

October 17, 2016

To: Record

From: DRS

Subject: Apollo Navigation Stars: “Navi”, “Dnoces”, and “Regor”

The issue addressed in this Memo is the origin of the contemporary (or prominent) star names for three of the 36 Apollo navigation stars. As will be discussed in detail below, the names (“Navi”, “Dnoces”, and “Regor”) actually originated in a discussion during March-April 1967 among the director of the Griffith Planetarium, Dr. Clarence Cleminshaw, and the original back-up crew for Apollo 1 (McDivitt, Scott, and Schweickart). These star names are discussed in the *Apollo Lunar Surface Journal (Journal, or ALSJ)* just after an Apollo 15 GET of 105:11:33 (Appendix A). Unfortunately this section of the *Journal* also contends that two *Journal* contributors attributed these three star names to a story in *Schirra’s Space*, a book published in 1988 (21 years after the fire) in which Gus Grissom ostensibly conspired with the Director of the Morehead Planetarium, Tony Jenzano, to name the three stars after the members of his crew as a “con” (or joke). Based on the evidence presented below, this is absolutely not correct. However, the joke story has unfortunately been distributed worldwide. Hopefully, this Memo will substantiate an appropriate correction.

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1.0 Origin of Star Names

During the Apollo program, the crews were required to identify and locate 36 stars for celestial navigation. Most of these stars had popular names, but, at the beginning of Apollo, three did not.

Soon after the tragic Apollo 1 fire (about 2 months), the Apollo 9 crew (Jim McDivitt, Dave Scott, and Rusty Schweickart) were undergoing navigation star training in the Griffith Planetarium under the tutelage of Dr. Clarence Cleminshaw, the Director of the Griffith. During a break in Dr. Cs office, we began discussing the fire and the sad loss of the A-1 crew. Somebody (?) suggested that perhaps we should honor the crew and memorialize them by naming the three obscure Apollo navigation stars after them. But how to do that discretely and uniquely? A subsequent comment suggested that we reverse the order of letters in their name - but how? The group then explored several options and decided to use Gus’s middle name (Ivan, or Navi), Ed’s name title (Second, or Denoces), and Roger’s first name (Roger, or Regor). We recorded those in our informal notes and began to use them. Subsequently, they

were recorded in the official NASA star list and became the names of preference in all NASA documentation.

And I remember just how we arrived at the star names. First we wrote all three full names backwards. Then looking at them, the better sounding name was selected. Virgil Ivan Grissom – Ligriv ***Navi*** Mossing, Edward H. White, Second – Drawde H. Etihw, ***Dnoces***; and Roger B. Chaffee – ***Regor*** B. Eeffahc.

This source of the names is discussed very briefly in the Journal just after an Apollo 15 GET of 105:11:33; the complete Journal entry on this subject is presented in Appendix A.

2.0 Background and Summary

On March 21, 1966, NASA announced the crews for the first Apollo mission – prime: Gus Grissom, Ed White, and Roger Chaffee; and backup: Jim McDivitt, Dave Scott, and Rusty Schweickart. The designations of the crew at that time were Commander (Pilot), Navigator and Systems Engineer. In backing up Ed White, I was actually Gus’s backup navigator, a very significant position relative to the following discussion. As many people are likely aware, unfortunately without the tragic loss of Gus, Ed and Roger, it is doubtful we would have landed on the Moon before the end of the decade.

During the over seven months following this announcement (March-October, 1966), the six of us worked very closely on all aspects of this very troubled mission -- “AS-204”, and especially Command Module 012, until October, 1966, when we were informally replaced by a new backup crew, Wally Shirra, Donn Eisle, and Walt Cunningham (who were not formally announced until December). By then the spacecraft and prime crew had moved to KSC to begin final preparations for the mission; Jim, Rusty, and I remained in Downey working on the soon-to-be Apollo 9. Then tragically on January 27, 1967, the prime crew lost their lives in the spacecraft fire during the “plugs out” test on the pad at KSC.

Unfortunately, a subsequent entry in the *Journal* contradicts this story by claiming that the “Navi”, “Dnoces”, and “Regor” star names were based on a conspiracy (or joke) by Gus, which was ostensibly conceived with Tony Jenzano, the director of Morehead Planetarium. Specifically, the issue is a secondary source entry in the Apollo 15 Journal after GET: **105:11:33**:

“[During our Apollo 15 mission review, Dave recalled that the stars had been named for the Grissom crew after the Apollo 1 fire; but educators Betty Niver and Mary Zornio called my attention to a story in Wally Schirra's book to the effect that, long before the fire, Grissom conspired with the Director of the Morehead Planetarium, Tony Jenzano, to name the three stars after the members of his crew.”

This is absolutely incorrect. If this entry is correct, then Gus kept the new names secret from April 1966 (his last visit with Tony Jenzano at Morehead Planetarium) until his death in January 1967. Based on a detailed analysis of the events that occurred between the time of Gus’s last visit to the Morehead (April 1966) and the most recent publication referencing the star names (1998) (see Sections 3.0 and 4.0 below), it can be concluded that the secondary source of the Journal entry as quoted above is incorrect. Among many other factors, I was Gus’s backup navigator for the first seven months during this period; I worked with him almost daily; I flew with him many times, including at night discussing the brilliant stars overhead; and he never said a word about these names. Neither did any of our other four crewmates (Ed, Roger, Jim and Rusty) ever even hint at new star names.

The “*Wally Schirra’s book*” referenced by these educators is a 1988 book, *Schirra’s Space*, by Richard Billings – this is a very poor book with many very confusing errors. According to this book, Gus and Tony Jenzano “cooked up a wonderful con...and submitted the names of three guide stars to the Griffith Park director...” . This was Dr. Clarence Cleminshaw who did not receive the NASA contact until September 1966. However, in Schirra’s 1994 “JSC Oral History”, Wally stated that Dr. Cleminshaw told him that “We have three stars in the celestial system now that we didn’t know about that the Apollo 1 crew told us about that they’d learned from Tony Jenzano.”-- but Wally did not meet Dr. Cleminshaw until after the fire, in the spring of 1967. And Gus never did meet Dr. Cleminshaw (CM 012 shipped from Downey to KSC on Aug 25, 1966, and crew activities moved at the same time; so Dr. Cleminshaw was not aware of Gus’s secret, but he was aware of the names (as above). Further, the Journal entry includes a statement from Tony Jenzano that: “*I was not involved in the ‘renaming’ of the stars (Navi, Dnoces, and Regor).*”

A subsequent entry in this section of the Journal states that I (DRS) “...found a November 1966 checklist which contains the new names.” According to my records, this is a misinterpretation because the only “checklist” I have from that period is dated “Oct 1966”, and contains the formal astronomical names only, with no popular (or “prominent”) names (see Section 4.2 below). These notes were prepared before the actual definition of the new names in the spring of 1967; and at the time, October 1966, I was completely unaware of any renaming of the stars by Gus or anybody else.

The following summary chronology presents a sequence of events to substantiate the above analysis, followed by a detailed chronology (Section 3.0) with comments as well as references to support each event and the related comments (Appendix B).

1966

- **March 21**: AS-204 (Apollo 1) crews announced: **Prime**: Gus Grissom, Ed White, Roger Chaffee; **Back-up**: Jim McDivitt, Dave Scott, and Rusty Schweickart. ²
- **April 15**: Last visit to Morehead by Gus, Ed, Roger, Jim, and Rusty. ¹
 - Final chance for Gus to discuss star names with Tony Jenzano, Morehead Director.
- **August 25**: CM-012 spacecraft shipped to KSC. ²
- **September early**: Gus and crew beginning training at KSC (spacecraft and simulator). ⁴
- **September**: Griffith Observatory receives contract from NASA for astronaut training. ⁶
- **October 18**: A-1 Prime crew (Gus and crew) altitude chamber test at KSC. ⁴
- **October 21**: A-1 Backup crew (Schirra and crew) altitude chamber test at KSC. ^{4, 8}
- **December**: Schirra and crew announced as back-up to A-1, join Gus and crew at KSC. ⁷
- **December 22**: McDivitt and crew announced as prime crew for AS-207/208. ⁷

1967

- **January 27**: CM-012 Fire. ⁴
- **March-April**: McDivitt and crew meet with Cleminshaw, name stars.
- **May 9**: Wally and crew assigned to Apollo 7 prime crew. ²
- **May-June**: Wally back to Downey, meets Cleminshaw, learns of new star names. ⁵

1977

- Cleminshaw, C. H., *the Beginners Guide to the Stars*, Thomas Y. Crowell, New York, 1977. ¹¹

1988

- Schirra, Wally & Billings, Richard; *Schirra’s Space*, Naval Institute Press, Annapolis, 1988. ¹²

1998

- Wally JSC Oral History explains meeting with Cleminshaw, learning about new star names. ¹³

Unfortunately, as a result of these incorrect entries in the Journal, the origin of *Navi*, *Dnooces*, and *Regor* as a joke has been widely distributed in all forms of information on Apollo. The origin of these names was not a joke; the origin was intended to honor and memorialize three wonderful men who worked so hard to make Apollo a success and eventually gave all they had. Dr. Cleminshaw himself recognized this as an honor in his 1977 book, *The Beginners Guide to the Skies*:

“*Navi (Gamma Cassiopeiae)* is “*Ivan*” spelled backwards and was named in honor of Virgil Ivan Grissom, one of the three astronauts killed in the Apollo fire.” (Note: “*in honor of...Grissom*”, not “*by.....Grissom*”). (Similar entries are included for Ed White and Roger Chaffee.)

3.0 Chronology

The following summary presents the chronological sequence of events that occurred as a basis of the origin of the Apollo 1 crew star names. This section includes specific comments related to each event supported by numbered references presented in Appendix B.

1965

- Aug 3, 1965: Last visit to Moorhead by Wally Schirra.¹

1966

- March 21: AS-204 (Apollo 1) crews announced: Prime: Gus Grissom, Ed White, Roger Chaffee;
 - Back-up: Jim McDivitt, Dave Scott, and Rusty Schweickart.²
 - McDivitt and crew worked closely with Gus and crew for five months until September when Gus and crew moved to KSC
 - Subsequent to this announcement, Gus never mentioned new star names, to anybody.
- April 15: Last visit to Morehead by Gus, Ed, Roger, Jim, and Rusty.¹
 - Final opportunity for Gus to discuss star names with Tony Jenzano
 - Jenzano knew nothing about new star names until after the Fire
 - Gus did not visit the planetarium at Griffith Park, nor did he meet Dr. Cleminshaw
- May thru July: CM-012 systems test, Downey
 - Both prime and backup crews participated extensively in spacecraft systems tests
- June 10: Apollo Astronauts at UNC, Morehead (none from Apollo 1).³
 - Gus and crew, McDivitt and crew heavily involved in CM-012 systems test, Downey
 - DRS (backup navigator) flew with Gus at night, no mention of new names for stars
- August 25: CM-012 spacecraft was shipped to KSC on August 25, arrived on August 26.²
 - Gus and crew followed CM-012 to KSC, nothing remained for them to do at Downey
 - McDivitt and crew remained at Downey to work on AS-207/208 and the Block II spacecraft
- September early: Gus and crew beginning training at KSC (spacecraft and simulator).⁴
 - The prime CM simulator was located at KSC
 - Gus and crew moved to KSC with the CM-012 spacecraft in early September
 - Gus and crew did not return to Downey
 - Therefore Gus had no opportunity to discuss the new star names with Cleminshaw

- Therefore, Gus held the names secret and did not disclose them to anybody in any form
- Mid Sept – Wally and crew were in Miami.⁵
 - Wally and crew not in LA when Griffith received the contract for Astronaut training
 - Wally had no opportunity to discuss new star names with Cleminshaw at that time
 - However, Cleminshaw was not aware of new star names, had no contact with Gus
 - In May 1994, Wally stated that he learned new star names from Cleminshaw
 - Therefore, Wally did not know about new star names before the Fire
- September: Griffith Observatory receives contract from NASA for astronaut training.⁶
- September 29; Wally and crew assigned to AS-205, 2nd manned mission (not to AS-204, 1st)
- October 11: Most recent entry in DRS Notebook, three stars without popular or short names.⁹
 - DRS Notebook contained draft checklists, systems diagrams, and list of navigation stars
 - New names for stars had not yet even been considered
 - (See Section ___ below for excerpts from the Notebook)
- October 18: A-1 Prime crew (Gus and crew) altitude chamber test at KSC.⁴
- October 21: A-1 Backup crew (Schirra and crew) altitude chamber test at KSC.^{4, 8}
 - Although not yet formally announced, Wally and crew were backing up Gus and crew
 - The dates of crew assignments on a particular mission are based on NASA public announcements. Although the crews knew their mission assignments before the NASA formal announcements, formal training would not begin until after the NASA formal announcements.
 - McDivitt and crew were still in Downey working on AS 207/208
- December. Schirra and crew announced as back-up to A-1, formally join Gus and crew at KSC.⁷
- December 22. McDivitt and crew announced as prime crew on AS-207/208.⁷

1967

- January 27: CM-012 Fire.⁴
- March-April: McDivitt and crew meet with Cleminshaw, name stars.
- May 9: Wally and crew assigned as prime crew for Apollo 7 (1st manned mission post-fire).²
- May-June: Wally back to Downey, meets Cleminshaw, learns of new star names.⁵
 - (See Wally's JSC Oral History transcript below – 1998)
- September: Cleminshaw article in the "Griffith Observer" with new star names.¹⁰
 - In the September 1967 article, his first release to the public regarding the new star names:

"The astronauts going to the moon must be well acquainted with the sky. They have a list of 37 stars which will be used in the Apollo spacecraft. They consist of Polaris, 32 stars in the list of 57, and four additional stars. These are Gamma Cassiopeiae (Navi), Beta Capricorni (Dabih), Gamma Velorum (Regor) and Iota Ursae Majoris (Dnoce). It is apparent that the special names of the last two have been recently coined, being the backwards spellings of "Roger" and "Second."
 - As further verification of this first public release, between Sept 1966 (contract to Griffith) and Sept 1967, Dr. Cleminshaw published six other articles in the "Griffith Observer", with no mention of new star names. It can be concluded that he was not aware of the names until after the referenced back-up crew discussions in March-April, 1967.

1977

- Cleminshaw, C. H., *the Beginners Guide to the Stars*, Thomas Y. Crowell, New York, 1977.¹¹

- Almost ten years after his NASA training contract and after he helped name the stars with the McDivitt crew, he described the recognition of the names as:
 - o “Navi (*Gamma Cassiopeiae*) is “Ivan” spelled backwards and was named in honor of Virgil Ivan Grissom, one of the three astronauts killed in the Apollo fire.”
 - o Note: “...*in honor of*...Grissom...”, not “...*by*...Grissom...”
- (See Section 4.3 below for the specific pages from *The Beginners Guide to the Stars*)

1988

- Schirra, Wally & Billings, Richard; *Schirra’s Space*, Naval Institute Press, Annapolis, 1988. ¹²
 - (See separate section on *Schirra’s Space*)

1998

- Wally JSC Oral History explains meeting with Cleminshaw, learning about new star names. ¹³
 - From Schirra’s JSC Oral History transcript:

“**Schirra:** Yeah. The director of the Griffith Park Planetarium, the same as Tony Jenzano with Morehead, told my crew—Cunningham and Eisele and myself—that “We have three stars in the celestial system now that we didn’t know about that the Apollo 1 crew told us about that they’d learned from Tony Jenzano; they’re ‘Navi,’ ‘Dnoce,’ and ‘Regor.’” “Navi” is Ivan Grissom spelled backwards; “Regor” is Roger spelled backwards, and “Dnoce” is Ed White the Second, spelled backwards. And this poor director of the planetarium for at least 2 years thought those were real stars! [laughs]

Neal: Did you actually use the stars for navigation?

Schirra: We used them for reference for yaw. At night, if you couldn’t see the Earth clearly, because it’s dark just as it is when you’re down on the surface, you’re not going to get a good checkpoint. But the star field’s right there and you can say, “Ah, that planet is where it should be. That star is where it should be. That’s my yaw attitude.” Very, very precise. We’re talking about, oh, 1/1000th of a degree. The same use of the stars was used in Apollo to 1/10,000th of a degree. That’s how accurate that stuff is.”

- The Apollo 1 crew departed Downey before Griffith/Cleminshaw received the NASA contract
- Therefore the Director of Griffith did not learn the names from the Apollo 1 crew
- They are real stars, contrary to Schirra’s comment, “thought those were real stars.”
- They are used for navigation, not for “yaw alignment”.
- Obviously at the time of the interview, Schirra did not recall the navigational use of the stars.

4.0 Reference Excerpts

4.1 “SCHIRRA’S SPACE” – BOOK EXCERPTS ANALYSIS

Schirra’s Space – analysis of relevant excerpts (pp 169,170)

Schirra, Wally; Billings, Richard; *Schirra’s Space*, Naval Institute Press, Annapolis, 1988

Our astronomy mentor was Tony Genzano¹, the director of the Moorhead Planetarium in Chapel Hill, North Carolina. Tony had a great sense of humor, and he and Gus Grissom cooked up a wonderful con² as we prepared for the first Apollo mission. Gus was in command of that mission. He and his crewmates, Ed White and Roger Chaffee, were at the North American plant in Downey, California, where their spacecraft was being readied. To practice their astronomical observations, they went to the planetarium at Griffith Park in Los Angeles.³

For inertial guidance navigation it was necessary to designate thirty-seven named stars—Sirius, Polaris, etc.—in the celestial sphere. And it was up to us to select guide stars⁴, to indicate the way to the named stars. With Genzano as a co-conspirator Gus submitted the names of three guide stars to the Griffith Park director—Navi, Regor and Dnoces. I was at the time assigned to command the second Apollo mission, and when my crew and I got to Los Angeles⁶ planetarium, those names were firmly established. No one there

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SCHIRRA'S SPACE



realized they had been concocted or how⁷. Navi is Ivan spelled backward, as in Virgil Ivan Grissom. Regor is Roger reversed. Dnoces is a backward spelling of "second," as in Edward H. White II.

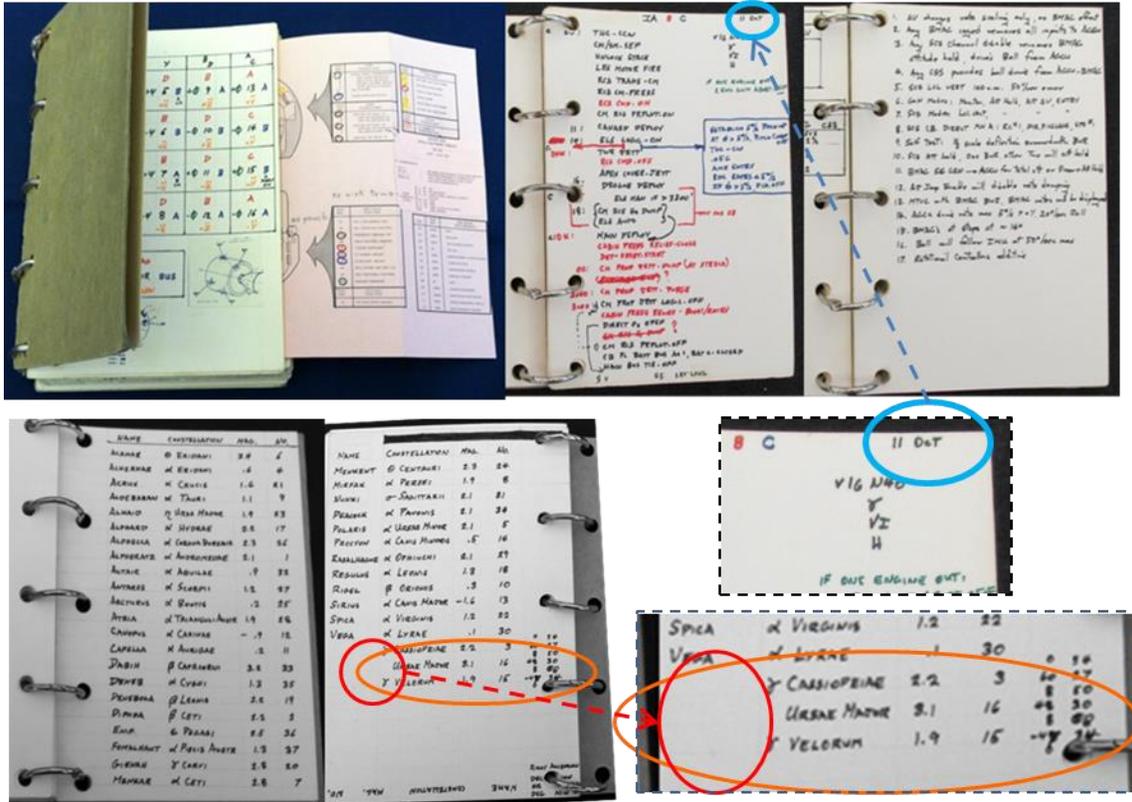
Comments

1. Name spelling incorrect, should be "Tony Jenzano" ("J" instead of "G").
2. Jenzano was not aware of the new star names (according to the ALSJ).
3. Gus and crew departed LA for KSC (Aug) before Griffith Park received the contract (Sept).
4. MIT selected the navigation stars, astronauts did not; and "guide stars" were not designated as such by anybody.
5. Gus was not in LA when the Griffith Park Director (Dr. Cleminshaw) received the NASA contract; Gus was in Florida at KSC with the spacecraft (shipped on Aug 25) and simulator.
6. On Sept 29, 1966, Schirra and crew were announced by NASA as prime for the 2nd manned mission (AS-205), not as back-up to the 1st manned mission (AS-204); they were in Miami in mid-Sept, and they participated in a KSC chamber test on October 18, 1966. They did not arrive in LA formally until May 1967 after they had been assigned to Apollo 7.
7. The new star names were not defined until after the A-1 fire. Schirra stated that Cleminshaw told him about the names (JSC Oral History), so Cleminshaw knew about the name changes.

The Schirra book has no index, no forward, no preface, no notes, no references, and apparently no significant (or very little) editing, and was released from a small publishing house. The Journal entry is from two "educators" who offer no references, no primary sources, no confirmation, no 2nd party opinions, or whatever, resulting in an entry that unfortunately has serious flaws. In this 3-step Journal chain of secondary sources: (1) the contributing educators say that (2) author of the book says, that (3) Wally says,but nobody says that Gus says; i.e., there is no referenced primary source from Gus directly. And finally, if the people who offered this contribution did not recognize the above errors, they certainly did not know much about Apollo.

4.2 DRS Notebook, October 1966

1. October 11: Most recent entry in DRS Notebook, three stars without popular or short names.⁹
 - DRS Notebook contained draft checklists, diagrams of systems, and list of navigation stars
 - New names for stars had not yet even been considered



During this period, and to help learn the many complexities of Apollo, I prepared a small booklet to carry in my flight suit pocket. This booklet included various systems diagrams, handwritten checklists and other information, including a list of the stars we were required to learn for navigation. This list included three stars for which popular names were not available.

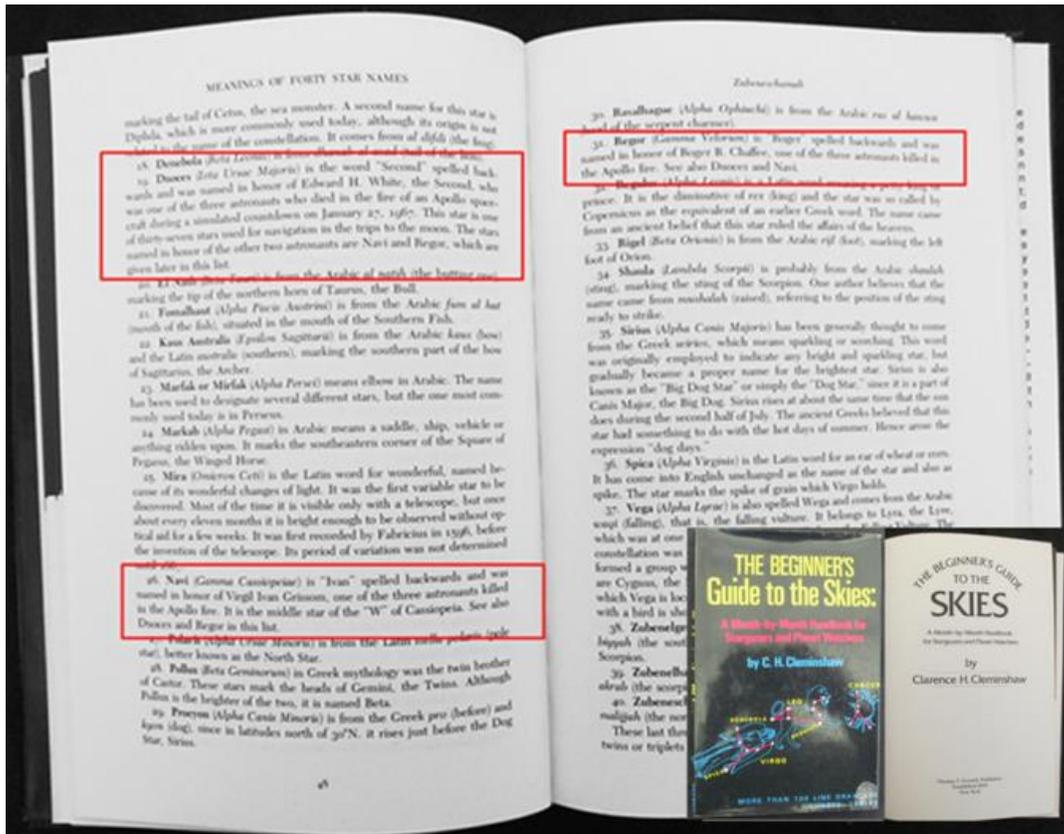
The “checklist” referenced in the *Journal* was my hand-written list of stars in a small book I formed to study Apollo systems and procedures which I carried in the pocket of my flight suit, the most recent entry of which was Oct 11, 1966, long after the purported re-naming of the stars. Note in the checklist shown above, 3 stars have long complex names rather than the prominent short names finally assigned.

4.3 *The Beginners Guide to the Stars*

1977

- Cleminshaw, C. H., *the Beginners Guide to the Stars*, Thomas Y. Crowell, New York, 1977.¹¹
 - Almost ten years after his NASA training contract and after he helped name the stars with the McDivitt crew, he described the recognition of the names as:
 - o “Navi (*Gamma Cassiopeiae*) is “Ivan” spelled backwards and was named in honor of Virgil Ivan Grissom, one of the three astronauts killed in the Apollo fire.”

○ Note: “...in honor of...Grissom...”, not “...by...Grissom...”



As extracted from the top of the left page above:

18. Denebola (*Beta Leonis*) is the word “Second” spelled backwards and was named in honor of Edward H. White, the Second, who was one of the three astronauts who died in the fire of an Apollo spacecraft during a simulated countdown on January 27, 1967. This star is one of thirty-seven stars used for navigation in the trips to the moon. The stars named in honor of the other two astronauts are Navi and Regor, which are given later in this list.

And this remembrance could very well be influenced by the three islands in Long Beach Harbor that were named in honor of Gus, Ed and Roger soon after the Apollo 1 fire. During the months before the fire, all six of us had spent many hours at the Long Beach Athletic Club and surroundings during our evening leisure activities – Gus, Ed and Roger were good friends of Long Beach too.

5.0 Observations (some repeated from above)

Evidence. There is no evidence that Gus told anybody about the new star names or how they originated.

- Tony Jenzano did not know
- Wally did not know
- Cleminshaw did not know
- Other members of the prime and backup crews did not know (including Wally's crew)
- MIT did not know
- NASA did not know

Therefore, how could the new names have been recorded before the fire if nobody knew about them?

Night flight. As mentioned, I was Gus's backup navigator and did not know about the new names. As an example, I remember one night in particular. I was Ed White's back-up, and if he could not fly for any reason, I would be Gus's Pilot (actually navigator), his right-hand man. Gus and I were close. One night, four of us were flying back from LA to Houston – Jim and Ed in a T-38 (fast), and Gus and I in a T-33 (slow). The new T-38 had to stop in El Paso for fuel, but the slower T-33 could go all the way, if we went high (about 40,000 feet). A challenge and the race were on – to decide who could land at Ellington first (the T-38 or the T-33). I don't recall who won, but it was very close – when we arrived overhead at Ellington, Gus dove straight down, full tilt (I was in the back seat); it was an exciting ride; but during the over two hours at night and there was not one word from Gus about new star names.

Long Beach Harbor Islands. And this remembrance could very well have been influenced by the three islands in Long Beach Harbor that were named in honor of Gus, Ed and Roger soon after the Apollo 1 fire. During the months before the fire, all six of us spent many hours at the Long Beach Athletic Club and surroundings during our evening leisure activities – Gus, Ed and Roger were good friends of Long Beach too, and were recognized as such soon after the fire (<http://wikimapia.org/118540/Island-White>).

Gus Grissom

- When did Gus tell anybody? Why did he keep the secret from so many people?
- Gus went to the Cape in August 1966 with the spacecraft. This was before Griffith Park (Cleminshaw) received the NASA contract for astronaut training. Therefore, Gus would not have had a chance to tell Cleminshaw about the stars.
- Then if Wally did meet Cleminshaw in September 1966 for Apollo 2, Cleminshaw would not have known about the stars to tell him (as Wally recorded in his oral history). But there is no indication that Wally attended any Cleminshaw training for Apollo 2, in fact, his photo was not in the Griffith Park magazine announcing the beginning of astronaut training.
- The new names are not mentioned in Gus's book, or any other reference or book (except *Schirra's Space*).
- Gus's book makes no mention of the star names, but the book does indicate that Wally was unhappy about being assigned to be Gus's back up.
- Gus was not the type of person to glorify himself or to name a star after himself.
- The most recent training of Gus and his crew at Morehead occurred on April 4, 1966, at which time Gus purportedly changed the names. Tony Jenzano was Director and does not recall any name change (according to the *Journal* entry).
- I joined the A-1 crew in late March. I worked closely with Gus for 8 months (almost daily, and flew with him often) and I never heard a word about the new star names. My small notebook (excerpts above) contains the original MIT names of all of the stars, including the three that were subsequently changed, but my notebook does not show the new names.

Wally Schirra

- The rationale for the formulation or selection of the new names is not discussed by Wally or in *Schirra's Space*, or during Wally's JSC Oral History.
- Wally was noted for "gotchas", and the focus of the section in the *Schirra's Space* book is on gotchas, one of which was the story about Gus playing the joke with the new names.
- Wally did not learn the new names from Gus, although he was Gus's backup and good friend, Wally learned from Cleminshaw.

Dr. Cleminshaw

- Did not write about the new names until one year after receiving the NASA contract.
- Cleminshaw did not tell DRS and others that the new star names came from Gus,
- If he did, why not in Sept 1966, instead of the spring 1967?
- Gus had departed for the Cape by Sept 1966, so if Cleminshaw had learned from Gus, he had to know the new names in Sept 1966 when astronauts first visited Griffith. But he did not acknowledge the new names until a year later (in the "Griffith Observer"), September 1967.

6.0 Conclusions

The new names of the stars were not a joke by Gus, but originated in discussions with Dr. Cleminshaw during A-1 original backup crew training session after the fire. Chronological summary:

1967. March-April. Names originated in discussion with Dr. Cleminshaw during A-1 original backup crew training session. September. Names first noted publically by Dr. Cleminshaw in the monthly "Griffith Observer" magazine.

1977. Names formally published for the first time in Dr. Cleminshaw's *Beginners Guide to the Stars*.

1988. *Schirra's Space* book published with the story about the joke by Gus. Wally was noted for "gotchas" or spoofs, to fool the target, and the focus of the section in the *Schirra's Space* book is on gotchas, one of which was likely intended to be a gotcha on the source of the new star names.

1998. Wally follows up on the joke story in *Schirra's Space* in his JSC Oral History; however he recalls that he learned the names from Dr. Cleminshaw, not from Gus Grissom.

2016. The *Journal* discussion sourcing the story about Gus conspiring with Tony Jenzano to define the new names is not credible, including both the book and the contributors (educators).

Oh yes, **1966** – the so-called conspiracy by Gus with Tony Jenzano did not happen, but was apparently conjured by the author of *Schirra's Space* with or without Wally's input.

As a confirmation of the importance of the *Journal* and how widely it is used, this false concept is now unfortunately vastly circulated among many documents, websites, journals, papers, school, etc. In the interest of truth of Apollo, I hope there is a way to correct the issue and record a proper remembrance of Gus, Ed, and Roger for perpetuity.

DRS

APPENDIX A

Apollo Lunar Surface Journal

Apollo 15

105:11:33 Scott: Okay. Standing by.

[Because of the LM tilt, the stars listed on Surface 1-5 are not the ideal ones to use for the platform alignment.]

[Scott - "As you know, we had 36 stars that we learned and used as navigation stars. On Apollo 9, we did a lot of star work. I'd been working on the G&N (Guidance and Navigation), so the sextant and the star catalog were part of my early responsibilities (in Gemini). So, when we got to go on Apollo 9, and started finalizing what we were to do, part of what we had to do was a thorough check of the G&N because, on Apollo 9, we turned it off for the first time. Prior flights had left all the Guidance and Navigation running. On 9, we decided that it was mature enough to shut it down. But, when you turned it on again, you had to align it with the stars. I was Command Module Pilot and that was my job."]

["In (earlier) training with Neil (for Gemini 8), flying across the countryside, what we would do is look up and we would practice our stars. We didn't get much southern hemisphere practice (that way), but we got that in the planetarium (see below). We used to pick out remote (fainter) stars and test each other on the constellations. (That) teaches you what you need to know in these alignments, which go very quickly if you know your stars. If you can find a star quickly and verify it is, indeed, the star you want, you can align your platform much more quickly than if you have to go look at a star chart, look at 122, and figure out where that fits in. You don't have time for that. You've got to know it."]

[" We had 36 stars and, when we started, there were only 33 with prominent names. Now there are 36 with prominent names. The three that didn't have names are now called Navi, Dnoces and Regor. If you go look at the (Apollo) star catalog, there are a lot of stars - all the ones you're familiar with - and then these three."]

[Dave is, of course, overstating the case when he says that there were "three that didn't have names" because, in fact, the three already had names that had long been recognized by the astronomical community. "Navi" is Gamma Cassiopeia; "Dnoces" is Iota Ursa Majoris; and "Regor" is Gamma Velorum. Dave is referring to the fact that Gamma Cassiopeia does not have a traditional Arabic or European name and that the traditional Arabic names of the other two - Suhail (Regor) and Talitha (Dnoces)- are not as familiar to most people as those of such stars as Polaris, Betelgeuse, Arcturus, etc. See the article Dnoces, Navi, and Regor by E.C. Krupp in the October 1994 edition of Sky & Telescope.]

[Scott - "And do you know where the names came from? For the record: Virgil Ivan Grissom, Edward H. White II, and Roger Chaffee. I hope they got left in the catalog."]

[For readers who have not tumbled to the connection between the star names and the Apollo 1 crew, "Navi" is "Ivan" spelled backwards, "Regor" is "Roger", and "Dnoces" is "Second".]

[During our Apollo 15 mission review, Dave recalled that the stars had been named for the Grissom crew after the Apollo 1 fire; but educators Betty Niver and Mary Zornio called my attention to a story in Wally Schirra's book to the effect that, long before the fire, Grissom conspired with the Director of the Morehead Planetarium, Tony Jenzano, to name the three stars after the members of his crew. Journal Contributor Charles Rolston notes that there is also a discussion of the star names in the James Michener novel Space.]

[In a 1996 discussion of the question, Dave Scott recalled that, during his early involvement in Gemini, all of the astronauts spent time with Jenzano at Morehead in Chapel Hill, North Carolina, learning their way around the sky. He speculated that it was during one of these visits that the naming took place and, indeed, has found a November 1966 checklist which contains the new names. Dave was a member of the Jim McDivitt [crew](#) that backed up the Grissom crew until they were assigned to the mission that became Apollo 9.]

[Late in 1996, I was able to contact Jenzano, who provided the following clarification: "The great majority of celestial navigation training for the Mercury, Gemini and Apollo astronauts was conducted at the Morehead Planetarium in Chapel Hill, North Carolina. At the time a summary report was written in 1969, the astronauts had already logged over 1700 hours of training at the Morehead Planetarium. Training continued up to the Apollo-Soyuz mission in 1975. In 1959, Link Trainers were designed and constructed (by Jenzano) which mirrored the view the astronauts would have in their capsules while in space. The astronauts memorized specific constellations and significant stars and utilized this information with accompanying star charts in order to be able to plot their position in space at any given time. The Mercury trainer had the capacity to yaw left or right in order to simulate the action of the thruster rockets. New trainers were constructed for the Gemini (and Apollo) missions."]

["I was not involved in the 'renaming' of the stars (Navi, Dnoce, and Regor). Shortly after the Apollo (1) tragedy, NASA sent star charts from the mission for me to review and edit. In that review, I noticed three stars on the charts that had been named incorrectly and included this information in my report back to NASA officials. I made no attempt to discern why the star names were incorrect. Several years later, I met with one of the original Mercury astronauts, Wally Schirra, at a conference and, in the course of the conversation, the renamed stars were mentioned as a private joke made by Gus Grissom. When I returned home from the conference, I looked through my records and retrieved the letter I had written to NASA. I then copied the letter and sent it to Mr. Schirra. In the (cover) letter to Mr. Schirra, I acknowledged that, obviously, I had inadvertently 'spilled the beans' on the astronauts. I noted that, if I had known, I might have 'gone along with the joke' to see how far it would go!"]

105:11:36 Mitchell: Okay. The first pair, we will have [star 3 \(Navi\) in detent 3](#); star 12 (Rigel) in detent 6. Second pair...

105:11:48 Scott: 3 in detent 3 and 12 in detent 6.

[[Star 3](#) is Gamma Cassiopeiae (Navi) in the constellation Cassiopeia and star 12 is Beta Orionis (Rigel) in Orion.]

APPENDIX B

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