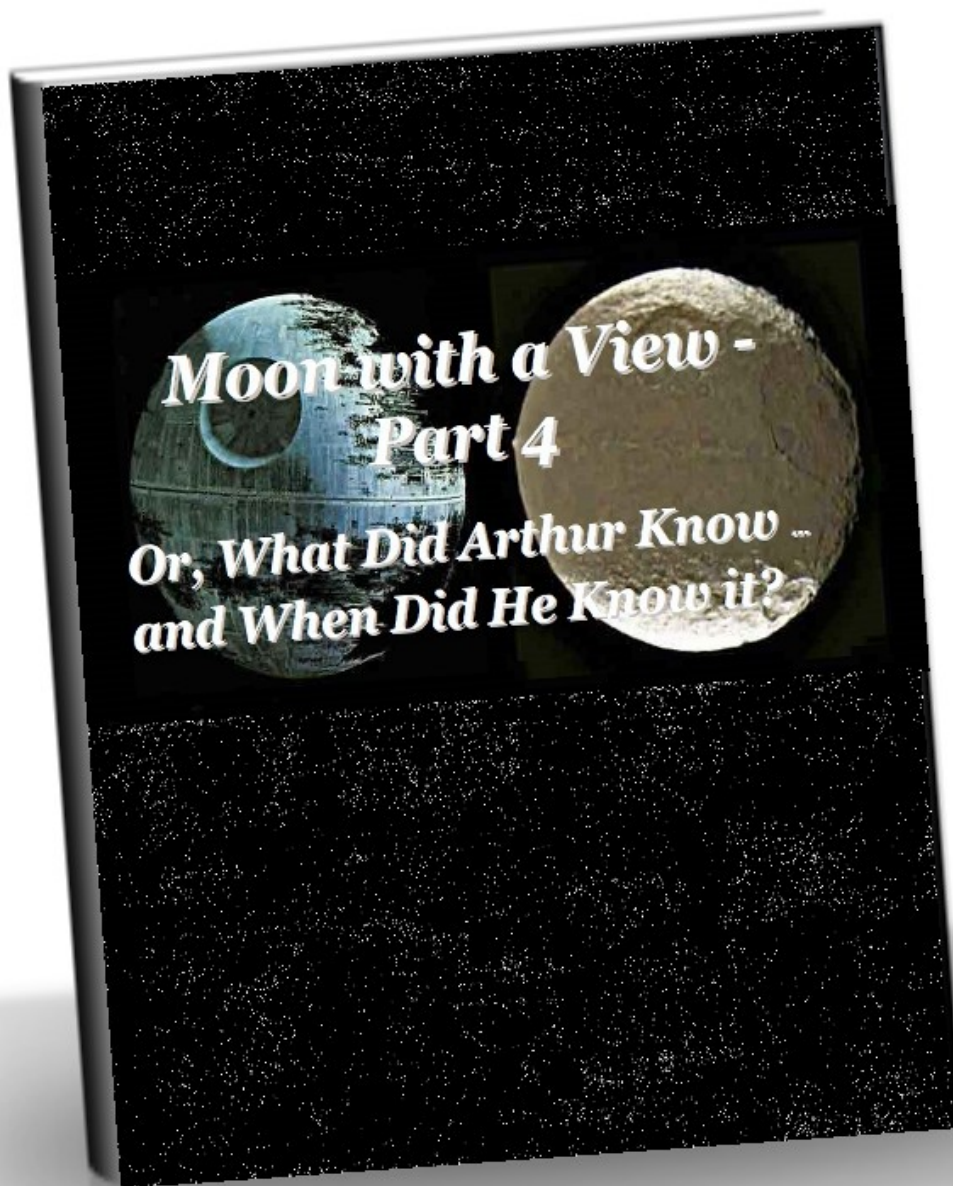


*Moon with a View -
Part 4*



***Or, What Did Arthur Know ... and When
Did He Know it?***

By Richard C. Hoagland

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"The only way of discovering the limits of the possible is to venture a little way past them ... into the impossible."

-- Clarke's Second Law

Ok, this is the part the critics hate the most—

Where we freely speculate about what all of this might mean

As noted earlier, the late cosmologist Sir Fred Hoyle once remarked "I don't see the logic of rejecting data just because they seem incredible." So, despite what you might have heard, speculation to sort out which data is "incredible" has to be at the heart of the true scientific method. All scientific hypotheses are really nothing more than "dressed up speculations."

Without venturing a hypothesis, even an "outrageous one" -- attempting to knit together all the various assembled facts into some kind of a coherent storyline (the speculative part) -- "science" would simply be an exercise in making lists

In truth, astronomers have engaged in many, many speculations over the mysterious nature of Iapetus for literally hundreds of years: starting with the source and origin of "the Dark Side of Iapetus." Here (below - courtesy of Tilmann Denk, from the Cassini Team) are just a few of the most recent speculations on Iapetus, offered by professional astronomers (including, some other current members of the Cassini Team ...) to explain this "oldest riddle in planetology."

Albedo-dichotomy origin summary

Possible classification of Iapetus global albedo dichotomy origin hypotheses:

1. Exogenic origin/ dust is coming in over long time

- (a) Dark grayish dust from Phoebe hits Iapetus's leading side and gets chemically altered/ reddened (Soter 1974, Burns *et al.* 1979, 1996, Hamilton 1997)
- (b) Dark reddish dust from smaller retrograde outer Saturnian satellites covers Iapetus's leading side (Buratti *et al.* 2002)

2. Asymmetric exogenic influence removes thin ice veneer from leading side, but not from trailing side and poles

(a) Viewpoint of orbit mechanics:

- (a1) Circumsaturnian dust is the cause (from Phoebe or other outer Saturnian satellites) (Cruikshank *et al.* 1983; Bell *et al.* 1985; Buratti and Mosher 1995)
- (a2) Interplanetary micrometeoroid flux is the cause (Cook and Franklin 1970, Squyres and Sagan 1983; Wilson and Sagan 1996)

(b) Viewpoint of physical processes on the surface:

- (b1) Exposing of the dark subsurface layer by bright material erosion (Cook and Franklin 1970; Wilson and Sagan 1996)
- (b2) enrichment of formerly intimately mixed dark material due to sublimation of the bright ice component (Cruikshank *et al.* 1983; Bell *et al.* 1985; Buratti and Mosher 1995)
- (b3) synthesis of the dark material by chemical/irradiation processes made possible by bright icy material erosion (Squyres and Sagan 1983)

3. Exogenic origin/ dust and debris originates from a major single event

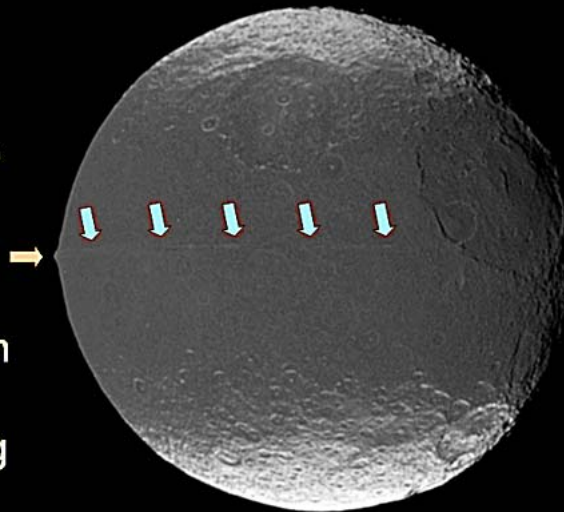
- (a) from collision with reddish Hyperion (Matthews 1992, Marchi *et al.* 2002)
- (b) from collision with Iapetus itself (Tabak and Young 1989)
- (c) from collision of an outer Saturnian satellite with a heliocentric object with the result of a retrograde debris cloud crossing Iapetus's orbit (Denk and Neukum 2000)
- (d) material comes from Titan (Owen *et al.* 2001)

4. Endogenic origin: Dark material from interior (Smith *et al.* 1981, 1982)

Then (thanks again to Denk - below), there's Cassini's newest, literally "off the wall" Iapetus discovery ... and its associated "scientific speculations."

Dec 2004: Images & discoveries

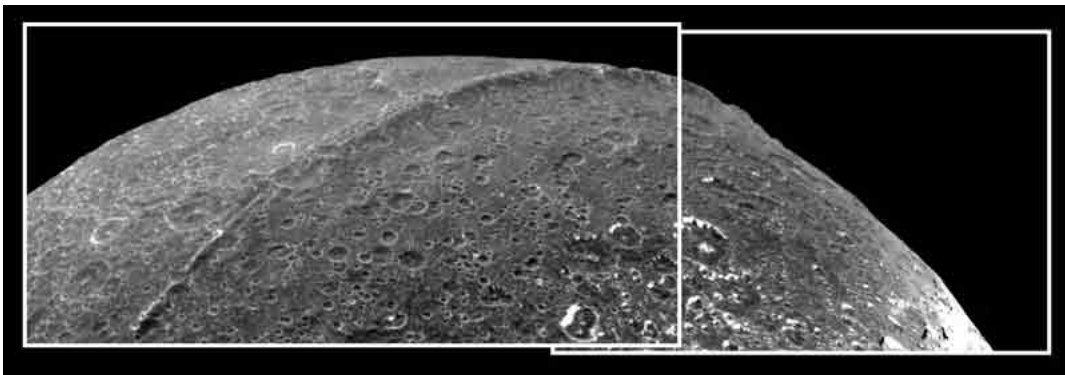
- Stunning landform:
The "bellyband"
- ~2000 km long ridge
or chain of mountains
- Exactly aligned along
the equator
- Up to 20 km high
(depends on selection
of reference radius)
- Narrow peak, residing
on a broader bulge



... its origin is a puzzle so far, and no similar geologic feature has been observed elsewhere in the solar system [emphasis added]”

Even so, the usual geological speculations by the Cassini team to “explain” their suddenly “unique solar system feature” (translation: “we have no previous experience with whatever this thing is ... from any prior planetary mission ... but here’s what we think it might be anyway ...”), have not been long in coming:

... it is not yet clear whether the ridge is a mountain belt that has folded upward, or an extensional crack in the surface through which material from inside Iapetus erupted onto the surface and accumulated locally, forming the ridge”



Translation: “It has to be a mountain range ... right?”

But all too soon this official, isolated speculation about the origin of the “Iapetus Wall” has evolved ... into using this “unknown” in an effort to “explain” – via additional speculation -- another, centuries-old “unknown” ...

... thus, Cassini Regio [the dark ellipse] may have had its origin in plume-style eruptions in which dark particulate materials accumulated on the surface as fallout, perhaps in conjunction with the creation of the equatorial ridge [emphasis added]

So, when critics look with derision on “speculation in science” – keep in mind that ALL true science begins precisely in such speculation ... even NASA’s. There are no exceptions. The political truth is, certain “speculations” re Iapetus are simply on the “approved list” at this point ... and the rest are carefully “forbidden”–

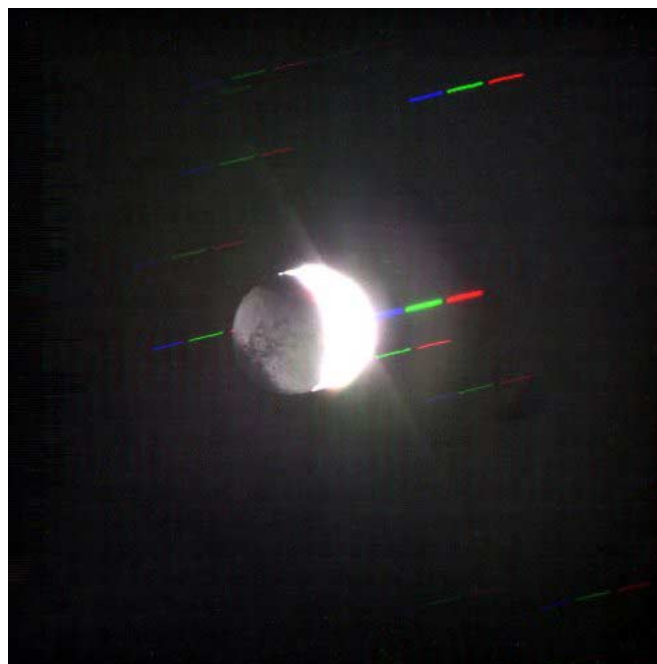
So, here (below) are some of our own “scientific speculations” on Iapetus – mixed with some startling new facts.

Enjoy.

OK, let’s begin with the big one: what the hell is Iapetus!?

Actually, it’s easier to begin with what it’s not: apparently, a natural untouched moon

The best evidence for this extremely controversial assertion is NASA’s own imagery and measurements. Natural planetary objects do not come with “edges and facets’ – as is indirectly admitted even by quotes from the Cassini’s team’s own published papers (below).



... However, as in Voyager data [8], a good reference ellipsoid cannot be found because of the unusual irregular shape of Iapetus. A preliminary, triaxial limb

fit result from these and earlier data is 732, 726, and 722 km for three radii [emphasis added]

As stated earlier, natural solar system objects larger than about 250 miles across are round! The physics behind this is very simple: unless they're made of high-strength metals (like iron), the self-gravity of any object composed of ordinary "silicates" (rock) above a certain size will crush all the "edges" down into a ball. So, how do we know that Iapetus is not made of such "sterner stuff" (I mean, some meteorites are iron ...), which could then support much higher, "hundred-mile-long edges" -- even against the 1/40th Earth's gravity calculated for its surface?

Simple: spacecraft measurements.

Beginning with the Voyager fly-bys in the 1980's, and now with Cassini's own much closer encounter in December, 2004, the radio tracking of the spacecraft yielded very accurate measurements of Iapetus' gravitational attraction ... and hence its mass. This, divided into the measured volume of the "triaxial ellipsoid" cited earlier (above), gives us an overall density for Iapetus. And the density of a natural planetary object is directly related to that object's average composition.

Since the density comes out to only about 1.1 grams per cubic centimeter, Iapetus' average density is far below that of pure iron (7.87g/cc). In fact, it's nowhere close to being even as dense as stony meteorites ("rocks" -- ~3.5 g/cc) ... but is close to pure water ice (0.91 g/cc) ... with just "a dash of rock" thrown in.

And such a natural "icy object" simply could not sustain (against its own gravity) the miles-high, angular geometry that NASA itself has measured for Iapetus!

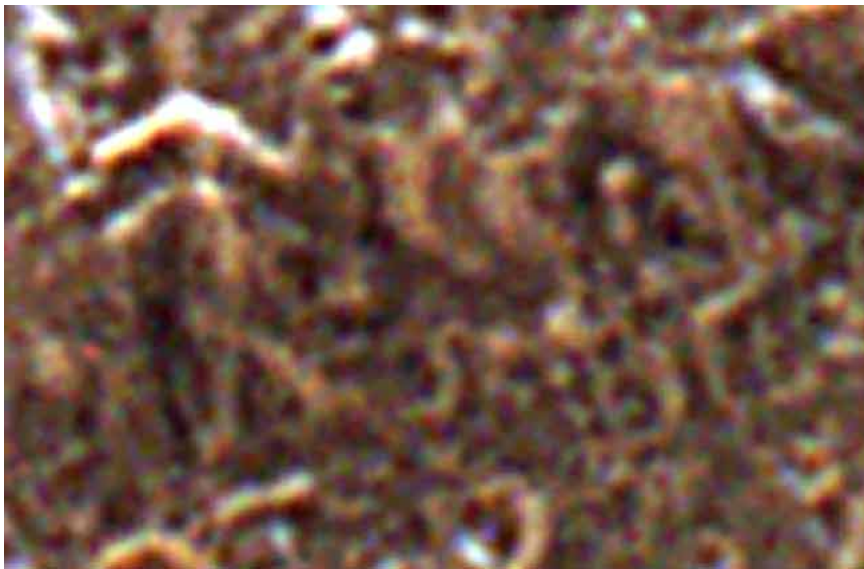
Ergo: something MAJOR about Iapetus cannot be natural

The next question has to be: exactly what?

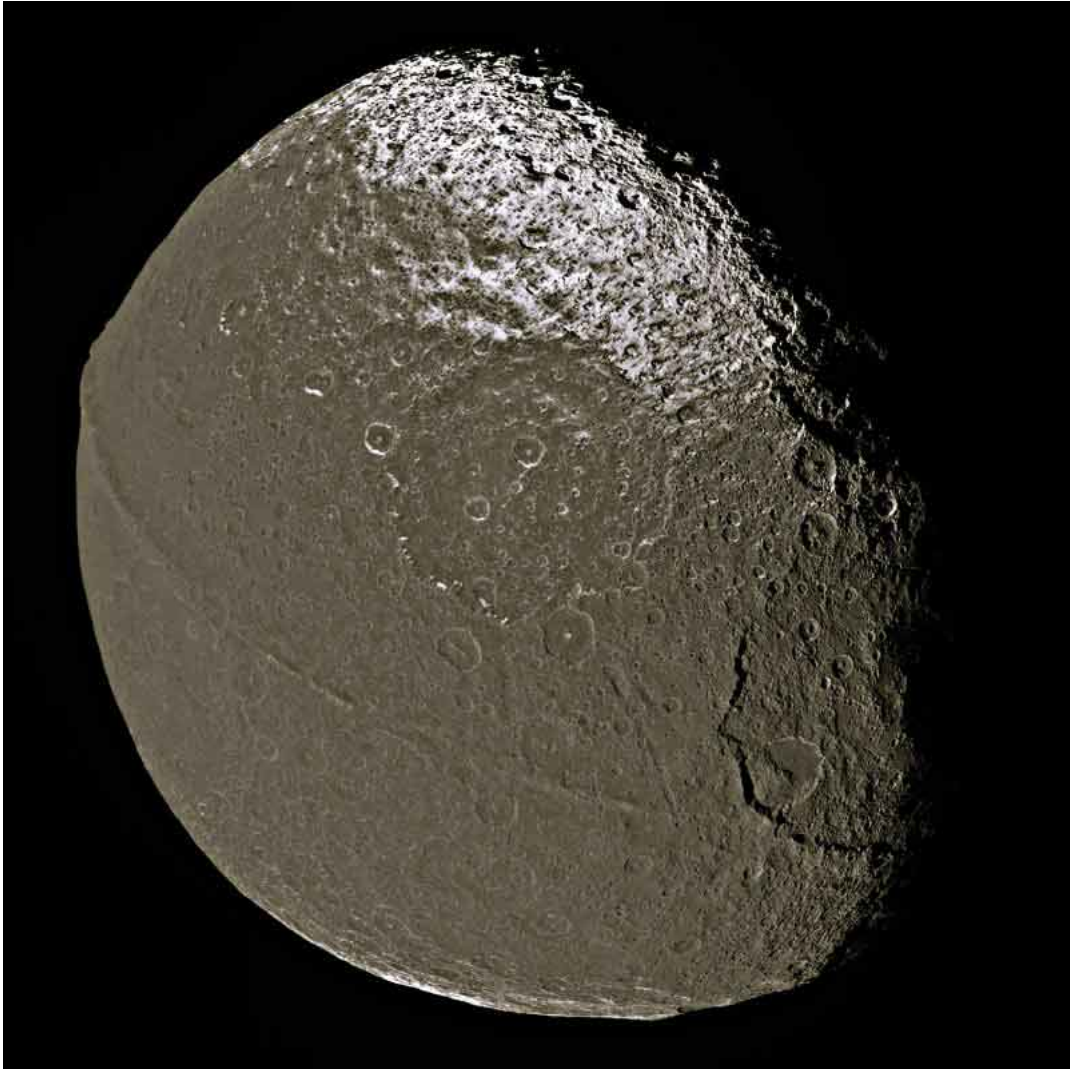
The aligned, repeating, rectilinear 3-D geometry we've discovered all across Iapetus' surface (below) is also foreign to any natural process ... especially on this scale. It also argues forcefully in favor of some kind of "outside, artificial agency" -- which has heavily modified this "moon."



The easiest explanation for all this – after you throw away “geology” -- is that someone visited Iapetus a long, long time ago (according to the count of impact craters ...), and left some remarkable structures on its surface. Then, after literally eons, Cassini finally arrived ... to photograph the ruins.

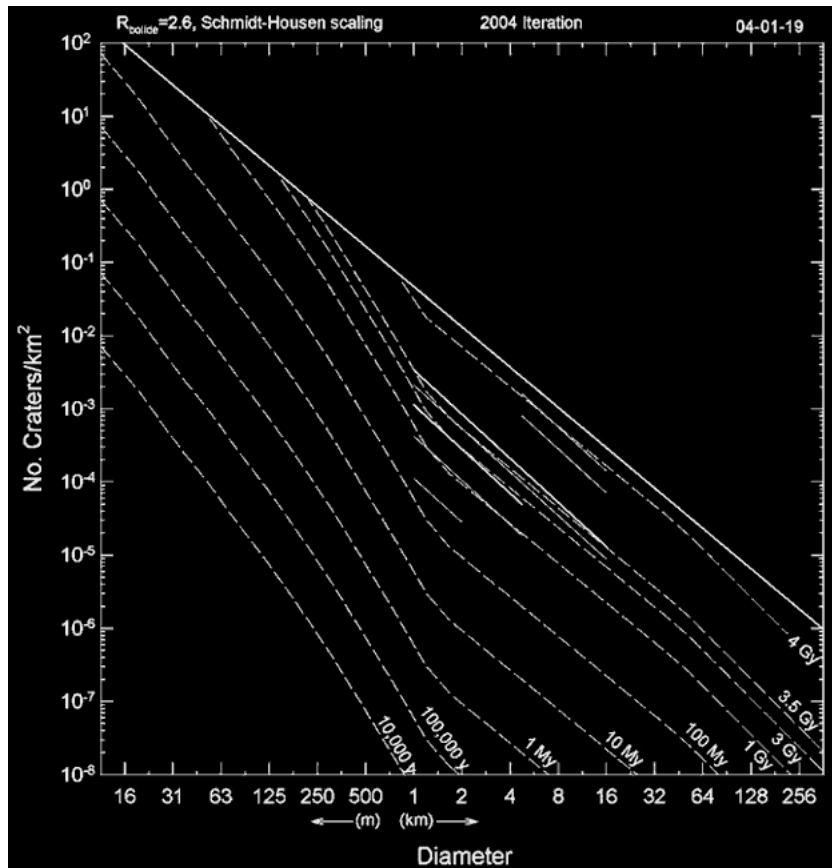


There are several problems with this theory, beginning with equating the great number of craters visible within Iapetus’ “dark ellipse” (below) with an actual “great age.”



Traditional dating of planetary surfaces relies on “crater counts” to determine relative regional ages; the more craters a given surface manifests in spacecraft images (above), the older it is assumed that surface has to be

This results in a set of graphs (below), counting impact craters of ascending diameters, on a variety of surfaces across the solar system – beginning with the Moon – and deriving provisional ages of those surfaces based on the planets’ mass, their position in the solar system, and the estimated populations of potential impactors in that region of the solar system.



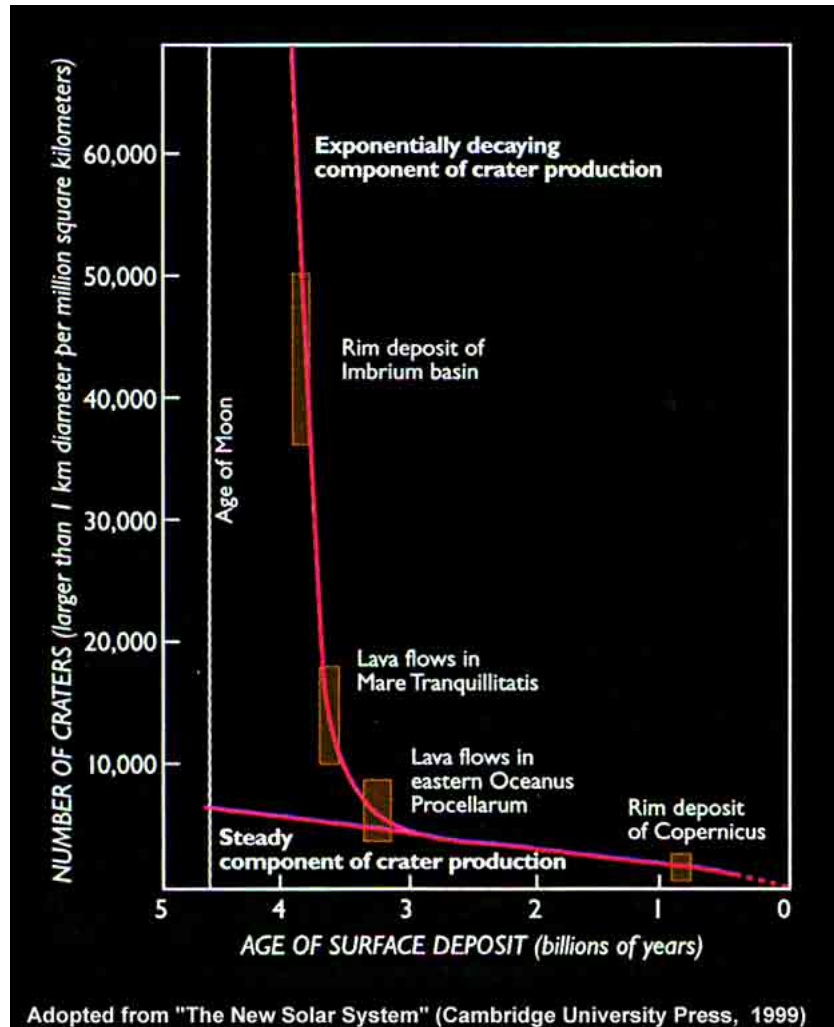
The only actually calibrated cratering data comes from those > 30-year-old Apollo landings on the Moon -- and the astronaut retrieval and return to Earth of the priceless lunar samples (augmented by several Soviet robotic Luna sample return missions). Careful radiometric measurements of radioactive isotopes (and their “daughter products”) in the various rocks returned from those Apollo and Soviet Missions have allowed provisional “real” ages to be attached to key lunar crater populations – establishing the closest thing to an “absolute chronology” for solar system cratering events we currently possess.

All other “surface ages” in the solar system – from Mercury to the airless moons of Neptune -- given that we have no “ground truth samples” from any other body – are ultimately derived from that calibrated cratering chronology ... first established for the Moon. Obviously, given that the distant environment of Saturn is a vastly different region of the solar system than the space surrounding Earth -- almost a billion miles further from the Sun, and with moons of different composition -- this “calibration” can at best only be approximate.

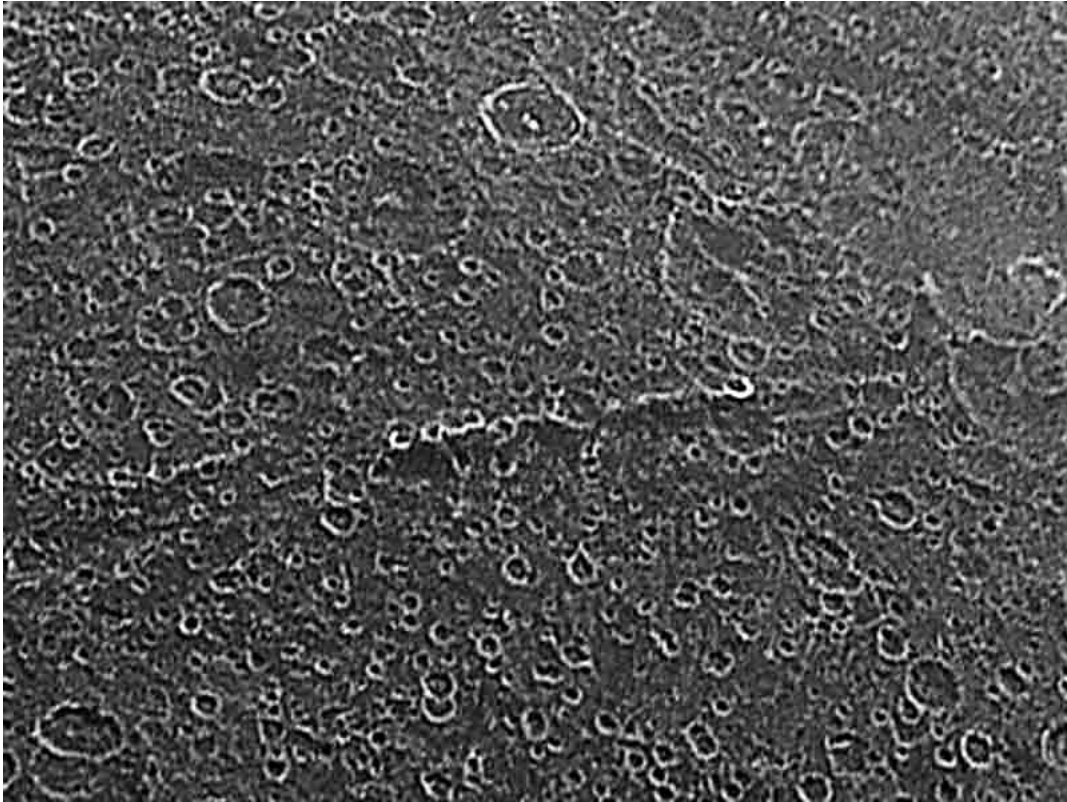
But, worse, it has operated under a defining assumption for over thirty years – that this wide-spread evidence of extensive cratering -- from the planet Mercury to the moons of the outer solar system -- is due to a single episode of “late heavy bombardment,” from a

then newly-formed population of asteroids and comets “in the beginning” – debris literally left over from the solar system’s nebula formation, 4.5 billion years ago

And that this impacting population -- after initially, steeply, declining -- has been almost constant (or very gradually waning ...) over the ensuing billions of years (below)



Thus, if a given planetary surface exhibits a “shoulder-to-shoulder” crater population (like the center of Iapetus’s “dark ellipse” - below), if it hasn’t been “resurfaced” by obvious internal lava flows (which Iapetus hasn’t) -- it is automatically assumed that particular planetary surface must be very, very old ... potentially dating back literally billions of years ... to that “late heavy bombardment” period at the tail end of the actual formation of the solar system.



That overriding NASA assumption, of that last thirty or so years, is now quite likely to be very, very wrong Because--

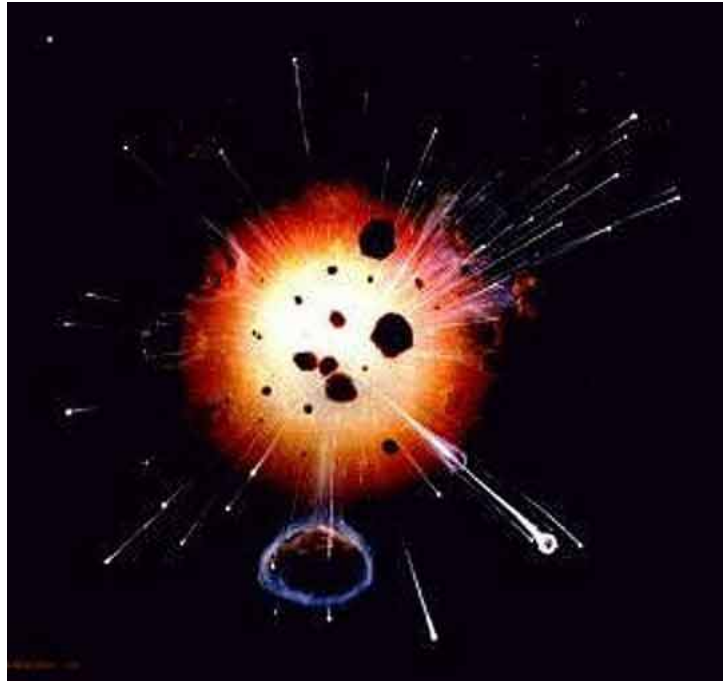
A remarkable alternative to this idea was proposed -- over those same thirty years -- by a scientific “renegade,” a world-class expert in solar system celestial mechanics: former Head of the Celestial Mechanics Branch of the U.S. Naval Observatory in Washington, D.C., Dr. Tom Van Flandern.

Van Flandern found – and published in peer-reviewed scientific journals over those same three decades – compelling evidence of a very different solar system. One filled with a history of the semi-periodic, catastrophic destruction of whole worlds ... and the creation of vast clouds of orbiting debris ... which ultimately wind up hitting all the other planets (and their moons).

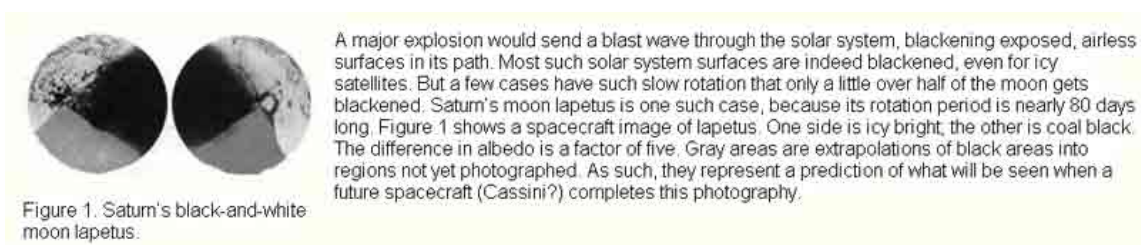
If Van Flandern’s theory is correct, then the carefully calibrated official cratering graph (above) -- featuring one, intensive, initial period of nebular debris bombardment ... followed by a vastly reduced number of ever smaller collisions over the ensuing aeons—

Is completely wrong!

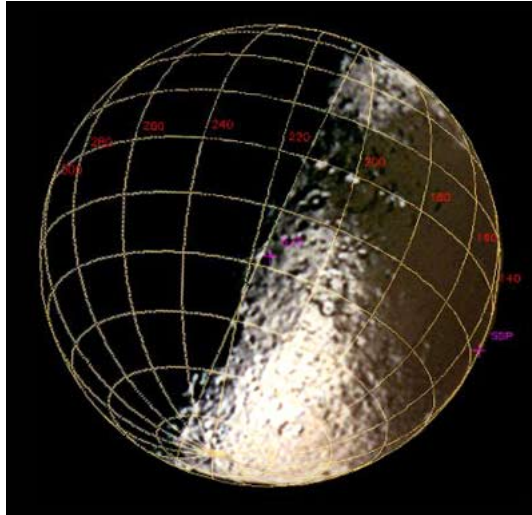
Instead, in Van Flandern's reconstructions, as several successive planets (of a significantly more populated former solar system) literally explode (!) and spread their shrapnel far and wide – separated by hundreds of millions of years between explosions – successive “waves” of impacting debris repeatedly collide with all the remaining planets and their satellites, to leave a highly intermittent record of overlapping destruction and catastrophe ... which is still on-going.



In the mode that “all true science begins with successful predictions,” Van Flandern made one particularly intriguing forecast several years ago in support of the “exploded planet hypothesis [EPH].” In Van Flandern's paper (2000), he makes the following statement vis a vis Iapetus:



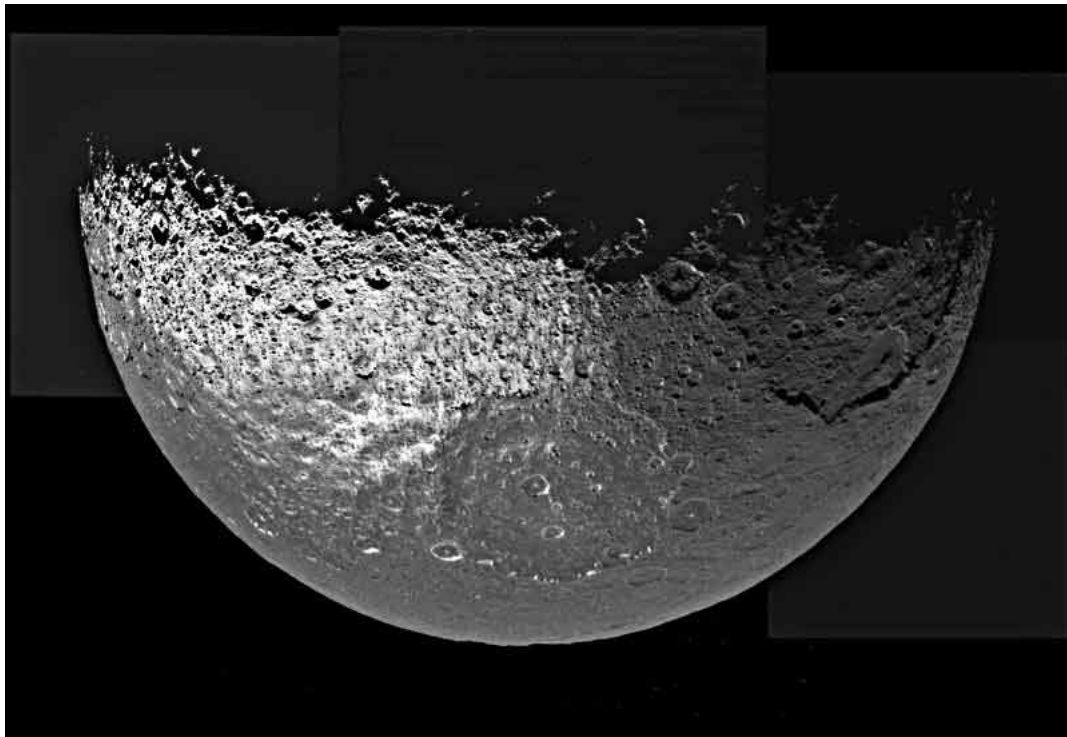
As can be seen in this “gridded” Cassini image from December 8, 2004 (below), Tom's predictions in the case of the EPH and Iapetus were NOT specifically fulfilled; the distinctly elliptical geometry of “Cassini Regio” does NOT conform to his simplified “dark half moon” model (above – left).



Some may view this as a major failure of Van Flandern's model. I don't – for detailed reasons I'll go into in a bit. For now, based on our own subsequent discovery of completely independent evidence for EPH (subsequent to Van Flandern's published "Iapetus test" in 2000), this apparent "EPH failure at Iapetus" is actually due to an oversimplified model for the interaction of such explosion debris from Planet V with Iapetus itself... rather than an intrinsic failure of the EPH.

(Incidentally, this is the key reason why there can be no single "up or down" test for any scientific model ... not even the possibility that Iapetus could be a "spaceship moon" Decisions on whether or not a given hypothesis represents "reality" must be based on the outcome of a range of careful observations and predictions ... as we all, at some point, suffer a "failure of imagination" regarding just how subtle Nature can appear. As someone noted, "the devil is in the details")

That being said, how does the EPH model impact (sorry ...) our previously stated puzzle: ascertaining the true age of Iapetus, by counting the number of craters on its surface ...? Obviously, if the EPH is true -- then the "wall-to-wall" cratering observed in the Cassini imaging (below) – contrary to many recent comments on the Internet – CANNOT reflect the true "NASA age" of this amazing "moon."



One thing is very obvious: regardless of “when” it happened, something repeatedly battered the hell out of this unique Saturnian “moon!”

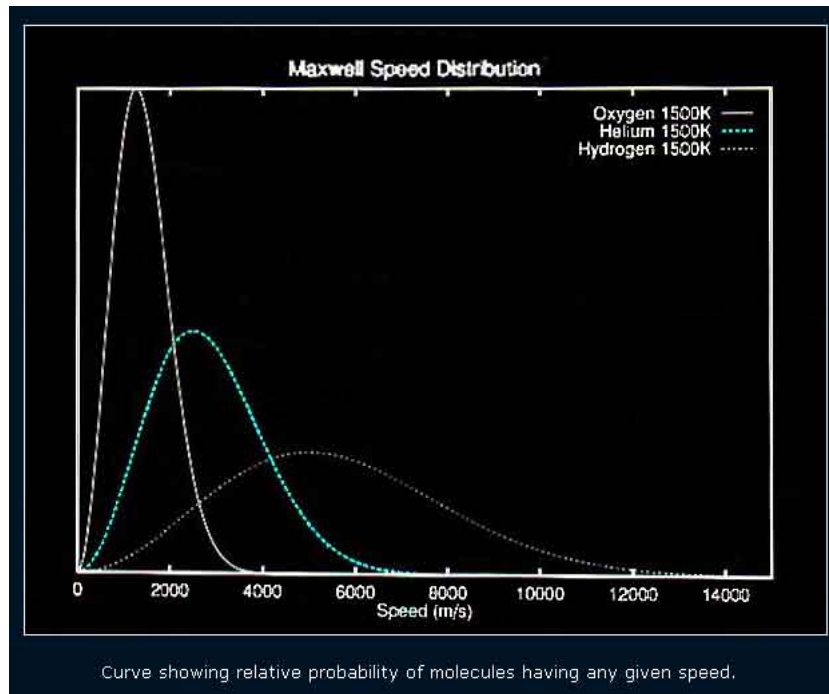
Which brings us back to the question we posed earlier: if major aspects of this object – its shape, the “wall,” the astonishing surface geometry, etc. -- are increasingly difficult to explain away “geologically” ... then just what is Iapetus: a modified natural satellite of Saturn ... or even, a completely artificial “moon?”

The prime reason I cannot believe that the geometry we now see all across the surface of Iapetus represents mere “surface installations” comes down to essentially one word: gravity.

Iapetus, with a gravitational attraction 1/40th that of Earth (1/7th our own Moon), simply cannot hold any reasonable atmosphere for any length of time. That would make the extensive geometry (“surface constructions”) as we see on Iapetus totally impractical ... as former surface habitations.

This concept of “retainable atmospheres” is not new in astrophysics; Sir James Jeans was calculating and writing about planetary and satellite atmospheric escape rates in the early 20th Century, using the newly-discovered atmosphere of distant, low-mass Titan (in 1908) as theoretical confirmation of his calculations regarding how a planet’s/ moon’s atmospheric temperature (which determines the average speed of gaseous

molecules and atoms – below – depending on their mass), coupled with its escape velocity (related to surface gravity), determine how long such atmospheres can be retained. His classic work, augmented by more recent calculations and observations regarding how the energetic magnetospheres of the giant planets (like Saturn) can sweep atmospheres from their low-mass satellites away into space, made it quite clear that no one would have ever created extensive habitations on Iapetus' surface.



However, if the geometry we see on Iapetus' was part of the remains of former underground installations ... revealed through either catastrophic bombardment, or a much longer age of meteor erosion of overlying surface layering ... then the whole idea of Iapetus as some kind of "space base" -- or even a designed "moon-sized space station" -- began to make more sense.

It was after analyzing these atmospheric rates, and the startling new images presented by Cassini – especially, Iapetus' bizarre geometric shape – that I came to the provisional conclusion that Iapetus had not been "built upon" ... so much as it had to be carefully designed!

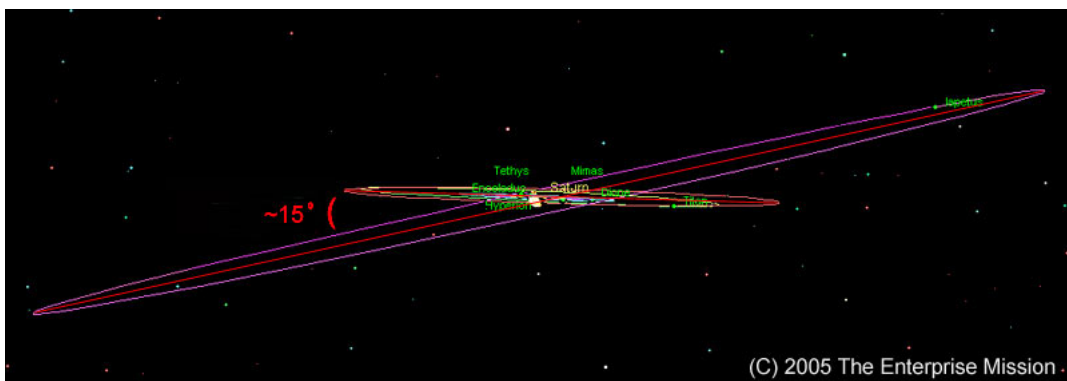
And, a lot has happened to "the neighborhood" since that occurred

The second major clue in favor of this radical idea was the orbit of Iapetus.

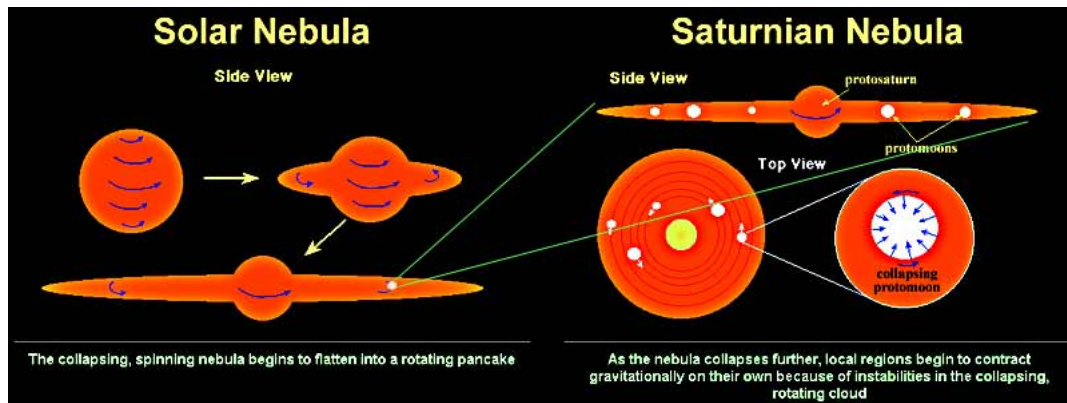
All the other “regular” moons – from little Mimas (~250 mile diameter) to Titan (~3200 miles across) – orbit in the plane of Saturn’s equator, along with the trillions of particles making up the rings (below).



Iapetus is different. Though the third largest satellite (after Titan) -- at slightly over 900 miles across -- as noted earlier, Iapetus orbits significantly inclined to the rest of Saturn’s moons (below) – at some ~15 degrees ... and over 2 million miles (~ 60 Saturn radii) away.



Flattened “nebular models” for both the swirling condensation of the solar system from an original cloud of interstellar gas and dust -- as well as the condensation of the major planets within that flattened nebula (below) -- have difficulty with high inclination orbits; frictional forces and mutual gravitational encounters should “warp” the orbits of forming planets and/or satellites down into the general plane of all the other forming objects, even before they’re fully formed



The high orbital inclination of the third largest moon in the Saturn system ... and in the outer regions of its proto-nebula ... presents a fundamental “problem” for this simple picture. One way around this problem is to explain the “anomaly” as due to “a catastrophic collision/interaction with another proto-moon” as Iapetus was forming. However, this is an “ad hoc” solution -- born of a lack (in the strictly natural paradigm) of any viable alternative

Once the (amazing) possibility is admitted that Iapetus could be an artificial “moon” – and may have been deliberately inserted into such an odd orbit – the “coincidental” nature of its unique, steep inclination (relative to the other similar-sized Saturnian moons -- Dione, Rhea, etc.) goes away.

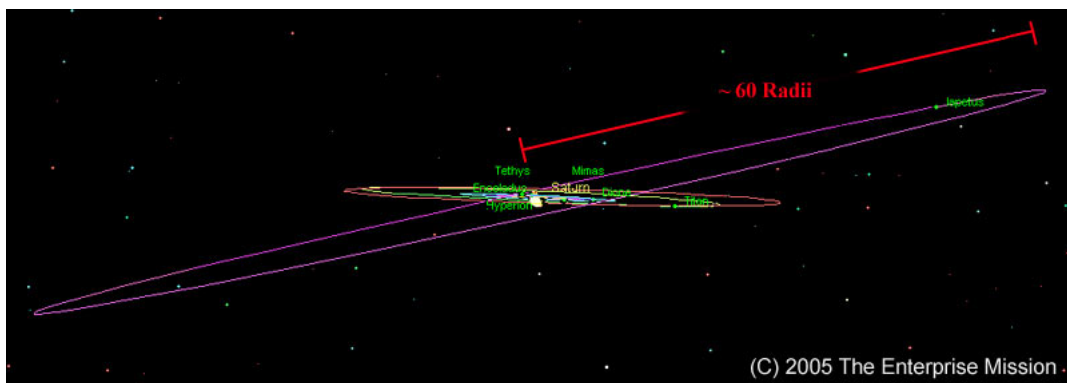
But, equally “coincidental” is the shape of Iapetus’ inclined orbit ... and its precise distance from Saturn.

Iapetus’ orbit is extremely close to being circular -- with an eccentricity of only 0.0283 – departing from a perfect circle by slightly less than 3%. (By comparison, our Moon’s orbital eccentricity – a body that mainstream planetologists now propose was born from a similar theorized “collision” – is 0.0549 or ~ 6% ... essentially twice as eccentric as Iapetus!)

For an almost circular, very high inclination orbit to have formed through “random chance” is really pushing coincidence -- if the agent for achieving that low eccentricity and the high inclination is supposed to be the same “random” collisional event, back when Iapetus was forming.

And, there’s more.

The sharp reader will have noticed, from the preceding references, that Iapetus currently orbits slightly less than 60 radii away from Saturn (59.091 radii, to be exact - below). This discrepancy, 0.15% -- in the artificial model that precisely 60 radii was originally intended -- would represent how much Iapetus has drifted since it was “parked” (as a designed “station”) in Saturn orbit. That rate of drift, either due to Saturnian/sun tides, or other forces (to be discussed in detail later), could give another way to estimate – other than by counting craters – roughly “when” this entire scenario in fact occurred



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That “ideal” Iapetus distance from Saturn just “happens” to also be base 60 -- another tetrahedral number -- suddenly appearing in the first Sumerian civilization on Earth some ~ 6000 years ago A number that fits perfectly into the redundant, equally mysterious tetrahedral placement of the two major “ring basins” we’ve previously discussed on Iapetus ... 120/240 degrees apart.

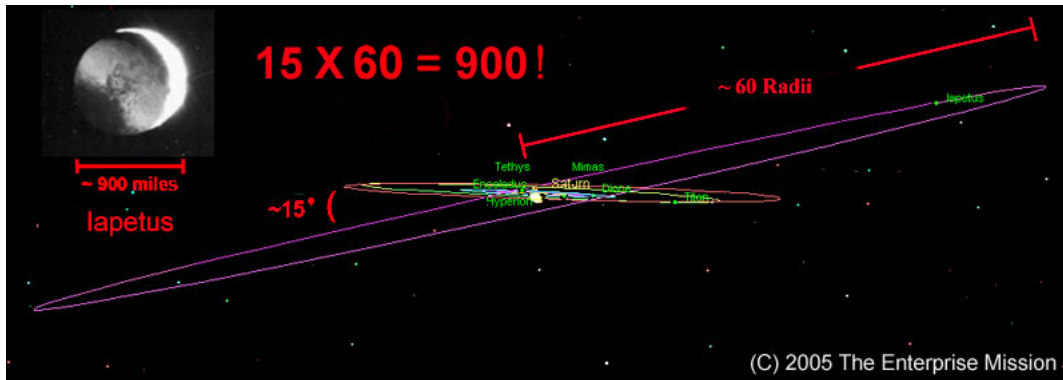
And, the same number that is also redundantly communicated via Iapetus’ own baffling Platonic shape!

Which leads us to another startling “coincidence.”

If you take the inclination of Iapetus’ orbit (~ 15 degrees) and multiply by its distance in Saturn radii (60), the result is the average of the current Cassini “triaxial measurements” of Iapetus’ diameter (below)—

~ 900 miles!

The measured Iapetus’ diameter!!



(The slight discrepancies between the “ideal numbers,” and those currently observed, can easily be explained as slight changes – occurring over a literally geological period of time – in the evolving orbital elements of Iapetus ... again, due to external solar system forces.)

All these numbers – Iapetus’ size, distance from Saturn, and orbital inclination -- are “independent variables.” Meaning – none of them are automatically interrelated, or mandated by any current theory of satellite formation. Yet, for some reason, they have all come together in Iapetus ... this one bizarre “moon” ... orbiting Saturn. This simply makes no sense, and the odds of it happening coincidentally – especially, resulting in the actual diameter of Iapetus expressed in miles! -- are (really!) “astronomical”–

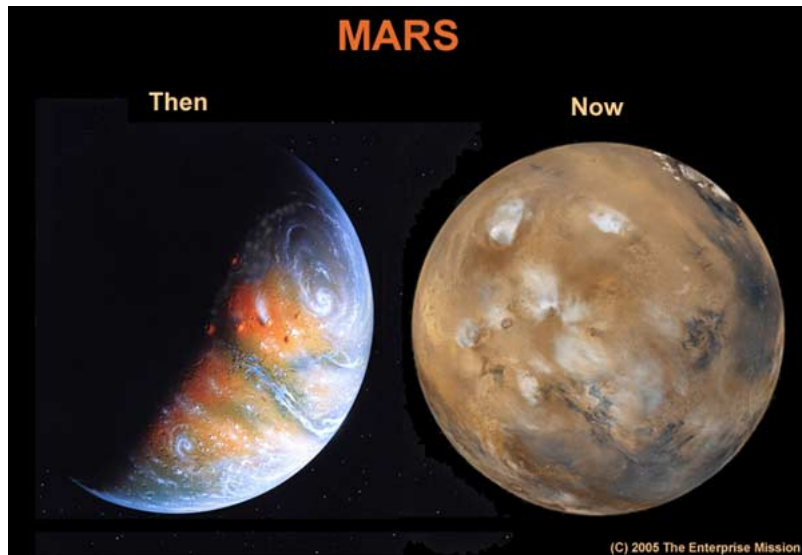
Unless this was designed!

Now, if Iapetus was created (literally, “from the ground up”) -- to memorialize “something” extremely valuable and historically important -- both its size and orbital elements could easily have been precisely engineered ... as recurring aspects of the same “tetrahedral message” embodied in other aspects of this satellite ... a much vaster variant on our previously discovered (and deciphered) tetrahedral “Message of Cydonia.”

Curiously, if you again take that orbital inclination of Iapetus in degrees (~ 15), and divide it into the ~ 60 Saturn radii of its orbit, the result is 4 ... the number of the very planet where we found our first extraterrestrial “tetrahedral” design.

In other words, is Iapetus actually a time capsule -- with its own haunting, multi-leveled Message? A message ultimately ending with (below):

“Mars is where our solar-system-wide civilization was centered ... and where its shattering demise began ...?”



Regardless of the details, the point of such an elaborate, redundantly encoded communication – if it is “communication” -- could only be to signal the presence of vital information on/in Iapetus regarding its strange presence in the Saturn system ... to whoever discovered this unique “moon” when they finally developed (redeveloped?) the technology able to reach Saturn once again!

But, a signal that would only be successful if those reaching it this time understood the crucial, ancient “code key” of hyperdimensional physics: base 60. Which, among other essentials, includes the non-arbitrary, elemental reason for a “360-degree circle” ... and the size of the British mile ... based on sexagesimal “tetrahedral geometry” itself.

Ok, you now see where I’m going

In the “spaceship moon model” for Iapetus -- leaving aside for the moment the non-trivial reasons for building such a stupendous “craft” -- there are only two possible points of origin:

1) 1) A “vehicle” from somewhere, far beyond the solar system ... some kind of “interstellar ark”– which came to this system a long, long time ago ... and ended up at Saturn. Or, 2) a spaceship “moon” built within this solar system, for equally obscure reasons ... which also ended up at Saturn -- but with a visible signature, the baffling “light/dark dichotomy” -- which would flag it across the entire system and future

millennia as “anomalous” ... for the returning descendents of whoever originally left it circling eternally in orbit

What was it Goldsmith and Owen said, back in 1980 ...?

... the only object in the Solar System which we might seriously regard as an alien signpost – a natural object deliberately modified by an advanced civilization to attract our attention [emphasis added]



*Or, as I noted the other night on “Coast,” it overwhelmingly reminds me now of that great line from Kirk, in *Star Trek IV*:*

“Ok, everybody ... remember where we parked!”

*We’ll consider in some detail the “interstellar option” later on. But for now, what about the “solar system explanation”: if *Iapetus* is truly a derelict “spaceship moon” -- who built it, and where could they have come from ... in this system?*

In keeping with years of previous research published here on Enterprise, would it surprise anyone to learn that the answer to those questions could lead us all the way back across the solar system ... from the distant, icy realm of Saturn ... back to—

Mars?

What if (we're speculating, remember?) ... the inconceivable, increasingly confirmed catastrophe which overtook Planet V – the last major solar system planet to explode in the Van Flandern model, and the one Mars used to orbit as a moon – was anticipated?!

What if the real science of planetology was able then – utilizing a sophisticated hyperdimensional model – to be aware of a developing instability in Planet V's core ... centuries or even millenia before it was destined to explode?

Faced with such an overwhelming but certain, planet-wide catastrophe -- what would that incredibly advanced society (judging by the awesome scale of the ruins still present on its surface) have done?

If it was discovered that nothing could be accomplished technologically to prevent such a catastrophic core explosion, the only reasonable alternative would have been a mass migration of the Martian population (or, a reasonable fraction thereof ...) to another planet. And one definitely well away from the inner solar system ... as the effects of the explosion would be felt even billions of miles away

And that would have called for either an interstellar migration to another solar system, or the terraforming of another planet ... in the outer reaches of this one. Or—

The creation of a totally new “planet!”

So, was Iapetus part of all three options ...?

In other words, was Iapetus a specifically designed “interstellar ark” -- created on a crash basis in the Saturn system (see below) to transport a significant population from a doomed Mars (if not from other worlds in the entire imperiled inner solar system!) ... to the stars?

Is that what the “number 4” – indelibly encoded in the very orbit of Iapetus – is telling us ... across the millions of miles and the literally millions of years since that inconceivable explosion: that it all goes back to ... Mars!?

Did mass interstellar migration with such a large population turn out to be impossible, in time ... so Iapetus was built as the “replacement planet” in this system -- for some small percentage of the teeming populations of those soon to be destroyed inner system worlds (the Earth, the Moon, Mars ...) whose peoples would literally have no place else to go ...?

Was this “ark” (Noah anyone ...?) then left in orbit around Saturn ... because – like in the interstellar scenario above -- the Saturn system was an abundant source of raw materials for its construction, if not the vital resources needed to sustain a long-term biosphere for those who would be “saved?” Was Saturn also chosen because it was far enough from the impending cataclysm to insure survival ... yet still close enough to the warm center of the solar system to allow the next phase in this extraordinary Plan to be initiated--

The increasingly fascinating enigma of Titan -- as a literal “Saturn system terraforming project?” A valiant attempt to recreate a whole new world for the rescued populations of the soon-to-be-destroyed entire inner solar system ... but on an even grander scale ...?



Stay tuned