

# WHAT FIGHTER PILOTS UNIQUELY SHARE WITH SUBMARINERS

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The sky above and oceans below have a lot more in common than being blue. Despite sharp contrasts in character, they represent operating mediums for remarkably similar forms of high-technology combat.

At first glance, few would even remotely consider the air-to-air and sub-on-sub arenas as having any significant unifying features. Among the many differences between the two, the most obvious is the vast dissimilarity in relative speed of operations. Fighter pilots typically engage at closure rates of 1,000 kts or more. Committal decisions and initial moves occur only minutes, sometimes even seconds, apart. In contrast, the commander and crew of a nuclear attack submarine (SSN) operate at a far slower pace. For them, a speed of 30 kts or more is attained only when making noise is not an operational concern.

In yet another key difference, SSNs typically hunt and engage as singles, whereas the basic fighting unit in aerial combat is a two-ship element of fighters. Four or more four-ship flights will often be committed in major offensive sweeps, and fighting without the support of a wingman is uniformly shunned as an invitation to disaster.

There are also differences in the human demands that figure in the two contrasting combat arenas. Although both entail high task loading, often to a point of mental and even physical saturation, fighter pilots work alone in the cockpit or, at most, with a single weapons officer in the back seat. For their part, SSN commanders take into combat a crew of up to ten officers and 100 or more enlisted men. That, in conjunction with the longer engagement times typically involved, makes for significant dissimilarities in task management, crew coordination, and needed stamina going into a fight.

By the same token, thanks to secure radio, fighter pilots can talk freely among themselves and share tactical information via data link, even in a heavy jamming environment. For them, communication is instantaneous and generally unobstructed. In



contrast, submariners fight an unseen, unheard, and very private fight beneath the ocean's surface, in which contact with anyone in the world above is out of the question.

Furthermore, there is a considerable difference in the relative comprehensiveness of the tactical awareness picture enjoyed by the two combatants. Fighter pilots usually command a rich, if not definitive, visualization of what they are facing going into a fight. SSN

commanders, on the other hand, while not totally blind by any means, tend at best to have a more ambiguous grasp of their situation throughout most of an engagement.

Finally, there is an asymmetry in stakes between the air-to-air and sub-on-sub missions. A fighter pilot who absorbs a surface-to-air or air-to-air missile shot may be lucky enough to have the option of ejecting and saving his life. For the submarine commander, taking a lethal torpedo hit is generally a lose-all proposition. Neither individual typically broods about these possibilities. But an SSN skipper knows at some level that he has more to lose going into a fight.

Yet with all due allowance for these and other differences, there are enough areas of comparability between the air-to-air and sub-on-sub mission areas to suggest that the two classes of high-technology warriors share more of a kinship than either may be prepared to acknowledge. Without exhausting the many examples, they include:

**Operating in a three-dimensional arena.** There is a big difference between maneuvering on a flat plane and in free space. Fighter pilots and submariners both face the complexities of a

third dimension that do not routinely figure in the planning of those who fight in the surface warfare world. In each medium, it is difficult to hide, given the capabilities of sensors on both sides. Both fighters and SSNs

can remain elusive up to a point, the former by terrain masking at ground-hugging altitudes and the latter by exploiting thermoclines and other ocean anomalies and generally operating a quiet



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and stealthy ship. But as a rule, unobstructed line of sight means detectability. The big difference between the two lies in detection range. A modern air intercept radar can acquire a fighter-sized target at a distance of from 50 to 100 nautical miles in the forward sector. Today's attack submarines, in contrast, are now so quiet that one must be in very close proximity to an enemy sub before it can be detected by passive sonar.

Of course, the SSN commander also has the option of using active sonar. However, like initiating a radar search in air-to-air combat, that has the effect of pinpointing the illuminator's location and marking him as hostile. It is the equivalent of someone turning on a flashlight in a dark room full of armed opponents. For that reason, it is advisable only when a firing solution and disengagement option are at hand.

**A high premium on initiative and stealth.** In both air-to-air and undersea combat, the winner will be the one who can enter the fight unobserved, take the first shot with impunity, and disengage at will. Since the SSN, in a manner of speaking, was the original stealth fighter, submariners have known this for years. Only with the advent of low-observable aircraft and extended-range air-to-air missiles has it emerged as the dominant tactical advantage in aerial combat.

**Overlaps in tactics and tactical repertoires.** Likewise in both air-to-air and undersea combat, employment concepts begin with getting the most out of one's platform and weapons against enemy equipment of roughly comparable capability. From there, they progress to dynamic one-on-one maneuvering as the foundation for more complex scenarios. In both air-to-air and undersea combat, the tactics package proceeds from one-on-one to one-on-one-or-more (or one-versus-unknown). Where this point of comparison breaks down is that fighter engagements will usually be many-versus-many—an unlikely scenario in SSN combat.

More to the point, the winning edge in both cases involves an amalgam of good situation awareness going into a fight, plus the ability to analyze and sort quickly, make crisp committal decisions inside the enemy's information processing loop, get off a valid shot, and then reengage from a position of strength or exit the fight to safety. The big difference lies in the way in which the time factor plays in the two cases. In aerial combat, elapsed time from initial vector to weapon impact and disengagement will be minutes at most. In the SSN world, things generally proceed more slowly at first, with the premium going to perseverance and steel nerves. But in both cases, events begin unfolding quickly as the endgame approaches. Also in both cases, the side with the better situation awareness will invariably command the tactical advantage.

**Overlaps in mission character.** There is at least an indirect resemblance between the respective offensive sweep missions in the air-to-air and undersea warfare worlds. In both cases, the classic injunction *lose sight, lose fight* applies, although in air-to-air, "sight" may entail a radar paint, and in undersea warfare it obviously refers to sensor contact. Likewise in both cases, there is a premium on making the most of guile and deception. There are points of comparison as well in the use of passive defenses,

such as decoys, chaff and flares, and other countermeasures. With respect to cueing, there are analogs in the uses of offboard support by airborne radar surveillance platforms like the E-2 and E-3 in the case of the air-to-air fighter pilot and the combination of the P-3, P-8, and antisubmarine warfare destroyer for the attack submariner.

**A clean fight.** In theory, at least, fighter pilots die alone in combat, whereas submarine commanders go with a lot of company. But in both cases, moves and countermoves are distant, impersonal, and antiseptic. And in both cases, the tactical problem is generally couched in terms of the attacker against the opponent's platform, with the priorities typically being to survive first and then win.

**Maximum weapons range is a pivotal consideration.** Likewise in both cases, if the attacker's lethal reach is greater than the defender's, the attacker can control the fight from initial moves to resolution and disengagement. Contrariwise, fighter pilots and SSN commanders can both use angles and speed to negate or defeat an opponent's shot—if they have the requisite performance margin in their own platform.

**Smart last-ditch maneuvers can be a lifesaver when energy and ideas have been exhausted.** By throttling back to idle and releasing flares, fighter pilots can defeat many infrared-guided air-to-air missiles. Similarly, SSN commanders can employ countermeasures or go to all stop to reduce noise and negate an enemy's targeting solution. That said, a world-class guns defense in close aerial combat, or a *Red October*-type last-chance break turn during the crucial endgame of an SSN engagement (the movie depiction of the latter no doubt a considerable exaggeration of real-world SSN maneuvering), depends critically on good situation awareness and timing. Anyone attempting such a tactic had best have a viable disengagement option. Otherwise, he may simply be helping to solve his attacker's problem.

**Fair fights are a losing proposition.** Both fighter pilots and their SSN compatriots will seek to avoid, at all reasonable cost, the sort of close-in engagements that aerial combat pilots have aptly characterized as knife fights in a phone booth. In each case, in the terminal phase in which the opponents are eyeball-to-eyeball (figuratively speaking in the submariner's case) and committed to the fight, it is often very difficult for either side to disengage cleanly. That means a high probability of a kill by the luckier or more aggressive and tactically astute combatant. Accordingly, the preferred game plan in both mediums is to conduct standoff combat, in which stealth and surprise are the pivotal factors. Ideally, the first indication that a fight is on should be an illuminated fire light in the enemy pilot's cockpit—or the sound of an incoming torpedo in the enemy sonarman's headset.

**Knowledge warfare is also key to deciding outcomes.** This applies especially if there are major asymmetries in the opposed weapons at play. An example in air-to-air combat would be a situation in which one side had launch-and-leave radar-guided missiles and the other didn't. Knowing one's own and the enemy's platform and weapons performance parameters and limitations, as well as the tactics and operating proclivities of the other side, is

crucial to success in both mediums.

**The human factor will usually be the swing variable.** The Israeli Air Force's chief of training opined some years ago that "the three most important ingredients in air-to-air combat are aggressiveness, aggressiveness, and aggressiveness." He meant disciplined aggressiveness, to be sure, not the headstrong combativeness of a bull in the ring. But aerial and undersea warfare are closely akin in not being forgiving places for the indecisive. The commander of the German Luftwaffe's fighter arm during World War II, General Adolf Galland, well described an irreducible trait of the winning air warrior as "the spirit of attack born in a brave heart."

This has commonly been taken for granted in the case of the fighter pilot. It has not, however, been a part of the stereotypical image of the submariner. Yet the naval historian Norman Friedman has offered a useful corrective in the latter regard: "When we went to nuclear subs, Admiral Rickover, who ran the program, was an engineer, not really a combat type. To this end, every officer commanding a nuclear ship is a nuclear engineer. But what you really want in a submarine commander is a pirate."

Just as basic flying ability is an insufficient precondition for the successful fighter pilot, so is nuclear engineering training for the SSN commander. Flying skills are but a means of putting fire and steel on target. Likewise for the SSN skipper, the submarine is but an instrument for getting a tactical job done. When all the polite language is pared away, the winning fighter pilot and the winning SSN commander are, at bottom, winning personality types. The airplane and submarine are simply extensions of their competitive instinct and prowess.

To take this point of comparison a step further, the accomplished nuclear engineer is not, by that qualification alone, automatically suited to the tactically demanding hunter-killer mission in undersea warfare. There remains a core element of initiative, aggressiveness, and unswerving commitment to prevailing that is key to success in that mission, without which any SSN commander will suffer an inherent liability going into harm's way.

For the same reason, in an ideal selection approach like that long employed by the Israeli Air Force, fighter pilots are screened first for personality traits deemed most essential for success in air combat, including emotional maturity, calmness under stress, the ability to absorb information quickly, controlled self-confidence, rapid adaptability, and a deeply rooted will to win. Then, and only then, does it become important to determine whether candidates also have the aptitude to fly an airplane. The latter, while important also, is secondary to ultimate mission performance. Almost anyone with basic intelligence and good motor skills can be taught to fly a fighter. A different and more influential consideration enters the equation when it comes to wielding it effectively as an aerial weapons platform. It is that indispensable added fac-



tor made up of instinctive tactical acumen and iron will that largely accounts for the difference between mediocrity and mastery. Likewise in undersea warfare, tactical cunning and boldness in execution will frequently be the deciding

factors in determining an engagement's outcome.

**So what?** If the points etched out above have any validity in principle, what do they mean for the two communities in practice? In years past, fighter pilots and submariners lived in separate worlds with respect to their professional concerns because they operated in arenas with virtually no functional overlap whatever. Adding further to that separation, once the Cold War ended in 1991, the classic high-end challenges for both communities largely went away.

For fighter pilots, those challenges mainly entailed massed offensive sweeps into hostile airspace, with ensuing air battles initiated by head-on radar missile shots from beyond visual range and then devolving into swirling dogfights featuring shorter-range infrared missiles and guns against the enemy's superior numbers. For attack submariners, they were headed by the epic hunter-killer campaign against elusive Soviet nuclear ballistic missile-launching submarines (SSBNs) from the open oceans to the Barents Sea and other rear-area bastions closer to home.

In the early aftermath of the Soviet Union's collapse, with lower-intensity counterinsurgency operations in Iraq and Afghanistan driving their combat involvement throughout most of the 21st century's first decade, fighter pilots in all U.S. services found themselves reduced, by and large, to a supporting role in land warfare. Likewise, the once-dominant focus of the Navy's SSN community on blue-water operations became largely displaced by more littoral combat concerns.

Now, however, with a rising China developing ever more capable aerial and undersea assets aimed at conducting anti-access and area denial operations against U.S. forces in the Western Pacific, and with the recent reemergence of a confrontational Russia also showing resurgent air ambitions and improved capabilities in the undersea domain, our fighter community's rich backlog of experience at planning and training for aerial warfare should have not just renewed but heightened relevance to the emerging world of submarine warfare and vice versa.

Furthermore, the U.S. Navy has lately begun working to realign and redefine its centers of combat excellence across all warfighting domains toward a model long well-exemplified by the Naval Strike and Air Warfare Center at NAS Fallon, Nevada, much in the same way the U.S. Air Force did beginning in the 1990s to bring together all of its combatant communities—including bombers, mobility assets, special operations forces, and its intelligence, space, and cyberspace adjuncts—into its once more narrowly focused Fighter Weapons School at Nellis AFB, Nevada, rendering it today a more all-inclusive Weapons School

with applications across the service's entire combat mission spectrum.

In light of the foregoing, when one considers also that low observability to enemy sensors has become a dominant aspect of platform design in both the aerial and undersea warfare domains, a persuasive case can be made that today's fighter pilots and attack submariners have more in common now than ever before. As the seams between and among U.S. force elements since Operation Desert Storm have steadily given way to an emergent need for more rational force integration and joint employment, there are manifold reasons for combatants of all operational callings in all services to get to know one another's mission responsibilities better. Toward that end, fighter pilots and attack submariners would appear to be almost perfectly poised to set the example.

Of course, some might object that this is a baseless pairing in the end, since much the same can be said for serving officers in *any* combat arm, whether it be fighter aviation, undersea warfare, or, for that matter, infantry, armor, surface naval warfare, and special operations. Up to a point, there is merit in such a view. After all, the warrior ethic is universal and should inhere indivisibly in all military professionals, regardless of their particular mission tasking and core competencies.

Yet to insist on such a leveling rule to a fault would be to ignore a unique tie between fighter pilots and attack submariners that sets them apart from their fellow combatants in other walks of service life. Both are literally at the sharp end of the lance when it comes to contact with the enemy. Both have full control over their tactics development and execution. In each case, their platforms and weapons are direct extensions of themselves.

And their personalities and situation assessments figure centrally in the course and outcome of the fights they win or lose.

In light of that, a studied start by both communities of an eventually open-ended dialogue between reflective fighter pilots and attack submariners aimed at exchanging insights regarding points of force employment where both have practices in common could make for an eye-opening experiment for all concerned. It is a reasonable bet that the overlapping combat repertoires that would be brought to light through such an exchange would be as revealing as they were surprising to most participants on both sides.

To be sure, it would be a reach in the extreme to sug-

gest that just because of the surface similarities between the two modes of combat, fighter pilots and attack submariners would stand to learn much of *direct* applicability to their respective mission sets by talking to one another. Short of that, however, the two communities could benefit enormously from paying closer heed to how each goes about such common processes as prospective commanding officer selection, mission planning, tactics development and validation, coordinated operations among diverse force elements, and integrating technology, tactics, and training. The air-to-air and SSN communities should also have numerous pertinent operational experiences to share with respect to technology application, most notably in the areas of information assimilation and display, combat data prioritization, and task management under stress.

Perhaps the most readily accessible bridge linking the two communities might be their respective vernacular associated with the dynamics of combat engagements. Fighter pilots routinely use terms like high-low split, single-side offset, resolution cell, and so on that relate to team tactics. Similar terms of art in the SSN world would no doubt resonate no less familiarly among fighter pilots.

And for sure, any fighter pilot granted a chance to observe a sub-on-sub training engagement at first hand from an SSN's attack center and then to monitor the debrief in the wardroom afterwards would feel almost instantly at home, since he would have seen it all before in a different medium when it came to the

basics. That was certainly my own most pronounced impression gained from watching simulated undersea combat as a guest aboard USS *Atlanta* (SSN-712) during a four-day prospective commanding officer training deployment in 1996 in

the instrumented undersea range north of Puerto Rico that pitted us in a dozen one-on-one engagements in all against USS *Miami* (SSN-755).

Might the same be said of an SSN commander after a day or more spent flying as a first-hand observer of air combat training with a fleet (or Air Force or Marine Corps) fighter squadron? Whatever the answer, a serious joint effort by both communities to inspire a continuing operator-to-operator dialogue across the divide between the two domains would not only break new ground among America's highest-technology combatants; it could also yield a learning outcome of untold professional value to both.

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**Dr. Ben Lambeth with Navy Captain Dan Cheever following an F-16 sortie they flew together with TOPGUN at NAS Fallon in Aug 2009.**



**Dr. Ben Lambeth with C.O. of the USS *Atlanta*, CDR Kevin Peppe, at dockside in Roosevelt Roads, Puerto Rico in Aug 1996.**