusions of the wide region.

NASA's Goddard Space Flight Center maintains a public web site where visitors can get 10-degree-square MOLA maps. These maps are very good but provide only general information of the large scale topography of an area. An attempt here was made to make a narrower MOLA map of the approximately 2 km by 2 km Profile Face area, one depicting individual orbital paths.

A major problem with comparing MOLA maps with MOC visuals is that the coordinates given in the ancillary data for the MOC are based on the aerographic coordinate system rather than the areocentric system used by the MOLA team. As a result, there could be a difference of up to a third of a degree, about 20 km, between the two systems. Because of this, a rather large MOLA map of the region was produced to first provide wide orientation. MOLA shots in a four-degree square encompassing the Profile Face was downloaded and tabulated, and resulted in the acquisition of millions of shots.

In order to fit into an Excel workbook, the data was culled to 64224 shots from 92 orbits and a color map was created (Fig. 33). Longitude and latitude were plotted on the x and y axes. Rough elevations, measured in meters, were color coded. Each orbital path appears as a line, each line a series of shots 340 meters apart. The resulting map shown was then compared to a MOC visual.

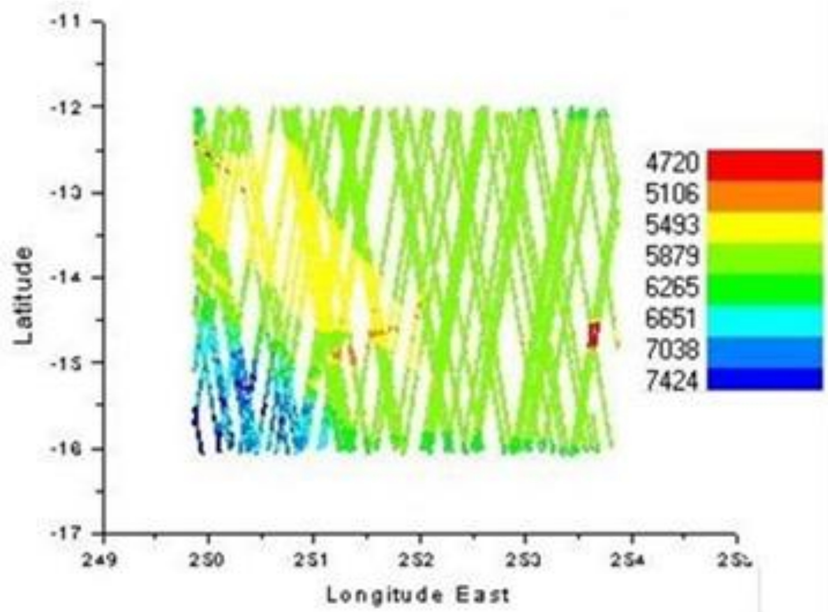


Figure 33. MOLA map of wide Profile Face area

Of the many available MOC wide angle images of the target area, image E1004472 was selected because it includes the whole area covered in the color map. Prominent features visible in the MOC image were then lined up with the elevations depicted in the color topography map (Fig. 34). Prominent features were annotated with letters A through H, where A is the grooved, higher elevations toward the southwest, C through F is the curving southwest to northeast channel, and G and H the two craters in the east.

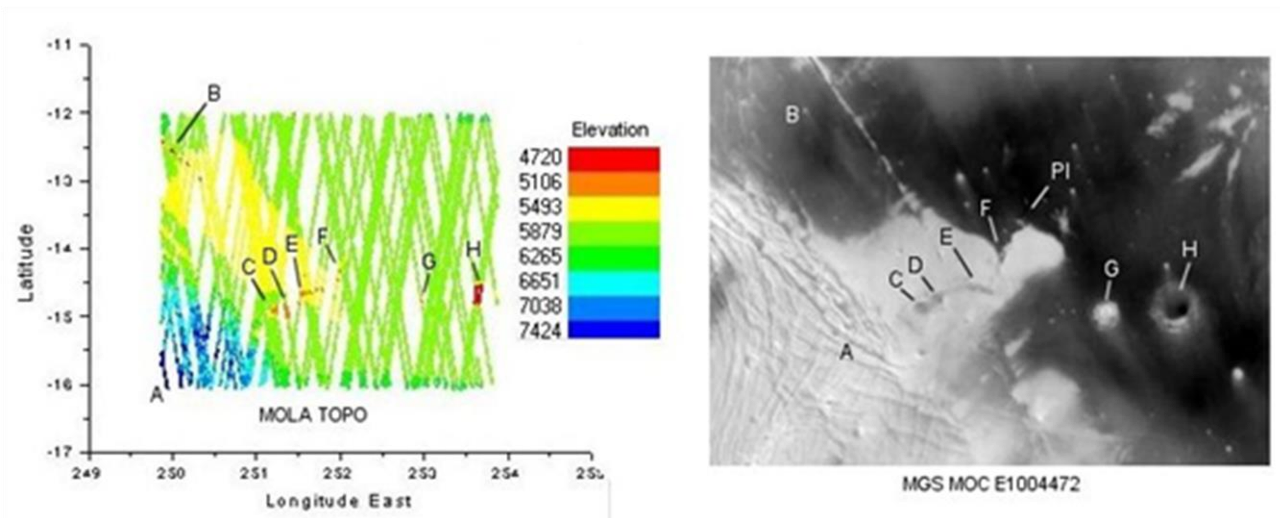


Figure 34. Color coded MOLA elevations map aligned with MOC visual

With the orientation of the MOLA shots visually matching up with the MOC image, it was then possible to produce a color map of the smaller area that the Profile Face occupies (Fig. 35). Here 28 orbits provide 3221 shots in a 0.8 degree square. The portion of the channel labeled F appears to be located in the red region shown. Other prominent features around the Profile Face (labeled PI in Figure 34) are labeled I, J, and K.

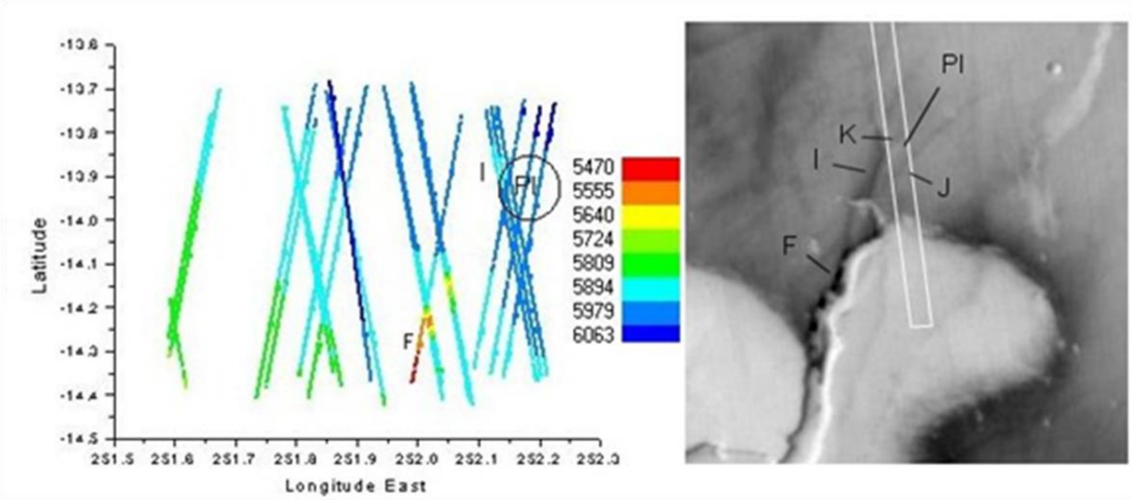


Figure 35. Color coded MOLA elevations map of narrow Profile area

Although the location of the target cannot be located very precisely, it appears to lie within the circle depicted in the color map. Numerous individual orbits near and crossing the target circle were analyzed. Three are shown here (Fig. 36). Although not entering the circle, orbit 11550 is shown for reference, crossing channel F. Two other orbits are shown, 16568, and 18471, with the latter apparently passing near the middle of the circle. Latitude verses elevation plots were created for each orbit.

When viewing these graphs, imagine looking toward the west with negative latitude running south towards one's left, north to the right. The scales in the x and y axes are not equal; elevations on the vertical axis span several hundred meters depending on the particular elevations, but the horizontal axis is squeezed in, spanning 0.8 degree or about 48,000 meters.

From the graphs shown and with the use of an Excel workbook, general conclusions of the regional topography of the Profile Face region can be made as follows:

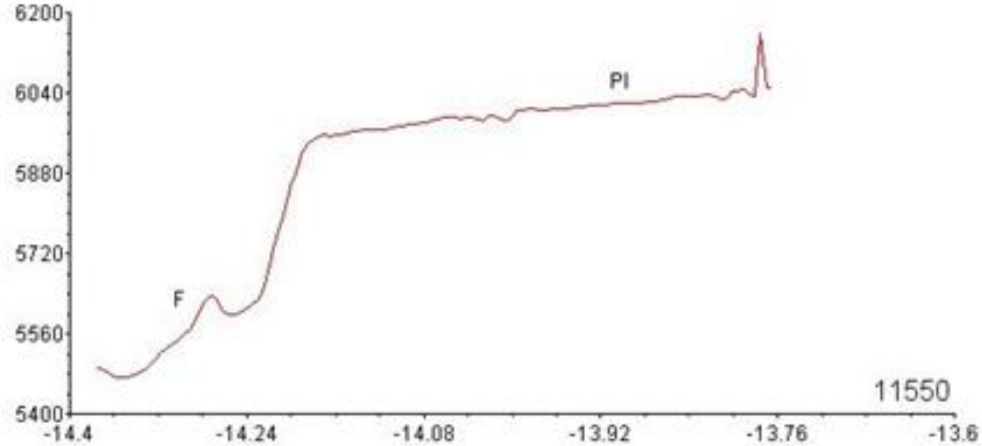
(a.) The graphs show that once beyond channel F the MOLA registered a long, relatively flat expanse along all three orbits, with elevation rising approximately 40 meters over a distance of 24km. (There is an interesting blip at the north end of the 11550 graph. It does not appear to be one of the atmosphere/cloud hits listed as unreliable in the MOLA tables, shots eliminated by the author for the purpose of graphing.)

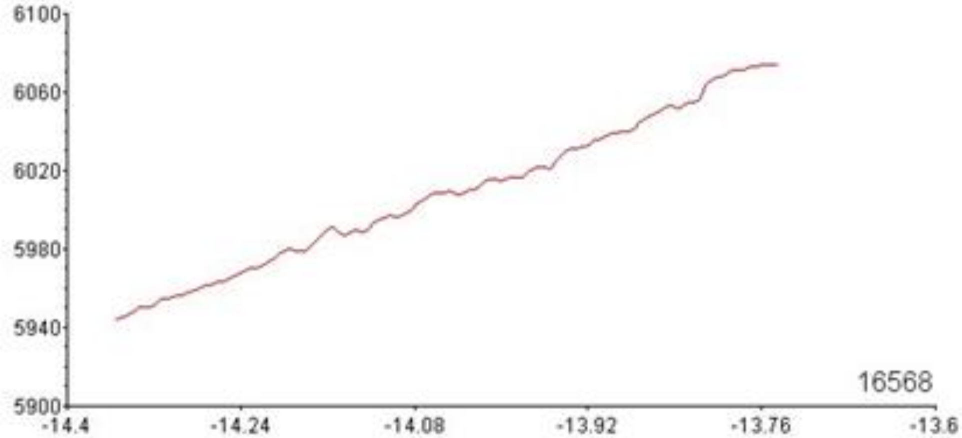
(b.) Even when the channel F ravine is included in a statistical analysis of orbit 11550, the median elevation is 5958 meters, the average 5972 meters, and the average deviation 486 meters, all happening over a distance of over 42 kilometers, a slow and gradual increase in elevation toward the north.

(c.) Orbit 18479 is most relevant because it (or the similar neighboring orbit) might cross the target area. The elevation changes from 5949.61 meters to 6076.38 meters within 117 shots (over a distance of about 35 to 40 km). There is a gradual increase in elevation of about one meter per shot (per 340 m) along this orbit.

(d.) Should the ejection fault north of the Profile Face be indeed ejecting fluid, this fluid would flow down grade, south and southwest, then ultimately into the deep ravine west of the profile. It would also flow south into the area of the Profile Face. This fluid, much like the so-called streaks and stains, could be causing the surface colorations in the lower, dark regions composing the Profile Face.

It must be emphasized that the individual laser shots are separated by about 340 meters, so only about four or five shots could fall within the approximately 1500m by 1500m Profile area. But even so, it can be said that differences in elevation between the given sequential shots averages slightly more than one meter, making for a relatively flat surface over a considerable distance of thousands of meters, meaning the dark colorations cannot be shadows and most probably are caused by fluid flowing south from the ejection fault in the upper elevations into and around the area of the Profile Face.





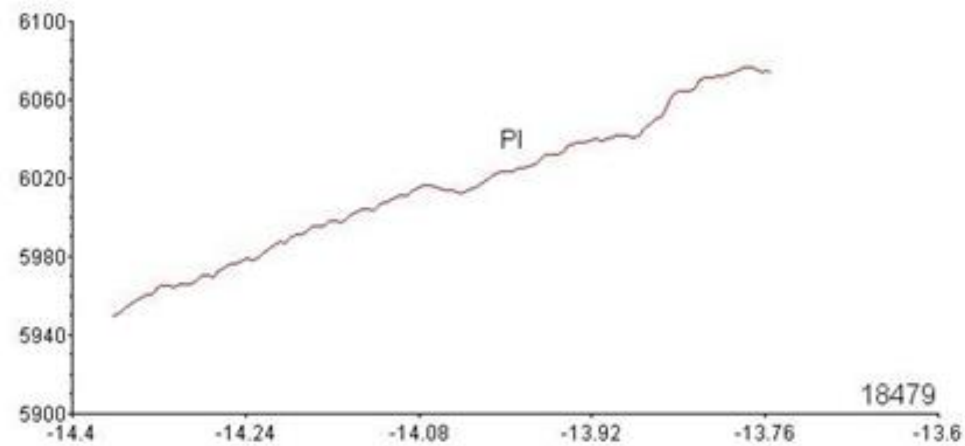


Figure 36. Graphs of MOLA orbit shots depicting elevation changes across the target area. Looking toward the west with south to the left and north to the right.

APPENDIX B. Artistic Facial Proportions

Basic artistic facial proportions are given and compared to the dimensions of the Nefertiti profile (Fig. 37).[24,25]

(1.) Portrait Art: The distance between the middle of the eye to the base of the nose is equal to the distance from the base of the nose to the chin, or as illustrated in Figure 5, b = c + d.

Profile Image: b = 141m while c + d = 237m.

(2.) Portrait Art: The lower lip lies midway between the base of the nose and the chin, or c = d.

Profile Image: c = 113m and d = 124m.

(3.) Portrait Art: The back of the neck lies on a line with the lower lip.

Profile Image: The back of the neck lies very near this line, visible as light colored corner.

(4). Portrait Art: The eyes are in the middle of the face, or a = b + c + d.

Profile Image: It is difficult to mark the top of the skull because of what can be perceived as the uraeus of a crown, but judging from the crown and how it appears to set on the skull, a reference line is drawn. Here a = 446m and b + c + d = 378m.

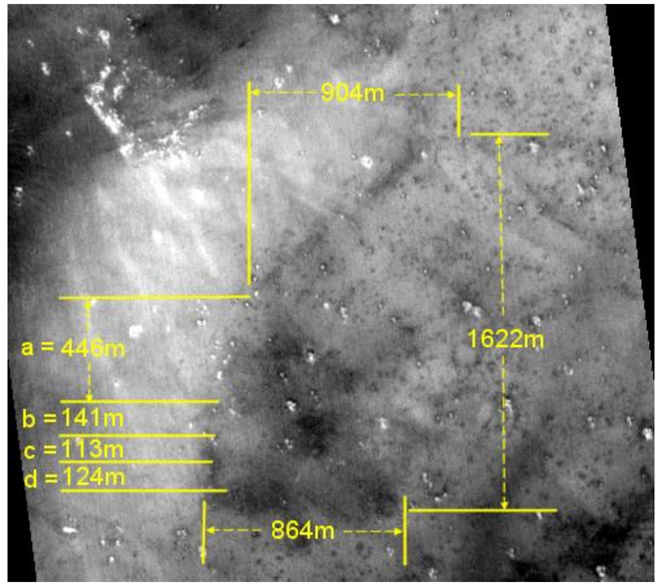


Figure 37. Approximate dimensions depicted in Profile Face. Unannotated image MGS M0305549 courtesy NASA/JPL/MSSSS

Is it possible the headdress is wrapped about an elongated skull?

The lines inserted by the authors are certainly somewhat subjective and could legitimately be moved about to some degree. For example, in expectation to meet the above portrait art criteria, the upper boundary of distance c could be raised slightly at the nostril" so b = c + d would be better satisfied, but the author refrained from this type of "adjustment", leaving the initially drawn lines unchanged.

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