## Mr. Howard Fireman

As the Executive Secretary of the Resources and Requirements Review Board (R3B), I am part of the process police that Rear Admiral Joe Carnevale mentioned in this presentation. The good news, from my perspective, is that I get to see everything—ships,

***Mr. Howard Fireman assumed his current position as the Deputy Director of the Navy Programming Division on the Chief of Naval Operations (CNO) staff in 2009. He also serves as the Executive Secretary for the Resources and Requirements Review Board. Previously, Mr. Fireman was the senior civilian responsible for Surface Ship Design and Systems Engineering at the Naval Sea Systems Command, where he was also appointed as Chief Systems Engineer for Ships and as the Deputy Warranting Officer. During this time he served as the NATO Chairman for Ship Design and Mobility and was Technical Project Officer. In 2001, Mr. Fireman served as the Special Assistant for Science and Technology to the CNO Executive Panel until he became a member of Senior Executive Service for the Naval Sea System Command and worked as the Director for the In-Service Submarine Programs. He was selected as the Science and Technology Advisor for the Commander of Seventh Fleet and worked aboard USS* **Blue Ridge** *in Yokosuka, Japan, from 1999 until 2001. He was Seventh Fleet's Chief Technology Officer. In 1994, Mr. Fireman was selected as the Acquisition Program Manager for the San Antonio (LPD17) Program. Mr. Fireman has B.S.E. and M.S.E. degrees in naval architecture and marine engineering from the University of Michigan. In 1993, he earned his M.S. degree in technical management from The Johns Hopkins University. Mr. Fireman's awards include the University of Michigan Department of Naval Architecture and Marine Engineering Rosenblatt-Michigan Alumni Award (2010) and Bill Zimmie Award (2008), the American Society of Naval Engineers Gold Medal (2006), the Meritorious Presidential Rank Award, two Navy Superior Civilian Service Awards, the Navy Meritorious Civilian Service Award, and the Department of the Navy Competition and Procurement Excellence Award.***

airplanes, unmanned systems, information technology. It is a good place to be.

One of the things that the R3B does is serve as the gatekeeper. The R3B reviews Key Performance Parameters. We also review Key System Attributes, the guidance for analyses of alternatives (AoAs), and the Initial Capabilities Documents (ICDs). We just did exactly that in a series of 10 R3Bs looking across the whole set of Navy programs in support of the Navy Program Objective Memorandum (POM) being developed for FY2013.

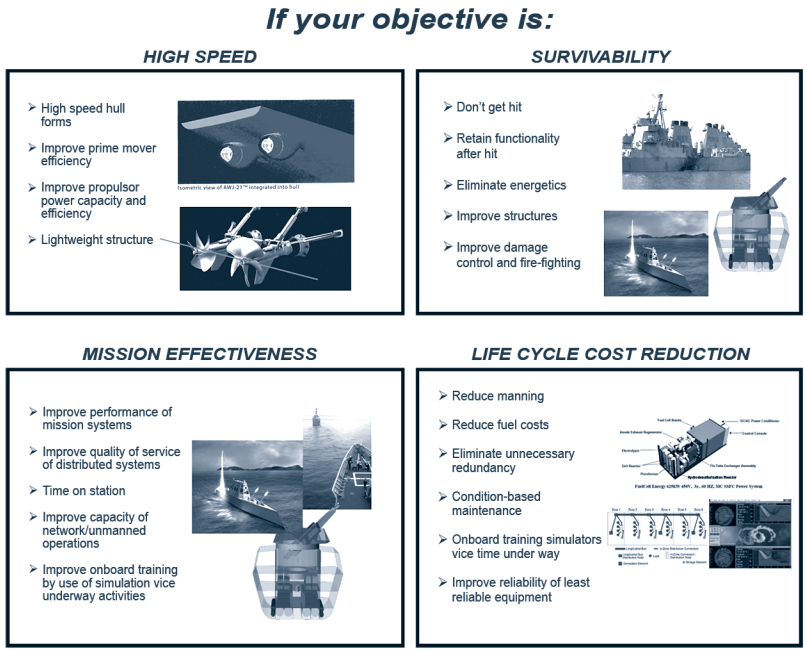


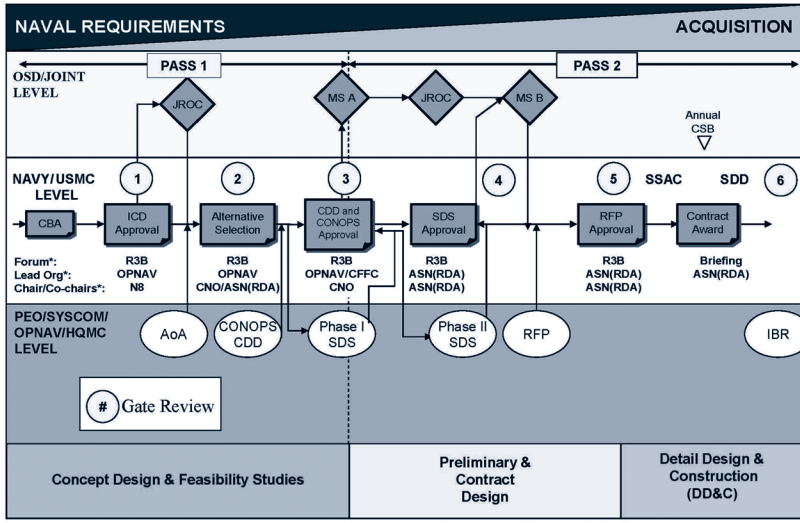

**Figure 1. Alternative Design Objectives**

As Rear Admiral Carnevale mentioned, it is about getting the requirement right. So, we have to ask first, what is our objective (Figure 1)? Do we want to go fast? Do we want to survive? What is it that we want? What is important to the Navy? Based on what we want, we see different things that are potential options. Each of these will result in different shipboard architectures and subsystem designs and components. Then if you want to have effectiveness,

you have to address onboard training, use of simulations, time on station, and ultimately the size of your fuel tank. If life cycle is the objective, then there is another set of parameters we need to look at.

As one of my old bosses used to say, a problem well defined is a problem half answered. A lot of things that used to fall out the tail end are what we do up front. So, we insist on putting the analytical piece up front and making sure that we have the appropriate tools to do that. I am okay with putting money in the development of the analytical tools we need.

To reiterate, we need to start by identifying our objective. Once we have that, we get into the process of specifications and having the design done before we start building it. We have to figure things out early so that we can determine precisely what the requirements mean. We have to have good analysis done up front using the right tools so that the decision makers can make the right call. If we have done all that correctly, the process should get easier, and then 20 years from now, no one will be disappointed with what comes out the other end.




OSD, Office of the Secretary of Defense; ASN(RDA), Assistant Secretary of the Navy-Research Development Acquisition; JROC, Joint Requirements Oversight Council; USMC, United States Marine Corps; CNO, Chief of Naval Operations; CFFC, Commander, Fleet Forces Command; RFP, Request for Proposal; SYSCOM, Systems Command; HQMC, Headquarters Marine Corps; MS A, Milestone A; MS B, Milestone B; CSB, Configuration Steering Board; IBR, Integrated Baseline Review; SSAC, Source Selection Advisory Council; PEO, Program Executive Office.

**Figure 2.** SECNAVINST 5000.2D [1]

The formal process we use in the Navy is laid out in Secretary of the Navy Instruction (SECNAVINST) 5000.2D (Figure 2), which was signed out by Dr. Donald Winter in 2008. [1] The process lays out six different gates that we go through, and they are very, very important. Where Office of the Chief of Naval Operations (OPNAV) gets to play pretty heavily in the process is in gates 1, 2, and 3. Those gates focus primarily on capabilities and requirements; thus, they address the Capability Development Document (CDD) and the system concept of operations (CONOPS). The R3B sessions for gates 1, 2, and 3 are typically chaired by my boss, Vice Admiral John Terence Blake, the N8.

Following gate 3, we get into engineering and architecture development and what we call the System Design Specification (SDS), which you see next to gate 4. That is where the analysis falls out, and that is how architectures are developed. We have to make certain that the SDS has the right systems and components in it, because we are essentially locking in significant parts of the design for a very long time. It is important to get it right early in the preliminary design stage. The Honorable Sean Stackley, Assistant Secretary of the Navy for Research, Development and Acquisition, chairs gates 4, 5, and 6.

One of the key elements prior to gate 1 is the capability based assessment (CBA); I will talk a little bit more about that shortly when I address some of the likely climate impacts on ship design. During the CBA, we try to open the aperture and see where we are headed. A CBA, for example, could tell us that we need to invest in science and technology (S&T) before we start thinking about building some key subsystem or component. We have to know that early before we even get to what gap we have or whatever system we want to fuel because the Office of Naval Research may need a 5-year head start.

The linkage between what we want to do and the capabilities based assessment should be a stimulator of the S&T process as well as to the acquisition process. If a key system or component is not at the technology readiness level (TRL)—if it is not mature enough—forget everything after gate 3 because it is never going to get on the program. It is too late for whatever it is to ride that bus. So getting

things in line among S&T, acquisition, engineering, requirements, and capabilities is very, very important.

Now let us get into energy (Figure 3). It is all about questions like what is the ship supposed to do, what is its mission, what is the CONOPS, what is the operating tempo, how much time is spent steaming, how much time is spent in the threat environment, and what radar resources do you need? So you have to worry about mission profile and operating tempo. While the design process is obviously complex, if you get it figured up front, what comes out the other end should not be a surprise and will probably meet expectations.

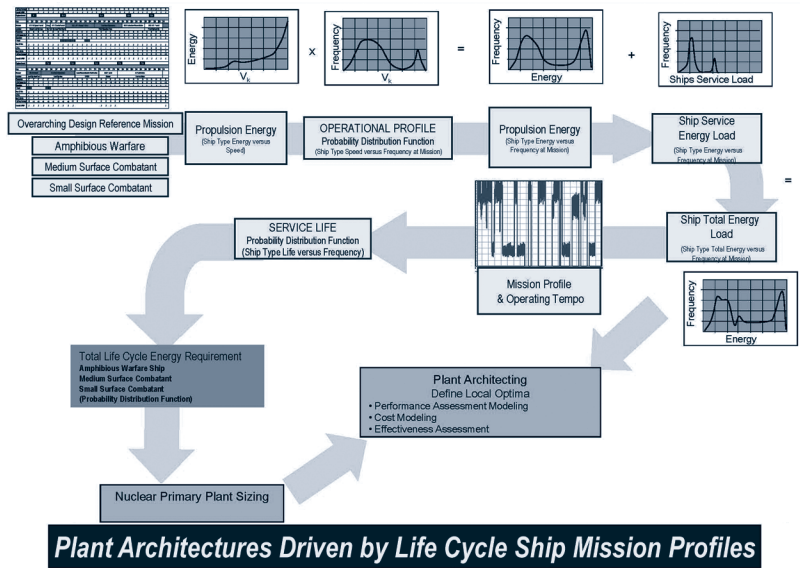
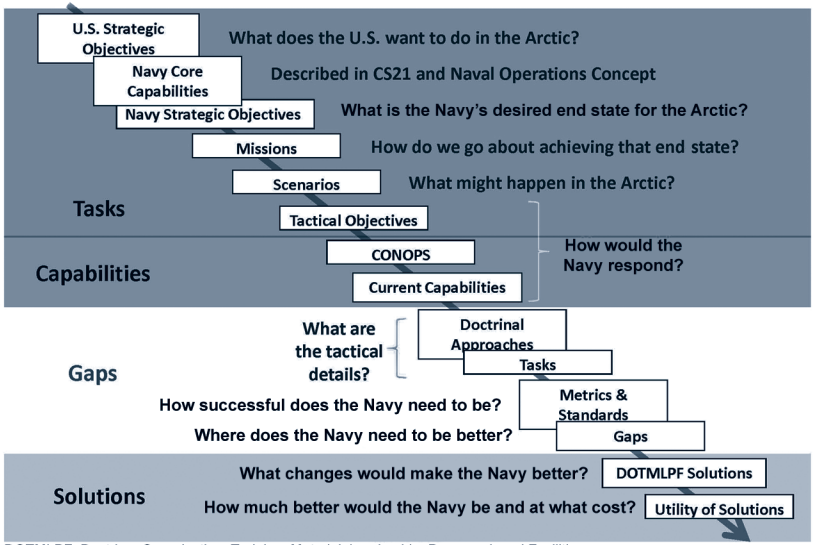



**Figure 3. Energy Requirements**

As I indicated, the overall ship architecture will be driven by the specific problem we are trying to solve. That will lead to the requirements and then to the specifications and components. We will also need the appropriate linkages to S&T investment to ensure that we can meet all those requirements. We will invariably want to have the most efficient system, use the least volume, and have the least displacement. And, we will need to remember that as the ship gets heavier, we have to push it through the water, and the

faster we want to go, the more energy we need. As you can see, we have a very complex system of systems problem.

Now let me turn briefly to the impact of climate on ship operations. As you may know, we have developed an Arctic Roadmap to help us get our pieces up front (Figure 4). [2] One of the key elements of that roadmap is a capabilities based assessment, which I think you will hear more about in Rear Admiral David Titley's presentation. The CBA will describe what we are trying to do, which will then lead into our gap analysis—our assessment of whether our current systems meet requirements or whether we need new widgets. Eventually the roadmap will get us down to the solutions that we require. But, everyone has to be on board, and I guess there are a lot of boxes, and yes, there is a lot of complexity. But again, if we are going to invest billions of dollars, we really do need to get the right type of analysis up front and early.




DOTMLPF, Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities.

**Figure 4. Arctic Roadmap**

We also need to focus on identifying the knee in the curve of cost versus capability. And to do that, we have to have the right tools. I bet if I were to ask each of you to give me a definition of total ownership cost, I would get 15 or 20 different definitions,

maybe even more. So, we have to make sure we have defined things properly and that we are accounting for all of the appropriate costs.

## REFERENCES

1. The Secretary of the Navy, *SECNAV Instruction 5000.2D*, 2008, **http://doni.daps.dla.mil/directives/05000 general management security and safety services/05-00 general admin and management support/5000.2d.pdf**.
2. Department of the Navy, *Navy Arctic Roadmap*, 10 Nov 2009, **http://www.navy.mil/navydata/documents/USN_artic_roadmap.pdf**.