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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

SHOSH YONAY and YUVAL YONAY,

Plaintiffs,

v.

PARAMOUNT PICTURES CORPORATION, a Delaware corporation, and DOES 1-10,

Defendants.

Case No. 2:22-CV-3846-PA-GJS

EXPERT REPORT OF ANDREW CRAIG

I. INTRODUCTION

Paramount Pictures Corporation's counsel at O'Melveny & Myers LLP asked me to opine whether the article "Top Guns" by Ehud Yonay (the "Article") about the United States Navy's Fighter Weapons School, also known as TOPGUN, is accurate and factually correct.

This report is based on the information now known to me. I reserve the right to supplement this report or revise my opinions if new or additional information becomes available.

II. COMPENSATION

I am being compensated for my work at the rate of $500.00 USD per hour. My compensation is not tied to my opinions or the outcome in this case.

III. PROFESSIONAL BACKGROUND AND NAVAL AVIATION EXPERIENCE[1]

A. Education and Early Professional Background

I was born in Marion, Ohio in 1979. I grew up in a rural setting, where my father owned a machine shop and my mother was a high school teacher. In 1986, when I was six years old, the original *Top Gun* movie came out. It was rated PG-13, so I didn't get to see it in theaters, but when it came out on VHS tape, my mother let me watch it. I was about seven years old then, and from that moment, becoming a Navy fighter pilot and attending TOPGUN was what every single fiber of my being was focused on. In my sophomore year of high school, I spoke to both Navy and Air Force recruiters about becoming a fighter pilot. When the Navy recruiter told me that "anyone can land on 3 miles of concrete runway; it takes talent to land a fighter jet in a 50-foot by 120-foot area that's moving," it confirmed that the Navy (and not the Air Force) was for me.

I applied and was accepted to the United States Naval Academy in Annapolis, Maryland as a member of the class of 2002. I graduated with a B.S. in Mechanical Engineering, with a specialization in gas turbine engines. I was also the captain of the Naval Academy's golf team and a four-year letter winner.

After graduating from the Naval Academy in Annapolis, my career as a naval aviator began with Aviation Preflight Indoctrination ("API") in Pensacola, Florida. API taught and tested basic aviation principles—such as gravity, lift, thrust, and drag—on the ground in a classroom setting. It was also where I and the other aspiring aviators fulfilled the pre-requisites to fly our first Navy aircraft, including jungle/desert survival training, first aid, and survival swimming. In API, we were issued our first flight suit, boots, and helmet.

In 2003, after completing API, the Navy transferred me to Corpus Christi, Texas, where I was assigned to Primary Flight Training as a part of Fixed Wing Training Squadron TWENTY SEVEN ("VT-27"). There, I learned to fly the T-34, a low-wing, turboprop aircraft.

[1] A copy of my curriculum vitae is attached at **Appendix A**.

T-34C Turbo Mentor

My time flying the T-34 at VT-27 was one of the most stressful of my aviation career. I knew that at the end of 9 to 12 months of training, students would be assigned to one of three specialized categories: jets, props (i.e., propeller planes), or helicopters. If I wanted to fulfill my dream of becoming a fighter pilot, I had to get jets. There was no way around it. Unsurprisingly, jets was by far the most competitive category. In a class of 30 to 35 students, there were typically only one or two spots available. Finishing at the top of my class was the only option. I studied hard and rehearsed every mission for a year. Those efforts paid off when I ended up as the top student and secured my spot in jets.

In 2004, I moved to Meridian, Mississippi for intermediate and advanced jet training. At that time, the Navy was going through a transition period. In years prior, naval aviators would fly the T-2 Buckeye during intermediate jet training and then shift to the A-4 Skyhawk for advanced jet training. With the A-4 aging and budgets tight, the Navy wanted to use a single aircraft for all jet training. Therefore, it combined intermediate and advanced training into one "total syllabus" utilizing the T-45 Goshawk. When I arrived in Meridian, however, all the A-4's had been recently retired and there were not enough T-45 Goshawks to support all the students. So, for my intermediate training, I had the honor of being a member of the last T-2 Buckeye class, as part of Fixed Wing Training Squadron SEVEN (VT-7).

T-2C Buckeye

T-45 Goshawk

After completing intermediate training in the T-2 Buckeye, I moved down the hall to Fixed Wing Training Squadron NINE ("VT-9") for advanced jet training in the T-45 Goshawk. While with VT-9, I completed my first carrier landings on board the USS *Harry S. Truman*. Much like the ability to select jets at the end of Primary Flight Training, the reward for finishing first in jet training was the opportunity to select your preferred aircraft in the Navy's Fleet along with a Fleet Replacement Squadron ("FRS"). Once again, I finished at the top of my class, and I selected the FA-18C in Virginia Beach, Virginia. That wasn't my original preference, though. My initial dream had been to fly the F-14 Tomcat, but unfortunately the Navy stopped accepting students for the F-14 FRS one class before mine due to the Tomcat's impending retirement.

In 2005, I arrived in Virginia Beach at Strike Fighter Squadron ONE ZERO SIX ("VFA-106") for FA-18C training. I spent nine months learning to fly the FA-18C, including formation flying, dropping bombs, air-to-air intercepts (i.e., finding, tracking, and engaging another aircraft with radar and other combat systems beyond visual range), and Basic Fighter Maneuvers ("BFM") (i.e., close in, visual combat commonly referred to as dogfighting).

FA-18C Hornet

I finished as a "Priority A" student. Priority A meant that my ability to fly the aircraft (and, most importantly, land on the ship) was well above average, and, as a result, I could either be sent to a Fleet squadron on cruise or Forward Deployed Naval Forces ("FDNF") in Japan for my first flying outside the comforts of a training environment. After all, the last thing a deployed Fleet squadron or a forward deployed squadron in Japan needed was someone who couldn't be trusted to land on the ship. Students that did not finish Priority A were assigned to squadrons stateside so they could practice more before deploying. This time, the choice belonged to the Navy, and it sent me to FDNF.

My first Fleet squadron was the Golden Dragons of Strike Fighter Squadron ONE NINE TWO ("VFA-192") in Atsugi, Japan. For 24 of the 36 months of my tour with VFA-192, I was deployed aboard an aircraft carrier. I spent 2006 and 2007 flying missions off the USS *Kitty Hawk*, and 2008 flying off the USS *George Washington*. During that time, I qualified as a Combat Division Lead (capable of leading four airplanes into combat) and as a Landing Signals Officer (facilitating the safe return of naval aircraft aboard carriers).

While in Japan, I was also selected to attend the United States Navy Strike Fighter Tactics Instructor program – more commonly known as TOPGUN. TOPGUN is the Navy's graduate level fighter pilot training program. When I was selected to attend TOPGUN, I was also chosen to stay on staff as an instructor. The selection process required that I return stateside to conduct a "rush ride" with the TOPGUN BFM Subject Matter Expert (SME) in Fallon, Nevada. This exercise, along with attending various TOPGUN social functions would determine my fit for the TOPGUN staff. Additionally, every TOPGUN graduate I had ever flown with had to submit letters of recommendation highlighting my experience and vouching for me.

B. TOPGUN Training and Work as an Instructor

I arrived in Fallon in February 2009 and went through the TOPGUN training course as a student in April of that year. I completed the four phases of TOPGUN: (1) BFM (dogfighting), (2) Air-to-Surface (dropping bombs), (3) Section (two aircraft vs multiple air-to-air adversaries), and (4) Division (four aircraft vs multiple air-to-air adversaries). I finished first in my TOPGUN class and was selected to lead the Graduation Strike. The Graduation Strike is TOPGUN's culminating event, where the students plan, brief, execute, and debrief a mission against the instructors, who act as adversaries.

After graduating, from May 2009 to May 2012, I served on the TOPGUN staff as an instructor pilot ("TOPGUN IP"). In that role, I performed a number of functions. I was the Air-to-Air Mission Planning SME, who is responsible for taking all mission planning factors for an air-to-air fight and creating a gameplan that pits US Navy aircraft strengths against enemy aircraft weaknesses. I also served as the Standardization Officer, with responsibility for standardizing instruction across the TOPGUN program. The Standardization Officer is one of the two highest positions, along with the Training Officer, that first-tour instructors can hold on staff. As a TOPGUN IP, I held three simultaneous Naval Air Training and Operating Procedures

Standardization ("NATOPS")[2] aircraft qualifications: FA-18A-D, FA-18E/F, and F-16A. I was also qualified to teach all four phases of TOPGUN.

FA-18F Super Hornet

F-16A Viper

C. Subsequent Naval Aviation Experience

In May 2012, I left TOPGUN for Lemoore, California to be the Training Officer of Strike Fighter Squadron ONE ONE THREE ("VFA-113"). There, I flew FA-18C Hornets off the USS *Carl Vinson* and was responsible for training 16 squadron pilots for an upcoming 10-month deployment to the North Arabian Sea, where they would perform operations over Syria. During the 18-month workup cycle for the deployment, my Carrier Airgroup Commander, the officer in charge of all aircraft aboard an aircraft carrier, chose me to be the fighter package lead (i.e., the aviator responsible for protecting the striker aircraft) 13 times. Not once during my time as lead in our simulations was a striker aircraft shot down—a record I am still proud of today.

[2] The NATOPS manual standardizes general flight and operating procedures for Navy aircraft.

In May 2014, I decided to transition out of active duty and into the Navy Reserves as a Selected Reservist ("SELRES"). A SELRES is a military member that works part-time for the Navy. In 2014, I became a contractor for 2 Circle Consulting, Inc., where I worked closely with TOPGUN as a civilian. I moved back to Fallon, my home to this day. And I joined Composite Fighter Squadron THIRTEEN ("VFC-13") and flew the F-5 Tiger II—the same aircraft flown by the TOPGUN instructors mentioned in the Article.

F-5N Tiger II

From 2014 to 2020, I flew countless missions as an aggressor[3] for TOPGUN instructors and students as part of TOPGUN Instructor Under Training (IUT) and the TOPGUN course. I served as the Executive Officer ("XO") of VFC-13 from 2018 to 2019 and the Commanding Officer ("CO") from 2019 to 2020. The XO is the second-in-command of a squadron and is responsible for being a sounding board for the CO as well as maintaining good order and discipline within the squadron. The squadron CO is responsible for every aspect of the squadron including caring for aircraft, personnel and support equipment. VFC-13 is one of only four Navy fighter squadrons where a SELRES can be selected as the CO. During my time as CO, VFC-13 won the Golden Wrench, Safety S, Blue M and Battle E—all four major awards that an adversary squadron can win.

In May 2020, I was assigned to the Naval Aviation Warfighting Development Center ("NAWDC"—TOPGUN's parent command) as the Viper Transition Team Military Lead. In this capacity, I was the military member responsible for the successful acquisition of 26 USAF F-16C/D aircraft to replace aging FA-18C and F-5N aircraft.

[3] Aggressor pilots help prepare combat aircrews by providing challenging, realistic threat replication and feedback.

F-16C Fighting Falcon

In January 2022, I was selected as the Navy Reserve's first Commanding Officer of the Virtual Adversary Replication Modeling and Intelligence Translation Team (VARMITT). VARMITT analyzes intelligence collected on threat countries and replicates the behaviors of their pilots during large scale simulation exercises. I continue in this role today.

D. Additional Professional Experience

In my civilian life, I hold an FAA Airline Transport Rating and am a 737NG pilot for Delta Air Lines, flying international and domestic routes. I am also a Senior Warfare Analyst for 2 Circle Consulting Inc., where among other things, I help collect and analyze performance data on Navy fleet aviators in real-world training environments.

Separately, I am the owner/operator of Rolling Horse Ranch, my family's ranching operation in Fallon. I oversee all aspects of the Ranch's beef and hay production, finances, sales, and advertising.

I have not authored any publications in the previous 10 years, nor have I previously served as an expert in litigation.

E. Awards and Commendations

During my time in the Navy, I have been awarded:

- the Meritorious Service Medal (2x)
- the Navy and Marine Corps Commendation Medal (3x)
- the Navy and Marine Corps Achievement Medal (3x)
- the Battle E (3x – VFA-192, VFA-113 and VFC-13)

IV. SUMMARY OF OPINIONS

A. The Article accurately and factually describes the TOPGUN program, including:

- The training that TOPGUN students receive.
- The personalities and characteristics of TOPGUN students and graduates.
- The process of becoming a TOPGUN instructor, as well as the instructors' limited combat experience.
- The camaraderie and close connections that form at TOPGUN
- The social life at TOPGUN.
- The occasional tension between Navy leadership and TOPGUN instructors.

B. The Article accurately and factually describes the experience of flying a fighter jet, certain mechanical components and characteristics of fighter jets, and certain physics concepts that apply to fighter jets.

The documents I considered in rendering my opinions are listed in **Appendix B**.

V. OPINIONS

A. The Article Accurately and Factually Describes the TOPGUN Program.

As discussed above, TOPGUN is the Navy's premier fighter pilot training program. Founded in 1969, TOPGUN was based at Naval Air Station ("NAS") Miramar in San Diego, CA until 1996, when the Navy incorporated the program into the Naval Strike and Air Warfare Center ("NSAWC") and moved it to NAS Fallon in Nevada, where it remains today. Today, Miramar is a Marine Corps installation and the home of the 3rd Marine Aircraft Wing.

The Navy established TOPGUN once it became clear that its training program for fighter pilots was insufficient. Following the Korean War, the Navy's then view on air-to-air combat was that radar-guided missiles fired from beyond visual range would make close-quarters conflict obsolete. Based on this mistaken belief, dogfighting training was essentially eliminated from the Navy's fighter pilot training curriculum in the late 1950s and early 1960s. However, in the Vietnam War, during Operation Rolling Thunder (1965 to 1968) the US's AIM-4, AIM-7, and AIM-9 missiles performed dismally, achieving a less than 10% hit rate in most cases. Moreover, during the first three years of Vietnam, the US's kill ratio (i.e, the number of enemy aircraft shot down for every American aircraft shot down) stood at an unacceptable 2.5:1, a steep decline from 10:1 ratio the US enjoyed in the Korean War. To address this crisis, the Chief of Naval Operations, Admiral Tom Moorer, directed the Naval Air Systems Command to conduct "an in-depth examination of the entire process by which air-to-air missile systems are acquired and employed."[4] In 1968, the Navy published the Air-to-Air Missile System Capability Review, more commonly known as the Ault Report. Among its recommendations, the Ault Report

[4] *See* Report of the Air-to-Air Missile System Capability Review, Naval History and Heritage Command, https://www.history.navy.mil/content/dam/nhhc/research/histories/naval-aviation/aultreport/sections1-4.pdf.

advised the establishment of an "Advanced Fighter Weapons School" to revive the US's air-to-air combat expertise.[5] That school became TOPGUN.

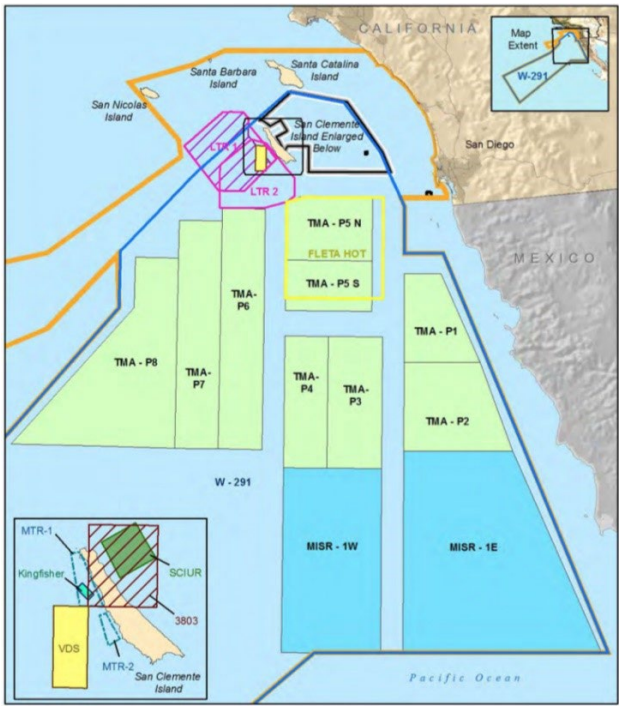
I have read the Article, and my opinion is that it factually describes the TOPGUN program as it existed in 1983 and, in many respects, as it still exists today. For example, the Article accurately describes various aspects of the physical setting around TOPGUN at the time. For instance, the red "WELCOME TO FIGHTERTOWN U.S.A." stenciled sign at the end of the runway was real, as confirmed to me by many naval aviators who were at NAS Miramar in the 1980s. Those aviators explained that, just prior to the filming of the original *Top Gun*, the sign was moved from the side of the Miramar gun butt to the top of Hangar 1 (TOPGUN's dedicated space at NAS Miramar) and altered to read "FIGHTERTOWN USA" in black letters. I have also seen historical photographs of the "WELCOME TO FIGHTERTOWN U.S.A." sign.

Another example is the Article's reference to the station's Officers Club. Just as it was in 1983, today the Officers Club at MCAS Miramar is decorated with cruise plaques, although some of the TOPGUN specific memorabilia has been moved with the TOPGUN program to NAS Fallon. The Officers Club at MCAS Miramar as well as that at NAS Fallon have bells that are used to enforce the Club's rules. These bells are very common at Navy Officers Clubs throughout the country and world. Prior to 9/11, the Officers Club was open to civilians, with no need for a military escort. This meant that, consistent with the Article's description, TOPGUN pilots could drink and socialize with women in a lively atmosphere. Precisely as the Article suggests, after the formal debrief of a training exercise has concluded, instructors and students will often head to the Officers Club for a beer and a more informal debrief. The relaxed setting of the Officers Club breaks down formal barriers and allows the instructors to better relate to the students.

The Article also mentions that the walls of the staircase in the TOPGUN hangar are adorned with stenciled MiGs, each one representing a MiG kill achieved by a program graduate. Those stenciled aircraft are still present in Hangar 1 at MCAS Miramar. This tradition continues to this day in Fallon. Although the building currently housing the TOPGUN program does not contain a staircase, the Navy has erected a wall of glass bricks between the Fleet Training Building (where TOPGUN exists) and Hangar 5, where the jets are parked. Each brick is etched with the name of the graduate who achieved the kill, the date of the kill, and a silhouette of the downed aircraft. The most recent addition to the wall came courtesy of Lieutenant Commander Mike "MOB" Tremel, who served with me as a TOPGUN instructor in 2011 and 2012. In June 2017, Tremel, piloting an FA-18E, shot down a Syrian Su-22 Fitter over Syrian territory as it attempted to bomb coalition troops.

The Article references TOPGUN pilots flying out of NAS Miramar down past the Mexican border, into what air traffic controllers call a "Warning Area." Military aviators call the areas off southern California "Papa Areas." The exact Warning Areas referenced in the Article existed in 1983 and are still actively used by Navy fighter aircrews today.

[5] *Id.* at 37.



Current military airspace called "Whiskey-291" or the "Papa Areas" in the SOCAL operating area.

When dogfighting in a training environment, pilots are required per Navy training rules to set a hard deck (i.e., an altitude limit) at 5,000 feet above the ground. During other mission sets (such as low level training) flight will take place at extremely low elevations and through mountainous terrain in order to mitigate the threat of enemy surface to air missile systems. Due to the fact that the ground at Fallon, where TOPGUN is now located, is 4,000 feet above mean sea level (MSL), the hard deck has to be set at a minimum of 9,000 feet MSL. This extra altitude takes away from the realism of combat training, so TOPGUN instead does two-week Basic Fight Maneuvers ("BFM") detachments to places that have overwater training ranges, to better reflect actual combat settings. In the words of the Article: "You fight like you train, so you'd better train like you're going to fight." One of the main locations for BFM detachments is still Miramar, CA. The others are New Orleans, Key West, Virginia Beach, and Lemoore.

The Article also introduces readers to Lieutenants Alex Hnarakis and Dave Cully, two TOPGUN trainees known by their respective call signs, "Yogi" and "Possum." Within the Naval aviation community, it is very common for fighter pilots to refer to each other using their call signs. Both men are real people who attended and graduated from the TOPGUN program. Like the other TOPGUN graduates (including myself), their pictures still hang on the wall in the TOPGUN schoolhouse in Fallon.

Class 02-83 with Lieutenants Hnarakis and Cully (circled in red). This picture hangs in the Fleet Training Building in Fallon.

Hnarakis and Cully attended class 02-83 (i.e., the second class of 1983), which is consistent with the May 1983 date of the Article. Hnarakis and Cully's squadron, Fighter Squadron ONE ("VF-1") Wolfpack, is a real US Navy Fighter Squadron. According to the US Navy Archives, it was established on October 14, 1972 and disestablished on September 30, 1993. The squadron is famous inside the fighter community for its logo of a wolf sticking its tongue out. Squadron members were famous for wearing that logo on the side of their helmets.

The Famous VF-1 Logo

The Article goes on to note that the VF-1 Wolfpack was one of only two contenders for the Clifton Award. The Clifton Award is a real award that recognizes meritorious achievement by a fighter squadron while deployed aboard an aircraft carrier. As noted in the Navy Archives, the award is named after Rear Admiral Joseph C. Clifton and was first presented in 1968.

Even the secondary individuals discussed in the Article are known in the TOPGUN community. Take, for example, Randy "Duke" Cunningham—a former graduate and one of the most polarizing figures in the history of the program. Cunningham and his Radar Intercept Officer,[6] Willy Driscoll—also referenced in the Article—were chosen to attend one of the first TOPGUN classes as representatives of VF-96 in the early 1970s. In 1971, they returned to the USS *Constellation* on Yankee Station in the Tonkin Gulf, off the coast of Vietnam. Between January and May of 1972, Cunningham and Driscoll shot down five Vietnamese MiGs, including three on a single mission. As the Article notes, the Navy's kill ratio in Vietnam was abysmal prior to 1972. Cunningham and Driscoll's success (along with other crews that recently graduated from the program) proved that the resources invested into TOPGUN produced significant return. After the Vietnam War, Cunningham came back to NAS Miramar as a TOPGUN Instructor. In 1990, he was elected to Congress.[7] Later, he was convicted of tax evasion and conspiracy. He was sentenced to prison but was eventually pardoned by President Trump in January 2021.[8] To this day, he serves as a cautionary tale for TOPGUN graduates. Every class, during the final lecture given to students before they leave the program, the TOPGUN Commanding Officer recalls Cunningham's rise and fall. The CO explains how the Navy formed TOPGUN to train the best fighter pilots in the world, and how that means nothing if its graduates lack integrity and bring discredit to the program. For his part, Willy Driscoll still speaks to every class of graduates about his and Cunningham's missions together, but he avoids any discussion of his former partner's post-Navy activities.

B. The Article Accurately and Factually Describes the Training that Occurs at TOPGUN.

As described in the Article, aerial combat training at TOPGUN has always been extremely competitive and rigorous. The modern TOPGUN course consists of four main parts: (1) Basic Fighter Maneuvers (dogfighting), (2) Air-to-Surface (dropping bombs),(3) Section (air-to-air flights with two blue air fighters vs an unknown number of enemy fighters), and (4) Division (air-to-air flights with four blue air fighter vs an unknown number of enemy fighters). The TOPGUN syllabus evolves constantly. Each year, a three-day syllabus review is conducted by all members of the TOPGUN staff. Flights are added, subtracted, and reworked to ensure that every single teaspoon of jet fuel yields the largest training return on investment, taking into account changes in the types of threats the United States faces.

That said, no different than in 1983, dogfighting plays a prominent role in TOPGUN training. This is due in part to the lessons learned during the Vietnam War. As mentioned earlier, in the mid-1960s, the Navy thought dogfighting would become a thing of the past

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[6] Radar Intercept Officers ("RIOs") like Driscoll or Dave Cully were responsible for operating the aircrafts communications and radar systems,and sat directly behind the pilot. The RIO position in the F-14 Tomcat has been replaced by the role of Weapons System Officer in the FA-18A-F Super Hornet flown today.

[7] *Cunningham, Randall (Duke)*, History, Art & Archives of the U.S. House of Representatives, https://history.house.gov/People/Detail/11696.

[8] Executive Grant of Clemency to Randall Harold Cunningham, https://www.justice.gov/file/1358506/download (Jan. 13, 2021).

because the F-4 aircraft described in the Article would be able to fight beyond visual range. The idea was that the F-4 could detect enemy aircraft via radar, launch its AIM-7 Sparrow missiles from a distance, and shoot down a MiG-15/17/19/21 before it could ever get a shot off with its own within-visual-range, heat-seeking missiles. This proved not to be the case. Restrictive rules of engagement, set by leadership in Washington D.C., prevented the F-4 from firing missiles beyond visual range. Instead, the pilot and his radar intercept officer had to visually identify the aircraft they were going to shoot down so as not to mistakenly take out a friendly aircraft, an aircraft from a third-party nation, or worst of all, a civilian airliner.

Of course, in 2023, the Navy has more sophisticated radar and missiles than can hit targets at significant ranges. Thus, the question inevitably becomes how much time should the TOPGUN course spend on dogfighting when it may never happen. The answer is: still a significant amount. Determined not to repeat the mistakes of Vietnam, instructors focus on BFM during the first three weeks of the nine-week program.

The Basic Fighting Maneuvers (aka dog fighting) module at TOPGUN is broken down into Offensive, Defensive and High Aspect subparts. The Offensive BFM flight starts with the student behind the instructor at pre-determined ranges. The goal is for the student to stay behind the instructor and employ valid simulated weapons.[9] When students show up at TOPGUN, they are Lieutenants having just finished their first tour in the Fleet. They feel confident because, as the Article notes, "they have already raced past most fighter pilots their age." The TOPGUN instructors are most likely 12-to-18 months senior to them and are also Lieutenants.

Occasionally, a student comes to TOPGUN with an overly confident attitude. As the first graded flight in the TOPGUN syllabus, Offensive BFM provides the instructor with the opportunity to show the student that the latter has plenty to learn. More often than not, within 20 or 30 seconds of the "fights on" call during the first offensive flight, the instructor will have maneuvered into an attack position and employed simulated weapons against the student. This role reversal occurs despite the fact that both student and instructor are in the exact same aircraft with the exact same capabilities. The only difference is the pilot. The Offensive BFM flight is often the first time that some students realize they are not the "top dog" anymore. Losing so quickly to the instructor leaves TOPGUN students extremely disappointed because they were outmaneuvered and "shot down" or "killed" despite starting with every tactical advantage. Hnarakis' quote in the Article says it all: "In this business, you hate to lose and getting shot is synonymous with losing."

Debriefing sessions in a "classroom style" setting follow training exercises at TOPGUN. Typically, a mass debrief will be held in an auditorium or classroom with all the participants of the flight where large scale errors are pointed out. Afterwards, individual instructors and crews will break into smaller debriefing rooms where they will talk about individual mechanics of each aircraft. Post the Offensive BFM flight, TOPGUN students go back to the debriefing space, the sting of defeat fresh in their minds, to review the flight in painstaking detail. It's a tough pill to

[9] FA-18 aircraft have a "simulation mode" that can be used for training. When simulating the deployment of heat seeking missiles, for example, a 1500 hertz tone will be present in a pilot's headset when the weapon has a good track on the target.

swallow, but the experience opens the door to nine weeks of the most intense learning imaginable.

Next up, Defensive BFM places the TOPGUN instructor behind the student, and the goal is for the student to keep the attacker from employing weapons for as long as possible. For the student, it is generally less memorable than Offensive BFM because, this time, the instructor begins with the positional advantage, and the expectation (and nearly always the result) is they will maintain that advantage throughout the exercise.

Finally, High Aspect training incorporates a neutral start. In the current TOPGUN course, it can involve the instructor and student flying similar aircraft (e.g., F-18 vs F-18 or F-35 vs F-35) or dissimilar aircraft (e.g., F-18 vs F-16 or F-35 vs F-16). The F-16 is the modern version of the 1983 F-5 referenced in the Article. The F-16s flown by TOPGUN instructors in the adversary role are capable of obtaining speeds of 800+ knots indicated airspeed, Mach 2.0+, 70,000 feet MSL, and up to ten times the force of gravity ("G"). Just like the Article's description of Hnarakis and Cully squaring off against instructors flying the F-5, TOPGUN students train against the F-16 to replicate a threat aircraft that is smaller, faster, and in some cases more maneuverable.[10] The High Aspect BFM really brings out the competitive nature of both students and instructors. Who can get the first shot? Who can gain the offensive advantage? Each second of the confrontation will be relived once the participants are back on the ground, with serious bragging rights to the victor. The instructor wins the vast majority of the time, as they have had more "sets and reps" doing BFM and have perfected the craft. By this point, the students are catching up rapidly—although they still have plenty left to learn.

BFM is a thrill, but at TOPGUN, the exercises are also taken very seriously and graded. There is only so much time allotted to achieve the training objectives set for each flight. While the students aren't expected to be perfect, there is an expectation of noticeable improvement from flight to flight. Ultimately, the student must meet the program's bar if they want to graduate and earn the right to wear the TOPGUN patch. Students recognize this. At a cost of approximately $18,000 for a single Super Hornet flight-hour and approximately $35,000 for an F-35 flight-hour, they know there are only so many flights allotted for them to get it right. Accordingly, the pressure on TOPGUN students to meet expectations is immense. It's not uncommon to have one or two of the nine or ten crews in a class fail to complete the course. There are no participation trophies; only excellence is rewarded. Students recognize the value of getting off to a good start in BFM. If a student struggles in the early stages of the program, they will likely struggle the whole way through, and in some cases, not make it to graduation. However, if students put in the effort to make it to the top of the class and stay there, life will be easier. Many students refer to it as the "4th Law of Thermodynamics"—"if the heat is on somebody else, it's not on you."

BFM requires flying at different speeds depending on the situation. Sometimes a dogfight calls for slow speeds. These slow speeds allow an aircraft to fly slower than the adversary and as a result of this speed difference, the slower aircraft ends up behind the faster

[10] At a later stage of the TOPGUN course, during the "section" phase, a student is paired with a section instructor pilot and will perform two versus one maneuvering. Occasionally, students might also find themselves in a dogfight with their wingman and multiple bandits.

aircraft in an advantageous position. Many fighter pilots refer to this as "the race to the wall…first one to get there loses."

Dogfights at TOPGUN can also call for flying at high speeds, sometimes in excess of 500 knots. Those extreme speeds bring crushing G forces, as the Article describes. The F-14 Tomcat flown by Hnarakis and Cully can reach 6.5Gs. The F-18 Super Hornet flown by today's TOPGUN students can reach 7.5Gs and the F-16 flown by TOPGUN instructors can reach as high as 10Gs. The Article correctly explains that these G forces are extremely debilitating causing impaired vision as the blood is pushed out of a pilot's brain and down to his / her lower extremities.

Consistent with the Article's description, TOPGUN has a reputation for being the most intense flight training in the world. With that intensity comes risk. Indeed, one of the risks of extreme G forces is that the pilot blacks out mid-flight. As the blood is pushed out of a pilot's head the of risk of GLOC (G induced Loss of Consciousness) or blacking out increases significantly. As a pilot progresses from normal flight to GLOC, they will first experience tunnel vision where it seems like the pilot is looking through a soda straw. As the G forces continue tunnel vision turns to gray out - commonly referred to ALOC (Almost Loss of Consciousness). In this phase if the pilot does not ease the G forces while in the ALOC they will almost certainly progress on to GLOC. The TOPGUN program strives to push students and their aircraft to the limit—but no further. The idea is to place students in an environment that closely replicates the stress level they may one day face in combat. Of course, that doesn't mean safety isn't a priority. Risk mitigation measures include hard decks, soft decks, and a minimum of a 500-foot safety bubble around each aircraft at all times. Sometimes safely being able to execute the mission is the objective of the training. For instance, some missions are flown at extremely low levels and through mountainous terrain in order to mitigate the threat of enemy surface to air missile systems. While no longer the priority tactic due to the advanced electronic warfare, TOPGUN still trains students to execute low-level ingresses and egresses through mountainous terrain. Specific safety measures like "no lower than X altitude" and "no slower than Y airspeeds," as well as specific mission cross-check times (i.e., maximum time between completing a task inside the cockpit and looking back outside in order to not hit the ground or a wingman) have been developed, and are routinely employed, to keep aircrew safe during low-level training and in combat.

Despite these risk mitigation measures, the slightest mistake or indecision during air combat can be costly or even deadly. In March 2014, the program suffered its first fatal accident when a student's FA-18C Hornet crashed on the Fallon Range Training Complex, approximately 70 miles east of NAS Fallon, during a TOPGUN Section. It was the single darkest day in the history of TOPGUN. After the crash, despite being cleared by the formal Navy accident investigation, instructors took personal responsibility for what happened. They undoubtedly replayed the event on loop in their minds, theorizing about preventative measures they could have taken. The experience was a grave reminder that no matter how skilled a pilot you are, flying fighter jets is one of the most dangerous jobs in the world. Any day could be your last. This risk always has been and always will be a part of TOPGUN and fighter aviation. This risk is something the Navy, the program, and individual instructors and students have accepted as a prerequisite for training the best pilots in the world.

Such training is still a necessity, and a critical part of TOPGUN's mission. History has proven that no amount of advanced technology inserted into a fighter aircraft will replace a well-trained pilot at the controls, and the aim of the TOPGUN program is to provide those skills with the training and knowledge needed to confront any real-world challenge in the air. This was true over the skies of Vietnam, when the superior F-4 Phantom and the AIM-7 Sparrow faced the MiG-21. Despite the F-4 being technologically superior to the MiG-21, the F-4 pilots were poorly trained for close in dogfights while the MiG-21 pilots had trained their whole life for just that scenario. It is also true today. In 2017, during the Navy's Syrian Su-22 FITTER shootdown, then Lieutenant Commander Tremel's first AIM-9X (arguably the most advanced within-visual-range weapon in the world) failed to function as intended. However, Tremel was a TOPGUN instructor, so upon seeing his first missile fail, his program training kicked in. He immediately selected a missile with a different guidance mode, checked the launch parameters, and fired successfully. These kinds of fallback situations are something that TOPGUN instructors and students rehearse time and again during dogfighting simulations. No matter how technologically advanced a fighter aircraft, a skilled fighter pilot at the controls can make all the difference.

C. The Article Accurately and Factually Describes the Personalities and Characteristics of Many TOPGUN Students and Graduates.

As the Article explains, "[j]ust getting [to TOPGUN is] the ultimate break." TOPGUN graduates represent the top 1% of all naval aviators. Prior to 1996, TOPGUN operated on the power projection model (described in the Article) in which top Lieutenants would be pulled from their first fleet squadron, brought to TOPGUN, sent through the training course, and returned to their fleet squadron three to five months later. This was the experience of Hnarakis and Cully described in the Article. In 1996, however, TOPGUN pivoted to the Strike Fighter Tactics Instructor ("SFTI") model. Under this approach, Lieutenants complete their first fleet tour before applying to TOPGUN. After that, there might be follow-on orders to TOPGUN staff, Strike Fighter Weapons School Atlantic ("SFWSL"), Strike Fighter Weapons School Pacific ("SFWSP"), VX-9, or the FRS. Lieutenants complete the TOPGUN course, go to their production tour, then do a follow-on Training Officer tour in a VFA squadron. Eventually, about four or five years post TOPGUN graduation, they return to the normal career path as a Department Head.

Anyone who has had the privilege of attending TOPGUN's closed-door manning meetings can attest to the fact that those chosen to attend the program are recruited and selected based on three criteria: talent, passion, and personality.

Talent is an obvious qualification. An aviator attempting to enroll in the program must be a talented pilot—well above average in the Fleet. Some people are just born with natural capacity to fly fighter aircraft. In my opinion this group consists of less than 2% of TOPGUN applicants. They are shoe-ins for the course and often end up as some of the best instructors in the program. A second group of people are those who have developed their superior skill via practice and experience. The vast majority of applicants fall within this group, according to my estimation. If you don't fall within either group, you won't be selected. Training a person who doesn't possess a threshold level of skill and who has an exceedingly low probability of making it through the program is simply too expensive for the government. The TOPGUN patch comes

with a certain amount of assumed credibility in the air. If an aviator is incapable of living up to that standard, their selection as a student/instructor is a non-starter.

Passion also matters. TOPGUN aviators must be passionate about fighter aviation and winning air wars. Over the course of their career, they will need to spend thousands of hours of unpaid personal time studying the strike fighter craft. Only true passion will keep the fire lit for that long. In my experience, most TOPGUN graduates develop the passion for fighter aviation at a young age—most in elementary school. For example, as the Article explains, Hnarakis "wanted to fly ever since he was twelve." I'm almost 44 years old and for the last 35 years, I have only wanted to do one thing in life: be a fighter pilot. While I once thought my obsession was unique, I was quickly disabused of that notion after exposure to TOPGUN instructors and students, past and present. To a person, they share the same passion, developed early on in life. In fact, I can think of only two or three people—out of the thousands of naval aviators I've come across—who woke up one day at age 18 or 20 and decided they wanted to be a fighter pilot. And I've never met a TOPGUN instructor who falls into that category. The road to an Officer Commission (via the Naval Academy), Reserve Officer Training Corps, or Officer Candidate School almost always starts well before your 18th birthday. In order to start flight school, one must receive a four-year college degree as well as a Commission in the Navy. Flight school itself is usually two years from Aviation Preflight Indoctrination to getting winged. Add an additional year for the FRS and another three years for a first Fleet tour. Thus, by the time students enter the first day of TOPGUN, they have been working at being a fighter pilot in some capacity for over ten years. Once they graduate from the program, they will need to satisfy another five-year commitment to the Navy. Without passion for fighter aviation, the long hours will wear on a person and eventually break them down.

Finally, there's personality, a multifaceted attribute. You may max out the scale on talent and passion, but if you come off as arrogant or unapproachable, you are of limited value to the TOPGUN program. The goal of TOPGUN is not to produce a few "aces of the base." One aviator won't win a large-scale air war for the United States. Instead, TOPGUN aims to produce graduates that are capable of going back to the Fleet and teaching the average aviator how to be a better pilot. To do this, graduates must have a receptive personality. In the Fleet, the newest person in the squadron, fresh from the FRS, should be able to ask TOPGUN graduates questions about anything without feeling like they will hear "that's a dumb question" or "how do you not know that" as the answer.

Of course, having an approachable personality doesn't mean that TOPGUN graduates don't brief, fly, and debrief with swagger. However, in my experience as both a TOPGUN student and instructor, that swagger is a byproduct of the confidence that they must have to succeed. TOPGUN graduates must possess a high degree of confidence in order to operate at the extremely high level expected of them.

One thing that perpetuates the perception that TOPGUN graduates are cocky is the unintended and unwritten "caste system" that exists within naval aviation. Although all naval aviators wear the same wings, there is fairly well-established hierarchy. While informal, the hierarchy somewhat closely tracks the order of preference for selections made in flight school. Generally speaking, helicopter pilots are at the "bottom." The Navy has far more helicopter pilots than any other platform, so the "eliteness" of the trade is just not there. The next step up

are those that fly props or transports. E-2/C-2 pilots generally get the nod over P-3/P-8/C-9/C-40 because they land on the aircraft carrier versus just on long runways. Attack pilots[11] are generally viewed as the next rung up. Then come the fighter pilots. In today's Navy, fighters consist of F-18E/F and F-35C. As the Article mentions, above those, at the top, are the graduates of TOPGUN. Those pilots invited back to staff as instructors stand even higher. Finally, those that have been invited back to TOPGUN staff more than once (like the current TOPGUN Commanding Officer, Commander "Vespa" Stigi, who has returned three times) are Navy legends. Because TOPGUN graduates dominate the upper echelon of the naval aviation "caste system," it's understandable that they would be perceived as maintaining a certain level of swagger and cockiness.

The Article rightly explains that "[g]reat fighter pilots are always thinking ahead of their planes." This comes up in the context of Hnarakis rehearsing killing bogeys in his mind, well before the start of a specific dogfighting exercise. Planning multiple moves ahead of an air-to-air engagement is probably one of the most difficult concepts to grasp as a student at TOPGUN. In dogfights, it is relatively easy to memorize and rehearse one, maybe two moves in advance. But how those moves affect your own energy state as well your adversary's is tough to predict and even harder to teach. Still, this kind of "thinking ahead" is characteristic of elite naval aviators and is a point of emphasis during TOPGUN training.

Another key aspect of a TOPGUN pilot's personality is a willingness to push limits. For example, the Article correctly mentions "thumping"—when one aircraft sneaks up on another and flies past so as to "thump" the unsuspecting aircraft with its jet wash—a common practice in 1983. Back then, it was much easier for pilots to push the envelope and flout the rules because if no one ratted them out, they couldn't be held accountable. Today, with the advent of sophisticated tracking systems and embedded GPS in the aircraft, maneuvers like thumping are no longer feasible without consequences. With the FA-18 and F-35, everything a pilot does is tracked and recorded. If they fly too low or too close to another aircraft, the tracking systems will document it, and they will have to answer to the TOPGUN CO. By contrast, the F-5 and F-16 I flew at TOPGUN circa 2010 did not have these tracking systems. At the risk of outing myself, I can confirm that thumping an unsuspecting fellow instructor happened occasionally. At that time, instructors kept the tomfoolery among themselves. It never trickled down to the students because no instructor wanted to be viewed as unprofessional.

D. The Article Accurately and Factually Describes the Camaraderie and Close Connections that Form at TOPGUN

The Article illustrates the close relationship between pilots and RIOs. That was typical in 1983 and still is the case with two-person crews at TOPGUN. The relationship can depend on the aircraft involved. In each TOPGUN class, there are typically nine or ten crews. Usually one or two are FA-18F crews, which consist of a pilot and Weapons System Officer ("WSO")—the modern equivalent of a RIO. The rest fly the FA-18E or F-35, both of which are single seat aircraft. Such aircraft make up about 75% of the Navy's current fighters, a significant departure

[11] Attack pilots drop bombs. Fighter pilots fight other airplanes. Strike fighter pilots do both.

from the era described in the Article, when two-person crews flying the F-4 Phantom and the F-14 Tomcat were the norm.

When a two-person FA-18F crew goes through the TOPGUN course, they operate as a single entity. They are often together for nearly every waking hour—practicing, studying, and working in sync, consistent with how they are expected to operate their aircraft. Even among the single seat crews, it's entirely normal for pilots to pair up and spend significant time together, both at work and socially. It's like going to the gym. If you have a workout partner that is depending on you to be there at 5:00 AM, you're much more compelled to show up and put in the work. Partners push each other to be better. When going through TOPGUN, students need all the push they can get. The natural result is exactly the kind of close relationship the Article describes.

Relatedly, the Article mentions that how normal it is for pilots and RIOs to spend more time together than with their respective spouses. Unfortunately, this, too, is true. A naval aviator can spend inordinate amounts of time away from their family. A typical workup cycle (i.e., the official Navy training evolutions required for an airwing and aircraft carrier to go on deployment) starts with two-to-three months at home for Maintenance Phase. In the Maintenance Phase, maintainers begin to groom the jets for combat, and aviators begin receiving the personal qualifications that certify them to execute various missions. From there, a squadron will go on a two- or three-week detachment away from their home base for the Air-to-Surface phase of the Strike Fighter Advanced Readiness Program ("SFARP"). Then, they will come home for two or three weeks before detaching away for the Air-to-Air phase of SFARP. With SFARP complete, a squadron will return home for a month or two and then head out to their assigned aircraft carrier for Tailored Ships Training Availability ("TSTA") for six-to-eight weeks. Once TSTA is complete, they will return to their home base for approximately a month, before detaching to NAS Fallon for Airwing Fallon as well as the Integrated Air Defense Course. These two training evolutions take six weeks. Squadrons return to home base for another month or six weeks, and then they leave for Composite Training Unit Exercise and Joint Task Force Exercise, which usually last about six weeks. Upon completion of those exercises, it's about a 50/50 chance that the squadron just continue on to deployment for six-to-nine months or come home for a few weeks before going out on deployment. As soon as an aircraft carrier returns home from a long deployment, the aviators and ships company will either start the process all over again with Maintenance Phase or execute a sustainment exercise and then head back out again for a four- or five-month deployment. As the Navy continues to stand down aircraft carriers and carrier air wings with no reduction in tasking, it becomes a vicious cycle that is extremely hard on families.

Consequently, as the Article explains, when naval aviators are away from their loved ones, their squadron becomes "their home and family, security blanket and confessional circle." The significant time spent apart from spouses and children leads to aviators to rely on each other to fill the void. For instance, the typical birthday celebration might include a family dinner and some cake. Naval aviators, by contrast, make do celebrating with their squadron mates. A member of the squadron may grab a mediocre cake from the local grocery store (or wardroom, if deployed aboard a ship) and place it on the ready room table for all to eat, making sure to recognize that one of their colleagues is now a year older.

Naval aviators, like everyone else, are subject to stressors that can bring them down. This might include difficulty at home with a spouse, financial troubles, or the death of a parent. When these situations arise, it is in everyone's best interest to remedy them as quickly and effectively as possible. The business of fighter aviation is far too dangerous to have someone's mind thinking about things unrelated to flying. This is where the squadron or, in many cases, a pilot/RIO relationship like the one between Hnarakis and Cully becomes indispensable. The absolute trust developed between squadron mates (especially pilot/WSO teams) helps get aviators through these life situations. Despite jokingly harassing each other about the smallest things, aviators often trust and confide in their squadron mates as much as they do in their own spouse. Anytime I talk to another pilot in the squadron about a serious life stressor, I refer to them by their first name and not their call sign. To me, this is a way of demonstrating that I'm there for them as a friend and confidant. I'm not the only one that approaches these difficult situations in this manner, as I've seen and heard other pilots handle difficult situations similarly. When a fighter pilot is deployed aboard an aircraft carrier on the other side of the world, away from their family, and life presents them with difficulties, the only people there to comfort them are the members of the squadron.

With the amount of time squadron mates are together without their families, it's only natural that they form very close bonds that often last a lifetime. Squadron Commanding Officers have the difficult job of balancing work and personal life while trying to maximize the production of their squadron. If they push too hard for too long, they will burn the squadron out before deployment. However, if they don't push hard enough, the squadron will fall short of the Navy's expectations in preparing for deployment. In order to facilitate this bonding between members of the squadron, the CO will task a Junior Officer (JO) with finding a hotel or house away from the base that the squadron members can stay in together in order to wind down and recuperate from the long days of training. The JO is responsible for ensuring appropriate transportation, entertainment, and food. "Admins" that I've personally been a part of include snow skiing in Lake Tahoe, wine tasting in Paso Robles, and fishing in Key West. These events give aviators a chance to extend their bonds in a setting outside of work and are invaluable to a squadron's success.

Throughout the Article, Hnarakis and Cully are referenced by their nicknames or call signs, "Yogi" and "Possum." Of course, call signs are a real thing. Since the earliest days of aviation, pilots have needed a quick way to reference each other in flight and on the ground. Because full names are too long and first names can sometimes be nonunique, call signs were introduced. Call signs grew in popularity as very-high-frequency (and eventually ultra-high-frequency) radio came into use during World War II. Many times, call signs were a play on the pilot's first or last name. For instance, if an aviator's name was Lieutenant Andrew Smart, his call sign might be "Notso" Smart. Lieutenant Melvin Pope might be named "Holy" Pope. Some call signs are chosen in order to remind the named individual about something silly or stupid they did on the ground or in the air. I knew a pilot who once hit a deer in a T-45. From that moment on, his call sign was "Bambi." There was also a pilot who had an unfortunate diarrhea incident in flight and his call sign was "Depends"—a reference to the brand of absorbent, disposable undergarments.

Today, the most common way for a new pilot entering the squadron to get a call sign is through a call sign review board. Normally, the CO of the squadron will determine when the

new aviator has been around long enough to warrant a call sign. The CO will then write the pilots name (for instance "LT Andrew _____ Craig") up on the board. For about a week different members of the squadron will have the opportunity to suggest potential call signs. At the end of the week, the squadron will get together and each call sign will be presented to the squadron along with any applicable explanatory stories. Each squadron member will vote and a call sign will be chosen. Then a patch will be made for that aviator with the new call sign, and they will be a full-fledged member of the squadron. Aviators will have different call signs that come and go in the Training Command and FRS. That being said, it is rare for a pilot to change their call sign once they have obtained one during their first fleet tour.

E. The Article Accurately and Factually Describes Social Life at Top Gun.

The Article references how naval aviators frequent bars—both on deployment as well as at home station—in order to blow off steam. Despite Navy leadership's disapproval, aviators frequenting Officers Clubs or other drinking establishments is ingrained in the culture. Flying Navy fighter jets carries with it a tremendous amount of risk and stress. One can debate whether drinking alcohol is a good way to unwind after a flight and relieve that stress, but there's no arguing that it happens—a lot. After the end of the official debrief, drinks at the Officers Club or another local watering hole provide an opportunity to talk about flights with the other pilots involved. Only other fighter pilots know the exhilaration and stress associated with flying fighter jets. It's almost pointless to discuss it with civilians. Without experiencing it, they just won't understand. Getting together over a drink after a flight is a time-tested way to blow off steam and get the body to start relaxing so a pilot can unplug and get some sleep before waking and doing it all over again the next day.

The Article discusses the mixture of intense competition and close camaraderie that exists between students and instructors at TOPGUN. Almost every single person who flies a fighter jet for the Navy can be classified as having a "Type A" personality. They are ambitious, goal oriented, self-starting, aggressive, competitive, motivated by challenges, and in some cases can be classified as a workaholic. When you combine such 27–30 year olds with fighter jets in the sky and alcohol after the flight, you set the stage for competition and conflict. During the TOPGUN program, students and instructors are constantly in competition with each other. They take $80 million dollar machines onto the training range daily and compete. These aviators all have a deep-seated desire to be the best. As a general matter, the intense competition stays healthy and helps increase everyone's performance in the air.

Sharing in the crucible that is the TOPGUN course also leads to a tight fellowship between the aviators. In my experience, students as well as members of the TOPGUN staff usually get along extremely well. My best friends in life to this day are former TOPGUN students or TOPGUN instructors. The hard work and intense flying make for lifelong friendships.

As part of the social experience, the Article mentions VF-1 Junior Officers purchasing a bell in Singapore to deliver to the WOXOF room at the Miramar Officers Club. This bell would have been used to uphold the laws of the Club: If someone enters covered (i.e., with a hat on) or finds themselves behind the bar, they have to pick up the tab for everyone else's drinks. Every fighter pilot Officers Club I have ever been to (NAS Atsugi Japan, NAS Oceana, NAS Lemoore,

NAS Fallon, I-bar @ North Island, NAS Key West, etc.) has had a bell. Ringing the bell for infractions at an NAS Officers Club was real in World War II and has been the standard ever since. Today, when students finish the TOPGUN course and are staying on staff as instructors, they are "given" a TOPGUN challenge coin. The TOPGUN Training Officer usually tosses the coin behind the bar, forcing the newly minted instructor to go behind the bar to retrieve it. Of course, this act breaks Club protocol, and the new instructor is forced to buy a round of drinks for all the other instructors. With the advent of smart phones, placing a cell phone on the bar has been added to the list of infractions enforced at some NAS Officers Clubs. It is also very common for NAS Officers Clubs to have a pool table, dart board, or shuffleboard table (or any other game) where Naval Aviators can challenge each other.

As described in the Article, port calls are a huge hit with Fleet aviators. A port call is when a Navy ship pulls into a foreign port so that the sailors can get some rest and relaxation ("R&R") and explore the country and immerse themselves in the culture. I have never personally been to Subic Bay in the Philippines (where VF-1 went in the Article), but I have been to Perth, Australia (also described in the Article) for a port call. The R&R, after days of flying and stressful carrier landings, is both welcome and needed. The description of VF-1 and the USS *Ranger* pulling into Perth in the early 1980s is almost a word-for-word description of what happened when we pulled into Fremantle (Perth's port town) Australia in 2006 on the USS *Kitty Hawk*. Much like an "Admin" on a detachment, the squadron CO designates an individual who is responsible for flying off on the COD (Carrier Onboard Delivery) aircraft a day or two prior to the ship pulling in. The price for two extra days of liberty on land is arranging transportation to and from the ship, finding a place for the squadron to stay during the port call, and organizing activities for them to do while in port. The squadron doesn't necessarily stay together the entire time while in port. Much like how Hnarakis went skydiving and Cully rented a car to go sight-seeing, during my visit to Perth, some folks went to the Burswood Casino, others went wine tasting in the Margert River Valley, and another group played golf. Each port call is different and every aviator has different ways of recharging their batteries. There is no doubt R&R is an integral aspect of Navy life when deployed at sea.

F. The Article Accurately and Factually Describes the Experience of Flying a Fighter Jet.

The Article describes a carrier landing as a "controlled crash." This is an accurate description and one used by many naval aviators. In commercial aviation, a good landing is one where the aircraft is descending around 60 feet per minute just prior to touchdown. Any landing with a greater than 240 feet per minute descent rate is considered a hard landing, and the aircraft may have to be inspected for damage. A soft landing is accomplished by reducing the throttles to idle and momentarily increasing the angle of the aircraft's nose relative to the flight path by pulling back on the stick/yoke just prior to touchdown. Pilots refer to this action as "flaring."

Carrier landings are a different beast. A normal rate of descent for a carrier landing is 750 feet per minute—over 12 times that of a good landing for a commercial airliner. When landing a fighter jet on the deck of an aircraft carrier, pilots cannot flare the aircraft. For carrier landings, the jet must be flown at a precise angle of attack[12] so that the tailhook engages the

[12] The angle of attack is where the relative wind hits the mean aerodynamic cord of the wing.

arresting gear wire at the same time the main wheels hit the flight deck. If the angle of attack is too high, the tailhook may grab the wires while the main wheels are above the ground and slam the aircraft down onto the flight deck, causing damage or destroying the jet. If the angle of attack is too low, the aircraft's wheels will hit the flight deck of the carrier, but the tailhook will pass above the wires and not engage to stop the aircraft.

Instead of smoothly reducing the throttles to idle, as one would when landing commercial airliner, a pilot landing on an aircraft carrier must advance the throttles to military power[13] as they feel the wheels of the aircraft touch down. This way, if the tailhook misses engaging the wires, the aircraft can take off again and come back around for another landing attempt. The deceleration rate of a normal airliner is somewhere between five to eight knots per second. By contrast, the deceleration rate of a fighter jet landing on an aircraft carrier is just shy of 100 knots per second.

An FA-18 landing on an aircraft carrier at the correct angle. The tailhook (circled) and the two main mount wheels will hit the flight deck at the same time.

[13] Military power is full power from the engine but without use of the afterburner.

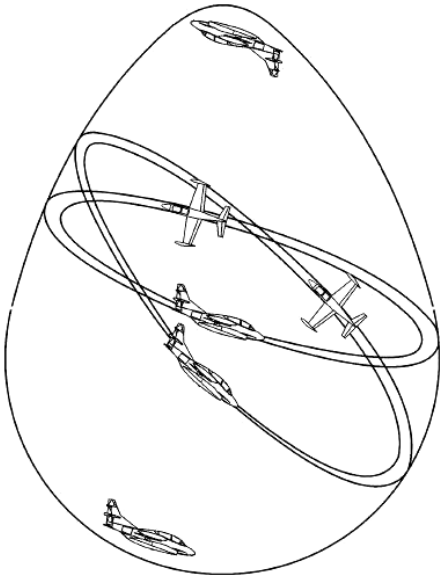
As mentioned earlier, TOPGUN usually detaches to an overwater location for BFM phase. One of the negatives of fighting over the ocean is the sensation, described in the Article, of operating in a "blue dome." Sometimes, on cloudless days, the color of the sky and the color of the sea are exactly the same. This lack of horizon has caused fatal accidents in which pilots have flown their aircraft into the water thinking they were pointed into the sky. Sometime after 1983, the Navy promulgated a "defined horizon" rule to mitigate this risk in air combat training. The rule states aircrew must have "5 miles visibility with a defined horizon, 2,000 feet vertically and 1 mile horizontally from all clouds."

As the Article explains, turning at high speeds in a fighter jet can produce extremely high G forces. In some cases, if pilots do not execute the proper anti-G straining maneuver ("AGSM") or relax the G force on the aircraft, they can suffer from G-induced loss of consciousness, known as G-LOC. G-LOC is almost certainly fatal for single-seat fighter pilots because no one else is in the aircraft to assist. Recognizing drastic consequences of G-LOC, the Navy sends fighter aircrew to the centrifuge in Lemoore, California or to Holloman Air Force Base in New Mexico to experience intense G loads while in a "safe" training environment. The only real way to overcome the debilitation is through proper AGSM and spending enough hours pulling Gs such that the sensation feels familiar and the body gets used to it. TOPGUN instructors pride themselves on being able to carry on a normal conversation over the radio while pulling upwards of 7Gs. They do so out of necessity: During dogfighting training, instructors must simultaneously fly their aircraft and talk a student through the relevant maneuvers—an extremely challenging task.

In its description of the F-14, the Article correctly explains that the aircraft's wings "can sweep back for fast flying or open to the sides like an eagle's for landing or just 'loitering.'" Aircraft designers began experimenting with swept wings as early as the mid-1930s. Up until that point, all aircraft had straight wings, which are defined by having the airflow pass perpendicular over the leading edge and trailing edge of the wing. The benefits of a straight wing design are slow landing speeds and increased stability. The negative of straight wings is that they limit how fast an aircraft can travel. Supersonic airflow over a straight wing causes a significant drag wave and prevents the aircraft from going faster all while using more fuel due to the increased induced drag. Engineers found that a swept-wing design delayed the onset of this drag wave, allowing the aircraft to go faster over the ground prior to reaching transonic speeds. The more sweep a wing has, the more the drag wave is delayed. However, there are tradeoffs, namely that swept-wing aircraft have higher approach speeds for landing, a problem when your landing target is an aircraft carrier. The engineers designing the F-14 Tomcat found a way to have the best of both worlds: a variable swept wing, which could change sweep from as low as 20 degrees to as high as 68 degrees. This versatility allowed the F-14 to act as a supersonic air-to-air interceptor while its wings were in the swept position, but also allowed it to more easily land on a carrier while its wings were in a straight position.

The Article also describes a maneuver known as the "vertical egg." The vertical egg is not so much a specific maneuver as it is a physics concept still taught by TOPGUN today. When an aircraft is performing a vertical loop, the flight path across the bottom of the loop is longer than at the top of the loop. This is because when the aircraft goes across the top of the loop, it is being assisted by gravity and is able to turn faster/tighter due to this assist. When an aircraft goes across the bottom of the loop, it is hindered by gravity and is unable to turn as fast or as

tight due to gravity opposing it. If a loop were done with smoke coming out of the exhaust of the aircraft, the shape drawn in the sky would closely resemble an egg having a bigger base and a smaller top.[14]

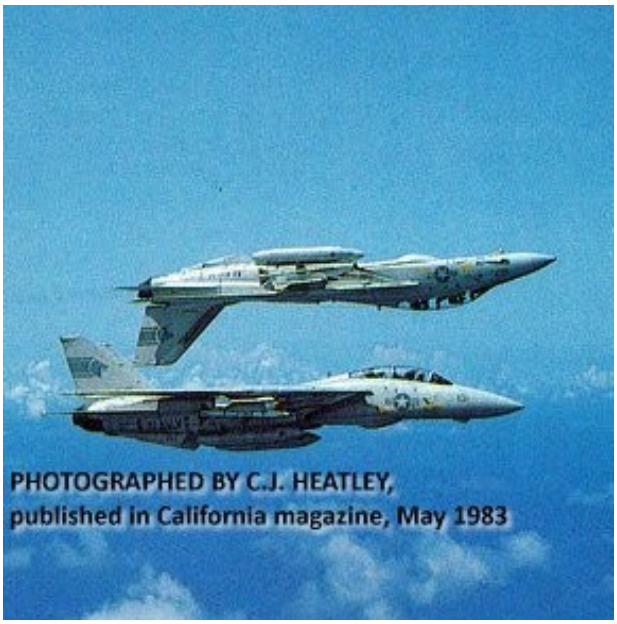


The "vertical egg"

The Article also references a situation where, after realizing a bogey fired a heatseeking missile at him, Yogi "break[s] hard –pull[s] away fast—to foul up the missile's tracking system … and head[s] up in a 7.5-G climb." This maximum performance pull at the last second while dispensing flares to decoy the missile seeker is an actual maneuver still taught and used today by TOPGUN (and other) pilots.

On the topic of maneuvers, the Article also features a "back-to-back" picture taken by C.J. Heatley. It is an actual picture of two F-14's flying formation.

[14] I understand that plaintiffs have alleged that *Top Gun: Maverick* includes a scene in which a "vertical egg" maneuver is performed. Putting aside that there is no "vertical egg" maneuver, I have reviewed the film, and did not see any scene depicting vertical loops where exhaust smoke created a shape resembling an egg.



While it is possible for one aircraft to fly upside down while the other aircraft flies right side up just below, the picture published in the Article is actually a bit of an optical illusion. Although it looks like the aircraft are flying directly on top of each other, the inverted F-14 is actually slightly farther away from the camera than the F-14 that is right side up. This is done for safety reasons. It is also much easier for the pilot flying the inverted aircraft to fly formation on the other aircraft when they are looking slightly off to the side than directly straight up at the aircraft. The Blue Angels— the Navy flight demonstration squadron—fly (and have flown for years) a maneuver called the "double farvel" that is very similar to the picture in the Article. While thrilling to airshow crowds, the slight bit of offset between aircraft creates just enough margin for the maneuver to be repeated safely.

Blue Angels performing the "double farvel"

G. The Article Accurately and Factual Describes Certain Mechanical Components of Fighter Jets.

The Article accurately references the F-14's afterburner being an incredibly powerful part of the aircraft. The afterburner was incorporated into the first jet engine in 1941. It is basically an additional section bolted on to the back of the engine behind the traditional exhaust section of a non-afterburning engine. The goal of an afterburner is to instantly increase the thrust of an engine. It was originally developed in order to achieve supersonic flight but can be used anytime maximum power is required. The General Electric F110 engine found in the F-14B/D Tomcat can produce 16,333 pounds of thrust at military power. At maximum power with the afterburner, it is capable of producing 29,950 pounds of thrust, nearly an 85% increase. Naturally, this increase in thrust comes at a massive cost in the form of fuel. At military power, a GE-F110 engine can use up to 8,000 lbs of fuel per hour. At maximum power with full afterburner engaged, that same engine can use up to 80,000 lbs of fuel per hour.

The Article correctly notes that the TF-30 engines in the F-14A were extremely stall prone. The slow speeds occasionally required for dogfighting produced extremely high angles of attack. Together, they limited the amount of airflow that went down the intake of the engine. The F-4 Phantom and F-14 Tomcat referenced in the Article (especially the Tomcats with TF-30 engines) were extremely susceptible to stalling at high angles of attack. Stalling is also a risk when talking about any type of sideslip coupled with throttle movements. Sideslip is where the aircraft is flying somewhat sideways through the air. Sideslip is usually introduced to an aircraft by a pilot stepping on the rudders. It is well known among naval aviators that anytime there was simultaneous throttle movement coupled with the fuselage of the aircraft blocking the flow of air down the intake, the F-14 engine was prone to stall. This was extremely problematic when attempting to land the F-14A aboard an aircraft carrier because both lineup and power corrections needed to be made at the same time. Eventually, the Navy dispensed with the TF-30 due to poor reliability and awarded General Electric the contract to develop the GE-F110 in the late 1980s. A variant of the F-110 is still used today in F-15 and F-16 aircraft.

The Article also references the process of enabling the F-5's air-to-air weapons system. This discussion of the weapons system, including the right-hand digital display and the manner in which it is used, is also factually accurate. The F-5 is a very simple airplane to operate, possessing only short-range heat-seeking missiles. The flight characteristics and simplicity of the F-5 are very similar to the MiG-21. This made it the perfect surrogate for the MiG-21 for TOPGUN training.

In a sidebar ("THE AGONY AND THE AGONY"), the Article describes the author looking at the ejection seat in the F-5 aircraft and wanting to practice the steps to eject again just prior to going flying. Everything he writes about the ejection seat is factual. It has two black and yellow handles on the outside of the pilot's thighs that when pulled will initiate the firing of the rocket motors below the seat. The picture on the next page is my son sitting in a retired F-5 ejection seat. The handles he is holding onto are the ones that will fire the rocket motors.

While naval aviators go through extensive survival training, they cannot simulate the physical circumstances they may face just seconds before needing to pull the handle to eject themselves from an aircraft. Due to the extremely high G forces (60+ vertical Gs) generated when the ejection seat fires, pilots never actually practice ejecting due to the wear and tear placed on their bodies. To make up for this lack of training, the Navy has taken a few steps. First, pilots must get a yearly "seat brief" for the aircraft they fly. This seat brief is done with an Aviation Structural Mechanic – Safety Equipment ("AME"). AMEs are enlisted members of the squadron who are responsible for the daily maintenance of the ejection seat. The brief includes the nuts and bolts of how the seat works and requires the pilot to sit in a training ejection seat (without rocket motors) and memorize the steps to eject. Second, every three years Navy pilots have to go through "swim phys." Swim phys is a three-day course where aviators are refreshed on the basics of water survival, first aid, the ejection sequence, and the parachute landing fall. The ejection sequence portion of this training focuses on training a pilot to get their body in the proper position to reduce injury just prior to pulling the ejection handle. The training stresses that the pilot should not delay the decision to eject just because they want to get into the perfect ejection envelope or body position. No matter how perfect your body position is, if the decision to eject is made too late, the chances of a pilot surviving are nearly zero.

H. The Article Accurately and Factually Describes the Process of Becoming a TOPGUN Instructor, as well as the Instructors' Limited Combat Experience.

The Article states that "[i]f [TOPGUN students] play it right and look sharp, they might even get invited back as Top Gun instructors -- which is as high as a fighter pilot can get." This statement is as true today as it was back in 1983, although the selection process for Navy

TOPGUN IPs has changed slightly.[15] Back then, after the student pilots finished the TOPGUN course, the staff extended some of them an invitation to stay on as instructors. During the days of the TOPGUN Power Projection era (pre-1996), Navy students would come directly from their Fleet squadrons to TOPGUN for the course. Once finished, they would normally go back. However, if the TOPGUN staff found a student's performance impressive, they would invite that student to return to the program as an instructor. After the transition from Power Projection to Strike Fighter and Tactics Instructor (SFTI) in 1996, the selection process for Navy TOPGUN instructors changed. Post-1996, students would be chosen as TOPGUN instructors *prior* to going through the TOPGUN course. Students apply to TOPGUN to stay on staff as an instructor or go to one of the other SFTI positions such as Strike Fighter Weapons School Atlantic (SFWSL), Strike Fighter Weapons School Pacific (SFWSP), TEST SQUADRON NINE (VX-9 - a Navy test and evaluation squadron) or the Fleet Replacement Squadrons. If a prospective student wanted to become a TOPGUN instructor, they would have to complete at least one "rush ride." A rush ride is a flight where the prospective TOPGUN instructor briefs, flies and debriefs with a couple current instructors. It is also expected that the prospective instructor will attend TOPGUN social events over the months/years leading up to the selection process to ensure they will be a good fit on staff. I can remember seeing the official Navy orders and getting the phone call from the TOPGUN Training Officer inviting me to the TOPGUN staff like it was yesterday. It was the single greatest day of my Navy career. Everything I had done in the nearly 10 years leading up to that day had finally paid off. I'm sure every TOPGUN instructor could tell you where they were, who they were with and who was on the other end of the phone when they received the news they had been selected as a TOPGUN IP. It's an unforgettable moment.

Separately, the Article explains that at the time Hnarakis and Cully began their TOPGUN training, "only the course chief, Commander Ernie ('Ratchet') Christensen, and one or two instructors could speak with the authority of actual combat experience." It is true that, over the years, the number of TOPGUN instructors that have actual air-to-air combat experience has dwindled. With the possible exception of Desert Storm in 1991, the last major air-to-air campaign this country fought was in Vietnam in the 1960s. The United States has not had to enter a legitimate air campaign in the last 50 years. Many people credit that to the fact that our technology and training (much of it provided by TOPGUN) has been far superior to our adversaries in the air-to-air arena. Currently, no one on the TOPGUN staff has air-to-air combat experience. However, if the Navy sticks with tradition, Commander Michael "MOB" Tremel will likely be asked to come back as the next TOPGUN CO when his time as a Fleet CO comes to an end in 2024. This move would once again bring actual air-to-air combat experience to the program staff. In any event, nearly all TOPGUN instructors have air-to-*surface* combat experience, having fought in places like Syria, Afghanistan, and Iraq.

[15] The Marine Corps Instructors that join TOPGUN staff—there are usually about four or five IPs from the USMC on staff at a time—are selected the same way that they were in 1983.

I. The Article Accurately and Factually Describes the Occasional Tension Between Navy Leadership and TOPGUN.

The Article accurately highlights the history of tension between Navy leadership, who want to impose decorum and discipline on the program, and TOPGUN's instructors, who take a less inflexible approach to their tasks.

Conflict between upper-level leadership and the TOPGUN program tends to occur more in peacetime than in wartime. In wartime, everyone is focused on a common external enemy; in peacetime, there is no external enemy, so pilots naturally look to make one. With the exception of a few early days during Desert Storm, the early days of Afghanistan, and a six-month stretch in 2014 (when President Trump ordered aggressive action over Iraq and Syria), the history of TOPGUN has coincided with the United States operating in peacetime. The Navy did not participate in a single air-to-air engagement between the Gulf War in 1991 and the Syrian Su-22 shootdown in 2017. Since the dawn of the program, TOPGUN instructors have had a reputation for pushing the envelope, both in the air and on the ground. That is still true today. As a result, they can butt heads with leadership. The Article's discussion of conflict in late 1977 when a new leader arrived at TOPGUN is consistent with the tension that can emerge between TOPGUN leadership and the rank and file students and instructors.[16]

One example was in 2011 when the NAWDC Operations Officer, CDR James Kuehl, failed to provide the requisite number of jets for TOPGUN instructors to practice BFM. Instead, he spread the jets equally across all of NAWDC's departments. As punishment, the TOPGUN staff placed a dead fish in the ceiling of his office, allowing it to rot for days. Once TOPGUN was given what the staff believed to be their deserved allocation of jets, the fish was removed (and the resulting stench dissipated).

Another example is the TOPGUN 1v1 Briefing Skit that occurs in the presence of guest Air Force, Marine Corps, and foreign military pilots. During the skit, the TOPGUN instructors dress as different characters and make fun of Navy leadership and pretty much anyone or anything else they view as getting in the way of the program's interests. Every class, there's a good chance the TOPGUN CO may find himself in the NAWDC Admiral's office, apologizing for something one of the instructors said or did during the skit. While Navy leadership's public stance is that everyone must strictly adhere to discipline and decorum, deep down they know the value of a program like TOPGUN that's willing to push limits. One day, the United States may

[16] The Article's reference to Rear Admiral Frederick Fellowes (misspelled as "Fellows" in the Article) is factually accurate. Rear Admiral Fellowes served as the Commander, Fighter Airborne Early Warning Wing Pacific in San Diego, and was known to strictly enforce the rules, which was not popular with TOPGUN students and/or instructors who liked to push the limits. Likewise, as mentioned in the Article, Rear Admiral Paul Gillcrist succeeded Rear Admiral Fellowes as Commander, Fighter Airborne Early Warning Wing Pacific in 1979. Throughout his long and distinguished career, Rear Admiral Gillcrist logged over 6,000 total flight hours, had more than 950 fixed wing aircraft carrier landings, and holds the distinction of being the first Flag Officer to land an F-14 on an aircraft carrier—he was unquestionably a "fighter pilot's pilot."

fight an air war we aren't 100% certain we can win. If that happens, the naval aviators wearing the TOPGUN patches will play a significant role in determining the outcome.

An additional factor contributing to conflict might be the change in perspective someone has as they climb the ranks of the Navy. TOPGUN instructors are always thinking at the tactical level—for example, how to ensure a graduate has all the skills necessary to win a 1v1 BFM engagement against a Chinese J-11. Leadership, by contrast, is tasked with thinking at the strategic level—such as how we get a battle group in position to fight a Chinese J-11, or how we make sure our fighters are sufficiently armed and fueled for the fight. Tactical thinkers tend to blow off strategic thoughts as too abstract, while strategic thinkers just assume that once all the pieces are in place, sound tactics will follow. In my experience, this dynamic can, on occasion, result in TOPGUN instructors and upper-level leadership being at odds with each other.

As the Article suggests, there can also be some intergenerational tension between older TOPGUN pilots and the younger generation of talented aviators. One of the things that makes TOPGUN stand out from most highly successful organizations is its incredible youth and relative inexperience. Of the 30 TOPGUN instructors on staff at any given time, 28 of them are Navy LTs usually between the age of 27 and 32 years old. Those Lieutenants have had flown only three years in a front-line Fleet squadron. The other two instructors are the TOPGUN Executive Officer, usually a 34-to-36-year-old Navy Lieutenant Commander who has flown approximately six years in a front-line Fleet squadron, and the TOPGUN Commanding Officer, a 37-to-40 year-old Navy Commander who typically has nine or ten years of experience flying in a front-line Fleet squadron.

This skew to youth is intentional. When aviators know that they only have three years as a TOPGUN instructor, they give it their all every single day to help ensure they make a difference in that time. There's also value in fresh thinking: Part of what undercut the Navy's success during the first four years of the Vietnam War was old, stale thinking by senior leadership when it came to air combat. It took one senior leader—Captain Frank Ault, who called the Navy out for its failings—and a group of young Navy LTs to establish TOPGUN in order to teach air-to-air combat the proper way. Finally, flying fighter jets is a young person's game. The stress placed on the body while pulling Gs all day, every day is only sustainable for a short while and only when the body is in its prime. A 27-to-32 year old Lieutenant is much more capable of handling those G forces before breaking down than a 40+ year old Captain or Commander.

That said, there are plenty of interactions between current instructors and former TOPGUN graduates, who have since moved on and obtained the rank of Captain, Commander or even higher. More often than not, these interactions are cordial. However, sometimes these interactions reveal deep divides. Former TOPGUN graduates that ascend past the rank of Commander most often find themselves in the Pentagon or in Naval Air Systems Command ("NAVAIR"), working to acquire new technologies that will give the United States an advantage over its adversaries. It's a noble job. However, the utility of those technologies can be a source of tension between those older officers and the TOPGUN instructors.

Going back to Vietnam, the Navy's reliance on the latest technology (e.g., the F-4 Phantom and AIM-7 Sparrow) over elite training was misguided. TOPGUN grew out of this

mistake, the instructors do not forget it. Each time a senior Navy Captain or Commander comes back to TOPGUN to demonstrate the new technology that they believe will revolutionize the way the Navy fights wars, the staff meets their enthusiasm with skepticism. It's not that TOPGUN instructors don't like advances in technology. It's that they want to make sure the technology is tested and ripe before putting it in the hands of Fleet aviators at the front lines of a conflict. Well intentioned Navy leadership at the Pentagon is constantly pushing to get new technology into the hands of the Fleet. However, many times this technology has not been subject to a thorough training plan, or has small "bugs" that prevent it from being employed as designed and intended. Without TOPGUN's prior approval, front-line aviators risk finding themselves in a combat situation without the proper tools to succeed.

Occasionally, Captains and Commanders leverage their experience to argue that they have a deeper understanding of what the Navy needs. This places members of the TOPGUN staff on the defensive and the tension between the two groups escalates. Unfortunately—or perhaps fortunately—since most Captains and Commanders do not fly anymore, the dispute can't be settled in the air. Most of the time, the old guard returns to the Pentagon/NAVAIR after their demonstrations, and TOPGUN stays the course. The program only provides recommendations for front-line aviators to use proven technologies and tactics. That's why the most successful leaders work with TOPGUN throughout the development of technology in order to get their buy in early on.

A specific example of this relationship is drone technology and Artificial Intelligence (AI). Recently, there have been discussions in upper levels of Navy leadership that drone technology and AI can replace fighter pilots. This would render fighter pilots, and as a result the TOPGUN program, obsolete. The Navy first presented a requirement for an unmanned aerial system (UAS) capable of operating from an aircraft carrier in 2006. 17 years later in 2023, the Navy has the MQ-25 Stingray. While many of the specifics of the MQ-25 are classified, it has not yet operationally deployed on an aircraft carrier and its AI is limited. So far, the only missions the MQ-25 has been able to successfully complete is landing and taking off from an aircraft carrier and refueling an FA-18 Super Hornet in uncontested airspace. Despite the shortcomings of a 17 year program Navy leadership loves the concept of drone technology and AI due to the fact that this technology eliminates the need to train pilots which is extremely expensive. Additionally, USN leadership believes that drones will be able to operate around the clock with no stopping due to the physical limitations (nutrition, fatigue, sleep etc.) that a pilot experiences. TOPGUN staff members view drone technology as a positive. However, based on the last 17 years of developing the MQ-25, many TOPGUN staff members believe that it will be a long time (20+ years) before drones and AI can operate in contested skies with the same effectiveness as a well-trained pilot. Differing viewpoints such as these can often cause tension.

Dated: July 7, 2023

By: _____
Andrew Craig

APPENDIX A

Andrew D. Craig

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Air- to- Air Warfare expert, United States Navy Adversary Squadron Commanding Officer, TOPGUN Instructor and NAWDC Adversary

PROFESSIONAL TRAINING / EDUCATION

Strike-Fighter Tactics Instructor (SFTI) Course	U. S. Navy Fighter Weapons School (TOPGUN), 2009
Bachelors of Science - Mechanical Engineering	U. S. Naval Academy, 2002

PROFESSIONAL PROFILE

Core Competencies

- Teaching / Public Speaking
- Briefing and Debriefing
- Modeling and Simulation
- Mission Planning and Execution
- After-action Analysis / Lessons Learned
- Training Program Development
- Tactics, Techniques & Procedures (TTP) Development and Documentation

Certifications / Ratings / Qualifications

- VFC-13 Commanding Officer
- TOPGUN Instructor
- Strike-Fighter Tactics Instructor (SFTI)
- Advanced Tactics Techniques and Procedures (ATTP) Instructor
- Adversary Level 4 Instructor
- Joint Helmet Mounted Cueing System (JHMCS) Instructor
- FA-18 Functional Check Flight (FCF) Pilot

Security Clearances

TOP SECRET // SCI
TOP SECRET // SAR

Subject Matter Expertise

- Air-to-Air Mission Planning
- Integrated Fire Control (IFC)
- AIM-120 & APG-65/73/79 Integration
- Threat Aircraft
- Threat Air-to-Air Missiles
- Strike and Air Warfare (STW / AAW)

EXPERIENCE

Virtual Adversary Replication, Modeling & Intelligence Translation Team (VARMITT)
June 2020 – Present

Position(s): Commanding Officer
Duties / Accomplishments:

- Work with Office of Naval Intelligence (ONI) as well as other Intelligence Community (IC) partners as well as multiple Navy, Air Force, Marine Corps and Army Program Offices to characterize threat capabilities and behaviors in the out year directly affection billions of dollars in acquisition funding.
- Plan, lead and debrief adversary missions in multiple virtual environments such as Virtual Warfare Center, Joint Simulation Environment, Air Defense Strike Group Facility and Integrated Training Facility.

Viper Transition Team June 2020 – January 2021

Position(s): Military Lead
Duties / Accomplishments:

- Responsible for all aspects of United States Navy acquisition of 26 x F-16C/D from the Arizona Air National Guard
- Work closely with Lockheed Martin at the to purchase upgrades for F-16 aircraft making them the most capable adversary fighter jet flown by any service of any Nation

Delta Air Lines April 2017 – Present

Position(s): *737 First Officer / Pilot*

Duties / Accomplishments:

- Responsible for safe and efficient execution of domestic and international flights for Delta Air Lines

2 Circle Consulting Inc. August 2014 – December 2018

Position(s): *Senior Warfare Analyst*

Duties / Accomplishments:

- Support NAVAIR Training Analysis Project team, PMA-265 and PMA -205 to collect and analyze performance data on USN fleet aviators in real world training environments to include Strike Fighter Advanced Readiness Program (SFARP), Airwing Fallon and TOPGUN.
- Utilize performance data to develop training syllabi for FA-18 aircrew Advanced Tactics Techniques and Procedures applying best practices of live, virtual and constructive training methods for the skill set being trained to.
- Provide John's Hopkins University Applied Physics Lab with cutting edge tactical information and guidance in order to develop an aircrew mental state for an advanced air-to-air warfare mission model currently used by multiple government entities.

Composite Fighter Squadron ONE THREE (VFC-13) August 2014– May 2020

Position(s): *Commanding Officer, Standardization Board Member, SELRES Operations Officer, SELRES Safety Officer*

Duties / Accomplishments:

- As Commanding Officer directly responsible for 56 military officers / enlisted and 183 government contractors in the accomplishment of over 3800 flight hours over 4000+ sorties in support of United States Navy aviators preparing to deploy in support of the Global War on Terrorism.
- During tenure as VFC-13 Commanding Officer, VFC-13 was awarded the Battle E for best adversary squadron in USN, Safety S for safest adversary squadron as well as the Golden Wrench for best adversary maintenance squadron.
- Led and instructed adversary missions in support of TOPGUN, Airwing Fallon, SFARP and USN Fleet unit level training on the Fallon Range Training Complex (FRTC) in Fallon NV.
- One of five members of the VFC-13 standardization board responsible for making tactical recommendations to the Commanding Officer ensuring VFC-13 remained the premier adversary squadron in the USN.

Rolling Horse Ranch Owner / Operator August 2014 - Present

Position(s): *Owner / Operator of Hay Production and Beef Cattle Ranch*

Duties / Accomplishments:

- Oversee all aspects of family ranching operation including beef production, hay production, financial management, sales and advertising.

Strike-Fighter Squadron ONE ONE THREE (VFA-113) Training Officer July 2012 – July 2014

Position(s): *Training Officer / F/A-18 Pilot*

Duties / Accomplishments:

- Utilized VFA-113's multi-million dollar flight training budget to complete advanced training for 18 pilots across all F/A-18 mission sets in preparation for a 10-month combat deployment aboard USS CARL VINSON (CVN-70).
- Develop squadron training plan requiring detailed integration of squadron aircraft availability, airspace/bombing range schedules, aircrew training syllabus requirements, aggressor support and countless other competing interests.
- Assist VX-9 in identifying, documenting and correcting software deficiencies in all variants of the F/A-18. Documentation and software correction resulted in aircrew having the highest probability of success during combat missions.

United States Navy Fighter Weapons School (TOPGUN) February 2009 – June 2012

Position(s): *TOPGUN Instructor / Standardization Officer / Air-to-Air Mission Planning SME*

Duties / Accomplishments:

- Instructed graduate-level strike-fighter tactics and weapons employment in the classroom, in the cockpit, and in briefing/debriefing settings during four ten-week TOPGUN courses per year.
- Assisted Boeing software engineers in the early stage development of Integrated Fire Control (IFC) in the F/A-18A-F as well as developed IFC training program for USN fleet aviators.
- Served as the Navy/Marine Corps subject matter expert on Air-to-Air Mission Planning. Worked closely with U.S. intelligence agencies to gather the most up to date information threatening U.S. Navy air operations. Interfaced with the USAF 422 Test and Evaluation Squadron, VX-9, Boeing, and Raytheon to revolutionize USN Air-to-Air employment doctrine resulting in F/A-18 aircrew having the tools to ensure air supremacy is maintained in present and future conflicts.
- Assisted Boeing, Raytheon Missile Systems, Lockheed Martin, and other defense contractor engineers on multiple projects/programs ensuring cutting edge weapons systems developed for the FA-18 and F-35 were able to be utilized effectively on the first day of combat by U.S. Navy aircrew.

Previous Military Assignments June 1998 – January 2009

- Strike-Fighter Squadron ONE NINE TWO (VFA-192) – Assistant Operations Officer, Division Officer
- Strike-Fighter Squadron ONE ZERO SIX (VFA-106) – FA-18C Fleet Replacement Pilot
- Naval Aviation Schools Command – Student Naval Aviator
- U. S. Naval Academy – Golf Team Captain – 4 year letter winner

APPENDIX B

Materials Considered

Cunningham, Randall (Duke), History, Art & Archives of the U.S. House of Representatives, https://history.house.gov/People/Detail/11696.

Executive Grant of Clemency to Randall Harold Cunningham, https://www.justice.gov/file/1358506/download (Jan. 13, 2021).

"Frederick Gale Fellowes, Jr.," Navy History and Heritage Command, https://www.history.navy.mil/research/library/research-guides/modern-biographical-files-ndl/modern-bios-f/fellowes-frederick-gale-jr.html.

"Frederick 'Ted' Gale Fellowes Jr. '52," Dartmouth Alumni Magazine, https://dartmouthalumnimagazine.com/frederick-ted-gale-fellowes-jr-52.

"Lineage for Fighter Squadrons," Naval History and Heritage Command, https://www.history.navy.mil/content/dam/nhhc/research/histories/naval-aviation/insignias/vf-lin.pdf.

"Paul R. Gillcrist, Rear Admiral, USN (Ret.)," The Golden Eagles, https://www.epnaao.com/BIOS_files/REGULARS/Gillcrist-%20Paul%20T.pdf.

"Report of the Air-to-Air Missile System Capability Review," Naval History and Heritage Command, https://www.history.navy.mil/content/dam/nhhc/research/histories/naval-aviation/aultreport/sections1-4.pdf.

Top Gun: Maverick (2022).

Yonay, Eduh. "Top Guns," *California* Magazine (May 1983).

PROOF OF SERVICE

I am over the age of eighteen years and not a party to the within action. I am a resident of or employed in the county where the service described below occurred. My business address is O'Melveny & Myers LLP, 1999 Avenue of the Stars, 8th Floor, Los Angeles, California 90067-6035. I am readily familiar with this firm's practice for collection and processing of correspondence for mailing with the United States Postal Service. In the ordinary course of business, correspondence collected from me would be processed on the same day, with postage thereon fully prepaid and placed for deposit that day with the United States Postal Service. On July 7, 2023, I served **EXPERT REPORT OF ANDREW CRAIG** by putting a true and correct copy thereof in a sealed envelope, with postage fully prepaid, and placing the envelope for collection and mailing today with the United States Postal Service in accordance with the firm's ordinary business practices, addressed as follows:

Marc Toberoff
TOBEROFF & ASSOCIATES, P.C.
23823 Malibu Road, Suite 50-363
Malibu, CA 90265
Telephone: (310) 246-3333

I declare under penalty of perjury under the laws of the State of California that the above is true and correct. Executed on July 7, 2023, at Los Angeles, California.

Matthew Kaiser