Commander Daniel Orchard-Hays

I am going to spend a few minutes talking about things that we are doing in the fleet today. Obviously, in the current fiscal environment, one of the things we have been asked to do at the fleet

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Commander Daniel Orchard-Hays grew up in Silver Spring, Maryland. He is a 1995 graduate of Rensselaer Polytechnic Institute (RPI) in Troy, New York, where he was commissioned through the Naval Reserve Officers Training Corps. He earned his Naval Flight Officer wings in 1996 in Pensacola, Florida. After completion of F-14D training with the VF-101 Grim Reapers in Oceana, Virginia, he was assigned as a Radar Intercept Officer (RIO) to the VF-31 Tomcatters onboard USS* Abraham Lincoln. *He then transitioned to the F/A-18F Super Hornet in Lemoore, California, where he was assigned as a Weapon System Officer (WSO) instructor with the VFA-122 Flying Eagles. During this tour, he was selected to attend TOPGUN and served briefly as the Assistant Forward Air Controller (Airborne) instructor at Strike Fighter Weapons School Pacific. Commander Orchard-Hays's next sea tour was as the WSO Training Officer with the VFA-2 Bounty Hunters onboard USS* Abraham Lincoln *during their first deployment in the F/A-18F. He then spent a year at the Army Command and General Staff College in Leavenworth, Kansas, before completing his Department Head tour with the VFA-32 Swordsmen onboard USS* Harry S. Truman. *He is currently assigned as the VFA and Non-Combat Expenditure Allocation (NCEA) Readiness Officer to the Commander of Naval Air Force Atlantic in Norfolk, Virginia. During his operational tours, Commander Orchard-Hays has deployed four times in support of Operation Southern Watch, Operation Iraqi Freedom, and Operation Unified Assistance. His awards include the Air Medal (Strike Flight), the Navy Commendation Medal, the Joint Service Achievement Medal, the Navy Achievement Medal, and various other service awards. Commander Orchard-Hays has a B.S. in aeronautical engineering (space concentration) from RPI and a master of business administration degree from Webster University.

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level is to look at how we are operating to see if there are some places where we can become very efficient.

Based on that, there are three things in particular that I want to talk about today: SMART tanking, cold (truck) refueling, and simulation. Since you are going to hear a lot more about simulation from Commander Scott Fuller, I will limit myself to providing the fleet perspective. Then, I will identify some additional things that we may be able to look at.

Many of you are no doubt aware that naval aviation is currently undergoing a major recapitalization effort; as one of the results of that, we have gotten rid of some of our older legacy aircraft. The S-3 that Captain Randall Lynch flew is gone. That was our primary refueling aircraft for the last 10 or 15 years; now we rely on the F/A-18E/F Super Hornet for that mission. The photo in the upper right of Figure 1 shows a Super Hornet refueling another Super Hornet. The advantage of the Super Hornet is that it can carry more fuel than the S-3. Unfortunately, it burns a lot more as well. So when we first transitioned about 6 or 7 years ago, we basically stuck with the same operational model we had used with the S-3s, which is you launch a tanker aircraft any time you have airplanes flying. You leave that guy out there burning; he burns a lot of his gas in the process, and then you hope he has enough fuel left to refill inbound aircraft and then get back on deck.

There are some disadvantages to that. Obviously you are burning fuel, but you also have to put on a lot of fuel tanks to do that. Although you cannot see it in the top picture, the refueling aircraft is carrying five fuel tanks—four externals and an Aerial Refueling Store (ARS) pod. Even when empty, those tanks add weight to the aircraft. Thus, when an aircraft is carrying them, it is likely that the pilot will have to get rid of any excess fuel in his plane when he recovers to ensure that the overall aircraft weight remains below the carrier's recovery limit.

As part of the effort, Carrier Air Wing 5, operating out of Japan, started looking at ways to be more efficient. In particular, their effort was focused on making Hornet pilots more efficient. Then, about 2 years ago, Carrier Air Wing 7 proposed an approach that

we call SMART—that stands for Short-Cycle Mission and Recovery Tanking. We had to come up with an acronym; otherwise, we would not be able to remember it!

Essentially what we do is reduce airborne gas. One of the risks you accept is you do not have to have a tanker airborne all the time. I will not go into all the operational details, nor will I say that we are doing this wholesale, because we are not. There are still times when you need to have a five wet, as we call it, tanker airborne. But in the bottom picture in Figure 1 you can see a Super Hornet refueling off of another F/A-18 equipped solely with an ARS; it is carrying no other external tanks. That approach offers a number of operational advantages, of which the most significant is that by dropping all those fuel tanks the pilot can bring more internal weight back to the ship and thereby reduce the amount of fuel that must be dumped before he recovers.

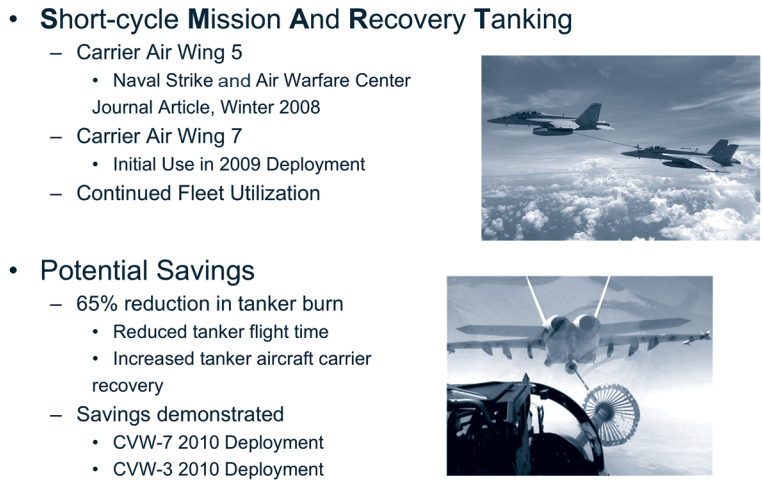

Figure 1. SMART Tanking

As it turns out, about 10% of our cost of doing business on the carrier is refueling. So if we can reduce that, which we can, we can save some money. We have found that we can get a 65% reduction in the tanker fuel burned by going to SMART. While we cannot use the SMART approach all of the time, there are significant portions of deployment where you can. And by doing so, we

can reduce the fuel burned by our tankers by 65%. That translates roughly to a low single-digit percent increase in our operational efficiency. We also benefit by not having to bring as much fuel to re-supply the carrier, and we can use the fuel that we have saved for other missions.

Air Wing 3 has always utilized this practice, and we have had portions of other air wings that have tried this and are moving toward utilizing this approach over the long-term. There are some cultural challenges to overcome, primarily from senior leadership because you have to make risk decisions on how often you are going to have the aircraft airborne with or without fuel available.

The second initiative for improving efficiency looks at how we do truck refueling at major training installations like Naval Air Station Lemoore. For those of you who are not familiar with that base, the airfield was actually laid out very well. Offset runways enable pilots to minimize their taxi time both for takeoff and recovery, so they burn a lot less fuel.

On the other hand, they have laid hot pit refueling sites at the throat of every taxiway coming back to the ramp. What that means is that when an aircraft lands, it goes into the hot pit, and a fuel hose is hooked up while the jet is turning. After fuel is pumped, the plane is taxied back to the line. The idea behind this approach was that it reduced the need to use fuel trucks. With fewer trucks, the argument went, you need fewer drivers and you could save some money. Unfortunately, the cost of fuel has increased substantially since this approach was first devised.

In 2006, staff at Lemoore decided to look at the cost of doing this in the face of higher fuel costs. They discovered that the aircraft burns about 70 gallons of fuel during a "hot" refueling cycle. To put that in perspective, the jet burns about 2000 gallons on a typical sortie, so about 3% of that (70/2000 × 100%) is lost while sitting in the hot pit for 18–20 minutes while refueling.

There are a number of ways to deal with this. Pilots could obviously just shut down their aircraft when they pull into the pits (Figure 2). But the pilots would not have anything to do at that point, so they would hop out and you would have to get the maintenance

folks to tow the aircraft back to the line. After trying that for a while, we realized that it would probably be smarter just to buy more fuel trucks. In FY2006—a time when aviation fuel cost a mere 93 cents per gallon—the Navy saved $1.3 million at Lemoore by adding more trucks. To gain that savings, they added 1000 additional cold truck refueling evolutions and eliminated 1000 hot pit refuelings. Today, JP-5 costs $3.06 per gallon.

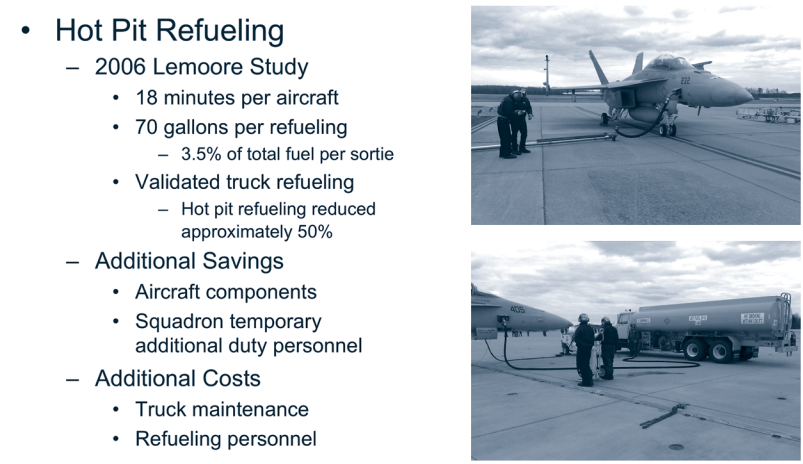

Figure 2. Cold (Truck) Refueling

The Navy has the same challenges at Naval Air Station Oceana, where we are looking at ways to possibly buy more fuel trucks so that our squadrons do not have to spend as much time running our engines. While it is probably not a substantial amount of time, our naval aviators could use the 20 minutes of time that they now spend sitting in the jet while it is being refueled to do something more important, like debriefing a student pilot. Obviously, this should not be the primary driver of why we are doing this, but it is an added benefit. When aircrew get in the airplane, they want to fly. They do not want to just sit on the deck.

As I said, I am not going to spend a whole time on simulation because Commander Fuller is going to cover it in detail, but I do want to describe how the fleet looks at simulation. Recently, we have been under a lot of pressure to move a larger portion of

our overall training curriculum into simulators. In Figure 3 I have listed some of the topics where we currently rely heavily on simulator training. The simulator is excellent for emergency procedures and flight preparation and great for tactical repetition and mission rehearsal, and that is primarily what we use it for.

Figure 3. Simulation

One of the things that we have been trying to accomplish for at least 10 years is to figure out a way to move more of our training and readiness program into our simulators. We have had limited success doing that. We need to find the right balance between training in the aircraft and training in simulators. It is clear that our aircrews need to fly the airplane to learn some tasks. It is also clear that you can do some training in a simulator to help prepare you to actually fly your mission. The question we have not answered—and it has been asked of us—is: what is the right mix of time in the airplane and time in the simulator?

We are currently working with CNA to see whether we can identify appropriate metrics for determining the right way to determine whether reducing flight hours by X and replacing them with Y simulator hours will allow us to maintain the same capability. From the fleet's perspective, before we cut flight hours, we have to have some sort of methodology to determine whether our

aviators, who will be receiving more simulator time and less flight time, will be as competent in the airplane as those who receive more flight time.

Some of the other energy efficiency initiatives that we are looking at are identified in Figure 4. Let me begin with fueling and defueling practices at our fields. We have found that on some of our missions, we do not need all the gas that the jet can carry. Taking advantage of that, however, requires some planning. We do not necessarily know exactly which airplane we are going to be using; sometimes an aircraft that we had planned on using is down for maintenance, and sometimes something fails before we take off. So, it is not going to be as simple as just putting in the gas that you need for the mission.

- Fueling/Defueling Practices
  - FCLP
  - Tanking
  - Maintenance
- Mission Planning
  - Extended Training Flights
  - RVSM Certification
- External Stores Carriage
  - Minimize to Mission Essential
- Maintenance
  - Ground Support Equipment

Figure 4. Additional Potential Initiatives

One of the training evolutions where we know we need less fuel is when we are just practicing landings, or what we call Field Carrier Landing Practice (FCLP). In other instances, we may have five fuel tanks on a jet, but we do not need fuel in all of them. We need to find the balance between totally filling up the jet and only partially filling it.

The last topic that I will discuss under fueling practices is maintenance. Occasionally we need the airplane to have as little gas as possible on board so that our maintenance crews can work on it, particularly when they are working on the fuel tanks.

As for mission planning, the Super Hornet recently received certification for Reduced Vertical Separation Minimum (RVSM), which allows us to fly that aircraft at altitudes above 29,000 feet over the United States. As a result, we are able to better optimize fuel use during cross-country flights, particularly when we are moving airplanes from one side of the country to the other. We are also looking at ways to plan our flights better so that we optimize fuel use.

In the case of external stores, we have a lot of training flights where we put fuel tanks on our jets. The problem is when you put tanks on the jet, you create a lot of drag. If you have to go back and forth across country, you end up burning a lot of additional fuel. So, we are trying to make sure that we spread out our resources and truck them back and forth as opposed to putting them on the airplane and burning extra gas to haul a training missile or fuel tank from one place to another.

Finally, we have discovered that some of our other aircraft platforms were not designed with all of the features of the F/A-18. The Hornet has minimum startup and shutdown time on the ground, and there is no need to run the auxiliary power unit (APU) to do maintenance. Some of our other platforms were not designed that way, and they have to run the APU to do maintenance. They are both burning fuel and wearing out important parts. So we are trying to make sure we have sufficient ground support equipment to be able to do maintenance on our aircraft without requiring that they use an APU.