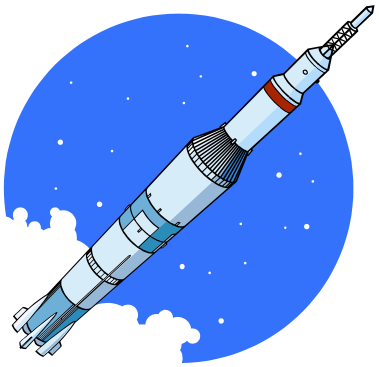

THE SCIENCE OF SPACE FLIGHT IN CLASSIC SCI-FI CINEMA:

A Remembrance of "Lost in Space" and "Planet of the Apes"
-Dedicated to the Memory of the Apollo 1 Astronauts-

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We commemorate the Apollo 1 astronauts by taking a look at the science of space flight technology in two all-time favorite sci-fi classics through the prism of the Apollo manned space program. Learn about the propulsion of the saucer-shaped Gemini 12 [later renamed the Jupiter 2!] and why the ship was enveloped in a brilliant glow in the pilot episode of Lost in Space. What was the mission of Air Force One, its propulsion technology, and why did it crash land in a lake, thereby stranding its crew on the Planet of the Apes? These and other questions are explained in this paper via the science of the 1960s – the hey-day of America's manned space exploration!

ABSTRACT

This paper examines the science of space flight as shown in classic sci-fi cinema, specifically one from a landmark TV series – "Lost in Space" – the other from a film noted for one of cinema's all-time surprise endings – "Planet of the Apes." Both of these classic sci-fi masterpieces were produced and screened during the mid-to-late 1960s. We have focused on the original unaired pilot for "Lost in Space" [titled "No Place to Hide" and filmed in 1964] and the original "Planet of the Apes" [released in 1968] because the scientific content in both productions strongly reflected the era in which they were made. Unlike the content of later episodes and/or films associated with both productions*, the science fact of the original works is verifiable and was more rigorously, if not consistently, applied*. As such*, we make the case that space flight technology depicted in these sci-fi classics was more realistic and achievable than has been previously credited – especially when viewed through the prism of the Apollo moon program from that same era*. Both of these sci-fi classics presented stories about exploring new frontiers led by enterprising and courageous people. They reflected the aggressive spirit of the Apollo space program whose goal was to land a man on the moon and return him safely to Earth before the close of the 1960s. It is with respect and honor that we dedicate this paper to the memory of the Apollo 1 astronauts whose courage and ultimate sacrifice provided the foundation for our nation successfully achieving that goal.

INTRODUCTION

Although the 1960s is replete with a number of well-known, high quality sci-fi TV programs and motion pictures, both "Lost in Space" and "Planet of the Apes" were released at the peak of public interest in the space program as the USA was simultaneously engaged in a race to the moon and Cold

War tensions were high. Both stories were explicitly presented as USA-led rather than global or international expeditions. As such, "Lost in Space" and "Planet of the Apes" reflected American exceptionalism in the same spirit that Jules Verne's companion novels From the Earth to the Moon and 'Round the Moon did when published nearly 100 years earlier.

Verne extolled Yankee ingenuity, pioneering spirit and can-do attitude when he successfully predicted that Americans would be the first to reach the moon. Similarly, the Space Family Robinson and their scientific assistant, who set out to begin colonization of a planet in the Alpha Centauri star system in "Lost in Space" [hereafter referred to as LIS] as well as the "Planet of the Apes" [hereafter referred to as POTA] astronauts who were piloting their space ship to a distant star, all possessed strength of character, courage and scientific knowledge that Verne felt were the necessary qualities to explore outer space. *In all three cases [Verne's novels, LIS and POTA] the prevailing scientific knowledge of the day was incorporated into their respective story lines, and the science fact from that time governed the direction and content of the story lines in a more rigorous manner than other science fiction novels and film productions from the same periods.* [This will be explained in greater detail later in this paper.]

NOTE: Readers who are interested in "Star Trek" space travel technology should read 21st Century Propulsion, published by V.E. Haloulakos, NASA Symposium "Vision 21", Space Travel for the Next Millenium, NASA Lewis Research Center, Cleveland, Ohio, 3-4 April 1990, in which he makes a strong case that warp drive technology was and is achievable in the context of very long-term scientific progress. This paper, which focuses on LIS and POTA, is a companion or sequel because it affirms the scientific validity of other science fiction works that have not received the same, albeit well-deserved, attention as "Star Trek."

While the predictive power of Verne's 19th century novels was affirmed by the 20th century Apollo moon missions, the future as envisioned by LIS and POTA remains a work in process. Moreover, the science fact underlying both of these classic sci-fi productions has been overlooked largely because the adventure and exploration themes in LIS and POTA overshadowed the space flight technology that was integral to both story lines. We enjoyed these classic sci-fi productions not only for the adventure, but *also* for how they reflected American ingenuity and technology that made such stories a very real and achievable possibility within our lifetimes. This paper seeks to expand the appreciation for the science fact of LIS and POTA as we revisit the exciting story lines of both.

This paper is organized as follows: First we present a synopsis of each story. We then explain and document how LIS and POTA reflect scientific knowledge and exploration themes from the 1960s. Where appropriate, we make inferences based upon scientific and aerospace industry practices from that same era. These are offered to clarify certain events or aspects of the respective storylines. Regarding storyline content, we have relied upon published original information sources [largely from 20th Century Fox which produced both of these classic sci-fi stories] rather than fan-based fiction that arose in later years.

THE STORY LINES

A Synopsis of "Lost In Space: No Place to Hide"

The Gemini-12 spacecraft, a saucer like vehicle, with the Space Family Robinson and their scientific assistant, is launched from Earth in 1997 to begin colonization of a planet in the Alpha Centauri star system [traveling a distance of approximately 4.3 light years]. The voyage will last 98 years with the crew kept in stasis [aka suspended animation] during the space flight. The Gemini-12 is

powered by atomic energy with fully automated onboard computers to take care of the flight itself. The ship runs into a meteor storm in deep space which damages the craft and sends it off course. Since the automatic systems are unable to make all the necessary repairs, the ship's computer selects the nearest planet to crash-land on. The ship's atomic clock indicates that it is the year 2001, implying that Earth aged about 3-1/2 years during the journey. It is not given how long the Gemini-12 itself was traveling in space.

The balance of the story is devoted to survival: the family sets up camp, domesticates several local animals and starts a farm. However, the cold climate later forces the Robinsons and their assistant to travel south in the Chariot, a solar powered amphibious land rover. In the ensuing events our space pioneers endure a lost child, battle a giant Cyclops, survive an earthquake in an abandoned, underground city and nearly capsize at sea. When they finally reach the planet's tropical region, the story closes with everyone giving prayerful thanks for a safe journey while they are being secretly observed by two humanoid aliens [actually natives of the planet] standing close behind nearby bushes.

A Synopsis of "Planet of the Apes"

An American spacecraft, Air Force One, is carrying four astronauts on a journey to a distant star. The ship, bearing the combination design of a Delta rocket and an Apollo command module, left Earth in 1972 and its crew is placed in stasis [suspended animation] six months after its launch, with the automated onboard computers taking care of the flight and all life support systems. The spacecraft attempts to land on a planet but crashes into a lake. The crew is forced to abandon ship but notes the atomic clock reads the year 3978, implying that Earth has aged 2006 years since the launch date. It is not clear how long Air Force One was

actually in flight, but the astronauts have aged about 18 months since they were all in stasis.

One of the astronauts [Stewart] passed away before the crash landing because her stasis unit failed during the space flight. The three remaining astronauts speculate that they are about 320 light years away from Earth in an unnamed planet in the constellation of Orion. Although the planet appears desolate at first, the astronauts encounter a society where apes have developed into creatures with human-like speech and intelligence, while humans are mute creatures wearing animal skins! Apes hunt-and-kill humans for sport as well as use them for scientific research. One of the astronauts [Dodge] is killed, while another [Landon] is captured and later lobotomized during an experiment. Commander George Taylor, the lone surviving and fully functional astronaut, eventually makes friends with two ape scientists who later help him escape and return to the area where his spaceship crash landed. Taylor, along with Nova, a girl he was captured with, flees from the apes and explores the shoreline. Not long afterwards, Taylor makes a startling, if not emotional discovery! There half-buried in the sand is the Statue of Liberty! Taylor realizes that he has been back on Earth the whole time – 2,000 years in the future!

SPACE FLIGHT TECHNOLOGY AND MISSION PROTOCOLS

- Design and Propulsion of Spacecraft

The saucer-shaped Gemini 12 of and the Delta rocket/Apollo command module Air Force One reflected the requirements of each mission. The Gemini 12 is bolder in concept, if not more "futuristic" in terms of its design and propulsion versus Air Force One. This can be attributed to the difference in launch dates: Gemini-12's launch date is given as 1997 [33 years from when LIS was filmed] while Air Force One's launch date is given as 1972 [just 4 years from when POTA was released]. Since LIS was created with a far-distant future in mind, the launch pad and command center are

designated as Alpha Control, while the POTA spacecraft is launched from Cape Kennedy because its departure date was in much closer proximity to the film's 1968 release date.

Perhaps the future as envisioned in the original LIS pilot may have included a civilian-research driven rather than a military-research driven command structure. As noted later in this paper, the crew of Gemini-12 is comprised of civilian scientists [including three PhDs] and no military personnel while Air Force One appears to have an equally skilled crew but it is implied that all are military personnel. During the 1960s scientifically trained military officers, usually with a strong flight background comprised the crews of the first series of USA manned space expeditions. It is conceivable that eventually this would evolve into a more broad-based, civilian effort with less emphasis on military considerations as space exploration became more accessible to the general population.

<u>"Lost In Space" - Spacecraft & Mission Protocols</u>
Gemini 12 was designed and built for a colonization mission, and therefore the multiple-decks with living and working accommodations in a self-contained vehicle [with take-off and landing capability] were both practical and appropriate. The saucer design would allow ample space [with easy access] for atomic motors to be safely integrated into the spacecraft while transporting the colonists and their mission equipment. The Gemini 12 was designed for interstellar flight and physical comfort. Moreover, space colonization was definitely a long-range, futuristic concept and so the spacecraft design had a distinctly different look versus the then contemporary space travel vehicles of the 1960s.

Another distinguishing characteristic of Gemini 12 was its take-off and landing capability on solid ground, while US manned space flights during the 1960s were designed for take-off with aid of rocket boosters [whose stages were discarded once the vehicle achieved orbit] and landing on

water for the return flight to planet Earth. The choice of the Alpha Centauri star system for future colonization is logical because it is the closet to our solar system, and therefore a reasonable first step for interstellar space travel, if not colonization. In the opening scenes, the narrator informs us that a series of "deep telescopic probes" [a precursor by nearly two decades to the Hubble Telescope, as well the unmanned Voyager spacecraft programmed for a flight path to leave our solar system] led to the selection of the planet to be colonized.

<u>"Lost In Space" - Propulsion, Travel Time & Distance</u>
Gemini 12 was atomic powered, but little else in the way of technical data was provided. However, since we are informed that the flight time was supposed to be 98 years, and the distance to Alpha Centauri is 4.3 light years away, this implies that Gemini 12 [designated here as G12] would be travelling at a rate of speed equal to about 8,161 miles per second. This calculation was arrived at through the following steps:

(1) Speed of light = 186,000 miles per second
(2) G12 travel time factor: 98/4.3 = 22.79
(3) Reciprocate time factor: 1/22.79 = 0.0439
(4) Multiply reciprocated time factor by speed of light [0.0439] x [186,000] = 8,161

Interstellar space flight at 8,161 miles per second by 1997 was an achievable goal, especially given the rapid time table of achieving new performance levels in the context of manned space flight. During the early-to-mid 1960s trips to Mars were planned and vehicles were designed for landings and returns [unmanned 1984 and manned 1988].

The acceleration of technology development in the second half of the 20th century implied a manned journey to Alpha Centauri was not inconceivable.

Consider the following milestones in the context of a relatively short time table:

- $E = MC^2$ is unveiled in 1905.
- Uranium nucleus split / Einstein writes to FDR [1938/39].
- Basic university lab atom splitting experiment [Berlin, Dec. 1938] to Hiroshima and Nagasaki [Aug. 1945] in 6.5 years.
- Antiproton is discovered (1955) and Antimatter becomes fact.
- Mankind went from Sputnik 1 to Apollo 11 in less than 12 years.
- Trapping and storage of antiprotons achieved in 1984

On this basis, it is reasonable to infer that strong resolve, commitment of resources, dedication and willingness to take risk without fear of failure would make possible a spacecraft capable of interstellar travel by the late 1990s. When taking into account the pace of space travel in the 1960s, it is not unreasonable to make the leap of expecting colonization missions beyond our solar system to occur by the end of the 20^{th} century.

The propulsion system that would be needed to power the Gemini 12 for interstellar travel was achievable when viewed through the prism of the 1960s vision of future rocket technology. Specifically a propulsion system with a specific impulse exceeding 1500 seconds would be needed.

This vision is supported by the specific impulses of rocket fuel forecasted by research from that period which indicated exotic propulsion systems would need to be developed and made economical to produce, store and use.

Specific Impulses of Rocket Fuels

- Molecular Matter: 250 to 500 seconds
- Metastable Matter: 600 to 3150 seconds
- Nuclear Matter: 800 to 6330 seconds
- Antimatter: 1000 to ? seconds

In sum, the vision of LIS 33+years into the future [i.e., the 1997 forecast of interstellar travel based on extrapolating the ongoing trends in 1964] was far more realistic than

initially credited. The use of atomic power for deep space travel with an implied speed of 8,161 miles per second was (is) indeed achievable and development of stasis chambers so astronauts would be able survive the long journey a reasonable solution to bridge the time-distance factor. Naming the spacecraft Gemini 12 while the USA was in the midst of that same program was a very nice tribute to how rapidly we were progressing and pushing into new frontiers.

Another thought in terms of how the Gemini 12 would have utilized atomic power to travel to Alpha Centauri, and in keeping with its more futuristic saucer-shaped design, is the use of anti-gravity. Again, if we follow the same logic of scientific progress, here is the basis for use of antigravity propulsion:

- Gravity waves will be fully characterized. (Why not?)
- Each celestial body sends out waves whose amplitude and frequency are directly related to its mass and size.
- The net gravity field at any point in space is the result of the gravity wave interference pattern.
- Super sensors and supercomputers analyze this wave pattern and identify its basic components.
- An "antigravity wave generator" will then generate waves of precisely the same amplitude and frequency but of opposite phase. Thus, by causing an exact destructive interference, it will precisely cancel out the gravity field.
- A suitable propulsion system can then accelerate the vehicle to very high velocities with a rather low force and low energy expenditure.

During the launch of the Gemini 12 and its ensuing space flight, the spacecraft is enveloped in a brilliant glow. Since the LIS pilot episode was filmed in Black-and-White, this glowing effect is sharply evident. Moreover the glow appears to pulsate as the spacecraft powers up for its launch. We would attribute this visible, brilliant glow to the use of an anti-gravity propulsion system powered by atomic energy. Since the Gemini 12 is launched without the aid of rocket fuel boosters [propelled by solid or liquid fuel], this

further affirms the logical inference of an anti-gravity propulsion system.

The Gemini 12 was chock full of computers with an entire deck devoted to propulsion, so there was ample room for an anti-gravity propulsion system. The flight/mission control equipment was located on the top or upper deck; galley, crew quarters and laboratory areas were located immediately below in the second deck; propulsion and colonization equipment were in the lowest or third deck [in closest proximity to the thrusters and main rockets].

"Planet of the Apes" Spacecraft & Mission Protocols

The combined Delta rocket/Apollo command module design for Air Force One's mission is one associated with the "survey" or "fly-by" mission that was the protocol of the Apollo moon program in the late 1960s – early 1970s. The compact design of Air Force One is comparable to the Apollo spacecraft, whose purpose was to travel to a specific destination, gather preliminary data and map the area as a first step for follow-up visits.

Air Force One appears to be a similar size and design of a 1960s manned spacecraft [a command module with reentry capability] aided by rocket booster stages, and its automatic landing equipment appears to have been programmed for a water landing upon its return. This was evidenced at the outset of the film when the spacecraft entered into the planet's atmosphere and made a spectacular series of evasive maneuvers through a very mountainous region with deep canyons before landing in a very large lake. This can be seen at this web link.
http://www.youtube.com/watch?v=JDbTmhOSuoY

Since Air Force One's launch date is given as 1972, it is in line with the take-off and landing technology associated with manned US spaceflights during the 1960s and 1970s.

One more thought: as noted in our synopsis of the storyline, it turns out that Air Force One actually made a *round* trip since at the end of the film we learn the crew landed on Earth 2000 years in the future. We can infer that the computerized navigation and landing systems noted the spacecraft had returned to Earth and therefore appropriately landed in water since that was the protocol of the 1960s and 1970s.

Although we are never directly informed about Air Force One's specific mission or destination, we can infer based on the prevailing spaceflight technology and mission protocols of the 1960s that its voyage to a distant star was very likely the Alpha Centauri star system because it is the nearest to our own solar system. Moreover we can also infer that it was an exploratory mission to Alpha Centauri to gather preliminary data and map the neighboring star system as a logical first step for interstellar space travel, as this was the protocol followed by Apollo manned flights to the moon. The moon is the planet Earth's nearest major celestial body and the manned space flights, with eventual landing, exploration and return were accomplished through a series of fly-by missions. Each succeeding flight tested various functions and procedures that would lead to a manned landing and return on a single mission.

If we extrapolate this protocol for interstellar travel, and frame it within the context of the 1960s, it is logical to conclude that the same would be done for travel to the nearest star system. The conversation among the surviving astronauts following their crash landing implies that *colonization may have been an eventual goal* and that Air Force One's mission was a critical step in that process. But it is highly unlikely that the goal for their specific mission was colonization since the size and design of their vehicle was comparable to the Apollo spacecraft of the 1960s, with the only significant difference in the interior layout attributed to the stasis chambers for interstellar flight.

"Planet of the Apes" - Propulsion, Travel Time & Distance

Unlike "Lost in Space" we are not told specifically what type of propulsion is used by Air Force One. Therefore we can only make a series of guesses or inferences. In the opening sequence of the film the viewport of the spacecraft reveals a pattern of light waves associated with the blue shift on the spectrum. This means short wave lengths that imply the vehicle is traveling at a very high rate of speed toward the reaches of deep space.

One guess would be that Air Force One was powered by nuclear rockets that would have similar propulsion capability as explained in our LIS section. However, the nuclear rockets would likely be connected via the service module and rocket boosters, similar to the Saturn V rockets that were used to launch the Apollo spacecraft. In other words, the nuclear rockets would be attached during the journey to and from Alpha Centauri, but jettisoned prior to reentry into the Earth's atmosphere. The crash landing into the water shows *only* the command module which implies that the service module and rocket boosters were jettisoned for reentry. This would be the same protocol as followed by Apollo, but on a greatly expanded scale.

Another possibility is the use of anti-gravity [previously discussed in the LIS section]. Such a propulsion system would also account for the "blue shift" of light waves on the spectrum because of the very high rate of speed associated with it. Our guess, based on the configuration of the space craft, is nuclear rockets, but we would not entirely rule out the use of anti-gravity, especially since it is inferred that Air Force One is under military supervision. History shows that such exotic propulsion could easily fit within the defense industry research and development protocols, and would likely be deployed for an interstellar mission, if feasible.

Time Dilation

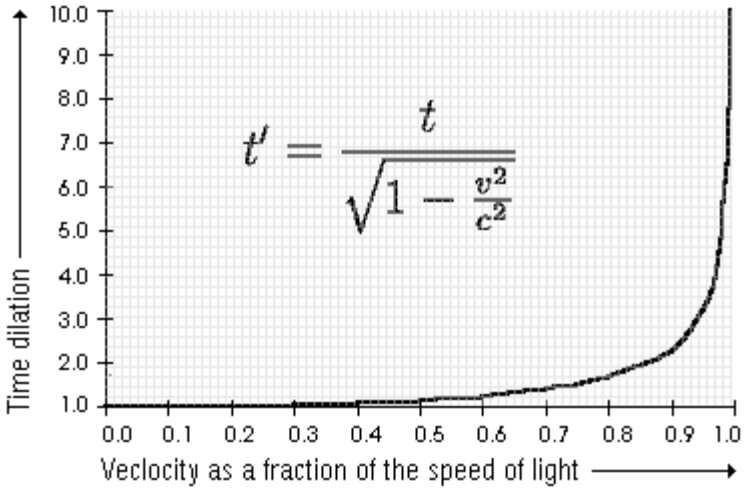
This topic is never really addressed in LIS nor does it play a significant part in the storyline. However, in POTA, time dilation is the crucial element that affects the entire mission and storyline. The Special Theory of Relativity has changed our understanding of time such that we move through three space dimensions and a fourth dimension that is related to, but not exactly time itself. Essentially it is time multiplied by the square root of -1.

This implies that when moving from one space coordinate to another, one causes their own position on the time coordinate to also change, even if unnoticed by the traveler. This is what causes time to elapse. As a practical matter we are always traveling through time; but when traveling through space one travels through time less than what one might expect. Therefore, time in a moving vehicle traveling at very high speeds [that start to approach the speed of light], will be observed by the stationary observer to be moving *slower* by the factor t'. Mathematically, this can be expressed:

$$t' = \frac{t}{\sqrt{1-(v^2/c^2)}}$$

Where t' = time dilation factor; t = time; v = velocity and c = speed of light.

Graphically, the velocity of the vehicle is expressed as a fraction of the speed of light [horizontal axis] and the time dilation is the resulting outcome [vertical axis] that is a function of: time divided by the square root of the quantity 1 minus the velocity squared divided by speed of light squared.



Source: thebigview.com

In POTA, this means that time for the Air Force One astronauts' reference frame was stretched by the time dilation factor. Commander Taylor observes at the outset of the film that according to the space ship's atomic clock, Earth has aged about 700 years while the crew has been traveling for six months in deep space at a very high speed approaching the speed of light. Specifically the atomic clock reads the year 2673 while the launch date was 1972. This implies Earth has aged nearly 117 years for each month Air Force One has been in deep space! This observation is noted just prior to Commander Taylor entering stasis for the remainder of the voyage. Therefore, the time dilation factor presented in POTA is both scientifically and *mathematically possible* for a spacecraft equipped with very high powered propulsion systems cited in this paper.

As to what went wrong with Air Force One's mission: we would offer that it may have been possible for the spacecraft to have entered into a "wormhole" in which the vehicle, already traveling at a very high rate of speed, may have entered into a "shortcut" through space-time that brought Air Force One back to Earth. The ship's automatic onboard computers having noted that the spacecraft had arrived back

on Earth, then followed the program for water landing [the customary protocol of US manned space flight in the 1960s and 1970s].

The wormhole would have obviously been uncharted, and this implies that the spacecraft did not reach Alpha Centauri, but instead made a circuitous return home. When the crew was guessing where they landed – 320 light years from Earth on an unnamed planet in the constellation of Orion – it was just that. A guess! They may have speculated that if the ship veered off course, the onboard computers would zero in on the nearest planetary system, within vicinity of the original flight path. Since it is not given what that exact flight path was, we are as much in the dark as the crew of Air Force One. At no time did they consider the ship had returned to Earth because the idea of a *traversable* wormhole was not yet part of the science in the 1960s.

CREW COMPLEMENT

The crew complement for both the Gemini-12 [LIS] and Air Force One [POTA] reflected the view that space travel requires people with extraordinary skills, capabilities and character. When we review the background and experience of the US astronauts from the 1960s, this is most evident. The Apollo 1 crew of Virgil Grissom, Edward White and Roger Chaffee typify the strong curriculum vitae of the flight crews from that period. We selected the Apollo 1 crew [that tragically perished in an accidental fire during a simulated countdown for mission AS-204] because the Apollo program inaugurated manned space exploration beyond the orbit of Planet Earth, and it coincided with LIS and POTA during the 1965-1968 timeframe. It has been said that our nation stood on the shoulders of giants to reach the moon and those giants were named Grissom, White and Chaffee. Hence, our reason for citing the Apollo 1 crew as the standard of excellence by which to compare the crew complements featured in the classic sci-fi programs.

Crew of Apollo 1

Virgil I. Grissom: Lt Colonel, United States Air Force
Commander, Apollo 1
BSME – Purdue University

Edward H. White, II: Lt Colonel, United States Air Force
Senior Pilot, Apollo 1
BS – US Military Academy (West Point)
MSAE – University of Michigan

Roger B. Chaffee: Lt Commander, United States Navy
Pilot – Apollo 1
BSAE – Purdue University

Crew of Gemini 12 – "Lost in Space: No Place to Hide"

- Dr. John Robinson: Professor of Astrophysics at University of Stellar Dynamics
- Dr. Maureen Robinson: Biochemist, New Mexico College of Space Medicine
- Judith Robinson: Eldest daughter (age 19) who postponed a career in musical comedy field
- Penny Robinson: Youngest daughter (age 11) with IQ of 147 and hobby of zoology
- Will Robinson: Only son (age 9) and graduate of Campdal Canyon Science School with highest average in school history
- Dr. Donald West: Graduate student at Center for Radio Astronomy, developer of the theory on other planets fitness for human habitation "that rocked the scientific community."

Crew of Air Force One – "Planet of the Apes"

- Taylor: Commander
- Landon: Senior Pilot
- Dodge: Senior Scientist [specialty: geology]
- Stewart: Co-pilot and Navigator

Observations on the Crew of Apollo 1

Each one of the Apollo 1 astronauts had a distinguished record of achievement. Grissom was the pilot for the second flight of the Mercury program and the first flight for Gemini. He was also awarded the United States Air Medal Cluster and USAF Distinguished Flying Cross. White was the first American to walk in space [Gemini 4 mission]. Chaffee was

awarded the United States Air Medal for flying several photographic missions over Cuba during the 1962 Missile Crisis. *In sum, Apollo 1 represented America's best in terms of combining military service, scientific and technical skills*.

Observations on the Crew of Gemini-12 [LIS]

There is more biographical information available on the Gemini 12 crew [LIS] versus the Air Force One contingent [POTA]. With the exception of the eldest daughter the entire Space Family Robinson all possessed academic and scientific credentials ideally suited for space travel and colonization. Arguably the eldest daughter's artistic background, while not relevant to a scientific expedition, reflects a very high achievement level in her own field, and shows high aptitude for growth and learning. Dr. West, the family's scientific assistant is a fellow scientist who selected the planet to be colonized.

Observations on the Crew of Air Force One [POTA]

Although less is known about the POTA crew, much can be inferred from the dialogue between the characters in the movie and published information in a series of Topps trading cards that depicted the entire film. Taylor is obviously in command because he is the last one to enter stasis before the ship commences its multi-year flight and is charged with responsibility for the crew's well being. When the ship crash lands in a lake, Taylor is the one issuing the orders to abandon ship and is addressed as "skipper" by his crew. Landon's dialogue with Taylor regarding the apparent time dilation and location of where they have landed implies his position as senior pilot. Dodge is the senior scientist as he determined the planet's air was breathable and later ran tests on the planet's soil. Shortly after the crash landing, Dodge planted a miniature American flag upon reaching shore – a tribute to our nation's pioneering spirit in exploring new frontiers. Given the mission's need for extensive knowledge on inter-stellar space and navigation, and the functions already being carried out by Messrs. Taylor,

Landon and Dodge, it can be inferred that Stewart was the navigator and likely a back-up pilot.

One other important observation: the inclusion of Stewart, a female astronaut, presaged the actual US Space Shuttle female astronauts such as Sally Ride and Judith Resnick. Moreover, the former Soviet Union had already sent women into space such as cosmonaut Valentina Tereshkova, who orbited Earth in 1963. The survival skills, physical stamina and scientific knowledge shown by the crew after their crash landing reflects the same aptitude associated with Apollo astronauts.

CLOSING THOUGHTS

This year, 2011, our nation marks the 50th anniversary of its commitment to land a man on the Moon and return him safely to Earth before the close of the 1960s. Not only were we fully immersed in a space race but we looking out several decades and planning further exploration into the frontier of outer space. This included not only manned missions to Mars, but consideration on how to pursue interstellar travel. The cinema, which has always reflected events of the day and popular culture, focused on American exceptionalism and scientific imagination with classic television shows like "Lost in Space" [LIS] and motion pictures such as "Planet of the Apes" [POTA].

Exciting storylines tend to obscure the science of the space flight depicted in such productions. In this paper we have attempted to explain how the space flight technology in LIS and POTA was both scientifically possible and feasible PLUS how both of these classic sci-fi productions incorporated the protocols of the Apollo moon project, as well as the scientific community's long-range plans for interstellar travel. It is fun to watch the original LIS pilot "No Place to Hide" and the 1968 version of "Planet of the Apes" through a scientific prism. When we take into account how our fictional heroes

in both stories were written to reflect the real-life heroes from the 1960s Space Age – Apollo 1 astronauts Grissom, White and Chaffee – there is a sense of pride, wonder and gratitude for such men of great character. The Space Age of the 1960s served to measure the best of our skills and abilities as a nation and as a people. We hope this paper reflects that same spirit of ingenuity, imagination and courage, and will inspire readers to keep this vision alive!

- List of references cited on next page.
- Photographs and sketches of spacecraft cited in this paper are in the APPENDIX.

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"Lost in Space" pilot episode "No Place to Hide" – for network television. Written by Shimon Wincelberg and Irwin Allen. 20th Century Fox Film Corp., 1964.

Lost in Space: 25th Anniversary Tribute Book. By James Van Hise. Publisher: Pioneer Books, Las Vegas, 1990.

National Aeronautics and Space Administration [NASA].

Personal Collection of George A. Haloulakos, Sci-Fi Hobbyist. DVDs, scrapbook of news and magazine articles, drawings of spacecraft.

"Planet of the Apes" motion picture. Screenplay by Michael Wilson and Rod Serling. 20th Century Fox Film Corp., 1968.

"Planet of the Apes" Topps Trading Cards. Publisher: Apjac Productions, Inc. and 20th Century Fox Film Corp., 1967.

Thebigview.com

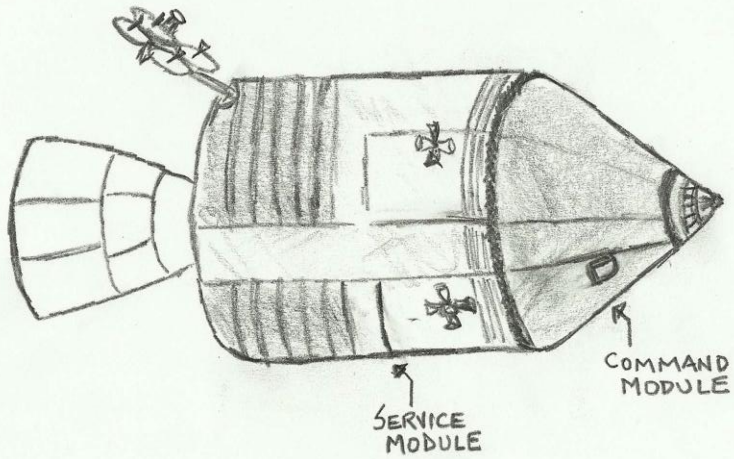
The Boeing Company

YouTube.com

APPENDIX – PHOTOGRAPHS & DRAWINGS OF SPACECRAFT

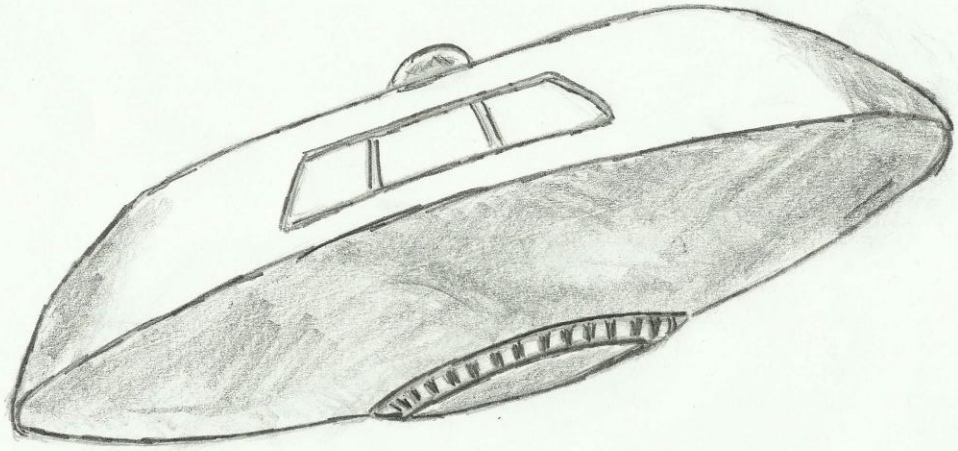
DELTA ROCKET

Source: The Boeing Company



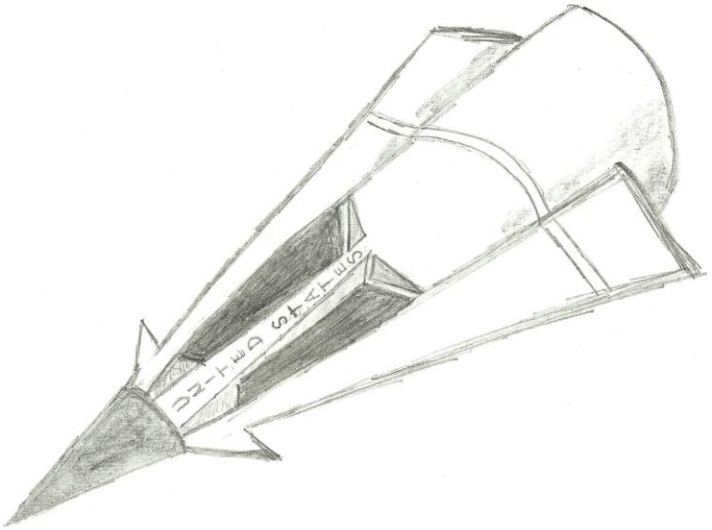
APOLLO 1

+Protodeacon George Haloulakos
May 7, 2011



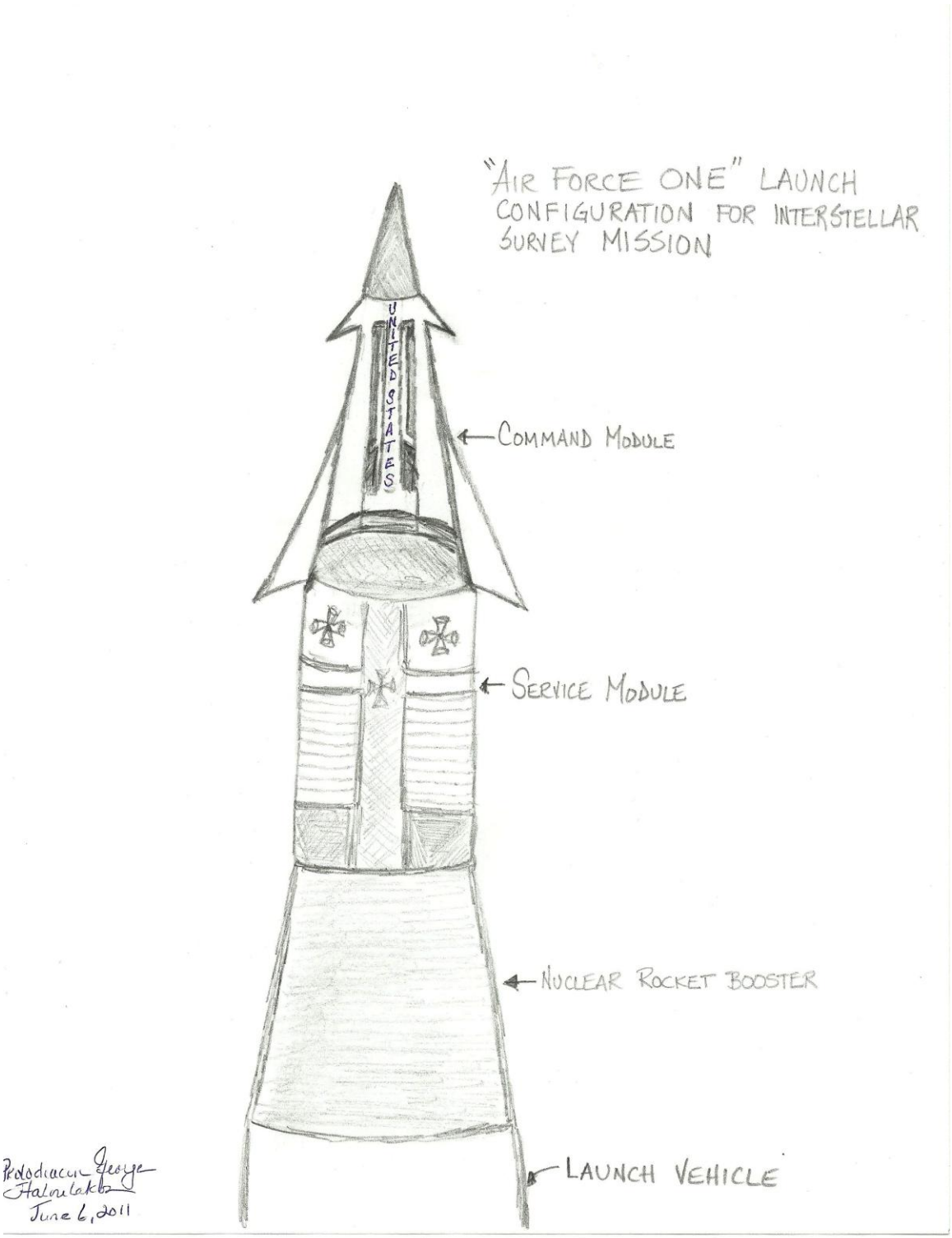
GEMINI 12
"LOST IN SPACE;
NO PLACE TO HIDE"

+Protodeacon George Halaulakos
March 26, 2011



AIR FORCE ONE
"PLANET OF THE APES"

+Protodeacon George Halvadakis
May 17, 2009


"AIR FORCE ONE" LAUNCH CONFIGURATION FOR INTERSTELLAR SURVEY MISSION
UNITED STATES
COMMAND MODULE
SERVICE MODULE
NUCLEAR ROCKET BOOSTER
LAUNCH VEHICLE
Rodriacus George Halmlakka
June 6, 2011