Voiceover: This program is sponsored by the United States Naval Institute.
Voiceover: The following is a production of the Pritzker Military Museum and Library. Bringing citizens and citizen soldiers together through the exploration of military history, topics, and current affairs, this is *Pritzker Military Presents*.
Clarke: Welcome to *Pritzker Military Presents* with Vice Admiral Robert Dunn, United States Navy Retired, and his book *Gear Up, Mishaps Down: The Evolution of Naval Aviation Safety from 1950- 2000*. I'm your host Ken Clarke, and this program is coming to you from the Pritzker Military Museum and Library in downtown Chicago, and it's sponsored by the United States Naval Institute. This program and hundreds more are available on demand at PritzkerMilitary.org. Less than five years after US naval aviation led the victory over imperial Japan, that very organization was in crisis. The navy forces had been drastically reduced, and growing sentiment argued that the new US air force could do anything naval aviation could do. Meanwhile naval aviation mishap rates soared, leading to the loss of hundreds of sailors over thousands of accidents. With these pressures, naval aviation needed to either improve or perish, and it took fifty years to turn this around. Today in war and peace time the navy and marine corps accident rate is at least as good as that of the air force and approaches that of commercial aviation. In his book *Gear Up, Mishaps Down*, Vice Admiral Dunn explains how naval aviation safety was improved through dedicated and professional leadership, a focus on lessons learned from mishaps and near mishaps, a willingness to learn from other enterprises and by better training, maintenance, and supply. Now even with the need to maintain high readiness, naval aviation has never been safer meaning less sailors or aviators that are hurt or killed protecting our freedoms and navy families remain strong. Vice Admiral Robert F. Dunn is a naval aviator who commanded the Blue Diamonds Attack Squadron 146 in combat during the Vietnam War. He also commanded the aircraft carrier USS Saratoga and the Naval Safety Center. His last navy assignment was as deputy chief of naval operations for air warfare. In retirement he served as deputy chairman of the NASA Aerospace Advisory Panel and chairman of a GSA Blue Ribbon Panel to examine non-DOD government aircraft safety. Please join me in welcoming to the Pritzker Military Museum and Library Vice Admiral Robert Dunn. Bob, welcome home.
(Applause)
Dunn: Good evening everybody. Thank you very much for attending, and thanks to the Pritzker Library and Museum for having me. I want to thank also a part of the Pritzker Museum, the Tawani Foundation, for supporting the Naval Historical Foundation over these past many years. And I say that in my position as a former president of the Naval Historical Foundation, and I know how much what the Tawani has done for them means. I want to thank not only those of you who are here but those of you listening. The--and I also appreciate the chance to visit once again my hometown. I think often of my hometown. Lane Tech rowing on the Lincoln Park lagoon, the Cubs, and hopefully they're gonna go again this year. It's all in my genes. But this is not about me; it's about a book I wrote about naval aviation safety, a book with applications far beyond aviation safety. My qualifications to write such a book rest on my long career as a naval officer and naval aviator. Included in that career was a short course at the University of Southern California Safety School, an assignment as a squadron safety officer, and then as commander of the Naval Safety Center in Norfolk, Virginia. My qualifications might even include what happened when I was fourteen or fifteen years old. We, and that is my family and I, were at a place that we had on the river, the river being the Fox River about forty miles north of Chicago near Cary, Illinois. It was in the summer of 1944, and

a power line went across the river at that spot. A little yellow airplane from Glenview Naval Air Station came along and tried to go under the wires. The plane missed and cut the bottom wire, faltered, dipped one wheel into the water, and took off. My father got us out of the water-- my sister and brother and I--and called the power company to let them know where the break was. About five miles downriver meanwhile, five miles downriver, another little yellow airplane actually crashed into the river, and a man and his son went out in a rowboat and rescued the pilot. The next day the Chicago Tribune headlined, "Eagle scout and pilot"--"Eagle scout and father rescue navy pilot." They had gotten the two stories mixed up. That was my first experience with fake news. Fake news is big where I come from these days in Washington DC, and I guess there's a bit of fake news around here as well. That story does not appear in my book however, 'cause I've tried to avoid anything fake, and besides, the terms under which I reached it demand solid reference. The book is in fact a product of a Ramsey Fellowship. Admiral Dewitt C. Ramsey was a WWII admiral who left a packet of money to the Smithsonian Air and Space for the purpose of fellowships. And individuals over the years have applied for these fellowships. If they get the fellowship, they get a stipend, but they're expected to do basic research on something to do with naval aviation. I was a selectee one year, and so I went to work. And after extensive research, I came up with a body of information upon which the book was built, specifically *Gear Up, Mishaps Down.* I would have preferred the title to be “The Evolution of Naval Aviation Safety”, but the publisher wanted to say *Gear Up, Mishaps Down*, and so since he was publishing the book I had to go along with that. Because it is indeed the story of the evolution of naval aviation safety. The years 1950 to 2000 as shown on the chart are significant for several reasons. I served and flew during most of those years--actually 1952 to 1989. One can see the dramatic improvement in safety in that chart, and the improvement and safety over those years was proportionately larger than before or after. At the end of the period, the navy, marine, coastguard rate was equal to the air force and nearing that of commercial aviation. By the way, a definition for you, for those who may not know, naval aviation includes navy, marine, and coast guard. Ship-based, land-based, single-engine, multi-engine, fixed wing, rotary wing, jet, and prop. But anyhow as a result of my research, I put together a book, which has a preface, an introduction, twelve chapters, appendices, sidebars, and graphics, all amounting to some 70,000 words. It tells the story of naval aviation safety in the last half of the 20th century and affords lessons learned not only for naval aviation, but for other enterprises as well. The book starts with a sea story about a Phantom 1, and early jet--a Phantom 1--crashing on a night carrier landing. But that's only to get your attention. Chapter two describes naval aviation in the early 1950s, a particularly bad time for several reasons. One was the carry-over of habits developed in WWII and before. Another carries through an old navy tradition that stems from the 19th century that the captain is always in charge and can do no wrong. I say the 19th century--remember that's when sailing ships went off for months at a time, and the only rule was the rule of the captain, and you didn’t argue with what he wanted you to do. And some of that carries through until--even until today. Although with the modern communications and Internet, it's diminishing. It also carries with the rule that commanding officer’s in charge, often optimized by the statement, "Don’t ask why, just do it because I said to do it." There was also the WWII environment, coming out of the WWII environment, and the onset of the Cold War, the threat of nuclear weapons, and air force and navy competition. Some of you may remember victory through air power, where the air force was going to do everything didn’t need the navy, and what was called the admirals revolt, where a group of admirals in the Pentagon revolted against the plans laid down by the secretary of defense. And even though distant, even though much of this took place elsewhere, those problems more were felt in the fleet. Leadership in the

fleet was spotty, likely the result of the fact the squadron commanders were assigned out of the Pentagon with lots of room for what we call cousin detailing. If you knew somebody, you could get the orders. If you didn't know somebody, you're out of luck. A sort of assignment by influence. And at the same time the tradition was that individual commanding officers and operations officers set the standard, and the standards were somewhat soft. One belief was that once you earned your wings, you were forever qualified. The other was a statement, show me how to start it and I'll fly it, or more often one would just read the book, take a blindfold cockpit, check out, and take out. I had two experiences which exemplify what happened. One was when I checked into my first squadron, the operations officer said, "Are you ready to fly?" What answer could a young pilot say but, "Yes, sir"? He says, "You take 406 and I'll take 402,"--this was out of Alameda, by the way--"and I'll meet you over the San Mateo Bridge at 5,000 feet." I said, "Oh, that's reasonable. I know where the San Mateo Bridge is." So I went, and I circled and circled and circled, and he never showed up, until I looked up in the sun, and there he was coming down at me, checking me out to see if I knew how to handle an attacking aircraft. No brief, just do it. Another bad experience I had happened a year later. I was flying on the skipper's wing for an operational readiness exercise in the Hawaiian area. We had--the ship was operating just south of Oahu, and we took off. Four airplanes--we took off, and after rendezvous, I was on the skipper's wing. We proceeded down, and we passed by, of course, Oahu, Molokai, and when we got towards Lanai, the leader--the skipper signaled--we were in radio silence--signaled to break up ready for attack. And I closed up on him as best I could and jiggled the plane up and down, went back and forth, and he was just flying--bump, bump, bump-- and finally I had to come up on the radio and say, "Skipper, wrong island." "Whoop." And so we went down to Kahului, which then was a target island, and dropped our ordinance. When we got back to the ready room, the operations officer, who had also been on the flight, pulled me aside and chewed me out. He said, "Why did you come up on the radio?" I said, "Well, I didn't want to bomb the wrong island." He said, "I wanted that SOB to bomb the wrong island." So that's the kind of leadership we had in those days. Things were bad. Beyond that uncertain leadership, maintenance was out of a little green book. And I have a quote from that, from one--little green book that you could put in your hip pocket, put notes in. A friend of mine gave me a quote that I want to read to you that's in the book. "In VA-85, we had a chief petty officer named Krupsky, a barrel-chested, sloop-shouldered, unusually energetic and dedicated man with a well worn green book he kept in his rear pocket and retrieved with frequency throughout the day as he ranged from the flight deck to the hangar deck in Ready Five. If something had happened to him or he lost that book, we'd be in deep trouble. Thankfully he never lost it." Supply was by what we call cumshaw, allegedly a Chinese word that you know somebody who could get something, or cruise box, by that the supply officer would fill a cruise box full of parts before the deployment began and try to keep the aircraft outfitted that way. Then came a call because of the possibility of a nuclear war and some other things, a call for more night and all-weather flying, but except for special squadrons, in reality it was only at twilight or under a full moon, because it ruined the movie on the hangar deck if you flew other times. Then we also had to transition to jets from props to jets, which was a difficult thing. The fleet had straight deck aircraft carriers, rather than the angle deck you see today, and catapults were operated by hydraulic systems rather than the steam systems you see today. The ops--the operations were constrained by the secretary of defense. Some of you may remember the name Louie Johnson, who was an anathema to the navy. But then came Korea, and it turned out that it was an aircraft carrier--actually two, an American aircraft carrier, the Valley Forge, and a British aircraft carrier that happened to be on station in the Far East, that came to the aid of the Americans and the South

Koreans that were being pushed south on the Korean peninsula. The air force couldn't do it because the air force station in Japan did not have the range on their airplanes. It took a while to get them built up, and it was a carrier force that went in first. Well, the reserves were recalled, ships were de-mothballed, and we expanded the pilot training raid, training more people. While all that was going on, the mishap rate climbed. In addition to that uncertain leadership, safety was almost an afterthought. There was only a small Pentagon office dealing with safety. Squadron safety officers were a collateral duty--that is, they did that in addition to something else--and usually a junior officer reporting to the operations officer. Beyond that, except for the training command, little or no standardization. The change in the commanding officer, the ops officer, meant change in the standard operating procedure in the squadron. The result that there were a lot of mishaps. Carrier crashes, low pullouts from dives, disappearances over water. One squadron, a small transport squadron, lost four aircraft in six months. A panther division--that's a straight-winged jet--was led by the division leader into a mountaintop in the clouds. Another ASW, anti-submarine warfare squadron, lost twenty-two of twenty-two aircraft in one six-month cruise. It was a bad time. Well, eventually things did change. The night and the all-weather and instrument operations got better but still were bad. The transition to jets and a plethora of new aircraft caused more problems. On the plus side, the aircraft carriers gained angled decks, courtesy of a British development. A mirror landing system instead of the LSO with his paddles. The advent of an angle-of-attack indicator, which showed how fast the aircraft was going in the cockpit, and in-flight refueling so that if you got low on fuel you could get more fuel while you were out on the mission. The--as for safety, there was indeed a small aviation safety effort in the Pentagon, but it was very small. They were limited to keeping records of accidents and NAVAIR, naval air systems command--called the Bureau of Aeronautics at the time--did put out some good publications called--which carried cartoons, which some of you may have seen. There's Grampaw Pettibone, Annie Mouse, and Dilbert. These cartoons were humorous, but they all delivered a lesson at the same time. And that was the good part of the safety effort. The CNO staff in the Pentagon, the flight safety branch was only six officers. All they did was to review accidents, kept files on pilots who'd had accidents, issued flight safety bulletins, and posters like those I'd just shown you. In 1951, that safety office, for reasons I was unable to ascertain, was moved from the Pentagon down to Norfolk. And that turned out with hindsight to be a step in the right direction, but at the time nobody knew that because the safety effort was still understaffed, and it was in Norfolk, and nobody in San Diego or Alameda or Jacksonville wanted to pay any attention to anybody who said anything coming out of Norfolk. That was a problem. But then in 1953 there were two major events. One was the safety center got a new officer in charge, a captain by the name of James Flatly. He was a WWII fighter ace, and he was the kind of guy that took no nonsense. The second thing that happened was there was a crash, a terrible crash, of an R4Q. There is a picture of an R4Q, a marine transport aircraft. The R4Q was carrying forty-two NROTC midshipmen from Corpus Christy to Norfolk, and it stopped at Whiting Field in Northwest Florida for fuel. And there was six aircrew on board. After takeoff the aircraft just flew into the ground, into the trees just out of Whiting Field, and forty of the forty-two ROTC midshipmen were killed and five of the six aircrew were killed. Flatley got hold of that. He was unhappy with the accident report that came in, turned over a lot of rocks, and stirred the Pentagon. He sent a sixty-four--the cause of the accident, by the way, was undetermined. This really got Flatley to working, and he sent a sixty-four-page letter to the CNO. This letter has since become known as the Flatley Report, an important thing in naval aviation safety history. And these were the results of the Flatley Report. Rather than me read those, I'll give you a second to read those over for yourself. *(Pause)* Parenthetically I'll point out to say that in

May of 1968, some years later, the aviation safety officer, safety activity was made a full command and expanded to include surface and submarine and shore safety at the same time. And today it does a good job, largely as result of what Jimmy Flatley got started back in 1953. As that effort was taking hold, new aircraft came on the scene. Not only jets, but helos and land-based planes too. New equipment came along--better radios, mentioned angle of attack, in-flight refueling, steam catapults, optical landing systems. All of that was good, but note that most of the new equipment had an effect on carrier flying, and some eighty percent of navy/marine/coastguard flying was not off carriers. Meanwhile a most important change was made in assignment of commanding officers, responsibility for selection, and assignment of the commanding officer was shifted from the Pentagon to the Bureau of Naval Personnel. Yes, occasionally a misfit was assigned, but more often it was an improvement. Cousin detailing went into the history bin, and commanding officer qualifications, expertise, began improving, and with that the rest of the people in the squadron besides. Close on the heels of that management revolution was the establishment of a different way of training to fly fleet aircraft. The step turned out to be second only importance to the establishment of the safety center with regards effecting naval aviation safety. Historically a pilot would go to a squadron, and if there's a new aircraft he would check out the new aircraft. There was no standard way. As I said before, it depended a lot on what the commanding officer or the operations officer said. Now there was a problem that came to the attention of the deputy chief of naval operations for air warfare in the Pentagon one day, talking about recovering the A-4 Skyhawk aboard aircraft carriers. It seems as though on the east coast the Skyhawk would land with its speed breaks in. On the west coast the Skyhawk would land with its speed breaks out. And so this three star admiral said, "Well, why is that? Why are they different?" And that little question started the ball rolling towards some sort of standardization, towards checking out a new aircraft, standardization to landing aboard carriers, and a thing called the replacement air group was formed. The--now, they called--there's a replacement air group at the time-- in a vernacular called RAG-- it's still called the RAG today, even though we don't have replacement air groups. We have replacement air wings. For some reason, the acronym RAW never came to be pronounced as raw. They’re stills Rags. The RAG not only standardized the way you learn to fly an aircraft, but they put all the aircraft of one type at one naval air station so that--or marine corps air station--so that you didn’t have to spread maintenance skills and supplies along around a number of different air stations. The use of simulators was enhanced, because you could put the simulators for one particular type of aircraft at that station. The way it worked was this. A pilot of naval flight officer reporting to the RAG would experience an entirely different process in checking out than the historical process. The first thing that would happen was that he would go through--he, now she, but at the time it was he--would go through an instruments school. Second, there would be a ground school in a classroom on procedures, and then he'd go through a simulator course. Only then after all that was finished would he undertake a carefully constructed familiarization flight, and that would be flown in a duel place aircraft if possible. Once the RAGs were in full operations safety improved and combat readiness improved. It got to be one of those things where we all asked, "Why didn’t we do this before?" A special case as far as aviation safety concerns aerospace medicine. Now aviation's had doctors associated with them ever since airplanes first began to fly. In fact in Britain you might be interested to know that the doctors there thought the best test of whether a man could fly an airplane was whether or not he could ride a horse. Well, that's not too different from what we did in the United States from time to time when we thought that somebody had to know how to fly an airplane--I mean, had to drive an automobile in order to fly an airplane. We learned that that wasn’t true when we began running up against North

Koreans and North Vietnamese who didn't know how to drive cars, but they could fly an airplane pretty well. The big saying now is, and after a lot of study is, that the doctor who flies best understands the pilot, and thus we came up with the flight surgeons. Flight surgeons are now integral parts of squadrons. If we don't have a flight surgeon in each squadron, we have one for at least one every other squadron. They fly regularly, they take part in the briefs, they know the pilots, the air crewman, they know the families, and they ensure that the aircrew and the families are physically fit and take care of them when they have a problem. They also do research. They do research in high-altitude flight, oxygen systems, anti-G systems, survival and escape systems, vertigo, cockpit design and instrument flight, and more. They participate in accident investigation. No investigation is complete unless you have a doctor participating. They do studies. Two of the most famous studies are the thousand-aviator study and the returned POW study. The thousand-aviator study began in 1940 when a thousand aviation candidates were selected, and they were followed through--some of them still followed through to this day--to see how they progressed physically. Returned POW study, as the name probably suggest, is to take some of those people who had been POWs in North Vietnam, take them to Pensacola once a year, give them a very thorough annual physical to see just how captivity has affected them. Springing out of the flight surgeon community was a size of human factors. Prior to the 1960s any mishap or near mishap was normally assigned to the pilot. The pilot screwed up, or maybe the maintenance guy screwed up. In fact prior to that time a saying that you might enjoy is, "Nothing could be fairer than to call it pilot error." Well, the flight surgeons and human factors acolytes got into this, and today human factors are used, are essential to design, maintenance, mishap prevention, and flight surgeons were first introduced to subject, often borrowing from academia and industry. The--then based largely on the work of--on that work, the safety center introduced a human error research and analysis program. Actually a model--and using that model mishap data were analyzed, root causes determined, lessons learned, and promulgated the fleet. Later two aviation psychologists developed what's called the Swiss cheese model. That categorizes human failures, it better enables root caused analysis, and it can be used in forming remedial actions. And that is used in training, material, procedures, maintenance, everything. Today human factors are addressed in every preflight brief and have been adopted by the air force, the airlines, and industry. Maintenance and supply: extremely important parts of aviation safety. In the 1950s, maintenance was done in the squadron backed up by a fleet-air support squadron, a shore, or a division of the ship when at sea. The enlisted people did go through schools for training, and the Bureau of Aeronautics had standards for manuals. Supply was at the naval air station or Marine Corps air station or the ship's supply department. Manuals were supplemented by the wheel book I read to you before and out of cruise boxes in what we called cumshaw. The advent of jets overwhelmed the system. In 1954 the Patuxent River inspections requirements branch established standardized check sheets. In 1950 a failure and unsatisfactory report was inaugurated. In 1954, the Perry Ward, the same Perry who instigated the RAG looked at personnel and set up a system for training, and not only training and assignment, but for specs and standards for parts. An admiral in Memphis named Fitzhugh Lee was the first one to instigate this in his command. By 1959 we had a comprehensive maintenance program, we had an aviation maintenance officer program. Prior to that there were no designated aviation maintenance officers. Some pilot who maybe had an interest or was senior enough was called the maintenance officer. Now we had designated aviation maintenance officers. They did not fly. They went through special schools and ran the maintenance departments in the squadrons. We incorporated maintenance training in the replacement air groups, and we installed a program called the naval aviation

maintenance program. That program was expanded and put on computers over the next few years, and later the shore-based intermediate maintenance activities were merged with the depots that form what today we call fleet readiness centers where they overhaul aircraft and support the fleet. The--turning to aircraft and aircraft systems and design safety, a big part of aviation safety, there's been a remarkable growth in reliability of aircraft engines, control systems, and hydraulics. A meteoric rise in the importance of avionics. A commensurate rise in operational capability and safety. And fewer acquisitions have contributed to increased safety. Take a look at this slide. Back in the 1950s the navy, Marine Corps acquired--flew first flights on twenty-eight aircraft. That number diminished over time, and look how the safety record parallels the diminishment of new types of aircraft introduced into the fleet. My next subject has to do with simulators and synthetic trainers. They've been around for a long time. In fact in WWI we have pictures of pilots sitting on sawhorses simulating the airplane and turning it and manipulating controls. In the 1930s we got the Link Trainer. Some of you have seen the Link Trainer, the little blue box that you fly around. There are more, better today, and simulators are wide spread use among the airlines, the air force and the navy. But the eternal balance in simulators is seeking the right balance. The right balance between simulator time and flight time. To a pilot, especially a navy or marine pilot, flight time is money in the bank. You ask any pilot how much flight time he has, and he's very proud to tell you almost down to the same hour, but simulator time doesn't count in that. Time in a box doesn't count; it's flight time that counts. Nevertheless simulators afford lower training costs. They do reduce the flight time necessary to check out an airplane. They can enable a unit to be safer, and they require fewer support aircraft and virtually no support aircraft. And you get more accurate grading if you're trying to grade somebody. As I said before, the unfortunate part is that simulator time does not count as flight time. There are not enough simulators to compete with aircraft for procurement dollars, and they fall short in practice of perceptual motor skills. The consensus on simulators is that they're good for initial familiarization and instrument training checks. They cannot substitute for flight time. Flight safety is clearly enhanced, but nobody has ever been able to determine how much. And a lack of fidelity with simulators continues to be a problem. In the 21st century we introduced three new concepts: crew resource management, which supports mission accomplishment through enhanced performance, operational risk management, which is the process of recognizing and mitigating risk, and a thing called culture workshops. I'm gonna come back to that in just a little bit and talk some more about it. In fact, I'll talk about it right now. The culture workshop is something that is fairly new and somehow sometimes difficult for those of us who aren't in it to really understand it. But if I can just read you something here please, along the topic of discussion of happy hours and ready rooms, many naval aviators had an idea that the very culture of naval aviation was somehow at the root of the inability to eliminate mishaps. The ace of the base and wannabe-mavericks like Tom Cruise in *Top Gun* exercised undue influence, especially on the younger aircrews. Thus the growing influence to begin an examination of culture, conscientious commanding officers assisted by human factors acolytes were the first to begin such examinations. Then on January 29, 1996, an F-14 Tomcat crashed into a residential neighborhood on departure form Nashville International Airport. Both crewman and three people on the ground were killed and three homes engulfed in flames. Directly relevant was that this was the fourth major mishap for that squadron in the preceding year. This mishap was so egregious and attracted so much publicity that Admiral Frank Kelso, the CNO, personally ordered the assistant chief of naval operations for air warfare to take action. In response they later turned to, among other avenues, the naval aviation human factors quality management board. The board, chartered to reduce human error flight mishap rate by

fifty percent by fiscal year 2000, looked in turn to the international guard, which had attributed their recent fifty percent decrease in mishaps to use of culture workshops, a process whereby the culture inside an organization can be quickly assessed based upon the international guard experience--the airborne adopted culture workshops as a tool to prevent mishaps. So going into the 21st century, we have crew resource management supporting a mission account spent through enhanced performance, operational risk management, the process of recognizing and mitigating risk, and culture workshops. So what--how do we wrap all of this up? The most important elements of success, I have listed on the board there: the Flatley report, RAGs, NATOPS, and the naval air maintenance plant, establishment of the safety center, revolution in personnel management, angled decks, steam cats, and the optical landing system. Second only to that, the naval aeromedical enterprise, including human factors, the flight surgeons and the human factors people. The transition to jets and the use of simulators. And very important but common to other aviation, system safety, aircraft design, improvements in aircraft and equipment systems. Too early to tell, or at least it was when I wrote this book is CRM, ORM, and culture workshops. Conclusions: the naval aviation safety since 1950 has been a tremendous success story. Lives and aircraft have been saved, readiness has moved to unprecedented levels, and naval aviation today is as safe as it's ever been, with no diminution on either capability or readiness. This book tells a story. There are appendices in the book, and you can see what they are there for your information. And thanks for listening.
1: Admiral, the Tailhook Association convention ended over the weekend. I caught the flag panel discussion a couple days ago, and they were talking about some of the ongoing issues with OBOGs and some of the crew retention problems. I was wondering if you could offer any insight as to how NAVAIR can deal kinda deal with those issues going forward.
Dunn: I'm sorry, I'm not hearing the question too well. What convention ended?
1: The Tailhook Convention in Reno ended over the weekend.
Dunn: Oh, Tailhook. It did, didn't it?
1: It did.
Dunn: I--I didn’t get to go to Tailhook. My wife wouldn’t let me go.
1: They had some safety concerns that the flag panel addressed, and I was wondering if you could talk about some of those.
Dunn: I have--I apologize. I was not there, and I don’t know the results of the convention, what was said. But you mentioned OBOGs is one thing, yeah. The OBOGs--the onboard oxygen generating system, OBOGs, which many of our airplanes have--has been deficient in recent years. Both the navy and the air force, marines have had trouble with OBOGs. The new F-35 fighter has trouble with its oxygen system. And there have been a lot of theories, a lot of investigations, but I’m not sure that there has been an answer yet. They’re flying airplanes under certain limitations, but what those limitations are I can't say right now, and I don't know where their investigation is. I apologize for not understanding the question.
1: That’s okay.
Dunn: Yes, sir?
2: Has the service navy started to look at some of the procedures that the naval aviation is using in terms of lowering the risk of ship collisions and accidents?
Dunn: The answer is yes. The--an investigative officer for those recent accidents—you’re probably referring to these recent accidents.
2: Yes.
Dunn: An investigating officer has been appointed, and one of the supporting agencies is the safety center in Norfolk, which has a surface directorate that will look into this. And

there are a lot of--I think a lot of things they ought to look into. Now this is an editorial from Vice Admiral Bob Dunn. It's not an official navy position. But I think that the surface navy could probably learn an awful lot if they would look more closely at aviation, because they have not gotten away from the fact that the commanding officer is not to be questioned. And I don't know where the commanding officers were on those particular accidents. So there's a lot of investigation to go on. Yes, sir.
3: This is a kind of broad question, but I was wondering what the role of technology was in improving aviation safety for the navy.
Dunn: Well, the role of technology was quite big. For example--I guess I didn't dwell on it enough--but start with the ships. Different kind of catapults, different kind of arresting gear, different kind of system for advising the aircraft whether it's on glide slope or glide path for a landing, and better catapults. But you go onto the aircraft themselves, the better instrumentation. Aircraft today--when I first started flying, you only flew in bad weather or at night to achieve your minimum requirement. But now flying at night and in bad weather is a routine affair. And they do that because they have better instruments, better facilities. So yes, technology has contributed an awful lot to that. Okay.
4: This isn't necessarily about specifically your book and naval aviation, but related to your own personal experiences, I wonder if you could talk a little bit about your experience in the Vietnam War as an aviator.
Dunn: (Chuckles)
4: And any anecdotes you want to share, even the one you shared with me backstage.
Dunn: Well I was-- my timing was such that I got a chance to be right in the middle of the Vietnam War. I made two cruises to the Gulf of Tonkin flying the A-4 Skyhawk, which was a small attack bomber. I was a squadron executive officer--that is the number two-person in a squadron--for one cruise, and I was a commanding officer in the second cruise. And I ended up--I flew 255 combat missions, of which only about five were in the South. The rest were in the North. And in the North is where we saw a lot of radar-guided antiaircraft artillery. Surface-to-air missiles. And it was an exciting time to be there. Fortunately I was able to survive and come back. In my squadron I lost one pilot--became a prisoner of war, and he was a prisoner of war from 1967 'til 1973 when they were released. Another episode that grates on me to this day--I was leading a strike against a petroleum facility near Haiphong, and the North Vietnamese began shooting some missiles. And we know they were going to be shooting missiles, because we had radar detection gear in the airplane. We could hear the radar actually detecting our aircraft. And we could hear the missile launch, because they had a different kind of sound when the missile launches. Then we could see the missiles. We had onboard equipment that was supposed to deflect the missiles, provide a false signal. That didn't always work, and so we jinked--we turned back and forth and went up and down. I saw this one--I saw two missiles come, and we turned away. And it came time to turn back. As I turned back, my wingman took a direct hit with a surface-to-air missile and just exploded. And he was gone. And those are the kinds of things you don't forget. The--I don't know what else to say about it. Yes?
5: You mentioned the F-35. In your opinion, are aircraft getting so complex that it might, well, worsen the safety risk?
Dunn: I'm told that it can be easily handled. But let me give you a story in response to your question. A couple of years ago--it must be three years ago now--a shipmate of mine who had retired and was working for Lockheed Martin in the Washington area invited me over to a place where they had an F-35 simulator. Offered me the chance to fly the F-35 simulator. It's an open cockpit simulator. So I had my friend on one side, and I had a guy who knew what he was doing on the other side. And I took off the air--took off the simulator, climbed to altitude, came back down, made a vertical landing like you

can do in the F-35B. Couple other things, then came around to make a carrier landing, and I made the carrier landing. And everything went well. But in front of me was all these gauges and all these handles and all these buttons and all these screens. I mean, there maybe I think three to five (48) cathode ray tubes where you can call up different pages plus the side stick controller with about nine buttons. You got a--I guess that's on this side. Then you got a throttle with about nine buttons. So I said to the guy--he said, "Admiral, how did you like it?" "I said, "Well, I liked it fine, but how long does it take to learn to fly this thing?" He says, "Well, we get these midshipmen over here from the naval academy, and they get it like that. But for you, admiral, it would take a while." Okay.

5: I have another question. This one's from online. What kind of planes did you fly, and what do you believe is still a blind spot in naval aviation safety?

Dunn: Well, first of all, the planes I flew--I started out, went through flight training in a thing called the SNJ. The air force called it the T-6, a single-engine prop airplane. And then I went through advanced training, and my first fleet squadron was the AD Skyraider, a big single-engine aircraft, attack aircraft. Then I flew the A4 Skyhawk I told you about. Then later on when I got to be more senior, I got to be an air wing commander, I could fly anything in air wing, so I flew the F4 Phantom and the F14 Tomcat, the A6 Intruder. And I was very fortunate that I had a job in the Pentagon just as I retired, and at age sixty--and I did, I went through all the proper wickets and everything--at age sixty I went out, and I flew the F-18 and carrier qualified in the F/A-18. So that was my graduation exercise. What glaring hole do we have in aviation safety today? I think right now the biggest problem is the people who are flying are not getting enough money for flying hours. They don't have enough fuel to fly. They fly enough when they're off on deployment on a cruise in the Far East or the Persian Gulf, something like that. But when they come home they're relegated to four hours or less a month, and that's not enough time to keep up proficiency in a high-performance aircraft. That's probably the biggest problem we have right now. The--yes, sir.

3: Sorry, it's me again. I was just wondering as a squadron commander, how do you--kind of a vague question again--but how do you keep your people under you motivated despite all the problems?

Dunn: How do you keep them motivated?

3: Yeah, just like--

Dunn: Same as any other leadership position. You try to let them know what the job is, be sure they have the training for the job, and then cheer them on. Those are the three basic principles of leadership that I would follow, and they seem to work pretty well. You gotta keep it simple. You can't--I wouldn't got into a leadership book and try to extract lessons, although you might be able to get those same lessons out of a leadership book. And maybe you've had someone here talking about leadership. I don't now, but that's my quick answer.

5: You talked about how this--your research for this book was related to fellowship.

Dunn: Right.

5: But what inspired you to write this specific topic? And then also what are some of your other favorite books on either military history or naval aviation that you could recommend?

Dunn: What are my favorites? The--well, I had the right credentials to write a book on safety, having been a--gone through the US sea school, been a squadron safety officer, and commanded the safety center. And it was something that had not been written about, and I saw a need to develop the history of that. So I think that's the best I can do on that. The--I'm a reader, so it's hard for me to say what my favorite book is. I would say that a book that may no longer be in print, I don't know. It was Morison's history of

WWII, really kept me going. I like all kinds of history books. Churchill's history, the four-volume series, is quite good. And I can't remember--this is terrible. I can't remember what I have just read most recently, but I keep reading all the time.
5: Any other questions?
Dunn: Well thank you all for your attention.
(Applause)
Clarke: Thank you to Vice Admiral Dunn for a fascinating discussion and to the United States Naval Institute for sponsoring this program. The book is *Gear Up, Mishaps Down: The Evolution of Naval Aviation Safety, 1950-2000*, published by the Naval Institute Press. To learn more about the United States Naval Institute, visit USNI.org. To learn more about the Pritzker Military Museum and Library, visit in person or online at PritzkerMilitary.org. Thank you, and please join us next time on *Pritzker Military Presents*.
Voiceover: Visit the Pritzker Military Museum and Library in downtown Chicago. Explore original exhibits on military history, or be a part of a live studio audience. Watch other episodes of *Pritzker Military Presents*; find out What's On at PritzkerMilitary.org.
(Theme music)
Voiceover: *Pritzker Military Presents* is made possible by members of the Pritzker Military Museum and Library and its sponsors. The views and opinions expressed in this program are not necessarily those of the Museum and Library.
(Theme music)
Voiceover: The preceding program was produced by the Pritzker Military Museum and Library.